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TECHNICAL MEMORANDUM ON SECRET RAVINE CREEK AND SPECIAL-STATUS FISH
Public Draft Environmental Impact Report for the Rocklin Crossings Project

The southeast corner of the Rocklin Crossings Project is located approximately 300 feet northwest of Secret Ravine Creek. Secret Ravine Creek, which is part of the Dry Creek Watershed, provides spawning and rearing habitat for the federally threatened Central Valley steelhead (*Oncorhynchus mykiss*) and spawning habitat for fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*), a federal candidate species and state species of special concern. Thus, uncontrolled soil erosion generated during project construction could indirectly affect fish habitat and benthic macroinvertebrates by degrading the water quality within Secret Ravine Creek. Urban pollutants generated from the site during ongoing operations could also potentially degrade water quality, if not properly controlled and treated.

In light of this possibility, a number of commenters have voiced concern regarding the project's effect on Secret Ravine Creek and the creek's salmon population. The following memorandum addresses those various comments in a comprehensive manner by providing information on special-status fish and habitat in the project area, as well as describing the potential impacts from the project and the effectiveness of the mitigation proposed to address such impacts. The response also addresses the analysis and conclusions of the following studies identified by the commenters: Ayres, et al. (2003), U.C. Santa Barbara, *Assessment of Stressors on Fall-Run Chinook Salmon in Secret Ravine*, Placer County, CA; and U.C. Berkeley, 2003, *A benthic macro invertebrate survey of Secret Ravine: the effects of urbanization on species diversity and abundance*.

Further, as discussed below, the project's runoff, erosion and subsequent sedimentation issues will be minimized or eliminated, through implementation of Mitigation Measures 4.10-2 and 4.10-3, which require the preparation of an erosion control plan and stormwater pollution prevention plan (SWPPP) and the installation of appropriate Best Management Practices (BMPs) for compliance with all the requirements of the City's Stormwater Runoff Pollution Control Ordinance (Title 8, Chapter 8.30 of the City Code) and the Grading and Erosion and Sedimentation Control Ordinance (Title 15, Chapter 15.28 of the City Code), which regulate stormwater and prohibit non-stormwater discharges except where regulated by an NPDES permit.

Site operations with the potential to degrade water quality in the long term would also be mitigated through Mitigation Measure 4.10-3, which requires the project applicant to identify additional stormwater runoff BMPs. Currently, stormwater runoff for the project is planned to be pre-treated by roadway catch-basin filters and continuous deflection system (CDS) units, and then routed to a detention basin. While the catchbasin filters and CDS units would function as the primary treatment BMPs, the detention basin would serve to further reduce pollutants in storm water through infiltration, biological uptake, and settling. The detention basin has been designed to function as a water quality basin in accordance with Guidance Document for Volume and Flow-based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection published by the Placer Regional Stormwater Coordination Group (PRSCG) (May 2005), and would serve to provide the preferred "treatment train" system. Such measures are designed to reduce the discharge pollutant concentrations to comply with existing water quality criteria and to minimize the potential for impacting Secret Ravine Creek, Central Valley steelhead and Critical Habitat, or Chinook salmon. Prior to issuance of a grading permit for the site, however, the BMPs shall be reviewed for adequacy by the City of Rocklin, Engineering Department to ensure that they will effectively remove pollutants from the site's stormwater runoff. At that time, if technologies as effective as, or more effective than, catch-basin filters or CDS units are available, they can be considered.

The mitigation proposed will prevent the project from contributing to the degradation of Secret Ravine Creek and the special-status fish that use the Creek. Moreover, as discussed below, it appears that, regardless of the existing or proposed uses of the project site, special-status fish populations in Secret Ravine Creek have already been declining in recent years. The reason for the recent decline in fall-run Chinook salmon stocks in Secret Ravine Creek is unclear, however. The decrease in the numbers of live Chinook salmon, carcasses, and redds observed in 2007 in the Dry Creek Watershed is similar to low numbers observed in other California streams. (A "redd" is a gravel-covered depression [or nest] in which salmon lay their eggs.) Thus, the decline appears to be a coast-wide phenomenon, and is likely related to ocean conditions (Pacific Fishery Management Council 2008) rather than causes local to Secret Ravine Creek.

Based on the positive results of presence/absence surveys conducted by CDFG in 2004 and 2005 and observations of juvenile salmonids in 2007 by ECORP biologists, however, successful spawning and rearing is still occurring even though the overall quality of the stream habitats within lower Secret Ravine Creek (i.e., within the general Project area) is currently relatively poor for anadromous fish. The results of habitat typing within the area of potential impact associated with the Rocklin Crossings project and the project's proposed detention basin indicate that limited spawning and rearing habitat is present for both Central Valley steelhead and Chinook salmon. The stream habitats in both Dry Creek and Secret Ravine Creek consist primarily of flatwater areas comprised of runs and shallow pools with very few riffles (ECORP 2007, 2008). Moreover, the small amount of riffle and pool tail-out habitat that occurs in lower Secret Ravine Creek is already degraded by an abundance of sand, resulting in embeddedness of cobble and gravel substrates.

The poor to moderate quality of the stream habitats in Secret Ravine Creek is also evidenced by the moderate benthic macro invertebrate (BMI) diversity noted within the above reaches of lower Secret Ravine Creek. Macroinvertebrates are an important food source for Chinook salmon and steelhead and are also good indicators of stream quality. While the *"A benthic macro invertebrate survey of Secret Ravine*" (U.C. Berkeley, 2003) study attributes the differences in BMI community structure between the upstream and downstream sites to impacts associated with urban runoff and nutrient loading in the vicinity of the downstream site, no information (water quality data or sources of impairment) was provided in the study to support this conclusion.

While habitat within Secret Ravine Creek may be currently of poor to moderate quality, the project will not contribute to any further degradation. With implementation of Mitigation Measures 4.10-2 and 4.10-3, the water entering Secret Ravine Creek would meet existing water quality criteria from the project area, and the project's potential impacts on Central Valley steelhead and designated Critical Habitat, and on Central Valley fall/late fall-run Chinook salmon, as well as BMIs, would be reduced to a less than significant level.

Background on Special-Status Fish Populations and Habitat in or around the Project Area

Secret Ravine Creek, which is part of the Dry Creek Watershed, provides spawning and rearing habitat for the federally threatened Central Valley steelhead (*Oncorhynchus mykiss*) and spawning habitat for fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*), a federal candidate species and state species of special concern. In addition, the Dry Creek Watershed, including Secret Ravine Creek, is designated as Critical Habitat for steelhead trout. Central Valley steelhead and designated Critical Habitat are protected by law under the federal Endangered Species Act (ESA), as amended. Fall- and late fall-run Chinook salmon, however, have not been listed under either the federal or state ESAs, and as such, are not protected by these federal or state laws. Fall-run and late fall-run Chinook salmon, however, are designated by the National Marine Fisheries Service as "candidate" species, and by the California Department of Fish and Game as "species of special concern."

Current Special-Status Fish Populations in Secret Ravine Creek

Fisheries data for Secret Ravine Creek are available from the California Department of Fish and Game (CDFG), Region 2. Fish surveys conducted in Secret Ravine Creek by CDFG and others (Vanicek 1993b) documented the presence of 22 species, including eight native fishes. More recent surveys conducted by Garcia and Associates and CDFG in 1998 and 2002, respectively, documented the presence of the same general fish assemblage.

While current local population information for steelhead or Chinook salmon within the Dry Creek Watershed is not available, due to the lack of systematic or comprehensive surveys, data trends indicate that special-status fish populations in the Dry Creek Watershed, which includes Secret Ravine Creek, have been declining in recent years. The earliest surveys to evaluate salmon spawning activities in Secret Ravine Creek were conducted by CDFG in 1963, with subsequent surveys conducted in 1964-1966, 1968, and 1985. From 1998 through 2000, CDFG conducted additional surveys to determine the distribution of rearing steelhead and Chinook salmon, and to determine emigration timing of juvenile steelhead and salmon from both Secret and Miners Ravine creeks. Since 2000, the only surveys that have been conducted in Secret Ravine Creek are the one-day salmon counts performed annually (since 1997) by the Dry Creek Conservancy (DCC), and the presence/absence surveys conducted by CDFG in 2004 and 2005. The DCC surveys are similar to the earlier CDFG surveys (prior to 1998), which involved observations of live fish, carcasses, and redds to determine the run size and population estimates. The 2004-2005 CDFG surveys involved the use of electrofishing gear to determine presence/absence only. The 1998-2000 CDFG surveys also involved electrofishing but the data were collected within standard reach lengths to provide quantitative data for estimating the population.

From 1998 through 2000, CDFG conducted electrofishing and screw trapping in Dry Creek below the confluence with Miners and Secret Ravine creeks. Sampling results indicated that during all three years of monitoring, young-of-the-year steelhead, yearling, and older fish were present in both Miners and Secret Ravine Creeks (Bailey Environmental 2003).

In 2004 and 2005, CDFG conducted resource assessment surveys in the creek to determine presence/absence of Central Valley steelhead and Chinook salmon. As part of this assessment, CDFG electrofished interspersed sections of the creek from the headwaters, near Newcastle, downstream to just above the confluence with Miners Ravine Creek. The results of these surveys conducted in October and November 2004, and May 2005, are provided, by stream reach, in Table 8-1.

Table 8-1. Surveys by Stream Reach

Location	**Fall 2004**		**Spring 2005**	
	Steelhead	Chinook	Steelhead	Chinook
Upstream of Gilardi Road crossing	+	--	+	--
Buckeye Road off Penryn Rock Spring Road	+	--	+	--
China Mine Road crossing	+	--	+	--
L.D.S. Recreation Park at Penryn Road	+	--	+	+
Loomis Basin Park	--	--	+	+
Horseshoe Bar Road crossing	+	--	+	+
Behind Sierra College at Rocklin Road	--	--	--	+
Greenbrae Road	--	--	--	+
Upstream of East Roseville Parkway	--	--	--	+
Downstream of East Roseville Parkway	--	--	NA	NA
Upstream of confluence with Miners Ravine	--	--	NA	NA

+ - Observed within reach
-- - Not observed within reach

In addition to the information collected by CDFG since 2003, the DCC has conducted annual one-day salmon surveys for live fish, carcasses, and redds in Secret Ravine Creek (and in Miners Ravine, Antelope, Linda/Cirby, and Dry creeks). The surveys were conducted primarily by volunteers in November in 2003 and 2004, and in December from 2005 through 2007. These data are provided in the Table 8-2.

Table 8-2. Annual One-Day Salmon Surveys

Reach Location	Live Fish					Carcasses					Redds				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Confluence to East Roseville Parkway, Roseville	7	16	5	0	1	3	1	1	1	2	1	5	1	0	0
East Roseville Parkway to China Garden Rd., Rocklin	12	40	13	5	1	11	8	4	8	1	3	33	32	30	4
China Garden Rd. to Rocklin Rd., Rocklin	42	35	30	0	0	12	3	5	2	0	18	15	24	2	0
Rocklin Rd. to Sierra College Blvd., Rocklin	61	23	-	0	0	14	9	-	0	0	2	7	-	10	0
Sierra College Blvd. to Brace Rd., Loomis	22	40	15	0	0	8	12	2	0	0	7	5	4	0	0
Brace Rd. to Loomis Basin Park, Loomis	61	68	0	0	0	38	30	1	0	0	37	-	0	0	0
Loomis Basin Park, Loomis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	*205*	*222*	*63*	*5*	*2*	*86*	*63*	*13*	*11*	*3*	*68*	*65*	*61*	*42*	*4*

Based on available information and observations by ECORP biologists in 2007, it appears that Central Valley steelhead and Chinook salmon are still successfully spawning (and rearing for steelhead) in Secret Ravine Creek. Since 2003, however, the numbers of fish have declined, especially in 2007.

The decrease in the numbers of live Chinook salmon, carcasses, and redds observed in 2007 in the Dry Creek Watershed, however, is similar to low numbers observed in other California streams. In 2007, a total of 87,966 natural and hatchery fall-run Chinook salmon adults were estimated to have returned to the Sacramento Basin to spawn. This number represents the second-lowest escapement estimate on record and was approximately 33% of the preseason expectation of 265,500 returning adults. Table 8-4 presents the number of natural and hatchery adult fall-run Chinook salmon that returned to the Sacramento River Watershed (including the Dry Creek Watershed) to spawn from 2000 to 2007 (Pacific Fishery Management Council 2008). As is evident from the data, the annual variation in the numbers of fall-run Chinook salmon returning to spawn in California streams can be substantial from one year to the next.

Table 8-4. Natural and Hatchery Adult Fall-Run Chinook Salmon that Returned to the Sacramento River Watershed

Year	Upper River[1]			Lower River[2]			Totals		
	Hatchery	Natural[3]	Subtotal	Hatchery	Natural	Subtotal	Hatchery	Natural	Grand Total
2000	20,793	152,923	173,716	26,782	216,291	243,073	47,575	369,214	416,789

2001	23,710	130,440	154,150	33,689	358,217	391,906	57,399	488,657	546,056
2002	61,946	481,924	543,870	23,747	207,883	231,630	85,693	689,806	775,499
2003	82,708	184,802	247,510	25,490	248,636	274,126	108,198	413,438	521,636
2004	51,557	70,557	122,114	28,510	132,930	161,440	80,067	203,487	283,554
2005	142,135	96,716	238,851	41,166	113.990	155,156	183,301	210,706	394,007
2006	56,966	85,882	142,848	21,722	103,338	125,060	78,688	189,220	267,908
2007	11,558	32,854	44,412	9,681	33,873	43,554	21,239	66,727	87,966

[1] The Sacramento River and tributaries upstream of the Feather River
[2] The Sacramento River and tributaries downstream of the Feather River
[3] Fish spawning in natural areas are the result of natural and hatchery production

The reason for the recent decline in fall-run Chinook salmon stocks in Secret Ravine Creek, the Dry Creek Watershed and statewide is unclear. Both hatchery and naturally produced fish have been negatively affected, and returns of coastal stocks in Oregon, the Columbia River, and British Columbia were all low in 2007. In addition, only 2,000 jacks (immature fish that return to the rivers at age two) returned to Central Valley streams in 2007 relative to the long-term average of 40,000 fish, indicating that the number of returning adults in 2008 will probably also be low. This decline appears to be a coast-wide phenomenon, and is likely related to ocean conditions (Pacific Fishery Management Council 2008) rather than causes local to Secret Ravine Creek.

In addition to the recent low numbers of fish returning to the Dry Creek Watershed to spawn, barriers to fish passage occur within the Dry Creek Watershed that may contribute to this decline. These barriers include temporary beaver dams, seasonal flashboard dams, pipeline crossings, concrete dams, and natural falls. According to David Vanicek (1993), several man-made structures and natural barriers exist within the Dry Creek channel that could potentially restrict migration at low flows, especially the pipeline crossing at the Cirby Creek confluence near Riverside Drive in Roseville. However, recent modifications to the pipeline crossing have improved passage conditions. The absence of holding pools and the potential presence of barriers at low flows creates inadequate conditions for the upstream movement of adult salmon during the fall spawning run (Vanicek 1993). Even though anadromous (ocean-going) species routinely migrate into the watershed to spawn, full access to Secret Ravine and Miners Ravine creeks may not be possible during low flow periods.

Near the mouth of Secret Ravine Creek, an old pipeline crossing and concrete sill across the stream channel may be a complete barrier or impede passage during certain low flow conditions (Bailey Environmental 2003). In addition, low flows during the spawning migration, especially for fall-run Chinook salmon, have also been identified as a potential passage problem in Secret Ravine Creek (Dry Creek Conservancy 2001).

Current Special-Status Fish Habitat in Secret Ravine Creek

In general, spawning and rearing habitat for anadromous salmonids includes cold flowing water, suitable substrates, and readily available food sources. Both steelhead and Chinook salmon require gravel and cobble substrates with limited amounts of fine sediments (sand, silt, and clay) for spawning. Fry (a term used for a young salmon after it hatches from the egg), and older juveniles, require adequate instream cover (cobble or boulders, large woody debris, undercut banks, or submerged and overhanging vegetation) for protection from predators. In general, water temperatures of 15 °C (59 °F) or less are necessary for successful incubation and hatching of eggs for both steelhead and Chinook salmon. Chinook salmon fry and juveniles can tolerate warmer water temperatures (up to approximately 20 °C (68 °F), while steelhead juveniles can tolerate temperatures up to 26 to 27º (79 to 81 °F).

The overall quality of the stream habitats within lower Secret Ravine Creek is relatively poor for anadromous fish and other species. Stream habitats in both Dry Creek and Secret Ravine Creek consist primarily of flatwater areas comprised of runs and shallow pools with very few riffles (ECORP 2007, 2008). Stream habitats within Secret Ravine Creek are generally of higher quality than those in Dry Creek, although fine sediments dominate substrates in both creeks. According to the results of an ecological risk assessment conducted by Ayres, et al. (2003), sediment in Secret Ravine Creek is the primary stressor to Chinook salmon, and is associated with two other stressors, stream flow and channel morphology. The risk assessment used two models (the Modified Relative Risk Model and the Stressor-Driven Risk Model) and available data to help understand and predict links between sources, stressors, and their resulting ecological effects. Even though both models identified sediment as the primary stressor in the creek, neither model was able to accurately account for the relative contributions that any particular stressor has on the system.

Furthermore, the presence of fine sediment in the lower reaches of Secret Ravine Creek would be expected, since the creek flows through an alluvial floodplain comprised primarily of small substrate. Surveys conducted in the upper portion of Dry Creek and in Miners Ravine and Secret Ravine creeks indicate that stream substrates are dominated by sand, silt, and clay (51% combined) (Vanicek 1993). In general, bank substrates within and downstream of the Project consist primarily of sand and small gravel, with a small percentage of large gravel, cobble, boulder, and bedrock. Stream cover for fish is generally sparse, and mostly limited to overhanging vegetation, which provides overhead cover for fish that is not available from other sources in the creek (i.e., boulders, undercut banks, downed woody debris, bubble and turbulent water cover, etc.). Based on the composition of the dominant streambed and bank substrates throughout much of lower reach, it is likely that the stream channel has always had relatively high levels of sand and gravel.

Other potential stressors on Chinook salmon include reduced fish access and toxicity. Toxicity issues associated with the presence of heavy metals may be a result of past mining operations within the drainage. Available water quality data for Secret Ravine Creek is limited to a few studies conducted by the DCC and the Central Valley Regional Water Quality Control Board (CVRWQCB). These data include a variety of parameters, although the information is not comprehensive or systematic. The DCC periodically conducts “first flush” and/or quarterly monitoring upstream of Rocklin Road and at the confluence with Miners Ravine Creek. Water quality data have shown that the nitrate to orthophosphate ratio for the creek varies from the recommended 10:1; however, the values were not excessive (Bailey Environmental 2003). From 2000 to 2002, the CVRWQCB collected monthly water quality samples from three locations within Secret Ravine Creek. Results of this effort, which included pesticide scans, indicated that pesticides were not a problem within the watershed; however, standards for cadmium, copper, and zinc were exceeded in at least one sample. In addition, pH values tended to fluctuate throughout the year, although adjacent watersheds and drainages also showed the same type of fluctuations (Bailey Environmental 2003).

Based on available temperature data for Secret Ravine Creek, conditions are generally suitable for both steelhead and salmon during the late fall, winter, and spring throughout most of the stream length. During the summer, water temperatures in the lower reaches of the creek (mostly downstream of Sierra College Boulevard) are normally too warm to support rearing of juvenile steelhead. According to CDFG (2006), suitable year-round rearing habitat for steelhead is present from at least Brace Road in Loomis, upstream to the headwaters. During the summer, high water temperatures and associated effects appear to be a limiting factor for steelhead rearing from approximately Sierra College downstream to the confluence with Miners Ravine Creek (CDFG 2006). However, from late fall through spring, lower water temperatures allow salmonids to use the lower reaches for rearing.

Thus, in general, due to the scarcity of suitable riffles and pool tail-outs, spawning and rearing habitat for Central Valley steelhead and Chinook salmon is generally sparse within the Dry Creek Watershed (including Secret Ravine Creek). Moreover, the small amount of riffle and pool tail-out habitat that occurs in lower Secret Ravine Creek (i.e., within the general Project area) is already degraded by an abundance of sand, resulting in embeddedness of cobble and gravel substrates.

2007 Secret Ravine Creek Special-Status Fish Habitat Assessment (Habitat Typing)

In the fall of 2007, ECORP Consulting fisheries biologists conducted a field-based fish habitat assessment (or habitat/species evaluation) for special-status fish occurring in Secret Ravine Creek within and adjacent to the Project area. Above Sierra College Boulevard, the Secret Ravine Creek channel is generally stable with abundant streamside vegetation and very few areas with active erosion. Most of this lower portion of Secret Ravine Creek flows through an alluvial floodplain comprised primarily of small substrates.

The assessment included approximately 2,903 linear feet of creek upstream of the proposed detention basin discharge point (upstream reach), and about 1,665 feet from the discharge point downstream to the Sierra College Boulevard Bridge (downstream reach) (Figure 1). These reaches were selected to evaluate potential effects of the detention basin discharge on downstream habitats and Central Valley steelhead. In general, bank substrates both upstream and downstream of the proposed detention basin discharge point consist primarily of sand and gravel, with a small percentage of boulder and bedrock. The Valley-foothill riparian corridor within these reaches ranges from poorly to relatively well developed, providing moderate bank stability. During stream habitat typing, a total of 70 separate habitats (i.e., discrete and distinct types of habitats, such as runs, riffles, or pools) were recorded within the 2.903 feet upstream reach; and a total of 48 separate habitats were recorded within the 1,665 foot downstream reach.

Findings of Habitat Typing in the Upstream Reach

With the exception of a short bedrock cascade, the Secret Ravine Creek channel upstream of the detention basin discharge point (upstream reach) is generally low gradient (<2% slope) and moderately incised, consisting primarily of earthen banks with interspersed areas of bedrock and large boulder. The average wetted width of the stream channel was 14.2 feet, and the average depth was about 1.3 feet. In-stream habitats were dominated by runs and step-runs (~65%), followed by glides (~15%) and pools (~16%). The remaining stream habitats included riffles (~2%) and cascades (<2%). Substrate composition within the upstream reach was generally similar to that recorded for the downstream reach, although the percentage of fine sediment (silt and sand) was higher than in the downstream reach due to a higher percentage of pool and glide habitat within the upstream reach. Fine sediment comprised 68% of the substrate within the upstream reach (~61% sand and 7% silt). Gravel comprised about 9% of the substrate (~5.0% fine and 4% coarse), while cobble was sparse, averaging approximately 3%. Boulders and bedrock comprised approximately 19% of the substrate (10% and 9%, respectively). Canopy cover varied from 0 to 100%, with an average of ~23%. Instream cover for fish was generally limited (averaging about 22%) and varied with habitat type. Available cover consisted primarily of overhanging vegetation, object cover, water turbulence and depth, and undercut banks.

Within the upstream reach, the limited spawning and rearing habitat with suitable substrates, sparse cover for fish, and generally meager canopy provides only marginal habitat value for anadromous salmonids (trout and salmon).

Findings of Habitat Typing in the Downstream Reach

The Secret Ravine Creek channel from the proposed detention basin discharge point downstream to the Sierra College Boulevard Bridge (downstream reach) is generally low gradient (<2% slope) and moderately incised, consisting primarily of earthen banks with interspersed areas of bedrock and large boulder. The average wetted width of the stream channel was 15.7 feet, and the average depth was 0.9 feet. In-stream habitats within this 1,665 feet reach were dominated by runs and step-runs (~42%), followed by glides (23%) and low gradient riffles (~18%). The remaining stream habitats include pools (~14%) and high gradient riffles (~3%). Substrate composition within this reach was generally similar to that recorded for the upstream reach, although the percentage of fine sediment (silt and sand) was somewhat lower than in the upstream reach. Fine sediment comprised 63% of the substrate within the downstream reach (~57% sand and 6% silt). Gravel comprised approximately 14% of the substrate (13% fine and 1.0% coarse), while cobble was relatively sparse, averaging about 4%. Boulders and bedrock comprised 7% and 5% of the substrate, respectively, within this reach. Canopy cover varied from 0 to 100%, with an average of ~39%. Instream cover for fish was generally low to moderate, averaging about 27%. Available cover varied with habitat type, and consisted primarily of overhanging vegetation, object cover, water turbulence and depth, and undercut banks.

Within the downstream reach, riffle habitat and pool tail-outs with suitable substrates for spawning and rearing are more common, cover for fish is slightly higher, and the canopy is denser than in the upstream reach, providing moderate habitat value for anadromous salmonids (trout and salmon).

Findings of Habitat Typing in the Upstream and Downstream Reaches Combined

The two reaches combined total 4,568 feet in length and contain 118 separate habitats. Within the two reaches, run and glide habitats comprise about 75% of the total linear distance. These habitat types are common in most “Valley” streams that flow through predominantly low gradient earthen channels. Sand was the dominant substrate observed, averaging nearly 60% within the combined reaches. As a result, embeddedness of gravel, cobble, and boulder substrates was common throughout both reaches. In general, embeddedness estimates averaged 25 to 50% in most rocky areas, although some areas exceeded 50%.

Channel widths in run and glide habitats averaged 15.1 feet. Maximum depths in these two habitat types averaged 1.6 feet with average depths of 0.9 feet. Run and glide habitat had relatively high percentages of sand and silt (averaging 72% of the total substrate) with relatively small amounts of gravel (9% total; 6% fine and 2% coarse), boulder (6%), bedrock (4%), and cobble (2%). Canopy cover in run and glide habitats ranged from 0 to 80%, with an average of 21%. Average canopy cover was greater in the upstream reach (30%) with lower average values (24%) in the downstream reach. Instream cover for fish, which consists primarily of overhanging vegetation, object cover, and water turbulence or depth, was relatively low, averaging between 15 and 20%.

Pools comprised approximately 18% of the stream habitats within the two reaches. Main channel pools were the most abundant pool type (comprising 47% of the pool habitat) and were generally the widest areas of the creek, averaging slightly less than 5.5 meters (18 feet) in width. Other pool habitats present within the reach included lateral scour pools, backwater pools, secondary channel pools, and a single trench pool. These additional pool types accounted for the remaining 53% of the total pool habitat. Due to the abundance of fine sediments (sand and silt), pool depths were generally shallow. The maximum depth recorded in a single pool was 4.4 feet. Main channel and corner pools combined had an average maximum depth of 2.0 feet and an average depth of 1.5 feet. As expected, pools had relatively high percentages of silt and sand, averaging 69% of the total substrate. The remainder of the substrate consisted of approximately 7% gravel, 9% boulder, and 10% bedrock. Canopy cover for pool habitats ranged from 0 to 90% with an average of 28%. Instream cover for fish was generally low to moderate, averaging about 25%. Available cover observed consisted primarily of object cover, overhanging vegetation, and water depth.

Overall, riffle habitats were sparse, comprising less than 3% of the habitats within the two reaches combined. The limited amount of riffle habitat appeared to be associated with a general lack of rocky substrates combined with a low gradient stream profile. A total of 14 short riffles were recorded within the two reaches combined (12 low gradient and two high gradient). The riffles averaged slightly less than 13.1 feet in width, with average maximum depths of 1.3 feet and average depths of 0.8 feet. Substrate composition within riffle habitats consisted of a mixture of sand (28%), similar amounts of fine and coarse gravel (14% and 13% respectively; totaling 27%), cobble (16%), and boulder (25%) with a small amount of bedrock (4%). Canopy cover in riffle habitats averaged 34%, with a range of 0 to 70%. Instream cover for fish was moderate to good (46%), consisting of object cover, overhanging vegetation, and water turbulence.

During habitat mapping, surveyors observed downstream movement of sand throughout both reaches, even though flows were relatively low. This continual sand movement reduces the potential for rooted aquatic vegetation to become well established within the stream channel, and is likely responsible for the embeddedness of cobble and gravel substrates.

Fish Observations during Habitat Typing

Due to the presence of anadromous salmonids within Secret Ravine Creek, fisheries sampling is not authorized by the National Marine Fisheries Service (NMFS) as part of habitat assessments. However, fish were occasionally observed during habitat typing performed by ECORP in 2007. Fish observed included native Sacramento pikeminnow (*Ptychocheilus grandis*) and steelhead trout (*Oncorhynchus mykiss*), and several introduced species, including largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), and mosquitofish (*Gambusia affinis*). During the assessments, a few steelhead fingerlings were observed in the fall upstream of Sierra College Boulevard, and one dead Chinook salmon fingerling (impaled on a branch in the stream) was observed in the spring just downstream of China Garden Road.

Water Quality Sampling Results Collected during Habitat Typing

Water quality parameters recorded in Secret Ravine Creek during each site visit included water temperature, conductivity, total dissolved solids, salinity, dissolved oxygen, and pH. Table 8-3 provides water quality values that were recorded during habitat typing for the Rocklin Crossings Project on 8, 9, and 11 October 2007 and in the reach downstream of China Garden Road for another project on 7 May 2007. Values obtained for temperature and dissolved oxygen met the water quality standards for cold freshwater habitat as stipulated in the Basin Plan (State Water Resources Control Board), and was within the acceptable range for salmonid rearing (Moyle 2002). Values for the remaining parameters were within the normal range for foothill streams in this region. Stream flow was measured at 12.0 cubic feet per second (cfs) on 7 May 2007, at 8.2 cfs on 8 October 2007; and at 10 cfs on 9 and 11 October.

Table 8-3. Water Quality Values Recorded During Habitat Typing

Date	Water Temperature (˚C)	Water Conductivity (ms/cm)	Total Dissolved Solids	Turbidity (NTU)	Salinity (ppt)	Dissolved Oxygen mg/L (%)	pH
7 May 2007	17.1	144	--	2.1	0.0	9.5 (109)	7.7
8 October 2007	15.1	134	0.11	--	0.1	13.5 (134)	7.9
9 October 2007	15.4	117	0.09	--	0.1	12.3 (123)	7.8
11 October 2007	15.5	142	0.11	--	0.1	12.0 (121)	7.9

Conclusions Regarding Special-Status Fish Populations Based on Results of Habitat Typing

In general, results of habitat typing within the area of potential impact associated with the Rocklin Crossings project and the proposed detention basin indicate that limited spawning and rearing habitat is present for both Central Valley steelhead and Chinook salmon within the two surveyed reaches. Additionally, based on available information and observations by ECORP biologists, it appears that Central Valley steelhead and Chinook salmon are still successfully spawning (and rearing for steelhead) in Secret Ravine Creek, although, as discussed above, since 2003 the numbers have declined, especially in 2007.

Status of Benthic Macroinvertebrates in Secret Ravine Creek

Benthic macroinvertebrates (BMIs) are animals without backbones that live on the bottom of streams during all or part of their life cycle. Macroinvertebrates are an important food source for Chinook salmon and steelhead, which spawn in Dry Creek. In addition, differences in BMI populations can indicate perturbations such as pollution. Aquatic macroinvertebrates are also good indicators of stream quality because they have limited migration patterns and cannot escape pollution, so they show cumulative impacts of pollution as well as impacts of habitat loss not detected by traditional water quality assessments (de Barruel 2003).

In general, stream habitat characteristics required by salmonids for spawning and rearing also provide optimal conditions for BMI communities. These characteristics include cool flowing water with high dissolved oxygen levels, and abundant gravel and cobble substrates with limited amounts of fine sediments (sand, silt, and clay).

Sediment (especially fines) within stream courses can degrade habitat for BMI assemblages by eliminating interstitial spaces between substrate that serve as habitat for aquatic invertebrates. Stream habitats in both Dry Creek and Secret Ravine Creek consist primarily of flatwater areas comprised of runs and shallow pools with very few riffles (ECORP 2007, 2008). Based on surveys conducted in the upper portion of Dry Creek and in Miners Ravine and Secret Ravine Creeks, stream substrates were dominated by sand, silt, and clay (51% combined) (Vanicek 1993). Sand also appears to be the dominant substrate type in lower Secret Ravine Creek downstream of the Horseshoe Bar Road Bridge (personal observations by ECORP fisheries biologists 2007 and 2008). As a result, BMI populations within the lower portion of Secret Ravine Creek would be expected to have moderate Taxa Richness (20 to 40 species). Taxa Richness is the total number of different types of animals in the sample; greater taxa richness generally indicates greater habitat quality. Streams with higher percentages of more favorable substrates of gravel and cobble (which is more typical for salmonid streams) would be expected to have high Taxa Richness (50 to 70 species).

Very little BMI data have been collected in Secret Ravine Creek. The most recent study available was conducted in 2003 through the University of California, Berkeley by de Barruel and West (2003). In addition, the DCC conducted limited BMI sampling in 2000 and 2001 (Bailey Environmental 2003), and Wayne Fields collected samples at several locations in 1999 (Fields 1999). Sampling efforts in 2003, 2001, and 1999 were conducted at two general locations on Secret Ravine Creek: an upper site behind Sierra College, and a lower site above the confluence with Miners Ravine Creek. The locations of the 2000 sampling sites are not available. Wayne Fields collected samples at these two sites and at several additional sites including the Horseshoe Bar Road area, near the west end of China Garden Road, downstream of Dominguez Road, and Loomis Basin Park.

Data obtained in September by Fields (1999) showed the same general trends in BMI populations at each stream location sampled. Abundance (an estimate of the total number of organisms in a sample based on the proportion of organisms counted in the subsample) was slightly higher at the downstream sites, with similar diversity (Taxa Richness) at all locations. Analysis of the data indicated that BMI species composition and population levels were not significantly different at five of the six sampling sites located between the mouth of Secret Ravine Creek and Loomis Basin Park (approximately 5.7 miles upstream of the confluence with Miners Ravine Creek).

Results of sampling conducted by the DCC from 2000 through 2004 generally showed the same trends as Fields (1999) with the greatest Abundance at the downstream site and similar diversity (Taxa Richness) at both sites. The number of tolerant taxa was also similar between the two sites, and the number of sensitive taxa was only slightly higher at the upstream site relative to the downstream site. Percent Chironomidae (midge larvae) was usually slightly higher at the downstream site than at the upstream site; though, midge larvae comprised a relatively large proportion of the samples at both sites.

Data collected by de Barruel and West (2003) also showed that Abundance was greatest at the downstream site and diversity (Taxa Richness) was generally similar at both locations. The number of sensitive taxa was consistently higher at the upstream site relative to the downstream site, which indicates improved stream habitat conditions for BMIs at the upstream site relative to the downstream site. The percent error for these data, however, was relatively high and overlapped at both sites, indicating that these metrics showed high variability between samples. Percent Chironomidae (midge larvae) comprised a large proportion of the BMI population at the downstream site, but were not present at the upstream site. Large numbers of midges generally indicate poorer water quality conditions; they are very tolerant to a wide variety of conditions. But they occur virtually everywhere in varying numbers and diversity. The lack of midge larvae at the upstream site is highly unusual, since midge larvae are usually ubiquitous (in varying densities) in all flowing water systems.

The results of the above studies indicates that BMI communities within the lower reaches of Secret Ravine Creek (downstream of Loomis Park) are generally similar and that stream conditions (including water quality) and species diversity (which is in the moderate range) do not vary significantly throughout most of lower Secret Ravine Creek.

Due to the limited amount of sampling conducted as part of the de Barruel study, differences in habitat characteristics at sampling locations, and the high variability observed for BMI metrics between samples, it is not possible to use the results of this study to determine if BMI populations at the two sites have been negatively affected by urban development. Many of the conclusions provided in this report lack necessary supporting documentation or are based on insufficient data. The report attributes the differences in BMI community structure between the upstream and downstream sites to impacts associated with urban runoff and nutrient loading in the vicinity of the downstream site, yet no information (water quality data or sources of impairment) was provided to support this conclusion. Thus, while the authors conclude that the BMI population at the downstream site has been negatively affected by urban development, they fail to provide either any information regarding which development areas or potential sources of degradation are present within the lower reach that are affecting the site, or water quality results that indicate polluted conditions. Additionally, the study only addresses a single sampling effort conducted during one year and does not evaluate the natural variation typical of BMI communities.

Furthermore, the data collected in the above studies cannot be compared due to different sampling methods, different sampling locations and habitat characteristics, and potentially different sample collection times (sampling dates were only provided for one study). Thus, caution must be used when interpreting the limited and discontinuous data available for the creek, as these studies only represent BMI population data for specific points in time (which may not reflect average conditions) at varying site locations, and do not address overall variability within the system. Since BMI communities are typically highly variable and are influenced by a multitude of physical habitat characteristics and water quality parameters, even slight variations in habitat can have significant effects on the benthic community. Some of the more important habitat characteristics include: elevation; stream gradient, width, and aspect; substrate composition and distribution; water depth, velocity, temperature, turbidity, presence of toxicants, and other water quality issues; amount and type of streamside vegetation; and percent canopy cover. In addition, BMI communities can vary annually depending on the time of year that sampling is conducted (i.e., organisms present in the spring may be reduced or absent in the summer or fall), the amount and timing of rainfall, water and air temperatures, and other environmental factors. None of these factors are fully addressed or accounted for in the studies.

Differences in rainfall amounts and timing can directly affect the magnitude and duration of local stream flows and corresponding water velocities, which can affect BMI community abundance and composition metrics. Wetter years with high spring outflows can mobilize and re-distribute substantial amounts of substrate within the stream channel, and create localized scour. BMI community responses to these types of disturbances usually include lower organism diversity and abundance for a period following these events. Hynes (1970) and other investigators have observed that periods of high water reduce invertebrate fauna and associated food resources (i.e., algae and periphyton) in streams.

Therefore, to adequately describe and evaluate the health of stream BMI communities requires several consecutive years of sampling at specific locations to document and quantify annual variation and trends in community structure and population dynamics. The samples need to be collected during the same general time period each year using the same methodology. At the current time, these data are not available for Secret Ravine Creek.

Based on anecdotal evidence (the presence of high water marks and deposition of organic material along the creek), Secret Ravine Creek is a flashy system during the wet season with periodic high winter/spring flows. During the summer and fall, stream flows are typically low, but consistent. Streams that experience these types of annual flow regimes tend to have BMI communities with patchy distributions associated with key habitat characteristics that include stream gradient and channel morphology, water depth and velocity, substrate composition including fines, and food availability. The high variability and patchiness of benthic macroinvertebrate communities has been well documented in the literature (Hynes 1970, Lake 2000).

Conclusions Regarding Status of Benthic Macroinvertebrates in Secret Ravine Creek Based on Habitat Typing Results

Observations made in the spring and fall of 2007 by ECORP during stream habitat typing associated with the Rocklin Crossings project indicate that benthic habitats do not appear to currently support a robust BMI community structure. The moderate BMI diversity noted within the above reaches of lower Secret Ravine Creek is likely due to a combination of factors, including a general absence of riffle habitat; the presence of abundant fine sediments; the general lack of gravel and cobble substrates; and relatively high embeddedness that reduces the interstitial spaces between gravel and cobble substrates for BMIs.

In general, the differences in BMI communities observed at the site behind Sierra College and above the confluence with Miners Ravine Creek are typical of the lower reaches of small streams that flow out of the Sierra foothills. The BMI population at the downstream site is typical of the lowest reaches (Valley floor) of many of these small streams where habitat characteristics and water quality conditions are usually more stressful than at upstream locations. Downstream of China Garden Road, the stream channel becomes lower gradient and wider, the riparian corridor is less well developed than in upstream areas, and water temperatures are warmer due to increased exposure. In addition, differences in microhabitat are also present between the upstream and downstream sites which affect BMI use of the habitat.

Potential Effects of the Project on Secret Ravine Creek

The southeast corner of the Rocklin Crossings Project is located approximately 300 feet northwest of Secret Ravine Creek. While it appears that the numbers of Chinook salmon in the Creek have declined in recent years, they are still successfully spawning and rearing in the Creek. The results of habitat typing indicate that limited spawning and rearing habitat is present for both Central Valley steelhead and Chinook salmon within the vicinity of the Rocklin Crossings project area. Additionally, the habitat typing study indicates that benthic habitats do not appear to currently support a robust BMI community structure in the vicinity of or downstream of the Rocklin Crossings project area.

The abundance of fine sediment has been identified by CDFG, the DCC, Vanicek (1993), Ayres, et al. (2003), and others as a major issue relative to spawning and rearing habitat for both Central Valley steelhead and Chinook salmon in the lower reaches of the creek. Ayres, et al. (2003) attributed increased sedimentation in Secret Ravine Creek to the presence of impervious surfaces and off-highway vehicle use. Most of the existing impervious surfaces within close proximity to the creek, however, are associated with Interstate 80, single family residences that occur along much of the stream channel, and residential roads that cross the creek, not the proposed project site. In general, small to large amounts of impervious surfaces are already present along portions of Secret Ravine Creek.

Since the majority of the creek flows through private property, most of the off-highway vehicle use has occurred in the lower reaches below Sierra College Boulevard, especially between China Garden Road and the confluence with Miners Ravine Creek, where public access is readily available. Avoidance and protection measures to be implemented along Secret Ravine Creek as part of the proposed Vista Oaks Development (located immediately downstream of the end of China Garden Road) should eliminate off-highway vehicle use in this area and allow for stabilization of the stream banks. Elimination of this major source of stream bank erosion and fine sediment should reduce the overall amount of sediment in the lower reaches of the creek.

Uncontrolled soil erosion generated during project construction could indirectly affect fish habitat and benthic macroinvertebrates by degrading the water quality within Secret Ravine Creek. Urban pollutants generated from the site during ongoing operations could also potentially degrade water quality, if not properly controlled and treated. Given the project's location and the mitigation measures discussed below and in the EIR, it is unlikely the project would significantly affect either Critical Habitat or special-status fish species.

The project's runoff, erosion and subsequent sedimentation issues will be minimized or eliminated, through implementation of Mitigation Measures 4.10-2 and 4.10-3, which require the preparation of an erosion control plan and stormwater pollution prevention plan (SWPPP) and the installation of appropriate Best Management Practices (BMPs) for compliance with all the requirements of the City's Stormwater Runoff Pollution Control Ordinance (Title 8, Chapter 8.30 of the City Code) and the Grading and Erosion and Sedimentation Control Ordinance (Title 15, Chapter 15.28 of the City Code), which regulate stormwater and prohibit non-stormwater discharges except where regulated by an NPDES permit.

The BMPs proposed to be implemented during construction include: the use of soil stabilizers, fiber rolls, inlet filters, and gravel bags to prevent pollutants from being carried off-site in stormwater generated on the project site. The erosion control plan will ensure that proper control of siltation, sedimentation, and other pollutants will be implemented per the National Pollution Discharge Elimination System (NPDES) permit requirements and County ordinance standards. Debris, soil, silt, sand, bark, slash, sawdust, cement, concrete, washings, petroleum products or other organic or earthen material will not be allowed to enter into or be placed where it may be washed by rainfall or runoff into Secret Ravine Creek. Furthermore, the SWPPP will specify the pollutants that are likely to be used during construction and that could be present in stormwater drainage and non-stormwater discharges; and to ensure the BMPs are effective, a sampling and monitoring program will be included in the SWPPP that meets the requirements of SWRCB Order 99-08-DWQ. (Mitigation Measures 4.10-2c.)

Site operations with the potential to degrade water quality in the long term would also be mitigated through Mitigation Measure 4.10-3, which requires the project applicant to identify additional storm water runoff BMPs. Currently, stormwater runoff from the project is planned to be pre-treated through roadway catchbasin filters and continuous deflection system (CDS) units, and will then be routed to a detention basin. While the catchbasin filters and CDS units would function as the primary treatment BMPs, the detention basin would serve to further reduce pollutants in stormwater through infiltration, biological uptake, and settling. The detention basin has been designed to function as a water quality basin in accordance with Guidance Document for Volume and Flow-based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection published by the Placer Regional Stormwater Coordination Group (PRSCG) (May 2005), and would serve to provide the preferred "treatment train" system. The detention basin has been designed to serve a dual use; attenuate peak post project flows and accommodate the water quality volume.

ECORP estimated post-project pollutant concentrations for a design that incorporates both CDS units/catchbasin filters and a water quality basin (Table 15-4). Pollutant concentrations are estimated to occur below established limits, for all evaluated pollutants that have associated limits.

Table 15-4. Rocklin Crossing Estimated Pollutant Concentrations

Constituent of Concern	Units	Secret Ravine Baseline Concentration	Typical* Commercial Concentration	Pre-treatment BMP** Removal (%)	Basin*** Removal (%)	Project w/pre-treament BMPs and Basin	Criteria
Oil and Grease	mg/L	0.00	6.94	33.00	30.30	3.24	Not Available
Total Suspended Solids	mg/L	54.40	84.00	27.00	54.00	28.21	Not Available
Total Dissolved Solids	mg/L	108.90	38.74	15.30	-12.80	37.01	450[a]
Total Organic Carbon	mg/L	10.40	11.84	0.00	22.20	9.21	Not Available
Nitrate	mg/L	1.70	1.21	41.00	35.40	0.46	10[b]
Nitrite	mg/L	0.00	1.21	41.00	35.40	0.46	1.0[b]
Zinc (Total)	ug/L	0.00	197.20	47.00	58.50	43.37	43-78[c]

* City of Stockton Water Quality Monitoring Program (HSI Hydrologic Systems, 2002 – River Island EIR)
** Currently proposed: catchbasin filters and CDS Units. Removal rates based on those for hydrodynamic separators: USEPA NPDES Stormwater BMPs Database (updated 6/2003)
*** Based on those for dry pond USEPA NPDES Stormwater BMPs Database (updated 6/2003)
a. Water Quality Limit for Agriculture (Ayers & Westcot)
b. Maximum Contaminant Level Allowed in Drinking Water, Regional Water Quality Control Board Basin Plan
c. Assumed hardness of 30-60 mg/L, calcium carbonate

The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region identifies narrative criteria for oil and grease. Numerical criteria are not identified; however, the Regional Board has imposed, by order, discharger-specific limits ranging from 10-20 mg/L. The estimated project discharge concentration falls below this limit.

The project's proposed detention basin would serve to mitigate for downstream impacts related to flow modification. Design of the project detention basin to serve a dual detention/water quality function, and thus would serve to minimize the discharge of pollutants from the project site. With the incorporation of a water quality basin ensuring that the estimated pollutant concentrations (for evaluated pollutants) would comply with existing water quality criteria.

Following discharge from the detention basin, the stormwater would flow through an existing grassy swale for approximately 300 feet before entering Secret Ravine Creek. Such measures are designed to reduce the discharge pollutant concentrations to comply with existing water quality criteria and to minimize the potential for impacting Secret Ravine Creek, Central Valley steelhead and Critical Habitat, or Chinook salmon. Prior to issuance of a grading permit for the site, however, the BMPs shall be reviewed for adequacy by the City of Rocklin, Engineering Department to ensure that they will effectively remove pollutants from the site's stormwater runoff. At that time, if technologies as effective as, or more effective than, catch-basin filters or CDS units are available, they can be considered.

Thus, with implementation of Mitigation Measures 4.10-2, 4.10-3, the quality of the water entering Secret Ravine Creek would not be degraded, and the project's potential impacts on Central Valley steelhead and designated Critical Habitat, and on Central Valley fall/late fall-run Chinook salmon , as well as BMIs, would be reduced to a less than significant level. Even so, the language of Mitigation Measures 4.10-2, 4.10-3, and 4.12-11 could be improved upon in order to further allay concerns about potential effects on fish. As modified the Measures would read as follows:

Mitigation Measure 4.10-2 Potential for Short-Term Construction-Related Water Quality Degradation

a. The project applicant shall demonstrate compliance, through its erosion control plan and SWPPP, with all requirements of the City's Stormwater Runoff Pollution Control Ordinance (Title 8, Chapter 8.30 of the City Code) and the Grading and Erosion and Sedimentation Control Ordinance (Title 15, Chapter 15.28 of the City Code), which regulate stormwater and prohibit non-stormwater discharges except where regulated by an NPDES permit. This includes preparing erosion, sediment, and pollution control plans for the entire construction site. The project's grading plans shall be approved by the City of Rocklin, Engineering Department prior to the initiation of site grading activities. The project applicant shall implement measures including the use of soil stabilizers, fiber rolls, inlet filters, and gravel bags to prevent pollutants from being carried off-site in stormwater generated on the project site. These measures shall be designed to accommodate stormwater discharges associated with proposed measures that would be implemented to control on-site dust generation (e.g., wheel washing, active watering).

b. Prior to the issuance of a grading permit or any construction activity, the project applicant shall obtain from the Central Valley RWQCB the appropriate regulatory approvals for project construction including a Section 401 water quality certification, ~~and an NPDES stormwater permit for general construction activity, including construction dewatering activities.~~

c. As required under the NPDES stormwater permit for general construction activity, the project applicant shall prepare and submit the appropriate Notice of Intent and prepare the SWPPP and the erosion control plan for pollution prevention and control prior to initiating site construction activities. The SWPPP shall identify and specify the use of erosion sediment control BMPs, means of waste disposal, implementation of approved local plans, nonstormwater management controls, and inspection and maintenance responsibilities. The SWPPP shall also specify the pollutants that are likely to be used during construction and that could be present in stormwater drainage and nonstormwater discharges. A sampling and monitoring program shall be included in the SWPPP that meets the requirements of SWRCB Order 99-08-DWQ to ensure the BMPs are effective.

d. Construction techniques shall be identified that would reduce the potential runoff and the SWPPP shall identify the erosion and sedimentation control measures to be implemented. The SWPPP shall also specify spill prevention and contingency measures, identify the types of materials used for equipment operation, and identify measures to prevent or clean up spills of hazardous materials used for equipment operation and hazardous waste. Emergency procedures for responding to spills shall also be identified. BMPs identified in the SWPPP shall be used in subsequent site development activities. The SWPPP shall identify personnel training requirements and procedures that would be used to ensure that workers are aware of permit requirements and proper installation and performance inspection methods for BMPs specified in the SWPPP. The SWPPP shall also identify the appropriate personnel responsible for supervisory duties related to implementation of the SWPPP. All construction contractors shall retain a copy of the approved SWPPP on the construction site.

Level of Significance After Mitigation

With implementation of the above mitigation measures, erosion from site soils would be minimized and pollutants would be largely captured on the site. Also, the implementation of identified spill prevention and cleanup plans would limit the potential for hazardous material spills to adversely affect storm water quality. Therefore, the project's construction-related water quality impacts would be reduced to a less-than- significant level.

Mitigation Measure 4.10-3 Potential Long-Term Degradation of Water Quality
Before issuance of a grading permit for the site, the project applicant shall ~~obtain from the Central Valley RWQCB a general NPDES permit~~ submit a Notice of Intent to comply with the NPDES General Permit for Construction Related Activities and shall comply with all of the permit requirements in order to minimize storm water discharges associated with site operations. In addition, the project applicant shall prepare a SWPPP and implement Best Management Practices designed to minimize sedimentation and release of products used during site operations.

Before approval of the final project design, the project applicant shall identify storm water runoff BMPs selected from the Storm Water Quality Task Force's California Storm Water Best Management Practices Handbook (American Public Works Association 1993), the Bay Area Stormwater Management Agencies Association's (1999) Start at the Source: Design Guidance Manual for Stormwater Quality Protection, or similar documents. The applicant shall adopt a "treatment train" stormwater quality program in which stormwater is subject to more than one type of BMP. Source control BMPs shall constitute the first-step BMPs and shall include, but would not be limited to, administrative controls such as signage at inlets to prevent illicit discharges into storm drains, parking lot and other pavement area sweeping, public education, and hazardous waste management and disposal programs. Second-step BMPs may include underground hydrodynamic separators or catch basin filters, or, upon approval of the City of Rocklin, a substitute device of equal or greater effectiveness. The second-step BMPs shall contain a media or structure designed to remove oil and grease. The third-step BMP shall include a water quality basin designed according to the Guidance Document for Volume and Flow-based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection published by the Placer Regional Stormwater Coordination Group (PRSCG) (May 2005). ~~Typical BMPs that could be used on the project site shall include, but are not limited to, catchbasin inserts, compost storm water filters, sand filters, vegetated filter strips, biofiltration swales, oil/water separators, biodetention basins, or other equally effective measures. Other BMPs shall include, but would not be limited to, administrative controls such as signage at inlets to prevent illicit discharges into storm drains, parking lot and other pavement area sweeping, public education, and hazardous waste management and disposal programs. BMPs shall identify and implement mechanisms for the routine maintenance, inspection, and repair of pollution control mechanisms. In addition, t~~The BMPs shall be reviewed for adequacy by the City of Rocklin, Engineering Department prior to issuance of a grading permit for the site to ensure that they will effectively remove pollutants from the site's stormwater runoff. Long-term functionality of the stormwater quality BMPs shall be provided for through a maintenance and inspection program. Prior to issuance of the first occupancy permit, the applicant shall submit to the City of Rocklin a Maintenance and Monitoring Plan for all stormwater BMPs. The Maintenance and Monitoring Plan shall 1) identify a schedule for the inspection and maintenance of each BMP, 2) identify methods and materials for maintenance of each BMP, 3) and include provisions for the repair or replacement of BMPs.

Level of Significance After Mitigation

With the implementation of the BMPs identified above, ~~the~~ stormwater discharge from the project site would be captured within the project's drainage systems and would be filtered through ~~oil/water separators~~ ~~and/or~~ ~~other equally effective control systems~~ pre-treatment devices such as hydrodynamic separators or catch basin inlet filters prior to being directed to the ~~detention~~ water quality basin. Once in the ~~detention~~ basin, the ~~settlement of undissolved solids would occur,~~ stormwater would undergo further ~~removing contaminants from the stormwater~~ treatment. Long-term functionality of the BMPs would be provided for through a maintenance and monitoring program. As the stormwater is discharged from the detention basin, it would flow through an existing grassy swale for approximately 300 feet before entering Secret Ravine Creek. ~~The grassy swale would remove additional contaminants within the stormwater through biofiltration.~~ The implementation of these BMPs, consistent with the requirements of the site's NPDES permit and the SWPPP, and design criteria identified by PRSCG, would ensure that the quality of the water entering Secret Ravine Creek would not be substantially degraded. With implementation of the above mitigation measures, the project's operational water quality impacts would be reduced to a less-than-significant level.

Mitigation Measure 4.12-11: Degradation of Chinook Salmon and Steelhead Trout Habitat.

Implement Mitigation Measures 4.10-2 and 4.10-3 identified in Section 4.10, Hydrology and Water Quality of this report in order to ensure water quality within Secret Ravine Creek is not substantially degraded with project construction and operation.

Level of Significance after Mitigation

With the implementation of the BMPs identified in Mitigation Measures 4.10-2 and 4.10-3, the ~~storm~~ stormwater discharge from the project site would be captured within the project's drainage systems and would be filtered through pre-treatment devices such as hydrodynamic ~~oil/water~~ separators ~~and/~~or catch basin inlet filters ~~other equally effective control systems~~ prior to being directed to the water quality basin. Once in the basin, the stormwater would undergo further treatment. Following discharge from the detention basin~~.~~ ,~~Once in the detention basin, the settlement of undissolved solids would occur, further removing contaminants from the storm water. As~~ the ~~storm~~ stormwater ~~is discharged from the detention basin, it~~ would flow through an existing grassy swale for approximately 300 feet before entering Secret Ravine Creek. ~~The grassy swale would remove additional contaminants within the storm water through biofiltration.~~ The implementation of these BMPs, consistent with the requirements of the site's NPDES permit and the SWPPP, and design criteria identified by PRSCG, would ensure that the quality of the water entering Secret Ravine Creek would not be substantially degraded. With implementation of the identified mitigation measures, the project's impacts on

Central Valley fall/late fall-run Chinook salmon and Central Valley steelhead trout would be reduced to a less-than-significant level.

While habitat within Secret Ravine Creek may be currently of poor to moderate quality, the project will not contribute to any further degradation. With implementation of Mitigation Measures 4.10-2, 4.10-3, and 4.12-11, the water from the project area entering Secret Ravine Creek would meet existing water quality criteria, and the project's potential impacts on Secret Ravine Creek and special-status fish would be reduced to a less than significant level.

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