5.8 HYDROLOGY AND WATER QUALITY

The purpose of this section of the Draft Environmental Impact Report (EIR) 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 Report*, prepared by GHD (May 2017) (refer to Appendix 15.7, PRELIMINARY HYDROLOGY REPORT). The purpose of the *Preliminary Hydrology Report* is to analyze the existing and post-construction hydrologic conditions of the site. Additionally, this section contains information based on the *Sacramento River Flood Study*, prepared by Pacific Hydrologic, Inc. (February 2016) and the *Draft Post Construction Stormwater Management Plan*, prepared by GHD (refer to Appendix 15.8 and Appendix 15.9, respectively). This section 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 derived from the following sources available for review at the City of Redding Development Services Department, Planning Division:

- City of Redding. *2000 - 2020 General Plan.* October 2000.
- City of Redding. *Local Hazard Mitigation Plan*. November 2015.
- City of Redding. *Redding Municipal Code Title 16, Buildings and Construction*. March 2018.
- City of Redding. *Storm Water Quality Improvement Plan.* August 2003.

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.

5.8.1 ENVIRONMENTAL SETTING

The City of Redding is situated at the far north end of the Sacramento Valley at the point where the valley meets the foothills of the Cascade mountain range. Redding is surrounded by mountains to the west, north, and east. Elevations range from about 400 feet above mean sea level (msl) in the lowlands adjoining the Sacramento River near Anderson to over 1,100 feet msl on the hilltops in the western part of the City. East of the Sacramento River, land is generally flat, and is divided only by the courses of Churn, Clover, and Stillwater Creeks. A distinctive water course in the area is the Sacramento River, which flows through the City in a general north-south direction. Several creeks also run through the Redding area, eventually draining into the Sacramento River. Sixteen primary drainage basins ranging in size from 1.0 to 48.9 square miles and numerous smaller local tributaries to the Sacramento River are located within City limits.

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 Redding is approximately 33 inches. Redding 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.

Major dams in the region include Shasta Dam, on the Sacramento River approximately 14 miles north of the project site, and Whiskeytown Dam, on Clear Creek about 12 miles northwest of the site. These

dams provide water storage, flood control, and hydroelectric power. Keswick dam, downstream of Shasta Lake and just north of Redding, serves as a forebay to regulate peaking power releases from Shasta Dam upstream and also includes a hydroelectric facility.

The City's storm drainage infrastructure currently includes approximately 130 miles of storm drain pipe, 174 miles of open channels, and 45 detention basins. The City has several programs that provide water quality protection, many of which are addressed in the Natural Resources Element of the *General Plan*, a grading ordinance that addresses erosion and sediment control, a floodplain ordinance, and a Storm Water Quality Improvement Plan (SWQIP).

The proposed project encompasses approximately 10.55 acres in an area comprised of partially developed land with two small buildings, foundation remnants, and undeveloped vacant land. Approximately 27 percent of the land is currently covered by impervious surfaces. The topographic elevations range from approximately 467 to 497 feet msl with slopes varying between 1.7 and 3.3 percent. Most of the proposed project site consists of urban habitat, annual grassland, and riparian woodland- the vegetation present does not form a distinct woodland community.

SURFACE WATER

Existing drainage from the site is by sheet flow and is divided into six distinct drainage areas. The proposed project is adjacent to the Henderson Open Space area which will not be developed, although the areas immediately west between the Sacramento River and Building 'A' will be partially improved as the Henderson-Parkview Open Space Restoration, Trail and Kayak Access. The site currently drains partly to an existing City storm-drain system located at the northwest corner of the property with the rest of the site draining to the west, directly the adjacent Henderson Open Space area and to the Sacramento River.

Surface Water Quality

The segment of the Sacramento River from Keswick Dam to Cottonwood Creek is listed on the Clean Water Act Section 303(d) List of Water-Quality Limited Segments for contamination with unknown toxicity. The affected segment extends through the City of Redding and south to east of the Community of Cottonwood. A TMDL is scheduled for completion in 2019. No other water bodies near the site are listed on the Section 303(d) List.[1]

GROUNDWATER

The project site is located over the Enterprise Subbasin of the Redding Groundwater Basin. The Redding Groundwater Basin underlies approximately 544 square miles in the north end of the Sacramento Valley; the Enterprise Subbasin is approximately 95 square miles in the northeast portion of the Redding Basin.

Groundwater was encountered onsite in borings and test pits to depths between 10 and 22 feet below ground surface (bgs) made as part of the geotechnical investigation for the proposed project. Other previous investigations onsite have encountered groundwater at depths between 24 and 35 feet bgs.[2]

[1] State Water Resources Control Board (SWRCB), 2017. Impaired Water Bodies. [Online]: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml. Accessed: October 9, 2018.
[2] CGI Technical Services, Inc. *Geotechnical Report Mercy Wellness Center, Redding, California*. April 2016.

Groundwater Quality

Water from the Redding Groundwater Basin is generally very high quality. However, two wells that have been removed from regular service have shown arsenic levels above the primary contaminant level (MCL), the highest concentration level allowed in drinking water. Manganese levels are also a challenge for some of the wells located in the Enterprise Basin. The challenge is currently being addressed by adjusting pumping rates to achieve blending between wells to provide water below the secondary MCL.

HYDROLOGY

The proposed 10.55-acre project site falls within the local Sacramento River watershed area and remains mostly undeveloped. According to the existing 100-year floodplain maps produced by the Federal Emergency Management Agency (FEMA), approximately 3.58 acres of the proposed project site is located within the established 100-year floodplain of the Sacramento River. The portion of the site in the current established floodplain includes a portion of Building 'A', the portion of the parking lot between Building 'A' and Building 'B', and the parking lot west of Building 'B'.

As noted on Figure 5.8-1, EXISTING DRAINAGE AREA MAP, and described in the *Preliminary Hydrology Report*, the existing 100-year floodplain for the Sacramento River shown on the Figure 5.8-1 is based on existing FEMA mapping. The information is not considered reliable as it relies on an incorrect backwater model. As a result, additional modeling has been conducted that accurately delineates the FEMA floodway. Based on the updated backwater modeling, the proposed Building 'A' and parking lot previously identified within the floodway would be entirely located outside the floodway, within the floodway fringe. The floodway fringe captures the area between the floodway and the flood limit, rather than within the floodway. To make this correction a Letter of Map Revision (LOMR) dated February 14, 2017 was prepared and subsequently submitted to FEMA by the City after their review and approval.

Existing Peak Flows

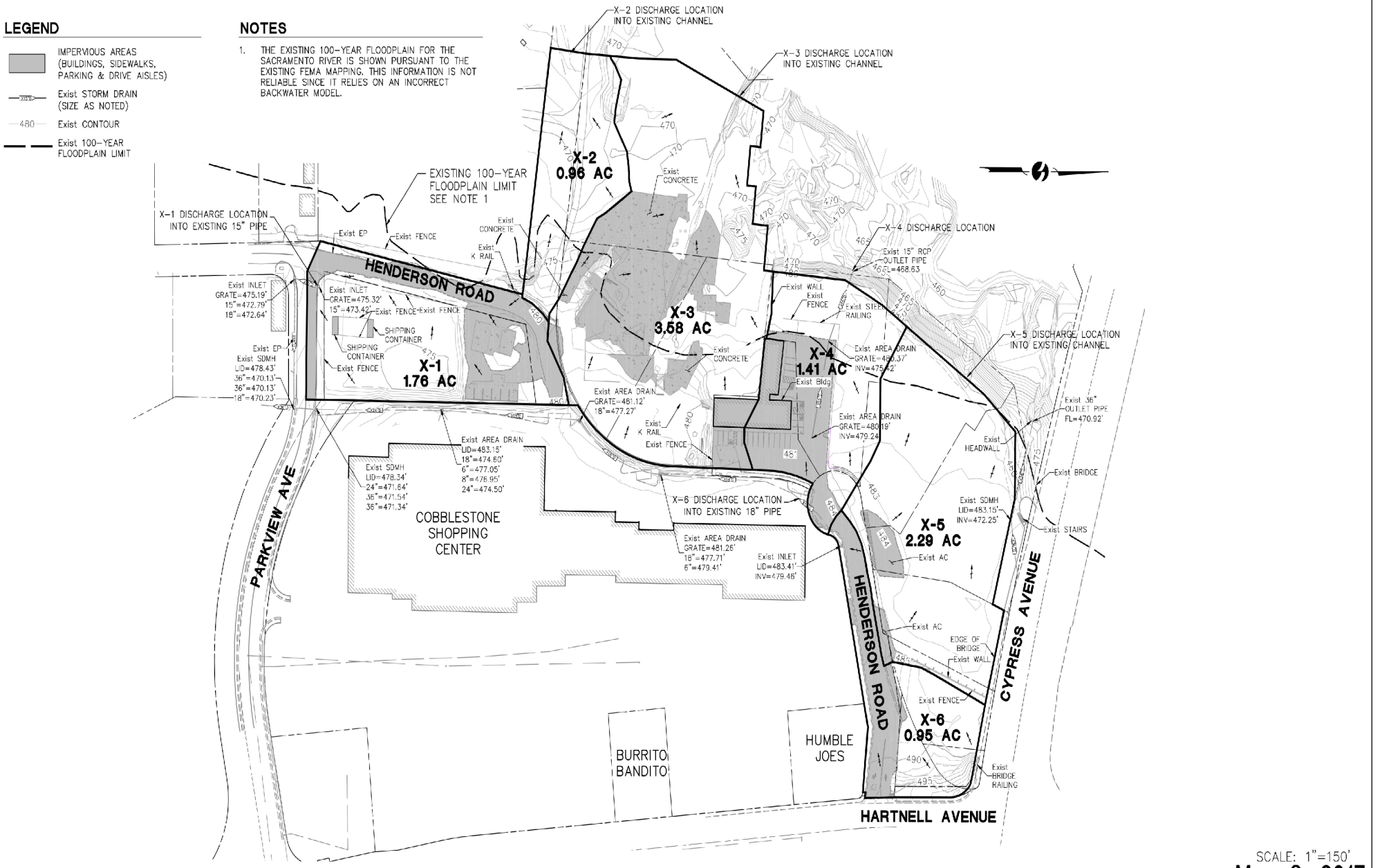
The City of Redding HEC-1 Processor was used to generate peak flows for the 10-, 25- and 100-year storm events (24-hour duration) for each of the existing six drainage areas as well as the proposed drainage areas. Existing drainage areas are identified using X-1 through X-6, and are further described below. Refer to Figure 5.8-1, EXISTING DRAINAGE AREA MAP, and Table 5.8-1, EXISTING PEAK FLOWS, for a summary of existing peak flows. As shown in Table 5.8-1, the overall 100-year peak flow for the project site in the existing condition is 46 cubic feet per second (cfs).

Table 5.8-1
EXISTING PEAK FLOWS

Drainage Area	Area (ac)	% Impervious	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
X-1	1.76	39	4	5	8
X-2	0.96	0	2	2	3
X-3	3.58	31	8	10	15
X-4	1.41	45	5	5	7
X-5	2.29	6	4	5	8
X-6	0.95	41	3	4	5
TOTAL	**10.95**	**27%**	**26**	**31**	**46**

Note:
1. Q10=Peak 10 Year Flows; Q25=Peak 25 Year Flows; Q100=Peak 100 Year Flows.

Source: GHD. *Preliminary Hydrology Report*. May 2017.



Dignity Health North State Pavilion Project

Existing Drainage Area Map

Figure 5.8-1

Drainage Area X-1

Existing drainage area X-1 is located near the southerly end of the project site, and includes a portion of Parkview Avenue, Henderson Road, as well as other concrete and paved impervious areas. Drainage area X-1 is comprised of approximately 1.76 acres and is approximately 39 percent impervious. The existing 100-year peak flow for this drainage area is currently 8 cfs and currently discharges through an existing 15-inch culvert to the south, and into the existing City storm drain system.

Drainage Area X-2

Existing drainage area X-2 is located in the southwesterly area of the project site and includes undeveloped, pervious areas. Drainage area X-2 is approximately 0.96 acres and 0 percent impervious. The existing 100-year peak flow for this drainage area is currently 3 cfs and discharges via sheet flow and an existing channel to the west, towards the Sacramento River.

Drainage Area X-3

Existing drainage area X-3 is located near the middle area of the project site, and includes various concrete and paved impervious areas. Drainage area X-3 is comprised of approximately 3.58 acres and is approximately 31 percent impervious. The existing 100-year peak flow for this drainage area is currently 15 cfs and discharges via sheet flow and an existing channel to the west, towards the Sacramento River.

Drainage Area X-4

Existing drainage area X-4 is located near the middle area of the project site, and includes a few small buildings, along with some various concrete and paved impervious areas. Drainage area X-4 is approximately 1.41 acres and approximately 45 percent impervious. The existing 100-year peak flow for this drainage area is currently 7 cfs and discharges via an existing culvert to the west, which ultimately discharges near the bottom of the slope on the westerly edge of the project site. A small amount of stormwater discharges to the west over the existing slope via sheet flow.

Drainage Area X-5

Existing drainage area X-5 is located near the northwesterly area of the project site, and includes some small paved impervious areas. Drainage area X-5 is approximately 2.29 acres and approximately 6 percent impervious. The existing 100-year peak flow for this drainage area is currently 8 cfs and discharges via sheet flow to an existing channel to the northwest, towards the Sacramento River.

Drainage Area X-6

Existing drainage area X-6 is located near the northeasterly portion of the project site, and includes a portion of Henderson Road, as well as other concrete and paved impervious areas. Drainage area X-6 is approximately 0.95 acres and approximately 41 percent impervious. The existing 100-year peak flow for this drainage area is currently 5 cfs and discharges into an existing 18-inch culvert near the end of the Henderson Road cul-de-sac, and is conveyed to the south through the existing City storm drain system.

5.8.2 REGULATORY SETTING

The following is a description of federal, State, and local environmental laws and policies that are relevant to the California Environmental Quality Act (CEQA) review process.

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 stormwater 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 stormwater 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.

The CWA-established NPDES permit program regulates municipal and industrial discharges to surface waters of the United States from their municipal separate storm sewer systems (MS4s). Under the NPDES program, all facilities that discharge pollutants into waters of the United States are required to obtain a NPDES permit. Requirements for stormwater discharges are also regulated under this program.

The NPDES has a variety of measures designed to minimize and reduce pollutant discharges. All counties with storm drain systems that serve a population of 50,000 or more must file for and obtain an NPDES permit, as must construction sites of 1 acre or more. Another measure for minimizing and reducing pollutant discharges to a publicly owned conveyance or system of conveyances[3] is the EPA's Storm Water Phase II Final Rule. The Phase II Final Rule requires an operator (such as a city) of a regulated municipal separate storm sewer system (MS4) to develop, implement, and enforce a program (e.g., best management practices [BMPs], ordinances, or other regulatory mechanisms) to reduce pollutants in postconstruction runoff to the City's storm drain system from new development and redevelopment projects that result in the land disturbance of greater than or equal to 1 acre.

[3] Includes roadways, catch basins, curbs, gutters, ditches, man-made channels, and storm drains designed or used for collecting and conveying stormwater.

Small MS4 General Permit

The SWRCB issued a Statewide General Permit for Small MS4s (MS4 General Permit), Order No. 2013-DWQ-0001, which took effect on February 5, 2013. The MS4 Permit requires implementation of water quality measures for two categories of projects: small projects, those creating and/or replacing 2,500 to 5,000 feet of impervious surfaces on a site; and regulated projects, development and redevelopment projects that create or replace 5,000 or more square feet of impervious surface. Regulated new development projects must implement source control measures, low-impact development measures, site design measures, treatment control measures, and hydromodification management.

Source control measures are intended to keep pollutants from mixing with runoff, and thus minimize the transport of urban runoff and pollutants offsite and into storm drains. Source control measures include standards for design and operation of outdoor areas where substances that could contaminate stormwater are used, such as fueling areas, loading areas, material storage areas, and work areas.

Low-impact development (LID) is an approach to land development (or redevelopment) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product. LID measures include bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions.[4]

Site design measures emphasize conservation and use of existing natural site features integrated with distributed, small-scale storm water controls to mimic natural drainage. Treatment control measures remove pollutants from site runoff; measures include bioretention planters, vegetated swales, and infiltration trenches and basins.

Hydromodification refers to changes in the hydrology of a site, such as runoff and stormwater infiltration, that adversely affect watershed health and function. Regulated projects that create and/or replace 1 acre or more of impervious surface must incorporate stormwater control measures that prevent the post-project runoff from exceeding the pre-project runoff for a two-year, 24-hour storm event. Hydromodification management measures include a combination of site design and treatment control measures.

The MS4 General Permit expired June 30, 2018, however it was administratively continued in accordance with 40 Code of Federal Regulations Section 122.6 and remain in full force and effect until a new General Permit is issued or the State Water Board rescinds the existing General Permit.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 mandate the Federal Emergency Management Agency (FEMA) to evaluate flood hazards. FEMA provides Flood Insurance Rate Maps (FIRMs) for local and regional planners to promote sound land use and floodplain

[4] US Environmental Protection Agency. 2017. *Urban Runoff: Low Impact Development*. [Online]: https://www.epa.gov/nps/urban-runoff-low-impact-development. Accessed: October 9, 2018.

development and identify potential flood areas based on current conditions. To delineate a FIRM, FEMA conducts engineering studies called Flood Insurance Studies. Using information gathered in these studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas on FIRMs.

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

Statewide General Construction Permit

Construction projects of 1 acre or more are regulated under the Construction General Permit, Order No. 2012-0006-DWQ, issued by the SWRCB. Under the terms of the permit, applicants must file permit registration documents with the SWRCB prior to the start of construction, including a Notice of Intent, risk assessment, site map, Storm Water Pollution Prevention Plan (SWPPP), annual fee, and signed certification statement.

The SWPPP must demonstrate conformance with applicable BMPs, including a site map that shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project location. The SWPPP must list BMPs that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for nonvisible pollutants if there is a failure of the BMPs, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act acts in cooperation with the CWA to establish the 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. Table 5.8-2, BENEFICIAL USES, describes the beneficial uses identified by the Basin Plan for the drainages located within the project site.

Table 5.8-2
BENEFICIAL USES

ID	Use Type	Description
AGR	Agricultural Supply	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
COLD	Cold Freshwater Habitat	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
MIGR	Migration of Aquatic Organisms	Uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.
POW	Hydropower Generation	Uses of water for hydropower generation.
REC1	Water Contact Recreation	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.
REC2	Non-Contact Water Recreation	Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing.
SPWN	Spawning, Reproduction, and/or Early Development	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
WILD	Wildlife Habitat	Uses of water that support terrestrial ecosystems including, but not limited to, the preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Source: California Regional Water Quality Control Board. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition*, Table II-2, Surface Water Bodies and Beneficial Uses. June 2015.

Sustainable Groundwater Management Act of 2014

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA; Water Code Section 10720 et seq.). SGMA and related amendments to California law require that all groundwater basins designated as high or medium priority in the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) Program, and that are subject to critical overdraft conditions, must be managed under a new Groundwater Sustainability Plan (GSP) or a coordinated set of GSPs, by January 31, 2020. High or medium priority basins that are not subject to a critical overdraft must be regulated under one or more GSPs by 2022. Where GSPs are required, one or more local Groundwater Sustainability Agencies (GSAs) must be formed to implement applicable GSPs. A GSA has the authority to require registration of groundwater wells, measure and manage extractions, require reports and assess fees, and to request revisions of basin boundaries, including establishing new subbasins. GSAs were required be formed for high and medium priority basins by June 2017.

Within the Redding Area Groundwater Basin, the Enterprise Sub-Basin and Anderson Sub-Basin is identified as a medium priority, while the Millville Sub-Basin is identified as very low priority. This is in contrast with the majority of the Central Valley, which encompasses the Sacramento River, San Joaquin River, and Tulare Lake hydrologic regions, where almost all of the basins from the City of Sacramento south to the southern boundary, have been designated as high priority.

Each GSP must include a physical description of the covered basin, such as groundwater levels, groundwater quality, subsidence, information on groundwater-surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, and a description of how the plan will affect other plans, including city and county general plans. As defined by the Act, "sustainable groundwater management" means that groundwater use within basins managed by a GSP will not cause any of the following "undesirable results:" (a) chronic lowering of groundwater levels (not including overdraft during a drought, if a basin is otherwise managed); (b) significant and unreasonable reductions in groundwater storage; (c) significant and unreasonable seawater intrusion;

(d) significant and unreasonable degradation of water quality; (e) significant and unreasonable land subsidence; and (f) surface water depletions that have significant and unreasonable adverse impacts on beneficial uses (Water Code Section 10721(w)).

REGIONAL

Enterprise Anderson Groundwater Sustainability Agency

The Enterprise Anderson Groundwater Sustainability Agency (EAGSA) was formed consisting of the overlying members of the Redding Area Groundwater Basin. The EAGSA was formed by Memorandum of Understanding (MOU) agreed to by the City of Anderson, the County of Shasta, the Clear Creek Community Services District (CCCSD), the Bella Vista Water District, the Anderson Cottonwood Irrigation District (ACID), and the City of Redding. As required, the EAGSA shall prepare and implement a Groundwater Sustainability Plan (GSP) for the Enterprise and Anderson sub-basins by 2022.

LOCAL

City of Redding General Plan

The elements within the City of Redding *General Plan* provide goals, policies, and implementation measures in order to reduce impacts of projects on water quality. Applicable goals relative to the project site within these elements are listed in Table 5.8-3, CONSISTENCY WITH APPLICABLE CITY OF REDDING GENERAL PLAN GOALS AND POLICIES FOR HYDROLOGY AND WATER QUALITY, followed by a brief explanation of how the proposed project compiles with the goals and policies.

City of Redding Storm Water Quality Improvement Plan

The City retains a SWQIP document that addresses the six minimum control measures for improving storm water quality as required per Water Quality Order No. 2013-0001-DWQ. The six control measures are 1) Public Education and Outreach, 2) Public Participation and Involvement, 3) Illegal Discharge Detection and Elimination, 4) New Construction Runoff Control, 5) Post-Construction Storm Water Management, and 6) Pollution Prevention/Good Housekeeping for Municipal Operations and Facilities. This document includes information and requirements for the City's storm water quality management program, including program history and regulatory setting, program management, receiving water characterization, program implementation, and program evaluation and reporting.

City of Redding Local Hazard Mitigation Plan

The purpose of the City of Redding's *Local Hazard Mitigation Plan* (LHMP) is to implement and sustain actions that reduce vulnerability and risk from hazards or reduce the severity of the effects of hazards on people and property. Mitigation actions are both short-term and long-term activities which reduce the cause or occurrence of hazards; reduce exposure to hazards; or reduce effects of hazards through various means, including preparedness, response, and recovery measures. The LHMP includes resources and information to assist in planning for hazards. The plan provides a list of actions that may assist the City in reducing risk and preventing loss from future hazard events. The actions address hazards, as well as specific activities for, Wildland Fire, Flood, Hazardous Material, Severe Winter Weather, Earthquakes, Utility Disruption, Aviation Disaster, Chemical, Biological, Radiological, Nuclear, Explosives (CBRNE), Dam Overflow or Failure, and Volcanic issues.

Table 5.8-3
CONSISTENCY WITH APPLICABLE CITY OF REDDING GENERAL PLAN GOALS AND POLICIES FOR HYDROLOGY AND WATER QUALITY

General Plan Goals and Policies	Consistency Analysis
GENERAL PLAN GOAL NR1	
MINIMIZE SOIL EROSION AND SEDIMENTATION PROBLEMS RESULTING FROM DEVELOPMENT ACTIVITIES; IMPROVE THE QUALITY OF STORMWATER RUNOFF.	
Policy NR1B: Require development applicants to submit and receive Public Works Department approval for erosion- and sediment-control plans prior to undertaking grading activities.	**Consistent.** RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* addresses requirements associated with clearing, grading, fills and excavation and sets forth rules and regulations to prevent erosion and control sediment. Review and approval by the Public Works Department of improvement plans and accompanying grading and erosion control plans assures compliance.
Policy NR1C: Minimize soil erosion and sedimentation created during and after construction activities to the fullest extent practicable, using Best Management Practices (BMPs).	**Consistent.** Refer to Policy NR1B consistency finding. BMPs will be identified in the grading, erosion control plans and SWPPP submitted for approval.
Policy NR1D: Make project monitoring and enforcement activities a priority to ensure that erosion-control measures are in place prior to the start of the rainy season and function properly and effectively.	**Consistent.** A SWPPP will be developed and designed, specific to the site, conforming to the required State Storm Water NPDES Construction Permit. The plan covers monitoring and enforcement activities and addresses the prevention of soil loss by storm water runoff and/or wind erosion, of sedimentation and/or of dust/particulate matter air pollution.
Policy NR1E: Aggressively pursue immediate remediation when erosion damage is discovered and/or initial control measures fail.	**Consistent.** The SWPPP identifies that immediate remediation be undertaken when erosion damage is discovered and/or initial control measures fail.
Policy NR1F: Establish and levy fines for failure to comply with the requirements of the Grading Ordinance and/or an approved erosion- and sediment-control plan.	**Consistent.** The RWQCB and the City actively monitor high profile and large projects such as the proposed project and will levy fines on the property owner for failure to comply with the SWPPP, grading ordinance and/or the approved erosion control plan.
GENERAL PLAN GOAL NR3	
PRESERVE AND PROTECT THE QUANTITY AND QUALITY OF GROUNDWATER RESOURCES WITHIN THE PLANNING AREA.	
Policy NR3B: Comply with the Regional Water Quality Control Board's regulations and standards to maintain and improve groundwater quality in the Planning Area.	**Consistent.** Implementation of the proposed project will not result in impacts on the groundwater quality in the Planning Area. Adherence to this policy will be required by City standards and ordinance and by State Water Resources Control Board regulations.
GENERAL PLAN GOAL HS2	
PROTECT THE LIVES AND PROPERTY OF RESIDENTS AND VISITORS FROM FLOOD HAZARDS.	
Policy HS2D: Design both new development and redevelopment projects to minimize hazards associated with flooding.	**Consistent.** Proposed project is located on higher ground that is not subject to flooding from any offsite sources.
Policy HS2E: Strictly limit development in areas subject to flooding from a 100-year storm event. Allow minor encroachments into floodplains only if it can be demonstrated that such encroachments will not impact other properties or significantly contribute to a cumulative effect of other encroachments.	**Consistent.** A portion of the site is within the existing 100-year floodplain, however the current delineation the FEMA flood way is incorrect and a Letter of Map Revision (LOMR) has been submitted to FEMA. The project will be out of the floodplain after the placement of fill and will not increase the water surface elevation or extent of inundation during the most probable 100-year flood. The proposed project would be designed consistent with requirements contained within the RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* to minimize the flow of stormwater during project operation.
Policy HS2H: Require new development to demonstrate that existing and/or planned (on- or offsite) drainage facilities are sized to accommodate project storm runoff and to prevent offsite increase in peak runoff rates and flood elevations.	**Consistent.** The proposed project would be designed consistent with requirements contained within the RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* to minimize the flow of stormwater during project operation, and will include the use of the City's approved Henderson Open Space, culverts, and connections to the existing storm drain system, will mitigate potential increased flows due to an increase in impervious areas.

Table 5.8-3
CONSISTENCY WITH APPLICABLE CITY OF REDDING GENERAL PLAN
GOALS AND POLICIES FOR HYDROLOGY AND WATER QUALITY

General Plan Goals and Policies	Consistency Analysis
	In the unlikely event that the Henderson Open Space Project is not built, the proposed project would construct storm drain conveyance and outlet facilities similar to the Henderson Open Space project in accordance with standard engineering practices and would conform to the existing channels that receive existing stormwater runoff. According to the *Preliminary Hydrology Report*, there would be no adverse effects due to the construction and operation of the proposed project on the adjacent properties in the watershed.
GENERAL PLAN GOAL PF9	
AVOID INCREASES IN EXISTING 100-YEAR FLOOD LEVELS.	
Policy PF9A: Establish the following thresholds for stormwater drainage facilities: · Design drainage facilities to convey a 100-year storm. · Until adequate regional facilities are in place, utilize a policy of "no net increase in runoff" for development projects in all drainage basins where existing development is within the 100-year floodplain.	**Consistent.** The proposed project has been designed to accommodate a 100-year storm event. According to the *Preliminary Hydrology Report*, there would be no adverse effects due to the construction and operation of the proposed project.
Policy PF9B: Encourage project designs that minimize drainage concentrations and coverage by impermeable surfaces.	**Consistent.** The project has been designed to manage stormwater flows consistent with RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation*. The proposed project also includes bio-retention areas which include a minimum of 18 inches of bio-retention soil mix (in addition to the drain rock and filter material), that is free-draining and will temporarily pond to a maximum 6-inch depth. Proper construction of the bio-retention areas and proper planting of trees in these areas will allow trees to be planted and survive.

Source: City of Redding. *2000 - 2020 General Plan*. October 2000.

City of Redding Grading Ordinance

RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation*, addresses requirements associated with clearing, grading, fills and excavation. The ordinance sets forth rules and regulations to control clearing and grading and to prevent erosion and other environmental damage. It also establishes administrative procedures for the issuance and enforcement of permits, and provides for the approval of plans and inspection of grading and erosion-control implementation measures.

City of Redding Construction Standards

The City of Redding has adopted a set of construction standards that are applied to the design of subdivisions and other development projects, streets, and utilities. The construction standards provide requirements for the design of storm drainage facilities, including hydraulic criteria and typical details for structures.

City of Redding Stormwater Program

The City of Redding Public Works Department Stormwater Program administers requirements of the MS4 General Permit in the City. The City issued its Post-Construction Standards Plan in May 2016.[5]

City of Redding Council Policy 1806

Council Policy 1806, *Floodplain Development and Storm Water Detention*, contains stormwater policies related detention and floodplain development for consideration by the City departments when considering subdivisions, use permits, building permits, rezonings, *General Plan* amendments, City construction projects, grading permit applications, and floodplain encroachments. Council Policy 1806 requires measures to be incorporated into project design to ensure that increased in stormwater runoff do not occur as a result of project construction and/or appropriate mitigation measures are incorporated into the project to lessen flooding elsewhere in the drainage basin. This requirement does not apply to projects that are in close proximity to a natural waterway and there will be no development between the project and the Sacramento River. However, the project is proposing bioretention areas within landscaping areas throughout the project site to remove pollution from surface runoff from building areas and parking and driveway surfaces.

5.8.3 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. The following significance thresholds related to hydrology and water quality have been derived from Appendix G of the State *CEQA Guidelines*:

[5] City of Redding. *Post-Construction Standards Plan*. [Online]: http://www.cityofredding.org/home/ showdocument?id=8851. Accessed: October 8, 2018.

- *Violate any water quality standards or waste discharge requirements.* Refer to Impact 5.8-1, 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 5.8-2, 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 5.8-3, 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 5.8-4, 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 5.8-5, below.

- *Otherwise substantially degrade water quality.* Refer to Impact 5.8-6, 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 Impact 5.8-7, 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 5.8-8, 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 June 2018, the City 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 to 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):

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

In the June 2018 Initial Study circulated by the City, the above referenced significance threshold related to the placement of housing within a 100-year floodplain was inadvertently identified as having a potentially significant impact. However, as the proposed project does not include housing units this potential impact has been revised to reflect a no impact determination, and is therefore not discussed further in this Draft EIR.

5.8.4 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 Report,* prepared by GHD (May 2017) (refer to Appendix 15.7, PRELIMINARY HYDROLOGY REPORT) has been referenced for determining potential impacts of the proposed project. Other studies utilized in the evaluation of potential hydrology and water quality impacts include the *Draft Post Construction Stormwater Management Plan*, prepared by GHD and the *Sacramento River Flood Study*, prepared by Pacific Hydrologic, Inc. (February 2016) (refer to Appendix 15.8 and Appendix 15.9, respectively).

The evaluation of project impacts is also based on professional judgment, analysis of the City of Redding's hydrology and water quality policies, and the above referenced significant criteria, 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 5.8-1 ***Implementation of the proposed project may violate water quality standards or waste discharge requirements.***

Significance: Potentially 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 Subsection 5.8.2, *Regulatory Setting*, above. Potential impacts associated with water quality or waste discharge violations are described as follows.

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 and areas of offsite improvements 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.

Construction activities could lead to temporary impacts on surface water quality due to construction related pollutants and/or soil erosion. The project site and offsite improvement areas are 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.

The SWRCB is responsible for implementing the Clean Water Act and has issued a statewide General Permit (Water Quality Order No. 2009-0000-DWQ as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ) for construction activities within the State. The State General Construction Activity Storm Water Permit (CGP) is implemented and enforced by the 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 truck and vehicle 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 are 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 and/or containing stockpiled materials, covering stored materials and elevating them off the ground, if necessary, 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 dumpsters and trash cans throughout the site for litter/floatable management.

The SWRCB has also adopted a statewide general permit (Water Quality Order No. 2013-0001-DWQ) for small MS4s covered under the CWA to efficiently regulate numerous storm water discharges under a single permit. Permitees must meet the requirements in Provision D of the General Permit which require the development and implementation of a 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

Potential short-term impacts to surface water quality would be reduced following compliance with *General Plan* policies NR1B, NR1C, NR1D, NR1E, and NR1F as discussed above in Table 5.8-3, CONSISTENCY WITH APPLICABLE CITY OF REDDING GENERAL PLAN GOALS AND POLICIES FOR HYDROLOGY AND WATER QUALITY. In addition, the City's SWQIP dated August 2003 addresses the above measures and numerous other storm water quality concerns. The design and construction of site facilities shall comply with the City's SWQIP and the Statewide General Permit (Water Quality Order No. 2009-0000-DWQ as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ).

Mitigation Measure **MM 5.8-1a** requires preparation and implementation of a SWPPP, including BMPs to protect water quality. Implementation of **MM 5.8-1a** would reduce potential construction-related impacts on water quality to a *less than significant* level by implementing SWPPP and BMPs to ensure that water quality standard and waste discharge requirements are not violated. Impacts would be *less than significant*.

Long-Term Operation

The proposed project would result in the development of the majority of the 10.55-acre site as a medical facility on a campus like setting. A net effect of urbanization can be to increase non-point pollutant export over what would occur naturally under undeveloped conditions. The impact would be on any adjacent streams and 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.

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 washoffs, chemical spills, as well as animal droppings and litter types of wastes. The pollutants are washed from street surfaces by rainfall when 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 since the proposed project would incorporate required measures and devices designed to minimize pollutants, debris and sediments.

The proposed project will be approximately 77 percent impervious, compared to the 27 percent impervious condition under existing conditions. A *Draft Post Construction Stormwater Management Plan* was prepared to identify post construction BMPs to satisfy compliance with MS4 regulations. Storm water management techniques include, but are not limited to, the construction of flow-through planters and bio-retention areas within drainage management areas throughout the project site as illustrated in Figure 3-14, STORMWATER CONTROL PLAN, in Section 3.0, PROJECT DESCRIPTION.

All storm drain facilities are proposed to be designed and constructed consistent with the intent of applicable City of Redding Construction Standards, the City of Redding SQWIP, and the City of Redding MS4 General Permit from the RWQCB. These plans and standards incorporate strategies to minimize the storm water pollution. Further, potential water quality (non-point source pollutants) impacts would be reduced to less than significant levels following compliance with *General Plan* policies NR1D, NR1E, NR1F, and NR3B, which reflect regulatory requirements which ensure that water quality (non-point source pollutants) are minimized. In addition, the proposed project would be served by City wastewater services, therefore, the project would not involve any permitted discharges of waste material into ground or surface waters. Consistency with the policies contained in the *General Plan*, including the adherence with City construction standards and SQWIP, MS4 General Permit requirements, and **MM 5.8-1b**, impacts regarding water quality (non-point source pollutants) would be *less than significant*.

Mitigation Measures:

MM 5.8-1a: Prior to any ground-disturbing activities begin, the contractor shall apply for and maintain coverage under the General Construction Storm Water Permit. The contractor shall prepare and implement a SWPPP, including an erosion control plan that includes erosion control measures and construction waste containment measures to ensure that waters of the United States and the State are protected during and after project construction. The SWPPP shall include site design measures to minimize offsite stormwater runoff that might otherwise affect surrounding habitats. The Central Valley RWQCB will review and monitor the effectiveness of the SWPPP through mandatory reporting by the City and the contractor as required.

The SWPPP shall be prepared with the following objectives: (a) identify all pollutant sources, including sources of sediment, that may affect the quality of stormwater discharges from the construction of the project; (b) identify BMPs that effectively reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the site during construction to the Best Available Technology/Best Control Technology standard; (c) provide calculations and design details as well as BMP controls for site run-on that are complete and correct; (d) identify project discharge points and receiving waters; and (e) provide stabilization BMPs to reduce or eliminate pollutants following construction.

The contractor shall implement the SWPPP, including all BMPs, and perform inspections of all BMPs during construction. Potential SWPPP BMPs could include, but would not be limited to the following:

- Preserve existing vegetation where possible;
- Surface roughening of final grades to prevent erosion, decrease run-off, increase infiltration, and aid in vegetation establishment;
- Riparian buffers or filter strips along the perimeter of the disturbed area to intercept pollutants prior to offsite discharge;
- Placing fiber rolls around onsite drain inlets to prevent sediment and construction-related debris from entering inlets;
- Placing fiber rolls along down-gradient disturbed areas of the site to reduce runoff flow velocities and prevent sediment from leaving the site;
- Placing silt fences down-gradient of disturbed areas to slow down runoff and retain sediment;
- Stabilizing the construction entrance to reduce the tracking of mud and dirt onto public roads by construction vehicles;
- Staging excavated and stored construction materials and soil stockpiles in stable areas and covering materials to prevent erosion; and
- Stabilizing temporary construction entrances to limit transport/introduction of invasive species and control fugitive dust emissions.

MM 5.8-1b: Prior to issuance of a grading permit, the project applicant shall submit a final post construction stormwater management plan to the City concurrent with site improvement plans. The report shall be prepared by a Registered Civil Engineer and shall, at a minimum, include: A written text addressing existing conditions, the effects of the proposed improvements, all appropriate calculations, watershed maps, changes in flows and patterns, and proposed on- and offsite improvements and drainage easements to accommodate flows from this project. The report shall identify water quality protection features and methods to be used during construction, as well as long-term post-construction water quality measures.

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

IMPACT 5.8-2	***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: Less Than 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 proposed project would create several acres of new impervious surfaces (e.g., staging areas, onsite access drives, surface parking areas, proposed structures, and upgrades to the existing water supply and other utilities) which could reduce the amount of precipitation that is able to infiltrate the soil and recharge groundwater reserves. However, the project incorporates several stormwater bio-retention areas, which would allow runoff from impervious surfaces to infiltrate into the soil and would preserve groundwater recharge. The project does not include groundwater wells and would receive water from the City's municipal supply, which relies predominantly on Central Valley Project (CVP) water (refer to Section 5.16, UTILITIES AND SERVICE SYSTEMS). For these reasons, the proposed project would have a *less than significant* impact on groundwater supplies and groundwater recharge.

Water Supply Availability Normal-Year (Average) Conditions

As noted under Impact 5.16-4 in Section 5.16, UTILITIES AND SERVICE SYSTEMS, adequate water supplies are available from the City of Redding to serve the proposed project and uses within the City's service area under normal wet year conditions. Based on the City's supply availability under different conditions there is sufficient water available to meet the proposed project water demands. The design of 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 single dry year conditions, the City's water supplies are projected to be sufficient to meet demand. A supply surplus is projected to exceed 8,000 AFY, thereby accommodating the proposed project's water demand of 12 AFY under a single dry year scenario. Under multi-dry year dry conditions, the City's surface supplies are still subject to USBR-imposed shortages, with specific reductions similar to the single dry year for year one and year two and beyond. As discussed in Section 5.16, UTILITIES AND SERVICE SYSTEMS, the City projects sufficient water supplies to meet projected demands during multiple dry years through year 2035. Therefore, adequate water supplies are available to accommodate the proposed project's water demand of 12 AFY during multiple dry year conditions. Impacts are *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 5.8-3	***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.***

Significance: Potentially Significant Impact.

Impact Analysis: The rate and amount of surface runoff is determined by multiple factors, including: 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

Vegetation removal and excavation of soils on the project site areas would be required to construct building foundations and associated infrastructure systems (e.g. water and wastewater systems). 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 the project site is generally level; however, overall onsite 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 stormwater runoff. The clearing of vegetation and grading activities, for example, could lead to exposed or stockpiled soils, which are susceptible to peak stormwater runoff flows and wind forces. In addition, the presence of large amounts of raw materials for construction may lead to stormwater runoff contamination.

Grading will require excavations for footings and foundations varying from 2 to 4 feet to accommodate Building 'C' located northeast of Building 'A' and parallel to Henderson Road (North). Excavations between 5 and 10 feet will be required for Building 'A.' For Building 'B,' fills of up to 5 feet will be necessary. In the southern area of the site adjacent to the Henderson Open Space area, fills of 1 to 4 feet will be required and in the northern area, grading will occur with some cuts and fills of up to 2 feet in and around the area of Building 'C.' To the maximum extent feasible, the earthwork will be balanced between cut and fill. It is estimated that the maximum amount of earthwork will be 30,000 cubic yards (CYs) of which 15,000 CYs will be cut and 15,000 CYs will be fill. Existing retaining walls from previous site improvements will serve to identify transition areas between cuts and fills.

As discussed in Impact 5.8-1, 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 City regulatory requirements affecting design, construction and operation potential impacts are significantly minimized.

The project applicant would be required to request coverage under the NPDES General Permit, Order No. Water Quality Order No. 2009-0000-DWQ (as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ), because the proposed project would result in one or more acres of land disturbance. To conform to the requirements of the MS4 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 **MM 5.8-1a** would mitigate the potential for erosion of soils or siltation during construction activities.

Additionally, pursuant to the RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation*, 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 the City of Redding Permit Center Division 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 and **MM 5.8-1a** would reduce the potential for impacts relative to erosion or siltation onsite or offsite to *less than significant*.

Long-Term Operation

Consistent with City requirements, the project applicant would be required to prepare storm drain improvement plans for the onsite improvements to ensure that existing offsite drainage patterns are maintained during operation and that operation of the proposed project would not result in substantial erosion or loss of topsoil; 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. As discussed in Impact 5.8-1, the proposed project would be required to comply with the most recent requirements of the RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation*. 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 **MM 5.8-1a** and **MM 5.8-1b**, including federal, State and City stormwater regulations and post-construction BMPs required by the RMC Chapter 16.12.

Mitigation Measures: Implement **MM 5.8-1a** and **MM 5.8-1b**, as described above.

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

IMPACT 5.8-4	***Implementation of the proposed project would not 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: Less Than Significant Impact.

Impact Analysis: The rate and amount of surface runoff is determined by multiple factors, including: 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 and will increase the amount of impervious surfaces at the proposed project site which would have the potential to cause an increase in runoff on the site or adjacent to the site. 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

Water would be used during the 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. It is anticipated that approximately 1 AF of water would be used during construction (Tully & Young, 2018).

The proposed project site is generally flat and 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. The potential for construction of the proposed project, including offsite improvements, to alter existing drainage patterns would be minimized through compliance with design specifications and BMPs required by the RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* 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 lower 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 horizontal surface materials such as asphalt, concrete, and roofing materials to the landscape. These materials are relatively impervious, which means, that they absorb less rainwater. Depending on the site design, grading associated with development may also eliminate many of the low-lying areas that may have been providing a degree of surface storage. As impervious surfaces replace natural ground cover 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 increase which may result in downstream flooding if not properly mitigated.

The proposed project site remains mostly undeveloped with some scattered trees and other vegetation. Some remaining impervious surfaces on previously developed portions of the site include old asphalt paving areas, concrete pad areas, and two existing buildings. The City of Redding HEC-1 Processor was used to simulate runoff production that would occur during storm having return periods of 10-, 25-, and 100-years. Development of the proposed project would increase runoff production by creating an increase in impervious cover through the introduction of onsite paving and structures, and as a result, increase the peak flows leaving the site and discharging towards the west and eventually into the Sacramento River. As previously discussed above, project development would increase the overall impervious surface area within the proposed project site from 27 percent to 77 percent. The 100-year peak flow for the entire site would increase from 46 cfs to 66 cfs. The *Sacramento River Flood Study* concluded that no increase in the surface elevation of flood waters during a 100-year flood would occur as a result of the proposed project, therefore there are no downstream properties that would be adversely affected.

During circulation of the City's July 2017 Initial Study/Mitigated Negative Declaration for the proposed project, concerns were raised that during high flows, drainage systems would be disabled and flood

events could cause back-flushing of the detention basins resulting in concentrated pollutants entering the Sacramento River. It should be noted that the drainage systems would in fact have a temporary "back-water" or back-up condition during high flows, but are designed with sufficient "head" or depth that the drainage systems would operate as necessary to meet City of Redding stormwater standards. In addition, the onsite bio-retention areas will be elevated sufficiently above the 100-year floodplain such that there would not be any potential of "back-flushing." The back-water that may occur, the water would be within the drainage systems conveying stormwater that has previously been treated by the bio-retention soil mix. As a result, the pollutants are contained within the bio-retention soil only and not within any of the drainage systems. Impacts 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 5.8-5 ***Implementation of the proposed project would not 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.***

Significance: Less Than Significant Impact.

Impact Analysis: The proposed project will include construction of three new buildings, with associated drive aisles, parking areas, sidewalks, and landscaping areas (refer to Section 3.0, PROJECT DESCRIPTION). The majority of the project site has been designed to discharge similar to existing discharge patterns, with some slight changes. The upper area to the north will discharge into an existing 36-inch culvert, which discharges into an existing channel near the Sacramento River, just south of the Cypress Avenue bridge. The majority of the lower section of the site will discharge towards the west at two locations which currently receive some runoff, and will connect to two new culverts to be installed with the City of Redding's approved Henderson Open Space project. The overflow parking area to the south/southeast will discharge to the south into an existing 15-inch culvert that currently receives runoff from this same area. Table 5.8-4, PROPOSED PEAK FLOWS, provides a summary of post-project peak flows for each drainage area. In addition refer to Figure 5.8-2, PROPOSED DRAINAGE AREA MAP.

Table 5.8-4
PROPOSED PEAK FLOWS

Drainage Area	Area (ac)	% Impervious	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
P-1	1.17	62%	4	5	7
P-2	0.39	75%	2	2	2
P-3	3.17	73%	13	15	20
P-4	1.29	88%	6	7	8
P-5	4.24	73%	17	20	26
P-6	0.52	75%	2	2	3
TOTAL	**10.78**	**77%**	**44**	**51**	**66**

Note:
1. Q10=Peak 10 Year Flows; Q25=Peak 25 Year Flows; Q100=Peak 100 Year Flows.

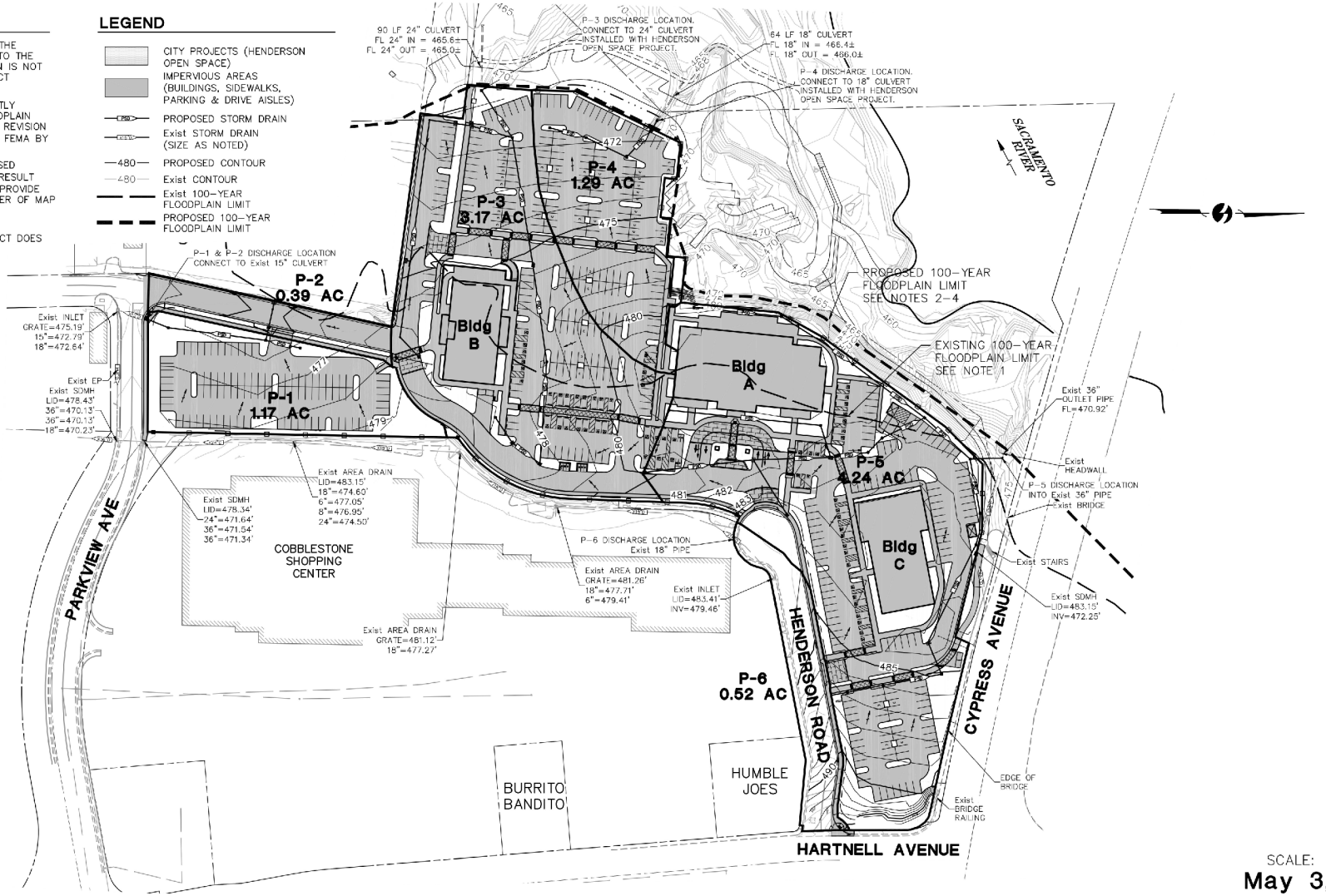
Source: GHD. *Preliminary Hydrology Report*. May 2017.

NOTES

1. THE EXISTING 100-YEAR FLOODPLAIN FOR THE SACRAMENTO RIVER IS SHOWN PURSUANT TO THE EXISTING FEMA MAPPING. THIS INFORMATION IS NOT RELIABLE SINCE IT RELIES ON AN INCORRECT BACKWATER MODEL.
2. PACIFIC HYDROLOGIC INC. (PHI) IS CURRENTLY COMPUTING THE CORRECT 100-YEAR FLOODPLAIN LIMITS AND WILL PREPARE LETTER OF MAP REVISION (LOMR-F) APPLICATION FOR SUBMITTAL TO FEMA BY THE CITY OF REDDING.
3. PHI IS CURRENTLY COMPUTING THE PROPOSED 100-YEAR FLOODPLAIN LIMITS (THAT WILL RESULT FROM THE PROPOSED PROJECT) AND WILL PROVIDE THE CALCULATIONS AND CONDITIONAL LETTER OF MAP REVISION (CLOMR-F) APPLICATION.
4. IT IS EXPECTED THAT THE CLOMR-F WILL DEMONSTRATE THAT THE PROPOSED PROJECT DOES NOT HAVE A MEASURABLE IMPACT ON THE FLOODPLAIN.

LEGEND

- CITY PROJECTS (HENDERSON OPEN SPACE)
- IMPERVIOUS AREAS (BUILDINGS, SIDEWALKS, PARKING & DRIVE AISLES)
- PROPOSED STORM DRAIN
- Exist STORM DRAIN (SIZE AS NOTED)
- 480 PROPOSED CONTOUR
- 480 Exist CONTOUR
- Exist 100-YEAR FLOODPLAIN LIMIT
- PROPOSED 100-YEAR FLOODPLAIN LIMIT



SCALE: 1"=150'

May 3, 2017

SHN	Dignity Health North State Pavilion Project	Proposed Drainage Area Map Figure 5.8-2

As noted in Table 5.8-4, upon project completion the impervious area would increase from 27 percent to 77 percent. The proposed 10-year, 25-year, and 100-year peak flows for the entire project site are 44 cfs, 51 cfs, and 66 cfs, respectively. This amounts to an increase of 18 cfs, 20 cfs, and 20 cfs for the 10-year, 25-year, and 100-year peak flows, respectively.

Proposed Drainage Area P-1

Proposed drainage area P-1 is located near the southerly end of the project site, and includes the new parking area between Henderson Road, Parkview Avenue, and the Cobblestone Shopping Center. The new parking area will include paved parking and drive aisles, as well as some concrete sidewalk and curbs. Proposed drainage area P-1 is approximately 1.17 acres and approximately 62 percent impervious. The proposed 100-year peak flow for this drainage area is approximately 7 cfs and discharges into bio-retention areas near the west edge of area P-1 and ultimately combines with the stormwater from proposed drainage area P-2 before discharging into the existing 15-inch storm drain pipe to the south, under Parkview Avenue.

Proposed Drainage Area P-2

Proposed drainage area P-2 is located in the southerly end of the project site, and is limited to the area of reconstructed Henderson Road, between Parkview Avenue and the Open Space Access Road. Proposed drainage area P-2 is approximately 0.39 acres and approximately 75 percent impervious. The proposed 100-year peak flow for this drainage area is approximately 2 cfs. Proposed drainage area P-2 combines with stormwater flows from area P-1, and discharges to the south through the existing 15-inch storm drain pipe under Parkview Avenue.

Proposed Drainage Area P-3

Proposed drainage area P-3 is located in the southwesterly area of the project site, and includes one of the new buildings, along with the new Henderson Open Space Access Road and a portion of the lower parking area. Proposed drainage area P-3 is approximately 3.17 acres and approximately 73 percent impervious. The proposed 100-year peak flow for this drainage area is approximately 20 cfs and discharges to the west through the new 24-inch storm drain pipe installed with the City of Redding's Henderson Open Space project.

Proposed Drainage Area P-4

Proposed drainage area P-4 is located near the middle area of the project site, and includes the northerly portion of the lower parking area. Proposed drainage area P-4 is approximately 1.29 acres and approximately 88 percent impervious. The proposed 100-year peak flow for this drainage area is approximately 8 cfs. Proposed drainage area P-4 flows into new storm drain pipes, and discharges to the west through the new 18-inch storm drain pipe installed with the City of Redding's Henderson Open Space project.

Proposed Drainage Area P-5

Proposed drainage area P-5 is located near the northwesterly area of the projectsite, and includes the other two buildings to be constructed, as well as paved parking and drive aisles, and concrete sidewalks and curbs. Drainage area P-5 is approximately 4.24 acres and approximately 73 percent impervious. The

proposed 100-year peak flow for this drainage area is approximately 26 cfs. Proposed drainage area P-5 discharges via the new storm drain system and connects into the existing 36-inch City culvert to the north of the site, that discharges immediately northwest of the project site.

Proposed Drainage Area P-6

Proposed drainage area P-6 is located near the northeasterly area of the project site, and includes only the City right-of-way for this northerly portion of Henderson Road. Proposed drainage area P-6 is approximately 0.52 acres and approximately 75 percent impervious. The proposed 100-year peak flow for this drainage area is approximately 3 cfs. Proposed drainage area P-6 discharges into an existing 18-inch culvert near the end of the Henderson Road cul-de-sac, and is conveyed to the south through the existing City storm drain system.

Evaluation of Post Construction Discharge Locations

The existing discharge locations for drainage areas X-1 and X-6 will continue to have surface flows discharged through the existing culverts, with similar peak flows. Peak flows for the discharge location for X-6 will be reduced slightly, since a portion of area X-6 will be transferred to the discharge location for area X-5.

The existing discharge location for drainage area X-2 will continue to receive runoff from the site, but will have increased amounts discharging from this location due to available capacity. This area will see a substantial increase in flows from the site because of the ability to discharge into the new 24-inch culvert through the City's Henderson Open Space. Peak flows leaving the site will be increased to approximately 20 cfs for the 100-year storm event.

The existing discharge location for drainage area X-3 will see a decrease in peak flows leaving the site, since a portion of the existing drainage area X-3 will be transferred to the new southerly discharge point for area P-3. Peak flows leaving the site at the discharge location for area X-3 will decrease from approximately 15 cfs to approximately 8 cfs. This discharge will connect from the projects new storm drain system, into the new 18-inch culvert installed with the City's Henderson Open Space project, which will then discharge into an existing channel west of the City's project.

The existing discharge location for area X-4 will continue to receive small amounts of sheet flow over the slope, but the existing culvert will be eliminated, and flows at this location will be nearly eliminated over the slope and at the existing culvert outlet.

The existing discharge location for drainage area X-5 will also be modified significantly, diverting the flows in this area from sheet flow and existing channel discharge over the slope, to the new storm drain system, and then into the City's existing 36-inch culvert to the north of the project. It is anticipated that the 26 cfs added to the 36-inch culvert at this location will be accommodated with the existing 36-inch culvert, which then discharges immediately west of the connection with the new storm drain pipe.

Conclusion

While the proposed project alters existing drainage area hydrology and increases impervious surfaces, the increases in runoff for the project area will not adversely affect downstream properties, and therefore will not require mitigation to existing peak flow conditions. Meanwhile, flows to the City's

existing storm drain system to the south of the project site will be reduced slightly, which may have a positive effect on downstream properties. *Less than significant* impacts would occur.

Mitigation Measures: No mitigation measures are required.

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

IMPACT 5.8-6 *Implementation of the proposed project could otherwise substantially degrade water quality.*

Significance: Potentially 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 stormwater 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. The paved and impervious surfaces of the proposed project would generate stormwater runoff that would carry with it the roadway and automotive contaminants found on the pavement surface. Storm water management techniques include, but are not limited to, the construction of flow-through planters and bio-retention systems within drainage management areas throughout the project site as illustrated in Figure 3-14. Bio-retention systems are designed to function in a similar manner as the physical, chemical, and biological processes in the natural environment. They capture runoff, promote infiltration and evapotranspiration, recharge groundwater, and remove up to 99 percent of the nutrients, sediment, and heavy metals carried in stormwater.[6]

As previously discussed under Impact 5.8-1 and Impact 5.8-4, 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. These obligations are memorialized in **MM 5.8-1a** and **MM 5.8-1b**. Impacts would be *less than significant*.

Long-Term Operation

As stated in Impact 5.8-1, 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

[6] Ahiablame, Laurent M., Bernard A. Engel, and Indrajeet Chaubey. 2012. *Effectiveness of Low Impact Development Practices: Literature Review and Suggestions for Future Research*. Journal of Water, Air, and Soil Pollution. 223:4253-4273.

proper use and disposal, these chemicals are not expected to result in impacts that would substantially degrade water quality.

Offsite Improvements

Several offsite intersection improvements have been identified for the proposed project (refer to **MM 5.14-1, MM 5.14-3** and **MM 5.14-4** in Section 5.14, TRAFFIC AND CIRCULATION). These improvements would be implemented at-grade similar to existing roadway elevations within previously improved City roadway right-of-way and would be constructed in accordance with City design criteria. Similar to onsite construction activities, implementation of federal, State, and City regulatory requirements affecting design, construction and operation would be required during construction of any offsite infrastructure improvements. Impacts in this regard would be *less than significant*.

Mitigation Measures: Implement **MM 5.8-1a** and **MM 5.8-1b**, as described above.

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

IMPACT 5.8-7 ***Implementation of the proposed project could place within a 100-year flood hazard area structures which would impede or redirect flows.***

Significance: Less Than Significant Impact.

Impact Analysis: Implementation of the proposed project would include construction of approximately 3.58 acres of the western parking lot area, south of Building 'A' and west of Building 'C' abutting the Henderson Open Space area, within the currently mapped FEMA 100-year floodplain as shown on Figures 3-13a and 3-13b, GRADING AND DRAINAGE PLANS, in Section 3.0, PROJECT DESCRIPTION. The magnitude of encroachment represented by the fill is considered small when compared to the total conveyance area of the Sacramento River during a 100-year flood event.

The City of Redding has a "no rise" policy requiring that new development not encroach within the 100-year floodplain or that the project applicant demonstrate that the new encroachment will not increase the water surface elevation during the most probable 100-year flood using an appropriate engineering study and mitigation if needed. As a result, a flood study was completed by Pacific Hydrologic Incorporated (February 2016) (refer to Appendix 15.8, SACRAMENTO RIVER FLOOD STUDY).

The evaluation was completed utilizing the Corps of Engineers' HEC-RAS backwater program as a formal means of identifying potential flood risk impacts associated with implementation of the proposed project and evaluated several cross-sections near the downstream end and middle of the proposed parking lot (refer to Appendix 15.8, SACRAMENTO RIVER FLOOD STUDY). Table 5.8-5, BASE FLOOD WATER SURFACE ELEVATIONS, provides existing and post project base flood water surface elevations at each modeled cross-section.

Table 5.8-5
BASE FLOOD WATER SURFACE ELEVATIONS

Cross-Section	Existing Condition Elevation	Post Project Condition Elevation	Post Project Difference (feet)
73266	470.82	470.82	0
73448	471.18	471.16	-0.02
73730.7	471.17	471.15	-0.02
74013.5	471.64	471.64	0
74579	471.83	471.83	0

Source: Pacific Hydrologic Incorporated. *Sacramento River Flood Study*. February 2016.

As noted above in Table 5.8-4, implementation of the proposed project would not result in an increase in the water surface elevation or the extent of inundation compared to current conditions. The assessment concluded that the proposed parking lot as presently anticipated by the project with fill to remove the parking lot from the floodplain, will not increase the water surface elevation or the extent of inundation during the most probable 100-year flood. Any improvements near the floodplain (fencing, retaining walls, etc), would be designed using standard and best engineering practices to ensure all facilities will with stand and damage from the floodplain. Impacts would be *less than significant*.

As previously discussed above, subsequent analysis has determined that the FEMA floodway was incorrectly delineated and Building 'A' and parking lot between Building 'A' and Building 'B' would be entirely located within the floodway fringe. To make this correction a Letter of Map Revision (LOMR) must be prepared that meets the study and mapping requirements of FEMA. A LOMR dated February 14, 2017 was prepared and subsequently submitted to FEMA by the City after their review and approval. Based on the calculations to support the LOMR, the floodway, which is the portion of the river that conveys the high flows and high velocity of flood waters, is located greater than 200 feet from the westerly project boundary. As a result project construction will have no effect on the floodway. Waters within the floodplain near the westerly edge of the site would have would experience low depths and low velocities and would have no impact on neighboring developments.

A Conditional Letter of Map Revision based on Fill (CLOMR-F) will need to be approved prior to issuing a grading permit for fill in the floodway fringe. Once the LOMR is approved, the CLOMR-F will be prepared and submitted to FEMA. As a condition of project approval, grading within the floodway fringe would be suspended until such time the CLOMR-F is approved by FEMA. I

Mitigation Measures: No mitigation measures are required.

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

IMPACT 5.8-8 ***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.***

The California Supreme Court has held that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents." Thus, where the discussion below considers the effects of flooding as a result of the failure of a levee or dam on future users of the project site, such analysis goes beyond the bounds of CEQA.

Significance: Less Than Significant Impact.

Impact Analysis: Two major dams are located in the general vicinity of the proposed project: Shasta Dam and Whiskeytown Dam. The anticipated inundation resulting from the unlikely failure of these dams has been documented in the *General Plan.* According to Figure 4-5 of the Health and Safety Element of the *General Plan*, the proposed project is located within the inundation area of Shasta Dam, but outside the Whiskeytown Dam Failure inundation area (Figure 4-6).

Uncontrolled releases from Shasta Dam, although very unlikely, would devastate the entire northern Central Valley including the proposed project. The Sacramento River and its tributaries would overtop banks and levees. Massive flooding in the lowlands along the river would occur and Interstate 5, the main west coast transportation artery, would be affected by closure and possible structural damage. As a result, large portions of Redding along the Sacramento River, including the proposed project site, would be directly affected by a dam overflow or failure. Although these are two different types of events, the results are the same - uncontrolled releases from Shasta Dam.

Dam Overflow [7]

Although it is highly unlikely, a dam overflow is more likely than a dam failure. A dam overflow would be characterized by an "overtopping" of the dam. The design of the structure includes three large spillway gates to minimize the possibility of a true overtopping of the dam. During an intense and prolonged storm period that might bring water levels near the top of the dam, these spillway gates would be lowered allowing water to be discharged down the spillway. Controlling, or funneling, the discharge down the spillway prevents structural erosion along the base and sides of the dam, protects the turbine power generation plant at the base of the dam, and allows control of the release in cubic feet per second. Shasta Dam has never overflowed in its 60 year history

Dam Failure [8]

A dam failure is less likely than a dam overflow. A dam failure would be characterized by a structural breach of the dam. Flooding and overtopping, earthquakes, release blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, or terrorism typify dam failures. California has had about 45 failures of nonfederal dams. These failures occurred for a variety of reasons, the most common being overtopping of earthen dams. Some of the other reasons include specific shortcomings in the dams themselves or inadequate assessment of the surrounding geomorphologic characteristics. Shasta Dam is a federal dam, one of the largest concrete dams in the world, and secured firmly on bedrock.

Although there is a history of 45 dam failures within the State of California, most of the failures were earthen dams. Of the concrete dams that failed, all were of the "thin-arch" design. Shasta Dam is a federally controlled and inspected dam and is considered a "thick arch." Seismic activity is monitored, and tunnels throughout the dam itself allow inspectors to monitor for cracks and seepage. The dam is built on bedrock and is geomorphologically sound. The probability of a dam failure is extremely low**.**

Conclusion

The proposed project, like many developed areas along the Sacramento River in Redding, is located within the mapped inundation area of Shasta Dam. As noted above, Shasta Dam has never overtopped and the probability of dam failure is considered extremely low. In addition, the City maintains an

[7] City of Redding. 2015. *Local Hazard Mitigation Plan*. Page. 77. November 2015.
[8] Ibid.

Emergency Operations Center (EOC), including communication and coordination with USBR, to help coordinate information and resources should the City experience a large event such as dam overflow or failure.

While the proposed project would result in up to 180 people working at the proposed project site, the loss of life as a result of a catastrophic failure or overtopping of Shasta Dam is not considered significant given the dam type, construction, the historical context of dam operations and management, and ongoing coordination between the City and USBR. Impacts are therefore considered *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*.

5.8.5 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

The analysis of cumulative impacts focuses on those effects that, when combined together with other similar activities or projects could result in a large enough effect or impact that would be considered cumulatively significant. If the individual project's contribution is substantial enough, it may be considered cumulatively significant. In some instances, a project-specific impact may not combine with effects from other activities, in which case, the project's contribution to a cumulative effect would be less than considerable.

The geographic area considered for cumulative impacts to surface water, drainage, and flood hazards encompasses the Lower Sacramento Watershed, which spans about 20,125 square miles, including the Sacramento Valley, the northern Sierra Nevada, the south end of the Cascade Range, and some of the east slopes of the northern Coast Ranges. The area considered for cumulative water quality impacts covers the nine cities and towns (including Redding) and four counties within the six-county northern and central Sacramento Valley region that are permittees on the Small MS4 General Permit. These defined geographic areas are appropriate as cumulative development may adversely affect downstream water quality and flood hazards.

The geographic area considered for cumulative impacts to groundwater includes the Redding Groundwater Basin. This geographic extend is appropriate as the cumulative groundwater impacts are generally limited to the groundwater basin in which cumulative development would occur. Projects identified within Section 4.0, BASIS OF CUMULATIVE ANALYSIS, would likely use, in part, groundwater resources of the Redding Groundwater Basin.

IMPACT 5.8-9	***Implementation of the proposed project, combined with other past, present, and reasonably foreseeable future development, could potentially violate water quality standards or waste discharge requirements.***

Significance: Potentially Significant Impact.

Impact Analysis: Development of the proposed project would result in a significant impact to 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. Therefore, the proposed project's incremental contribution to water quality impacts would be cumulatively considerable.

As previously evaluated under Impact 5.8-1, the proposed project's surface runoff water quality, both during construction and post-development, would comply with adopted regulatory requirement that are designed by the SWRCB and Central Valley RWQCB to assure that regional development does not adversely affect water quality in any receiving waterbodies. The proposed project would comply with requirements of the NPDES General Permit, Water Quality Order No. 2009-0000-DWQ (as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ), would implement a SWPPP with specific BMPs to prevent construction pollutants, including eroded soils (such as topsoil), from moving offsite, would comply with RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* and submit grading plans, all being subject to approval by the City of Redding. In addition, implementation of **MM 5.8-1a** and **MM 5.8-1b** would ensure these requirements are met. As a result, a *less than significant* impact would occur.

As with the proposed project, any future urban development occurring in the cumulative watershed area would also comply with these conditions on an individual basis through compliance with the requirements of the City of Redding, SWRCB, and Central Valley RWQCB. Therefore, the proposed project impacts to runoff and water quality would not combine with past, present, or reasonably foreseeable future projects to create a significant cumulative impact. With implementation of mitigation measures and compliance with federal, State, and local regulations, water quality impacts would be cumulatively *less than significant*.

Mitigation Measures: Implement **MM 5.8-1a** and **MM 5.8-1b**, as described above.

Level of Significance After Mitigation: Through compliance with the requirements of the City of Redding, SWRCB, and Central Valley RWQCB as required and managed by **MM 5.8-1a** and **MM 5.8-1b**, the proposed project's incremental contribution to this impact would be *less than cumulatively considerable*. Successful implementation of mitigation measures identified for this proposed project, combined with individual environmental reviews and adherence with applicable regulatory requirements of the City of Redding, SWRCB, and Central Valley RWQCB on a project-by-project basis, would result in cumulatively *less than significant* impacts.

IMPACT 5.8-10	***Implementation of the proposed project, combined with other past, present, and reasonably foreseeable future development, would not 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.***

Significance: Less Than Significant Impact.

Impact Analysis: The proposed project would create several acres of new impervious surfaces which could reduce the amount of precipitation that is able to infiltrate the soil and recharge groundwater

reserves. However, the project incorporates several stormwater bio-retention areas, which would allow runoff from impervious surfaces to infiltrate into the soil and would preserve groundwater recharge.

The proposed project does not include groundwater wells and would receive water 12 AF annually from the City of Redding's municipal supply, which relies predominantly Central Valley Project (CVP) surface water resources. Between 2006 and 2010, groundwater, as a supplement to surface water sources to the City, provided approximately 30 percent of total annual water production. According to the City's *2015 Urban Water Management Plan*, groundwater wells can supply enough water to supplement existing surface water contracts with the USBR without any noted overdraft conditions in the local groundwater basin.

As represented in the City's *2015 Urban Water Management Plan,* adequate water supplies are available from the City to serve the proposed project and uses within the City's service area under normal wet year and multiple dry year conditions through year 2035. In addition, the proposed project would comply with federal, State, and local regulations and policies regarding water conservation. For these reasons, the proposed project would have a *less than significant* impact on groundwater supplies and groundwater recharge and the project's incremental contribution to groundwater impacts would not be cumulatively considerable.

Cumulative projects listed in Section 4.0, BASIS OF CUMULATIVE ANALYSIS, would develop impervious areas, which could decrease infiltration of stormwater within the Redding Groundwater Basin. As with the proposed project, cumulative projects would be required to comply with drainage requirements of one of two MS4 permits: either the Small MS4 General Permit or the Central Valley Region-Wide MS4 Permit issued by the Central Valley RWQCB in 2016, which covers storm drainage systems in cities as small as 10,000 population. The Small MS4 General Permit requires that certain categories of development and redevelopment projects evapotranspire, infiltrate, harvest/use, and biotreat certain quantities of storm water.[9] The Central Valley Region-Wide MS4 Permit also requires infiltration of stormwater, so long as infiltration will not adversely affect groundwater quality.[10]

It is important to note that the Redding Groundwater Basin is not an adjudicated basin. As the basin is not in overdraft, no legal pumping limit has been set; therefore, no overdraft mitigation efforts are currently underway. Though no safe yield has been established for the Redding Groundwater Basin, groundwater modeling as part of the Coordinated AB3030 Groundwater Management Plan indicates that the Redding Groundwater Basin is resilient to severe drought conditions and is able to recover with one year of normal rainfall.[11] However, as previously described above under Subsection 5.8.2, *Regulatory Setting*, the Enterprise Sub-Basin of the Redding Groundwater Basin, in which the project is located, has been identified as a medium priority basin under the SGMA. As a result, the Enterprise Anderson Groundwater Sustainability Agency (EAGSA) was formed consisting of the overlying members of the Redding Area Groundwater Basin. The EAGSA was formed by Memorandum of Understanding (MOU) agreed to by the City of Anderson, the County of Shasta, the Clear Creek Community Services District (CCCSD), the Bella Vista Water District, the Anderson Cottonwood Irrigation District (ACID), and the City of Redding. As required, the EAGSA shall prepare and implement a Groundwater Sustainability Plan (GSP) for the Enterprise and Anderson sub-basins by 2022.

[9] State Water Resources Control Board (SWRCB). 2013. *Statewide General Permit for Small MS4s.* [Online]: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/phsii2012_5th/order_final.pdf. Accessed: October 9, 2018.
[10] Central Valley Regional Water Quality Control Board (CVRWQCB). 2016. *Order No. R5-2016-0040. General Permit for Discharges from Municipal Separate Storm Sewer Systems [MS4s]*.
[11] City of Redding. *2015 Urban Water Management Plan*. June 2016.

Through the efforts of the EAGSA, the GSP will identify the long-term management and use of groundwater within the Enterprise and Anderson sub-basins in a manner that can be maintained without causing undesirable results. Undesirable results are generally defined with these sustainability indicators: (a) chronic lowering of groundwater levels (not including overdraft during a drought, if a basin is otherwise managed); (b) significant and unreasonable reductions in groundwater storage; (c) significant and unreasonable seawater intrusion; (d) significant and unreasonable degradation of water quality; (e) significant and unreasonable land subsidence; and (f) surface water depletions that have significant and unreasonable adverse impacts on beneficial uses (Water Code Section 10721(w)).

Each of these indicators will be evaluated in the GSP. The GSP will also document the minimum threshold conditions at which a sustainability indicator becomes significant and unreasonable. Then, the GSP must establish a measurable objective reflecting the basin's desired groundwater conditions, and provide for achievement of the sustainability goal within 20 years.

Given the current and foreseeable status of the Redding Groundwater Basin as a non adjudicated basin, coupled with the requirements of the Sustainable Groundwater Management Act, MS4 permits and federal, State, and local regulations and policies regarding water conservation, impacts to groundwater supplies and groundwater recharge within the Redding Groundwater Basin would be cumulatively *less than significant.*

Mitigation Measures: No mitigation measures are required.

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

IMPACT 5.8-11	***Implementation of the proposed project, combined with other past, present, and reasonably foreseeable future development, 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.***

Significance: Potentially Significant Impact.

Impact Analysis: Implementation of the proposed project would not result in the alteration of the course of a stream or river. However, project construction activities and resultant increase in onsite impervious surfaces would increase the potential for erosion and stormwater runoff. Therefore, the proposed project's incremental contribution to this impact is cumulatively considerable.

As previously described under Impact 5.8-9, above, the proposed project would comply with requirements of the NPDES General Permit, Water Quality Order No. 2009-0000-DWQ, would implement a SWPPP with specific BMPs to prevent construction pollutants, including eroded soils from moving offsite, would comply with RMC Chapter 16.12, *Clearing, Grading, Fills and Excavation,* and submit grading plans, all being subject to approval by the City of Redding. In addition, implementation of **MM 5.8-1a** and **MM 5.8-1b** would ensure compliance with the above requirements and *less than significant* impacts would occur.

As previously described above, the area considered for cumulative water quality impacts covers the nine cities and towns (including Redding) and four counties within the six-county northern and central Sacramento Valley region that are permittees on the Small MS4 General Permit.[12,13] Construction activities associated with cumulative development projects within the region 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.

Projects listed in Section 4.0, BASIS OF CUMULATIVE ANALYSIS, including other projects in those 13 jurisdictions would generate increased amounts of pollutants that could contaminate stormwater. All projects are subject to water quality regulations summarized in Subsection 5.8.2, *Regulatory Setting.* Each project would be required to implement BMPs in several categories, including site design, source control, treatment control, low-impact development, and hydromodification management. In addition, construction sites 1-acre and larger would be required to implement construction BMPs pursuant to the Statewide General Construction NPDES Permit. Therefore, impacts related to a substantial increase in erosion and siltation would be cumulatively *less than significant*.

Mitigation Measures: Implement **MM 5.8-1a** and **MM 5.8-1b**, as described above.

Level of Significance After Mitigation: Through compliance with the requirements of the City of Redding, SWRCB, and Central Valley RWQCB as required and managed by **MM 5.8-1a** and **MM 5.8-1b**, the proposed project's incremental contribution to the impact would be *less than cumulatively considerable*. Successful implementation of mitigation measures identified for this proposed project, combined with individual environmental reviews and adherence with applicable regulatory requirements of the City of Redding, SWRCB, and Central Valley RWQCB on a project-by-project basis, would result in cumulatively *less than significant* impacts.

IMPACT 5.8-12	***Implementation of the proposed project, combined with other past, present, and reasonably foreseeable future development, could potentially 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.***

Significance: Potentially Significant Impact.

Impact Analysis: As noted above in Impact 5.8-5, implementation of the proposed project would not exceed the capacity of an existing or planned stormwater drainage system. Therefore, the proposed project's incremental contribution is not cumulatively considerable in this regard.

Development of the proposed project could potentially impact water quality if operation and maintenance activities would result additional sources of polluted runoff, including but not limited to, pesticides, trash and debris, and oil and grease. As previously described above, street surfaces are the

[12] Northern Sacramento Valley Integrated Regional Water Management Group. 2014. *Northern Sacramento Valley Integrated Regional Water Management Plan*.
[13] The region referenced, about 9,441 square miles, consists of part of Shasta County; most of Butte, Glenn, and Colusa counties; and all of Tehama and Sutter counties. The Small MS4 General Permit covers numerous permittees across California; thus, permittees within the referenced region were chosen for analysis of cumulative impacts.

primary source of pollution in urban areas that typically contain atmospheric pollution, tire-wear residues, petroleum products, oil and grease fertilizer and pesticide washoffs, chemical spills, as well as animal droppings and litter types of wastes. As the project would increase the amount of impervious surface on site (approximately 77 percent) through development of onsite buildings and parking areas, the project's incremental contribution to pollutants, debris and sediments is considered cumulatively considerable.

As described under Impact 5.8-1, the proposed project would not result in substantial amounts of polluted runoff with implementation of implementation of **MM 5.8-1a** and **MM 5.8-1b** and compliance with federal, State, and local regulations. All storm drain facilities are proposed to be designed and constructed consistent with the intent of applicable City of Redding Construction Standards and MS4 Permit. In addition, wastewater services to the proposed project would be provided by City, therefore, the project would not involve any permitted discharges of waste material into ground or surface waters. Impacts would be *less than significant*.

Future urban development occurring in the cumulative watershed area is subject to the requirements of the City of Redding, SWRCB, and Central Valley RWQCB related to stormwater quality to reduce cumulative water quality impacts to *less than significant levels*. With respect to existing or planned stormwater drainage systems, cumulative projects within the jurisdiction of the City would be required to implement improvements identified in the City's *Drainage Master Plan* in order to ensure adequate storm drain capacity. Stormwater drainage within unincorporated Shasta County is designed and managed on a project-by-project basis and regulated through MS4 requirements and implementation of Shasta County *General Plan* Policy FL-h that requires the impacts of new development on the floodplain or other downstream areas due to increased runoff be mitigated. Therefore, with implementation of **MM 5.8-1a** and **MM 5.8-1b** and compliance with federal, State, and local regulations, impacts related to stormwater runoff and water quality would be cumulatively *less than significant*.

Mitigation Measures: Implement **MM 5.8-1a** and **MM 5.8-1b**, as described above.

Level of Significance After Mitigation: Through compliance with the requirements of the City of Redding, Shasta County, SWRCB, and Central Valley RWQCB as required and managed by **MM 5.8-1a** and **MM 5.8-1b**, the proposed project's incremental contribution to this impact would be *less than cumulatively considerable*. Successful implementation of mitigation measures identified for this proposed project, combined with individual environmental reviews and adherence with applicable regulatory requirements of the City of Redding, Shasta County, SWRCB, and Central Valley RWQCB on a project-by-project basis, would result in cumulatively *less than significant* impacts.

IMPACT 5.8-13	***Implementation of the proposed project, combined with other past, present, and reasonably foreseeable future development, would not place structures within a 100-year flood hazard area that would impede or redirect flows.***

Significance: Less Than Significant Impact

Impact Analysis: As noted above in Impact 5.8-7, implementation of the proposed project would not result in an increase in the water surface elevation or impede or redirect flows within the floodplain and the extent of inundation compared to current conditions within the floodplain would be *less than*

significant. City Council Policy 1806 that requires new projects within the City to prevent increases in stormwater runoff as a result of project construction and/or appropriate mitigation measures to lessen flooding elsewhere in the drainage basin. This "no rise" policy requires that new development not encroach within the 100-year floodplain or that the project applicant demonstrate that the new encroachment will not increase the water surface elevation during the most probable 100-year flood. Therefore, since the project would not result in an increase in the surface elevation of the Sacramento River, the project's incremental contribution to this impact is not cumulatively considerable.

Cumulative projects identified in Section 4.0, BASIS OF CUMULATIVE ANALYSIS, located within the jurisdiction of the City, would be required to adhere to City Council Policy 1806 and therefore avoid impacts within the 100-year floodplain. Other jurisdictions in the region strictly regulate development in 100-year flood zones. For example, cumulative projects located within unincorporated Shasta County would be subject to Shasta County *General Plan* Policy FL-a, that regulates new development in floodplains through zoning restrictions addressing land use type, density, and siting of structures; Policy FL-c, that encourages flood control measures to favor channel diversions or limited floodplain designs which avoid alteration of creeks and their immediate environs; and Policy FL-h, that requires the impacts of new development on the floodplain or other downstream areas due to increased runoff from development be mitigated.

Implementation of local regulations and requirements would ensure that potential cumulative impacts related to impeding or redirecting flows within the 100-year floodplain remain *less than significant*. Therefore, the proposed would not combine with past, present, or reasonably foreseeable future projects related to impeding or redirecting flows within the 100-year floodplain. Impacts would be cumulatively *less than significant*.

Mitigation Measures: No mitigation measures are required.

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