4.13 HYDROLOGY AND WATER QUALITY

4.13.1 INTRODUCTION

This section addresses potential hydrologic effects related to drainage and water quality within the Amoruso Ranch Specific Plan (ARSP or Proposed Project) Area (project site). Project site characteristics such as regional and local drainage conditions, flooding conditions, and surface and groundwater quality are described.

Reference materials include, in part, the following:

- *Amoruso Ranch Specific Plan Area Drainage Master Plan*, Kimley-Horn, February 2016 (Kimley-Horn, 2016a; included as **Appendix I**)
- *City of Roseville General Plan 2025*, as amended June 2015 (City of Roseville, 2015a)
- *Creekview Specific Plan Final EIR*, April 2011 (City of Roseville, 2011a)
- *Final EIR for the City of Roseville Retention Basin Project*, January 10, 2003 (City of Roseville, 2003)

These documents listed above are available for review during normal business hours (Monday through Friday 8 a.m. to 5 p.m.) at:

City of Roseville Permit Center
311 Vernon Street
Roseville, CA 95678

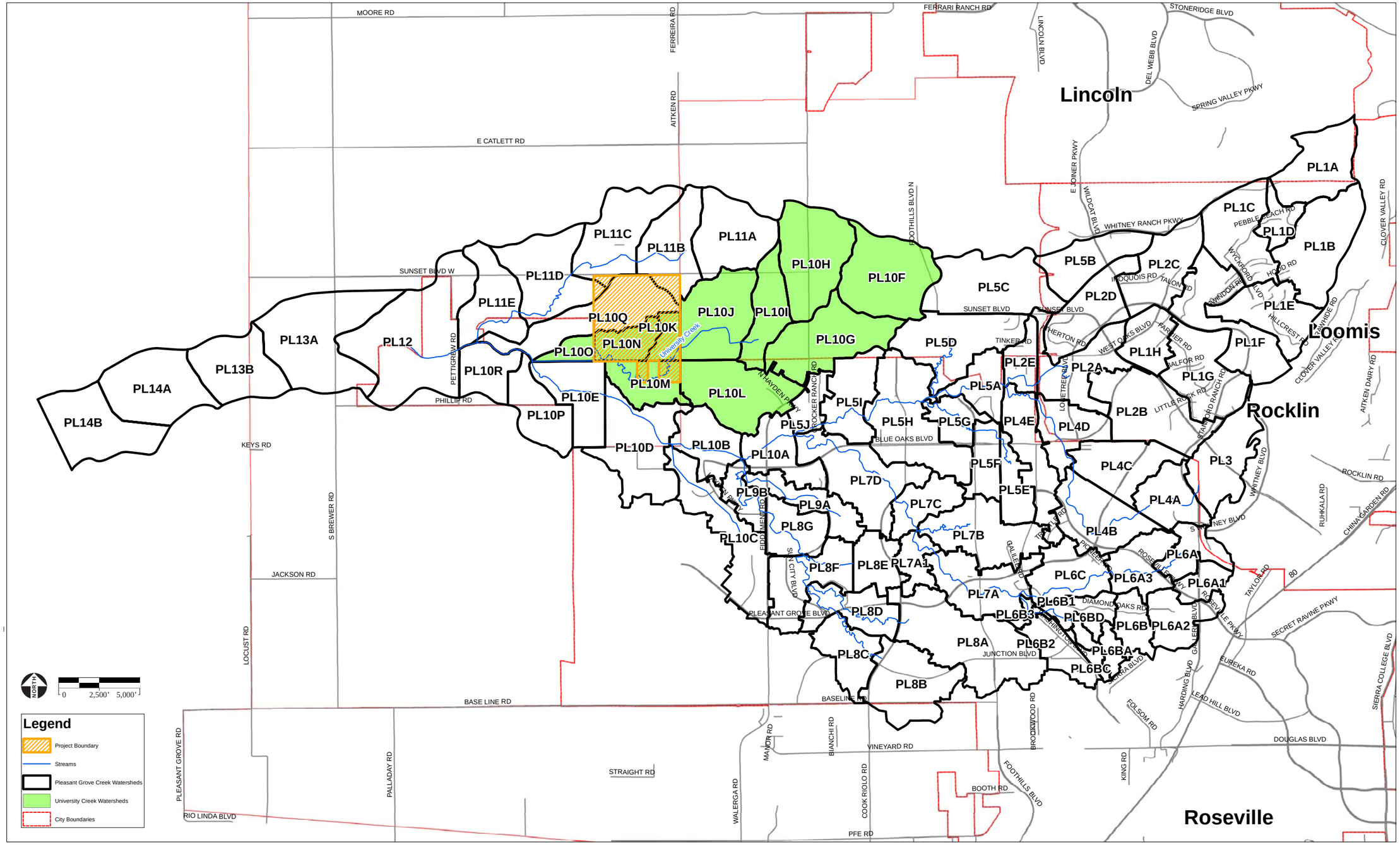
Three comment letters related to hydrology and water quality were received in response to the Notice of Preparation (NOP). The letters were submitted by the County of Sacramento Department of Water Resources, Placer County Flood Control and Water Conservation District (PCFCWCD), and Toad Hill Ranches, and provided concerns regarding existing drainage, flooding, and potential downstream changes and effects resulting from the Proposed Project. See **Appendix C** for a copy of the NOP and comments received in response to the NOP. Existing conditions are described in **Section 4.13.2** and potential impacts will be addressed in **Section 4.13.4**, below.

4.13.2 ENVIRONMENTAL SETTING

Regional Surface Water Hydrology

The 694.4-acre project site is located wholly within the Pleasant Grove Creek watershed. The Pleasant Grove Creek watershed totals approximately 400,000 acres and slopes from east to west as shown in **Figure 4.13-1**. The elevation in the upper watershed is approximately 120 feet, decreasing to approximately 45 feet in Sutter County.

The vast majority of the project site flows into University Creek located on the southerly boundary of the site. University Creek is a 3,477 acre watershed tributary to Pleasant Grove Creek, which drains to the Natomas Cross Canal via the Pleasant Grove Canal, which conveys drainage from both Placer and



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-1
Pleasant Grove Creek Watershed

Sutter counties. Stormwater drains into the Sacramento River just south of its confluence with the Feather River, approximately 14 miles west of the City of Roseville. Other watersheds that drain into the Natomas Cross Canal are: Coon Creek, Curry Creek, Auburn Ravine, and Markham Ravine.

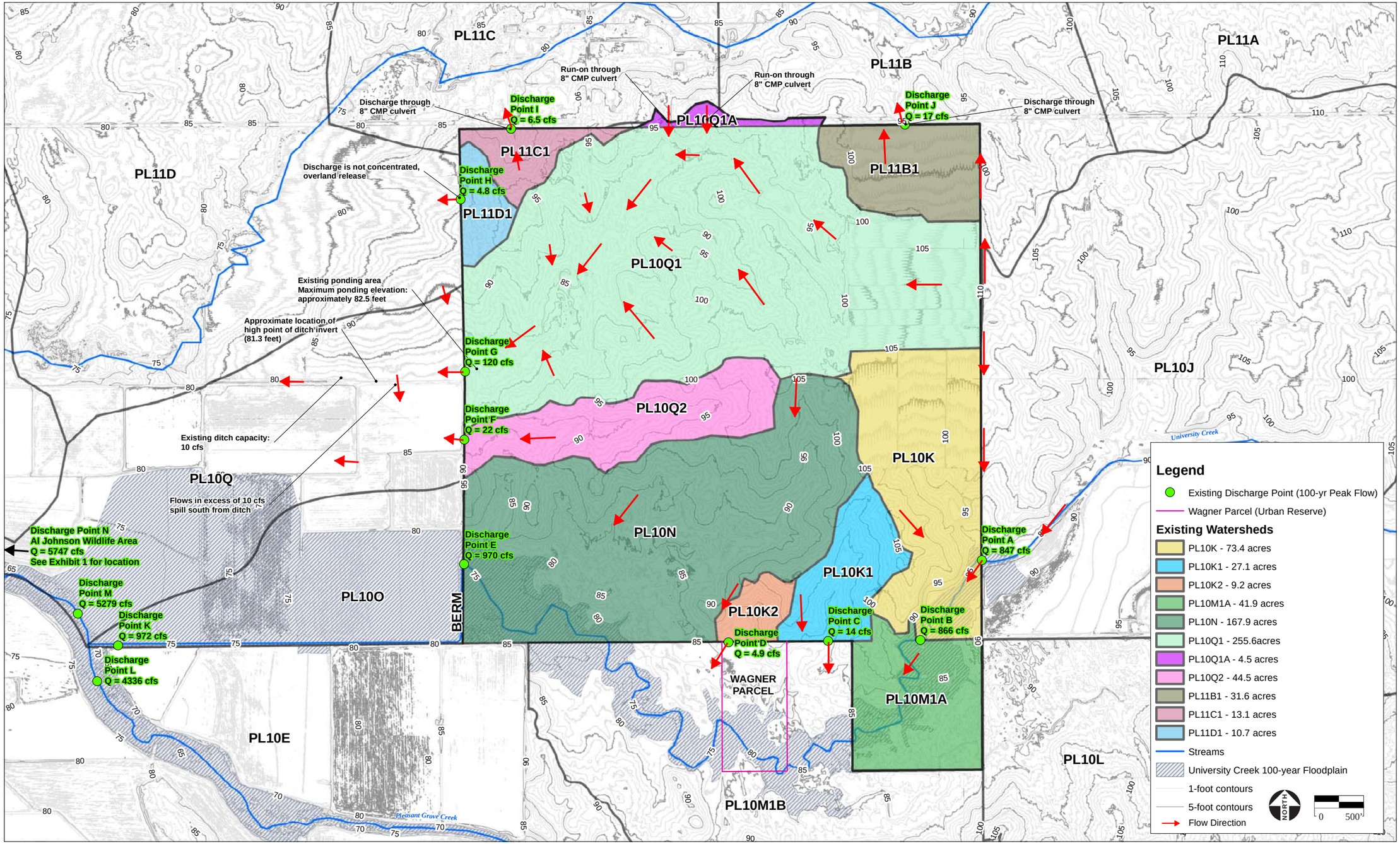
The Natomas Cross Canal watershed is within the Sacramento River Basin. The Sacramento River Basin covers approximately 26,500 square miles and is bounded by the Sierra Nevada Mountains to the east, the Coast Ranges to the west, the Cascade Range and Trinity Mountains to the north, and the Delta-Central Sierra area to the south. The Sacramento River is the principal river in the basin. The principal tributaries to the Sacramento River are the Pit and McCloud Rivers, which join the Sacramento River from the north, and the Feather and American Rivers, which are tributaries from the east. The average runoff from the Basin is estimated to be 21.3 million acre-feet (MAF) per year.

Existing Drainage Conditions within the Project Site

The project site is mostly located in an area identified as being within the PL10Q and PL10N sub-watersheds on historic drainage area maps. The northern corners of the project site are within the PL11B, PL11C, and PL11D sub-watersheds. Drainage from the southern portion of the project site flows directly into University Creek, an intermittent drainage tributary to Pleasant Grove Creek that flows from east to west along the southern boundary of the project site, crossing both the southeast and southwest corners of the site. University Creek joins the main branch of Pleasant Grove Creek just west of the project site. The remainder of the project site drains from northeast to southwest towards the center of the western property boundary, where a berm and ditch redirect flow around existing rice fields and directly into Pleasant Grove Creek within the City of Roseville Al Johnson Wildlife Area, with the exception of two small areas located on the northwest and northeast portion of the site which drain to the north (PL11B, PL11C). The location of the project site in relationship to the Pleasant Grove Creek watershed is shown in **Figure 4.13-1**. As shown, the project site is located within subwatersheds PL10Q, PL10N, PL11B, PL11C, and PL11D of the larger Pleasant Grove Creek watershed. In the Pre-Project condition, various drainage sheds within the project site drain to the north, west, and south as shown in **Figure 4.13-2**.

The project site accepts runoff from an approximately 4.5-acre residential area to the north of Sunset Boulevard West through two 8-inch culverts. Flow also enters the site through University Creek on the southeast corner of the site. University Creek flows onto the Creekview Specific Plan (CSP) Area to the south of the project site and back onto the project site near the southwest corner, where it continues flowing towards the northwest. After crossing the project's western boundary, the channel turns sharply to the south at Discharge Point E (**Figure 4.13-2**). The channel turns sharply south due to a man-made berm on the City-owned Al Johnson Wildlife Area property; at this location, the University Creek channel becomes a straightened, trapezoidal channel. As part of future improvements to the Al Johnson Wildlife Area, the City plans to abandon the existing ditch and reconstruct University Creek to its former, natural location (City of Roseville, 2003).

The historic low flow drainage path from Drainage Area PL10Q1 has been redirected to the north of a bermed rice field. A ditch is located just west of Discharge Point G, which has a slightly eastwardly slope for a distance of approximately 700-feet west of the property line. The highest point on the invert of the ditch is about 81.3 feet. Runoff is retained onsite until it reaches an elevation of 81.3 feet. The capacity



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-2
Existing Conditions Drainage Patterns

of the ditch at that location is less than 10 cubic feet per second (cfs), which is less than the 2-year flow rate from the tributary area. Low flows from PL10Q1 flow through the ditch, but runoff from larger storm events in excess of 10 cfs spill over the berm to the south and continue south and west towards University Creek and Pleasant Grove Creek as overland flow. The overland flow creates a ponded area that extends from the neighboring Gleason property onto the project site. This ponded area, which is outside of the 100-year floodplain, can reach a water surface elevation on the ARSP site of about 82.5 feet and is controlled by the elevation of the berm and the ditch. The maximum extent of the ponding at elevation 82.5 feet covers an area of about 2.7 acres within the project site (**Figure 4.13-3**). The ARSP Drainage Master Plan (**Appendix I**) has been designed to route flows away from this ponding area to alleviate the existing flooding issues on the neighboring Gleason property.

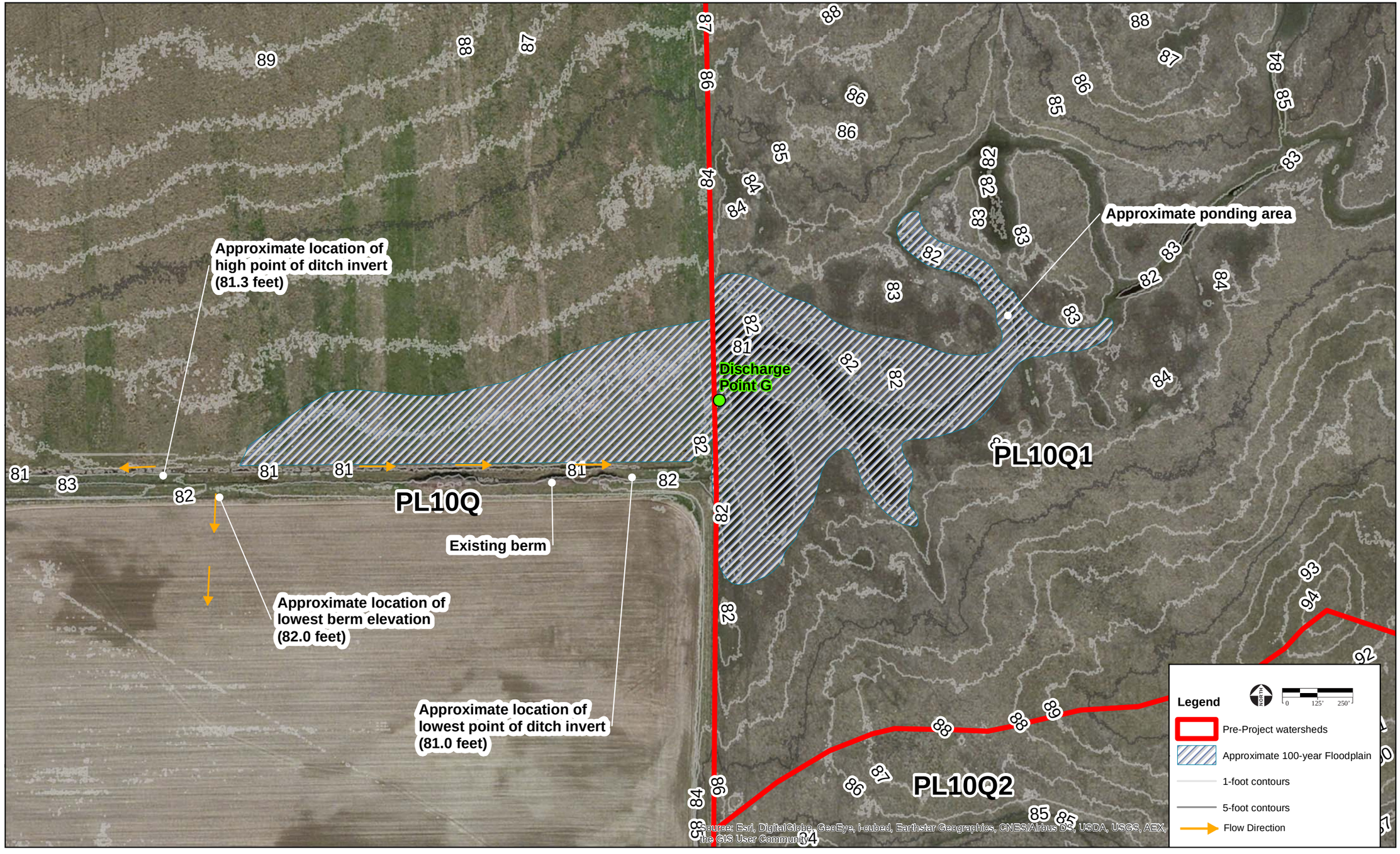
The drainage area acreages, discharge locations, and descriptions are provided in Table 1 of **Appendix I**.

Stormwater Volume

Placer County and the Cities of Roseville, Rocklin, Lincoln, and Auburn participated in the *Auburn Ravine, Coon, and Pleasant Grove Creek Watershed Study* prepared in 1993 to address concerns related to flooding as a result of regional development. The study found that the unmitigated peak flow increases would have the potential to increase flows in the Cross Canal by less than 3.6 inches along tributary streams and volumetric runoff and would have the potential to increase flooding 1.2 inches in the ponding area upstream of the Cross Canal (PCFCWCD, 1993). While shallow, these increases would inundate several hundred additional acres in Sutter County during a major flood. The study recommended a combination of regional and local detention and retention basins, adoption of a regional floodplain management plan, and grading ordinances and policies to remediate ongoing and prevent future flood hazard. Subsequently, the City of Roseville established a flood mitigation fee program for the construction of a regional retention basin at the Al Johnson Wildlife Area (formerly Reason Farms), located west of the project site, to address downstream volumetric impacts. In early 2003, the City certified a program level Final Environmental Impact Report (EIR) for the City of Roseville Retention Basin Project (SCH #2002072084, hereby incorporated by reference), which is available in the City of Roseville Permit Center, 311 Vernon Street, Roseville, CA 95678, during normal business hours. The City purchased the Al Johnson Wildlife Area property, and approved the site and conceptual plans for a retention basin flood control project. The Al Johnson Wildlife Area Retention Basin Project provides opportunity to construct two retention basins, a south basin with 1,850 acre-feet (AF) of storage and a north basin with 680 AF of storage. As additional developer fees are collected at the time of building permit issuance and the City can fund the construction of the southerly basin, the south basin will provide mitigation of volumetric increases resulting from development within the City of Roseville to date. It is anticipated that the north basin, or a reprogramming of the south basin, will accommodate the cumulative development in the City to include the ARSP drainage area as well.

Regulatory Floodplain

The Federal Emergency Management Agency (FEMA) oversees the delineation of flood hazard zones as it relates to the National Flood Insurance Program (NFIP) and the provision of federal disaster assistance. FEMA manages the NFIP and publishes the Flood Insurance Rate Maps (FIRMs), which show the



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-3
Western Boundary Existing Conditions Runoff Patterns

expected frequency and severity of flooding by area, typically for the existing land use and type of drainage/flood control facilities present. Flood zones are determined by the probability of flooding within a certain time period, such as a 100-year or 500-year flood event. Floodplains are divided into flood hazard zones, designated by the potential for flooding of an area during a flood event. Flood zones B, C, and X may include those areas that are located within the 100-year flood plain but are adequately protected by levee systems or other flood protection, while Zone A is designated as areas inundated by a 100-year storm event.

An area around and including University Creek is covered by Zone A on the currently effective FIRM panel 06061C0400F dated June 8, 1998, as shown in **Figure 4.13-4** (FEMA, 1998). Zone A is an area with 1 percent chance of flooding occurring in any year, or the 100-year floodplain. The remainder of the project site is located in Zone X, or an area determined to be outside of the 500-year floodplain (FEMA, 1998). A Letter of Map Revision dated September 26, 2006 revised a portion of the Approximate Zone A area on University Creek just downstream of the project site, although the FIRM was not revised for the project site.

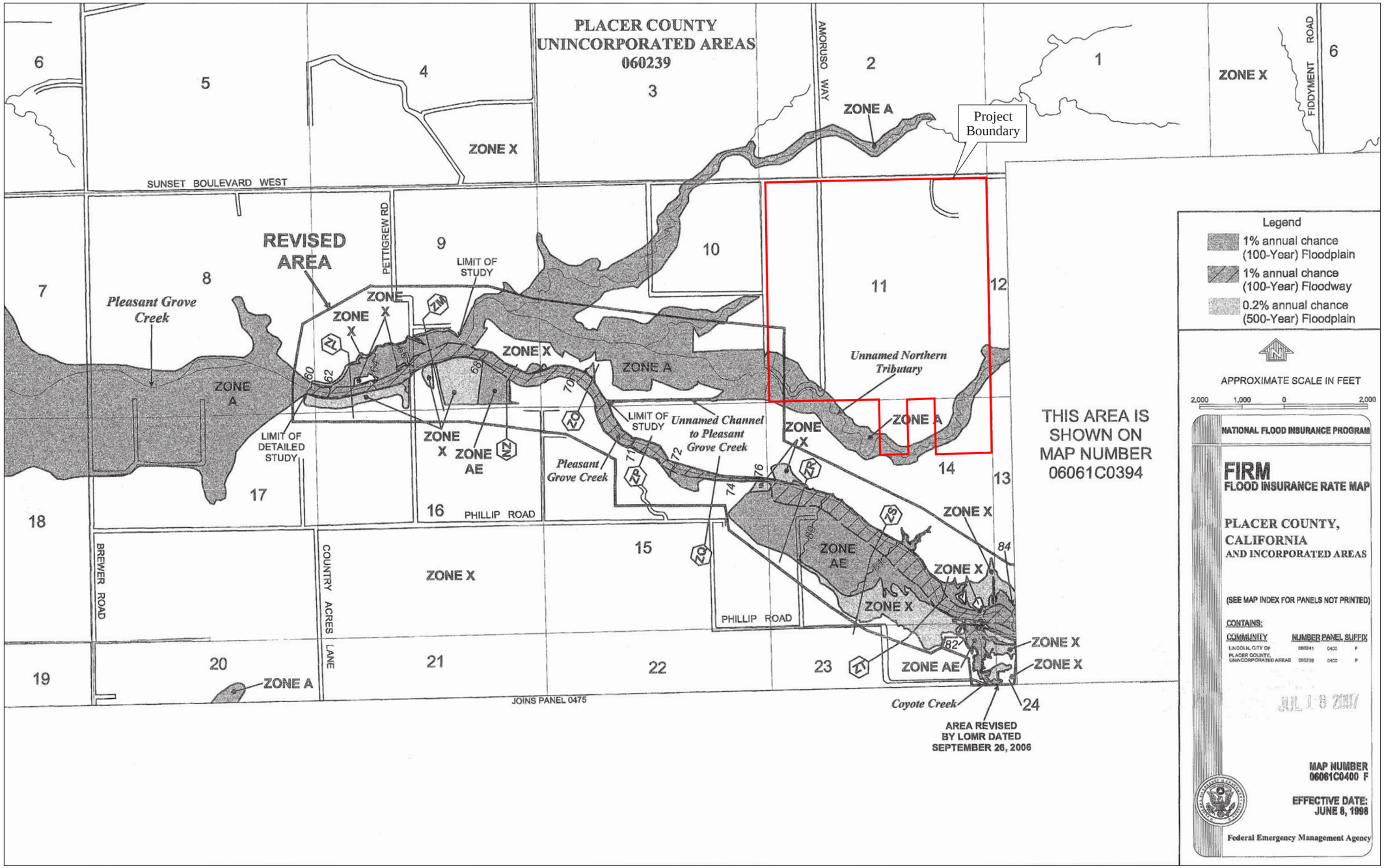
As discussed further in **Section 4.13.3** below, Senate Bill (SB) 5 enacted the Central Valley Flood Protection Act of 2008 to provide additional protection for urban areas within the 200-year floodplain that are protected by levees. The City's term Regulatory Floodplain refers to both the 100-year floodplain (discussed above) and the portions of the 200-year floodplain subject to SB 5. In the City of Roseville, the 200-year floodplain subject to SB 5 only includes the mainstem of Pleasant Grove Creek and the mainstem and major tributaries of Dry Creek. Based on the criteria set forth in SB 5, there is no 200-year floodplain within the ARSP.

Surface Water Quality

Surface water quality in the project site can generally be predicted based on the surrounding land uses. Most of the project site has been agricultural, primarily for grazing and pasture. Typical constituents in runoff from pasture lands would include nitrogen, phosphorus, and coliform bacteria. Runoff upstream of the project site would be expected to contain urban pollutants such as oil, grease, metals, nitrogen, and phosphorus from fertilizers, pesticides and herbicides, bacteria, and sediment.

The City is subject to the General Construction Permit and the General Permit for Waste Discharge Requirements for Small Municipal Separate Storm Sewer Systems (MS4s), commonly referred to as the MS4 Permit, both issued by State Water Resources Control Board (SWRCB). These orders address impacts to State waters resulting from construction activities and post-construction developments. The Proposed Project will comply with these adopted stormwater quality regulations, as discussed further in **Section 4.13.3**.

Pleasant Grove Creek will receive additional flow as a result of the Proposed Project. As discussed further in **Section 4.12.1**, future domestic and commercial wastewater from the area will be conveyed south to the Pleasant Grove Wastewater Treatment Plant (PGWWTP) for processing. The PGWWTP provides tertiary-level treatment through the process of screening, grit removal, extended aeration, secondary clarification, filtration, and ultraviolet disinfection. The treatment plant provides full nitrification and de-nitrification, and produces recycled water that meets Title 22 regulations for full, unrestricted use.



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-4
FEMA Flood Zones

Recycled water is used to irrigate golf courses, parks, streetscapes and other non-residential irrigation areas. Treated tertiary effluent from the PGWWTP discharges directly to an upstream segment of Pleasant Grove Creek southeast of the project site. The PGWWTP outfall to Pleasant Grove Creek is located east of the treatment plant.

In accordance with State requirements, surface water quality samples are collected 200 feet upstream and 200 feet downstream of the PGWWTP outfall. Water samples are collected on a weekly basis and analyzed for the parameters shown in **Table 4.13-1**. **Table 4.13-1** shows the minimum and maximum results from sampling upstream of the PGWWTP outfall since the PGWWTP began operations in 2004.

TABLE 4.13-1
PLEASANT GROVE CREEK WATER QUALITY DATA:
SEPTEMBER 2004 THROUGH AUGUST 2015

	Constituent			
	pH	**Dissolved Oxygen (mg/L)**	**Turbidity (ntu)**	**Temperature (deg F)**
Upstream (200 feet upstream of PGWWTP discharge outfall)				
Minimum	6.6	2.5	1	32
Maximum	9.5	17.7	35	87
Average	7.6	8.9	8	62
Source: City of Roseville, 2015e.				

According to a report prepared for the Placer County Planning Department (Foothill Associates, 2006), water quality is relatively high in Pleasant Grove Creek. Water samples taken from the Pleasant Grove Creek watershed were tested for numerous physical characteristics, biological factors, organic constituents, metals, and petroleum. The water temperature is slightly above the objective set by the Central Valley Basin Plan (Basin Plan), and temperatures increase in the lower watershed due to decreased riparian corridor canopy. Pleasant Grove Creek has moderately high total coliform counts, but it otherwise meets the standards of the Basin Plan (CVRWQCB, 2011).

Pleasant Grove Creek is listed on the Clean Water Act (CWA) Section 303(d) list of impaired waterbodies for the following constituents: oxygen, dissolved; pyrethroids; and sediment toxicity (SWRCB, 2010). Total Maximum Daily Loads (TMDLs) are still being established for these pollutants, and are expected in 2021 (SWRCB, 2010).

Regional Groundwater

Roseville is located in the North American River Groundwater Subbasin which underlies north Sacramento, south Sutter, and west Placer counties. The subbasin is a component of the larger Sacramento Valley Groundwater Basin. The subbasin is defined by the Bear River on the north, the Feather River and Sacramento Rivers on the west, the American River on the south, and a north/south line extending from the Bear River south to Folsom Lake that passes about 2 miles east of the City of Lincoln. The subbasin encompasses approximately 351,000 acres (DWR, 2006).

Several studies of the groundwater subbasin have occurred. The California Department of Water Resources (DWR) prepared Bulletin 118-3, Evaluation of Ground Water Resources: Sacramento County in July 1974. This Bulletin describes the various geologic formations that constitute the water-bearing deposits underlying the project site. The storage capacity of the North American subbasin is estimated by DWR in Bulletin 118 to be approximately 4.9 MAF. In 1998, the subbasin was studied by the Placer County Water Agency (PCWA) in the Placer Groundwater Management Plan. In June 2003, the City commissioned Montgomery Watson Harza to prepare a study titled Groundwater Impact Analysis for Proposed Reason Farms Land Retirement Plan, and in August 2007, the Cities of Roseville and Lincoln along with PCWA and the California American Water Company completed the Western Placer Groundwater Management Plan (WPGMP). The WPGMP was prepared in an effort to maintain a safe, sustainable, and high-quality groundwater resource to meet backup, emergency, and peak demands within a zone of the North American River Groundwater Subbasin.

As identified in DWR Bulletin 118-3, the formations that comprise the water-bearing deposits include an upper aquifer (Aquifer 1) and a lower aquifer system (Aquifer 2). Aquifer 1 consists of the Victor, Fair Oaks, and Laguna Formations. Aquifer 2 consists primarily of the Mehrten Formation. Groundwater within Aquifer 1 is typically unconfined, while in Aquifer 2 it is semi-confined.

Groundwater elevations within and around the project site have been monitored by DWR for several decades. There are three groundwater wells in the DWR monitoring network. One well (1IN/6E/18P005M) is located adjacent to Pleasant Grove Creek just west of Fiddyment Road in the West Roseville Specific Plan (WRSP) Area. A second well (11N/6E/30F002M) is east of the WRSP Area along Kaseberg Creek southeast of the intersection of Fiddyment and Phillip Roads. The third well (11/N5E/23B001M) is located on City-owned land north of the WRSP Area.

The upper portion of the groundwater basin has historically been pumped for agricultural use, and the lower, semi-confined portion of the aquifer has been used for urban water purveyors. The PCWA Integrated Water Resources Plan (IWRP) prepared by Brown and Caldwell (August 2006) indicates a potential safe yield of approximately 95,000 acre-feet per year (AFY) for the basin. The safe yield is defined as the amount of groundwater that can be continuously withdrawn from a basin without adverse impact. The IWRP also estimated average annual agricultural and urban demands in Western Placer County have been approximately 97,000 AFY. Under these pumping conditions, the groundwater levels at the southern end of the basin have been stable since about 1982 and the levels have risen slightly at the northern end of the basin, indicating that 97,000 AFY is also within the safe yield of the basin. These stable groundwater levels indicate that groundwater pumping is currently in balance with the natural groundwater recharge rate. This is attributed to the conversion of agricultural lands to urban uses over the past several decades. With the land conversions, pumping demands have decreased, especially when heavy pumping uses such as rice farming have been taken out of production. It is expected that agricultural basin pumping demands will continue to decrease over time. According to the IWRP, urban development within the Placer Vineyards, Curry Creek, and West of Lincoln study areas alone are estimated to reduce agricultural groundwater pumping demands by 20,000 AFY over time. If these pumping demands are not replaced by other equivalent pumping demands, it is expected to result in improvements to the condition of the basin.

There are no existing legal constraints that limit groundwater pumping until such time as a Groundwater Sustainability Agency is formed for the North American River Groundwater Subbasin.

Groundwater Recharge

Under natural conditions, groundwater recharge results from infiltration of precipitation (rain and snow). The rate and quantity of water reaching the saturation zone depends on factors that include the amount and duration of precipitation, soil type, moisture content of the soil, and vertical permeability of the unsaturated zone.

Soils containing hardpan occupy over half the valley on the east side of the Sacramento River (which includes the project site) and these hardpans severely restrict downward movement of water. Soil Group D (poor infiltration) accounts for the majority of soil cover in the project site. The abundance of Group D soils limits percolation and groundwater recharge under existing conditions. Consequently, the project site is not considered a significant recharge source in the regional context.

Although not intended to be a groundwater recharge project, for those times when the Al Johnson Wildlife Area Retention Basins are activated, the Proposed Project will provide an additional source of groundwater recharge in the vicinity of the project site, as the retention of stormwater in the basins will provide increased holding time and opportunity for recharge into the groundwater aquifer.

4.13.3 Regulatory Setting

Federal

Floodplain Development

FEMA determines floodplain boundaries for purposes of flood insurance requirements, and distributes FIRMs, which are used in the NFIP. These maps identify the locations of special flood hazard areas within the 100-year floodplain, and in some cases also identify a regulatory floodway; however, no floodway has been identified within the project site. FEMA allows non-residential development in the floodplain; however, construction activities are restricted within the flood hazard areas depending on the potential for flooding within each area.

Federal Executive Order No. 11988 directs federal agencies to avoid development within a floodplain. Specifically, if an agency has determined or proposes to conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative, consistent with the law and with the policy set forth in the Executive Order, requires siting in a floodplain, prior to taking action the agency shall: (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of the Executive Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain. The January 1, 2015 amendment to Executive Order 11988 adds the Federal Flood Risk Management Standard, a “flexible framework to increase resilience against flooding and help preserve the natural values of floodplains.”

Water Quality

The CWA (33 USC § 1251-1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Important sections of the Act are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity, which may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act.
- Section 402 establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and is discussed in detail below.
- Section 404 establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (EPA).

State

Urban Water Quality

The SWRCB and the Regional Water Quality Control Boards (RWQCB) are responsible for ensuring implementation and compliance with the provisions of the CWA, Porter-Cologne Water Quality Control Act, and NPDES programs. Along with the SWRCB and RWQCB, water quality protection is the responsibility of numerous water supply and wastewater management agencies as well as city and county governments.

The project site is located within the jurisdiction of the Central Valley RWQCB (CVRWQCB) (Region 5). The CVRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within its jurisdiction. Water quality objectives for the Sacramento River and its tributaries (e.g., Pleasant Grove Creek and University Creek) are specified in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan) prepared by the RWQCB in compliance with the federal CWA and the State Porter Cologne Act. The Basin Plan establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the Sacramento-San Joaquin River Basin. Because the City of Roseville is located within the CVRWQCB's jurisdiction, all discharges to surface water or groundwater are subject to the Basin Plan requirements.

On January 20, 2005, the SWRCB adopted sustainability as a core value for all RWQCB activities and programs, and directed RWQCB staff to consider sustainability in all future policies, guidelines, and regulatory actions.

Low Impact Development (LID) is a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional urban stormwater management, which collects untreated stormwater through drain inlets and conveys runoff directly and quickly through storm drain pipes or other

conveyances to streams and creeks, LID uses site design and stormwater management concepts that maintain the site's pre-development runoff rates and volumes. The goal of LID is to infiltrate, filter, store, evaporate, and detain runoff close to its source, which contributes to the effect of mimicking a site's predevelopment hydrology and helps maintain the predevelopment hydraulics of the receiving waters. LID has been a proven approach in other parts of the country, and is seen in California as an improvement over conventional stormwater management. The SWRCB and the RWQCBs prescribe the use of LID principles throughout California in various ways.

Construction Site Runoff Management

SWRCB Order 2009-0009-DWQ, SWRCB NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities ("General Permit"), establishes requirements for storm water discharges from construction activities, and applies to site disturbances greater than one acre, as described below.

Under the General Permit, any construction activity affecting one or more acres of land, or any activity that is part of a common plan of development or sale that disturbs one acre or more, as well as construction activities for linear overhead/underground utility projects that result in disturbance of one acre or more, must obtain a General Construction Activity Stormwater Permit Waste Discharge Identification Number. The permitting process requires the development and implementation of an effective Storm Water Pollution Prevention Plan (SWPPP). The project applicant must submit a Notice of Intent to the SWRCB to be covered by an NPDES permit and prepare the SWPPP prior to the beginning of construction. The SWPPP must include best management practices (BMPs) to reduce pollutants and any more stringent controls necessary to meet water quality standards. Dischargers must also comply with water quality objectives as defined in the Central Valley Basin Plan. If Basin Plan objectives are exceeded, corrective measures would be required.

The General Permit includes requirements for risk-based assessments and also contains numeric effluent limitations for projects covered under the General Permit. The Permit also imposes effluent monitoring and reporting requirements.

Urban Runoff Management

CWA Section 402(p) requires the EPA to develop a comprehensive phased program to regulate storm water quality discharges under the NPDES program. In November of 1990, Phase I of the NPDES program was issued addressing storm water discharges from MS4s serving populations over 100,000 and industrial activities including discharges from construction activities disturbing five acres or more. On December 8, 1999, the EPA published the NPDES Phase II regulations in the Federal Register as required by Section 402(p) of the CWA. NPDES Phase II regulations require small MS4s, those serving a population of less than 100,000 (at the time the amendments were finalized) and located in an urbanized area to obtain a municipal storm water permit.

As a Phase II community, the City of Roseville is currently required to operate under an NPDES Municipal Stormwater Permit administered by the State of California. The City of Roseville's original Stormwater Management Plan (SWMP) was adopted and approved by the RWQCB in March 2003, at which time the

City received a Phase II Stormwater Permit. On February 5, 2013, the SWRCB adopted the final draft of the more prescriptive General Permit for Waste Discharge Requirements for Storm Water Discharges form MS4s, order Number 2013-0001-DWQ, known as the MS4 Permit for Phase II communities. With the adoption of the new State General Phase II Stormwater Permit, all Phase II communities are subject to the new permit requirements.

Senate Bill 5

In 2007, the State of California passed a series of laws referred to as SB 5 directing DWR to prepare flood maps for the central valley flood system and the State Plan of Flood Control, which includes a system of levees and flood control facilities located in the Central Valley. This legislation also set specific locations within the area affected by the 200-year event as the urban level of flood protection (ULOP) for the Central Valley.

SB5 "requires all cities and counties within the Sacramento-San Joaquin Valley, as defined in California Government Code Sections 65007(h) and (j), to make findings related to an ULOP or the national Federal 1-2 August 2013 ULOP Criteria Emergency Management Agency (FEMA) standard of flood protection before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone."

The City of Roseville updated its General Plan in June 2015 to meet the requirements of SB 5. Key provisions within the legislation require that five locational criteria must all be met in order for the ULOP to apply. While all areas of the City meet two of the criteria (the City is an urban area of more than 10,000 people and the City is within the Sacramento-San Joaquin Valley), only certain areas of the City meet the remaining three criteria. These are:

1) Areas located within a flood hazard zone that are mapped as either a special hazard area or an area of moderate hazard on FEMA's official (i.e., effective) FIRM for the NFIP;
2) Areas located within an area with a potential flood depth above 3 feet, from sources other than localized conditions; and
3) Areas located within a watershed with a contributing area of more than 10 square miles.

Based on these criteria, there is no ULOP floodplain within the ARSP as none of the creeks within the ARSP have a contributing watershed of more than 10 square miles. As a consequence, the ULOP floodplain is not discussed any further in this EIR.

Sustainable Groundwater Management Act (SGMA)

The intent of the Sustainable Groundwater Management Act (SGMA; Water Code § 10720 et seq.) is to "enhance local management of groundwater consistent with rights to use or store groundwater… [and] to preserve the security of water rights in the state to the greatest extent possible consistent with the sustainable management of groundwater." The SGMA states that "any local agency or combination of local agencies overlying a groundwater basin may elect to be a groundwater sustainability agency for that

basin" (Water Code § 10723). A groundwater sustainability agency will be formed within each groundwater basin to prepare and implement a plan for long-term groundwater sustainability. The sustainability agency for the area has not yet been finalized.

Local

City of Roseville MS4 Permit

All Phase II communities are subject to the permit requirements of the State-issued MS4 Permit which supersedes the previous state order. This order took effect on July 1, 2013 and prescribes the requirements of all Phase II communities in meeting water quality objectives. The City has continued to modify its practices to conform to the priorities, activities, and strategies of the MS4 permit and to enact the minimum control measures and BMPs intended to address Phase II discharges, as required by the permit. The goal is to reduce pollutants in stormwater to the maximum extent practicable.

The MS4 Permit identifies activities to implement minimum control measures required under the General Permit: public outreach, public involvement, illicit discharge detection and elimination, construction site runoff, new development and redevelopment, municipal operations, water quality monitoring, and program effectiveness.

The MS4 Permit includes minimum required control measures for new development, such as structural and non-structural control strategies, and long-term operation and maintenance of controls. It includes specific guidance for volume and flow control design parameters for structural controls such as detention ponds, vegetative areas, runoff pretreatment in the form of source control and LID strategies, and hydromodification.

The City adopted the "Urban Stormwater Quality Management and Discharge Control Ordinance" (Stormwater Ordinance) (Ord. 4395 § 2 (part), 2006.) in order to establish a regulatory framework to implement construction and post-construction stormwater controls. In March 2007, the City adopted the Stormwater BMP Guidance Manual for Construction, and in May 2007, the City adopted the Stormwater Quality Design Manual. Since the early adoption of the City ordinances, and as required as part of the new MS4 Permit, the City is in the process of updating the design manual and ordinances. The City has the authority during plan checks, as well as site inspections, to enforce the permit requirements. Prior to final approval, the owner of any stormwater control structure will be required to submit an operations and maintenance manual and a proposed maintenance schedule. Additional detail on post-construction controls is provided within the context of the MS4 Permit and on the City's website (www.roseville.ca.us).

City of Roseville General Plan

The General Plan includes several policies relating to hydrology and water quality.

<u>Safety Element – Flood Protection Goals</u>

Goal 1: Minimize the potential for loss of life and property due to flooding.

Goal 2: Pursue flood control solutions that are cost-effective and minimize environmental impacts.

Safety Element – Flood Protection Policies

Policy 1: Continue to regulate, through land use, zoning and other restrictions, all uses and development in areas subject to potential flooding.

Policy 2: Monitor and regularly update City flood studies, modeling and associated land use, zoning and other development regulations.

Policy 3: Continue to pursue a regional approach to flood issues.

Policy 4: Minimize the potential for flood damage to public and emergency facilities, utilities, roadways and other infrastructure.

Policy 5: Require new developments to provide mitigation to insure that the cumulative rate of peak run-off is maintained at pre-development levels.

Policy 6: Continue to implement the Storm Maintenance Program to keep creeks and storm drain systems free of debris.

Policy 7: Establish flood control assessment districts or consider other funding mechanisms to mitigate flooding impacts.

Policy 8: Where feasible, maintain natural stream courses and adjacent habitat and combine flood control, recreation, water quality, and open space functions.

Amoruso Ranch Specific Plan

The ARSP designates the on-site intermittent drainage (University Creek) and its associated floodplain as Open Space Preserve. All drainage facilities will be designed and constructed in conformance with the City's Improvement Standards, the City's Stormwater Quality Design Manual, the PCFCWCD Stormwater Management Manual (SWMM) and the City's Open Space Preserve Operations and Management Plan (required under the CWA 404 Permit).

A number of LID elements will be incorporated into ARSP development plans to achieve an overall reduction in stormwater runoff and improve water quality. The selection and use of these elements may vary by development project, depending on the runoff reduction needed. The various LID options may include, but are not limited to, the following:

- Disconnected roof drains;
- Disconnected and separated pavement;
- Bio-retention facilities, rain gardens, and bioswales;
- Tree planting;
- Grass swales and channels;
- Curb cuts and vegetated filter strips;
- Impervious surface reduction – permeable pavements and porous pavements;
- Stream buffers;

- Soil amendments; or
- Pollution prevention, source control, and good housekeeping practices.

Disconnected roof drains can be used throughout all types of residential, commercial, public, and park land uses. Water running off of impervious roofs is treated by biological filtration between the roof leader outfall and where it enters a storm drain system. Disconnected sections may also provide the stormwater runoff with an opportunity to partially infiltrate into native soils.

Separated sidewalks, disconnected pavement, and the elimination of impervious paving areas allow for stormwater runoff to be treated and infiltrated into adjoining landscape areas before entering a conventional storm drain system. The use of pervious materials for walks and pavement can also provide a way for stormwater runoff to be detained by providing storage in a porous sub-base.

Interceptor trees create canopy that reduces the rate and amount of total stormwater runoff impacting the surrounding surfaces. Interceptor trees are also selected for their rooting habits that promote infiltration of surface runoff by breaking the surface tension of the soil and providing a route deeper into the soil matrix. The addition of soil amendments in the interceptor tree and landscaped areas can also add voids that can absorb stormwater runoff and prevent it from entering a conventional storm drain system. In residential areas, soil amendments may be added to a landscape strip adjacent to the street or pavement areas where runoff can be intercepted from adjoining areas. In commercial areas, soil amendments can be part of stormwater planter BMPs, whereas along roadways it can be used where flows are diverted into landscaped areas. Finally, vegetated swales allow for additional infiltration and biological uptake opportunities before discharge into an adjacent storm drain system.

Additional project design elements within the open space areas may also provide hydrograph modification benefits by allowing additional floodplain storage capacity for the site, added infiltration opportunities, and areas of evapotranspiration, nutrient uptake, biological filtering, and buffers between urban development and natural features.

City of Roseville Development Standards

The City maintains policies and guidelines regarding grading, erosion control, inspection, and permitting. Section 16.20.040 of the Roseville Municipal Code regulates stockpiling and grading, and addresses conditions under which permits and grading plans are required. Section 16.20.070 identifies grading plan performance standards.

A grading plan shall comply with the following criteria:

A. Fill or cut slopes shall be graded with slopes not to exceed 3:1.
B. When grading around native oak trees:

    1. Cut or fill slopes exceeding two feet in height shall not be permitted within a distance of 1.5 times the radius of the tree's protected zone.
    2. The grade shall not be raised or lowered around more than 50 percent of the protected zone; and

3. The grading shall not change the drainage pattern within a distance of 1.5 times the radius of the tree's protected zone.

Section 16.20.020 requires that all grading be performed in accordance with either City of Roseville Improvement Standards or Chapter 16 of the Zoning Ordinance, whichever is more restrictive. The Development Services Department requires that a grading permit be obtained prior to grading activities. At that time, the Applicant must submit, for review and approval, Improvement and/or Grading Plans along with a site-specific SWPPP. Slopes or banks along creek channels must be designed with proper slope protection to prevent soil erosion and channel-bank undercutting. The City has also adopted standards that would apply to projects within public rights-of-way or easements.

Section 10 of the City Improvement Standards identifies hydrologic and hydraulic methods to determine peak flow rates and criteria for identifying appropriate design and capacity for storm drainage infrastructure. Design criteria include requirements for channels and outfall design, cross culverts, inlet and outlet structures, and piping materials.

City of Roseville Floodplain Development

To prevent flooding conditions and to limit exposure of residents and structures to potential harm and/or damage, the City of Roseville General Plan (Safety Element/Flood Protection) contains policies that restrict land uses and development within the regulatory floodplain. For specific plans:

> *No development is permitted within the future floodplain (floodway and floodway fringe). Exceptions may be considered by the City for unusual conditions on a case-by-case basis if encroachment is limited to only the floodway fringe and would not result in any off-site increase in the water surface elevation.*

Chapter 9.80 of the Roseville Municipal Code identifies floodplain development criteria and restrictions that implement FEMA requirements. Section 10, of the City's Improvement Standards, also identifies criteria for development within the regulatory floodplain.

Placer County Flood Control and Water Conservation District

The PCFCWCD was created by SB 1312, effective August 23, 1984. The PCFCWCD formulates regional strategies for flood control management. In 1990, the PCFCWCD developed a SWMM that presents policy, guidelines, and specific criteria for evaluating hydrologic and hydraulic conditions associated with new development within the context of regional stormwater issues. The City references the SWMM criteria in Section 10 (Drainage) of the City's Improvement Standards.

The SWMM contains specific principles and policies for the design of storm drain facilities:

A. Storm drainage planning, design, and construction will avoid increasing the storm drainage problems in any area, or transferring drainage problems from one location to another. Watershed boundaries shall not be altered, and flows shall not be diverted from one watershed to another without compelling reasons.
B. Storm drains should use the natural drainage channel alignments whenever possible.

C. Development plans shall provide a secondary surface flow escape paths for flows in excess of the capacity of the primary piped or channelized drainage system without damage to structures.
D. Storm drainage planning and design shall be consistent with the flood boundaries and floodways delineated and regulated by the NFIP or other studies, such as watershed master plans.
E. Public storm drainage facilities shall normally be located within public road right-of-way, unless specifically approved by the local jurisdiction and shall be designed as permanent facilities with minimal maintenance costs.
F. The points at which drainage enter and exit a project shall be at the same vertical and horizontal location as exists before the project except by written and recorded agreement between adjacent landowners in the form of an easement.
G. Fill or structures shall not be permitted to block drainage paths even if these paths function only in storms of rare occurrence.
H. Storm drainage systems shall incorporate BMPs for the protection of water quality when required by the local jurisdiction.

4.13.4 IMPACTS

Method of Analysis

Drainage and Flooding

Technical data to support the analysis of potential drainage and flooding impacts of the Proposed Project were developed by Kimley Horn and is presented in the ARSP Drainage Master Plan (2016) found in **Appendix I**.

Stormwater Peak Flows

As discussed further in **Appendix I**, precipitation data for the regional and site models were developed using methodology outlined in the Placer County SWMM, which requires multiple storm centering scenario analysis. Site-specific hydrologic modeling was performed for the 2-year, 10-year, and 100-year 24-hour storm events using the HEC-HMS model (Version 4.0); results are shown in **Table 4.13-2** through **Table 4.13-4** (in **Impact 4.13-4** below). Using the HEC-HMS model and following the Placer County SWMM methodology allows for the efficient processing of multiple storm scenarios involving multiple recurrence intervals, storm centerings, and storm approach angles.

Stormwater Runoff Water Quality

The analysis of potential water quality effects was based on a qualitative comparison of predevelopment and post-development land uses.

Surface Water Quality

The analysis of potential surface water quality effects on Pleasant Grove Creek as a result of increased tertiary treated effluent discharges from the PGWWTP are analyzed in **Section 4.12.3**, **Wastewater**, **Impact 4.12.3-4**. This analysis concludes that the impact is less than significant with mitigation.

Thresholds of Significance

For purposes of this EIR, a significant impact would occur if development proposed in the project would do any of the following:

- Substantially degrade surface water quality due to increases in sediments, erosion and urban contaminants generated by construction and/or operational activities or violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of 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).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding or siltation on-or off-site.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Expose people, housing, or other structures to flood hazards by placing them in an area subject to inundation within the 100-year floodplain as defined by FEMA or the City's regulatory floodplain as defined by site-specific floodplain maps.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- 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 dam or levee.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Impacts from tsunamis, seiches, and mudflows were screened out of the analysis in the Initial Study (**Appendix B**) and will not be discussed further because the project site is not located near a water body or other feature that would pose any of these risks.

Impacts

IMPACT 4.13-1	EROSION AND RUNOFF FROM CONSTRUCTION SITES CONTAINING SOIL OR OTHER MATERIALS COULD DEGRADE WATER QUALITY IF DISCHARGED TO LOCAL STREAMS
Applicable Policies and Regulations	SWRCB NPDES Permit (State General Permit for Stormwater Discharges Associated With Construction and Land Disturbance Activities) Roseville Improvement Standards Sections 2 and 11 City of Roseville Stormwater BMP Guidance Manual for Construction
Significance with Policies and Regulations	Significant
Mitigation Measures	MM 4.13-1 Implementation of Construction Activity Stormwater Standards
Significance After Mitigation	Less than Significant

Development activities associated with the ARSP would involve construction of structures, roadways, parking lots, and infrastructure (including off-site infrastructure), which would require grading, excavation, and other construction-related activities that could cause soil erosion at accelerated rates. Sediment from construction activities could accelerate erosion that could have adverse effects on receiving water quality on the project site and within downstream watersheds, including University Creek, Pleasant Grove Creek, and the Sacramento River. Such effects could include increased turbidity, which could result in adverse impacts on fish and wildlife and their habitats, reduced pump life at Sacramento River water intakes due to abrasion, increased municipal water treatment costs for turbidity removal, and impaired recreation and aesthetic values. Another potential source of water quality degradation during construction activities is heavy machinery and other construction equipment. Construction equipment spills could result in the release of polluting constituents, such as heavy metals, oil, grease, and other petroleum hydrocarbons to University Creek and Pleasant Grove Creek. This is a **significant** impact.

Project developers are required by State law to obtain coverage under the State General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit). Developers are also required by City ordinance (Roseville Municipal Code Chapter 14.20) to fully comply with the State construction permit and reduce pollutants to the maximum extent practicable. Compliance with the General Permit requires a number of steps. The project developer must electronically file Permit Registration Documents before construction activities begin, including a SWPPP, Notice of Intent, Site Map, and Risk Assessment.

The Site Map must include detailed information such as site layout; the location of sensitive habitats or watercourses, drainage areas, discharge locations, soil disturbance areas, and sampling locations; and the locations of all runoff, erosion control, and sediment control BMPs. The BMPs must address source control, pollutant control, and treatment control. Examples include straw wattles, dikes, silt fences,

sediment traps, or similar methods. If construction occurs during the wet season, additional winterization improvements are required to stabilize the disturbed areas of the site, prevent erosion, and clean discharge waters. For all wet weather construction activities, a discharger is required to develop a Rain Event Action Plan before the onset of a storm event.

A discharger must develop a Risk Assessment using the forms and procedures set forth in the General Permit (Appendix 1) to assess the risk level of a construction project. Risk assessment is based on: 1) sediment transport and 2) receiving water risk. The assessed Risk Level (1, 2, or 3) will determine the specific requirements applicable to that site.

Monitoring and reporting requirements for all sites under the General Permit include visual monitoring and maintaining records of stormwater and non-stormwater discharges. Risk Level 2 and 3 sites are required to monitor effluent water quality, and some Risk Level 3 sites must monitor receiving water for pH and turbidity. Bioassessment sampling is required for Risk Level 3 sites larger than 30 acres with direct discharges into receiving waters. All dischargers must prepare and submit an Annual Report.

Contractors will be required to prepare and retain onsite an Erosion Control Plan in accordance with Sections 2 and 11 of the City of Roseville's Improvement standards, as well as the SWPPP that was developed under the General Permit. As part of the City's MS4 Permit requirements, the City actively inspects construction sites to ensure compliance with the State General Permit.

Mitigation Measure 4.13-1 requires the creation and implementation of a SWPPP and use of BMPs to minimize erosion and the risk of polluted runoff leaving the construction site. Further, compliance with the State's General Permit and the City Improvement Standards, combined with the City's inspection efforts under its MS4 Permit requirements, will ensure that construction-related sediment or other contaminants would be reduced to the maximum extent practicable, as required by law. As a result, the Proposed Project would not result in the violation of any water quality standards, would not create substantial sources of polluted runoff, and would not otherwise substantially degrade water quality. Therefore, this impact is **less than significant**.

IMPACT 4.13-2	CHANGES IN SURFACE WATER QUALITY RESULTING FROM URBAN STORMWATER RUNOFF AND OTHER OPERATIONAL ACTIVITIES
Applicable Policies and Regulations	NPDES Phase 2 Program Regulations (State-issued MS4 Permit)
Significance with Policies and Regulations	Significant
Mitigation Measures	MM 4.13-2 Stormwater Management Development Standards
Significance After Mitigation	Less than Significant

Development associated with the Proposed Project would result in the conversion of undeveloped land to urban uses including residences, schools, businesses, recreation, roadways, and parking areas. As discussed above, the increase in impervious surfaces resulting from the construction of buildings and paved areas would increase the rate and amount of stormwater runoff that would carry urban pollutants into University Creek thence Pleasant Grove Creek. It is anticipated that runoff from the project site would be typical of urban runoff water quality. Activities that could increase the types or quantities of non-naturally occurring pollutants in runoff due to development include:

- Motor vehicle operations;
- Residential maintenance (e.g., landscape maintenance- mowing, blowers, fertilizing, pesticide use, car washing);
- Litter;
- Careless material storage and handling;
- Domestic animal and wildlife wastes; and
- Pavement wear.

Pollutants typically associated with urban uses include oil and grease, coliform bacteria, petroleum hydrocarbons, nitrogen, phosphorus, heavy metals, pesticides, herbicides, and other constituents. Although some of the sediment load of developed areas would be reduced by implementing grassy swales, bio filters, and other measures, sources of pollution to stormwater runoff may still be present due to entrained dust on roadways and parking lots and blow over from open space areas and/or other off-site farming and construction activities. There is the potential that urban runoff from the Proposed Project could contain levels of pollutants that could adversely affect water quality in the local streams or increase sediment loads. Therefore, this impact is considered **significant**.

Consistent with current NPDES Phase II stormwater requirements, the ARSP identifies three general elements to treat stormwater: source control, runoff reduction, and treatment of runoff. Source control and the use of LID strategies are intended to manage pollution where it is first generated, keeping the pollutants from entering the stormwater in the first place. LID measures are the main tool that will be used for runoff reduction. The goal in the use of LID strategies is to keep pollutants from contacting runoff and leaving a site, thereby protecting water quality. LID is a stormwater management strategy that

emphasizes conservation and use of existing natural site features integrated with small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial, and industrial settings. By integrating LID concepts into the fabric of a community, stormwater management is effective on several levels: the LID strategies minimize the effects of impervious surfaces by promoting infiltration of runoff through swales, vegetation, or mechanical systems, which aids in filtration of pollutants prior to entering surface and ground waters; and helps mimic the natural pre-development hydrograph. The result is a diminished amount of stormwater, both in the terms of volume and pollutant level, which otherwise would require further treatment. These LID measures are discussed further in the ARSP and in **Section 4.13.3** above. The ARSP will incorporate principles of LID site development that may include a combination of the following:

- **Disconnected roof drains:** Water runoff from roof systems would be treated by biological filtration. Provides opportunities for infiltration.
- **Interceptor tree planting:** Limited trees are present within the project site. The specific plan would ensure that trees are planted and maintained, which would in turn reduce the rate and amount of total runoff which would enter the storm drain.
- **Soil amendments in landscaped areas and stormwater planters:** The addition of organic material to impervious soils can add voids that can absorb runoff, thereby preventing it from entering storm drain systems. In residential areas, this may include amending a landscape strip adjacent to the street or pavement areas where large amounts of runoff can be intercepted from lots. In commercial areas, this is likely to be limited to stormwater planter areas. At roadways, soil amendments will be used where roadway flows are diverted into the landscape areas.
- **Alternative driveways and porous pavement:** Pavement alternatives would allow the opportunity for infiltration of runoff.
- **Vegetated swales:** Required at all storm drain outlet locations, vegetated swales offer additional treatment and opportunities for additional infiltration of runoff.
- **Separated sidewalks:** Runoff would be treated before entering the gutter and the storm drain system.

Treatment control features are generally engineered technologies designed to remove pollutants from site runoff. Additional treatment control features in the ARSP could include bio-retention facilities, stormwater planters, vegetated swales, end of pipe velocity attenuation, settling areas, in-stream detention areas, and end of pipe grassy swales.

The specific LID strategies and structural BMPs that could be used in the project site, either individually or in combination, will be refined at the tentative map and site development stage to account for site specific plans. Drainage features will be designed to comply with the standards established as part of the City's Phase II MS4 Permit, and the City's Stormwater Management Design Manual. As more detailed information is developed for each land use (tentative map/site development) and target pollutants are identified, the design of specific stormwater treatment devices such as those referenced above, vegetative plantings, bio-filters, or other proprietary devices will be incorporated into the design.

In addition to general stormwater quality impacts associated with urban runoff, the Proposed Project will intentionally modify existing drainage basins to route water away from existing flood-prone areas. Specifically, water will be routed into one of three proposed open channel stormwater conveyance

facilities within the project site to carry excess water away from the Toad Hill Ranches and Gleason property, as discussed further in **Impact 4.13-4**. The convergence of the three open drainage channels will connect to University Creek at the location where the natural channel ends and the modified trapezoidal channel begins near the agricultural area. Connection at this location will also minimize backwater effects of the existing berm on the east side of University Creek near Discharge Point E. With the redirection of the northern shed to this discharge point, there is the potential that increased stormwater in this segment of University Creek could increase scouring and cause erosion; this would be a **significant** impact. In order to ensure that the increased volume of water entering University Creek at Discharge Point O would not cause issues due to erosion, monitoring of the downstream reaches of University Creek will be implemented and any necessary erosion and sediment control measures would be incorporated into the project design plans and submitted to the City for review and approval prior to receiving building/grading permits.

Compliance with the NPDES regulations and **Mitigation Measure 4.13-2**, which requires implementation of stormwater management, LID measures, and erosion control measures at University Creek, would ensure stormwater treatment devices specific to the land uses in the ARSP are implemented to the maximum extent practicable. Stormwater treatment devices will be chosen for their effectiveness in reducing urban pollutants in stormwater runoff to meet the Basin Plan and water quality objectives of the City's Phase II MS4 Permit. Taken together, all of these measures will avoid violation of any water quality standards, will avoid the creation of substantial additional sources of polluted runoff, and will avoid any substantial degradation of water quality. As a result, potential negative effects on water quality from urban runoff and project operational activities will be **less than significant**.

IMPACT 4.13-3	**GROUNDWATER DEPLETION OR INTERFERENCE WITH GROUNDWATER RECHARGE COULD RESULT IN LOWERING OF GROUNDWATER TABLE**
Applicable Policies and Regulations	Sustainable Groundwater Management Act
Significance with Policies and Regulations	Less than Significant
Mitigation Measures	None Required
Significance After Mitigation	Less than Significant

Although surface water is the primary source of potable water for the ARSP as discussed in **Section 4.12.1**, groundwater will be used to augment water during times of peak demand (i.e., summer months or drought years). A full discussion of potential impacts due to the use of groundwater as a supplemental water supply source is discussed in **Impact 4.12.1-6**.

Groundwater supply is partly dependent on recharge by percolation of rainwater through permeable surfaces. Groundwater recharge in the project site occurs primarily along stream channels such as

University Creek. As described in **Section 2.3**, the project site is undeveloped and there are minimal impervious surfaces; soils that are impermeable or underlain by hardpan comprise most of the project site. In these areas, infiltration is low, thereby limiting groundwater recharge.

Although there would be new impervious surfaces created by development of the Proposed Project, recharge is already limited under existing conditions. It is expected the retained wetlands and riparian corridor within the project site will allow for the storage and infiltration of waters for long periods of time. While infiltration rates are very small, over long periods of time these areas can provide a measurable contribution to the groundwater basin. In addition, the stormwater retention basins in the Al Johnson Wildlife Area will provide groundwater recharge to the basin.

Additionally, the loss of pervious surface through development of the Proposed Project is minimal compared to the overall size of the groundwater subbasin. Runoff from new impervious surfaces would be collected and diverted through onsite drainage controls, such as swales, channels, or other detention and water quality features, and ultimately released downstream. Some infiltration from these features would occur. Water from flows released from the project site to downstream channels could also provide some recharge. In effect, recharge would still occur, but at different locations and at different rates than under existing conditions. In addition, FEMA and City floodplain development restrictions would limit the types and locations of structures that could be placed near the stream channels. Because areas along stream channels are proposed to remain in open space, recharge along stream channels would not be affected.

Groundwater quality will not be affected as water will flow into storm drains and/or vegetated channels prior to discharge to University Creek and the Pleasant Grove Retention Basin, allowing time for contaminant breakdown and/or sediment deposition prior to infiltration into the groundwater. In addition, runoff would be sufficiently filtered by the soil environment prior to reaching the nearest groundwater aquifer. Therefore, this is a **less-than-significant** impact to the groundwater aquifer.

IMPACT 4.13-4	ALTERED DRAINAGE PATTERNS AND INCREASE IN THE RATE OF STORMWATER RUNOFF THROUGH THE DEVELOPMENT OF NEW IMPERVIOUS SURFACES THAT WOULD RESULT IN FLOODING OR SILTATION ON- OR OFF-SITE
Applicable Policies and Regulations	City of Roseville Improvement Standards Placer County Stormwater Management Manual
Significance with Policies and Regulations	Potentially Significant
Mitigation Measures	MM 4.13-5 Erosion Monitoring Plan
Significance After Mitigation	Less than Significant

The project site is currently undeveloped. As discussed above in **Section 4.13.2** and shown in **Figure 4.13-3**, there are existing flooding issues within the project site and surrounding properties along the western property boundary. The existing westerly agricultural ditch and berm cannot contain flows in excess of 10 cfs, which is less than the 2-year event flow rate for the area. Therefore, ponding is common on the Gleason property, Toad Hill Ranches, and on the project site following storm events. However, this area is not within the 100-year floodplain. Recognizing the existing resident's concern, the project applicant is proposing to divert approximately 300 acres that normally would flow from the site in both the northeast and northwest corners of the site, including the area that would normally flow onto the Toad Hill Ranches development, to the ARSP drainage system, which would convey that drainage to the south. This action would provide a public benefit by reducing flow to areas experiencing drainage issues (described below in more detail).

Development of proposed residential, commercial, schools, parks, and associated uses within the project site would increase the amount of impervious surfaces by 481 acres[1] compared to present conditions. This increase in impervious surfaces would increase the rate of surface runoff conveyed through the site and into University Creek thence Pleasant Grove Creek. In addition, development and grading would alter the existing runoff patterns and conveyance capacities on the properties.

As part of the proposed drainage system and overall grading plans for the Proposed Project, a large portion of the current flows affecting the Gleason property and Toad Hill Ranches will be redirected away from these two flood-prone areas. A portion of the flows to the north will be redirected to the south through the project site and ultimately into University Creek at the southwest corner of the project site via the proposed open channel conveyance facility along the western boundary of the ARSP property. Additionally, flows from the project site that currently flow westerly onto the Gleason property will be intercepted by the same open drainage channel and directed to the south for discharge into University Creek. In total, the stormwater from approximately 300 acres of land will be redirected to the south.

[1] Includes areas within the 694.4-acre project site proposed for development, not including the 48.9-acre Placer Parkway, 20-acre Urban Reserve parcel, and 144.2 acres of open space.

As a result of these proposed improvements, the existing Pre-Project flows that were identified as a concern to the neighbors will be conveyed as part of the overall drainage plan to University Creek and ultimately into Pleasant Grove Creek. As a result, the pre-and Post-Project drainage sheds are being altered, to the benefit of the neighboring properties. Potential impacts due to erosion from increasing flows at this location in University Creek are addressed in **Impact 4.13-2**, above.

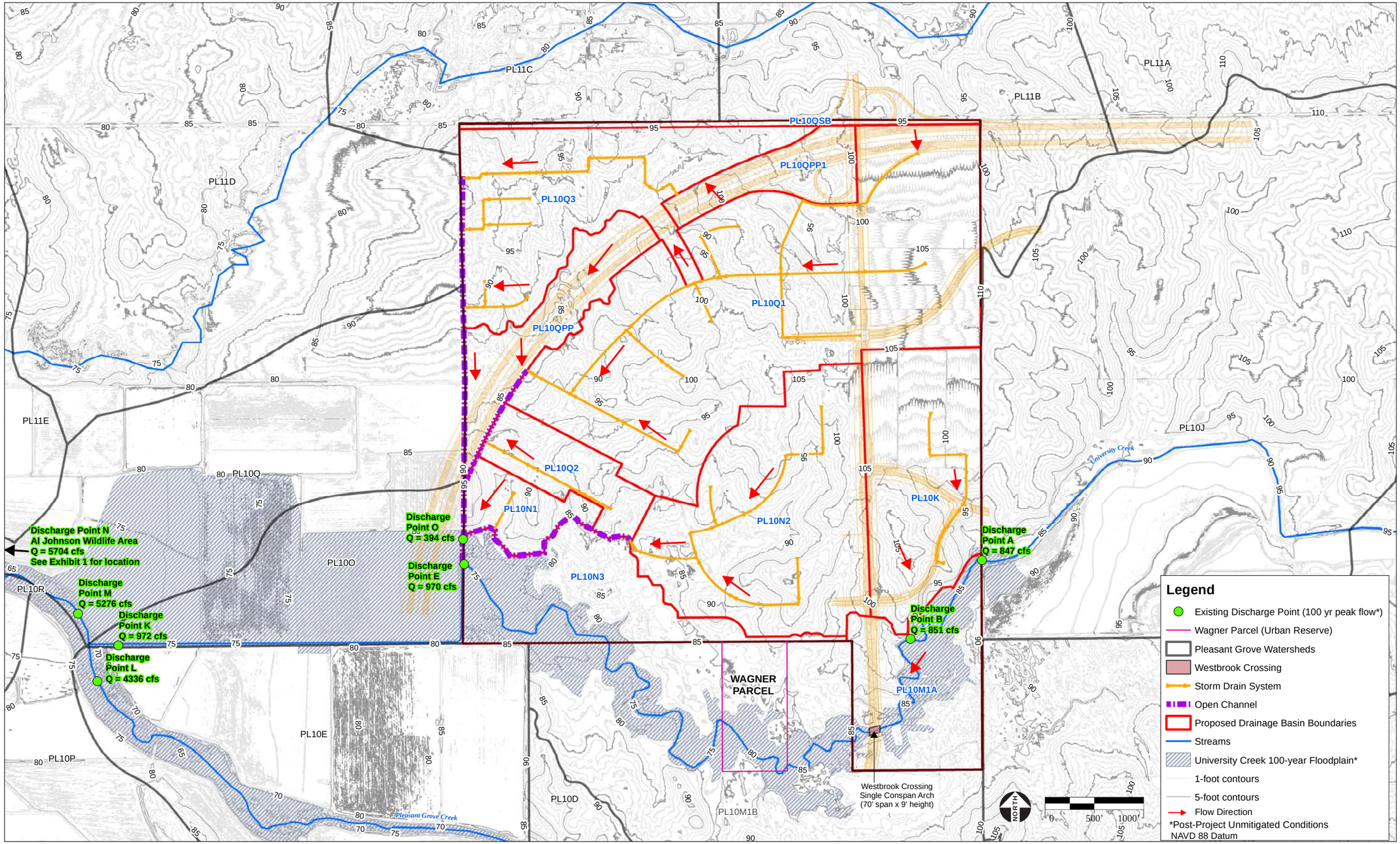
Results of hydrologic and hydraulic modeling were used to identify appropriate drainage facilities in the ARSP to manage stormwater peak flows in accordance with City Improvement Standards and Placer County SWMM requirements.

Increased stormwater flows and altered drainage patterns as a result of development of the Proposed Project could increase the potential for localized flooding within the developed project site. Potential risks from localized flooding could result in property loss and disruptions of transportation corridors that would disrupt essential services into, out of, and through the project site.

Consistent with Section 10 of the City of Roseville Design Standards, the ARSP Drainage Master Plan provides a preliminary analysis of the on-site storm drain conveyance system that would be constructed to ensure the safe conveyance of stormwater flows through the project site and into the creek system. The proposed onsite drainage system, described in the Drainage Master Plan included as **Appendix I**, has been designed with sufficient capacity to accommodate the Proposed Project as well as to address ongoing drainage issues in the vicinity (Kimley-Horn, 2016a). The majority of the flow generated by the Proposed Project will be routed into University Creek downstream of the existing berm at the southwestern corner of the project site. The ARSP proposes to drain the majority of the project site into channels on the western and southern borders of the project site. This concept for drainage, also referred to as the "storm drain system", avoids the necessity of piping to University Creek south of the site. Piping drainage to University Creek causes extreme amounts of grading and land disturbance. To avoid this, the channel concept was developed. Due to the use of these channels, the berm adjacent to University Creek near PL10N1 will remain in place and not be removed as part of the Proposed Project. The proposed drainage patterns and proposed outflows are shown in **Figure 4.13-5**.

The stormwater design requirements as set forth by the City of Roseville include:

- Residential lots adjacent to the City's Regulatory Floodplain shall have pad elevations a minimum of two feet above the 100-year unmitigated build-out floodplain.
- All drainage must enter and leave the improved area at its original horizontal and vertical alignment unless an agreement, approved by the City Attorney, has been executed with the affected property owners.
- Calculate 10-, 25-, and 100-year peak discharge and submit calculations with the plans for proposed drainage systems.
- Hydraulic grade line for the 10-year discharge shall be a minimum of one foot below all grates, manhole covers and all other drainage structures in the system.
- Cross culverts shall be designed for a 25-year storm event with no head on the inlets. They shall also be sized such that no serious damage will be incurred due to ponding as a result of a 100-year event. A flood easement shall be provided for all areas impacted due to upstream ponding in the 100-year event. Culverts across arterials shall be sized for the 100-year storm with a



SOURCE: Kimley Horn, 2015; AES, 12/18/2015

Figure 4.13-5
Proposed Conditions Drainage Patterns

minimum of one foot of freeboard below the lowest travel lane. Minimum diameter of cross culverts shall be 18 inches. To account for debris collection, a clogging factor of 150 percent shall be applied to all storm frequencies in the design of bridges or culverts that cross a channel or stream with a drainage area that exceeds 300 acres.

- Onsite peak flow mitigation to reduce Post-Project 100-year peak flows to Pre-Project levels.

Consistent with the City's design standards, additional considerations would be made for the safe conveyance and overland flow release of the 100-year storm event assuming a total blockage of the storm drain system. Prior to acceptance and issuance of construction documents, the final design for the storm drainage infrastructure and overland conveyance system would be reviewed by the City's Engineering Department to ensure it complies with the City Improvement Standards and the ARSP Drainage Master Plan. Consistency with City standards would avoid the potential for flooding within the project site.

University Creek flows to Pleasant Grove Creek, then to the Pleasant Grove Canal then to the Natomas Cross Canal and then drains to the Sacramento River. At present, during large storm events, water ponds along the western boundary of the project site during large storm events, then overtops the ditch onto adjacent properties. In addition, water in Pleasant Grove Creek downstream from the project site overflows its banks, flooding homes and ranches. The flood waters also run through the "Sankey Gap" into the Sutter County portion of the Natomas Basin in the vicinity of the Sutter Pointe Specific Plan Area.

Consistent with General Plan Policy SB-6 and PCFCWCD SWMM standards, peak flow runoff rates were determined for the Proposed Project to identify drainage features that would be necessary to mitigate Post-Project development flows. Pre-Project and post-development peak hydraulic grades for University Creek and Pleasant Grove Creek in the 2-year, 10-year, and 100-year storm scenarios are presented in **Tables 4.13-2** through **4.13-4**, respectively. **Figure 4.13-2** shows the sub-watersheds and discharge points discussed in **Table 4.13-2** through **4.13-4**.

The peak flows exiting the site under Post-Project conditions slightly exceed the Pre-Project peak flows for the 2-year and 10-year events, as shown in **Tables 4.13-2** and **4.13-3**, respectively. However, as discussed in **Section 4.13-3** and **Impact 4.13-2**, the Proposed Project would include numerous LID measures such as vegetated swales, porous pavement, and interceptor trees. Although these measures are primarily utilized to improve stormwater quality, in small storms such as the 2- and 10-year events, they would also function to slow the rate of runoff leaving the site. Therefore, the results presented in **Tables 4.13-2** and **4.13-3** are conservative "worst-case" scenarios for stormwater peak flows, as they do not include the reductions in peak flow due to LID measures. Additionally, as discussed above, the deliberate routing of water away from the Gleason property and Toad Hill Ranches is intended to remediate flooding outside of the 100-year floodplain, such as that which occurs in a 2- or 10-year storm event. In Pre-Project conditions, this water would eventually drain to University Creek downstream from the proposed location. Therefore, the Proposed Project would not change the overall amount of water in the system, although it would alter where it enters the creek. These small increases in peak flow from the 2- and 10-year events reflect the addition of flows that would normally negatively impact off-site properties to the north. The slight increases in peak flow in the 2- and 10-year storm events may result in impacts to off-site flooding or siltation, and this is a potentially **significant** impact. **Mitigation Measure 4.13-5** requires the Applicant develop a plan to monitor for erosion attributable to the Proposed Project, and to

implement measures to remediate and prevent erosion should it occur. After mitigation, the impacts due to the increases in 2- and 10-year peak flows are reduced to **less-than-significant** levels.

TABLE 4.13-2
2-YEAR PEAK FLOW COMPARISON (CFS)

Discharge Point	Description	Pre-Project	Post-Project	Net Change in Flow
A	Flow in University Creek upstream of ARSP	110	110	0.0
B	Flow in University Creek downstream of PL10K, PL10K1, and PL10K2	112	111	-1
C	Flow out of PL10K1	1.2	0.0	N/A
D	Flow out of PL10K2	0.4	0.0	N/A
E	Flow in University Creek existing ARSP	127	133	+7
F	Flow out of PL10Q2	2.2	0.0	N/A.
G	Flow out of PL10Q1	12	0.0	N/A
H	Flow out of PL11D1	0.5	0.0	N/A
I	Flow out of PL11C1	0.7	0.0	N/A
J	Flow out of PL11B1	1.6	0.0	N/A
K	Flow in University Creek upstream of confluence with Pleasant Grove Creek	127	134	+7
L	Flow in Pleasant Grove Creek upstream of confluence with University Creek	1,017	1,017	0.0
M	Flow in Pleasant Grove Creek downstream of confluence with University Creek	1,115	1,123	+8
N	Flow in Pleasant Grove Creek at Al Johnson Wildlife Area	1,192	1,194	+2
O	Flow from ARSP on-site Channels (Pre-Project PL10N)	N/A	58	+50

* - Values in the Post-Project condition that are 0.0 cfs represent basins where water is being directed away from the pre-project discharge points.
Source: Kimley-Horn, 2016a (**Appendix I**)

The peak flows from the 100-year storm event are discussed in **Table 4.13-4** below. **Table 4.13-4** shows the "Post-Project [No Storage]" model, which represents the proposed drainage system as described in **Section 2.8** of this Draft EIR, but does not include detention basins, and the "Post Project [With Storage]" model, which represents a hypothetical scenario designed to reduce the volume of runoff leaving the project site. As discussed in **Appendix I** and **Impact 4.13-5**, the volume of runoff leaving the Project site increases slightly under the post-development conditions. Therefore, a Post-Project [With Storage] model was developed for the 100-year, 24-hour event to evaluate impacts of onsite stormwater storage which would remediate the increases in volume. Three one-acre detention basins were added to the Post-Project [No Storage] model to create the Post-Project [With Storage] model shown in **Table 4.13-4**, below. The detention basins were added downstream of watershed PL10K and junctions YPL10Q3 and YPL10N1. Although onsite storage reduces flow volume, onsite storage causes higher peak flows than those under the Post-Project [No Storage] condition. This is due to peak flow timing.

TABLE 4.13-3
10-YEAR PEAK FLOW COMPARISON (CFS)

Discharge Point	Description	Pre-Project	Post-Project	Net Change in Flow
A	Flow in University Creek upstream of ARSP	391	391	0.0
B	Flow in University Creek downstream of PL10K	399	393	-6
C	Flow out of PL10K1	5.8	0.0	N/A
D	Flow out of PL10K2	2.8	0.0	N/A
E	Flow in University Creek existing ARSP	446	452	+6
F	Flow out of PL10Q2	7.8	0.0	N/A
G	Flow out of PL10Q1	43	0.0	N/A
H	Flow out of PL11D1	1.7	0.0	N/A
I	Flow out of PL11C1	2.3	0.0	N/A
J	Flow out of PL11B1	6.7	0.0	N/A
K	Flow in University Creek upstream of confluence with Pleasant Grove Creek	447	453	+7
L	Flow in Pleasant Grove Creek upstream of confluence with University Creek	2,020	2,020	0.0
M	Flow in Pleasant Grove Creek downstream of confluence with University Creek	2,440	2,442	+2
N	Flow in Pleasant Grove Creek at Al Johnson Wildlife Area	2,663	2,647	-16
O	Flow from ARSP on-site Channels	N/A	151	+119

* - Values in the Post-Project condition that are 0.0 cfs represent basins where water is being directed away from the pre-project discharge points.
Source: Kimley-Horn, 2016a (**Appendix I**)

Peak flows in Pleasant Grove Creek downstream of the confluence do not increase under Post-Project [No Storage] 100-year, 24-hour conditions. However, detaining runoff in the three hypothetical detention basins in the Post-Project [With Storage] scenario causes higher peak flows (shown in **Table 4.13-4**) and results in a delay in the Post-Project runoff. This causes peak flow coming from the project site to align in timing with the peak flows in University Creek and Pleasant Grove Creek.

The results of the hydrologic modeling presented in **Appendix I** indicate that the runoff from the project site occurs approximately 5.5 hours before the peak in the natural hydrograph of both Pleasant Grove Creek and University Creek. Providing onsite storage to retain runoff would result in the delay of the runoff so that it results in an increase in peak flows in both University Creek (where it exits the project site) and Pleasant Grove Creek (downstream of the confluence with University Creek and downstream of the Al Johnson Wildlife Area). This is shown in **Figure 4.13-6**. This may result in increased flooding and erosion issues within Pleasant Grove Creek. Therefore, the onsite storage scenario presented in **Table 4.13-4** is not recommended. It is recommended that the project applicant purchase retention credits for its volumetric increases through the City of Roseville's regional Reason Farms detention basin project, discussed further in **Impact 4.13-5** below.

TABLE 4.13-4
100-YEAR PEAK FLOW COMPARISON (CFS)

Discharge Point	Description	Pre-Project	Post-Project, No Storage [With Storage]*	Net Change in Flow No Storage [With Storage]
A	Flow in University Creek upstream of ARSP	847	847 [847]	0.0 [0.0]
B	Flow in University Creek downstream of PL10K	866	851 [860]	-15 [-6]
C	Flow out of PL10K1	14	0.0	N/A
D	Flow out of PL10K2	4.9	0.0	N/A
E	Flow in University Creek existing ARSP	970	970 [990]	0.0 [+20]
F	Flow out of PL10Q2	22	0.0	N/A
G	Flow out of PL10Q1	120	0.0	N/A
H	Flow out of PL11D1	4.8	0.0	N/A
I	Flow out of PL11C1	6.5	0.0	N/A
J	Flow out of PL11B1	17	0.0	N/A
K	Flow in University Creek upstream of confluence with Pleasant Grove Creek	972	972 [992]	0.0 [+20]
L	Flow in Pleasant Grove Creek upstream of confluence with University Creek	4,336	4,336 [4,336]	0.0 [0.0]
M	Flow in Pleasant Grove Creek downstream of confluence with University Creek	5,279	5,276 [5,294]	-3 [+15]
N	Flow in Pleasant Grove Creek at Al Johnson Wildlife Area	5,747	5,704 [5,715]	-43 [-32]
O	Flow from ARSP on-site Channels	N/A	394 [359]	+310 [+275]

* - Values in the Post-Project condition that are 0.0 cfs represent basins where water is being directed away from the pre-project discharge points.
Flows in [brackets] are the Post-Project flows with LID measures incorporated.
Source: Kimley-Horn, 2016a (**Appendix I**)

The hydraulic model predicts little difference between the Pre-Project and Post-Project [No Storage] conditions for the 100-year storm event (Kimley-Horn, 2016a; **Appendix I**). Further, as shown in **Tables 4.13-2** through **4.13-4**, the proposed drainage system would eliminate existing stormwater discharge points along the western site boundary that contribute to ongoing flooding issues caused in part by runoff on the ARSP site overtopping the existing ditch at Discharge Point G. No flooding would occur on or off-site as a result of altered drainage patterns and increases in the rate of surface runoff. The proposed drainage pattern alterations have been designed to alleviate existing flooding issues both on- and off-site. However, the due to the rerouting of flows away from the western boundary and into University Creek, the 2- and 10-year storm events will have a slightly increased peak flow rate as compared to Pre-Project conditions, which is reduced to less-than-significant levels through implementation of **Mitigation Measure 4.13-5**. There are no increases in peak flow from the 100-year storm event in the Post-Project condition, and therefore, impacts are **less than significant**.

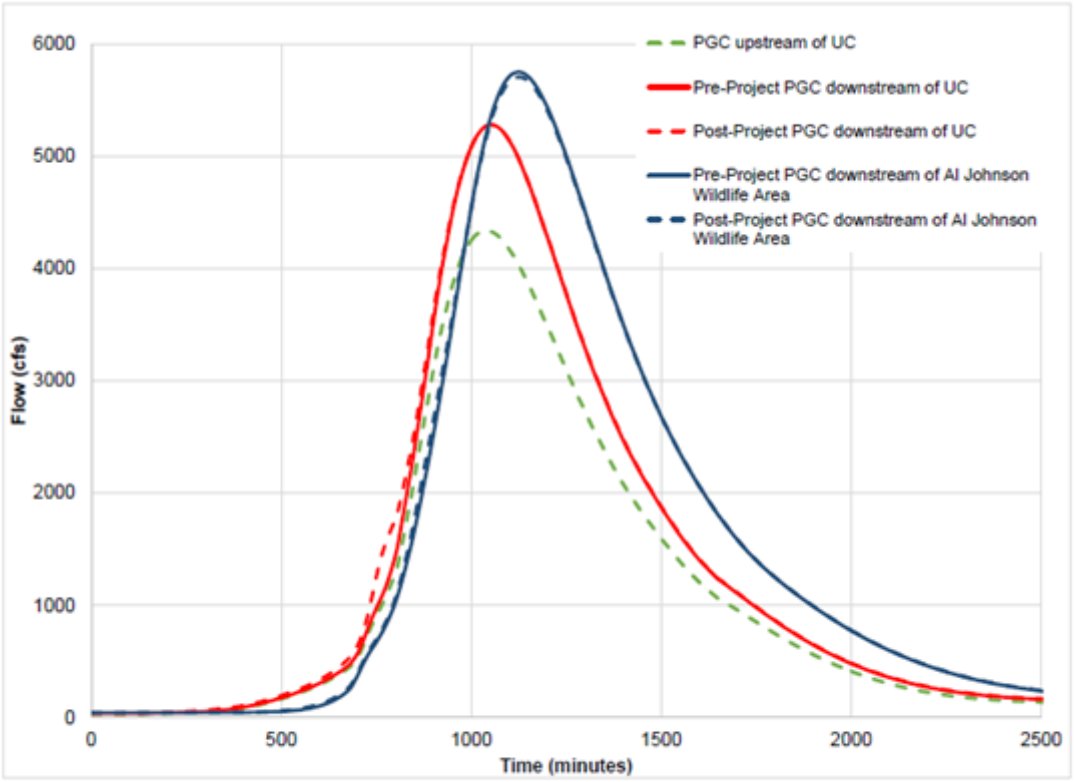


Figure 4.13-6: Pre- and Post-Project Hydrograph Comparisons for Pleasant Grove Creek
Source: Kimley-Horn, 2016a.

IMPACT 4.13-5	INCREASE IN THE AMOUNT OF SURFACE RUNOFF VOLUME, WHICH WOULD EXCEED THE CAPACITY OF EXISTING STORM DRAINAGE SYSTEMS AND INCREASE THE POTENTIAL FOR DOWNSTREAM FLOODING
Applicable Policies and Regulations	City of Roseville Improvement Standards City's Regional Flood Control Program
Significance with Policies and Regulations	Significant
Mitigation Measures	MM 4.13-3 Fair Share Payment to Regional Stormwater Retention
Significance After Mitigation	Less than Significant

As discussed in **Impact 4.13-3**, development of the Proposed Project would increase the impervious surfaces on approximately 481 acres of the project site, which would increase the volume of stormwater

runoff into University Creek and Pleasant Grove Creek compared to existing conditions. In addition, development and grading would alter the existing runoff patterns and conveyance capacities of the properties in the project site. This volume increase, when combined with the larger watersheds contributing to the Natomas Cross Canal watershed, has the potential to peak with the flood waters of the Sacramento River to cause flooding downstream of the project site in Sutter County. Development of the ARSP is estimated to generate an additional runoff volume of 75.31 AF (Kimley-Horn, 2016a; **Appendix I**). The ARSP contribution to the increase in volume of runoff in the Natomas Cross Canal watershed would be **significant**.

The ARSP drainage system is described in **Appendix I** and **Section 2.8.2**. As discussed further therein, the majority of the flow generated by the Proposed Project will be routed into University Creek downstream of the existing berm at the southwestern corner of the project site. The ARSP proposes to drain the majority of the project site into channels on the western and southern borders of the project site. This drainage plan avoids the necessity of piping to University Creek south of the site, thereby avoiding extreme amounts of grading and land disturbance that would be required. To avoid this, the channel concept was developed. Due to the use of these channels, the berm adjacent to University Creek near PL10N1 will remain in place. In addition, flows would be routed away from existing flood-prone areas on the neighboring Gleason property and the Toad Hill Ranches. The proposed drainage pattern alterations have been designed to alleviate existing flooding issues both on- and off-site.

The increase in volumetric flows from the project site would be managed to minimize the risk of downstream flooding beyond the boundaries in the Natomas Cross Canal watershed. As discussed in **Section 4.13.2**, the City of Roseville has approved a regional retention basin on City-owned property at the Al Johnson Wildlife Area. The Regional Pleasant Grove Retention Basin Facility will be located west of the project site. The EIR for the Pleasant Grove Retention Basin Facility was certified in 2003, and evaluated full buildout of the regional flood control project with a storage capacity of 2,350 AF. The flood control project evaluated two retention basins. Although not originally part of the fee district contributing to the future construction of the flood control project, there is sufficient storage capacity within the design to allow the ARSP to annex into and participate in the fee program. Upon construction of the north basin within the Reason Farms Regional Retention Basin, there will be sufficient capacity for the ARSP stormwater flows. The City currently collects a drainage impact fee from new development projects to fund construction of the regional flood control project, which will be constructed as funds are made available. Following the approval of the Land Use Plan and annexation into the City, the ARSP will be annexed into the fee district area and will contribute their fair share towards the future development of the flood control project.

The Proposed Project would require 75.31 AF of volumetric storage within the north retention basin, as detailed in **Appendix I**. Therefore, implementation of **Mitigation Measure 4.13-3**, which requires the project applicant annex into the Drainage Fee District and to pay drainage impacts fees for the volumetric storage needs of 75.31 AF, would reduce this impact to a **less-than-significant** level.

IMPACT 4.13-6	CONSTRUCTION OF OFF-SITE STORMWATER RETENTION FACILITIES
Applicable Policies and Regulations	City's Regional Flood Control Program
Significance with Policies and Regulations	Significant
Mitigation Measures	MM 4.13-4 North Retention Basin Construction
Significance After Mitigation	Significant and Unavoidable

As identified in **Impact 4.13-5** above, the Proposed Project would require 75.31 AF of volumetric storage within the north retention basin of the Regional Flood Control Project at the Al Johnson Wildlife Area. The ARSP, in combination with buildout of other projects in the area, would trigger construction of the north basin. The ARSP will contribute fees toward the construction of the Regional Flood Control Project. The potential impacts of construction of the north and south retention basins within the Al Johnson Wildlife Area were previously addressed in the EIR for the City of Roseville Retention Basin Project (SCH #2002072084) ("Retention Basin EIR"), incorporated by reference.

As concluded within the Retention Basin EIR, the majority of the impacts from construction and operation of the retention basins would be less than significant, or could be reduced to less-than-significant levels with mitigation identified in the Retention Basin EIR. However, the Retention Basin EIR determined that the following impacts may not be reduced to less-than-significant levels after application of recommended mitigation and would therefore remain significant:

- Conversion (direct and indirect) of prime agricultural land to non-agricultural use
- Short-term (construction phase) impacts to air quality
- Short-term (construction phase) impacts due to noise
- Significant cumulative indirect growth inducement

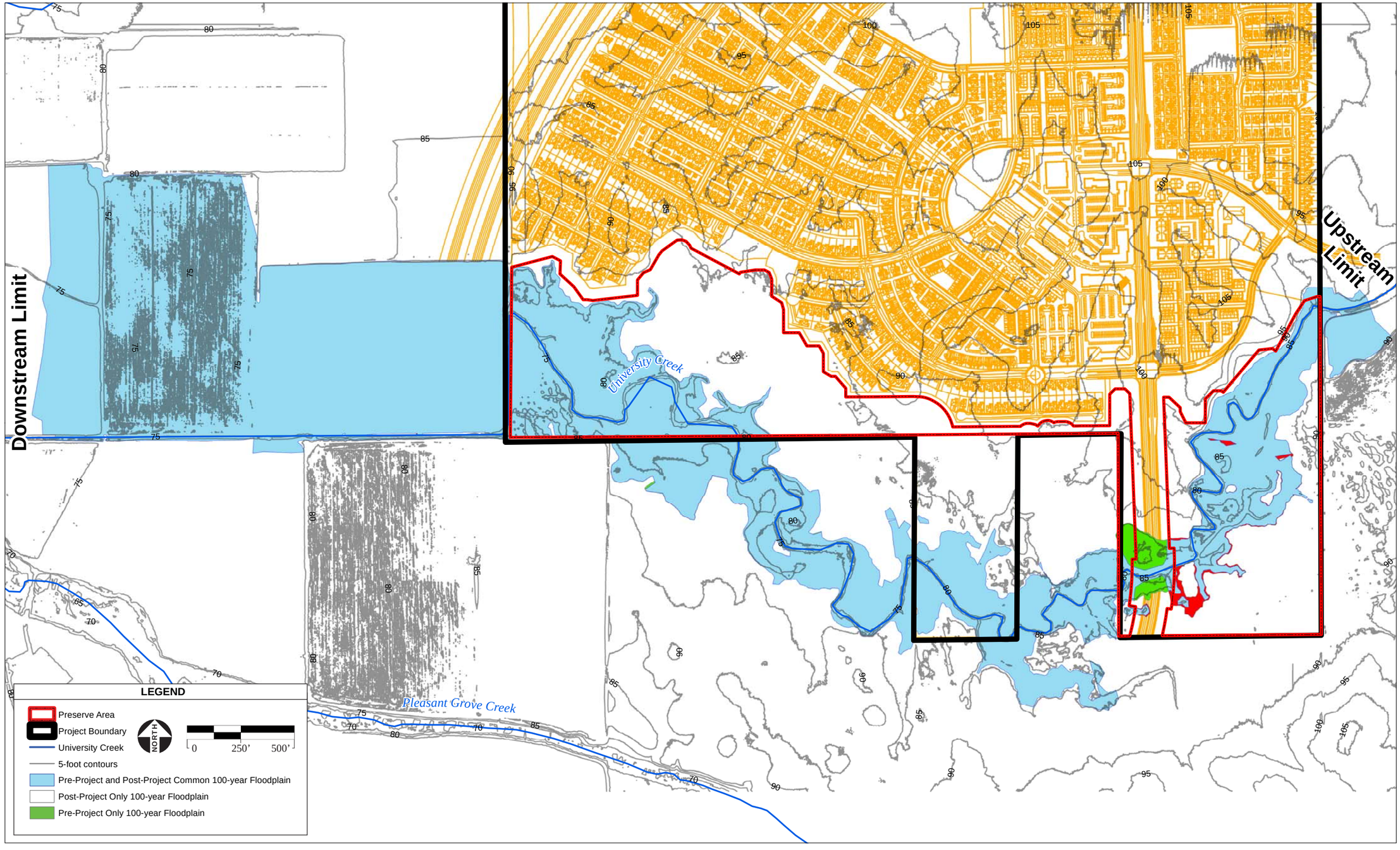
Implementation of **Mitigation Measure 4.13-4**, North Retention Basin Construction, requires that all appropriate construction related mitigation measures identified in the Retention Basin Project Final EIR be implemented as part of constructing the retention basin to reduce construction related impacts. However, because the ARSP would contribute towards the need to construct the north basin, and the ability to construct the basin is dependent on development fees, the timing of the construction of the basin is uncertain, and therefore would result in the significant impacts identified above; this impact is considered **significant and unavoidable**.

IMPACT 4.13-7	PLACEMENT OF FILL OR STRUCTURES IN THE 100-YEAR FLOODPLAIN COULD AFFECT WATER SURFACE ELEVATIONS, WHICH COULD INCREASE THE RISK OF FLOODING ON-SITE
Applicable Policies and Regulations	FEMA (44 CFR 60) City Floodplain Development Regulations (Roseville Municipal Code Chapter 9.80)
Significance with Policies and Regulations	Less than Significant
Mitigation Measures	None Required
Significance After Mitigation	Less than Significant

University Creek flows through the southern portion of the project site. The 100-year floodplain for University Creek is illustrated in **Figure 4.13-2**. The only portions of the project site that are within the 100-year floodplain, which closely follows the meanders of University Creek, are areas designated as General Open Space and Preserve Open Space where no development will occur.

The 100-year floodplains were analyzed for the Pre-Project and Post-Project [No Storage] conditions utilizing the peak flows for the 100-year, 24-hour event. There is no rise in the 100-year water surface elevation based on peak flow rates from the Post-Project [No Storage] condition downstream of Westbrook Crossing in University Creek to the confluence of Pleasant Grove Creek and in Pleasant Grove Creek downstream to the Al Johnson Wildlife Area (**Appendix I**). Thus, flooding from the 100-year, 24-hour storm into the Al Johnson Wildlife Area would not occur as a result of the Proposed Project and water surface elevations in the Al Johnson Wildlife Area would not be increased as a result of the Proposed Project. This impact is **less than significant**.

The 100-year Pre-Project and Post-Project development floodplains are depicted in **Figure 4.13-7**. As shown therein (in green), the Proposed Project includes a 9 foot high by 70 foot wide arch culvert proposed for Westbrook Road to cross University Creek at the southern boundary of the project site which results in a slight constriction of the floodplain. Therefore, compared to Pre-Project conditions, the crossing increases the water surface elevation upstream to the east. There is no impact to the downstream water surface elevation to the west of Westbrook Road Crossing. To offset the slight increases in water surface elevation caused by the culvert, the floodplain will increase in size in small pockets upstream to the east, as shown in red in **Figure 4.13-7**. However, these small increases are contained entirely within the project area and within the area designated for General Open Space and Preserved Open Space, so there will be no significant increase in the risk of flooding. This is a **less-than-significant** impact.



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-7
Pre-Project versus Post-Project Floodplain

IMPACT 4.13-8	CUMULATIVE HYDROLOGY AND WATER QUALITY IMPACTS
Applicable Policies and Regulations	City of Roseville Improvement Standards Placer County Stormwater Management Manual
Significance with Policies and Regulations	Significant
Mitigation Measures	MM 4.13-1 Implementation of Construction Activity Stormwater Standards MM 4.13-2 Stormwater Management Development Standards MM 4.13-3 Fair Share Payment to Regional Stormwater Retention
Significance After Mitigation	Less than Significant

Cumulative development in the Roseville area, which includes the Pleasant Grove Creek watershed, would increase the amount of impervious surfaces which could contribute to increased peak stormwater runoff flows and increased flood elevations. This is a **significant** cumulative impact.

Projects upstream and east of State Route 65 in Lincoln and Rocklin have constructed or have planned regional detention peak flow storage basins along Pleasant Grove Creek and its tributaries. Both the City of Roseville and Placer County General Plan policies require that individual projects mitigate their contribution of increased peak stormwater runoff flows and to minimize the potential for increased flood elevations and on- and off-site flooding.

As described above, the City currently collects a drainage fee for the future construction of a regional stormwater retention basin at the Al Johnson Wildlife Area to mitigate for volumetric impacts. The Retention Basin EIR evaluated the potential environmental effects of construction and operation of the regional retention basin to mitigate volumetric concerns to downstream properties. The ARSP Drainage Master Plan (2016) analyzed the impacts to University Creek and Pleasant Grove Creek from buildout of the cumulative development in the region, including the ARSP, CSP, WRSP, and the Placer Ranch area, and assessed that against the pre- and post-project impacts of the ARSP. The buildout of projects within the City of Roseville will be required to purchase credits within the City's retention basins to accommodate the volumetric flow increases modeled (**Appendix I**). With implementation of mitigation measures requiring in-lieu payments for the Al Johnson Wildlife Area, impacts due to cumulative development are reduced to **less than significant**.

All projects within the City are required to mitigate their peak flows to pre-project levels with the intent that there is no increase to the flood levels either upstream or downstream of the project. As described in the ARSP Drainage Master Plan (**Appendix I**), the post-development peak flows generated from the Proposed Project precede the peak flow timing of both the University Creek and Pleasant Grove Creek watersheds and, as such, there is no peak flow increase to flood levels as a result of the ARSP. Therefore, impacts due to cumulative development on peak flows are **less than significant**.

The Drainage Master Plan prepared for the Proposed Project (**Appendix I**) modeled the peak flow impacts due to cumulative development called the "Future-Fully Developed model," which includes the CSP, Placer Ranch area, and WRSP as incorporated by the City. The ARSP model (Post-Project [No Storage]) was then added to the Future-Fully Developed Model to assess potential impacts. As shown in **Table 4.13-5**, with the development of the cumulative environment, the net change in flows decrease in University Creek but increase slightly in Pleasant Grove Creek at Discharge Points L and M. Although there are slight increases in the peak flow at Discharge Points L and M (both downstream of the project site), these will not cause significant impacts due to the timing of the peak flows, similar to **Impact 4.13-4**.

TABLE 4.13-5
100-YEAR PEAK FLOW COMPARISON (CFS) FOR CUMULATIVE BUILD-OUT SCENARIO

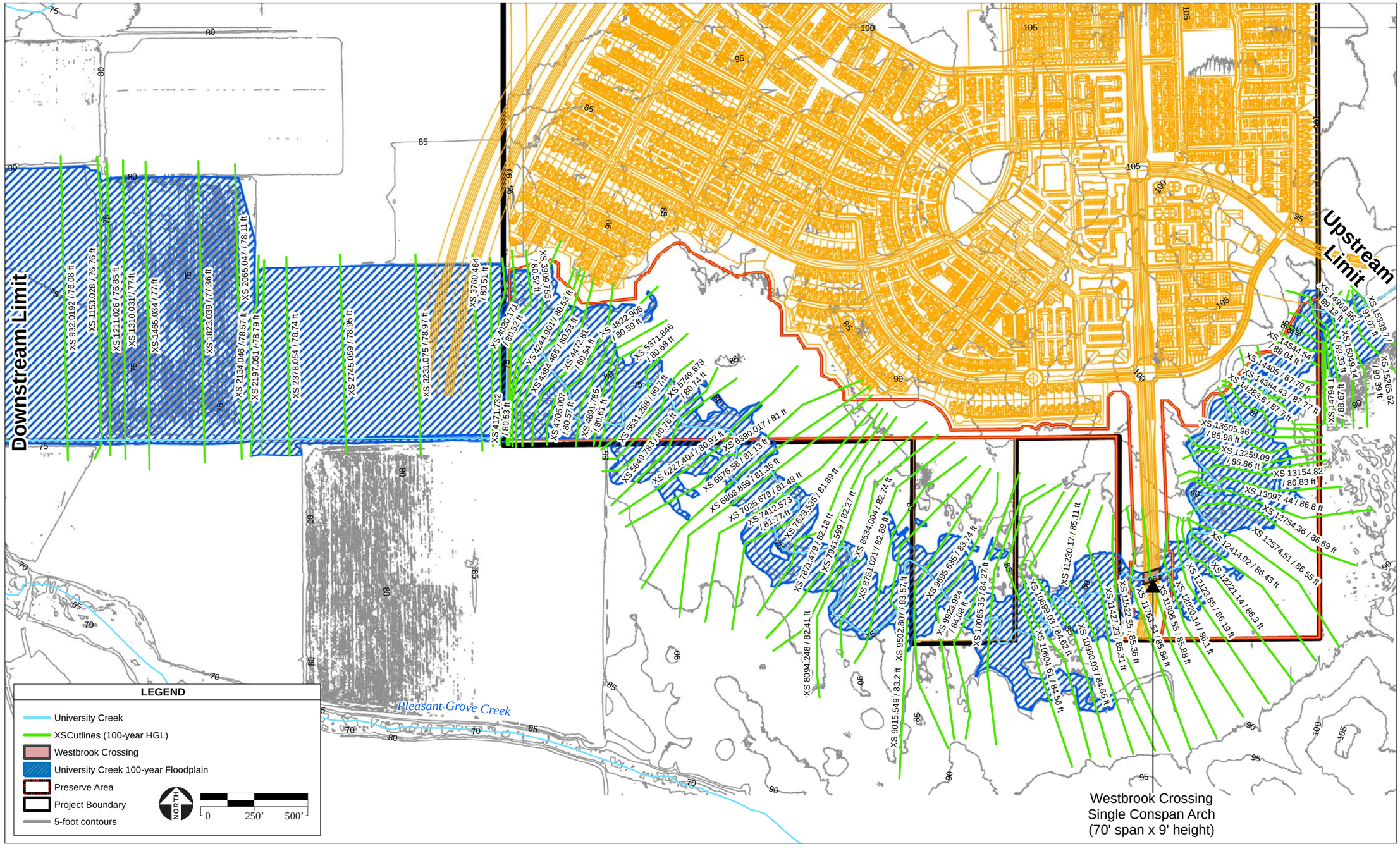
Discharge Point	Description	Pre-Project	Post-Project, No Storage with Cumulative Build-Out*	Net Change in Flow
A	Flow in University Creek upstream of ARSP	847	844	-3
B	Flow in University Creek downstream of PL10K	866	848	-18
E	Flow in University Creek existing ARSP	970	929	-41
K	Flow in University Creek upstream of confluence with Pleasant Grove Creek	972	931	-41
L	Flow in Pleasant Grove Creek upstream of confluence with University Creek	4,336	4,513	+177
M	Flow in Pleasant Grove Creek downstream of confluence with University Creek	5,279	5,332	+53

Source: Kimley-Horn, 2016a (**Appendix I**)

In addition, this model was utilized to analyze potential impacts to the 100-year floodplain as a result of cumulative build-out. The Proposed Project lies outside the Future-Fully Developed (with ARSP) floodplain, as shown in **Figure 4.13-8** (**Appendix I**). Therefore, there are no significant impacts to the Proposed Project due to future floodplain issues in the cumulative environment.

The Proposed Project and potential cumulative projects in the vicinity of the project site, including growth resulting from build-out of the City's General Plan and the nearby specific plans, would be required to comply with the general NPDES permit of the SWRCB, which is intended to reduce the potential for cumulative impacts to water quality during construction. Cumulatively considerable projects that would discharge stormwater runoff would be required to comply with NPDES discharge permits from the CVRWQCB and would be subject to subsequent environmental review. Therefore, impacts associated with cumulative construction related water quality effects would be **less than significant**.

Each of the cumulative development projects and the Proposed Project would be subject to local, State, and federal regulations designed to minimize cumulative impacts to water quality from operation. Mitigation measures for the Proposed Project in combination with compliance with City, state, and federal regulations, are expected to reduce cumulatively considerable impacts to a **less-than-significant** level.



SOURCE: Kimley Horn, 2015; AES, 2015

Figure 4.13-8
Cumulative Build-Out Floodplain

4.13.5 MITIGATION MEASURES

MM 4.13-1 Implementation of Construction Activity Stormwater Standards (Impact 4.13-1)

Prior to the issuance of a City grading permit and the commencement of construction activities, the Applicant shall demonstrate to the City compliance with the SWRCB NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit), the City of Roseville's Construction Standards, and the City's Stormwater BMP Guidance Manual. The SWRCB requires that all construction sites have adequate control measures to reduce the discharge of sediment and other pollutants to streams to ensure compliance with Section 303 of the CWA. To comply with the NPDES permit, the Applicant shall file a Notice of Intent with the SWRCB and prepare a SWPPP prior to construction, which includes a detailed, site-specific listing of the potential sources of stormwater pollution; pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills) to include a description of the type and location of erosion and sediment control BMPs to be implemented at the project site, and a BMP monitoring and maintenance schedule to determine the amount of pollutants leaving the project site. A copy of the SWPPP must be current and remain on the project site. Control measures are required prior to and throughout the rainy season. Water quality BMPs identified in the SWPPP could include but are not limited to the following:

- Temporary erosion control measures (such as silt fences, staked straw bales, and temporary revegetation) shall be employed for disturbed areas. No disturbed surfaces will be left without erosion control measures in place during the winter and spring months.
- Sediment shall be retained onsite by a system of sediment basins, traps, or other appropriate measures.
- A spill prevention and countermeasure plan shall be developed which would identify proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used onsite. The plan would also require the proper storage, handling, use, and disposal of petroleum products.
- Construction activities shall be scheduled to minimize land disturbance during peak runoff periods and to the immediate area required for construction. Soil conservation practices shall be completed during the fall or late winter to reduce erosion during spring runoff. Existing vegetation will be retained where possible. To the extent feasible, grading activities shall be limited to the immediate area required for construction.
- Surface water runoff shall be controlled by directing flowing water away from critical areas and by reducing runoff velocity. Diversion structures such as terraces, dikes, and ditches shall collect and direct runoff water around vulnerable areas to prepared drainage outlets. Surface roughening, berms, check dams, hay bales, or similar devices shall be used to reduce runoff velocity and erosion.

- Sediment shall be contained when conditions are too extreme for treatment by surface protection. Temporary sediment traps, filter fabric fences, inlet protectors, vegetative filters and buffers, or settling basins shall be used to detain runoff water long enough for sediment particles to settle out. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff losses and contamination of groundwater.
- Topsoil removed during construction shall be carefully stored and treated as an important resource. Berms shall be placed around topsoil stockpiles to prevent runoff during storm events.
- Establish fuel and vehicle maintenance areas away from all drainage courses and design these areas to control runoff.
- Disturbed areas shall be revegetated after completion of construction activities.
- All necessary permits and approvals shall be obtained.
- Provide sanitary facilities for construction workers.

MM 4.13-2 Stormwater Management Development Standards (Impact 4.13-2)

At the tentative map or site development stage, development shall be conditioned to include source control and LID strategies, treatment control measures, including but not limited to bio-retention treatment as required by the City's then current design standards and the City's then current General Phase II MS4 Permit issued by the State. The measures shall include, but are not limited to, the measures identified in the Amoruso Drainage Master Plan. In addition, necessary erosion and sediment control measures for University Creek at Discharge Point E and monitoring of University Creek downstream of the discharge point shall be incorporated into the project design plans and submitted to the City for review and approval prior to receiving building/grading permits.

MM 4.13-3 Fair Share Payment to Regional Stormwater Retention (Impact 4.13-5)

The applicant shall annex into the fee district and pay the Pleasant Grove Drainage fee to the City prior to the approval of each building permit, which would cover the cost of retention for that development's portion of the Pleasant Grove Retention Basin Project at the Al Johnson Wildlife Area.

MM 4.13-4 North Retention Basin Construction (Impact 4.13-6)

All relevant construction-related mitigation measures for construction of the north retention basin within the Al Johnson Wildlife Area listed in the adopted Mitigation, Monitoring, and Reporting Program shall be implemented. The City shall monitor the discharge at the western boundary on a yearly basis, to ensure that there are no impacts and that the existing facility within the Al Johnson Wildlife Area is functioning properly.

MM 4.13-5 Erosion Monitoring Plan (Impact 4.13-4)

At the onset of any grading activities within the ARSP that increase the existing drainage area tributary to the University Creek channel within Al Johnson Wildlife Area, a geomorphologic assessment of University Creek through the Al Johnson Wildlife Area property shall be conducted.

The geomorphologic assessment shall include erosion protection measures, such as stream bank stabilization and velocity reduction measures, and the location for their implementation. The construction of the erosion protection measures shall be triggered by criteria established within the geomorphologic assessment.