TETRA TECH EBA

OQM | Organizational Quality Management Program

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY KELOWNA, BC

PRESENTED TO

BC Ministry of Forests, Lands and Natural Resource Operations

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EXECUTIVE SUMMARY

Tetra Tech EBA Inc. (Tetra Tech EBA) was retained by BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) to conduct the Lower Mission Creek Hydraulic Capacity study as a result of a proposal submitted on December 17, 2013. The objectives of the study are to determine the 200-year flood profile along the lower reach of Mission Creek in Kelowna, to provide recommendations on adequate dike crest elevations along the existing dike system, to discuss the benefits and practicality of sediment removal, and to determine the impacts of a setback dike on the recommended dike crest elevations.

Mission Creek is located in the western portion of the Okanagan Highland and is the largest tributary of Okanagan Lake. The total direct drainage area at the mouth of Mission Creek is approximately 850 km^2. The lowest reaches of Mission Creek flow through the City of Kelowna, and are partially contained on both banks by an existing dike system. There are six bridge crossings located along the study reach: Lakeshore Road Bridge, Gordon Drive Bridge, Casorso Road Bridge, KLO Road Bridge and two pedestrian bridges located about 7 km and 8 km upstream from the creek mouth. The right bank dike system (looking downstream) extends from just upstream of Lakeshore Road Bridge to Ziprick Road, for a total length of 7.5 km. The left bank dike system (looking downstream) starts from about 200 m upstream of Lakeshore Road Bridge to Casorso Road Bridge and starts again from 1.1 km upstream of Casorso Road Bridge to about 1 km upstream of KLO Road Bridge.

A total of 84 creek cross sections along Mission Creek from Okanagan Lake to about 500 m upstream of Ziprick Road were surveyed within the study reach. Most of the cross section locations were based on the previous surveys completed by the Province in 1983 and 1992 as part of the Mission Creek floodplain mapping. Surveying of the cross sections that intersect with the proposed setback dike alignment downstream of Casorso Road Bridge were extended to cover the potential floodplain areas.

A flood frequency analysis using the available historical peak flow at the Mission Creek near East Kelowna hydrometric station (08NM116) was carried out. The recommended 200-year maximum instantaneous and maximum daily flows for the upstream end of the study reach were determined to be 137 m^3/s and 112 m^3/s, respectively. The recommended 200-year maximum instantaneous and maximum daily flows for the reach downstream of Casorso Road Bridge were determined to be 144 m^3/s and 118 m^3/s, respectively. Such peak flow estimates include a factor of 10% to take into account impacts of climate change on the hydrology of Mission Creek. In view of the 12% increase in peak flows in Mission Creek over the last 10 years, likely due to the combination of climate change, natural variability, and forest cover removal by forest fires, logging activities and beetle infestation, it is also recommended that a sensitivity analysis using a combined factor ranging from 10% to 22% be carried out in future hydraulic analyses such that the incremental difference in water levels can be determined and discussed.

A hydraulic model of the Lower Mission Creek was developed based on the survey conducted for the current assignment, and both steady and unsteady flow analyses were performed. Four model scenarios were developed and analyzed, and five lake levels were used as the downstream boundary conditions as suggested in the terms of reference. Based on the resulting water profiles from the hydraulic model, critical dike sections with inadequate freeboard were identified for all scenarios. Critical dike sections were identified along the lower portions of the study reach between Lakeshore Road Bridge and KLO Road Bridge. With the assumption that the proposed Lakeshore Road Bridge will be in place in the near future, the recommended dike crest elevations along the critical dike sections were determined from the unsteady flow analysis results for the model with the proposed Lakeshore Road Bridge in place with the full pool target lake level as the downstream boundary condition. In general, a maximum raise of 0.5 m is required on the right dike at XS-11 upstream of Gordon Drive Bridge and an average raise of 0.2 m is required all the critical sections along the right dike. A maximum raise of 0.4 m is

required on the left dike at XS-19 just downstream of Casorso Road Bridge and an average raise of 0.16 m is required for all the critical sections along the left dike.

Model results of the sediment removal scenario indicate that sediment removal would significantly reduce water levels by a maximum of 0.5 m and an average of about 0.2 m along the reach between Lakeshore Road Bridge and KLO Road Bridge. A rough comparison of the 1983/1992 channel survey and the 2014 channel survey was also conducted to determine the change of channel bed over the last 20 to 30 years in general. Based on the model results and a comparison of the 1983/1992 and 2014 channel surveys, it is recommended that sediment removal along the study reach be further considered as part of the dike maintenance plan. However, raising the dike in critical sections would still be a viable solution to ensure adequate hydraulic capacity in Lower Mission Creek.

Model results of the setback dike scenario show that the proposed setback dike would slightly reduce water level by a maximum of 0.24 m and an average of about 0.05 m along the reach between the downstream end of the proposed setback dike and XS-26, located about 700 m upstream of Casorso Road Bridge. In addition, it should be noted that the resulting flow velocities in the vicinity of the proposed setback dike alignment are considerably reduced. Such reduced flow velocities will likely allow more sediment to settle in this local reach, and it is recommended that during the design of the proposed setback dike, additional freeboard should be considered to account for the long term aggradation, which could be determined by analyzing historical channel cross sections.

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of BC Ministry of Forests, Lands and Natural Resource Operations and its agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than BC Ministry of Forests, Lands and Natural Resource Operations, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in the Ministry of Forests, Lands and Natural Resource Operations' Consulting and General Services Contract. Tetra Tech EBA's General Conditions are provided in Appendix A of this report. However, where applicable, the terms and conditions stated in Tetra Tech EBA's General Conditions are superseded by those stated in the Ministry's contract document for this Project.

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech EBA) was retained by BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) to conduct the Lower Mission Creek Hydraulic Capacity study as a result of a proposal submitted on December 17, 2013.

The objectives of the study are to determine the 200-year flood profile along the lower reach of Mission Creek in Kelowna, to provide recommendations on adequate dike crest elevations along the existing dike system, to discuss the benefits and practicality of sediment removal, and to determine the impacts of a setback dike on the recommended dike crest elevations.

2.0 SCOPE OF WORK

The scope of work for the study was as follows:

- Surveying of Mission Creek and dikes, including left and right dike profiles;
- Determination of the maximum instantaneous and maximum daily 200-year flows on Mission Creek, including consideration of climate change;
- Hydraulic modelling of Mission Creek, resulting in recommendations on adequate dike crest elevations at all points along the dike profile on both banks of Mission Creek and recommendations as to where sediment removal is necessary or (where practical) could obviate the need to increase the dike crest elevation locally;
- Hydraulic modelling of a setback dike including the associated survey work, leading to discussion on the impacts of the setback dike on the recommended dike crest elevations for the existing dike alignment and possible changes to local aggradation resulting from the setback dike; and
- Reporting summarizing the assumptions and methodology for all aspects of the services performed for the assignment.

3.0 REVIEW OF BACKGROUND INFORMATION

The following documentation provided by the MFLNRO and others was reviewed to obtain relevant project background information:

- AECOM, January 2009. Casorso Bridge General Arrangement Record Drawing (Dwg. No. S01) prepared for the City of Kelowna;
- Ministry of Environment, September, 1984. Mission Creek Floodplain Mapping and BC Water Surveys Data;
- Ministry of Forests, Lands and Natural Resource Operations, June 2013. Photos taken along Mission Creek on June 20, 2013 after the major flood event;
- Ministry of Water, Land and Air Protection, March 2002. Mission Creek at Kelowna Flood Protection Works Location Map for Emergency Planning and Response Purposes;
- Stantec Inc., May 2008. Mission Creek Crossing Gordon Drive Bridge Site Plan (Dwg. No. S1) prepared for the City of Kelowna;
- Stantec Inc., May 2008. Mission Creek Crossing Gordon Drive Bridge General Arrangement (Dwg. No. S2) prepared for the City of Kelowna; and

- Urban Systems Ltd., January 2014. Lakeshore Road Upgrades Mission Creek Bridge Plan and Profile (Issued for Information) prepared for the City of Kelowna.

In addition, the following documents were reviewed as part of the research on the impacts of forest cover removal and climate change on the hydrology of Mission Creek:

- Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), June 2012. Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC;
- BC Forest Service, March 2011. Water, Earth and Fire: Runoff, Erosion and Landslides after Wildfire in Southern British Columbia;
- Forest Research Extension Partnership (FORREX), 2003. Effects of Forest Management Activities on Streamflow in the Okanagan Basin: Outcomes of a Literature Review and a Workshop; and
- Ministry of Forests, Lands and Natural Resource Operations, July 2009. Climate Change in British Columbia.

4.0 PROJECT SITE

Mission Creek is located in the western portion of the Okanagan Highland and is the largest tributary of Okanagan Lake (Figure 4.1). The total direct drainage area at the mouth of Mission Creek is approximately 850 km^2. Elevations in the watershed range from about 345 m near the mouth to over 1880 m in the headwaters, approximately 75 km upstream from Okanagan Lake. Mission Creek is regulated by a dam at the outlet of Mission Lake near these headwaters. In addition, about 6 km upstream from the mouth of Mission Creek, a man-made diversion from Kelowna (Mill) Creek enters Mission Creek. It should be noted that a considerable amount of logging activity has taken place within the Mission Creek watershed and that the watershed has had numerous forest fires. In particular, extensive forests fires occurred within the Okanagan basin in 2003 and 2004. These events have impacted the Mission Creek Watershed hydrology.

The lowest reaches of Mission Creek flow through the City of Kelowna, and are partially contained on both banks by an existing dike system (Figure 4.2 and Figure 4.3). The study reach for the current assignment has a total length of about 8.7 km. There are six bridge crossings located along the study reach: Lakeshore Road Bridge, Gordon Drive Bridge, Casorso Road Bridge, KLO Road Bridge and two pedestrian bridges located about 7 km and 8 km upstream from the creek mouth. The right (north) bank dike system (looking downstream) extends from just upstream of Lakeshore Road Bridge to Ziprick Road, for a total length of 7.5 km. The left (south) bank dike system (looking downstream) starts from about 200 m upstream of Lakeshore Road Bridge to Casorso Road Bridge and starts again from 1.1 km upstream of Casorso Road Bridge to about 1 km upstream of KLO Road Bridge. It should also be noted that a hydrometric station operated by Water Survey of Canada (08NM116 Mission Creek near East Kelowna) is located near the upstream end of the study reach, approximately 8.3 km upstream of the creek mouth.

5.0 SITE RECONNAISSANCE

On February 6, 2014, Ms. Maria Lau, P.Eng. of Tetra Tech EBA visited the project site, and was accompanied by Mr. Shaun Reimer, P.Eng. of the MFLNRO. The purpose of the site visit was to gain a better understanding of the creek and dike system along the study reach and the associated floodplain areas. All major bridge crossings were examined, and past sediment removal sites were noted. The data collected from the site visit, including site photos indicating channel roughness, notes on existing dike conditions and proposed setback dike alignment, was utilised to develop the hydraulic modelling for the study.

6.0 SURVEYING

Survey work for the current assignment was undertaken by MMM Group Limited (MMM) from January to March of 2014. A total of 84 creek cross sections along Mission Creek from Okanagan Lake to about 500 m upstream of Ziprick Road were surveyed within the study reach. Most of the cross section locations were based on the previous surveys completed by the Province in 1983 and 1992 as part of the Mission Creek floodplain mapping. Profiles of the dike crests on the left and right banks as well as for the thalweg were completed where the weather conditions allowed during the survey. Additional survey points were also picked up at the major bridge crossings to confirm the underside and top elevations of the bridge deck and location of bridge piers. Surveying of the cross sections that intersect with the proposed setback dike alignment downstream of Casorso Road Bridge were extended to cover the potential floodplain areas.

Further details regarding the methods used for the survey can be found in Appendix B. Locations of the creek cross sections are shown on Figure 4.2 and Figure 4.3.

7.0 HYDROLOGY

The following sections summarize the methodology and results of the hydrologic analysis for the current study, which leads to the recommended maximum instantaneous and maximum daily 200-year flows for Mission Creek.

7.1 Available Hydrometric Data

The Water Survey of Canada (WSC) has a number of hydrometric stations on Mission Creek. The station with the longest period of record and most recent peak flow data is the Mission Creek near East Kelowna station (08NM116). The following table summarizes the information for all WSC hydrometric stations on Mission Creek.

Table 7.1: WSC Hydrometric Stations on Mission Creek

Station ID	Station Name	Drainage Area (km^2)	Period of Record	Type	Status
08NM016	Mission Creek near Rutland	622	1919 - 1946	Regulated	Inactive
08NM057	Mission Creek Rutland Diversion	N/A	1922 - 1930	Regulated	Inactive
08NM116	Mission Creek near East Kelowna	795	1949 - 2011	Regulated	Active
08NM233	Mission Creek above Pearson Creek	233	1977 - 1982	Regulated	Inactive
08NM239	Mission Creek below B.M.I.D. Intake	N/A	1980 - 1980	Regulated	Inactive

The Mission Creek near East Kelowna station is a regulated station, but for the purposes of the current study and in consultation with the MFLNRO, no attempt was made to naturalize the peak flow data. A total of 44 years of maximum instantaneous and 63 years of maximum daily flow data are available for this station. In general, peak flows in Mission Creek are governed by the snowmelt period from May to June.

It should be noted that major flood events were partially recorded in the past two years (2012 and 2013) and that both events were triggered by rainstorms. The largest maximum instantaneous flow on record is about 110 m^3/s and was observed at the Mission Creek near East Kelowna station in 2013. The second largest maximum daily

flow of 86.2 m^3/s was recorded in 2012, which was very close to the largest maximum daily flow of 87.5 m^3/s recorded in 1969. Unfortunately, WSC was not able to capture the 2012 maximum instantaneous flow due to technical issues onsite. However, Tetra Tech EBA has estimated the 2012 maximum instantaneous flow by applying a factor of 1.346, the maximum instantaneous to maximum daily flow ratio for the 2013 flood at the station, in view of the fact that both the 2012 and 2013 flood events were triggered by rainstorms. With this assumption, the 2012 maximum instantaneous flow was estimated to be about 116 m^3/s. Table 7.2 presents the historical peak flow data for the Mission Creek near East Kelowna station from WSC.

Table 7.2: Mission Creek near East Kelowna Station Historical Peak Flow Data

Year	Max Instant. (m^3/s)	Date	Max Daily (m^3/s)	Date	Year	Max Instant. (m^3/s)	Date	Max Daily (m^3/s)	Date
1949	N/A	N/A	49.3	15-May	1982	55.9	02-Jul	54.5	05-Jul
1950	N/A	N/A	52.1	15-Jun	1983	69.4	29-May	60.2	29-May
1951	N/A	N/A	49.3	23-May	1984	61.1	29-Jun	52.4	15-Jun
1952	N/A	N/A	50.7	20-May	1985	69.0	07-Jun	52.3	25-May
1953	N/A	N/A	62.3	13-Jun	1986	84.9	30-May	72.5	30-May
1954	N/A	N/A	36.2	19-May	1987	49.4	01-May	43.4	01-May
1955	N/A	N/A	34.0	13-Jun	1988	49.0	13-May	37.9	13-May
1956	N/A	N/A	38.5	24-May	1989	45.4	10-May	39.0	10-May
1957	N/A	N/A	42.5	18-May	1990	75.5	04-Jun	69.9	04-Jun
1958	N/A	N/A	34.0	21-May	1991	65.5	20-May	56.7	20-May
1959	N/A	N/A	53.8	24-May	1992	39.0	27-May	29.8	27-May
1960	N/A	N/A	49.0	12-May	1993	66.4	14-May	58.0	15-May
1961	N/A	N/A	64.6	07-Jun	1994	42.8	07-Jun	39.7	12-May
1962	N/A	N/A	N/A	N/A	1995	40.8	30-May	33.1	30-May
1963	N/A	N/A	35.4	23-May	1996	63.1	08-Jun	53.9	08-Jun
1964	N/A	N/A	71.4	07-Jun	1997	97.6	31-May	84.5	01-Jun
1965	N/A	N/A	39.4	12-Jun	1998	52.8	01-May	44.7	01-May
1966	N/A	N/A	N/A	N/A	1999	65.7	24-Jun	52.0	16-Jun
1967	N/A	N/A	45.9	09-Jun	2000	65.5	15-Jun	52.5	15-Jun
1968	N/A	N/A	50.1	03-Jun	2001	46.2	02-Jun	34.6	24-May
1969	97.7	May 14	87.5	13-May	2002	66.5	22-May	59.0	22-May
1970	48.1	Jun 04	34.8	03-Jun	2003	46.4	14-Jun	33.0	14-Jun
1971	70.2	May 13	62.6	13-May	2004	58.5	06-Jun	40.1	06-Jun
1972	91.2	Jun 01	81.8	31-May	2005	67.1	16-May	54.4	16-May
1973	43.9	May 25	37.7	18-May	2006	87.8	15-Jun	72.0	15-Jun
1974	77.6	Jun 17	66.0	17-Jun	2007	47.6	05-Jun	39.3	05-Jun
1975	56.4	Jun 03	48.7	02-Jun	2008	76.1	26-May	60.7	26-May
1976	76.5	Jun 16	71.1	16-Jun	2009	41.6	31-May	33.1	31-May
1977	45.3	Jun 07	36.0	03-May	2010	52.9	22-Jun	39.1	03-Jun
1978	54.4	Jun 06	44.5	06-Jun	2011	66.2	08-Jun	56.2	08-Jun
1979	55.2	May 27	43.0	27-May	2012	N/A	N/A	86.2	10-Jun
1980	57.2	May 06	46.2	06-May	2013	110	20-Jun	81.8	20-Jun
1981	72.5	May 21	60.6	21-May	-	-	-	-	-

In addition to the annual maximum instantaneous flow and maximum daily flow values, June 2013 hourly flood data was extracted from the Mission Creek near East Kelowna station. The hourly data was reviewed to determine the nature of the 2013 flood event and for use in the development of a design inflow hydrograph for Lower Mission Creek. Lastly, the station stage versus discharge rating curve was obtained from WSC.

Lake level data was extracted from the WSC hydrometric station Okanagan Lake at Kelowna (08NM083). Although the 200-year flood event elevation (343 m) and full pool target elevation (342.48 m) were determined prior to this analysis, hourly lake level data was extracted for June 2013. This lake level information was extracted for use in conjunction with the June 2013 hourly flow data from the Mission Creek near East Kelowna station.

7.2 Frequency Analysis

A single station frequency analysis was performed using HYFRAN Version 1.1, a statistical analysis tool for extreme events, based on the available historical peak flow data at the Mission Creek near East Kelowna station. To make use of all available peak flow data, the maximum instantaneous flow records were extended by applying a factor of 1.206 to the maximum daily flows for the 19 years where maximum instantaneous flow data was unavailable. This factor was the average of ratios of the maximum instantaneous to maximum daily flow for the three largest floods at the station. The Gumbel, Three-Parameter Log Normal, and Log Pearson Type 3 distributions provided close agreement in 200-year return period flow projections for both maximum instantaneous and maximum daily flow extended data sets. These flow estimates at the Mission Creek near East Kelowna station were adjusted to the creek mouth using the following relationship (MOELP, 1998):

$$Q_2 = Q_1(A_2/A_1)^{0.785}$$

Table 7.3 summarizes the results from the station frequency analysis.

Table 7.3: Results of Frequency Analysis

Estimated Peak Flow (m^3/s)	At Station (795 km^2)	At Creek Mouth (850 km^2)
200-year Max Instantaneous Flow	124	131
200-year Max Daily Flow	102	107

7.3 Other Considerations

A review of the historical peak flow data at the Mission Creek near East Kelowna station was conducted in relation to past and potential forest cover removal and climate change. The following sections describe the findings from the review of research on the impacts of forest cover removal and climate change on the hydrology of Mission Creek.

7.3.1 Review of Historical Peak Flow Record

The historical peak flow data at the Mission Creek near East Kelowna station was analyzed with regard to trends of increasing peaks. Although two major flood events occurred in the past two years, other large flood events also occurred over the period of record. The 2012 flood event, with an estimated maximum instantaneous flow of 116 m^3/s, is about a 100-year event while the 2013 flood event, with a recorded maximum instantaneous flow of 110 m^3/s, is about a 50-year event, both out of an extended period of record of 63 years.

7.3.2 Forest Cover Removal

Similar to other watersheds within the Okanagan basin, the Mission Creek watershed has had a considerable amount of logging activity, and the forest cover has further been removed due to numerous forest fires. Extensive forest fires that occurred in 2003 and 2004 within the Okanagan basin were particularly notable.

A review of the historical peak flow data in Mission Creek in the years following the 2003/2004 forest fires indicates that the maximum instantaneous and maximum daily flows increased in the following two years, but such peak flows were only in the range of 3 to 10-year return periods. An additional frequency analysis was performed by using peak flow data prior to the year of 2003 to determine the corresponding 200-year peak flow estimates for comparison purposes. Results of this exercise show that the 200-year maximum instantaneous flow estimated using the period of record up to the year of 2013 is about 12% more than that estimated using the period of record up to the year of 2002. The increase could be due to the impact of the forest fires, logging activities, Mountain Pine Beetle infestation, climate change or natural variability.

As suggested by FORREX (2003), in climates where snowmelt is the primary mechanism in generating peak flows, forest cover removal has been shown to have a significant effect on snow accumulation, and on the timing and rate of snowmelt. In addition, timber harvesting can increase soil moisture due to reductions in evapotranspiration, which in turn can increase the amount of water available for runoff. These changes can increase the magnitude of spring peak flows. Based on a large number of research results, the observed effects of harvesting on peak flows ranged from -36 to 563%, which led to the general conclusion that peak flows typically increase by 35% or less after forest harvest. The smaller peak flows, such as those that occur during the growing season and periods of soil recharge, showed the greatest relative increases. While larger peak flows did increase significantly, the changes were smaller in relative terms.

Based on the review of the historical peak flow data and the work by FORREX, a factor of up to 12% should be considered as applicable to the 200-year peak flows estimated from the frequency analysis to take into account potential impacts of forest cover removal on the peak flows in Mission Creek.

7.3.3 Climate Change

By the 2050s increased air temperatures will lead to continued decrease in snow accumulation, earlier melt, and less water storage for either spring freshet or groundwater storage. For snowmelt-dominated regimes, especially in southern BC, the warming trend may result in an earlier freshet, leading to lower flows in late summer and early autumn. Hydrologic scenarios for snowmelt-dominated basins in the Okanagan are projected to change in this way. In accordance with the APEGBC Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC, large drainage basins in which the hydrology is dominated by the spring snowmelt freshet may experience diminished flood magnitudes and more frequent low flows. However, the guidelines also suggest that the potential for a historically high flood will remain since an exceptionally large winter snow accumulation followed by a sudden spring heat wave might still create extremely high runoff. Spring floods associated with seasonal snowmelt may become more severe because of more rapid snowmelt or when a major warm storm occurs over a rapidly melting snowpack. Therefore, possible increases on the order of 10% in extreme spring flood flows are envisaged for flood protection designs that would last for more than a decade.

Since the design flows for the current study will be used to assess the hydraulic capacity of Mission Creek and its associated diking system, it is recommended that a factor of 10% be applied to the estimated 200-year peak flow data, in order to take potential impacts of climate change on the hydrology of Mission Creek into account.

7.4 Recommended Peak Flow Estimates

Based on the findings from the previous sections, it is recommended that a minimum factor of 10% be applied to the 200-year peak flows estimated from the station frequency analysis to take into account impacts of climate change on the hydrology of Mission Creek. In view of the 12% increase in peak flows in Mission Creek over the last 10 years, likely due to the combination of climate change, natural variability, and forest cover removal by forest fires, logging activities and beetle infestation, it is also recommended that a sensitivity analysis using a combined factor ranging from 10% to 22% be carried out in future hydraulic analyses such that the incremental difference in water levels can be determined and discussed. However, for the purposes of this report, only the recommended design flows using a factor of 10% have been analysed. Table 7.4 presents the recommended 200-year maximum instantaneous and maximum daily flows to be used in the current study.

Table 7.4: Recommended Design Flows (Including a Factor of 10% for Climate Change)

Recommended Peak Flow (m^3/s)	At Station (795 km^2)	At Creek Mouth (850 km^2)
200-year Max Instantaneous Flow	137	144
200-year Max Daily Flow	112	118

8.0 HYDRAULICS

The HEC-RAS water surface profile model, Version 4.1.0, developed by the Hydrologic Engineering Center was used for the hydraulic analysis of Lower Mission Creek. The following sections summarize the methodology and results of the hydraulic model, which lead to the identification of critical dike sections along the study reach, recommendations as to where sediment removal is necessary for flood protection, and discussions on the impacts of a proposed setback dike on the creek system.

8.1 Model Development

The HEC-RAS model was generated using the surveyed cross sections provided by MMM. The model extends from the mouth of Mission Creek at Okanagan Lake to about 400 m upstream of the Mission Creek near East Kelowna hydrometric station, which is located about 8.3 km upstream from the creek mouth. Selected cross section data was first entered into the model, followed by the addition of downstream reach lengths, locations of bank stations and Manning's n for representing the channel roughness. The initial values of Manning's n were based on photos taken during the site visit and a literature review. A Manning's n of 0.035 was used initially to represent the main channel roughness, and a Manning's n of 0.11 was used to represent the forested floodplain areas. Additional surveyed points provided by MMM at the bridge crossings were then entered for the six bridge structures within the study reach. This was followed by the additional of ineffective flow areas and adjustment to the contraction and expansion coefficients just upstream and downstream of the bridge crossings. Prior to initial model runs, top of dike elevations were identified at each surveyed cross sections, and levees were placed where appropriate to restrict the flow to be contained by the existing dike system.

Subsequent to the initial model runs, the following adjustments were made to better represent the existing conditions of the creek system and to improve the overall stability of the hydraulic model:

- Extend XS-27 to XS-23 to a maximum of 100 m to the south to represent the floodplain areas available for this local reach; and
- Insert a weir structure between XS-31B and XS-31A with the top of weir elevation based on XS-31B.

8.2 Model Scenarios

A total of four model scenarios were developed and analyzed in the current study:

Model Scenario 1 – Existing Conditions

Model Scenario 1 represents the existing conditions of the creek and dike systems based on the 2014 survey information provided by MMM.

Model Scenario 2 – Proposed Lakeshore Road Bridge

Model Scenario 2 is the same as Model Scenario 1 except that the existing Lakeshore Road Bridge was replaced by the proposed Lakeshore Road Bridge based on the preliminary design drawings provided by the City of Kelowna. It should be noted that the underside elevation of the proposed Lakeshore Road Bridge (346 m) is much higher than that of the existing bridge (343.7 m).

Model Scenario 3 – Proposed Sediment Removal

Model Scenario 3 is based on Model Scenario 2 with the proposed Lakeshore Road Bridge in place. Potential sediment removal at certain locations along the study reach was modelled (Figure 8.1 and Figure 8.2). In general, the creek bed was lowered by a maximum of 0.5 m. A trapezoidal excavated channel geometry with side slopes of 2H:1V was assumed. With consideration of the nearby bridge and weir structures, the potential sediment removal locations were determined and are listed as follows:

- Downstream of KLO Road Bridge from XS-33A to XS-32;
- Downstream of the weir structure between XS-31B and XS-31A from XS-31 to XS-23;
- Downstream of Casorso Road Bridge from XS-16 to XS-11; and
- Downstream of Gordon Drive Bridge from XS-6E to XS-4A.

Model Scenario 4 – Proposed Setback Dike

Model Scenario 4 is also based on Model Scenario 2 with the proposed Lakeshore Road Bridge in place. A proposed setback dike was modelled from just upstream of XS-15 to just downstream of XS-12A (Figure 8.1 and Figure 8.2). The proposed setback dike alignment was based on the Appendix 2 in the terms of reference for this study. It was assumed that the existing dike will be removed when the proposed setback dike is in place.

8.3 Model Calibration

Following initial model development, the hydraulic model for the existing creek condition was calibrated using the rating curve at the Mission Creek near East Kelowna station with a steady flow analysis. The downstream water level in the model was set to 342.48 m, the full pool target lake level in Okanagan Lake. Water level results from the simulation at the WSC station location (i.e. XS-58B) were then compared to the water levels shown on the rating curve. Adjustments were made to the channel roughness coefficients. A main channel Manning's n of 0.034 was selected from the model calibration, and it was assumed that the entire study reach would have a similar Manning's n value as that at the WSC station location. It should be noted that a flow change was assumed in the model just upstream of Casorso Road Bridge in view of the various tributaries entering the creek from the south. A drainage area of 795 km^2 was used to calculate the flow at the upstream end of the study reach near the WSC hydrometric station while a drainage area of 850 km^2 representing the entire Mission Creek

watershed at the mouth was used to calculate the flow just upstream of Casorso Road Bridge. Table 8.1 provides a summary of the model calibration.

Table 8.1: Model Calibration (Manning's n = 0.034 for Main Channel)

Return Period (Years)	Flow at WSC Station (m^3/s)	Flow at Casorso Rd. Bridge (m^3/s)	Rating Curve Water Level (m)	Modelled Water Level at WSC Station (m)	Difference (m)
2.3	63.6	67.0	384.23	384.20	-0.03
20	94.2	99.3	384.48	384.48	0.00
50	108	114	384.58	384.59	0.01
200	124	131	384.68	384.70	0.02
Average					0.00

In addition to the above model calibration, the June 20, 2013 flood event with a maximum instantaneous flow of about 110 m^3/s was modelled with the existing creek condition (Scenario 1). The corresponding downstream water level at Okanagan Lake was determined to be 342.44 m on June 20, 2013. The resulting water levels were compared to the water levels observed along the lower portions of the study reach based on the site photos provided by the MFLNRO. It was found that the model results roughly match with the observed water levels, which provides added confidence to the model calibration.

8.4 Model Simulation

The following sections summarize the simulation details and assumptions for the steady flow and unsteady flow analyses of the Lower Mission Creek hydraulic model.

8.4.1 Steady Flow Analysis

Steady flow analyses were performed for the study reach with the 200-year maximum instantaneous and maximum daily flow estimates. Similar to the arrangements in the model calibration, a flow change was assumed just upstream of Casorso Road Bridge in view of the various tributaries entering the creek from the south. The following table presents the set of flows used in each case:

Table 8.2: Steady Flow Analysis – Flow Data (m^3/s)

Case	Upstream End of Study Reach	At Casorso Road Bridge
200-year Max Instantaneous Flow	137	144
200-year Max Daily Flow	112	118

The upstream channel slope was used as the upstream boundary condition assuming that the resulting water surface slope would be similar to the corresponding channel slope.

Five lake levels, as suggested in the terms of reference, were used as the downstream boundary conditions:

- Lake Level 1: 342.48 m (Full Pool Target Lake Level)
- Lake Level 2: 342.61 m
- Lake Level 3: 342.74 m
- Lake Level 4: 342.87 m
- Lake Level 5: 343 m (200-year Lake Level)

8.4.2 Unsteady Flow Analysis

Unsteady flow analyses were also performed for the study reach with the 200-year flood hydrograph based on the hourly hydrograph shape that occurred in June 2013. The duration of the hydrograph is six days, and the 200-year flood hydrograph at the upstream end of the study reach is shown in Figure 8.3. A flow change in terms of lateral flow input was modelled just upstream of Casorso Road Bridge in view of the various tributaries entering the creek at this point. The lateral inflow was input as the difference between the 200-year flood hydrograph at the upstream end of the study reach and that at the Casorso Road Bridge. Five lake levels as suggested in the terms of reference were used as the downstream boundary conditions.

8.5 Summary of Results

The following sections present a summary of the results from the hydraulic model of Lower Mission Creek for various cases, downstream boundary conditions and scenarios analyzed. The tabulated summary of results can be found in the table section of the report. Selected modelled profiles to compare the four scenarios are shown on Figures 8.4 to 8.6.

8.5.1 Impacts of Lake Level

Five lake levels were used as the boundary conditions in all cases and for all scenarios. Model results indicate that the impacts of the various lake levels are limited to the Lakeshore Road Bridge for steady flow analyses and to Gordon Drive Bridge for unsteady flow analyses.

8.5.2 Critical Dike Sections

Based on the resulting water profiles from the hydraulic model, critical dike sections with inadequate freeboard were identified for all scenarios. The recommended downstream boundary lake level to combine with the 200-year inflow was determined to be the full pool target lake level of 342.48 m. The recommended water surface profiles to identify critical dike sections in all scenarios were determined to be those calculated in the unsteady flow analyses using the 200-year flood hydrograph. For a 200-year flood hydrograph with a maximum instantaneous peak flow, the required amount of freeboard for a clear-water flood as suggested by the Province is 0.3 m.

The critical dike sections are highlighted in the result summary tables in the table section of the report and on Figures 8.7 to 8.10. In general, the major critical dike sections are listed in Table 8.3.

Table 8.3: Summary of Critical Dike Section Locations and Approximate Lengths

Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Left Dike				
Between Casorso Road Bridge and KLO Road Bridge	-	-	-	-
Between Gordon Drive Bridge and Casorso Road Bridge	▪ XS-19 to XS-15 (340 m in length) ▪ XS-14 to XS-12 (585 m in length) ▪ at XS-7	▪ XS-19 to XS-15 (340 m in length) ▪ XS-14 to XS-12 (585 m in length) ▪ at XS-7	▪ at XS-19 ▪ at XS-12	▪ XS-19 to XS-16 (230 m in length) ▪ at XS-7
Between Lakeshore Road Bridge and Gordon Drive Bridge	▪ XS-6 to XS-4A (420 m in length)	▪ at XS-6 ▪ at XS-4A	▪ at XS-6 ▪ at XS-4A	▪ at XS-6 ▪ at XS-4A
Right Dike				
Between Casorso Road Bridge and KLO Road Bridge	▪ XS-27 to XS-24 (765 m in length)	▪ XS-27 to XS-24 (765 m in length)	-	▪ XS-27 to XS-24 (765 m in length)
Between Gordon Drive Bridge and Casorso Road Bridge	▪ XS-18 to XS-16 (160 m in length) ▪ XS-14A to XS-11 (715 m in length) ▪ at XS-7	▪ XS-18 to XS-16 (160 m in length) ▪ XS-14A to XS-11 (715 m in length) at XS-7	▪ XS-12A to XS-11 (380 m in length)	▪ XS-18 to XS-16 (160 m in length) ▪ XS-14A to XS-11 (715 m in length) ▪ at XS-7
Between Lakeshore Road Bridge and Gordon Drive Bridge	▪ XS-5 to XS-4A (145 m in length)	-	-	-

8.5.3 Recommended Dike Crest Elevations

With the assumption that the proposed Lakeshore Road Bridge will be in place in the near future, the recommended dike crest elevations along the critical dike sections were determined from the unsteady flow analysis results for Model Scenario 2 with the full pool target lake level as the downstream boundary condition. Table 3.1 in the table section of the report presents the associated model results and the recommended dike crest elevations. In general, a maximum raise of 0.5 m is required on the right dike at XS-11 upstream of Gordon Drive Bridge and an average raise of 0.2 m is required all the critical sections along the right dike. A maximum raise of 0.4 m is required on the left dike at XS-19 just downstream of Casorso Road Bridge and an average raise of 0.16 m is required for all the critical sections along the left dike.

8.5.4 Sediment Removal

Potential sediment removal was modelled at various locations downstream of KLO Road Bridge to about 50 m upstream of Lakeshore Road Bridge. Results of Model Scenario 3 indicate that sediment removal would significantly reduce water levels by a maximum of 0.5 m and an average of about 0.2 m along the reach between Lakeshore Road Bridge and KLO Road Bridge. As a result, most parts of the critical sections could be eliminated with the modelled sediment removal configurations, except for a short distance just downstream of Casorso Road Bridge, upstream of Gordon Drive Bridge for about 200 m in length, and certain points between Lakeshore Road Bridge and Gordon Drive Bridge.

A rough comparison of the 1983/1992 channel survey and the 2014 channel survey was conducted to determine the change of channel bed over the last 20 to 30 years in general. Results of the comparison indicate that there has been some degradation in the reach upstream of Pedestrian Bridge 1 and there has been no significant change in the reach between KLO Bridge and Pedestrian Bridge 1. Some deposition has occurred just upstream of KLO Bridge, but a lower channel bed and changes in channel geometry have been found downstream of KLO Bridge, likely due to past gravel removal events. Starting from halfway between KLO Bridge and Casorso Road Bridge to the downstream end of the reach, there has been aggradation of 0.5 m in the channel on average. The rate of aggradation over two or three decades is relatively low, so it is considered that the study reach is relatively stable.

Based on the model results and a comparison of the 1983/1992 and 2014 channel surveys, it is recommended that sediment removal along the study reach be further considered as part of the dike maintenance plan. However, raising the dike at critical sections would also be considered as a long term flood protection solution to ensure adequate hydraulic capacity in a relatively stable channel such as Lower Mission Creek.

8.5.5 Setback Dike Scenario

The Mission Creek Restoration Initiative (MCRI) is a multi-stakeholder group which includes provincial and local government representatives, as well as non-governmental organization representatives. The purpose of the initiative is to 're-naturalize' the lower portion of Mission Creek. It is our understanding that land has been purchased along the left (south) bank of Mission Creek between Gordon Drive and Casorso Road with the intent to construct a setback dike. Model Scenario 4 was developed specifically to help determine the potential impacts of setting back the dike at this location (just upstream of XS-15 to just downstream of XS-12A).

Results of Model Scenario 4 indicate that the proposed setback dike would slightly reduce water level by a maximum of 0.24 m and an average of about 0.05 m along the reach between the downstream end of the proposed setback dike and XS-26, located about 700 m upstream of Casorso Road Bridge. It is assumed that the top of dike elevations for the proposed setback dike will have sufficient amount of freeboard, and the proposed setback dike will replace the existing left dike (removed in the model). As a result the critical sections along the left dike in the vicinity of the proposed setback dike could be eliminated. However, critical dike sections remain upstream of the proposed setback dike along the left dike and between Gordon Drive Bridge and Casorso Road Bridge along the right dike.

Based on the model results, the proposed setback dike as modelled in the current study would provide marginally reduction in water levels locally.

In addition, it should be noted that the resulting flow velocities in the vicinity of the proposed setback dike alignment are considerably reduced. On average, the flow velocity was decreased from 2.2 m/s for Model Scenario 2 to 1.8 m/s for Model Scenario 4. This equates to a flow velocity reduction of 18% on average. Such reduced flow velocities will likely allow more sediment to settle in this local reach. It is recommended that during the design of the proposed setback dike, additional freeboard should be considered to account for the long term aggradation, which could be determined by analyzing historical channel cross sections.

9.0 CONCLUSIONS AND RECOMMENDATIONS

- A flood frequency analysis was performed based on the available historical peak flow data at the Mission Creek near East Kelowna hydrometric station (08NM116). The 200-year maximum instantaneous flow and maximum daily flow determined at the station were 124 m^3/s and 102 m^3/s, respectively. The 200-year maximum instantaneous flow and maximum daily flow adjusted to the mouth of Mission Creek were 131 m^3/s and 107 m^3/s, respectively.

- A review of the historical peak flow data at the Mission Creek near East Kelowna station was conducted in relation to past and potential forest cover removal and climate change. Although two major flood events occurred in the past two years, other large flood events also occurred over the period of record. The 2012 flood event, with an estimated maximum instantaneous flow of 116 m^3/s, is about a 100-year event while the 2013 flood event, with a recorded maximum instantaneous flow of 110 m^3/s, is about a 50-year event, both out of an extended period of record of 63 years.

- Based on the findings from the current study, it is recommended that a minimum factor of 10% be applied to the 200-year peak flows estimated from the flood frequency analysis to take into account impacts of climate change on the hydrology of Mission Creek.

- In view of the 12% increase in peak flows in Mission Creek over the last 10 years, likely due to the combination of climate change, natural variability, and forest cover removal by forest fires, logging activities and beetle infestation, it is also recommended that a sensitivity analysis using a combined factor ranging from 10% to 22% be carried out in future hydraulic analyses such that the incremental difference in water levels can be determined and discussed.

- The recommended 200-year maximum instantaneous and maximum daily flows for the upstream end of the study reach were 137 m^3/s and 112 m^3/s, respectively. The recommended 200-year maximum instantaneous and maximum daily flows for the reach downstream of Casorso Road Bridge were 144 m^3/s and 118 m^3/s, respectively.

- A hydraulic model of the Lower Mission Creek was developed based on the survey conducted for the current assignment, and both steady and unsteady flow analyses were performed. Four model scenarios were developed and analyzed, and five lake levels were used as the downstream boundary conditions as suggested in the terms of reference.

- Model results indicate that the impacts of the various lake levels are limited to the Lakeshore Road Bridge for steady flow analyses and to Gordon Drive Bridge for unsteady flow analyses.

- Based on the resulting water profiles from the hydraulic model, critical dike sections with inadequate freeboard were identified for all scenarios. The recommended downstream boundary lake level to combine with the 200-year inflow was determined to be the full pool target lake level of 342.48 m. Critical dike sections were identified along the lower portions of the study reach between Lakeshore Road Bridge and KLO Road Bridge.

- With the assumption that the proposed Lakeshore Road Bridge will be in place in the near future, the recommended dike crest elevations along the critical dike sections were determined from the unsteady flow analysis results for Model Scenario 2 with the full pool target lake level as the downstream boundary condition. In general, a maximum raise of 0.5 m is required on the right dike at XS-11 upstream of Gordon Drive Bridge and an average raise of 0.2 m is required all the critical sections along the right dike.

A maximum raise of 0.4 m is required on the left dike at XS-19 just downstream of Casorso Road Bridge and an average raise of 0.16 m is required for all the critical sections along the left dike.

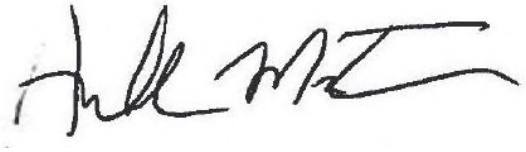
- Model results of the sediment removal scenario indicate that sediment removal would significantly reduce water levels by a maximum of 0.5 m and an average of about 0.2 m along the reach between Lakeshore Road Bridge and KLO Road Bridge. A rough comparison of the 1983/1992 channel survey and the 2014 channel survey was also conducted to determine the change of channel bed over the last 20 to 30 years in general. Based on the model results and a comparison of the 1983/1992 and 2014 channel surveys, it is recommended that sediment removal along the study reach be further considered as part of the dike maintenance plan. However, raising the dike in critical sections would still be a viable solution to ensure adequate hydraulic capacity in Lower Mission Creek.

- Model results of the setback dike scenario show that the proposed setback dike would slightly reduce water level by a maximum of 0.24 m and an average of about 0.05 m along the reach between the downstream end of the proposed setback dike and XS-26, located about 700 m upstream of Casorso Road Bridge. In addition, it should be noted that the resulting flow velocities in the vicinity of the proposed setback dike alignment are considerably reduced. Such reduced flow velocities will likely allow more sediment to settle in this local reach, and it is recommended that during the design of the proposed setback dike, additional freeboard should be considered to account for the long term aggradation, which could be determined by analyzing historical channel cross sections.

10.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech EBA Inc.



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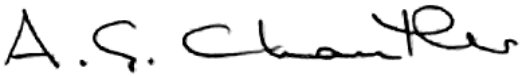

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TABLES

Table 1.1: Result Summary – Unsteady Flow Analysis, Lake Level 1

Unsteady Flow Analysis

Q_{200} Peak = **137** m^3/s (Design 200-year Flood Hydrograph including a Factor of 10% for Climate Change based on the 2013 flood event pattern, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

7 m^3/s (Additional flood hydrograph added just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.48** m (Full Pool Target Lake Level)

Critical Dike Section (Left Dike) - Inadequate freeboard with required freeboard of 0.3 m

Critical Dike Section (Right Dike) - Inadequate freeboard with required freeboard of 0.3 m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

			Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4			Req. Dike Crest Elev (m)	
River Station	XS ID	Reach Length	Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	Left	Right
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	-	-
8331.299	XS-58B	131.954	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	-	-
8199.345	XS-58A	100.296	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	-	-
8099.049	XS-58	63.843	N/A	384.415	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	-	-
8035.206	XS-57	182.429	N/A	383.450	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	-	-
7938.948	XS-56A	5	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	-	-
7936.448	Ped Bridge2	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	-	-
7852.777	XS-56	183.544	N/A	381.571	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	-	-
7669.233	XS-55	184.574	N/A	378.823	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	-	-
7484.659	XS-54	182.123	N/A	377.350	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	-	-
7302.536	XS-53	182.515	N/A	375.593	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	-	-
7120.021	XS-52	150.368	N/A	374.420	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	-	-
6969.653	XS-51A	5	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	-	-
6967.153	Ped Bridge1	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	-	-
6934.41	XS-51	101.551	N/A	372.477	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	-	-
6832.859	XS-50	68.693	N/A	372.077	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	-	-
6764.166	XS-49	139.707	N/A	371.229	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	-	-
6624.459	XS-48	130.772	N/A	369.951	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	-	-
6493.687	XS-47	184.488	N/A	368.379	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	-	-
6309.199	XS-46	119.834	N/A	367.502	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	-	-
6189.365	XS-45	137.962	N/A	366.462	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	-	-
6051.403	XS-44	145.372	N/A	365.398	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	-	-
5906.031	XS-43	146.942	N/A	364.307	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	-	-
5759.089	XS-42	115.198	363.462	363.432	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	-	-
5643.891	XS-41A	126.814	362.894	363.245	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	-	-
5517.077	XS-41	162.683	362.049	362.219	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	-	-
5354.394	XS-40A	125.944	361.025	361.171	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	-	-
5228.45	XS-40	83.611	359.972	360.630	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	-	-
5144.839	XS-39A	105.527	359.391	359.923	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	-	-
5039.312	XS-39	63.719	358.900	359.236	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	-	-
4975.593	XS-38	16.199	358.473	358.605	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	-	-
4959.394	XS-37A	77.95	358.457	358.559	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	-	-
4881.444	XS-37	28.894	357.887	358.695	357.21	0.68	1.49	357.21	0.68	1.49	357.18	0.71	1.51	357.21	0.68	1.49	-	-
4852.55	XS-36	8.832	N/A	N/A	357.20	N/A	N/A	357.20	N/A	N/A	357.18	N/A	N/A	357.20	N/A	N/A	-	-
4848.134	KLO Bridge	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4			Req. Dike Crest Elev (m)	
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	Left	Right
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4843.718	XS-35	32.772	N/A	N/A	357.17	N/A	N/A	357.17	N/A	N/A	357.15	N/A	N/A	357.17	N/A	N/A	-	-
4810.946	XS-34	45.021	357.648	357.646	356.72	0.93	0.93	356.72	0.93	0.93	356.66	0.99	0.99	356.72	0.93	0.93	-	-
4765.925	XS-33A	235.493	357.288	357.618	356.46	0.83	1.16	356.46	0.83	1.16	356.25	1.04	1.37	356.46	0.83	1.16	-	-
4530.432	XS-33	220.627	356.955	356.992	355.39	1.57	1.60	355.39	1.57	1.60	355.27	1.69	1.72	355.39	1.57	1.60	-	-
4309.805	XS-32	116.444	355.457	355.951	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	-	-
4193.361	XS-31B	9.836	355.623	355.589	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	-	-
4188.443	Weir	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.71	1.84	1.54	353.71	1.84	1.54	353.76	1.79	1.49	353.71	1.84	1.54	-	-
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.96	2.04	1.98	353.26	1.74	1.68	-	-
3863.118	XS-30	206.724	354.070	353.997	352.71	1.36	1.29	352.71	1.36	1.29	352.18	1.89	1.82	352.71	1.36	1.29	-	-
3656.394	XS-29	168.276	353.135	352.986	351.99	1.14	1.00	351.99	1.14	1.00	351.64	1.50	1.35	351.99	1.14	1.00	-	-
3488.118	XS-28	218.359	352.492	351.959	351.42	1.07	0.54	351.42	1.07	0.54	351.30	1.19	0.66	351.42	1.07	0.54	-	-
3269.759	XS-27	246.349	N/A	350.824	350.69	N/A	0.13	350.69	N/A	0.13	350.45	N/A	0.37	350.69	N/A	0.13	-	350.99
3023.41	XS-26	213.816	N/A	350.069	350.06	N/A	0.01	350.06	N/A	0.01	349.65	N/A	0.42	350.01	N/A	0.06	-	350.36
2809.594	XS-25	149.047	N/A	349.707	349.67	N/A	0.04	349.67	N/A	0.04	349.34	N/A	0.37	349.53	N/A	0.18	-	349.97
2660.547	XS-24	155.91	N/A	349.525	349.48	N/A	0.04	349.48	N/A	0.04	349.17	N/A	0.35	349.24	N/A	0.28	-	349.78
2504.637	XS-23	166.898	N/A	349.354	348.91	N/A	0.44	348.91	N/A	0.44	348.91	N/A	0.44	348.95	N/A	0.40	-	-
2337.739	XS-22	18.5	N/A	350.584	348.53	N/A	2.05	348.53	N/A	2.05	348.44	N/A	2.14	348.52	N/A	2.06	-	-
2319.239	XS-21	15	N/A	N/A	348.48	N/A	N/A	348.48	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A	-	-
2311.739	Casorso Br	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.45	N/A	N/A	348.45	N/A	N/A	348.35	N/A	N/A	348.44	N/A	N/A	-	-
2291.872	XS-19	70.515	348.234	350.033	348.32	-0.09	1.71	348.32	-0.09	1.71	348.18	0.05	1.85	348.31	-0.08	1.72	348.62	-
2221.357	XS-18	18.518	348.304	348.417	348.15	0.15	0.27	348.15	0.15	0.27	347.91	0.39	0.51	348.13	0.17	0.29	348.45	348.45
2202.839	XS-17	19.776	348.135	348.228	348.10	0.03	0.13	348.10	0.03	0.13	347.83	0.31	0.40	348.08	0.06	0.15	348.40	348.40
2183.063	XS-16	120.143	348.162	348.291	348.03	0.13	0.26	348.03	0.13	0.26	347.67	0.49	0.62	348.00	0.16	0.29	348.33	348.33
2062.92	XS-15	110.719	347.849	348.481	347.67	0.18	0.81	347.67	0.18	0.81	347.27	0.58	1.21	347.55	0.30	0.93	347.97	-
1952.201	XS-14A	118.057	347.853	347.587	347.45	0.40	0.14	347.45	0.40	0.14	347.10	0.75	0.49	347.31	0.54	0.28	-	347.75
1834.144	XS-14	174.668	347.393	347.235	347.19	0.20	0.05	347.19	0.20	0.05	346.89	0.50	0.35	347.11	0.30	0.13	347.49	347.49
1659.476	XS-13	40.15	347.097	347.022	346.84	0.26	0.18	346.84	0.26	0.18	346.59	0.51	0.43	346.92	0.30	0.10	347.14	347.14
1619.326	XS-12A	159.66	347.029	346.844	346.74	0.29	0.10	346.74	0.29	0.10	346.55	0.48	0.29	346.87	0.30	-0.03	347.04	347.04
1459.666	XS-12	210.58	346.592	346.451	346.40	0.19	0.05	346.39	0.20	0.06	346.33	0.26	0.12	346.39	0.30	0.06	346.69	346.69
1249.086	XS-11	10.026	346.197	345.650	345.89	0.31	-0.24	345.86	0.34	-0.21	345.71	0.49	-0.06	345.86	0.34	-0.21	-	346.16
1239.06	XS-10	6.111	346.231	346.206	345.85	0.38	0.36	345.82	0.41	0.39	345.66	0.57	0.55	345.82	0.41	0.39	-	-
1232.949	XS-9	16.127	346.309	346.256	345.85	0.46	0.41	345.81	0.50	0.45	345.65	0.66	0.61	345.81	0.50	0.45	-	-
1216.822	XS-8	119.967	346.383	346.198	345.87	0.51	0.33	345.84	0.54	0.36	345.67	0.71	0.53	345.83	0.55	0.37	-	-
1096.855	XS-7	54.273	345.747	345.779	345.66	0.09	0.12	345.61	0.14	0.17	345.31	0.44	0.47	345.61	0.14	0.17	345.91	345.91
1042.582	XS-6F	28.955	348.405	348.956	345.63	2.77	3.33	345.58	2.82	3.38	345.23	3.17	3.73	345.57	2.83	3.39	-	-
1031.775	Gordon Dr Br	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.55	3.20	3.46	345.50	3.25	3.51	345.06	3.69	3.95	345.49	3.26	3.52	-	-
916.613	XS-6	273.257	345.211	345.602	345.29	-0.08	0.31	345.19	0.02	0.41	344.92	0.29	0.68	345.19	0.02	0.41	345.49	-
643.356	XS-5	95.237	344.914	345.057	344.82	0.09	0.24	344.56	0.35	0.50	344.60	0.31	0.46	344.56	0.35	0.50	-	-
548.119	XS-4A	49.649	344.533	344.938	344.66	-0.13	0.28	344.33	0.20	0.61	344.33	0.20	0.61	344.33	0.20	0.61	344.63	-
498.47	XS-4	12.21	N/A	344.964	344.59	N/A	0.37	344.22	N/A	0.74	344.22	N/A	0.74	344.21	N/A	0.75	-	-
486.26	XS-3	11.592	N/A	N/A	344.60	N/A	N/A	344.22	N/A	N/A	344.22	N/A	N/A	344.22	N/A	N/A	-	-
480.464	Lakeshore Br	-	-	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.25	N/A	N/A	344.25	N/A	N/A	344.25	N/A	N/A	344.25	N/A	N/A	-	-
457.387	XS-1	109.312	N/A	N/A	344.18	N/A	N/A	344.18	N/A	N/A	344.18	N/A	N/A	344.18	N/A	N/A	-	-
348.075	XS-D	128.217	N/A	N/A	343.87	N/A	N/A	343.87	N/A	N/A	343.87	N/A	N/A	343.87	N/A	N/A	-	-
219.858	XS-C	91.763	N/A	N/A	343.55	N/A	N/A	343.55	N/A	N/A	343.55	N/A	N/A	343.55	N/A	N/A	-	-
128.095	XS-B	128.095	N/A	N/A	343.34	N/A	N/A	343.34	N/A	N/A	343.34	N/A	N/A	343.34	N/A	N/A	-	-
0	XS-A	0	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	-	-

Table 1.2: Result Summary – Unsteady Flow Analysis, Lake Level 2

Unsteady Flow Analysis

Q_{200} Peak = **137** m^3/s (Design 200-year Flood Hydrograph including a Factor of 10% for Climate Change based on the 2013 flood event pattern, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

7 m^3/s (Additional flood hydrograph added just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.61** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42
8035.206	XS-57	182.429	N/A	383.450	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24
7938.948	XS-56A	5	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77
7669.233	XS-55	184.574	N/A	378.823	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14
7484.659	XS-54	182.123	N/A	377.350	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69
7302.536	XS-53	182.515	N/A	375.593	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85
7120.021	XS-52	150.368	N/A	374.420	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51
6969.653	XS-51A	5	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21
6832.859	XS-50	68.693	N/A	372.077	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47
6764.166	XS-49	139.707	N/A	371.229	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97
6624.459	XS-48	130.772	N/A	369.951	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58
6493.687	XS-47	184.488	N/A	368.379	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77
6309.199	XS-46	119.834	N/A	367.502	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21
6189.365	XS-45	137.962	N/A	366.462	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91
6051.403	XS-44	145.372	N/A	365.398	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81
5906.031	XS-43	146.942	N/A	364.307	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73
5759.089	XS-42	115.198	363.462	363.432	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76
5643.891	XS-41A	126.814	362.894	363.245	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38
5517.077	XS-41	162.683	362.049	362.219	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22
5354.394	XS-40A	125.944	361.025	361.171	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23
5228.45	XS-40	83.611	359.972	360.630	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50
5144.839	XS-39A	105.527	359.391	359.923	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30
5039.312	XS-39	63.719	358.900	359.236	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21
4975.593	XS-38	16.199	358.473	358.605	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03
4959.394	XS-37A	77.95	358.457	358.559	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00
4881.444	XS-37	28.894	357.887	358.695	357.21	0.68	1.49	357.21	0.68	1.49	357.18	0.71	1.51	357.21	0.68	1.49
4852.55	XS-36	8.832	N/A	N/A	357.20	N/A	N/A	357.20	N/A	N/A	357.18	N/A	N/A	357.20	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.17	N/A	N/A	357.17	N/A	N/A	357.15	N/A	N/A	357.17	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.72	0.93	0.93	356.72	0.93	0.93	356.66	0.99	0.99	356.72	0.93	0.93

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.46	0.83	1.16	356.46	0.83	1.16	356.25	1.04	1.37	356.46	0.83	1.16
4530.432	XS-33	220.627	356.955	356.992	355.39	1.57	1.60	355.39	1.57	1.60	355.27	1.69	1.72	355.39	1.57	1.60
4309.805	XS-32	116.444	355.457	355.951	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50
4193.361	XS-31B	9.836	355.623	355.589	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.71	1.84	1.54	353.71	1.84	1.54	353.76	1.79	1.49	353.71	1.84	1.54
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.96	2.04	1.98	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.71	1.36	1.29	352.71	1.36	1.29	352.18	1.89	1.82	352.71	1.36	1.29
3656.394	XS-29	168.276	353.135	352.986	351.99	1.14	1.00	351.99	1.14	1.00	351.64	1.50	1.35	351.99	1.14	1.00
3488.118	XS-28	218.359	352.492	351.959	351.42	1.07	0.54	351.42	1.07	0.54	351.30	1.19	0.66	351.42	1.07	0.54
3269.759	XS-27	246.349	N/A	350.824	350.69	N/A	0.13	350.69	N/A	0.13	350.45	N/A	0.37	350.69	N/A	0.13
3023.41	XS-26	213.816	N/A	350.069	350.06	N/A	0.01	350.06	N/A	0.01	349.65	N/A	0.42	350.01	N/A	0.06
2809.594	XS-25	149.047	N/A	349.707	349.67	N/A	0.04	349.67	N/A	0.04	349.34	N/A	0.37	349.53	N/A	0.18
2660.547	XS-24	155.91	N/A	349.525	349.48	N/A	0.04	349.48	N/A	0.04	349.17	N/A	0.35	349.24	N/A	0.28
2504.637	XS-23	166.898	N/A	349.354	348.91	N/A	0.44	348.91	N/A	0.44	348.91	N/A	0.44	348.95	N/A	0.40
2337.739	XS-22	18.5	N/A	350.584	348.53	N/A	2.05	348.53	N/A	2.05	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.48	N/A	N/A	348.48	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.45	N/A	N/A	348.45	N/A	N/A	348.35	N/A	N/A	348.44	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.32	-0.09	1.71	348.32	-0.09	1.71	348.18	0.05	1.85	348.31	-0.08	1.72
2221.357	XS-18	18.518	348.304	348.417	348.15	0.15	0.27	348.15	0.15	0.27	347.91	0.39	0.51	348.13	0.17	0.29
2202.839	XS-17	19.776	348.135	348.228	348.10	0.03	0.13	348.10	0.03	0.13	347.83	0.31	0.40	348.08	0.06	0.15
2183.063	XS-16	120.143	348.162	348.291	348.03	0.13	0.26	348.03	0.13	0.26	347.67	0.49	0.62	348.00	0.16	0.29
2062.92	XS-15	110.719	347.849	348.481	347.67	0.18	0.81	347.67	0.18	0.81	347.27	0.58	1.21	347.55	0.30	0.93
1952.201	XS-14A	118.057	347.853	347.587	347.45	0.40	0.14	347.45	0.40	0.14	347.10	0.75	0.49	347.31	0.54	0.28
1834.144	XS-14	174.668	347.393	347.235	347.19	0.20	0.05	347.19	0.20	0.05	346.89	0.50	0.35	347.11	0.30	0.13
1659.476	XS-13	40.15	347.097	347.022	346.84	0.26	0.18	346.84	0.26	0.18	346.59	0.51	0.43	346.92	0.30	0.10
1619.326	XS-12A	159.66	347.029	346.844	346.74	0.29	0.10	346.74	0.29	0.10	346.55	0.48	0.29	346.87	0.30	-0.03
1459.666	XS-12	210.58	346.592	346.451	346.40	0.19	0.05	346.39	0.20	0.06	346.33	0.26	0.12	346.39	0.30	0.06
1249.086	XS-11	10.026	346.197	345.650	345.89	0.31	-0.24	345.86	0.34	-0.21	345.71	0.49	-0.06	345.86	0.34	-0.21
1239.06	XS-10	6.111	346.231	346.206	345.85	0.38	0.36	345.82	0.41	0.39	345.66	0.57	0.55	345.82	0.41	0.39
1232.949	XS-9	16.127	346.309	346.256	345.84	0.47	0.42	345.81	0.50	0.45	345.65	0.66	0.61	345.81	0.50	0.45
1216.822	XS-8	119.967	346.383	346.198	345.87	0.51	0.33	345.84	0.54	0.36	345.67	0.71	0.53	345.83	0.55	0.37
1096.855	XS-7	54.273	345.747	345.779	345.65	0.10	0.13	345.61	0.14	0.17	345.30	0.45	0.48	345.61	0.14	0.17
1042.582	XS-6F	28.955	348.405	348.956	345.62	2.78	3.34	345.57	2.83	3.39	345.22	3.18	3.74	345.57	2.83	3.39
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.55	3.20	3.46	345.49	3.26	3.52	345.06	3.69	3.95	345.49	3.26	3.52
916.613	XS-6	273.257	345.211	345.602	345.29	-0.08	0.31	345.19	0.02	0.41	344.91	0.30	0.69	345.18	0.03	0.42
643.356	XS-5	95.237	344.914	345.057	344.80	0.11	0.26	344.55	0.36	0.51	344.59	0.32	0.47	344.55	0.36	0.51
548.119	XS-4A	49.649	344.533	344.938	344.64	-0.11	0.30	344.31	0.22	0.63	344.31	0.22	0.63	344.31	0.22	0.63
498.47	XS-4	12.21	N/A	344.964	344.57	N/A	0.39	344.20	N/A	0.76	344.20	N/A	0.76	344.19	N/A	0.77
486.26	XS-3	11.592	N/A	N/A	344.57	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.81	N/A	N/A	343.82	N/A	N/A	343.82	N/A	N/A	343.81	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.41	N/A	N/A	343.41	N/A	N/A	343.41	N/A	N/A	343.41	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.13	N/A	N/A	343.13	N/A	N/A	343.13	N/A	N/A	343.13	N/A	N/A
0	XS-A	0	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A

Table 1.3: Result Summary – Unsteady Flow Analysis, Lake Level 3

Unsteady Flow Analysis

Q_{200} Peak = **137** m^3/s (Design 200-year Flood Hydrograph including a Factor of 10% for Climate Change based on the 2013 flood event pattern, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

7 m^3/s (Additional flood hydrograph added just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.74** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42
8035.206	XS-57	182.429	N/A	383.450	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24
7938.948	XS-56A	5	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77
7669.233	XS-55	184.574	N/A	378.823	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14
7484.659	XS-54	182.123	N/A	377.350	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69
7302.536	XS-53	182.515	N/A	375.593	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85
7120.021	XS-52	150.368	N/A	374.420	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51
6969.653	XS-51A	5	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21
6832.859	XS-50	68.693	N/A	372.077	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47
6764.166	XS-49	139.707	N/A	371.229	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97
6624.459	XS-48	130.772	N/A	369.951	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58
6493.687	XS-47	184.488	N/A	368.379	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77
6309.199	XS-46	119.834	N/A	367.502	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21
6189.365	XS-45	137.962	N/A	366.462	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91
6051.403	XS-44	145.372	N/A	365.398	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81
5906.031	XS-43	146.942	N/A	364.307	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73
5759.089	XS-42	115.198	363.462	363.432	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76
5643.891	XS-41A	126.814	362.894	363.245	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38
5517.077	XS-41	162.683	362.049	362.219	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22
5354.394	XS-40A	125.944	361.025	361.171	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23
5228.45	XS-40	83.611	359.972	360.630	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50
5144.839	XS-39A	105.527	359.391	359.923	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30
5039.312	XS-39	63.719	358.900	359.236	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21
4975.593	XS-38	16.199	358.473	358.605	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03
4959.394	XS-37A	77.95	358.457	358.559	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00
4881.444	XS-37	28.894	357.887	358.695	357.21	0.68	1.49	357.21	0.68	1.49	357.18	0.71	1.51	357.21	0.68	1.49
4852.55	XS-36	8.832	N/A	N/A	357.20	N/A	N/A	357.20	N/A	N/A	357.18	N/A	N/A	357.20	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.17	N/A	N/A	357.17	N/A	N/A	357.15	N/A	N/A	357.17	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.72	0.93	0.93	356.72	0.93	0.93	356.66	0.99	0.99	356.72	0.93	0.93

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.46	0.83	1.16	356.46	0.83	1.16	356.25	1.04	1.37	356.46	0.83	1.16
4530.432	XS-33	220.627	356.955	356.992	355.39	1.57	1.60	355.39	1.57	1.60	355.27	1.69	1.72	355.39	1.57	1.60
4309.805	XS-32	116.444	355.457	355.951	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50
4193.361	XS-31B	9.836	355.623	355.589	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.71	1.84	1.54	353.71	1.84	1.54	353.76	1.79	1.49	353.71	1.84	1.54
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.96	2.04	1.98	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.71	1.36	1.29	352.71	1.36	1.29	352.18	1.89	1.82	352.71	1.36	1.29
3656.394	XS-29	168.276	353.135	352.986	351.99	1.14	1.00	351.99	1.14	1.00	351.64	1.50	1.35	351.99	1.14	1.00
3488.118	XS-28	218.359	352.492	351.959	351.42	1.07	0.54	351.42	1.07	0.54	351.30	1.19	0.66	351.42	1.07	0.54
3269.759	XS-27	246.349	N/A	350.824	350.69	N/A	0.13	350.69	N/A	0.13	350.45	N/A	0.37	350.69	N/A	0.13
3023.41	XS-26	213.816	N/A	350.069	350.06	N/A	0.01	350.06	N/A	0.01	349.65	N/A	0.42	350.01	N/A	0.06
2809.594	XS-25	149.047	N/A	349.707	349.67	N/A	0.04	349.67	N/A	0.04	349.34	N/A	0.37	349.53	N/A	0.18
2660.547	XS-24	155.91	N/A	349.525	349.48	N/A	0.04	349.48	N/A	0.04	349.17	N/A	0.35	349.24	N/A	0.28
2504.637	XS-23	166.898	N/A	349.354	348.91	N/A	0.44	348.91	N/A	0.44	348.91	N/A	0.44	348.95	N/A	0.40
2337.739	XS-22	18.5	N/A	350.584	348.53	N/A	2.05	348.53	N/A	2.05	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.48	N/A	N/A	348.48	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.45	N/A	N/A	348.45	N/A	N/A	348.35	N/A	N/A	348.44	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.32	-0.09	1.71	348.32	-0.09	1.71	348.18	0.05	1.85	348.31	-0.08	1.72
2221.357	XS-18	18.518	348.304	348.417	348.15	0.15	0.27	348.15	0.15	0.27	347.91	0.39	0.51	348.13	0.17	0.29
2202.839	XS-17	19.776	348.135	348.228	348.10	0.03	0.13	348.10	0.03	0.13	347.83	0.31	0.40	348.08	0.06	0.15
2183.063	XS-16	120.143	348.162	348.291	348.03	0.13	0.26	348.03	0.13	0.26	347.67	0.49	0.62	348.00	0.16	0.29
2062.92	XS-15	110.719	347.849	348.481	347.67	0.18	0.81	347.67	0.18	0.81	347.27	0.58	1.21	347.55	0.30	0.93
1952.201	XS-14A	118.057	347.853	347.587	347.45	0.40	0.14	347.45	0.40	0.14	347.10	0.75	0.49	347.31	0.54	0.28
1834.144	XS-14	174.668	347.393	347.235	347.19	0.20	0.05	347.19	0.20	0.05	346.89	0.50	0.35	347.11	0.30	0.13
1659.476	XS-13	40.15	347.097	347.022	346.84	0.26	0.18	346.84	0.26	0.18	346.59	0.51	0.43	346.92	0.30	0.10
1619.326	XS-12A	159.66	347.029	346.844	346.74	0.29	0.10	346.74	0.29	0.10	346.55	0.48	0.29	346.87	0.30	-0.03
1459.666	XS-12	210.58	346.592	346.451	346.40	0.19	0.05	346.39	0.20	0.06	346.33	0.26	0.12	346.39	0.30	0.06
1249.086	XS-11	10.026	346.197	345.650	345.89	0.31	-0.24	345.86	0.34	-0.21	345.71	0.49	-0.06	345.86	0.34	-0.21
1239.06	XS-10	6.111	346.231	346.206	345.85	0.38	0.36	345.82	0.41	0.39	345.66	0.57	0.55	345.82	0.41	0.39
1232.949	XS-9	16.127	346.309	346.256	345.84	0.47	0.42	345.81	0.50	0.45	345.65	0.66	0.61	345.81	0.50	0.45
1216.822	XS-8	119.967	346.383	346.198	345.87	0.51	0.33	345.84	0.54	0.36	345.67	0.71	0.53	345.83	0.55	0.37
1096.855	XS-7	54.273	345.747	345.779	345.65	0.10	0.13	345.61	0.14	0.17	345.30	0.45	0.48	345.61	0.14	0.17
1042.582	XS-6F	28.955	348.405	348.956	345.62	2.78	3.34	345.57	2.83	3.39	345.22	3.18	3.74	345.57	2.83	3.39
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.55	3.20	3.46	345.49	3.26	3.52	345.06	3.69	3.95	345.49	3.26	3.52
916.613	XS-6	273.257	345.211	345.602	345.28	-0.07	0.32	345.19	0.02	0.41	344.91	0.30	0.69	345.18	0.03	0.42
643.356	XS-5	95.237	344.914	345.057	344.80	0.11	0.26	344.55	0.36	0.51	344.59	0.32	0.47	344.55	0.36	0.51
548.119	XS-4A	49.649	344.533	344.938	344.63	-0.10	0.31	344.31	0.22	0.63	344.31	0.22	0.63	344.31	0.22	0.63
498.47	XS-4	12.21	N/A	344.964	344.56	N/A	0.40	344.19	N/A	0.77	344.19	N/A	0.77	344.19	N/A	0.77
486.26	XS-3	11.592	N/A	N/A	344.57	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.38	N/A	N/A	343.38	N/A	N/A	343.38	N/A	N/A	343.38	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.07	N/A	N/A	343.07	N/A	N/A	343.07	N/A	N/A	343.07	N/A	N/A
0	XS-A	0	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A

Table 1.4: Result Summary – Unsteady Flow Analysis, Lake Level 4

Unsteady Flow Analysis

Q_{200} Peak = **137** m^3/s (Design 200-year Flood Hydrograph including a Factor of 10% for Climate Change based on the 2013 flood event pattern, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

7 m^3/s (Additional flood hydrograph added just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.87** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42
8035.206	XS-57	182.429	N/A	383.450	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24
7938.948	XS-56A	5	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77
7669.233	XS-55	184.574	N/A	378.823	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14
7484.659	XS-54	182.123	N/A	377.350	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69
7302.536	XS-53	182.515	N/A	375.593	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85
7120.021	XS-52	150.368	N/A	374.420	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51
6969.653	XS-51A	5	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21
6832.859	XS-50	68.693	N/A	372.077	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47
6764.166	XS-49	139.707	N/A	371.229	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97
6624.459	XS-48	130.772	N/A	369.951	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58
6493.687	XS-47	184.488	N/A	368.379	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77
6309.199	XS-46	119.834	N/A	367.502	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21
6189.365	XS-45	137.962	N/A	366.462	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91
6051.403	XS-44	145.372	N/A	365.398	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81
5906.031	XS-43	146.942	N/A	364.307	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73
5759.089	XS-42	115.198	363.462	363.432	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76
5643.891	XS-41A	126.814	362.894	363.245	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38
5517.077	XS-41	162.683	362.049	362.219	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22
5354.394	XS-40A	125.944	361.025	361.171	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23
5228.45	XS-40	83.611	359.972	360.630	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50
5144.839	XS-39A	105.527	359.391	359.923	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30
5039.312	XS-39	63.719	358.900	359.236	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21
4975.593	XS-38	16.199	358.473	358.605	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03
4959.394	XS-37A	77.95	358.457	358.559	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00
4881.444	XS-37	28.894	357.887	358.695	357.21	0.68	1.49	357.21	0.68	1.49	357.18	0.71	1.51	357.21	0.68	1.49
4852.55	XS-36	8.832	N/A	N/A	357.20	N/A	N/A	357.20	N/A	N/A	357.18	N/A	N/A	357.20	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.17	N/A	N/A	357.17	N/A	N/A	357.15	N/A	N/A	357.17	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.72	0.93	0.93	356.72	0.93	0.93	356.66	0.99	0.99	356.72	0.93	0.93

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.46	0.83	1.16	356.46	0.83	1.16	356.25	1.04	1.37	356.46	0.83	1.16
4530.432	XS-33	220.627	356.955	356.992	355.39	1.57	1.60	355.39	1.57	1.60	355.27	1.69	1.72	355.39	1.57	1.60
4309.805	XS-32	116.444	355.457	355.951	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50
4193.361	XS-31B	9.836	355.623	355.589	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.71	1.84	1.54	353.71	1.84	1.54	353.76	1.79	1.49	353.71	1.84	1.54
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.96	2.04	1.98	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.71	1.36	1.29	352.71	1.36	1.29	352.18	1.89	1.82	352.71	1.36	1.29
3656.394	XS-29	168.276	353.135	352.986	351.99	1.14	1.00	351.99	1.14	1.00	351.64	1.50	1.35	351.99	1.14	1.00
3488.118	XS-28	218.359	352.492	351.959	351.42	1.07	0.54	351.42	1.07	0.54	351.30	1.19	0.66	351.42	1.07	0.54
3269.759	XS-27	246.349	N/A	350.824	350.69	N/A	0.13	350.69	N/A	0.13	350.45	N/A	0.37	350.69	N/A	0.13
3023.41	XS-26	213.816	N/A	350.069	350.06	N/A	0.01	350.06	N/A	0.01	349.65	N/A	0.42	350.01	N/A	0.06
2809.594	XS-25	149.047	N/A	349.707	349.67	N/A	0.04	349.67	N/A	0.04	349.34	N/A	0.37	349.53	N/A	0.18
2660.547	XS-24	155.91	N/A	349.525	349.48	N/A	0.04	349.48	N/A	0.04	349.17	N/A	0.35	349.24	N/A	0.28
2504.637	XS-23	166.898	N/A	349.354	348.91	N/A	0.44	348.91	N/A	0.44	348.91	N/A	0.44	348.95	N/A	0.40
2337.739	XS-22	18.5	N/A	350.584	348.53	N/A	2.05	348.53	N/A	2.05	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.48	N/A	N/A	348.48	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.45	N/A	N/A	348.45	N/A	N/A	348.35	N/A	N/A	348.44	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.32	-0.09	1.71	348.32	-0.09	1.71	348.18	0.05	1.85	348.31	-0.08	1.72
2221.357	XS-18	18.518	348.304	348.417	348.15	0.15	0.27	348.15	0.15	0.27	347.91	0.39	0.51	348.13	0.17	0.29
2202.839	XS-17	19.776	348.135	348.228	348.10	0.03	0.13	348.10	0.03	0.13	347.83	0.31	0.40	348.08	0.06	0.15
2183.063	XS-16	120.143	348.162	348.291	348.03	0.13	0.26	348.03	0.13	0.26	347.67	0.49	0.62	348.00	0.16	0.29
2062.92	XS-15	110.719	347.849	348.481	347.67	0.18	0.81	347.67	0.18	0.81	347.27	0.58	1.21	347.55	0.30	0.93
1952.201	XS-14A	118.057	347.853	347.587	347.45	0.40	0.14	347.45	0.40	0.14	347.10	0.75	0.49	347.31	0.54	0.28
1834.144	XS-14	174.668	347.393	347.235	347.19	0.20	0.05	347.19	0.20	0.05	346.89	0.50	0.35	347.11	0.30	0.13
1659.476	XS-13	40.15	347.097	347.022	346.84	0.26	0.18	346.84	0.26	0.18	346.59	0.51	0.43	346.92	0.30	0.10
1619.326	XS-12A	159.66	347.029	346.844	346.74	0.29	0.10	346.74	0.29	0.10	346.55	0.48	0.29	346.87	0.30	-0.03
1459.666	XS-12	210.58	346.592	346.451	346.40	0.19	0.05	346.39	0.20	0.06	346.33	0.26	0.12	346.39	0.30	0.06
1249.086	XS-11	10.026	346.197	345.650	345.89	0.31	-0.24	345.86	0.34	-0.21	345.71	0.49	-0.06	345.86	0.34	-0.21
1239.06	XS-10	6.111	346.231	346.206	345.85	0.38	0.36	345.82	0.41	0.39	345.66	0.57	0.55	345.82	0.41	0.39
1232.949	XS-9	16.127	346.309	346.256	345.84	0.47	0.42	345.81	0.50	0.45	345.65	0.66	0.61	345.81	0.50	0.45
1216.822	XS-8	119.967	346.383	346.198	345.87	0.51	0.33	345.84	0.54	0.36	345.67	0.71	0.53	345.83	0.55	0.37
1096.855	XS-7	54.273	345.747	345.779	345.65	0.10	0.13	345.61	0.14	0.17	345.30	0.45	0.48	345.61	0.14	0.17
1042.582	XS-6F	28.955	348.405	348.956	345.62	2.78	3.34	345.57	2.83	3.39	345.22	3.18	3.74	345.57	2.83	3.39
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.55	3.20	3.46	345.49	3.26	3.52	345.06	3.69	3.95	345.49	3.26	3.52
916.613	XS-6	273.257	345.211	345.602	345.28	-0.07	0.32	345.19	0.02	0.41	344.91	0.30	0.69	345.18	0.03	0.42
643.356	XS-5	95.237	344.914	345.057	344.80	0.11	0.26	344.55	0.36	0.51	344.59	0.32	0.47	344.55	0.36	0.51
548.119	XS-4A	49.649	344.533	344.938	344.63	-0.10	0.31	344.31	0.22	0.63	344.31	0.22	0.63	344.31	0.22	0.63
498.47	XS-4	12.21	N/A	344.964	344.56	N/A	0.40	344.19	N/A	0.77	344.19	N/A	0.77	344.19	N/A	0.77
486.26	XS-3	11.592	N/A	N/A	344.57	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A	344.15	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A	343.81	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.39	N/A	N/A	343.39	N/A	N/A	343.39	N/A	N/A	343.39	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A
0	XS-A	0	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A

Table 1.5: Result Summary – Unsteady Flow Analysis, Lake Level 5

Unsteady Flow Analysis

Q_{200} Peak = **137** m^3/s (Design 200-year Flood Hydrograph including a Factor of 10% for Climate Change based on the 2013 flood event pattern, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

7 m^3/s (Additional flood hydrograph added just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **343** m (200-year Lake Level)

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A	386.97	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A	384.90	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A	383.99	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42	382.99	N/A	1.42
8035.206	XS-57	182.429	N/A	383.450	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24	382.21	N/A	1.24
7938.948	XS-56A	5	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A	381.24	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A	380.81	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77	379.80	N/A	1.77
7669.233	XS-55	184.574	N/A	378.823	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14	377.68	N/A	1.14
7484.659	XS-54	182.123	N/A	377.350	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69	375.66	N/A	1.69
7302.536	XS-53	182.515	N/A	375.593	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85	373.74	N/A	1.85
7120.021	XS-52	150.368	N/A	374.420	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51	371.91	N/A	2.51
6969.653	XS-51A	5	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A	370.89	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A	370.57	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21	370.27	N/A	2.21
6832.859	XS-50	68.693	N/A	372.077	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47	369.61	N/A	2.47
6764.166	XS-49	139.707	N/A	371.229	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97	369.26	N/A	1.97
6624.459	XS-48	130.772	N/A	369.951	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58	368.37	N/A	1.58
6493.687	XS-47	184.488	N/A	368.379	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77	367.61	N/A	0.77
6309.199	XS-46	119.834	N/A	367.502	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21	366.29	N/A	1.21
6189.365	XS-45	137.962	N/A	366.462	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91	365.55	N/A	0.91
6051.403	XS-44	145.372	N/A	365.398	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81	364.59	N/A	0.81
5906.031	XS-43	146.942	N/A	364.307	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73	363.58	N/A	0.73
5759.089	XS-42	115.198	363.462	363.432	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76	362.67	0.79	0.76
5643.891	XS-41A	126.814	362.894	363.245	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38	361.87	1.02	1.38
5517.077	XS-41	162.683	362.049	362.219	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22	361.00	1.05	1.22
5354.394	XS-40A	125.944	361.025	361.171	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23	359.94	1.08	1.23
5228.45	XS-40	83.611	359.972	360.630	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50	359.13	0.84	1.50
5144.839	XS-39A	105.527	359.391	359.923	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30	358.62	0.77	1.30
5039.312	XS-39	63.719	358.900	359.236	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21	358.03	0.87	1.21
4975.593	XS-38	16.199	358.473	358.605	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03	357.57	0.90	1.03
4959.394	XS-37A	77.95	358.457	358.559	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00	357.56	0.90	1.00
4881.444	XS-37	28.894	357.887	358.695	357.21	0.68	1.49	357.21	0.68	1.49	357.18	0.71	1.51	357.21	0.68	1.49
4852.55	XS-36	8.832	N/A	N/A	357.20	N/A	N/A	357.20	N/A	N/A	357.18	N/A	N/A	357.20	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.17	N/A	N/A	357.17	N/A	N/A	357.15	N/A	N/A	357.17	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.72	0.93	0.93	356.72	0.93	0.93	356.66	0.99	0.99	356.72	0.93	0.93

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.46	0.83	1.16	356.46	0.83	1.16	356.25	1.04	1.37	356.46	0.83	1.16
4530.432	XS-33	220.627	356.955	356.992	355.39	1.57	1.60	355.39	1.57	1.60	355.27	1.69	1.72	355.39	1.57	1.60
4309.805	XS-32	116.444	355.457	355.951	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50	354.45	1.01	1.50
4193.361	XS-31B	9.836	355.623	355.589	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32	354.27	1.35	1.32
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.71	1.84	1.54	353.71	1.84	1.54	353.76	1.79	1.49	353.71	1.84	1.54
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.96	2.04	1.98	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.71	1.36	1.29	352.71	1.36	1.29	352.18	1.89	1.82	352.71	1.36	1.29
3656.394	XS-29	168.276	353.135	352.986	351.99	1.14	1.00	351.99	1.14	1.00	351.64	1.50	1.35	351.99	1.14	1.00
3488.118	XS-28	218.359	352.492	351.959	351.42	1.07	0.54	351.42	1.07	0.54	351.30	1.19	0.66	351.42	1.07	0.54
3269.759	XS-27	246.349	N/A	350.824	350.69	N/A	0.13	350.69	N/A	0.13	350.45	N/A	0.37	350.69	N/A	0.13
3023.41	XS-26	213.816	N/A	350.069	350.06	N/A	0.01	350.06	N/A	0.01	349.65	N/A	0.42	350.01	N/A	0.06
2809.594	XS-25	149.047	N/A	349.707	349.67	N/A	0.04	349.67	N/A	0.04	349.34	N/A	0.37	349.53	N/A	0.18
2660.547	XS-24	155.91	N/A	349.525	349.48	N/A	0.04	349.48	N/A	0.04	349.17	N/A	0.35	349.24	N/A	0.28
2504.637	XS-23	166.898	N/A	349.354	348.91	N/A	0.44	348.91	N/A	0.44	348.91	N/A	0.44	348.95	N/A	0.40
2337.739	XS-22	18.5	N/A	350.584	348.53	N/A	2.05	348.53	N/A	2.05	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.48	N/A	N/A	348.48	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.45	N/A	N/A	348.45	N/A	N/A	348.35	N/A	N/A	348.44	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.32	-0.09	1.71	348.32	-0.09	1.71	348.18	0.05	1.85	348.31	-0.08	1.72
2221.357	XS-18	18.518	348.304	348.417	348.15	0.15	0.27	348.15	0.15	0.27	347.91	0.39	0.51	348.13	0.17	0.29
2202.839	XS-17	19.776	348.135	348.228	348.10	0.03	0.13	348.10	0.03	0.13	347.83	0.31	0.40	348.08	0.06	0.15
2183.063	XS-16	120.143	348.162	348.291	348.03	0.13	0.26	348.03	0.13	0.26	347.67	0.49	0.62	348.00	0.16	0.29
2062.92	XS-15	110.719	347.849	348.481	347.67	0.18	0.81	347.67	0.18	0.81	347.27	0.58	1.21	347.55	0.30	0.93
1952.201	XS-14A	118.057	347.853	347.587	347.45	0.40	0.14	347.45	0.40	0.14	347.10	0.75	0.49	347.31	0.54	0.28
1834.144	XS-14	174.668	347.393	347.235	347.19	0.20	0.05	347.19	0.20	0.05	346.89	0.50	0.35	347.11	0.30	0.13
1659.476	XS-13	40.15	347.097	347.022	346.84	0.26	0.18	346.84	0.26	0.18	346.59	0.51	0.43	346.92	0.30	0.10
1619.326	XS-12A	159.66	347.029	346.844	346.74	0.29	0.10	346.74	0.29	0.10	346.55	0.48	0.29	346.87	0.30	-0.03
1459.666	XS-12	210.58	346.592	346.451	346.40	0.19	0.05	346.39	0.20	0.06	346.33	0.26	0.12	346.39	0.30	0.06
1249.086	XS-11	10.026	346.197	345.650	345.89	0.31	-0.24	345.86	0.34	-0.21	345.71	0.49	-0.06	345.86	0.34	-0.21
1239.06	XS-10	6.111	346.231	346.206	345.85	0.38	0.36	345.82	0.41	0.39	345.66	0.57	0.55	345.82	0.41	0.39
1232.949	XS-9	16.127	346.309	346.256	345.84	0.47	0.42	345.81	0.50	0.45	345.65	0.66	0.61	345.81	0.50	0.45
1216.822	XS-8	119.967	346.383	346.198	345.87	0.51	0.33	345.84	0.54	0.36	345.67	0.71	0.53	345.83	0.55	0.37
1096.855	XS-7	54.273	345.747	345.779	345.66	0.09	0.12	345.61	0.14	0.17	345.30	0.45	0.48	345.61	0.14	0.17
1042.582	XS-6F	28.955	348.405	348.956	345.63	2.77	3.33	345.57	2.83	3.39	345.22	3.18	3.74	345.57	2.83	3.39
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.55	3.20	3.46	345.49	3.26	3.52	345.06	3.69	3.95	345.49	3.26	3.52
916.613	XS-6	273.257	345.211	345.602	345.29	-0.08	0.31	345.19	0.02	0.41	344.91	0.30	0.69	345.18	0.03	0.42
643.356	XS-5	95.237	344.914	345.057	344.80	0.11	0.26	344.55	0.36	0.51	344.59	0.32	0.47	344.55	0.36	0.51
548.119	XS-4A	49.649	344.533	344.938	344.64	-0.11	0.30	344.31	0.22	0.63	344.31	0.22	0.63	344.31	0.22	0.63
498.47	XS-4	12.21	N/A	344.964	344.57	N/A	0.39	344.20	N/A	0.76	344.20	N/A	0.76	344.19	N/A	0.77
486.26	XS-3	11.592	N/A	N/A	344.58	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A	344.23	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.15	N/A	N/A	344.16	N/A	N/A	344.16	N/A	N/A	344.15	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.82	N/A	N/A	343.82	N/A	N/A	343.82	N/A	N/A	343.82	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.43	N/A	N/A	343.43	N/A	N/A	343.43	N/A	N/A	343.43	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.15	N/A	N/A	343.15	N/A	N/A	343.15	N/A	N/A	343.15	N/A	N/A
0	XS-A	0	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A

Table 2.1: Result Summary – Steady Flow Analysis, Maximum Instant Flow, Lake Level 1

Steady Flow Analysis

Q_{200} = **137** m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

144 m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.48** m (Full Pool Target Lake Level)

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

			Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
River Station	XS ID	Reach Length	Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33
8035.206	XS-57	182.429	N/A	383.450	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84
7938.948	XS-56A	5	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83
7669.233	XS-55	184.574	N/A	378.823	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10
7484.659	XS-54	182.123	N/A	377.350	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75
7302.536	XS-53	182.515	N/A	375.593	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83
7120.021	XS-52	150.368	N/A	374.420	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56
6969.653	XS-51A	5	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28
6832.859	XS-50	68.693	N/A	372.077	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45
6764.166	XS-49	139.707	N/A	371.229	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93
6624.459	XS-48	130.772	N/A	369.951	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61
6493.687	XS-47	184.488	N/A	368.379	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71
6309.199	XS-46	119.834	N/A	367.502	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23
6189.365	XS-45	137.962	N/A	366.462	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88
6051.403	XS-44	145.372	N/A	365.398	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74
5906.031	XS-43	146.942	N/A	364.307	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77
5759.089	XS-42	115.198	363.462	363.432	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71
5643.891	XS-41A	126.814	362.894	363.245	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36
5517.077	XS-41	162.683	362.049	362.219	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20
5354.394	XS-40A	125.944	361.025	361.171	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21
5228.45	XS-40	83.611	359.972	360.630	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48
5144.839	XS-39A	105.527	359.391	359.923	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29
5039.312	XS-39	63.719	358.900	359.236	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18
4975.593	XS-38	16.199	358.473	358.605	357.56	0.91	1.04	357.56	0.91	1.04	357.57	0.90	1.03	357.56	0.91	1.04
4959.394	XS-37A	77.95	358.457	358.559	357.58	0.88	0.98	357.58	0.88	0.98	357.59	0.87	0.97	357.58	0.88	0.98
4881.444	XS-37	28.894	357.887	358.695	357.23	0.66	1.46	357.23	0.66	1.46	357.26	0.63	1.44	357.23	0.66	1.46
4852.55	XS-36	8.832	N/A	N/A	357.25	N/A	N/A	357.25	N/A	N/A	357.29	N/A	N/A	357.25	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.21	N/A	N/A	357.21	N/A	N/A	357.25	N/A	N/A	357.21	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.75	0.90	0.90	356.75	0.90	0.90	356.85	0.80	0.80	356.75	0.90	0.90

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.45	0.84	1.17	356.45	0.84	1.17	356.14	1.15	1.48	356.45	0.84	1.17
4530.432	XS-33	220.627	356.955	356.992	355.44	1.51	1.55	355.44	1.51	1.55	355.20	1.76	1.79	355.44	1.51	1.55
4309.805	XS-32	116.444	355.457	355.951	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61
4193.361	XS-31B	9.836	355.623	355.589	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.72	1.83	1.53	353.72	1.83	1.53	353.77	1.78	1.48	353.72	1.83	1.53
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.84	2.16	2.10	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.74	1.33	1.26	352.74	1.33	1.26	352.19	1.88	1.81	352.74	1.33	1.26
3656.394	XS-29	168.276	353.135	352.986	352.00	1.13	0.99	352.00	1.13	0.99	351.63	1.51	1.36	352.00	1.13	0.99
3488.118	XS-28	218.359	352.492	351.959	351.39	1.10	0.57	351.39	1.10	0.57	351.29	1.20	0.67	351.39	1.10	0.57
3269.759	XS-27	246.349	N/A	350.824	350.70	N/A	0.12	350.70	N/A	0.12	350.37	N/A	0.45	350.70	N/A	0.12
3023.41	XS-26	213.816	N/A	350.069	350.03	N/A	0.04	350.03	N/A	0.04	349.64	N/A	0.43	350.03	N/A	0.04
2809.594	XS-25	149.047	N/A	349.707	349.58	N/A	0.13	349.58	N/A	0.13	349.40	N/A	0.31	349.58	N/A	0.13
2660.547	XS-24	155.91	N/A	349.525	349.28	N/A	0.25	349.28	N/A	0.25	349.21	N/A	0.31	349.27	N/A	0.25
2504.637	XS-23	166.898	N/A	349.354	349.00	N/A	0.35	349.00	N/A	0.35	348.97	N/A	0.38	348.99	N/A	0.36
2337.739	XS-22	18.5	N/A	350.584	348.54	N/A	2.04	348.54	N/A	2.04	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.53	N/A	N/A	348.53	N/A	N/A	348.43	N/A	N/A	348.51	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.49	N/A	N/A	348.49	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.36	-0.13	1.67	348.36	-0.13	1.67	348.22	0.01	1.81	348.33	-0.10	1.70
2221.357	XS-18	18.518	348.304	348.417	348.19	0.11	0.23	348.19	0.11	0.23	347.93	0.37	0.49	348.14	0.16	0.28
2202.839	XS-17	19.776	348.135	348.228	348.14	0.00	0.09	348.14	0.00	0.09	347.84	0.30	0.39	348.09	0.05	0.14
2183.063	XS-16	120.143	348.162	348.291	348.07	0.09	0.22	348.07	0.09	0.22	347.65	0.51	0.64	348.02	0.14	0.27
2062.92	XS-15	110.719	347.849	348.481	347.71	0.14	0.77	347.71	0.14	0.77	347.31	0.54	1.17	347.58	0.27	0.90
1952.201	XS-14A	118.057	347.853	347.587	347.49	0.36	0.10	347.49	0.36	0.10	347.13	0.72	0.46	347.34	0.51	0.25
1834.144	XS-14	174.668	347.393	347.235	347.24	0.15	0.00	347.24	0.15	0.00	346.92	0.47	0.31	347.16	0.30	0.07
1659.476	XS-13	40.15	347.097	347.022	346.89	0.21	0.13	346.89	0.21	0.13	346.62	0.48	0.40	347.00	0.30	0.02
1619.326	XS-12A	159.66	347.029	346.844	346.79	0.24	0.05	346.78	0.25	0.06	346.58	0.45	0.26	346.93	0.30	-0.09
1459.666	XS-12	210.58	346.592	346.451	346.45	0.14	0.00	346.44	0.15	0.01	346.35	0.24	0.10	346.45	0.30	0.00
1249.086	XS-11	10.026	346.197	345.650	345.90	0.30	-0.25	345.87	0.33	-0.22	345.73	0.47	-0.08	345.87	0.33	-0.22
1239.06	XS-10	6.111	346.231	346.206	345.87	0.36	0.34	345.83	0.40	0.38	345.69	0.54	0.52	345.83	0.40	0.38
1232.949	XS-9	16.127	346.309	346.256	345.86	0.45	0.40	345.83	0.48	0.43	345.68	0.63	0.58	345.83	0.48	0.43
1216.822	XS-8	119.967	346.383	346.198	345.89	0.49	0.31	345.85	0.53	0.35	345.70	0.68	0.50	345.85	0.53	0.35
1096.855	XS-7	54.273	345.747	345.779	345.67	0.08	0.11	345.62	0.13	0.16	345.31	0.44	0.47	345.62	0.13	0.16
1042.582	XS-6F	28.955	348.405	348.956	345.65	2.76	3.31	345.59	2.82	3.37	345.24	3.16	3.72	345.59	2.82	3.37
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.59	3.16	3.42	345.53	3.22	3.48	345.12	3.63	3.89	345.53	3.22	3.48
916.613	XS-6	273.257	345.211	345.602	345.34	-0.13	0.26	345.24	-0.03	0.36	344.98	0.23	0.62	345.24	-0.03	0.36
643.356	XS-5	95.237	344.914	345.057	344.87	0.04	0.19	344.63	0.28	0.43	344.66	0.25	0.40	344.63	0.28	0.43
548.119	XS-4A	49.649	344.533	344.938	344.70	-0.17	0.24	344.39	0.14	0.55	344.39	0.14	0.55	344.39	0.14	0.55
498.47	XS-4	12.21	N/A	344.964	344.65	N/A	0.31	344.30	N/A	0.66	344.30	N/A	0.66	344.30	N/A	0.66
486.26	XS-3	11.592	N/A	N/A	344.65	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.44	N/A	N/A	343.44	N/A	N/A	343.44	N/A	N/A	343.44	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A
0	XS-A	0	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A

Table 2.2: Result Summary – Steady Flow Analysis, Maximum Instant Flow, Lake Level 2

Steady Flow Analysis

Q_{200} = **137** m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

144 m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.61** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33
8035.206	XS-57	182.429	N/A	383.450	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84
7938.948	XS-56A	5	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83
7669.233	XS-55	184.574	N/A	378.823	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10
7484.659	XS-54	182.123	N/A	377.350	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75
7302.536	XS-53	182.515	N/A	375.593	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83
7120.021	XS-52	150.368	N/A	374.420	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56
6969.653	XS-51A	5	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28
6832.859	XS-50	68.693	N/A	372.077	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45
6764.166	XS-49	139.707	N/A	371.229	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93
6624.459	XS-48	130.772	N/A	369.951	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61
6493.687	XS-47	184.488	N/A	368.379	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71
6309.199	XS-46	119.834	N/A	367.502	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23
6189.365	XS-45	137.962	N/A	366.462	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88
6051.403	XS-44	145.372	N/A	365.398	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74
5906.031	XS-43	146.942	N/A	364.307	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77
5759.089	XS-42	115.198	363.462	363.432	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71
5643.891	XS-41A	126.814	362.894	363.245	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36
5517.077	XS-41	162.683	362.049	362.219	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20
5354.394	XS-40A	125.944	361.025	361.171	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21
5228.45	XS-40	83.611	359.972	360.630	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48
5144.839	XS-39A	105.527	359.391	359.923	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29
5039.312	XS-39	63.719	358.900	359.236	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18
4975.593	XS-38	16.199	358.473	358.605	357.56	0.91	1.04	357.56	0.91	1.04	357.57	0.90	1.03	357.56	0.91	1.04
4959.394	XS-37A	77.95	358.457	358.559	357.58	0.88	0.98	357.58	0.88	0.98	357.59	0.87	0.97	357.58	0.88	0.98
4881.444	XS-37	28.894	357.887	358.695	357.23	0.66	1.46	357.23	0.66	1.46	357.26	0.63	1.44	357.23	0.66	1.46
4852.55	XS-36	8.832	N/A	N/A	357.25	N/A	N/A	357.25	N/A	N/A	357.29	N/A	N/A	357.25	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.21	N/A	N/A	357.21	N/A	N/A	357.25	N/A	N/A	357.21	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.75	0.90	0.90	356.75	0.90	0.90	356.85	0.80	0.80	356.75	0.90	0.90

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.45	0.84	1.17	356.45	0.84	1.17	356.14	1.15	1.48	356.45	0.84	1.17
4530.432	XS-33	220.627	356.955	356.992	355.44	1.51	1.55	355.44	1.51	1.55	355.20	1.76	1.79	355.44	1.51	1.55
4309.805	XS-32	116.444	355.457	355.951	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61
4193.361	XS-31B	9.836	355.623	355.589	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.72	1.83	1.53	353.72	1.83	1.53	353.77	1.78	1.48	353.72	1.83	1.53
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.84	2.16	2.10	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.74	1.33	1.26	352.74	1.33	1.26	352.19	1.88	1.81	352.74	1.33	1.26
3656.394	XS-29	168.276	353.135	352.986	352.00	1.13	0.99	352.00	1.13	0.99	351.63	1.51	1.36	352.00	1.13	0.99
3488.118	XS-28	218.359	352.492	351.959	351.39	1.10	0.57	351.39	1.10	0.57	351.29	1.20	0.67	351.39	1.10	0.57
3269.759	XS-27	246.349	N/A	350.824	350.70	N/A	0.12	350.70	N/A	0.12	350.37	N/A	0.45	350.70	N/A	0.12
3023.41	XS-26	213.816	N/A	350.069	350.03	N/A	0.04	350.03	N/A	0.04	349.64	N/A	0.43	350.03	N/A	0.04
2809.594	XS-25	149.047	N/A	349.707	349.58	N/A	0.13	349.58	N/A	0.13	349.40	N/A	0.31	349.58	N/A	0.13
2660.547	XS-24	155.91	N/A	349.525	349.28	N/A	0.25	349.28	N/A	0.25	349.21	N/A	0.31	349.27	N/A	0.25
2504.637	XS-23	166.898	N/A	349.354	349.00	N/A	0.35	349.00	N/A	0.35	348.97	N/A	0.38	348.99	N/A	0.36
2337.739	XS-22	18.5	N/A	350.584	348.54	N/A	2.04	348.54	N/A	2.04	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.53	N/A	N/A	348.53	N/A	N/A	348.43	N/A	N/A	348.51	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.49	N/A	N/A	348.49	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.36	-0.13	1.67	348.36	-0.13	1.67	348.22	0.01	1.81	348.33	-0.10	1.70
2221.357	XS-18	18.518	348.304	348.417	348.19	0.11	0.23	348.19	0.11	0.23	347.93	0.37	0.49	348.14	0.16	0.28
2202.839	XS-17	19.776	348.135	348.228	348.14	0.00	0.09	348.14	0.00	0.09	347.84	0.30	0.39	348.09	0.05	0.14
2183.063	XS-16	120.143	348.162	348.291	348.07	0.09	0.22	348.07	0.09	0.22	347.65	0.51	0.64	348.02	0.14	0.27
2062.92	XS-15	110.719	347.849	348.481	347.71	0.14	0.77	347.71	0.14	0.77	347.31	0.54	1.17	347.58	0.27	0.90
1952.201	XS-14A	118.057	347.853	347.587	347.49	0.36	0.10	347.49	0.36	0.10	347.13	0.72	0.46	347.34	0.51	0.25
1834.144	XS-14	174.668	347.393	347.235	347.24	0.15	0.00	347.24	0.15	0.00	346.92	0.47	0.31	347.16	0.30	0.07
1659.476	XS-13	40.15	347.097	347.022	346.89	0.21	0.13	346.89	0.21	0.13	346.62	0.48	0.40	347.00	0.30	0.02
1619.326	XS-12A	159.66	347.029	346.844	346.79	0.24	0.05	346.78	0.25	0.06	346.58	0.45	0.26	346.93	0.30	-0.09
1459.666	XS-12	210.58	346.592	346.451	346.45	0.14	0.00	346.44	0.15	0.01	346.35	0.24	0.10	346.45	0.30	0.00
1249.086	XS-11	10.026	346.197	345.650	345.90	0.30	-0.25	345.87	0.33	-0.22	345.73	0.47	-0.08	345.87	0.33	-0.22
1239.06	XS-10	6.111	346.231	346.206	345.87	0.36	0.34	345.83	0.40	0.38	345.69	0.54	0.52	345.83	0.40	0.38
1232.949	XS-9	16.127	346.309	346.256	345.86	0.45	0.40	345.83	0.48	0.43	345.68	0.63	0.58	345.83	0.48	0.43
1216.822	XS-8	119.967	346.383	346.198	345.88	0.50	0.32	345.85	0.53	0.35	345.70	0.68	0.50	345.85	0.53	0.35
1096.855	XS-7	54.273	345.747	345.779	345.67	0.08	0.11	345.62	0.13	0.16	345.31	0.44	0.47	345.62	0.13	0.16
1042.582	XS-6F	28.955	348.405	348.956	345.65	2.76	3.31	345.59	2.82	3.37	345.24	3.16	3.72	345.59	2.82	3.37
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.59	3.16	3.42	345.53	3.22	3.48	345.12	3.63	3.89	345.53	3.22	3.48
916.613	XS-6	273.257	345.211	345.602	345.34	-0.13	0.26	345.24	-0.03	0.36	344.97	0.24	0.63	345.24	-0.03	0.36
643.356	XS-5	95.237	344.914	345.057	344.87	0.04	0.19	344.63	0.28	0.43	344.66	0.25	0.40	344.63	0.28	0.43
548.119	XS-4A	49.649	344.533	344.938	344.70	-0.17	0.24	344.39	0.14	0.55	344.39	0.14	0.55	344.39	0.14	0.55
498.47	XS-4	12.21	N/A	344.964	344.64	N/A	0.32	344.29	N/A	0.67	344.29	N/A	0.67	344.29	N/A	0.67
486.26	XS-3	11.592	N/A	N/A	344.65	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A
0	XS-A	0	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A

Table 2.3: Result Summary – Steady Flow Analysis, Maximum Instant Flow, Lake Level 3

Steady Flow Analysis

Q_{200} = **137** m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

144 m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.74** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33
8035.206	XS-57	182.429	N/A	383.450	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84
7938.948	XS-56A	5	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83
7669.233	XS-55	184.574	N/A	378.823	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10
7484.659	XS-54	182.123	N/A	377.350	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75
7302.536	XS-53	182.515	N/A	375.593	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83
7120.021	XS-52	150.368	N/A	374.420	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56
6969.653	XS-51A	5	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28
6832.859	XS-50	68.693	N/A	372.077	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45
6764.166	XS-49	139.707	N/A	371.229	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93
6624.459	XS-48	130.772	N/A	369.951	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61
6493.687	XS-47	184.488	N/A	368.379	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71
6309.199	XS-46	119.834	N/A	367.502	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23
6189.365	XS-45	137.962	N/A	366.462	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88
6051.403	XS-44	145.372	N/A	365.398	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74
5906.031	XS-43	146.942	N/A	364.307	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77
5759.089	XS-42	115.198	363.462	363.432	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71
5643.891	XS-41A	126.814	362.894	363.245	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36
5517.077	XS-41	162.683	362.049	362.219	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20
5354.394	XS-40A	125.944	361.025	361.171	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21
5228.45	XS-40	83.611	359.972	360.630	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48
5144.839	XS-39A	105.527	359.391	359.923	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29
5039.312	XS-39	63.719	358.900	359.236	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18
4975.593	XS-38	16.199	358.473	358.605	357.56	0.91	1.04	357.56	0.91	1.04	357.57	0.90	1.03	357.56	0.91	1.04
4959.394	XS-37A	77.95	358.457	358.559	357.58	0.88	0.98	357.58	0.88	0.98	357.59	0.87	0.97	357.58	0.88	0.98
4881.444	XS-37	28.894	357.887	358.695	357.23	0.66	1.46	357.23	0.66	1.46	357.26	0.63	1.44	357.23	0.66	1.46
4852.55	XS-36	8.832	N/A	N/A	357.25	N/A	N/A	357.25	N/A	N/A	357.29	N/A	N/A	357.25	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.21	N/A	N/A	357.21	N/A	N/A	357.25	N/A	N/A	357.21	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.75	0.90	0.90	356.75	0.90	0.90	356.85	0.80	0.80	356.75	0.90	0.90

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.45	0.84	1.17	356.45	0.84	1.17	356.14	1.15	1.48	356.45	0.84	1.17
4530.432	XS-33	220.627	356.955	356.992	355.44	1.51	1.55	355.44	1.51	1.55	355.20	1.76	1.79	355.44	1.51	1.55
4309.805	XS-32	116.444	355.457	355.951	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61
4193.361	XS-31B	9.836	355.623	355.589	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.72	1.83	1.53	353.72	1.83	1.53	353.77	1.78	1.48	353.72	1.83	1.53
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.84	2.16	2.10	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.74	1.33	1.26	352.74	1.33	1.26	352.19	1.88	1.81	352.74	1.33	1.26
3656.394	XS-29	168.276	353.135	352.986	352.00	1.13	0.99	352.00	1.13	0.99	351.63	1.51	1.36	352.00	1.13	0.99
3488.118	XS-28	218.359	352.492	351.959	351.39	1.10	0.57	351.39	1.10	0.57	351.29	1.20	0.67	351.39	1.10	0.57
3269.759	XS-27	246.349	N/A	350.824	350.70	N/A	0.12	350.70	N/A	0.12	350.37	N/A	0.45	350.70	N/A	0.12
3023.41	XS-26	213.816	N/A	350.069	350.03	N/A	0.04	350.03	N/A	0.04	349.64	N/A	0.43	350.03	N/A	0.04
2809.594	XS-25	149.047	N/A	349.707	349.58	N/A	0.13	349.58	N/A	0.13	349.40	N/A	0.31	349.58	N/A	0.13
2660.547	XS-24	155.91	N/A	349.525	349.28	N/A	0.25	349.28	N/A	0.25	349.21	N/A	0.31	349.27	N/A	0.25
2504.637	XS-23	166.898	N/A	349.354	349.00	N/A	0.35	349.00	N/A	0.35	348.97	N/A	0.38	348.99	N/A	0.36
2337.739	XS-22	18.5	N/A	350.584	348.54	N/A	2.04	348.54	N/A	2.04	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.53	N/A	N/A	348.53	N/A	N/A	348.43	N/A	N/A	348.51	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.49	N/A	N/A	348.49	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.36	-0.13	1.67	348.36	-0.13	1.67	348.22	0.01	1.81	348.33	-0.10	1.70
2221.357	XS-18	18.518	348.304	348.417	348.19	0.11	0.23	348.19	0.11	0.23	347.93	0.37	0.49	348.14	0.16	0.28
2202.839	XS-17	19.776	348.135	348.228	348.14	0.00	0.09	348.14	0.00	0.09	347.84	0.30	0.39	348.09	0.05	0.14
2183.063	XS-16	120.143	348.162	348.291	348.07	0.09	0.22	348.07	0.09	0.22	347.65	0.51	0.64	348.02	0.14	0.27
2062.92	XS-15	110.719	347.849	348.481	347.71	0.14	0.77	347.71	0.14	0.77	347.31	0.54	1.17	347.58	0.27	0.90
1952.201	XS-14A	118.057	347.853	347.587	347.49	0.36	0.10	347.49	0.36	0.10	347.13	0.72	0.46	347.34	0.51	0.25
1834.144	XS-14	174.668	347.393	347.235	347.24	0.15	0.00	347.24	0.15	0.00	346.92	0.47	0.31	347.16	0.30	0.07
1659.476	XS-13	40.15	347.097	347.022	346.89	0.21	0.13	346.89	0.21	0.13	346.62	0.48	0.40	347.00	0.30	0.02
1619.326	XS-12A	159.66	347.029	346.844	346.79	0.24	0.05	346.78	0.25	0.06	346.58	0.45	0.26	346.93	0.30	-0.09
1459.666	XS-12	210.58	346.592	346.451	346.45	0.14	0.00	346.44	0.15	0.01	346.35	0.24	0.10	346.45	0.30	0.00
1249.086	XS-11	10.026	346.197	345.650	345.90	0.30	-0.25	345.87	0.33	-0.22	345.73	0.47	-0.08	345.87	0.33	-0.22
1239.06	XS-10	6.111	346.231	346.206	345.87	0.36	0.34	345.83	0.40	0.38	345.69	0.54	0.52	345.83	0.40	0.38
1232.949	XS-9	16.127	346.309	346.256	345.86	0.45	0.40	345.83	0.48	0.43	345.68	0.63	0.58	345.83	0.48	0.43
1216.822	XS-8	119.967	346.383	346.198	345.88	0.50	0.32	345.85	0.53	0.35	345.70	0.68	0.50	345.85	0.53	0.35
1096.855	XS-7	54.273	345.747	345.779	345.67	0.08	0.11	345.62	0.13	0.16	345.31	0.44	0.47	345.62	0.13	0.16
1042.582	XS-6F	28.955	348.405	348.956	345.65	2.76	3.31	345.59	2.82	3.37	345.24	3.16	3.72	345.59	2.82	3.37
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.59	3.16	3.42	345.53	3.22	3.48	345.12	3.63	3.89	345.53	3.22	3.48
916.613	XS-6	273.257	345.211	345.602	345.34	-0.13	0.26	345.24	-0.03	0.36	344.97	0.24	0.63	345.24	-0.03	0.36
643.356	XS-5	95.237	344.914	345.057	344.87	0.04	0.19	344.63	0.28	0.43	344.66	0.25	0.40	344.63	0.28	0.43
548.119	XS-4A	49.649	344.533	344.938	344.70	-0.17	0.24	344.39	0.14	0.55	344.39	0.14	0.55	344.39	0.14	0.55
498.47	XS-4	12.21	N/A	344.964	344.64	N/A	0.32	344.29	N/A	0.67	344.29	N/A	0.67	344.29	N/A	0.67
486.26	XS-3	11.592	N/A	N/A	344.65	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.84	N/A	N/A	343.84	N/A	N/A	343.84	N/A	N/A	343.84	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.08	N/A	N/A	343.08	N/A	N/A	343.08	N/A	N/A	343.08	N/A	N/A
0	XS-A	0	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A

Table 2.4: Result Summary – Steady Flow Analysis, Maximum Instant Flow, Lake Level 4

Steady Flow Analysis

Q_{200} = **137** m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

144 m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.87** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33
8035.206	XS-57	182.429	N/A	383.450	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84
7938.948	XS-56A	5	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83
7669.233	XS-55	184.574	N/A	378.823	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10
7484.659	XS-54	182.123	N/A	377.350	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75
7302.536	XS-53	182.515	N/A	375.593	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83
7120.021	XS-52	150.368	N/A	374.420	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56
6969.653	XS-51A	5	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28
6832.859	XS-50	68.693	N/A	372.077	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45
6764.166	XS-49	139.707	N/A	371.229	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93
6624.459	XS-48	130.772	N/A	369.951	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61
6493.687	XS-47	184.488	N/A	368.379	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71
6309.199	XS-46	119.834	N/A	367.502	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23
6189.365	XS-45	137.962	N/A	366.462	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88
6051.403	XS-44	145.372	N/A	365.398	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74
5906.031	XS-43	146.942	N/A	364.307	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77
5759.089	XS-42	115.198	363.462	363.432	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71
5643.891	XS-41A	126.814	362.894	363.245	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36
5517.077	XS-41	162.683	362.049	362.219	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20
5354.394	XS-40A	125.944	361.025	361.171	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21
5228.45	XS-40	83.611	359.972	360.630	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48
5144.839	XS-39A	105.527	359.391	359.923	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29
5039.312	XS-39	63.719	358.900	359.236	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18
4975.593	XS-38	16.199	358.473	358.605	357.56	0.91	1.04	357.56	0.91	1.04	357.57	0.90	1.03	357.56	0.91	1.04
4959.394	XS-37A	77.95	358.457	358.559	357.58	0.88	0.98	357.58	0.88	0.98	357.59	0.87	0.97	357.58	0.88	0.98
4881.444	XS-37	28.894	357.887	358.695	357.23	0.66	1.46	357.23	0.66	1.46	357.26	0.63	1.44	357.23	0.66	1.46
4852.55	XS-36	8.832	N/A	N/A	357.25	N/A	N/A	357.25	N/A	N/A	357.29	N/A	N/A	357.25	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.21	N/A	N/A	357.21	N/A	N/A	357.25	N/A	N/A	357.21	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.75	0.90	0.90	356.75	0.90	0.90	356.85	0.80	0.80	356.75	0.90	0.90

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.45	0.84	1.17	356.45	0.84	1.17	356.14	1.15	1.48	356.45	0.84	1.17
4530.432	XS-33	220.627	356.955	356.992	355.44	1.51	1.55	355.44	1.51	1.55	355.20	1.76	1.79	355.44	1.51	1.55
4309.805	XS-32	116.444	355.457	355.951	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61
4193.361	XS-31B	9.836	355.623	355.589	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.72	1.83	1.53	353.72	1.83	1.53	353.77	1.78	1.48	353.72	1.83	1.53
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.84	2.16	2.10	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.74	1.33	1.26	352.74	1.33	1.26	352.19	1.88	1.81	352.74	1.33	1.26
3656.394	XS-29	168.276	353.135	352.986	352.00	1.13	0.99	352.00	1.13	0.99	351.63	1.51	1.36	352.00	1.13	0.99
3488.118	XS-28	218.359	352.492	351.959	351.39	1.10	0.57	351.39	1.10	0.57	351.29	1.20	0.67	351.39	1.10	0.57
3269.759	XS-27	246.349	N/A	350.824	350.70	N/A	0.12	350.70	N/A	0.12	350.37	N/A	0.45	350.70	N/A	0.12
3023.41	XS-26	213.816	N/A	350.069	350.03	N/A	0.04	350.03	N/A	0.04	349.64	N/A	0.43	350.03	N/A	0.04
2809.594	XS-25	149.047	N/A	349.707	349.58	N/A	0.13	349.58	N/A	0.13	349.40	N/A	0.31	349.58	N/A	0.13
2660.547	XS-24	155.91	N/A	349.525	349.28	N/A	0.25	349.28	N/A	0.25	349.21	N/A	0.31	349.27	N/A	0.25
2504.637	XS-23	166.898	N/A	349.354	349.00	N/A	0.35	349.00	N/A	0.35	348.97	N/A	0.38	348.99	N/A	0.36
2337.739	XS-22	18.5	N/A	350.584	348.54	N/A	2.04	348.54	N/A	2.04	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.53	N/A	N/A	348.53	N/A	N/A	348.43	N/A	N/A	348.51	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.49	N/A	N/A	348.49	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.36	-0.13	1.67	348.36	-0.13	1.67	348.22	0.01	1.81	348.33	-0.10	1.70
2221.357	XS-18	18.518	348.304	348.417	348.19	0.11	0.23	348.19	0.11	0.23	347.93	0.37	0.49	348.14	0.16	0.28
2202.839	XS-17	19.776	348.135	348.228	348.14	0.00	0.09	348.14	0.00	0.09	347.84	0.30	0.39	348.09	0.05	0.14
2183.063	XS-16	120.143	348.162	348.291	348.07	0.09	0.22	348.07	0.09	0.22	347.65	0.51	0.64	348.02	0.14	0.27
2062.92	XS-15	110.719	347.849	348.481	347.71	0.14	0.77	347.71	0.14	0.77	347.31	0.54	1.17	347.58	0.27	0.90
1952.201	XS-14A	118.057	347.853	347.587	347.49	0.36	0.10	347.49	0.36	0.10	347.13	0.72	0.46	347.34	0.51	0.25
1834.144	XS-14	174.668	347.393	347.235	347.24	0.15	0.00	347.24	0.15	0.00	346.92	0.47	0.31	347.16	0.30	0.07
1659.476	XS-13	40.15	347.097	347.022	346.89	0.21	0.13	346.89	0.21	0.13	346.62	0.48	0.40	347.00	0.30	0.02
1619.326	XS-12A	159.66	347.029	346.844	346.79	0.24	0.05	346.78	0.25	0.06	346.58	0.45	0.26	346.93	0.30	-0.09
1459.666	XS-12	210.58	346.592	346.451	346.45	0.14	0.00	346.44	0.15	0.01	346.35	0.24	0.10	346.45	0.30	0.00
1249.086	XS-11	10.026	346.197	345.650	345.90	0.30	-0.25	345.87	0.33	-0.22	345.73	0.47	-0.08	345.87	0.33	-0.22
1239.06	XS-10	6.111	346.231	346.206	345.87	0.36	0.34	345.83	0.40	0.38	345.69	0.54	0.52	345.83	0.40	0.38
1232.949	XS-9	16.127	346.309	346.256	345.86	0.45	0.40	345.83	0.48	0.43	345.68	0.63	0.58	345.83	0.48	0.43
1216.822	XS-8	119.967	346.383	346.198	345.88	0.50	0.32	345.85	0.53	0.35	345.70	0.68	0.50	345.85	0.53	0.35
1096.855	XS-7	54.273	345.747	345.779	345.67	0.08	0.11	345.62	0.13	0.16	345.31	0.44	0.47	345.62	0.13	0.16
1042.582	XS-6F	28.955	348.405	348.956	345.65	2.76	3.31	345.59	2.82	3.37	345.24	3.16	3.72	345.59	2.82	3.37
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.59	3.16	3.42	345.53	3.22	3.48	345.12	3.63	3.89	345.53	3.22	3.48
916.613	XS-6	273.257	345.211	345.602	345.34	-0.13	0.26	345.24	-0.03	0.36	344.97	0.24	0.63	345.24	-0.03	0.36
643.356	XS-5	95.237	344.914	345.057	344.87	0.04	0.19	344.63	0.28	0.43	344.66	0.25	0.40	344.63	0.28	0.43
548.119	XS-4A	49.649	344.533	344.938	344.70	-0.17	0.24	344.39	0.14	0.55	344.39	0.14	0.55	344.39	0.14	0.55
498.47	XS-4	12.21	N/A	344.964	344.64	N/A	0.32	344.29	N/A	0.67	344.29	N/A	0.67	344.29	N/A	0.67
486.26	XS-3	11.592	N/A	N/A	344.65	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A	344.28	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A	343.42	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A	343.10	N/A	N/A
0	XS-A	0	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A

Table 2.5: Result Summary – Steady Flow Analysis, Maximum Instant Flow, Lake Level 5

Steady Flow Analysis

Q_{200} = **137** m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

144 m^3/s (Design Max Instant 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **343** m (200-year Lake Level)

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A	387.07	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A	384.79	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A	384.14	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33	383.08	N/A	1.33
8035.206	XS-57	182.429	N/A	383.450	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84	381.61	N/A	1.84
7938.948	XS-56A	5	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A	381.23	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A	380.89	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83	379.74	N/A	1.83
7669.233	XS-55	184.574	N/A	378.823	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10	377.72	N/A	1.10
7484.659	XS-54	182.123	N/A	377.350	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75	375.60	N/A	1.75
7302.536	XS-53	182.515	N/A	375.593	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83	373.76	N/A	1.83
7120.021	XS-52	150.368	N/A	374.420	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56	371.86	N/A	2.56
6969.653	XS-51A	5	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A	370.90	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A	370.56	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28	370.20	N/A	2.28
6832.859	XS-50	68.693	N/A	372.077	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45	369.63	N/A	2.45
6764.166	XS-49	139.707	N/A	371.229	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93	369.30	N/A	1.93
6624.459	XS-48	130.772	N/A	369.951	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61	368.34	N/A	1.61
6493.687	XS-47	184.488	N/A	368.379	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71	367.67	N/A	0.71
6309.199	XS-46	119.834	N/A	367.502	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23	366.27	N/A	1.23
6189.365	XS-45	137.962	N/A	366.462	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88	365.58	N/A	0.88
6051.403	XS-44	145.372	N/A	365.398	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74	364.66	N/A	0.74
5906.031	XS-43	146.942	N/A	364.307	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77	363.54	N/A	0.77
5759.089	XS-42	115.198	363.462	363.432	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71	362.72	0.74	0.71
5643.891	XS-41A	126.814	362.894	363.245	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36	361.89	1.00	1.36
5517.077	XS-41	162.683	362.049	362.219	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20	361.02	1.03	1.20
5354.394	XS-40A	125.944	361.025	361.171	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21	359.96	1.07	1.21
5228.45	XS-40	83.611	359.972	360.630	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48	359.15	0.82	1.48
5144.839	XS-39A	105.527	359.391	359.923	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29	358.63	0.76	1.29
5039.312	XS-39	63.719	358.900	359.236	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18	358.06	0.84	1.18
4975.593	XS-38	16.199	358.473	358.605	357.56	0.91	1.04	357.56	0.91	1.04	357.57	0.90	1.03	357.56	0.91	1.04
4959.394	XS-37A	77.95	358.457	358.559	357.58	0.88	0.98	357.58	0.88	0.98	357.59	0.87	0.97	357.58	0.88	0.98
4881.444	XS-37	28.894	357.887	358.695	357.23	0.66	1.46	357.23	0.66	1.46	357.26	0.63	1.44	357.23	0.66	1.46
4852.55	XS-36	8.832	N/A	N/A	357.25	N/A	N/A	357.25	N/A	N/A	357.29	N/A	N/A	357.25	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	357.21	N/A	N/A	357.21	N/A	N/A	357.25	N/A	N/A	357.21	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.75	0.90	0.90	356.75	0.90	0.90	356.85	0.80	0.80	356.75	0.90	0.90

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.45	0.84	1.17	356.45	0.84	1.17	356.14	1.15	1.48	356.45	0.84	1.17
4530.432	XS-33	220.627	356.955	356.992	355.44	1.51	1.55	355.44	1.51	1.55	355.20	1.76	1.79	355.44	1.51	1.55
4309.805	XS-32	116.444	355.457	355.951	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61	354.34	1.12	1.61
4193.361	XS-31B	9.836	355.623	355.589	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30	354.29	1.33	1.30
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.72	1.83	1.53	353.72	1.83	1.53	353.77	1.78	1.48	353.72	1.83	1.53
4061.767	XS-31	198.649	354.995	354.935	353.26	1.74	1.68	353.26	1.74	1.68	352.84	2.16	2.10	353.26	1.74	1.68
3863.118	XS-30	206.724	354.070	353.997	352.74	1.33	1.26	352.74	1.33	1.26	352.19	1.88	1.81	352.74	1.33	1.26
3656.394	XS-29	168.276	353.135	352.986	352.00	1.13	0.99	352.00	1.13	0.99	351.63	1.51	1.36	352.00	1.13	0.99
3488.118	XS-28	218.359	352.492	351.959	351.39	1.10	0.57	351.39	1.10	0.57	351.29	1.20	0.67	351.39	1.10	0.57
3269.759	XS-27	246.349	N/A	350.824	350.70	N/A	0.12	350.70	N/A	0.12	350.37	N/A	0.45	350.70	N/A	0.12
3023.41	XS-26	213.816	N/A	350.069	350.03	N/A	0.04	350.03	N/A	0.04	349.64	N/A	0.43	350.03	N/A	0.04
2809.594	XS-25	149.047	N/A	349.707	349.58	N/A	0.13	349.58	N/A	0.13	349.40	N/A	0.31	349.58	N/A	0.13
2660.547	XS-24	155.91	N/A	349.525	349.28	N/A	0.25	349.28	N/A	0.25	349.21	N/A	0.31	349.27	N/A	0.25
2504.637	XS-23	166.898	N/A	349.354	349.00	N/A	0.35	349.00	N/A	0.35	348.97	N/A	0.38	348.99	N/A	0.36
2337.739	XS-22	18.5	N/A	350.584	348.54	N/A	2.04	348.54	N/A	2.04	348.44	N/A	2.14	348.52	N/A	2.06
2319.239	XS-21	15	N/A	N/A	348.53	N/A	N/A	348.53	N/A	N/A	348.43	N/A	N/A	348.51	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.49	N/A	N/A	348.49	N/A	N/A	348.39	N/A	N/A	348.47	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.36	-0.13	1.67	348.36	-0.13	1.67	348.22	0.01	1.81	348.33	-0.10	1.70
2221.357	XS-18	18.518	348.304	348.417	348.19	0.11	0.23	348.19	0.11	0.23	347.93	0.37	0.49	348.14	0.16	0.28
2202.839	XS-17	19.776	348.135	348.228	348.14	0.00	0.09	348.14	0.00	0.09	347.84	0.30	0.39	348.09	0.05	0.14
2183.063	XS-16	120.143	348.162	348.291	348.07	0.09	0.22	348.07	0.09	0.22	347.65	0.51	0.64	348.02	0.14	0.27
2062.92	XS-15	110.719	347.849	348.481	347.71	0.14	0.77	347.71	0.14	0.77	347.31	0.54	1.17	347.58	0.27	0.90
1952.201	XS-14A	118.057	347.853	347.587	347.49	0.36	0.10	347.49	0.36	0.10	347.13	0.72	0.46	347.34	0.51	0.25
1834.144	XS-14	174.668	347.393	347.235	347.24	0.15	0.00	347.24	0.15	0.00	346.92	0.47	0.31	347.16	0.30	0.07
1659.476	XS-13	40.15	347.097	347.022	346.89	0.21	0.13	346.89	0.21	0.13	346.62	0.48	0.40	347.00	0.30	0.02
1619.326	XS-12A	159.66	347.029	346.844	346.79	0.24	0.05	346.78	0.25	0.06	346.58	0.45	0.26	346.93	0.30	-0.09
1459.666	XS-12	210.58	346.592	346.451	346.45	0.14	0.00	346.44	0.15	0.01	346.35	0.24	0.10	346.45	0.30	0.00
1249.086	XS-11	10.026	346.197	345.650	345.90	0.30	-0.25	345.87	0.33	-0.22	345.73	0.47	-0.08	345.87	0.33	-0.22
1239.06	XS-10	6.111	346.231	346.206	345.87	0.36	0.34	345.83	0.40	0.38	345.69	0.54	0.52	345.83	0.40	0.38
1232.949	XS-9	16.127	346.309	346.256	345.86	0.45	0.40	345.83	0.48	0.43	345.68	0.63	0.58	345.83	0.48	0.43
1216.822	XS-8	119.967	346.383	346.198	345.89	0.49	0.31	345.85	0.53	0.35	345.70	0.68	0.50	345.85	0.53	0.35
1096.855	XS-7	54.273	345.747	345.779	345.67	0.08	0.11	345.62	0.13	0.16	345.31	0.44	0.47	345.62	0.13	0.16
1042.582	XS-6F	28.955	348.405	348.956	345.65	2.76	3.31	345.59	2.82	3.37	345.24	3.16	3.72	345.59	2.82	3.37
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.59	3.16	3.42	345.53	3.22	3.48	345.12	3.63	3.89	345.53	3.22	3.48
916.613	XS-6	273.257	345.211	345.602	345.34	-0.13	0.26	345.24	-0.03	0.36	344.98	0.23	0.62	345.24	-0.03	0.36
643.356	XS-5	95.237	344.914	345.057	344.87	0.04	0.19	344.63	0.28	0.43	344.66	0.25	0.40	344.63	0.28	0.43
548.119	XS-4A	49.649	344.533	344.938	344.70	-0.17	0.24	344.39	0.14	0.55	344.39	0.14	0.55	344.39	0.14	0.55
498.47	XS-4	12.21	N/A	344.964	344.65	N/A	0.31	344.30	N/A	0.66	344.30	N/A	0.66	344.30	N/A	0.66
486.26	XS-3	11.592	N/A	N/A	344.65	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A	344.30	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A	344.29	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A	344.20	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A	343.85	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.45	N/A	N/A	343.45	N/A	N/A	343.45	N/A	N/A	343.45	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A	343.14	N/A	N/A
0	XS-A	0	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A

Table 3.1: Result Summary – Steady Flow Analysis, Maximum Daily Flow, Lake Level 1

Steady Flow Analysis

Q_{200} = **112** m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

118 m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.48** m (Full Pool Target Lake Level)

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54
8035.206	XS-57	182.429	N/A	383.450	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98
7938.948	XS-56A	5	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98
7669.233	XS-55	184.574	N/A	378.823	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27
7484.659	XS-54	182.123	N/A	377.350	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82
7302.536	XS-53	182.515	N/A	375.593	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96
7120.021	XS-52	150.368	N/A	374.420	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72
6969.653	XS-51A	5	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43
6832.859	XS-50	68.693	N/A	372.077	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64
6764.166	XS-49	139.707	N/A	371.229	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12
6624.459	XS-48	130.772	N/A	369.951	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76
6493.687	XS-47	184.488	N/A	368.379	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89
6309.199	XS-46	119.834	N/A	367.502	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36
6189.365	XS-45	137.962	N/A	366.462	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06
6051.403	XS-44	145.372	N/A	365.398	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93
5906.031	XS-43	146.942	N/A	364.307	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93
5759.089	XS-42	115.198	363.462	363.432	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89
5643.891	XS-41A	126.814	362.894	363.245	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53
5517.077	XS-41	162.683	362.049	362.219	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37
5354.394	XS-40A	125.944	361.025	361.171	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39
5228.45	XS-40	83.611	359.972	360.630	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64
5144.839	XS-39A	105.527	359.391	359.923	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46
5039.312	XS-39	63.719	358.900	359.236	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36
4975.593	XS-38	16.199	358.473	358.605	357.35	1.12	1.25	357.35	1.12	1.25	357.36	1.11	1.24	357.35	1.12	1.25
4959.394	XS-37A	77.95	358.457	358.559	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19
4881.444	XS-37	28.894	357.887	358.695	356.96	0.93	1.74	356.96	0.93	1.74	356.99	0.90	1.70	356.96	0.93	1.74
4852.55	XS-36	8.832	N/A	N/A	356.97	N/A	N/A	356.97	N/A	N/A	357.01	N/A	N/A	356.97	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	356.93	N/A	N/A	356.93	N/A	N/A	356.97	N/A	N/A	356.93	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.53	1.12	1.12	356.53	1.12	1.12	356.62	1.03	1.03	356.53	1.12	1.12

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.24	1.05	1.38	356.24	1.05	1.38	355.93	1.36	1.69	356.24	1.05	1.38
4530.432	XS-33	220.627	356.955	356.992	355.25	1.70	1.74	355.25	1.70	1.74	354.96	2.00	2.03	355.25	1.70	1.74
4309.805	XS-32	116.444	355.457	355.951	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84
4193.361	XS-31B	9.836	355.623	355.589	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.52	2.03	1.73	353.52	2.03	1.73	353.56	1.99	1.69	353.52	2.03	1.73
4061.767	XS-31	198.649	354.995	354.935	353.07	1.93	1.87	353.07	1.93	1.87	352.68	2.32	2.26	353.07	1.93	1.87
3863.118	XS-30	206.724	354.070	353.997	352.50	1.57	1.50	352.50	1.57	1.50	351.91	2.16	2.09	352.50	1.57	1.50
3656.394	XS-29	168.276	353.135	352.986	351.80	1.33	1.19	351.80	1.33	1.19	351.38	1.76	1.61	351.80	1.33	1.19
3488.118	XS-28	218.359	352.492	351.959	351.22	1.27	0.74	351.22	1.27	0.74	351.03	1.46	0.93	351.22	1.27	0.74
3269.759	XS-27	246.349	N/A	350.824	350.55	N/A	0.27	350.55	N/A	0.27	350.20	N/A	0.62	350.55	N/A	0.27
3023.41	XS-26	213.816	N/A	350.069	349.88	N/A	0.19	349.88	N/A	0.19	349.42	N/A	0.65	349.87	N/A	0.20
2809.594	XS-25	149.047	N/A	349.707	349.46	N/A	0.25	349.46	N/A	0.25	349.17	N/A	0.54	349.39	N/A	0.32
2660.547	XS-24	155.91	N/A	349.525	349.23	N/A	0.29	349.23	N/A	0.29	348.97	N/A	0.55	349.04	N/A	0.48
2504.637	XS-23	166.898	N/A	349.354	348.70	N/A	0.65	348.70	N/A	0.65	348.71	N/A	0.64	348.73	N/A	0.62
2337.739	XS-22	18.5	N/A	350.584	348.29	N/A	2.29	348.29	N/A	2.29	348.20	N/A	2.38	348.27	N/A	2.31
2319.239	XS-21	15	N/A	N/A	348.28	N/A	N/A	348.28	N/A	N/A	348.19	N/A	N/A	348.26	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.24	N/A	N/A	348.24	N/A	N/A	348.15	N/A	N/A	348.22	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.12	0.11	1.91	348.12	0.11	1.91	347.99	0.24	2.04	348.10	0.13	1.93
2221.357	XS-18	18.518	348.304	348.417	347.95	0.35	0.47	347.94	0.36	0.48	347.70	0.60	0.72	347.91	0.39	0.51
2202.839	XS-17	19.776	348.135	348.228	347.90	0.24	0.33	347.90	0.24	0.33	347.61	0.52	0.62	347.86	0.27	0.37
2183.063	XS-16	120.143	348.162	348.291	347.83	0.33	0.46	347.83	0.33	0.46	347.42	0.74	0.87	347.79	0.37	0.50
2062.92	XS-15	110.719	347.849	348.481	347.47	0.38	1.01	347.47	0.38	1.01	347.06	0.79	1.42	347.36	0.49	1.12
1952.201	XS-14A	118.057	347.853	347.587	347.24	0.61	0.35	347.24	0.61	0.35	346.87	0.98	0.72	347.10	0.75	0.49
1834.144	XS-14	174.668	347.393	347.235	346.98	0.41	0.25	346.98	0.41	0.25	346.65	0.74	0.59	346.88	0.30	0.36
1659.476	XS-13	40.15	347.097	347.022	346.62	0.48	0.40	346.62	0.48	0.40	346.34	0.76	0.68	346.70	0.30	0.32
1619.326	XS-12A	159.66	347.029	346.844	346.52	0.51	0.32	346.52	0.51	0.32	346.30	0.73	0.54	346.63	0.30	0.21
1459.666	XS-12	210.58	346.592	346.451	346.17	0.42	0.28	346.16	0.43	0.29	346.07	0.52	0.38	346.17	0.30	0.28
1249.086	XS-11	10.026	346.197	345.650	345.63	0.57	0.02	345.62	0.58	0.03	345.51	0.69	0.14	345.62	0.58	0.03
1239.06	XS-10	6.111	346.231	346.206	345.60	0.63	0.61	345.59	0.64	0.62	345.48	0.75	0.73	345.59	0.64	0.62
1232.949	XS-9	16.127	346.309	346.256	345.60	0.71	0.66	345.59	0.72	0.67	345.47	0.84	0.79	345.59	0.72	0.67
1216.822	XS-8	119.967	346.383	346.198	345.60	0.78	0.60	345.59	0.79	0.61	345.47	0.91	0.73	345.59	0.79	0.61
1096.855	XS-7	54.273	345.747	345.779	345.37	0.38	0.41	345.35	0.40	0.43	345.05	0.70	0.73	345.35	0.40	0.43
1042.582	XS-6F	28.955	348.405	348.956	345.33	3.07	3.63	345.31	3.09	3.65	344.94	3.46	4.02	345.31	3.09	3.65
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.28	3.47	3.73	345.25	3.50	3.76	344.81	3.94	4.20	345.25	3.50	3.76
916.613	XS-6	273.257	345.211	345.602	345.01	0.20	0.59	344.97	0.24	0.63	344.67	0.54	0.93	344.97	0.24	0.63
643.356	XS-5	95.237	344.914	345.057	344.47	0.44	0.59	344.35	0.56	0.71	344.37	0.54	0.69	344.35	0.56	0.71
548.119	XS-4A	49.649	344.533	344.938	344.30	0.23	0.64	344.14	0.39	0.80	344.14	0.39	0.80	344.14	0.39	0.80
498.47	XS-4	12.21	N/A	344.964	344.23	N/A	0.73	344.05	N/A	0.91	344.05	N/A	0.91	344.05	N/A	0.91
486.26	XS-3	11.592	N/A	N/A	344.24	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A
0	XS-A	0	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A	342.48	N/A	N/A

Table 3.2: Result Summary – Steady Flow Analysis, Maximum Daily Flow, Lake Level 2

Steady Flow Analysis

Q_{200} = **112** m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

118 m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.61** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54
8035.206	XS-57	182.429	N/A	383.450	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98
7938.948	XS-56A	5	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98
7669.233	XS-55	184.574	N/A	378.823	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27
7484.659	XS-54	182.123	N/A	377.350	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82
7302.536	XS-53	182.515	N/A	375.593	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96
7120.021	XS-52	150.368	N/A	374.420	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72
6969.653	XS-51A	5	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43
6832.859	XS-50	68.693	N/A	372.077	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64
6764.166	XS-49	139.707	N/A	371.229	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12
6624.459	XS-48	130.772	N/A	369.951	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76
6493.687	XS-47	184.488	N/A	368.379	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89
6309.199	XS-46	119.834	N/A	367.502	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36
6189.365	XS-45	137.962	N/A	366.462	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06
6051.403	XS-44	145.372	N/A	365.398	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93
5906.031	XS-43	146.942	N/A	364.307	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93
5759.089	XS-42	115.198	363.462	363.432	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89
5643.891	XS-41A	126.814	362.894	363.245	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53
5517.077	XS-41	162.683	362.049	362.219	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37
5354.394	XS-40A	125.944	361.025	361.171	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39
5228.45	XS-40	83.611	359.972	360.630	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64
5144.839	XS-39A	105.527	359.391	359.923	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46
5039.312	XS-39	63.719	358.900	359.236	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36
4975.593	XS-38	16.199	358.473	358.605	357.35	1.12	1.25	357.35	1.12	1.25	357.36	1.11	1.24	357.35	1.12	1.25
4959.394	XS-37A	77.95	358.457	358.559	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19
4881.444	XS-37	28.894	357.887	358.695	356.96	0.93	1.74	356.96	0.93	1.74	356.99	0.90	1.70	356.96	0.93	1.74
4852.55	XS-36	8.832	N/A	N/A	356.97	N/A	N/A	356.97	N/A	N/A	357.01	N/A	N/A	356.97	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	356.93	N/A	N/A	356.93	N/A	N/A	356.97	N/A	N/A	356.93	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.53	1.12	1.12	356.53	1.12	1.12	356.62	1.03	1.03	356.53	1.12	1.12

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.24	1.05	1.38	356.24	1.05	1.38	355.93	1.36	1.69	356.24	1.05	1.38
4530.432	XS-33	220.627	356.955	356.992	355.25	1.70	1.74	355.25	1.70	1.74	354.96	2.00	2.03	355.25	1.70	1.74
4309.805	XS-32	116.444	355.457	355.951	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84
4193.361	XS-31B	9.836	355.623	355.589	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.52	2.03	1.73	353.52	2.03	1.73	353.56	1.99	1.69	353.52	2.03	1.73
4061.767	XS-31	198.649	354.995	354.935	353.07	1.93	1.87	353.07	1.93	1.87	352.68	2.32	2.26	353.07	1.93	1.87
3863.118	XS-30	206.724	354.070	353.997	352.50	1.57	1.50	352.50	1.57	1.50	351.91	2.16	2.09	352.50	1.57	1.50
3656.394	XS-29	168.276	353.135	352.986	351.80	1.33	1.19	351.80	1.33	1.19	351.38	1.76	1.61	351.80	1.33	1.19
3488.118	XS-28	218.359	352.492	351.959	351.22	1.27	0.74	351.22	1.27	0.74	351.03	1.46	0.93	351.22	1.27	0.74
3269.759	XS-27	246.349	N/A	350.824	350.55	N/A	0.27	350.55	N/A	0.27	350.20	N/A	0.62	350.55	N/A	0.27
3023.41	XS-26	213.816	N/A	350.069	349.88	N/A	0.19	349.88	N/A	0.19	349.42	N/A	0.65	349.87	N/A	0.20
2809.594	XS-25	149.047	N/A	349.707	349.46	N/A	0.25	349.46	N/A	0.25	349.17	N/A	0.54	349.39	N/A	0.32
2660.547	XS-24	155.91	N/A	349.525	349.23	N/A	0.29	349.23	N/A	0.29	348.97	N/A	0.55	349.04	N/A	0.48
2504.637	XS-23	166.898	N/A	349.354	348.70	N/A	0.65	348.70	N/A	0.65	348.71	N/A	0.64	348.73	N/A	0.62
2337.739	XS-22	18.5	N/A	350.584	348.29	N/A	2.29	348.29	N/A	2.29	348.20	N/A	2.38	348.27	N/A	2.31
2319.239	XS-21	15	N/A	N/A	348.28	N/A	N/A	348.28	N/A	N/A	348.19	N/A	N/A	348.26	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.24	N/A	N/A	348.24	N/A	N/A	348.15	N/A	N/A	348.22	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.12	0.11	1.91	348.12	0.11	1.91	347.99	0.24	2.04	348.10	0.13	1.93
2221.357	XS-18	18.518	348.304	348.417	347.95	0.35	0.47	347.94	0.36	0.48	347.70	0.60	0.72	347.91	0.39	0.51
2202.839	XS-17	19.776	348.135	348.228	347.90	0.24	0.33	347.90	0.24	0.33	347.61	0.52	0.62	347.86	0.27	0.37
2183.063	XS-16	120.143	348.162	348.291	347.83	0.33	0.46	347.83	0.33	0.46	347.42	0.74	0.87	347.79	0.37	0.50
2062.92	XS-15	110.719	347.849	348.481	347.47	0.38	1.01	347.47	0.38	1.01	347.06	0.79	1.42	347.36	0.49	1.12
1952.201	XS-14A	118.057	347.853	347.587	347.24	0.61	0.35	347.24	0.61	0.35	346.87	0.98	0.72	347.10	0.75	0.49
1834.144	XS-14	174.668	347.393	347.235	346.98	0.41	0.25	346.98	0.41	0.25	346.65	0.74	0.59	346.88	0.30	0.36
1659.476	XS-13	40.15	347.097	347.022	346.62	0.48	0.40	346.62	0.48	0.40	346.34	0.76	0.68	346.70	0.30	0.32
1619.326	XS-12A	159.66	347.029	346.844	346.52	0.51	0.32	346.52	0.51	0.32	346.30	0.73	0.54	346.63	0.30	0.21
1459.666	XS-12	210.58	346.592	346.451	346.17	0.42	0.28	346.16	0.43	0.29	346.07	0.52	0.38	346.17	0.30	0.28
1249.086	XS-11	10.026	346.197	345.650	345.63	0.57	0.02	345.62	0.58	0.03	345.51	0.69	0.14	345.62	0.58	0.03
1239.06	XS-10	6.111	346.231	346.206	345.60	0.63	0.61	345.59	0.64	0.62	345.48	0.75	0.73	345.59	0.64	0.62
1232.949	XS-9	16.127	346.309	346.256	345.60	0.71	0.66	345.59	0.72	0.67	345.47	0.84	0.79	345.59	0.72	0.67
1216.822	XS-8	119.967	346.383	346.198	345.60	0.78	0.60	345.59	0.79	0.61	345.47	0.91	0.73	345.59	0.79	0.61
1096.855	XS-7	54.273	345.747	345.779	345.37	0.38	0.41	345.35	0.40	0.43	345.05	0.70	0.73	345.35	0.40	0.43
1042.582	XS-6F	28.955	348.405	348.956	345.33	3.07	3.63	345.31	3.09	3.65	344.94	3.46	4.02	345.31	3.09	3.65
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.28	3.47	3.73	345.25	3.50	3.76	344.81	3.94	4.20	345.25	3.50	3.76
916.613	XS-6	273.257	345.211	345.602	345.01	0.20	0.59	344.97	0.24	0.63	344.67	0.54	0.93	344.97	0.24	0.63
643.356	XS-5	95.237	344.914	345.057	344.47	0.44	0.59	344.35	0.56	0.71	344.37	0.54	0.69	344.35	0.56	0.71
548.119	XS-4A	49.649	344.533	344.938	344.30	0.23	0.64	344.14	0.39	0.80	344.14	0.39	0.80	344.14	0.39	0.80
498.47	XS-4	12.21	N/A	344.964	344.23	N/A	0.73	344.05	N/A	0.91	344.05	N/A	0.91	344.05	N/A	0.91
486.26	XS-3	11.592	N/A	N/A	344.24	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	342.96	N/A	N/A	342.96	N/A	N/A	342.96	N/A	N/A	342.96	N/A	N/A
0	XS-A	0	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A	342.61	N/A	N/A

Table 3.3: Result Summary – Steady Flow Analysis, Maximum Daily Flow, Lake Level 3

Steady Flow Analysis

Q_{200} = **112** m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

118 m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.74** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54
8035.206	XS-57	182.429	N/A	383.450	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98
7938.948	XS-56A	5	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98
7669.233	XS-55	184.574	N/A	378.823	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27
7484.659	XS-54	182.123	N/A	377.350	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82
7302.536	XS-53	182.515	N/A	375.593	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96
7120.021	XS-52	150.368	N/A	374.420	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72
6969.653	XS-51A	5	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43
6832.859	XS-50	68.693	N/A	372.077	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64
6764.166	XS-49	139.707	N/A	371.229	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12
6624.459	XS-48	130.772	N/A	369.951	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76
6493.687	XS-47	184.488	N/A	368.379	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89
6309.199	XS-46	119.834	N/A	367.502	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36
6189.365	XS-45	137.962	N/A	366.462	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06
6051.403	XS-44	145.372	N/A	365.398	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93
5906.031	XS-43	146.942	N/A	364.307	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93
5759.089	XS-42	115.198	363.462	363.432	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89
5643.891	XS-41A	126.814	362.894	363.245	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53
5517.077	XS-41	162.683	362.049	362.219	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37
5354.394	XS-40A	125.944	361.025	361.171	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39
5228.45	XS-40	83.611	359.972	360.630	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64
5144.839	XS-39A	105.527	359.391	359.923	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46
5039.312	XS-39	63.719	358.900	359.236	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36
4975.593	XS-38	16.199	358.473	358.605	357.35	1.12	1.25	357.35	1.12	1.25	357.36	1.11	1.24	357.35	1.12	1.25
4959.394	XS-37A	77.95	358.457	358.559	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19
4881.444	XS-37	28.894	357.887	358.695	356.96	0.93	1.74	356.96	0.93	1.74	356.99	0.90	1.70	356.96	0.93	1.74
4852.55	XS-36	8.832	N/A	N/A	356.97	N/A	N/A	356.97	N/A	N/A	357.01	N/A	N/A	356.97	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	356.93	N/A	N/A	356.93	N/A	N/A	356.97	N/A	N/A	356.93	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.53	1.12	1.12	356.53	1.12	1.12	356.62	1.03	1.03	356.53	1.12	1.12

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.24	1.05	1.38	356.24	1.05	1.38	355.93	1.36	1.69	356.24	1.05	1.38
4530.432	XS-33	220.627	356.955	356.992	355.25	1.70	1.74	355.25	1.70	1.74	354.96	2.00	2.03	355.25	1.70	1.74
4309.805	XS-32	116.444	355.457	355.951	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84
4193.361	XS-31B	9.836	355.623	355.589	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.52	2.03	1.73	353.52	2.03	1.73	353.56	1.99	1.69	353.52	2.03	1.73
4061.767	XS-31	198.649	354.995	354.935	353.07	1.93	1.87	353.07	1.93	1.87	352.68	2.32	2.26	353.07	1.93	1.87
3863.118	XS-30	206.724	354.070	353.997	352.50	1.57	1.50	352.50	1.57	1.50	351.91	2.16	2.09	352.50	1.57	1.50
3656.394	XS-29	168.276	353.135	352.986	351.80	1.33	1.19	351.80	1.33	1.19	351.38	1.76	1.61	351.80	1.33	1.19
3488.118	XS-28	218.359	352.492	351.959	351.22	1.27	0.74	351.22	1.27	0.74	351.03	1.46	0.93	351.22	1.27	0.74
3269.759	XS-27	246.349	N/A	350.824	350.55	N/A	0.27	350.55	N/A	0.27	350.20	N/A	0.62	350.55	N/A	0.27
3023.41	XS-26	213.816	N/A	350.069	349.88	N/A	0.19	349.88	N/A	0.19	349.42	N/A	0.65	349.87	N/A	0.20
2809.594	XS-25	149.047	N/A	349.707	349.46	N/A	0.25	349.46	N/A	0.25	349.17	N/A	0.54	349.39	N/A	0.32
2660.547	XS-24	155.91	N/A	349.525	349.23	N/A	0.29	349.23	N/A	0.29	348.97	N/A	0.55	349.04	N/A	0.48
2504.637	XS-23	166.898	N/A	349.354	348.70	N/A	0.65	348.70	N/A	0.65	348.71	N/A	0.64	348.73	N/A	0.62
2337.739	XS-22	18.5	N/A	350.584	348.29	N/A	2.29	348.29	N/A	2.29	348.20	N/A	2.38	348.27	N/A	2.31
2319.239	XS-21	15	N/A	N/A	348.28	N/A	N/A	348.28	N/A	N/A	348.19	N/A	N/A	348.26	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.24	N/A	N/A	348.24	N/A	N/A	348.15	N/A	N/A	348.22	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.12	0.11	1.91	348.12	0.11	1.91	347.99	0.24	2.04	348.10	0.13	1.93
2221.357	XS-18	18.518	348.304	348.417	347.95	0.35	0.47	347.94	0.36	0.48	347.70	0.60	0.72	347.91	0.39	0.51
2202.839	XS-17	19.776	348.135	348.228	347.90	0.24	0.33	347.90	0.24	0.33	347.61	0.52	0.62	347.86	0.27	0.37
2183.063	XS-16	120.143	348.162	348.291	347.83	0.33	0.46	347.83	0.33	0.46	347.42	0.74	0.87	347.79	0.37	0.50
2062.92	XS-15	110.719	347.849	348.481	347.47	0.38	1.01	347.47	0.38	1.01	347.06	0.79	1.42	347.36	0.49	1.12
1952.201	XS-14A	118.057	347.853	347.587	347.24	0.61	0.35	347.24	0.61	0.35	346.87	0.98	0.72	347.10	0.75	0.49
1834.144	XS-14	174.668	347.393	347.235	346.98	0.41	0.25	346.98	0.41	0.25	346.65	0.74	0.59	346.88	0.30	0.36
1659.476	XS-13	40.15	347.097	347.022	346.62	0.48	0.40	346.62	0.48	0.40	346.34	0.76	0.68	346.70	0.30	0.32
1619.326	XS-12A	159.66	347.029	346.844	346.52	0.51	0.32	346.52	0.51	0.32	346.30	0.73	0.54	346.63	0.30	0.21
1459.666	XS-12	210.58	346.592	346.451	346.17	0.42	0.28	346.16	0.43	0.29	346.07	0.52	0.38	346.17	0.30	0.28
1249.086	XS-11	10.026	346.197	345.650	345.63	0.57	0.02	345.62	0.58	0.03	345.51	0.69	0.14	345.62	0.58	0.03
1239.06	XS-10	6.111	346.231	346.206	345.60	0.63	0.61	345.59	0.64	0.62	345.48	0.75	0.73	345.59	0.64	0.62
1232.949	XS-9	16.127	346.309	346.256	345.60	0.71	0.66	345.59	0.72	0.67	345.47	0.84	0.79	345.59	0.72	0.67
1216.822	XS-8	119.967	346.383	346.198	345.60	0.78	0.60	345.59	0.79	0.61	345.47	0.91	0.73	345.59	0.79	0.61
1096.855	XS-7	54.273	345.747	345.779	345.37	0.38	0.41	345.35	0.40	0.43	345.05	0.70	0.73	345.35	0.40	0.43
1042.582	XS-6F	28.955	348.405	348.956	345.33	3.07	3.63	345.31	3.09	3.65	344.94	3.46	4.02	345.31	3.09	3.65
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.28	3.47	3.73	345.25	3.50	3.76	344.81	3.94	4.20	345.25	3.50	3.76
916.613	XS-6	273.257	345.211	345.602	345.01	0.20	0.59	344.97	0.24	0.63	344.67	0.54	0.93	344.97	0.24	0.63
643.356	XS-5	95.237	344.914	345.057	344.47	0.44	0.59	344.35	0.56	0.71	344.37	0.54	0.69	344.35	0.56	0.71
548.119	XS-4A	49.649	344.533	344.938	344.30	0.23	0.64	344.14	0.39	0.80	344.14	0.39	0.80	344.14	0.39	0.80
498.47	XS-4	12.21	N/A	344.964	344.23	N/A	0.73	344.05	N/A	0.91	344.05	N/A	0.91	344.05	N/A	0.91
486.26	XS-3	11.592	N/A	N/A	344.24	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A	344.03	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A	343.63	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A	343.23	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A	342.98	N/A	N/A
0	XS-A	0	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A	342.74	N/A	N/A

Table 3.4: Result Summary – Steady Flow Analysis, Maximum Daily Flow, Lake Level 4

Steady Flow Analysis

Q_{200} = **112** m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

118 m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **342.87** m

Assumed proposed setback dike has a minimum freeboard of 0.3 m

Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
8605.389	XS-58C	274.09	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54
8035.206	XS-57	182.429	N/A	383.450	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98
7938.948	XS-56A	5	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98
7669.233	XS-55	184.574	N/A	378.823	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27
7484.659	XS-54	182.123	N/A	377.350	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82
7302.536	XS-53	182.515	N/A	375.593	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96
7120.021	XS-52	150.368	N/A	374.420	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72
6969.653	XS-51A	5	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43
6832.859	XS-50	68.693	N/A	372.077	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64
6764.166	XS-49	139.707	N/A	371.229	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12
6624.459	XS-48	130.772	N/A	369.951	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76
6493.687	XS-47	184.488	N/A	368.379	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89
6309.199	XS-46	119.834	N/A	367.502	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36
6189.365	XS-45	137.962	N/A	366.462	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06
6051.403	XS-44	145.372	N/A	365.398	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93
5906.031	XS-43	146.942	N/A	364.307	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93
5759.089	XS-42	115.198	363.462	363.432	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89
5643.891	XS-41A	126.814	362.894	363.245	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53
5517.077	XS-41	162.683	362.049	362.219	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37
5354.394	XS-40A	125.944	361.025	361.171	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39
5228.45	XS-40	83.611	359.972	360.630	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64
5144.839	XS-39A	105.527	359.391	359.923	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46
5039.312	XS-39	63.719	358.900	359.236	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36
4975.593	XS-38	16.199	358.473	358.605	357.35	1.12	1.25	357.35	1.12	1.25	357.36	1.11	1.24	357.35	1.12	1.25
4959.394	XS-37A	77.95	358.457	358.559	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19
4881.444	XS-37	28.894	357.887	358.695	356.96	0.93	1.74	356.96	0.93	1.74	356.99	0.90	1.70	356.96	0.93	1.74
4852.55	XS-36	8.832	N/A	N/A	356.97	N/A	N/A	356.97	N/A	N/A	357.01	N/A	N/A	356.97	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	356.93	N/A	N/A	356.93	N/A	N/A	356.97	N/A	N/A	356.93	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.53	1.12	1.12	356.53	1.12	1.12	356.62	1.03	1.03	356.53	1.12	1.12

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.24	1.05	1.38	356.24	1.05	1.38	355.93	1.36	1.69	356.24	1.05	1.38
4530.432	XS-33	220.627	356.955	356.992	355.25	1.70	1.74	355.25	1.70	1.74	354.96	2.00	2.03	355.25	1.70	1.74
4309.805	XS-32	116.444	355.457	355.951	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84
4193.361	XS-31B	9.836	355.623	355.589	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.52	2.03	1.73	353.52	2.03	1.73	353.56	1.99	1.69	353.52	2.03	1.73
4061.767	XS-31	198.649	354.995	354.935	353.07	1.93	1.87	353.07	1.93	1.87	352.68	2.32	2.26	353.07	1.93	1.87
3863.118	XS-30	206.724	354.070	353.997	352.50	1.57	1.50	352.50	1.57	1.50	351.91	2.16	2.09	352.50	1.57	1.50
3656.394	XS-29	168.276	353.135	352.986	351.80	1.33	1.19	351.80	1.33	1.19	351.38	1.76	1.61	351.80	1.33	1.19
3488.118	XS-28	218.359	352.492	351.959	351.22	1.27	0.74	351.22	1.27	0.74	351.03	1.46	0.93	351.22	1.27	0.74
3269.759	XS-27	246.349	N/A	350.824	350.55	N/A	0.27	350.55	N/A	0.27	350.20	N/A	0.62	350.55	N/A	0.27
3023.41	XS-26	213.816	N/A	350.069	349.88	N/A	0.19	349.88	N/A	0.19	349.42	N/A	0.65	349.87	N/A	0.20
2809.594	XS-25	149.047	N/A	349.707	349.46	N/A	0.25	349.46	N/A	0.25	349.17	N/A	0.54	349.39	N/A	0.32
2660.547	XS-24	155.91	N/A	349.525	349.23	N/A	0.29	349.23	N/A	0.29	348.97	N/A	0.55	349.04	N/A	0.48
2504.637	XS-23	166.898	N/A	349.354	348.70	N/A	0.65	348.70	N/A	0.65	348.71	N/A	0.64	348.73	N/A	0.62
2337.739	XS-22	18.5	N/A	350.584	348.29	N/A	2.29	348.29	N/A	2.29	348.20	N/A	2.38	348.27	N/A	2.31
2319.239	XS-21	15	N/A	N/A	348.28	N/A	N/A	348.28	N/A	N/A	348.19	N/A	N/A	348.26	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.24	N/A	N/A	348.24	N/A	N/A	348.15	N/A	N/A	348.22	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.12	0.11	1.91	348.12	0.11	1.91	347.99	0.24	2.04	348.10	0.13	1.93
2221.357	XS-18	18.518	348.304	348.417	347.95	0.35	0.47	347.94	0.36	0.48	347.70	0.60	0.72	347.91	0.39	0.51
2202.839	XS-17	19.776	348.135	348.228	347.90	0.24	0.33	347.90	0.24	0.33	347.61	0.52	0.62	347.86	0.27	0.37
2183.063	XS-16	120.143	348.162	348.291	347.83	0.33	0.46	347.83	0.33	0.46	347.42	0.74	0.87	347.79	0.37	0.50
2062.92	XS-15	110.719	347.849	348.481	347.47	0.38	1.01	347.47	0.38	1.01	347.06	0.79	1.42	347.36	0.49	1.12
1952.201	XS-14A	118.057	347.853	347.587	347.24	0.61	0.35	347.24	0.61	0.35	346.87	0.98	0.72	347.10	0.75	0.49
1834.144	XS-14	174.668	347.393	347.235	346.98	0.41	0.25	346.98	0.41	0.25	346.65	0.74	0.59	346.88	0.30	0.36
1659.476	XS-13	40.15	347.097	347.022	346.62	0.48	0.40	346.62	0.48	0.40	346.34	0.76	0.68	346.70	0.30	0.32
1619.326	XS-12A	159.66	347.029	346.844	346.52	0.51	0.32	346.52	0.51	0.32	346.30	0.73	0.54	346.63	0.30	0.21
1459.666	XS-12	210.58	346.592	346.451	346.17	0.42	0.28	346.16	0.43	0.29	346.07	0.52	0.38	346.17	0.30	0.28
1249.086	XS-11	10.026	346.197	345.650	345.63	0.57	0.02	345.62	0.58	0.03	345.51	0.69	0.14	345.62	0.58	0.03
1239.06	XS-10	6.111	346.231	346.206	345.60	0.63	0.61	345.59	0.64	0.62	345.48	0.75	0.73	345.59	0.64	0.62
1232.949	XS-9	16.127	346.309	346.256	345.60	0.71	0.66	345.59	0.72	0.67	345.47	0.84	0.79	345.59	0.72	0.67
1216.822	XS-8	119.967	346.383	346.198	345.60	0.78	0.60	345.59	0.79	0.61	345.47	0.91	0.73	345.59	0.79	0.61
1096.855	XS-7	54.273	345.747	345.779	345.37	0.38	0.41	345.35	0.40	0.43	345.05	0.70	0.73	345.35	0.40	0.43
1042.582	XS-6F	28.955	348.405	348.956	345.34	3.07	3.62	345.31	3.09	3.65	344.94	3.46	4.02	345.31	3.09	3.65
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.28	3.47	3.73	345.25	3.50	3.76	344.81	3.94	4.20	345.25	3.50	3.76
916.613	XS-6	273.257	345.211	345.602	345.01	0.20	0.59	344.97	0.24	0.63	344.67	0.54	0.93	344.97	0.24	0.63
643.356	XS-5	95.237	344.914	345.057	344.47	0.44	0.59	344.35	0.56	0.71	344.38	0.53	0.68	344.35	0.56	0.71
548.119	XS-4A	49.649	344.533	344.938	344.31	0.22	0.63	344.15	0.38	0.79	344.15	0.38	0.79	344.15	0.38	0.79
498.47	XS-4	12.21	N/A	344.964	344.24	N/A	0.72	344.05	N/A	0.91	344.05	N/A	0.91	344.05	N/A	0.91
486.26	XS-3	11.592	N/A	N/A	344.24	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A	344.05	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A	343.97	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.64	N/A	N/A	343.64	N/A	N/A	343.64	N/A	N/A	343.64	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.26	N/A	N/A	343.26	N/A	N/A	343.26	N/A	N/A	343.26	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.03	N/A	N/A	343.03	N/A	N/A	343.03	N/A	N/A	343.03	N/A	N/A
0	XS-A	0	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A	342.87	N/A	N/A

Table 3.5: Result Summary – Steady Flow Analysis, Maximum Daily Flow, Lake Level 5

Steady Flow Analysis

Q_{200} = **112** m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, at upstream end of study reach, drainage area of 795 km^2 at 08NM116 Station)

118 m^3/s (Design Max Daily 200-year Flood including a Factor of 10% for Climate Change, just upstream of Casorso Road Bridge, drainage area of 850 km^2 at creek mouth)

Lake Level = **343** m (200-year Lake Level)

Assumed proposed setback dike has a minimum freeboard of 0.3 m

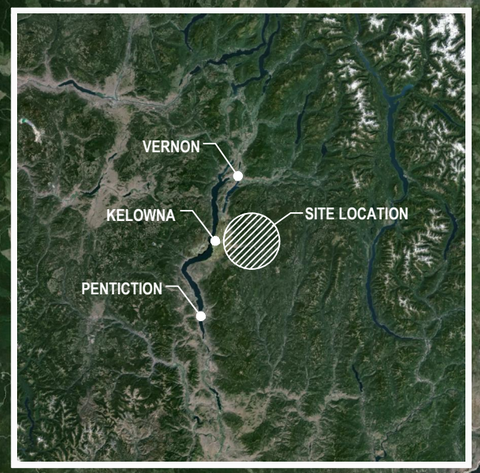
Model Scenarios:

1. Existing condition in 2014
2. Include proposed Lakeshore Rd Bridge
3. Model Scenario 2 with Proposed Sediment Removal
4. Model Scenario 2 with Setback Dike

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
		(m)	Left (m)	Right (m)	WSE (m)	Left FB (m)	Right FB (m)	WSE (m)	Left FB (m)	Right FB (m)	WSE (m)	Left FB (m)	Right FB (m)	WSE (m)	Left FB (m)	Right FB (m)
8605.389	XS-58C	274.09	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A	386.82	N/A	N/A
8331.299	XS-58B	131.954	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A	384.62	N/A	N/A
8199.345	XS-58A	100.296	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A	383.92	N/A	N/A
8099.049	XS-58	63.843	N/A	384.415	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54	382.87	N/A	1.54
8035.206	XS-57	182.429	N/A	383.450	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98	381.47	N/A	1.98
7938.948	XS-56A	5	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A	381.04	N/A	N/A
7936.448	Ped Bridge2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7933.948	XS-56B	81.171	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A	380.69	N/A	N/A
7852.777	XS-56	183.544	N/A	381.571	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98	379.59	N/A	1.98
7669.233	XS-55	184.574	N/A	378.823	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27	377.55	N/A	1.27
7484.659	XS-54	182.123	N/A	377.350	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82	375.53	N/A	1.82
7302.536	XS-53	182.515	N/A	375.593	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96	373.63	N/A	1.96
7120.021	XS-52	150.368	N/A	374.420	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72	371.70	N/A	2.72
6969.653	XS-51A	5	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A	370.71	N/A	N/A
6967.153	Ped Bridge1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6964.653	XS-51B	30.243	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A	370.40	N/A	N/A
6934.41	XS-51	101.551	N/A	372.477	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43	370.05	N/A	2.43
6832.859	XS-50	68.693	N/A	372.077	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64	369.44	N/A	2.64
6764.166	XS-49	139.707	N/A	371.229	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12	369.11	N/A	2.12
6624.459	XS-48	130.772	N/A	369.951	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76	368.19	N/A	1.76
6493.687	XS-47	184.488	N/A	368.379	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89	367.49	N/A	0.89
6309.199	XS-46	119.834	N/A	367.502	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36	366.14	N/A	1.36
6189.365	XS-45	137.962	N/A	366.462	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06	365.40	N/A	1.06
6051.403	XS-44	145.372	N/A	365.398	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93	364.47	N/A	0.93
5906.031	XS-43	146.942	N/A	364.307	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93	363.38	N/A	0.93
5759.089	XS-42	115.198	363.462	363.432	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89	362.54	0.92	0.89
5643.891	XS-41A	126.814	362.894	363.245	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53	361.72	1.17	1.53
5517.077	XS-41	162.683	362.049	362.219	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37	360.85	1.20	1.37
5354.394	XS-40A	125.944	361.025	361.171	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39	359.78	1.25	1.39
5228.45	XS-40	83.611	359.972	360.630	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64	358.99	0.98	1.64
5144.839	XS-39A	105.527	359.391	359.923	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46	358.46	0.93	1.46
5039.312	XS-39	63.719	358.900	359.236	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36	357.88	1.02	1.36
4975.593	XS-38	16.199	358.473	358.605	357.35	1.12	1.25	357.35	1.12	1.25	357.36	1.11	1.24	357.35	1.12	1.25
4959.394	XS-37A	77.95	358.457	358.559	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19	357.37	1.09	1.19
4881.444	XS-37	28.894	357.887	358.695	356.96	0.93	1.74	356.96	0.93	1.74	356.99	0.90	1.70	356.96	0.93	1.74
4852.55	XS-36	8.832	N/A	N/A	356.97	N/A	N/A	356.97	N/A	N/A	357.01	N/A	N/A	356.97	N/A	N/A
4848.134	KLO Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4843.718	XS-35	32.772	N/A	N/A	356.93	N/A	N/A	356.93	N/A	N/A	356.97	N/A	N/A	356.93	N/A	N/A
4810.946	XS-34	45.021	357.648	357.646	356.53	1.12	1.12	356.53	1.12	1.12	356.62	1.03	1.03	356.53	1.12	1.12

River Station	XS ID	Reach Length	Top of Dike Elev.		Model Scenario 1			Model Scenario 2			Model Scenario 3			Model Scenario 4		
			Left	Right	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB	WSE	Left FB	Right FB
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
4765.925	XS-33A	235.493	357.288	357.618	356.24	1.05	1.38	356.24	1.05	1.38	355.93	1.36	1.69	356.24	1.05	1.38
4530.432	XS-33	220.627	356.955	356.992	355.25	1.70	1.74	355.25	1.70	1.74	354.96	2.00	2.03	355.25	1.70	1.74
4309.805	XS-32	116.444	355.457	355.951	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84	354.11	1.35	1.84
4193.361	XS-31B	9.836	355.623	355.589	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52	354.07	1.55	1.52
4188.443	Weir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4183.525	XS-31A	121.758	355.552	355.251	353.52	2.03	1.73	353.52	2.03	1.73	353.56	1.99	1.69	353.52	2.03	1.73
4061.767	XS-31	198.649	354.995	354.935	353.07	1.93	1.87	353.07	1.93	1.87	352.68	2.32	2.26	353.07	1.93	1.87
3863.118	XS-30	206.724	354.070	353.997	352.50	1.57	1.50	352.50	1.57	1.50	351.91	2.16	2.09	352.50	1.57	1.50
3656.394	XS-29	168.276	353.135	352.986	351.80	1.33	1.19	351.80	1.33	1.19	351.38	1.76	1.61	351.80	1.33	1.19
3488.118	XS-28	218.359	352.492	351.959	351.22	1.27	0.74	351.22	1.27	0.74	351.03	1.46	0.93	351.22	1.27	0.74
3269.759	XS-27	246.349	N/A	350.824	350.55	N/A	0.27	350.55	N/A	0.27	350.20	N/A	0.62	350.55	N/A	0.27
3023.41	XS-26	213.816	N/A	350.069	349.88	N/A	0.19	349.88	N/A	0.19	349.42	N/A	0.65	349.87	N/A	0.20
2809.594	XS-25	149.047	N/A	349.707	349.46	N/A	0.25	349.46	N/A	0.25	349.17	N/A	0.54	349.39	N/A	0.32
2660.547	XS-24	155.91	N/A	349.525	349.23	N/A	0.29	349.23	N/A	0.29	348.97	N/A	0.55	349.04	N/A	0.48
2504.637	XS-23	166.898	N/A	349.354	348.70	N/A	0.65	348.70	N/A	0.65	348.71	N/A	0.64	348.73	N/A	0.62
2337.739	XS-22	18.5	N/A	350.584	348.29	N/A	2.29	348.29	N/A	2.29	348.20	N/A	2.38	348.27	N/A	2.31
2319.239	XS-21	15	N/A	N/A	348.28	N/A	N/A	348.28	N/A	N/A	348.19	N/A	N/A	348.26	N/A	N/A
2311.739	Casorso Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2304.239	XS-20	12.367	N/A	N/A	348.24	N/A	N/A	348.24	N/A	N/A	348.15	N/A	N/A	348.22	N/A	N/A
2291.872	XS-19	70.515	348.234	350.033	348.12	0.11	1.91	348.12	0.11	1.91	347.99	0.24	2.04	348.10	0.13	1.93
2221.357	XS-18	18.518	348.304	348.417	347.95	0.35	0.47	347.94	0.36	0.48	347.70	0.60	0.72	347.91	0.39	0.51
2202.839	XS-17	19.776	348.135	348.228	347.90	0.24	0.33	347.90	0.24	0.33	347.61	0.52	0.62	347.86	0.27	0.37
2183.063	XS-16	120.143	348.162	348.291	347.83	0.33	0.46	347.83	0.33	0.46	347.42	0.74	0.87	347.79	0.37	0.50
2062.92	XS-15	110.719	347.849	348.481	347.47	0.38	1.01	347.47	0.38	1.01	347.06	0.79	1.42	347.36	0.49	1.12
1952.201	XS-14A	118.057	347.853	347.587	347.24	0.61	0.35	347.24	0.61	0.35	346.87	0.98	0.72	347.10	0.75	0.49
1834.144	XS-14	174.668	347.393	347.235	346.98	0.41	0.25	346.98	0.41	0.25	346.65	0.74	0.59	346.88	0.30	0.36
1659.476	XS-13	40.15	347.097	347.022	346.62	0.48	0.40	346.62	0.48	0.40	346.34	0.76	0.68	346.70	0.30	0.32
1619.326	XS-12A	159.66	347.029	346.844	346.52	0.51	0.32	346.52	0.51	0.32	346.30	0.73	0.54	346.63	0.30	0.21
1459.666	XS-12	210.58	346.592	346.451	346.17	0.42	0.28	346.16	0.43	0.29	346.07	0.52	0.38	346.17	0.30	0.28
1249.086	XS-11	10.026	346.197	345.650	345.63	0.57	0.02	345.62	0.58	0.03	345.51	0.69	0.14	345.62	0.58	0.03
1239.06	XS-10	6.111	346.231	346.206	345.60	0.63	0.61	345.59	0.64	0.62	345.48	0.75	0.73	345.59	0.64	0.62
1232.949	XS-9	16.127	346.309	346.256	345.60	0.71	0.66	345.59	0.72	0.67	345.47	0.84	0.79	345.59	0.72	0.67
1216.822	XS-8	119.967	346.383	346.198	345.61	0.77	0.59	345.59	0.79	0.61	345.47	0.91	0.73	345.59	0.79	0.61
1096.855	XS-7	54.273	345.747	345.779	345.37	0.38	0.41	345.35	0.40	0.43	345.05	0.70	0.73	345.35	0.40	0.43
1042.582	XS-6F	28.955	348.405	348.956	345.34	3.07	3.62	345.31	3.09	3.65	344.94	3.46	4.02	345.31	3.09	3.65
1031.775	Gordon Dr Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1013.627	XS-6E	97.014	348.753	349.011	345.28	3.47	3.73	345.25	3.50	3.76	344.82	3.93	4.19	345.25	3.50	3.76
916.613	XS-6	273.257	345.211	345.602	345.01	0.20	0.59	344.97	0.24	0.63	344.67	0.54	0.93	344.97	0.24	0.63
643.356	XS-5	95.237	344.914	345.057	344.48	0.43	0.58	344.35	0.56	0.71	344.38	0.53	0.68	344.35	0.56	0.71
548.119	XS-4A	49.649	344.533	344.938	344.31	0.22	0.63	344.15	0.38	0.79	344.15	0.38	0.79	344.15	0.38	0.79
498.47	XS-4	12.21	N/A	344.964	344.25	N/A	0.71	344.06	N/A	0.90	344.06	N/A	0.90	344.06	N/A	0.90
486.26	XS-3	11.592	N/A	N/A	344.25	N/A	N/A	344.06	N/A	N/A	344.06	N/A	N/A	344.06	N/A	N/A
480.464	Lakeshore Br	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
474.668	XS-2	17.281	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A	344.04	N/A	N/A
457.387	XS-1	109.312	N/A	N/A	343.98	N/A	N/A	343.98	N/A	N/A	343.98	N/A	N/A	343.98	N/A	N/A
348.075	XS-D	128.217	N/A	N/A	343.66	N/A	N/A	343.66	N/A	N/A	343.66	N/A	N/A	343.66	N/A	N/A
219.858	XS-C	91.763	N/A	N/A	343.31	N/A	N/A	343.31	N/A	N/A	343.31	N/A	N/A	343.31	N/A	N/A
128.095	XS-B	128.095	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A	343.09	N/A	N/A
0	XS-A	0	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A	343.00	N/A	N/A

FIGURES



LOCATION MAP
SCALE: NTS

MILL CREEK

MILL CREEK OUTLET

08NM116

08NM057

MISSION CREEK

WATERSHED AREA: 795 km²

08NM233

MISSION CREEK OUTLET

WATERSHED AREA: 55 km²

08NM016

08NM239

ISSUED FOR USE

LEGEND

- Mission Creek Watershed Boundary
- Mission Creek Watershed Boundary Downstream of Station
- Monitoring Stations

SCALE 1:200,000

2 0 2 4 8km

NOTES

CLIENT

BRITISH COLUMBIA

TETRA TECH EBA

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

LOCATION MAP AND MISSION CREEK WATERSHED BOUNDARY

PROJECT NO.	DWN	CKD	REV
V13203141-01	JDM	ML	0
OFFICE: VANC	DATE: March, 2014		

Figure 4.1

Q:\Vancouver\Engineering\V132\Projects\V13203141-01 Lower Mission Creek Hydraulic Capacity Study\007 Reporting\Report Figures\Figure 7-1.dwg [FIGURE 7-1] April 01, 2014 - 9:58:27 am (BY: LAU, MARIA)

OKANAGAN LAKE

LAKESHORE RD

LAKESHORE RD BRIDGE

COOK RD

GORDON DRIVE

CASORSO RD

BENVOULIN RD

FISHER RD

K.L.O. RD

PIONEER RD

LEXINGTON DR

GORDON DR BRIDGE

LOWER MISSION CREEK

CASORSO RD BRIDGE

SWAMP RD

CASORSO RD

PARSONS RD

HEIMLICH RD

SPIERS RD

WEIR

0+000

0+500

1+000

1+500

2+000

2+500

3+000

3+500

4+000

4+500

XS-A

XS-B

XS-C

XS-D

XS-1

XS-2

XS-3

XS-4

XS-4A

XS-5

XS-5A

XS-5B

XS-6

XS-6A

XS-6E

XS-7

XS-8

XS-10

XS-6B

XS-6D

XS-6C

XS-11

XS-9

XS-12

XS-12A

XS-13

XS-14

XS-14A

XS-15

XS-16

XS-17

XS-18

XS-19

XS-21

XS-22

XS-20

XS-23

XS-24

XS-25

XS-26

XS-27

XS-28

XS-29

XS-30

XS-31

XS-31A

XS-31B

XS-32

XS-33

ISSUED FOR USE

LEGEND

MISSION CREEK DIKE

SCALE 1:10,000

100 0 100 200 400m

NOTES

1. Orthophoto provided by City of Kelowna's Open Data Catalogue taken on May 13, 2012.
2. Field survey completed by MMM Group in March 2014.

CLIENT

BRITISH COLUMBIA

TETRA TECH EBA

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

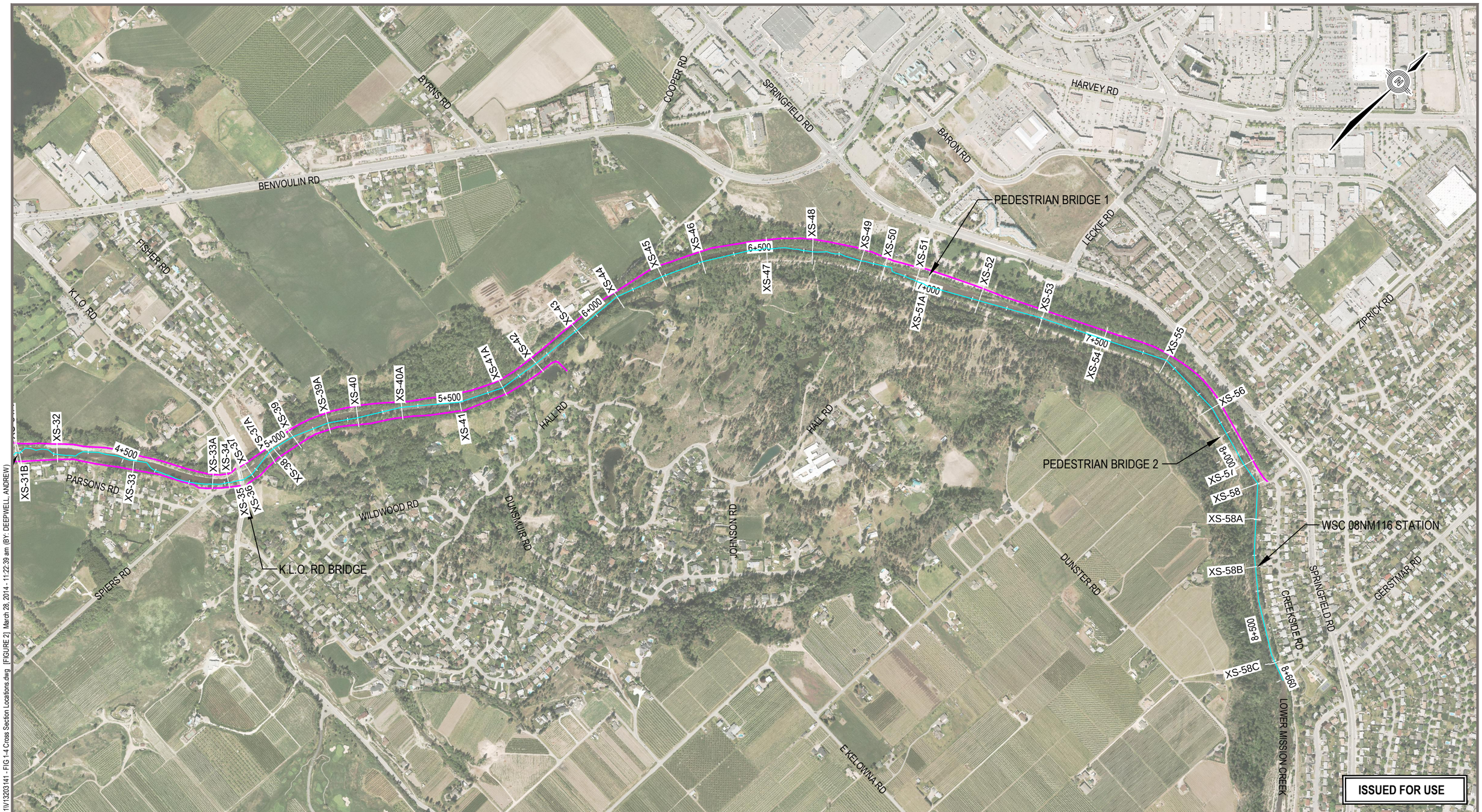
OVERALL SITE PLAN (LOWER STUDY REACH)

PROJECT NO.	DWN	CKD	REV
V13203141	JDM	ML	0

OFFICE	DATE
VANC	March, 2014

Figure 4.2

Q:\Vancouver\Drafting\Engineering\V13\2\V13203141\V13203141 - FIG 1-4 Cross Section Locations.dwg [FIGURE 1] March 28, 2014 - 11:22:28 am (BY: DEEPWELL, ANDREW)



LEGEND

MISSION CREEK DIKE

NOTES

1. Orthophoto provided by City of Kelowna's Open Data Catalogue taken on May 13, 2012.
2. Field survey completed by MMM Group in March 2014.

SCALE 1:10,000

100 0 100 200 400m

ISSUED FOR USE

CLIENT

BRITISH COLUMBIA

TETRA TECH EBA

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

OVERALL SITE PLAN (UPPER STUDY REACH)

PROJECT NO.	DWN	CKD	REV
V13203141	JDM	ML	0

OFFICE: VANC

DATE: March, 2014

Figure 4.3

Q:\Vancouver\Drafting\Engineering\V132\V13203141\V13203141 - FIG 1-4 Cross Section Locations.dwg [FIGURE 2] March 28, 2014 - 11:22:39 am (BY: DEEPWELL, ANDREW)

OKANAGAN LAKE

0+000

LAKESHORE RD

LAKESHORE RD BRIDGE

0+500

COOK RD

GORDON DRIVE

CASORSO RD

BENVOULIN RD

FISHER RD

K.L.O. RD

LEXINGTON DR

1+000

GORDON DR BRIDGE

1+500

PIONEER RD

2+000

2+500

LOWER MISSION CREEK

3+000

3+500

4+000

4+500

PARSONS RD

WEIR

CASORSO RD BRIDGE

SWAMP RD

CASORSO RD

HEIMLICH RD

SPIERS RD

ISSUED FOR USE

LEGEND

- MISSION CREEK DIKE
- PROPOSED SETBACK DIKE
- PROPOSED SEDIMENT REMOVAL

SCALE 1:10,000

100 0 100 200 400m

NOTES

1. Orthophoto provided by City of Kelowna's Open Data Catalogue taken on May 13, 2012.
2. Field survey completed by MMM Group in March 2014.

CLIENT

BRITISH COLUMBIA

TETRA TECH EBA

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

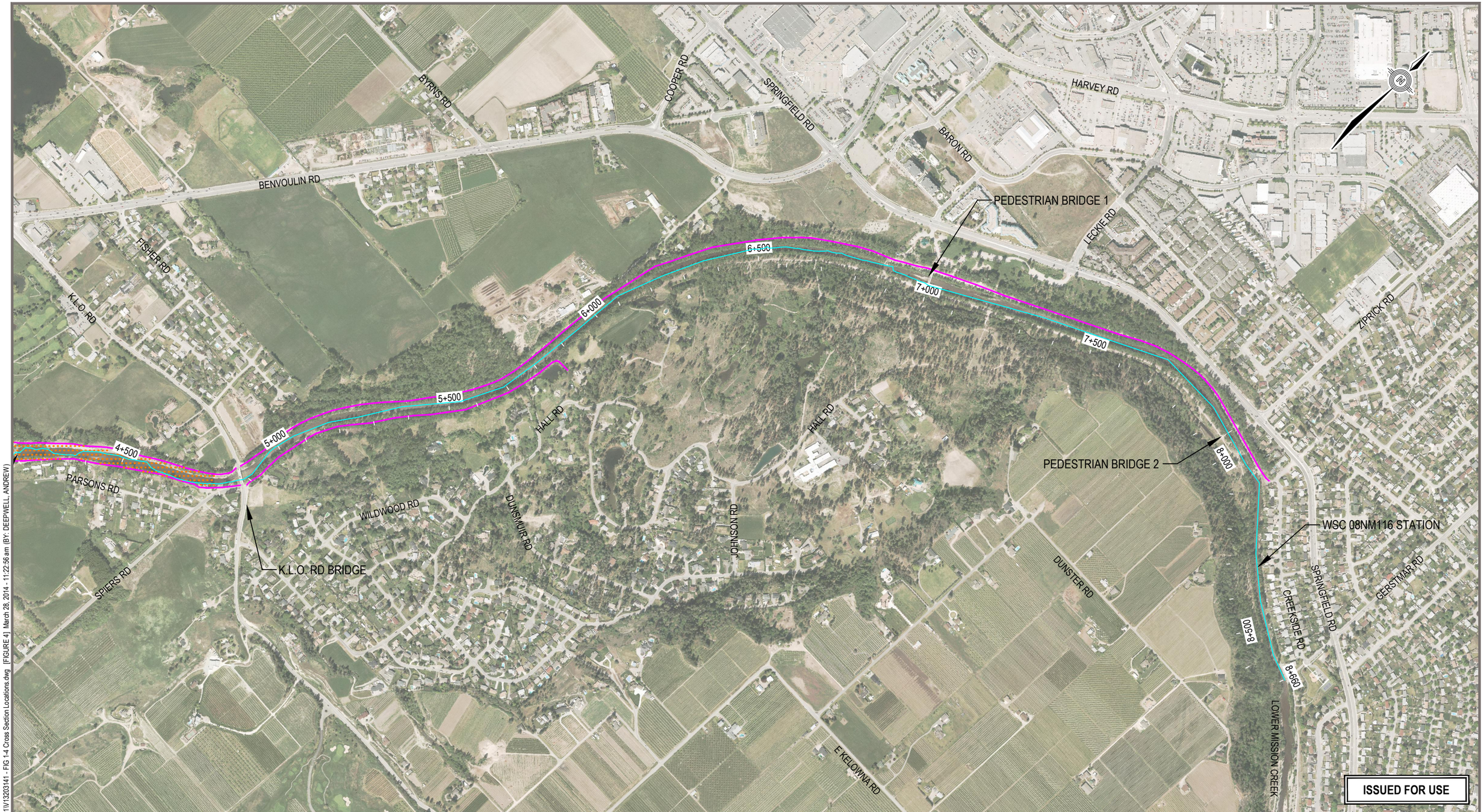
PROPOSED SETBACK DIKE AND SEDIMENT REMOVAL (LOWER STUDY REACH)

PROJECT NO.	DWN	CKD	REV
V13203141	JDM	ML	0

OFFICE	DATE
VANC	March, 2014

Figure 8.1

Q:\Vancouver\Drafting\Engineering\V132\V13203141\V13203141 - FIG 1-4 Cross Section Locations.dwg [FIGURE 3] March 28, 2014 - 11:22:45 am (BY: DEEPWELL, ANDREW)



ISSUED FOR USE

LEGEND

- MISSION CREEK DIKE
- PROPOSED SETBACK DIKE
- PROPOSED SEDIMENT REMOVAL

SCALE 1:10,000

100 0 100 200 400m

NOTES

1. Orthophoto provided by City of Kelowna's Open Data Catalogue taken on May 13, 2012.
2. Field survey completed by MMM Group in March 2014.

CLIENT

BRITISH COLUMBIA

TETRA TECH EBA

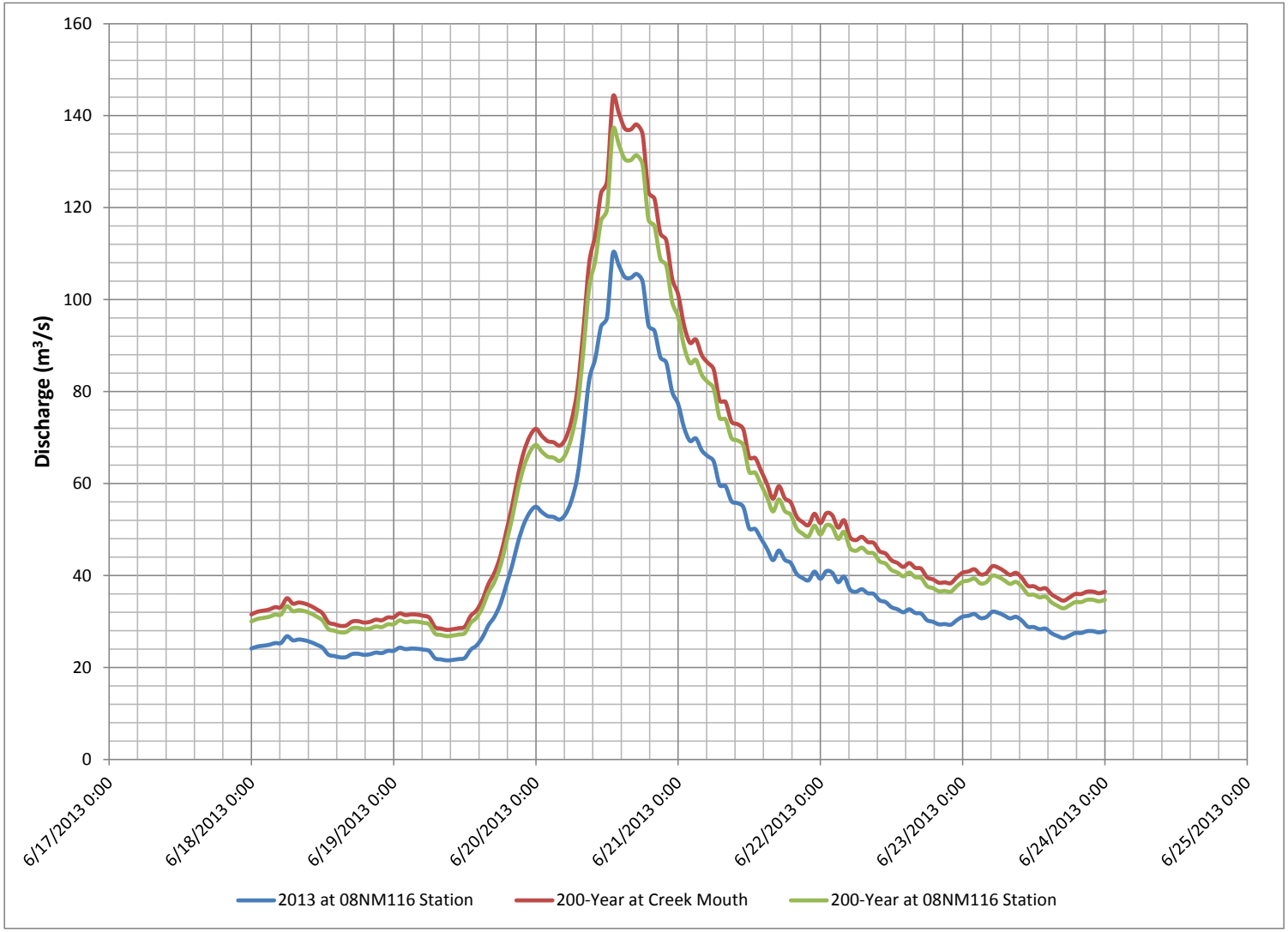
LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

PROPOSED SETBACK DIKE AND SEDIMENT REMOVAL (UPPER STUDY REACH)

PROJECT NO.	DWN	CKD	REV
V13203141	JDM	ML	0
OFFICE: VANC	DATE: March, 2014		

Figure 8.2

Q:\Vancouver\Drafting\Engineering\V132\V13203141\V13203141 - FIG 1-4 Cross Section Locations.dwg [FIGURE 4] March 28, 2014 - 11:22:56 am (BY: DEEPWELL, ANDREW)



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands, and Natural Resource Operations

TETRA TECH EBA

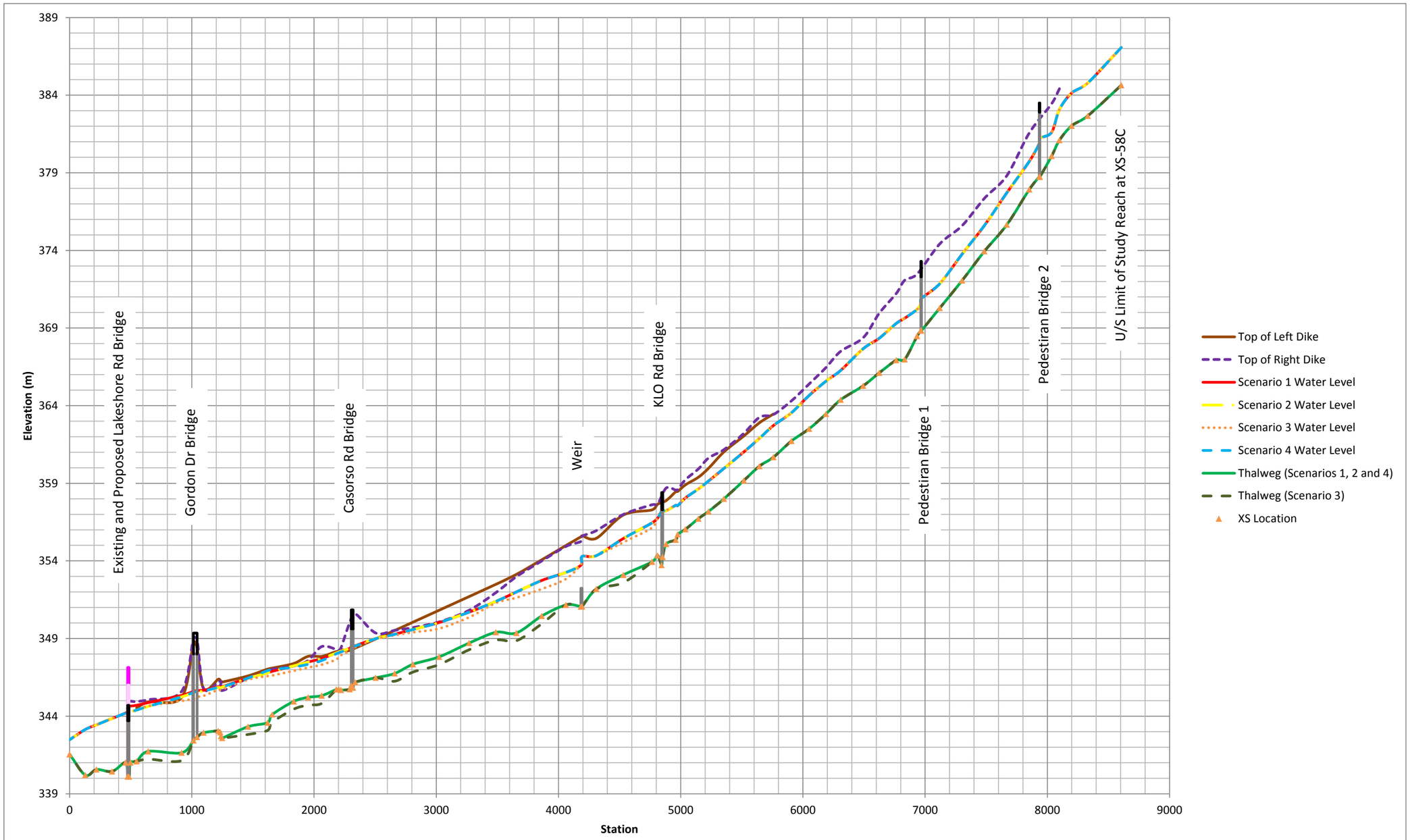
LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

200-Year Hourly Flood Hydrograph

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE	DATE
EBA-VANC	March, 2014

Figure 8.3



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

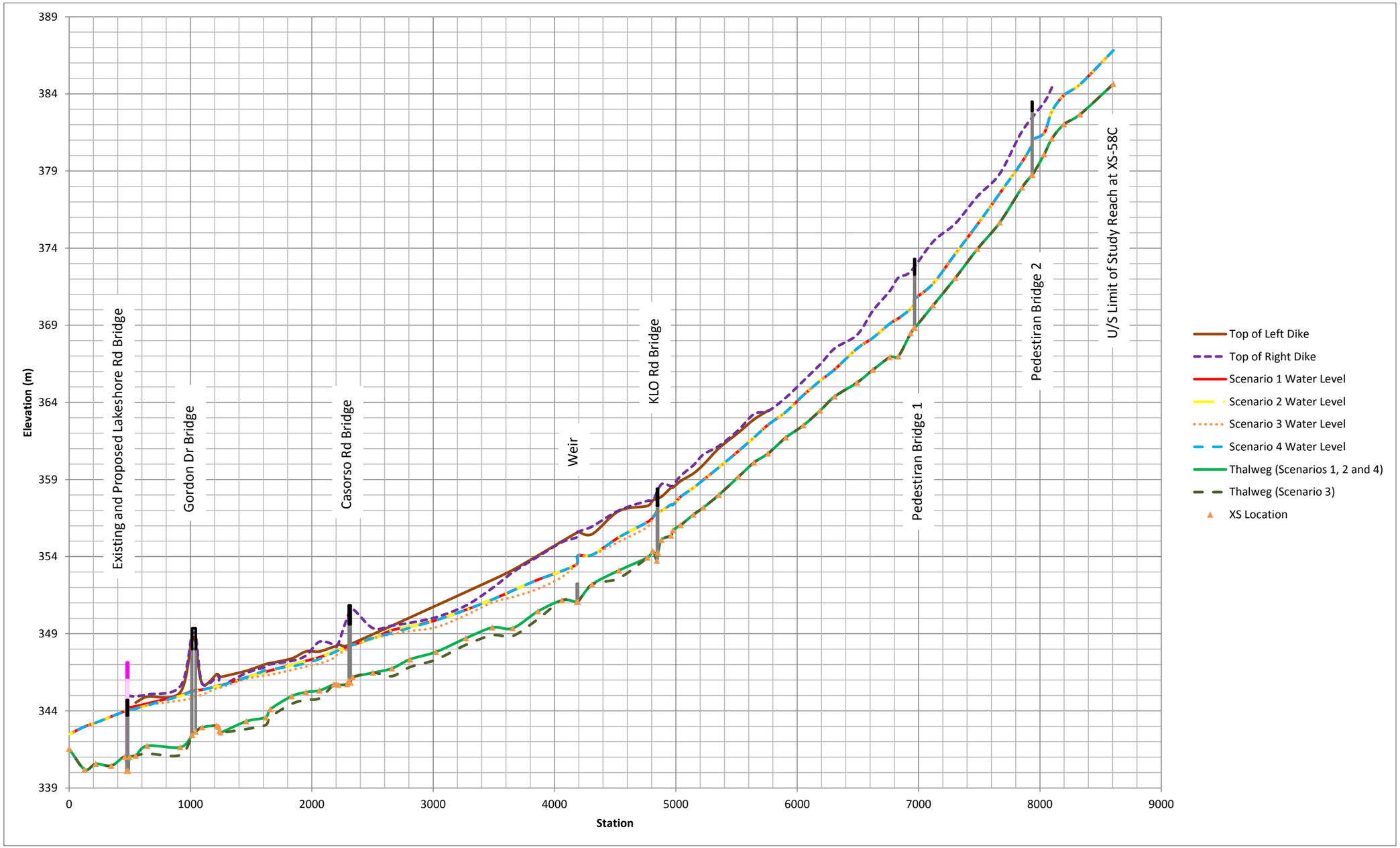
LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

Flood Profiles for All Scenarios (Steady Flow Analysis with 200-Year Max Instant Flow)

TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	
OFFICE: EBA-VANC	DATE: March, 2014			

Figure 8.4



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

Flood Profiles for All Scenarios (Steady Flow Analysis with 200-Year Max Daily Flow)

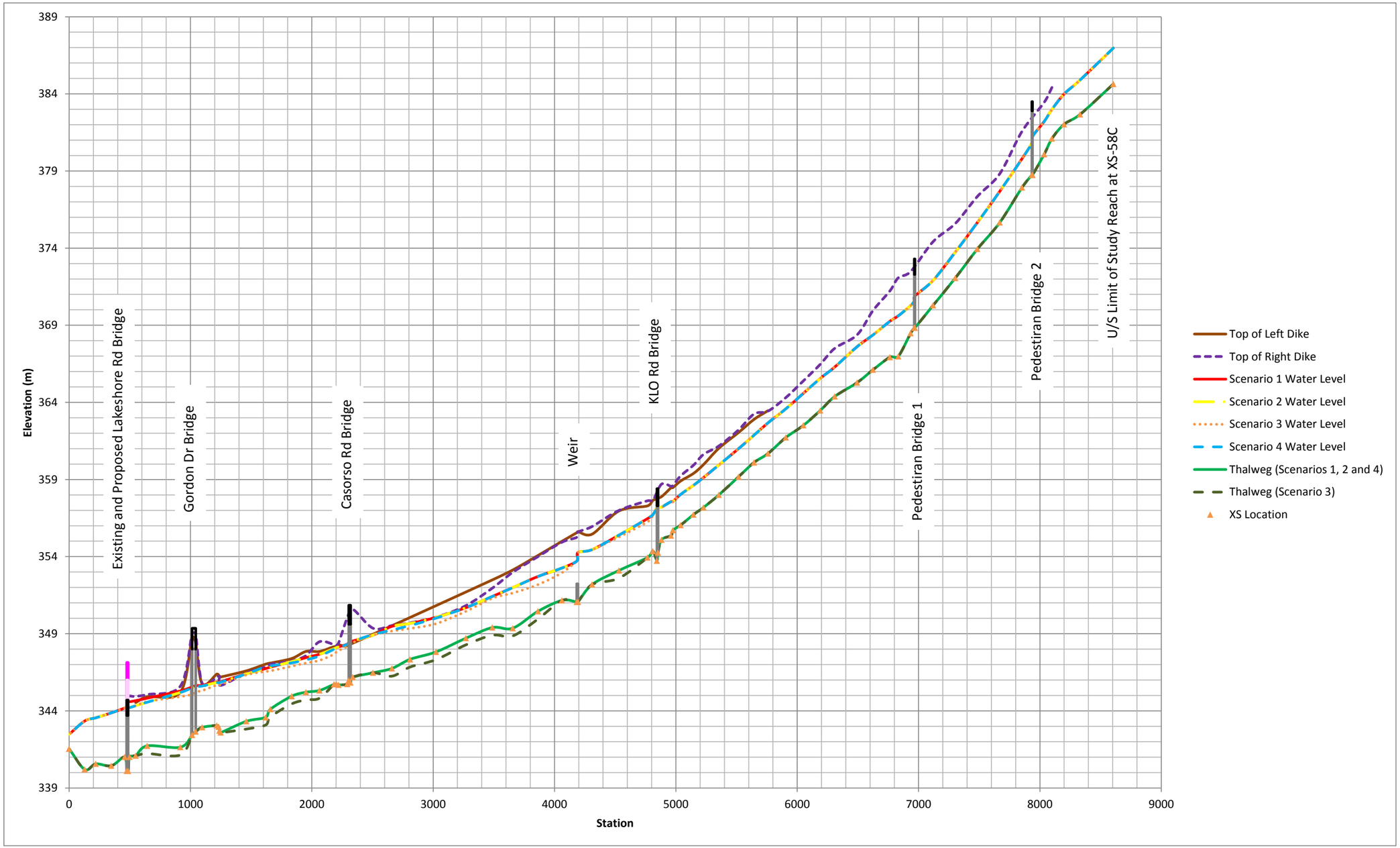
TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE: EBA-VANC

DATE: March, 2014

Figure 8.5



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

Flood Profiles for All Scenarios (Unsteady Flow Analysis with 200-Year Hydrograph)

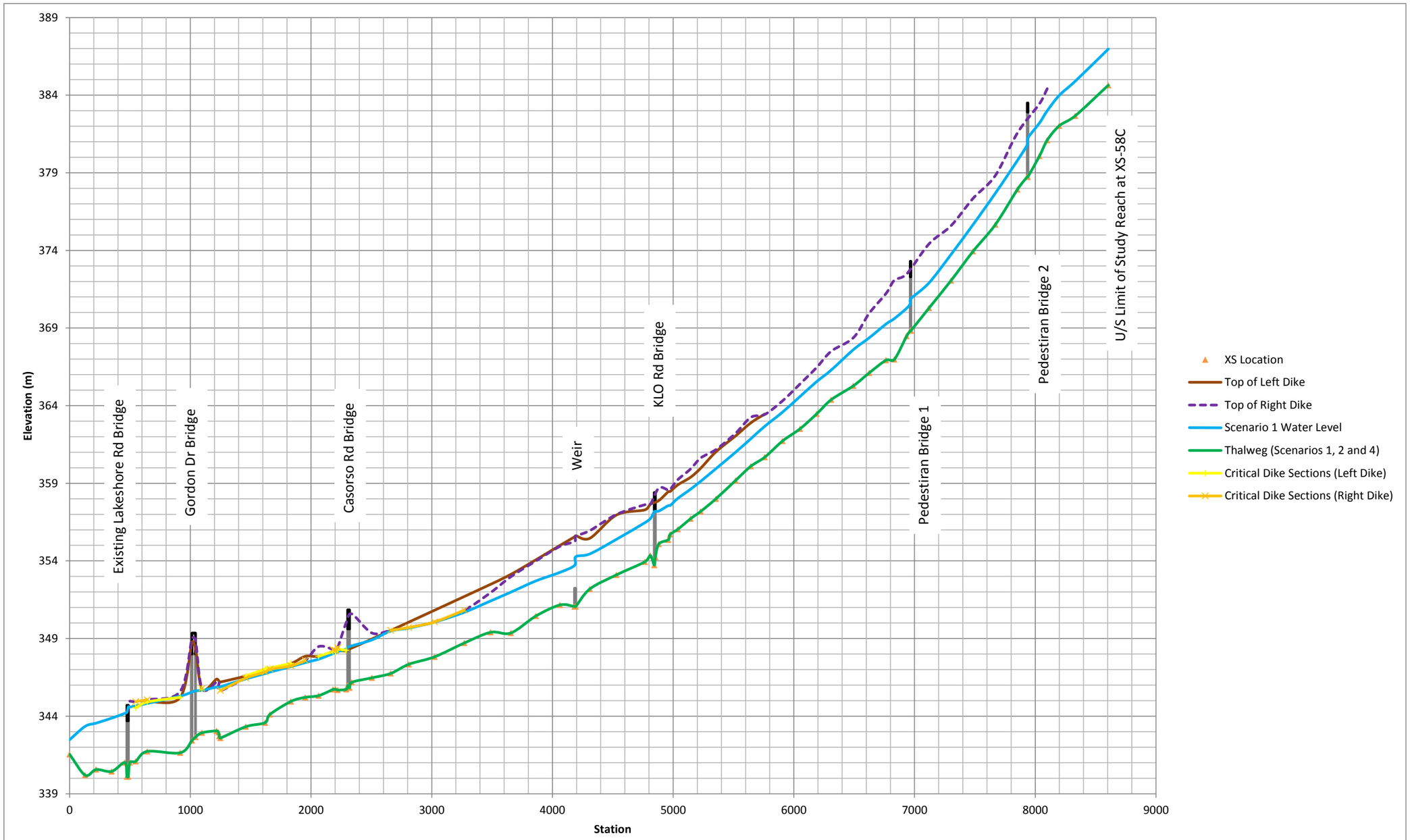
TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE: EBA-VANC

DATE: March, 2014

Figure 8.6



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

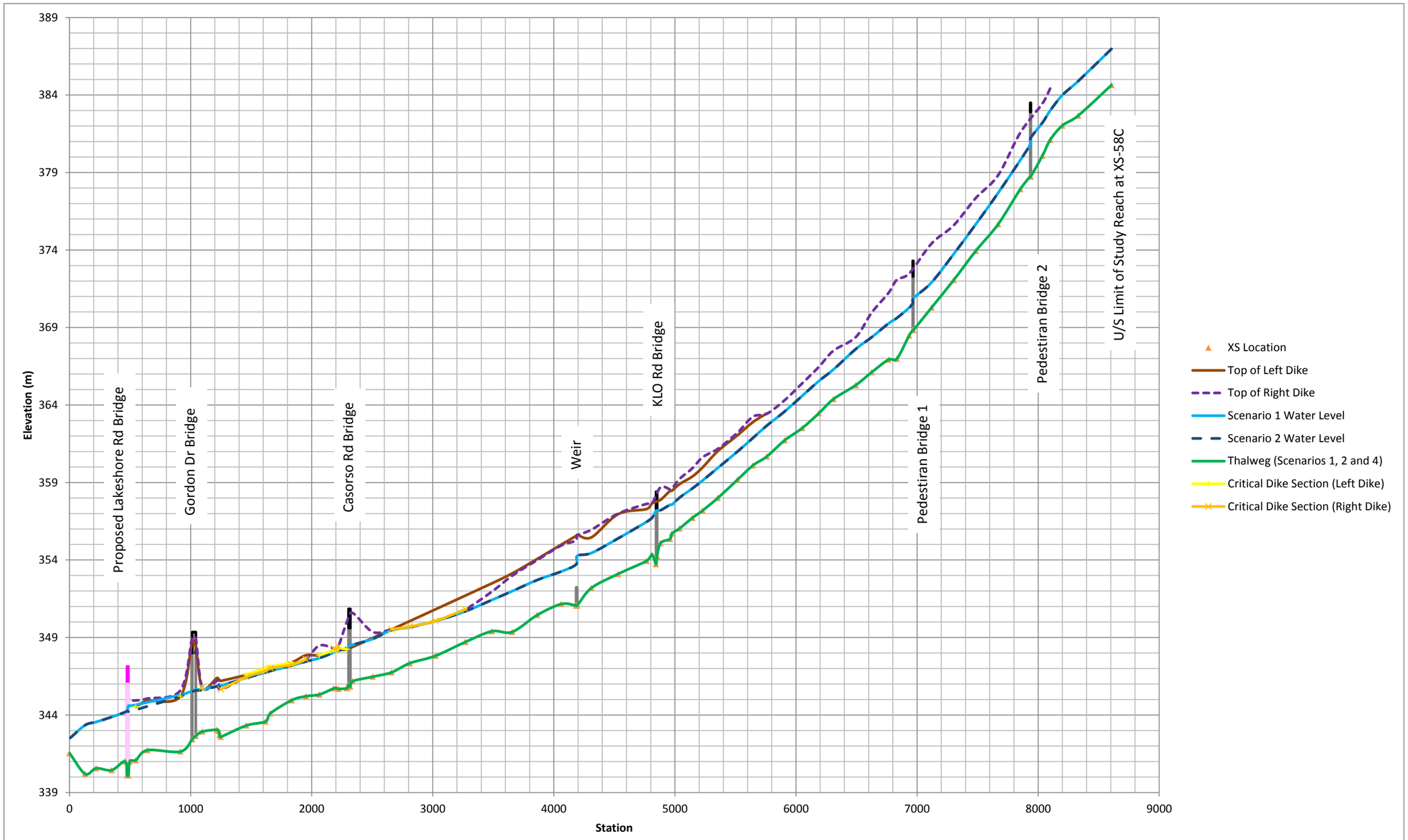
Critical Dike Sections – Scenario 1

TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE	DATE
EBA-VANC	March, 2014

Figure 8.7



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

Critical Dike Sections – Scenario 2

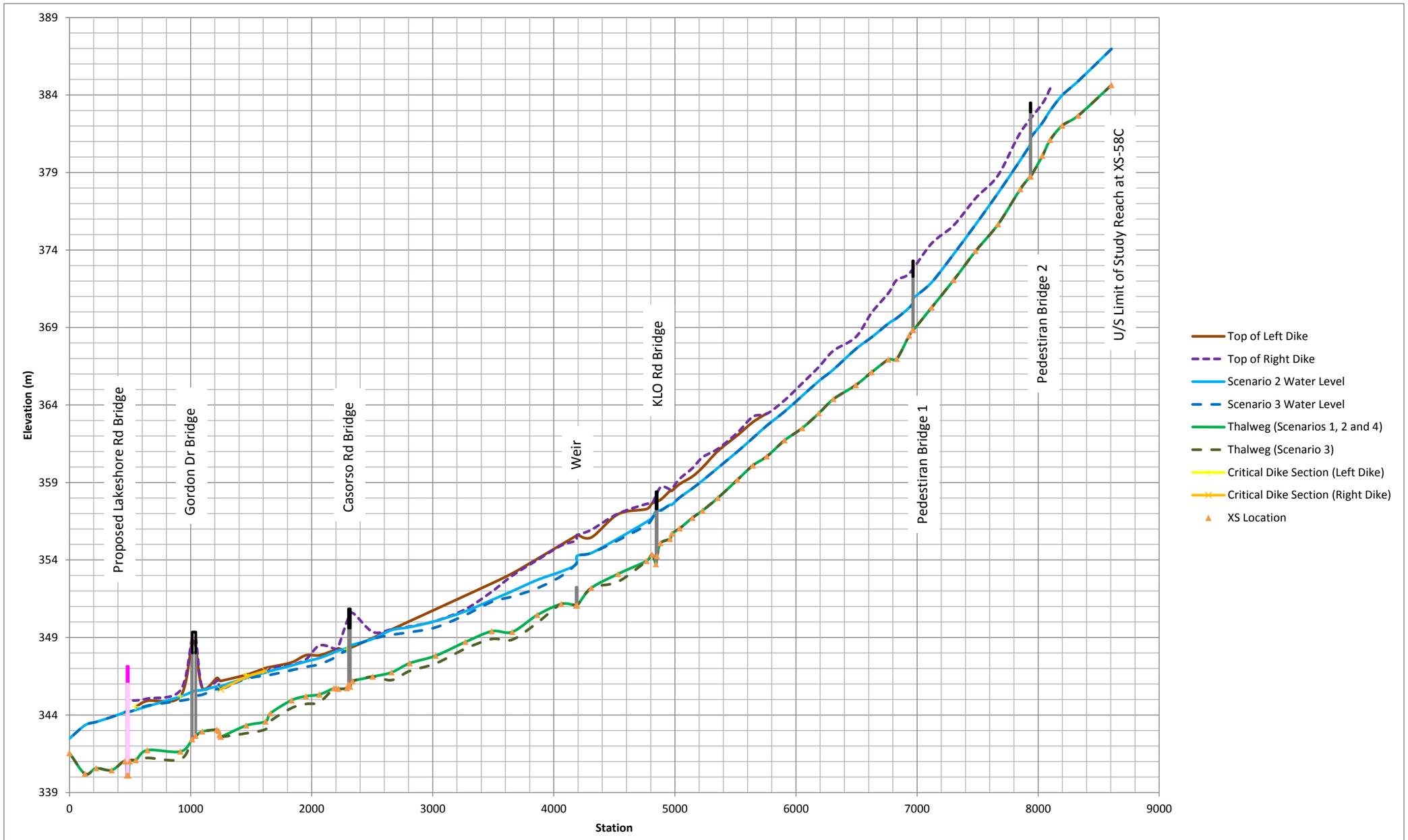
TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE: EBA-VANC

DATE: March, 2014

Figure 8.8



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

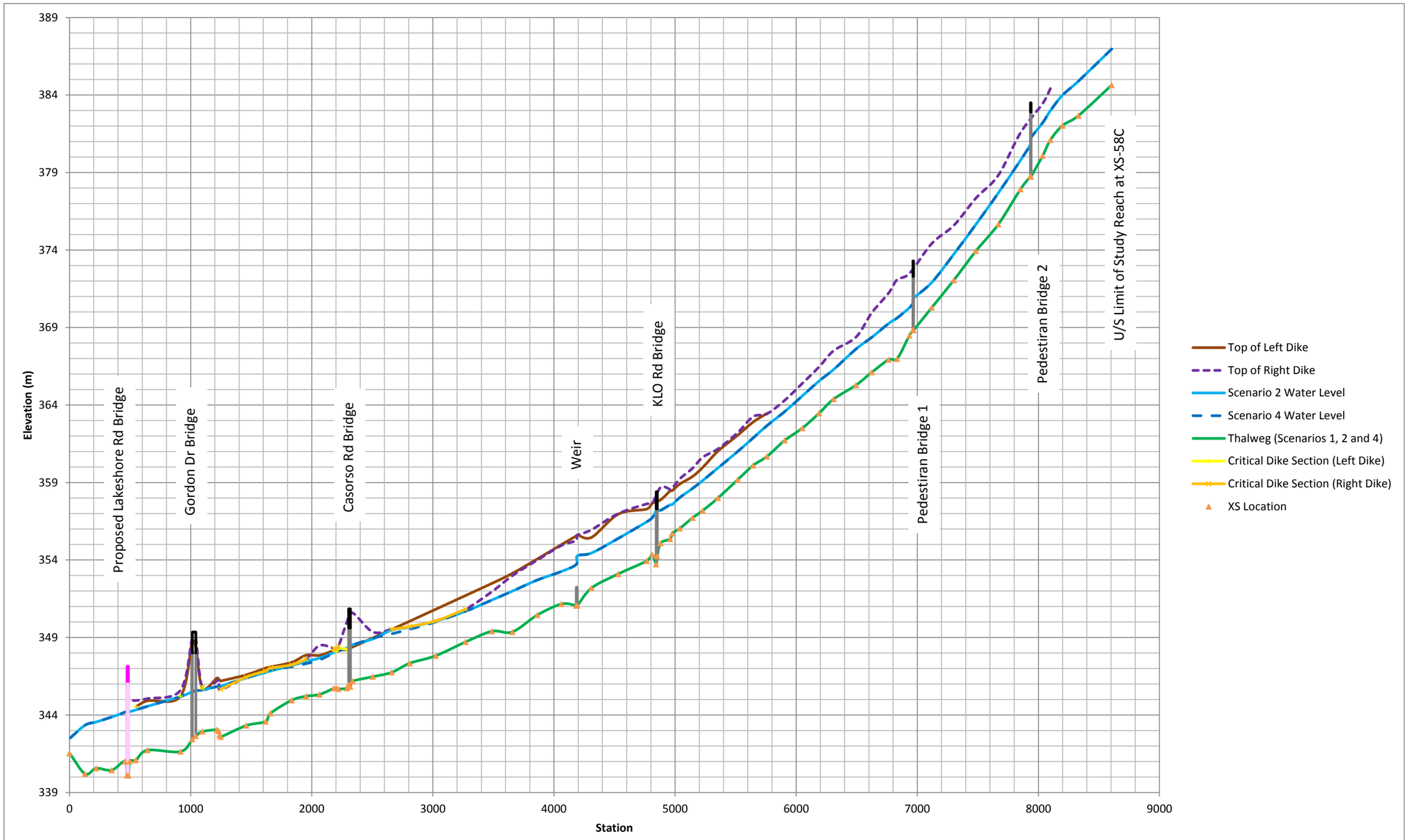
Critical Dike Sections – Scenario 3

TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE	DATE
EBA-VANC	March, 2014

Figure 8.9



LEGEND

NOTES

STATUS
ISSUED FOR USE

CLIENT
BC Ministry of Forests, Lands and Natural Resource Operations

LOWER MISSION CREEK HYDRAULIC CAPACITY STUDY, KELOWNA, BC

Critical Dike Sections – Scenario 4

TETRA TECH EBA

PROJECT NO.	DWN	CKD	APVD	REV
V13203141-01	ML	AGC	AGC	

OFFICE	DATE
EBA-VANC	March, 2014

Figure 8.10

APPENDIX A
TETRA TECH'S GENERAL CONDITIONS

GENERAL CONDITIONS

DESIGN REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This Design Report pertains to a specific site, a specific development, and a specific scope of work. The Design Report may include plans, drawings, profiles and other support documents that collectively constitute the Design Report. The Report and all supporting documents are intended for the sole use of Tetra Tech EBA’s Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, analyses or other contents of the Design Report when it is used or relied upon by any party other than Tetra Tech EBA’s Client, unless authorized in writing by Tetra Tech EBA. Any unauthorized use of the Design Report is at the sole risk of the user.

All reports, plans, and data generated by Tetra Tech EBA during the performance of the work and other documents prepared by Tetra Tech EBA are considered its professional work product and shall remain the copyright property of Tetra Tech EBA.

2.0 ALTERNATIVE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. Tetra Tech EBA’s instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless so stipulated in the Design Report, Tetra Tech EBA was not retained to investigate, address or consider, and has not investigated, addressed or considered any environmental or regulatory issues associated with the project specific design.

4.0 CALCULATIONS AND DESIGNS

Tetra Tech EBA has undertaken design calculations and has prepared project specific designs in accordance with terms of reference that were previously set out in consultation with, and agreement of, Tetra Tech EBA’s client. These designs have been prepared to a standard that is consistent with industry practice. Notwithstanding, if any error or omission is detected by Tetra Tech EBA’s Client or any party that is authorized to use the Design Report, the error or omission should be immediately drawn to the attention of Tetra Tech EBA.

5.0 GEOTECHNICAL CONDITIONS

A Geotechnical Report is commonly the basis upon which the specific project design has been completed. It is incumbent upon Tetra Tech EBA’s Client, and any other authorized party, to be knowledgeable of the level of risk that has been incorporated into the project design, in consideration of the level of the geotechnical information that was reasonably acquired to facilitate completion of the design.

If a Geotechnical Report was prepared for the project by Tetra Tech EBA, it will be included in the Design Report. The Geotechnical Report contains General Conditions that should be read in conjunction with these General Conditions for the Design Report.

6.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

MMM GROUP LIMITED – SURVEY METHODOLOGY

FIELD SURVEY METHODOLOGY

A total of 80 cross-sections along Mission Creek from Ziprick Road to Lake Okanagan were surveyed. Furthermore, profiles of the dike crests on the left and right banks as well as for the thalweg were completed.

The field survey was completed using a combination of RTK GPS and conventional total station methods. Open areas (areas without tree cover) were surveyed using the Pleiades local base station and a Leica Viva Rover. All other areas were surveyed using a 3" Robotic Leica Total Station.

A two person crew completed the field work by traversing along Mission Creek, using the existing and new control set with RTK, to survey the cross-sections and the profiles in conjunction. A field manager was also on site throughout the project to help locate the control, manage the crew, and ensure quality.

A safety plan was put in place prior to starting the field work. The ice on the creek and the fast flowing water were major factors considered in this plan.

All measured data was adjusted using least squares (Starnet Pro Software). Four Geodetic Control Markers (GCM's) and one local Pleiades Base station were each weighted at 1cm in 3 dimensions in the adjustment. The published control coordinates are listed in the table below:

Point	Northing	Easting	Elevation	Description
RTCM	5528803.507	320745.724	371.338	Pleiades Base
200	5526001.380	324456.306	358.244	75H2463
201	5524083.652	321121.310	343.979	75H2787
202	5524447.124	321150.785	343.726	95H1811
203	5528166.031	325953.438	379.670	95H1922

All data was surveyed in UTM Zone 11 NAD83 CSRS coordinates with Geodetic Elevations (HT2.0 Geoid Model).

COORDINATE TRANSFORMATIONS

The original survey data from 1980, 1983, and 1992 was stated to be in NAD27 UTM11 coordinates. In order for the cross-section plots to include both sets of data on one drawing for comparison, some transformations on the original data were required.

The following steps were used:

1. The original data (1980, 1983, and 1992) was transformed to from NAD27 to NAD83 in Microsurvey using the NTV_2 transformation.

2. The original survey contained ties to eleven GCM's with published NAD83 UTM 11coordinates. These ties did not match the published values and are shown in the table below:

Published GCM Values						Transormed (NAD27 to NAD83) from old survey control						Residuals			
Point	Northing	Easting	Elevation	Description		Point	Northing	Easting	Elevation	Description		Delta N	Delta E	Delta H	
729301	5528131.251	326518.796	384.415	73H1765		1980	198069	5528140	326519.4	384.436	73H1765	8.567	0.57	0.021	
644609	5527606.085	327213.296	393.753	73H1904		1983	1983310	5527615	327213.9	393.771	73H1904	8.567	0.576	0.018	
803114	5527453.754	327380.257	397.111	73H1907		1983	1983311	5527462	327380.8	397.129	73H1907	8.565	0.579	0.018	
48710	5526096.472	324222.462	356.553	75H2448		1992	199244	5526105	324223.1	356.577	75H2448	8.391	0.662	0.024	
940759	5526001.380	324456.306	358.244	75H2463		1992	199243	5526010	324457	358.289	75H2463	8.389	0.66	0.045	
492041	5524446.252	321157.796	343.632	75H2489		1980	19801	5524454	321158.5	343.705	75H2489	8.214	0.688	0.073	
93658	5523773.071	321061.473	343.628	75H2785		1992	199299	5523781	321062.2	343.709	75H2785	8.187	0.708	0.081	disturbed
721720	5524083.652	321121.310	343.979	75H2787		1992	19922	5524092	321122	344.072	75H2787	8.204	0.697	0.093	
605345	5524746.280	322493.047	345.764	75H2814		1980	198020	5524755	322493.7	345.806	75H2814	8.28	0.688	0.042	
468603	5524994.056	321974.919	345.211	75H2817		1980	198021	5525002	321975.6	345.258	75H2817	8.267	0.68	0.047	
438754	5528138.020	326315.361	382.998	77H2884		1980	198070	5528147	326315.9	383.017	77H2884	8.56	0.572	0.019	

3. A Helmert Transformation within MicroSurvey was used to best fit the original survey data with the published NAD83 values. The table below shows the resulting coordinate comparison of the published GCM coordinates and the transformed coordinates from the original survey. Note that the elevations were not adjusted or transformed.

Published NAD83 GCM Coordinates						Resulting Helmert Transformation Coordinates						Residuals		
Point	Northing	Easting	Elevation	Description		Point	Northing	Easting	Elevation	Description		Delta N	Delta E	Delta H
729301	5528131.251	326518.796	384.415	73H1765		198069	5528131.272	326518.805	384.436	73H1765		-0.021	-0.009	-0.021
644609	5527606.085	327213.296	393.753	73H1904		1983310	5527606.076	327213.274	393.771	73H1904		0.009	0.022	-0.018
803114	5527453.754	327380.257	397.111	73H1907		1983311	5527453.737	327380.228	397.129	73H1907		0.017	0.029	-0.018
48710	5526096.472	324222.462	356.553	75H2448		199244	5526096.467	324222.485	356.577	75H2448		0.005	-0.023	-0.024
940759	5526001.380	324456.306	358.244	75H2463		199243	5526001.362	324456.319	358.289	75H2463		0.018	-0.013	-0.045
492041	5524446.252	321157.796	343.632	75H2489		19801	5524446.258	321157.797	343.705	75H2489		-0.006	-0.001	-0.073
93658	5523773.071	321061.473	343.628	75H2785		199299	5523773.063	321061.460	343.709	75H2785		0.008	0.013	-0.081
721720	5524083.652	321121.310	343.979	75H2787		19922	5524083.654	321121.301	344.072	75H2787		-0.002	0.009	-0.093
605345	5524746.280	322493.047	345.764	75H2814		198020	5524746.276	322493.047	345.806	75H2814		0.004	0.000	-0.042
468603	5524994.056	321974.919	345.211	75H2817		198021	5524994.063	321974.931	345.258	75H2817		-0.007	-0.012	-0.047
438754	5528138.020	326315.361	382.998	77H2884		198070	5528138.045	326315.376	383.017	77H2884		-0.025	-0.015	-0.019

The transformation described above was applied to all measured coordinates for the original survey including the creek bed, thalweg, dike, and ground.