

5.9 HYDROLOGY AND WATER QUALITY

The purpose of this section is to describe the hydrologic and water quality setting of the proposed project site and surrounding area. This section contains information based on the *Preliminary Hydrology Analysis for Terra Robles Tract Map #1996*, dated February 15, 2016, prepared by S₂ ~ J₂ Engineering Inc. (refer to Appendix 15.6, PRELIMINARY HYDROLOGY ANALYSIS). The purpose of the *Preliminary Hydrology Analysis* is to analyze the existing and post-construction hydrologic conditions of the site. This section also evaluates potential long-term and short-term water quality impacts associated with construction and long-term operation of the proposed project. The following analysis of the potential environmental impacts related to hydrology and water quality is also derived from the following sources and agencies:

- Shasta County. Shasta County Grading Ordinance, Section 12.12.
- Shasta County. *Shasta County General Plan*. September 2004.
- Wildland Resource Managers. *Biological Review for Geringer's Capitol "Tierra Robles Ranch"* Shasta County, California. July 2015.

This section describes the affected environment and regulatory setting for hydrology and water quality. It also describes the impacts on hydrology and water quality that would result from implementation of the proposed project and mitigation measures that would reduce these impacts.

5.9.1 ENVIRONMENTAL SETTING

Shasta County is located in the northern portion of California. The County occupies the northern reaches of the Sacramento Valley, with portions extending into the southern reaches of the Cascade Range. The Sacramento River flows out of the Cascade Mountains to the north, through the center of the County, and toward the Sacramento Valley to the south.

The climate in the northern portion of the Sacramento Valley is characterized by hot, dry summers and moderately cool, wet winters. Average annual rainfall in the City of Redding, which is located approximately 5 miles west of the project site, is approximately 33 inches. The area usually experiences the majority of storm events from early November through early April. Snowfall is infrequent, seldom lasting for more than 24 hours. Rainfall depth for a 100-year return period storm event reaches approximately 2.1 inches in a 1-hour duration storm and 7.38 inches in a 24-hour duration storm. The intensity of rainfall in the area is elevation dependent, and the most intense precipitation is the result of localized cloudburst activity.

The County has several programs that provide water quality protection, including much of the Water Resources Element of the *General Plan*, and a grading ordinance that addresses erosion and sediment control.

SURFACE WATER

The proposed project encompasses approximately 715.4 acres and is currently undeveloped vacant land. Onsite topography is characterized as level to rolling terrain in the western portion of the proposed project site, and steeper slopes and ridges are located in the eastern portion of the site, with elevations ranging from approximately 600 feet above mean sea level (msl) to 650 feet above msl.

The proposed project site is dissected by three major drainage systems including Clough Creek, which flows southwest across the northwest corner of the property, an unnamed stream that flows south across the east central portion of the project site, and a major unnamed drainage that flows from north to southeast across the eastern side of the project site. In addition, there are two small streams with attached tributaries which drain the central portion of the project site. Clough Creek is one of the main tributaries of Stillwater Creek and is part of the Stillwater-Churn Creek Watershed (SRWP).

WATER QUALITY

Surface water quality is subject to federal, State, and local water quality requirements that are administered and enforced by the EPA, the California State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Board (RWQCB), with cooperation from each county.

The principal law governing pollution of the nation's surface waters is the federal Water Pollution Control Act (Clean Water Act [CWA]). Originally enacted in 1948, it was amended in 1972 and has remained substantially the same since. The CWA consists of two major parts: provisions that authorize federal financial assistance for municipal sewage treatment plant construction and regulatory requirements that apply to industrial and municipal dischargers. The CWA authorizes the establishment of effluent standards on an industry basis. The CWA also requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

To achieve its objectives, the CWA is based on the concept that all discharges into the nation's waters are unlawful, unless specifically authorized by a permit. The National Pollutant Discharge Elimination System (NPDES) is the permitting program for discharge of pollutants into surface waters of the United States under Section 402 of the CWA. Thus, industrial and municipal dischargers (point source discharges) must obtain NPDES permits from the appropriate RWQCB (i.e., the Central Valley region). The existing NPDES (Phase I) storm water program requires municipalities serving more than 100,000 persons to obtain an NPDES storm water permit for any construction project larger than five acres.

Proposed NPDES storm water regulations (Phase II) expand this existing national program to smaller municipalities with populations of 10,000 persons or more and construction sites that disturb greater than one acre. For other dischargers, such as those affecting groundwater or from non-point sources, a Report of Waste Discharge must be filed with the RWQCB. For specified situations, some permits may be waived and some discharge activities may be handled through inclusion in an existing general permit. While the U.S. Environmental Protection Agency (EPA) has two permitting options to meet NPDES requirements (individual permits and general permits), the SWRCB has elected to adopt one statewide General Permit for California that applies to all construction-related storm water discharges, except for those on tribal lands, in the Lake Tahoe Hydrologic Unit, and under the control of the California Department of Transportation (Caltrans).

Construction activity subject to this General Permit includes any clearing, grading, stockpiling, or excavation that results in soil disturbances of at least one acre of total land area. Construction activities disturbing less than one acre are still subject to this permit if the activity is part of a large common plan of development or if significant water quality impairment will result from the activity. The General Permit requires all dischargers whose construction activity disturbs one acre or more to:

- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) that specifies Best Management Practices (BMPs) to prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving offsite into receiving waters;
- Eliminate or reduce non-storm water discharge to storm sewer systems and other waters of the United States; and
- Perform inspections of all BMPs.

Storm Water Pollution Prevention Plan

The SWPPP has two major objectives: 1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges, and 2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in both storm water and in non-storm water discharges.

BMPs include activities, practices, maintenance procedures, and other management practices that reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges. BMPs include treatment requirements, operation procedures, and practices to control site runoff, spillage, leaks, waste disposal and drainage from raw materials storage. BMP implementation must take into account changing weather conditions and construction activities, and various combinations of BMPs may be used over the life of the project to maintain compliance with the CWA. The General NPDES Permit gives the owner the discretion to determine the most economical, effective, and innovative BMPs to achieve the performance-based goals of the General NPDES Permit.

There are two categories of BMPs: structural and non-structural. Structural BMPs are the specific construction, modification, operation, maintenance, or monitoring of facilities that would minimize the introduction of pollutants into the drainage system, or would remove pollutants from the drainage system. Non-structural BMPs are activities, programs, and other nonphysical measures that help reduce pollutants from non-point sources to the drainage system. In general, nonstructural BMPs are source control measures.

The issue of pollution in storm water and urban runoff has been recognized by both federal and state agencies, and there has been a growing concern regarding activities that discharge water affecting California's surface water, coastal waters, and groundwater. Discharges of water are classified as either point source or non-point source discharges. A point source discharge usually refers to waste emanating from a single, identifiable point. Regulated point sources include municipal wastewater, oil field wastewater, winery discharges, solid waste sites, and other industrial discharges. Point source discharge must be actively managed to protect the state's waters. A non-point source discharge usually is a waste emanating from diffused locations. As a result, specific sources of non-point source pollution may be difficult to identify, treat, or regulate. The goal is to reduce the adverse impact of non-point source discharges on water resources through better management of these activities. Non-point sources include drainage and percolation from a variety of activities such as agriculture, forestry, recreation, and storm runoff.

Point and Non-Point Source Pollutants

The issue of pollution in storm water and urban runoff has been recognized by both federal and state agencies, and there has been a growing concern regarding activities that discharge water affecting California's surface water, coastal waters, and groundwater. Discharges of water are classified as either point source or non-point source discharges. A point source discharge usually refers to waste emanating from a single, identifiable point. Regulated point sources include municipal wastewater, oil field wastewater, winery discharges, solid waste sites, and other industrial discharges. Point source discharge must be actively managed to protect the state's waters. A non-point source discharge usually is a waste emanating from diffused locations. As a result, specific sources of non-point source pollution may be difficult to identify, treat, or regulate. The goal is to reduce the adverse impact of non-point source discharges on water resources through better management of these activities. Non-point sources include drainage and percolation from a variety of activities such as agriculture, forestry, recreation, and storm runoff.

A net effect of urbanization can be to increase pollutant export over naturally occurring conditions. The impact of the higher export can be on the adjacent streams and on the downstream receiving waters. However, an important consideration in evaluating storm water quality from a project is to assess whether it impairs the beneficial uses of the receiving waters. Receiving waters can assimilate a limited quantity of various constituent elements; however, there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. Non-point source pollutants have been characterized by the following major categories in order to provide an understanding of typical urbanization impacts.

- Sediment
- Nutrients
- Trace Metals
- Oxygen-Demanding Substances
- Bacteria
- Oil and Grease
- Other Toxic Chemicals

Physical Characteristics of Surface Water Quality

Standard parameters used to assess the quality of storm water provide a method of measuring impairment. The backgrounds of these typical characteristics assist in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in the environment is a function of the intensity of the land use. For instance, high volume automobile traffic makes available a number of potential pollutants (such as lead and hydrocarbons). The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or groundwater.

The physical properties and chemical constituents of water have traditionally served as the means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for storm

water make up a long list and are classified in many ways. In many cases, the concentration of an urban pollutant is needed to assess a water quality problem. Some of the physical, chemical, or biological characteristics used to evaluate the quality of the surface runoff are identified as:

- Dissolved Oxygen (DO)
- Biochemical Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Total Dissolved Solids (TDS)
- pH
- Alkalinity
- Specific Conductance
- Turbidity
- Nitrogen (N)
- Phosphorus (P)

GROUNDWATER

The proposed project is located within the Redding Groundwater Basin. The Redding Basin is bound on the east by the dissected alluvial terraces, which form the foothills of the Cascade Range. The low hills and dissected uplands of the Coast Range stretch for the length of the western Shasta and Tehama County borders. The interior of the Redding Basin is characterized by stream channels, floodplain, and natural levees of the Sacramento River and its tributaries (SCWA, 2007).

EXISTING HYDROLOGY

Clough Creek is the most significant drainage on the project site, and is an intermittent stream that flows from north to south across the western portion of the site. Clough Creek originates several miles north of the project site and flows south, emptying into Stillwater Creek 2.5 miles south of the project site. Stillwater Creek flows 7.5 miles south-southeast before emptying into the Sacramento River. Several smaller tributaries to Clough Creek drain the northwestern portion of the site. The main channel is fairly wide (10 to 15 feet) and is comprised of a gravel bottom with pools and shallow runs.

Running from north to south along the eastern side of the site, through a shallow valley, is another intermittent stream that drains the properties located to the north of the project site. This stream is not as prominent as Clough Creek being between 8 and 12 feet in width. The stream bed is gravelly with a shallow gradient. This stream drains the eastern half of the project site. The stream originates in the upland terraces two miles north of the project site, flows through the site, and then continues another 1.5 miles prior to emptying into Little Cow Creek.

Draining the central portion of the project site are two narrow and shallow ephemeral streams that originate on or very near the project site and flow generally southward. The western most of the two streams originates near the southern edge of the project site and flows in and out of the project site before leaving the site through a culvert under Boyle Road. From there, the stream continues to flow southward ultimately emptying into Stillwater Creek approximately 3.5 miles south of the project site. The stream to the east originates on the tableland directly north of the project area. The stream is shallow and narrow with few tributaries. It drains the north central portion of the project area and flows south on

a parallel course to the western stream. Leaving the project site, it continues south for another mile before converging with the western stream.

A shallow ephemeral stream in the north central uplands of the project site drains the tableland of that area. As the stream flows south it falls into a fairly deep gorge that drains the eastern portion of the project site through a series of short ephemeral side streams. These streams converge to form an intermittent stream in the gulch that flows south off the site and ultimately empties into Little Cow Creek approximately 3 miles south of the project area. Little Cow Creek joins Cow Creek downstream and then Cow Creek empties into Sacramento River another seven miles to the south.

The project was divided into nine separate drainage basins within the project boundary for hydrologic analysis. Currently each of the nine basins are 100 percent pervious. The WinTR-55 watershed hydrology analysis software was used to develop a hydrology model in order to determine the pre- and post-development storm water runoff quantities for each basin. WinTR-55 was developed by the Natural Resources Conservation Service (NRCS) and uses the NRCS method to determine the peak flow rate produced by a particular design storm considering the following variables: soil type, ground cover type, flow type, design storm type, and duration for a specified location. Refer to Table 5.9-1, EXISTING PEAK FLOWS FOR SITE, for the summary of existing peak flows.

**Table 5.9-1
 EXISTING PEAK FLOWS FOR SITE**

Basin	Area (ac)	% Impervious	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
Clough Creek	933	0	276	372	525
E	206	0	103	139	196
F	69	0	38.8	52.3	73.5
G	34	0	16.3	22.1	31.2
J	36	0	21.1	28.4	39.8
L	68	0	28.3	38.4	54.3
M	7	0	4.2	5.6	7.8
N	15	0	8.9	11.9	16.7
P	17	0	10.0	13.5	18.9

Source: S₂ ~ J₂ Engineering Inc. *Preliminary Hydrology Analysis*. February 2016.

5.9.2 REGULATORY SETTING

FEDERAL

Clean Water Act

The CWA is a federal law that protects the nation’s surface waters, including lakes, rivers, coastal wetlands, and “waters of the United States.” The CWA specifies that discharges to waters are illegal, unless authorized by an appropriate permit. The permits regulate the discharge of dredged and fill materials, construction-related storm water discharges, and activities that may result in discharges of pollutants to waters of the United States. If waters of the U.S. are located on a project site, a proposed project is likely to discharge to them, and if impacts on them are anticipated, the project must obtain a CWA Section 401 Water Quality Certification from the appropriate RWQCB.

National Pollutant Discharge Elimination System

The NPDES program is administered by the EPA, which delegated oversight in California to the Regional Water Quality Control Boards. The NPDES program provides general permits and individual permits. The general permits are for construction projects that disturb more than one acre of land. The general permit requires the applicant to file a public Notice of Intent (NOI) to discharge storm water and to prepare and implement a SWPPP. The SWPPP includes a site map, description of proposed activities, demonstration of compliance with applicable ordinances and regulations, and a description of BMPs that would be implemented to reduce erosion and discharge of construction-related pollutants.

Impaired Waterbodies

The CWA §303(d) and the California's Porter-Cologne Water Quality Control Act (described below) requires the State to establish the beneficial uses of its State waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes a Total Maximum Daily Load (TMDL), which is the maximum quantity of a particular contaminant that a water body can maintain without experiencing adverse effects, to guide the application of State water quality standards. Section 303(d) also requires the State to identify "impaired" streams (water bodies affected by the presence of pollutants or contaminants) and to establish the TMDL for each stream.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act acts in cooperation with the CWA to establish the State Water Resources Control Board (SWRCB). The SWRCB is divided into nine regions, each overseen by a RWQCB. The SWRCB, and thus each RWQCB, is responsible for protecting California's surface waters and groundwater supplies. The Porter-Cologne Water Quality Control Act develops Basin Plans that designate the beneficial uses of California's rivers and groundwater basins. The Basin Plans also establish narrative and numerical water quality objectives for those waters. Basin Plans are updated every three years and provide the basis of determining waste discharge requirements, taking enforcement actions, and evaluating clean water grant proposals. The Porter-Cologne Water Quality Control Act is also responsible for implementing CWA Sections 401-402 and 303(d) to SWRCB and RWQCBs.

LOCAL

Shasta County Grading Ordinance, Section 12.12

The Shasta County Grading Ordinance (Grading Ordinance) sets forth regulations concerning grading, excavating, and filling. The Grading Ordinance prohibits any grading of a building pad, driveway, or impact to a water course more than 250 cubic yards or 10,000 square feet of disturbance area without a grading permit from the County. The grading permit must include an approved grading plan provided by the project applicant, and it must set forth terms and conditions of grading operations that conform to the County's grading standards. The permit also requires the project applicant to provide a permanent erosion control plan that must be implemented upon completion of the project. In practice, specific erosion-control measures are determined upon review of the final subdivision grading plan and are

tailored to project-specific grading impacts. An engineered wet weather plan is required during wet weather conditions or the wet season (October 15th through May 1st).

Shasta County General Plan

Under California law, cities and counties must adopt a comprehensive, long-term general plan, which consists of a set of goals and policies that guide local land use decisions. The general plan must, at a minimum, contain seven elements – land use, circulation, housing, conservation, open space, noise, and safety. The general plan must also contain a map or diagram within the land use element illustrating land use distribution by type of use, such as commercial, residential, and open space. A jurisdiction may choose to organize their general plan with the mandatory elements in the order that meets the communities' needs. Mandatory elements may also be combined, as is often the case with open space and conservation or noise and safety. A jurisdiction may adopt additional elements to address unique needs of the community.

The Shasta County *General Plan*, last amended in 2004, serves as the principal land use planning and policy document for the County. It identifies strategies, policies, and implementation recommendations for land use within its planning area. The Shasta County *General Plan* is a long-range comprehensive plan that governs growth and development in the unincorporated areas of Shasta County, including the proposed project site. The Shasta County *General Plan* consists of three primary groups: public safety, resources, and community development. Contained within these three broad groups are 22 individual sections that address the issues of the seven required general plan elements. Applicable hydrology and water quality policies relative to the project site within these elements (Water Resources Element and Flood Protection Element) are listed below:

- *Policy W-a.* Sedimentation and erosion from proposed development shall be minimized through grading and hillside development ordinances and other similar safeguards as adopted and implemented by the County.
- *Policy W-b.* Septic systems, waste disposal sites, and other sources of hazardous or polluting materials shall be designed to prevent contamination to streams, creeks, rivers, reservoirs, or groundwater basins in accordance with standards and water resource management plans adopted by the County.
- *Policy FL-a.* New development in floodplains shall be regulated through zoning regulations addressing land use type, density, and siting of structures.
- *Policy FL-c.* Whenever possible, flood control measures should consist of channel diversions or limited floodplain designs which avoid alteration of creeks and their immediate environs.
- *Policy FL-h.* The impacts of new development on the floodplain or other downstream areas due to increased runoff from that development shall be mitigated. In the case of the urban or suburban areas, and in the urban and town centers, the County may require urban or suburban development to pay fees which would be used to make improvements on downstream drainage facilities in order to mitigate the impacts of upstream development.

5.9.3 STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

In accordance with State *CEQA Guidelines*, the effects of a project are evaluated to determine whether they would result in a significant adverse impact on the environment. An EIR is required to focus on these effects and offer mitigation measures to reduce or avoid any significant impacts that are identified. The criteria used to determine the significance of impacts may vary depending on the nature of the project. According to Appendix G of the State *CEQA Guidelines*, the proposed project would have a significant impact related to hydrology and water quality, if it would:

- *Violate any water quality standards or waste discharge requirements.* Refer to Impact 5.9-1, below.
- *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.* Refer to Impact 5.9-2, below.
- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite.* Refer to Impact 5.9-3, below.
- *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.* Refer to Impact 5.9-4, below.
- *Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.* Refer to Impact 5.9-5, below.
- *Otherwise substantially degrade water quality.* Refer to Impact 5.9-6, below.
- *Place housing within 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.* Refer to AREAS OF NO PROJECT IMPACT, below.
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows.* Refer to AREAS OF NO PROJECT IMPACT, below.
- *Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.* Refer to Impact 5.9-7, below.
- *Inundation by seiche, tsunami, or mudflow.* Refer to AREAS OF NO PROJECT IMPACT, below.

Based on these standards, the effects of the proposed project have been categorized as either a “*less than significant*” impact or a “*potentially significant*” impact. Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a “*significant and unavoidable*” impact.

AREAS OF NO PROJECT IMPACT

In October 2012 and February 2016, the County conducted an Initial Study to determine significant effects of the proposed project. In the course of this evaluation, certain impacts of the proposed project were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type. The effects determined not to be significant are not required to be included in primary analysis sections of the Draft EIR. As such, the following impacts either are not applicable to the proposed project or are not reasonably foreseeable and are not addressed further within this section (refer to Section 10.0, EFFECTS FOUND NOT TO BE SIGNIFICANT):

- *Place housing within 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.*
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows.*
- *Inundation by seiche, tsunami, or mudflow.*

5.9.4 POTENTIAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

This section analyzes impacts on hydrology and water quality that could occur with implementation of the proposed project based on changes to the environmental setting as described above. The findings from the *Preliminary Hydrology Analysis* (February 2016) (refer to Appendix 15.6, PRELIMINARY HYDROLOGY ANALYSIS) has been referenced for determining potential impacts of the proposed project. The evaluation of project impacts is also based on professional judgment, analysis of the Shasta County’s hydrology and water quality policies, and the significance criteria established by Appendix G of the State *CEQA Guidelines*, which the lead agency has determined to be appropriate criteria for this Draft EIR. Hydrology and water quality impacts are analyzed below according to topic. Mitigation measures directly correspond with an identified impact.

IMPACT 5.9-1	<i>Implementation of the proposed project may violate water quality standards or waste discharge requirements.</i>
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Significance: Less Than Significant Impact.

Impact Analysis: Development of the proposed project would result in a significant impact to hydrology and water quality if associated construction, operation and maintenance activities would result in the violation of any water quality or waste discharge standards. Such violations could occur through the

creation of erosion, sedimentation, and/or polluted runoff, or through the accidental release of potentially hazardous materials during construction or operational activities. Applicable water quality standards and regulations are presented in above under *Regulatory Setting*. Potential impacts associated with water quality or waste discharge violations are described below.

Short-Term Construction

Construction controls are discussed separately from other water quality management measures because they are temporary and specific to the type of construction. Construction within the project area has the potential to produce typical pollutants such as nutrients, suspended solids, heavy metals, pesticides and herbicides, toxic chemicals related to construction and cleaning, waste materials (including wash water), paints, wood, paper, concrete, food containers, sanitary wastes, fuel, and lubricants. The greatest potential impact to water quality may exist during construction when the vegetation is removed, exposing underlying soils to erosion. Therefore, the vegetation should be left undisturbed as much as possible.

The project site is subject to new construction grading, including buildings and structures, utility placement, and roadway construction. Excavations and embankments would be necessary to construct the building pads, street and drainage improvements, and utilities associated with project development. Construction activities could lead to temporary impacts on surface water quality in downstream segments of Clough Creek due to the increase in sediments, the release of construction pollutants, and/or increased soil erosion. In addition, Clough Creek may experience increased water flows due to storm water runoff.

The State Water Resources Control Board (SWRCB) is responsible for implementing the Clean Water Act and has issued a statewide General Permit (Water Quality Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ) for construction activities within the State. The State General Construction Activity Storm Water Permit (CGP) is implemented and enforced by the Regional Water Quality Control Boards (RWQCBs). The CGP applies to construction activity that disturbs one acre or more, and requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that identifies Best Management Practices (BMPs) to minimize pollutants from discharging from the construction site to the maximum extent practicable. The BMPs, that must be implemented, can be categorized into two major categories: 1) erosion and sediment control BMPs, and 2) non-storm water management and materials management BMPs. Erosion and sediment control BMPs fall into four main subcategories:

- Erosion controls
- Sediment controls
- Wind Erosion controls
- Tracking controls

Erosion controls include practices to stabilize soil, in order to protect the soil in its existing location and prevent soil particles from migration. Examples of erosion control BMPs are: preserving existing vegetation, mulching and hydroseeding. Sediment controls are practices to collect soil particles after they have migrated, but before the sediment leaves the site. Examples of sediment control BMPs are: street sweeping, fiber rolls, silt fencing, gravel bags, sand bags, storm drain inlet protection, sediment traps and detention basins. Wind erosion controls prevent soil particles from leaving the site in the air. Examples of wind erosion control BMPs include: applying water or other dust suppressants to exposed soils on the site.

Tracking controls prevent sediment from being tracked off site via vehicles leaving the site to the extent practicable.

A stabilized construction entrance not only limits the access points to the construction site, but also functions to partially remove sediment from vehicles prior to leaving the site. Non-storm water management and material management controls reduce non-sediment related pollutants from potentially leaving the construction site to the extent practicable. The CGP prohibits the discharge of materials other than storm water and authorized non-storm water discharges (such as irrigation and pipe flushing and testing). Non-storm water BMPs tend to be management practices with the purpose of preventing storm water from coming into contact with potential pollutants. Examples of non-storm water BMPs include: preventing illicit discharges and implementing good practices for vehicle and equipment maintenance, cleaning and fueling operations, such as using drip pans under vehicles. Waste and materials management BMPs include implementing practices and procedures to prevent pollution from materials used on construction sites. Examples of materials management BMPs include:

- Good housekeeping activities, such as covering stored materials and elevating them off the ground, in a central location.
- Securely locating portable toilets away from the storm drainage system and performing routine maintenance.
- Providing a central location for concrete wash out and performing routine maintenance.
- Providing several dumpsters and trash cans throughout the construction site for litter/floatable management.
- Covering and/or containing stockpiled materials and overall good housekeeping on the site.

The SWRCB has also adopted a statewide general permit (Water Quality Order No. R-5-2016-0040) for small MS4s covered under the CWA to efficiently regulate numerous storm water discharges under a single permit. Permittees must meet the requirements in Provision D of the General Permit which require the development and implementation of a Storm Water Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable. The SWMP must include the following six minimum control measures:

- Public Education and Outreach on Storm Water Impacts
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination
- Construction Site Storm Water Runoff Control
- Post-Construction Storm Water Management in New Development
- Redevelopment and Pollution Prevention/Good Housekeeping for Municipal Operations

The design and construction of site facilities shall comply with the statewide General Permit (Water Quality Order No. R5-2016-0040). The proposed project would be subject to the requirements of *Shasta County Code* Chapter 12.12 related to grading. In accordance with these requirements, the project applicant cannot perform grading activities without a grading permit. Compliance with the statewide General Permit and *Shasta County Code* Chapter 12.12 of would serve to ensure that short-term surface water quality impacts are minimized to *less than significant* levels.

Long-Term Operation

A net effect of urbanization can be to increase non-point pollutant export over naturally occurring conditions. The impact of the higher export would be on Clough Creek and internal drainages and also on the downstream receiving waters. Receiving waters can assimilate a limited quantity of various constituent elements, but there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact.

The proposed project would result in the development of approximately 184.68 acres (25.8 percent of the total project area) as 166 residential lots and roadways. Approximately 74.2 percent of the total project site would remain undisturbed. Typical pollutants generated can include, but not be limited to, pesticides, trash and debris, and oil and grease. However, street surfaces are the primary source of pollution in urban areas. The street-generated pollutants typically contain atmospheric pollution, tire-wear residues, petroleum products, oil and grease fertilizer and pesticide wash-offs, chemical spills, as well as animal droppings and litter types of wastes. The pollutants are washed from street surfaces by rainfall that is sufficient to produce runoff. On and offsite drainage courses and riparian areas are not anticipated to be negatively affected by development of the proposed project. The proposed project would be required to incorporate measures and devices designed to minimize pollutants, debris and sediments, reducing impacts to a *less than significant* level.

The proposed project would provide both storm drainage conveyance and detention facilities. In addition, wastewater from the proposed project would be collected via individual residential septic tanks, transferred to a community collection system, treated, and then recycled for roadway median landscape irrigation. Therefore, the project would not involve any unpermitted discharges of waste material into ground or surface waters. Consistency with the applicable regulations, including the Statewide Phase II Small MS4 Permit and Central Valley RWQCB's Waste Discharge Requirements, would reduce impacts regarding water quality (non-point source pollutants) to *less than significant* levels.

The treatment system would be designed to meet the reuse requirements for discharge of Title 22 Disinfected Secondary Effluent. Per Title 22, recycled water used for the irrigation of roadway landscaping would be disinfected secondary-23. Secondary-23 recycled water is water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30-day period. The Orenco AXMAX treatment system would be designed to meet the reuse requirements for discharge of the Title 22 Disinfected Secondary Effluent as well as the Central Valley RWQCB's Waste Discharge Requirements. Impacts would be *less than significant* in this regard.

Offsite Improvements

Several offsite intersection improvements have been identified for the proposed project (refer to **MM 5.16-1** through **MM 5.16-4** in Section 5.16, TRAFFIC AND CIRCULATION). Similar to onsite construction activities, implementation of federal, State, and County/City regulatory requirements affecting design, construction and operation of these mitigation measures would be required during construction of **MM 5.16-1** through **MM 5.16-4**. Impacts in this regard would be *less than significant*.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT
5.9-2

The proposed project could 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.

Significance: Potentially Significant Impact.

Impact Analysis: The proposed project would result in an impact to groundwater supplies if construction or operation activities require a substantial supply of local groundwater resources or substantially alter existing groundwater recharge, such as through the creation of extensive new impermeable areas. The project site is undeveloped and currently provides some groundwater recharge because the surface is generally pervious. The proposed project would increase the amount of temporary and/or permanent impervious surface on the project site (e.g. staging areas, onsite access drives, surface parking areas, proposed structures, and upgrades to the existing water supply and other utilities); however, this increase would not be substantial with regard to hindering local groundwater recharge.

Currently the proposed project site does not have any potable water demand. Upon implementation of the proposed project, demand for 84 acre-feet per year (AFY) of potable water would result. The following summary regarding water supply availability is based on the analysis contained in Section 5.17, UTILITIES AND SERVICE SYSTEMS.

Water Supply Availability Normal-Year (Average Conditions)

As noted in Impact 5.17-4 in Section 5.17, UTILITIES AND SERVICE SYSTEMS, adequate water supplies are available from BVWD to serve the proposed project and uses within BVWD's service area under normal wet year conditions. In addition, the proposed project is considered rural residential by BVWD and is represented within the growth reflected in the *Urban Water Management Plan Update 2015*. Specifically, the rural classification water demand is expected to grow to approximately 830 AF by 2040, or approximately 40 AFY. Given the proposed project's estimated demand of 80 AFY at build-out, it is considered to represent about 10% of the overall growth in this category of over 800 AF. Implementation of **MM 5.17-4a** in Section 5.17, UTILITIES AND SERVICE SYSTEMS, would ensure the proposed project includes water efficient features as required by current design standards. Water supply demand under normal-year conditions are considered *less than significant*.

Water Supply Availability Dry-Year Conditions

During multiple-dry years, there would be insufficient water to meet demands within the BVWD service area, with or without the proposed project. As discussed in Impact 5.17-4 in Section 5.17, UTILITIES AND SERVICE SYSTEMS, when USBR declares a "Condition of Shortage", the Shortage Policy sets forth an

available volume for BVWD based upon the BVWD's actual diverted water supply (also known as baseline volume) during the prior three years when BVWD water allocations were 100 percent. Until such time as the proposed project's demands are able to be included in the BVWD's baseline quantities, the proposed project would be required to provide an alternative water supply to BVWD, a minimum of 90 percent of the project's prior year water use, during shortage conditions. Implementation of mitigation measure **MM 5.17-4b** in Section 5.17, UTILITIES AND SERVICE SYSTEMS, requires that the project applicant, prior to issuance of a building permit, to identify and implement an Agreement with BVWD to augment BVWD water supplies during dry years to off-set the proposed project's water demand. As a result, impacts related to water supply availability under dry-year conditions are *less than significant*. Refer to Section 5.17, UTILITIES AND SERVICE SYSTEMS, for additional information regarding anticipated proposed project water demands and proposed mitigation measures.

Mitigation Measures: Implement **MM 5.17-4a** and **MM 5.17-4b**.

Level of Significance After Mitigation: Impacts would be *less than significant* with mitigation incorporated.

IMPACT 5.9-3	<i>The proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or offsite.</i>
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Significance: Less Than Significant Impact.

Impact Analysis: Clough Creek is the most significant drainage on the project site, and is an intermittent stream that flows from north to south across the western portion of the site. Clough Creek originates several miles north of the project site and flows south, emptying into Stillwater Creek 2.5 miles south of the project site. Stillwater Creek flows 7.5 miles south-southeast before emptying into the Sacramento River. Several smaller tributaries to this stream drain the northwestern portion of the site. The main channel is 10 to 15 feet and is comprised of a gravel bottom with pools and shallow runs.

The rate and amount of surface runoff is determined by multiple factors, including the following: topography, the amount and intensity of precipitation, the amount of evaporation that occurs in the watershed, and the amount of precipitation and water that infiltrates to the groundwater. The proposed project would alter the existing drainage pattern of the site, which would have the potential to result in erosion or siltation on- or offsite. The disturbance of soils onsite during construction could cause erosion, resulting in temporary construction impacts. In addition, the placement of permanent structures onsite could affect drainage in the long-term. Impacts from construction and operation are discussed below.

Short-Term Construction

As discussed in Impact 5.9-1, potential impacts on water quality arising from erosion and sedimentation are expected to be localized and temporary during construction. However, due to federal, State and County regulatory requirements affecting design, construction and operation potential impacts are significantly minimized. Whereas, discussion may be appropriate for information purposes, no mitigation

measures are necessary due to regulations and standards that must be implemented. Construction-related erosion and sedimentation impacts as a result of soil disturbance would be *less than significant*.

Overall construction activities for the proposed project would include grubbing/clearing of the project site, cut/full and compaction of soils, installation of utilities, construction of proposed buildings, and the paving of approximately 52.8 acres of internal roadways. Approximately 18.32 percent of the total project area would be graded for building sites if the total designated building envelope was graded on each lot.

Vegetation removal and excavation of soils on approximately 184.68 acres of the project site would be required to construct building foundations and to improve associated infrastructure systems (e.g. water and wastewater systems, site access). Such activities have the potential to result in erosion or sedimentation and/or discharge of construction debris from the site. The proposed project would not require grading on steep slopes, which are typically prone to erosion, as one of the open space parcels is generally located on steep slopes (greater than 30 percent) adjacent to waterways in the eastern portion of the site; however, other earthmoving activities (e.g., excavation, creating building pads, etc.) would have the potential to loosen soil, and the removal of any onsite vegetation could contribute to future soil loss and erosion by wind and storm water runoff. The clearing of vegetation and grading activities, for example, could lead to exposed or stockpiled soils, which are susceptible to peak storm water runoff flows and wind forces. In addition, the presence of large amounts of raw materials for construction may lead to storm water runoff contamination.

The project applicant would be required to request coverage under the NPDES General Permit, Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ, because the proposed project would result in one or more acres of land disturbance. To conform to the requirements of the NPDES General Permit, a SWPPP would need to be prepared. The SWPPP would specify BMPs to prevent construction pollutants, including eroded soils (such as topsoil), from moving offsite. Implementation of the permit and BMP requirements would mitigate the potential for erosion of soils or siltation during construction activities.

Additionally, pursuant to *Shasta County Code* Chapter 12.12, the proposed project would be required to submit grading plans, which would be accompanied by a soils engineering report, engineering geotechnical report, and drainage calculations, to obtain the required grading permits. Requests for grading permits are submitted to Shasta County for review and approval once all requirements have been met satisfactorily. Although the proposed project would alter existing drainage patterns onsite, implementation of regulatory requirements would reduce the potential for impacts relative to erosion or siltation onsite or offsite to *less than significant*.

Long-Term Operation

Consistent with County requirements, the project proponent would be required to prepare a permanent erosion plan to be implemented upon completion of the project, for the site to ensure that that operation of the proposed project would not result damage to offsite property and streams, watercourses, and aquatic habitat, and avoid creation of unstable slopes or filled areas; however, no significant impacts with regard to erosion are expected to occur during the operational phase of the proposed project.

Operation of the proposed project would not substantially alter the existing drainage patterns, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite. The proposed project would bridge Clough Creek and not impact the channel. Additionally, the project includes a 20-foot setback protection area, where no activity is allowed around every wetland feature on the project site. As discussed in Impact 5.9-1, the proposed project would be required to comply with the most recent requirements of *Shasta County Code* Chapter 12.12. Therefore, long-term impacts on drainage patterns across the project site that could result in substantial erosion and siltation on or offsite would be *less than significant* with implementation of federal, state and County regulations and post-construction BMPs required by *Shasta County Code* Chapter 12.12.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT
5.9-4

Implementation of the proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.

Significance: Potentially Significant Impact.

Impact Analysis: The majority of the project site is mapped as Zone X, indicating that the majority of the site lies outside of the 0.2 percent annual chance floodplain (i.e., the 500-year floodplain). A small portion of the project site along Clough Creek is located in Zone A, indicating that a portion of the site lies within the 1 percent annual chance flood (100-year flood).

Short-Term Construction

Water would be used during the temporary construction phase of the proposed project (e.g. for dust suppression); however, any water used for dust control would be mechanically and precisely applied and would generally infiltrate or evaporate prior to running off. The proposed grading would not substantially alter the overall topography of the area. Although the amount of surface runoff on the project site would not substantially increase with construction of the proposed project, runoff patterns and concentrations could be altered by grading activities associated with the proposed project. Improper design of the access road or building pads could result in an alteration of drainage patterns that would cause flooding on- or offsite. The potential for construction of the proposed project to alter existing drainage patterns would be minimized through compliance with the requirements of *Shasta County Code* Chapter 12.12 and the preparation of a SWPPP. With implementation of such measures, the project would not substantially increase the amount of runoff in a manner that would result in flooding onsite or offsite. Impacts would be reduced to *less than significant*.

Long-Term Operation

When land is in a natural or undeveloped condition, soils, mulch, and plant roots absorb rainwater. This absorption process is called infiltration or percolation. Much of the rainwater that falls on natural or

undeveloped land slowly infiltrates into the soil and is stored either temporarily or permanently on the surface or in underground layers of soil. When the soil becomes completely saturated with water or the rate of rainfall exceeds the infiltration capacity of the soil, the rainwater begins to flow on the surface of land to low lying areas, ditches, channels, streams, and rivers. Rainwater that flows off a site is defined as storm water runoff.

The infiltration and runoff process is altered when a site is developed with urban uses. Buildings, roads, and parking lots introduce asphalt, concrete, and roofing materials to the landscape. These materials are relatively impervious, which means, that they absorb less rainwater. Grading associated with development also eliminates many of the low-lying areas that may have been providing a degree of surface storage. As impervious surfaces are added to the ground conditions and surface drainage becomes more efficient, the natural infiltration and storage processes are reduced. As a result, the volume and rate of storm water runoff increases. The increased volumes and rates of storm water runoff may result in downstream flooding is not properly mitigated.

Development of the proposed project area would increase rates and volumes of runoff generated by the site by introducing streets, buildings, and other impervious surfaces and by providing improved onsite drainage conveyance. The *Preliminary Hydrology Analysis* for the proposed project, included in Appendix 15.6 of this EIR, determined the rates of runoff produced by the local watersheds of interest under existing conditions and after development. For hydrologic analysis, the proposed project site was divided into nine drainages as noted above.

Table 5.9-2, EXISTING AND POST-DEVELOPMENT FLOWS FOR SITE, presents the peak flow rates (cfs) for pre-development and post-development conditions for 10, 25, and 100-year storms by basin as determined by the NRCS WinTR-55 Hydrology software. These flows are calculated based on the utilization of BMPs to mitigate increase flow from all structure.

**Table 5.9-2
 EXISTING AND POST-DEVELOPMENT PEAK FLOWS FOR SITE**

Basin	Q10 (cfs)		Q25 (cfs)		Q100 (cfs)	
	Pre	Post	Pre	Post	Pre	Post
Clough Creek	276	276	372	372	525	525
E	103	103	139	139	196	196
F	38.8	40.68	52.3	54.4	73.5	75.9
G	16.3	18.0	22.1	24.0	31.2	33.3
J	21.1	22.1	28.4	29.5	39.8	41.0
L	28.3	29.8	38.4	40.0	54.3	56.0
M	4.2	4.4	5.6	5.8	7.8	8.1
N	8.9	9.3	11.9	12.4	16.7	17.2
P	10.0	10.5	13.5	14.0	18.9	19.5

Source: S₂ ~ J₂ Engineering Inc. *Preliminary Hydrology Analysis*. February 2016.

The post-development flow increased an average of 0 to 6.7 percent across all of the basins. There was no change in the pre- and post-development flow of Clough Creek due to the use of onsite LID facilities to retain the additional storm water runoff that would result from roof impervious areas significantly reduces the total impervious area of the basin. There is only one proposed building envelope that has the potential to be affected by the 100-year floodplains. Implementation of **MM 5.9-4** would reduce potential impacts to *less than significant* levels.

Mitigation Measures:

MM 5.9-4: A requirement shall be placed on Lot #140 that any structure finish floor elevation will be one foot minimum above the 100-year floodplain elevation at that location of the Clough Creek drainage. At Lot #140, the floodplain is approximately 607.1 feet and therefore any structure finish flood elevation shall be required to be at or above 608.1 feet. Verification is subject to County Building Division at plan check.

Level of Significance After Mitigation: Impacts would be *less than significant* with mitigation incorporated.

IMPACT 5.9-5	<i>Implementation of the proposed project could create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.</i>
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Significance: Less Than Significant Impact.

Impact Analysis: As previously described above, Clough Creek originates several miles north of the project site and flows south, emptying into Stillwater Creek 2.5 miles south of the project site. Several smaller tributaries to this stream drain the northwestern portion of the site. The main channel is 10 to 15 feet and is comprised of a gravel bottom with pools and shallow runs. Based on the existing conditions, runoff currently generated by the site would primarily include fine sediments. Impacts from construction and operation are discussed below.

Short-Term Construction

As stated previously, the project proponent would be required to request coverage under the NPDES General Permit, Order No. Water Quality Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ, because the proposed project would result in one or more acres of land disturbance. To conform to the requirements of the NPDES General Permit, a SWPPP would need to be prepared. This would specify BMPs to prevent construction pollutants, including eroded soils (such as topsoil), from moving offsite. Implementation of the General Permit and BMP requirements would mitigate erosion of soils during construction activities. Compliance with these regulations would reduce the potential for the proposed project to create or contribute runoff water that would provide substantial additional sources of polluted runoff to *less than significant* levels.

Additionally, during project construction, there is a possibility of accidental release of hazardous substances, such as spilling petroleum-based fuels used for construction equipment. The level of risk associated with the accidental release of hazardous substances is not considered significant because of the small volume and low concentration of hazardous materials utilized during the construction phases. The project contractor would be required to use standard construction controls and safety procedures that would avoid and minimize the potential for accidental release of such substances into the environment. Standard construction practices would be observed such that any materials released would be appropriately contained and remediated as required by local, State, and federal law. Implementation of such measures would further reduce the potential for the proposed project to create or contribute

runoff water that would provide substantial additional sources of polluted runoff to *less than significant levels*.

Construction of the project would introduce impervious surfaces associated with project components and may require imported water for dust suppression activities, but would not have the potential to substantially increase the amount of storm water runoff that would exceed the capacity of existing storm water systems. With implementation of the SWPPP and requirements of *Shasta County Code* Chapter 12.12, impacts associated with runoff during project construction would be *less than significant*.

Long-Term Operation

Development of the proposed project would introduce additional impervious surfaces and would have the potential to increase the amount of storm water runoff either onsite or that exiting the site. Surface runoff velocities, volumes, and peak flow rates would therefore have the potential to increase. As discussed under Impact 5.9-4, with incorporation of the recommended LID facilities, the proposed project would not overwhelm any offsite storm water drainage systems. As stipulated, possible permit requirements for the SWPPP and the permanent erosion plan required by *Shasta County Code* Chapter 12.12, would reduce project impacts as the result of creating or contributing to runoff that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. *Less than significant* impacts are anticipated.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.9-6	<i>Implementation of the proposed project could otherwise substantially degrade water quality.</i>
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Significance: Less Than Significant Impact.

Impact Analysis: As previously discussed, construction activities could potentially degrade water quality through the occurrence of erosion or siltation at the project site. Additionally, accidental release of potentially harmful materials, such as engine oil, diesel fuel, or other substances used in operation of the facilities, could potentially degrade water quality onsite or of downstream waterbodies from storm water runoff.

Short-Term Construction

Construction of the proposed project would include soil-disturbing activities that could result in erosion and sedimentation, as well as the use of harmful and potentially hazardous materials required to operate vehicles, equipment, and project components. The transport of disturbed soils or the accidental release of potentially hazardous materials could result in water quality degradation; however, as previously discussed under Impact 5.9-1 and Impact 5.9-4, the potential for water quality impacts to occur would be minimized through implementation of design specifications, BMPs, and discharge prohibitions, as required by applicable water quality related regulations and/or permitting.

The project applicant would be required to request coverage under the NPDES Construction General Permit. A SWPPP would be prepared to specify BMPs to prevent construction pollutants, including eroded soils (such as topsoil) from moving offsite. Implementation of the permit and BMP requirements would reduce the potential for construction activities to substantially degrade water quality to *less than significant*.

Long-Term Operation

As stated in Impact 5.9-1, the handling, use, and disposal of any hazardous substances (e.g. solvents, paints, fuels) during operation would occur in conformance with applicable local, State, and federal regulations. Additionally, the proposed project may use herbicides to maintain vegetation onsite. With proper use and disposal, these chemicals are not expected to result in impacts that would substantially degrade water quality.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.9-7	<i>Implementation of the proposed project could expose people or structures to a significant risk of loss. Injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.</i>
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Significance: Potentially Significant Impact.

Impact Analysis: Shasta Dam, located approximately 11.5 miles northwest of the site, pose a flood risk to all downstream channels. According Chapter 5.3, *Dam Failure Inundation*, of the Shasta County *General Plan*, the proposed project is located within the South Central Region Planning Area and could be subject to injury or loss of life in the event of a catastrophic failure of Shasta Dam. Considering existing development patterns and trends, particularly in the South Central Region and the unlikelihood of a dam failure, the *General Plan* notes that it would be infeasible to preclude future development from locating in dam inundation areas and discourages critical structures (hospitals, fire, and police stations) and high occupancy structures (schools, theaters, and public meeting places) from locating in these areas. The proposed project does not include such facilities.

Two agricultural impoundments are located immediately north of the proposed project. The ponds are primarily filled with irrigation water and not storm water runoff therefore, it was assumed that a dam breaching event would not likely occur in the same timeframe as the 100-year flood. An approximate peak flow resulting in a dam failure upstream of the project in Clough Creek was estimated using methods outlined in the *Guidelines for Calculating and Routing a Dam-Break Flood* by the U.S. Army Corps of Engineers (Corps). The dam breach flow was modeled and mapped independently of any storm flow. Additionally, it was assumed that the dam would not catastrophically break but would fail in one isolated location. It should be noted that the risk associated with failure of these impoundments represent a condition that exists with or without the proposed project.

The additional flow through Clough Creek in the event that the upstream pond's dam was breached was estimated to be 600 cubic feet per second (cfs) and is assumed to be an isolated event. As described under Impact 5.9-4, above, Lot #140 represents the single onsite building envelope that has the potential to be affected by a potential breach of these agricultural impoundments. Implementation of **MM 5.9-4** would reduce potential impacts to *less than significant* levels.

Mitigation Measures: Implement **MM 5.9-4**.

Level of Significance After Mitigation: Impacts would be *less than significant* with mitigation incorporated.

5.9.5 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

IMPACT 5.9-8	<i>The proposed project, in combination with other cumulative projects, could result in increased degradation of surface water quality and flooding impacts in the area.</i>
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Significance: Less Than Significant Impact.

Cumulative Setting: The geographic scope for cumulative impacts to hydrology and water quality includes past, present, and reasonably foreseeable projects are identified in Section 4.0, BASIS OF CUMULATIVE ANALYSIS. Impacts of the proposed project would be cumulatively considerable if they have the potential to combine with similar impacts of the identified cumulative projects. Cumulative effects related to hydrology and water quality resulting from implementation of the proposed project, along with development in the vicinity, may expose more persons and property to potential water quality hazards. Cumulative development may also adversely affect downstream water quality, thereby impacting surface and groundwater supplies.

Impact Analysis: Construction activities associated with cumulative development projects within the County would result in disturbance to surface soils and potential for erosion. Additionally, runoff from construction sites would be typical of urban uses and may include silt and sediment, oil and grease, floatable trash, nutrients (such as fertilizers), heavy metals, pathogens (such as coliform bacteria), and other substances. Additionally, new development within the County would involve an increase in impervious surfaces, which in turn increase storm water runoff in the County. This increased runoff could exceed the capacity of existing infrastructure. Future development projects would be required to comply with State regulations, consisting of preparation of a SWPPP, implementation of BMPs, and requirements of the NPDES Permit. Additionally, the *Shasta County Code* includes grading requirements. Implementation of these regulations and requirements would reduce potential impacts on water quality, waste discharge, runoff, erosion, and siltation to *less than significant* for overall cumulative impacts.

Construction and operation of the proposed project could result in impacts to water quality, waste discharge, runoff, erosion, and/or siltation. Culverts, storm drains, and other runoff conveyance facilities associated with the proposed project would have a design capacity adequate to operate under projected runoff and debris loads. Compliance with the permit requirements would reduce short term impacts on water quality, waste discharge, runoff, erosion, and/or siltation. Post construction BMPs would serve to

reduce long-term water quality impacts to *less than significant levels*. Therefore, the proposed project would not significantly contribute to cumulative impacts in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Cumulative impacts related to hydrology and water quality would be *less than significant*.