# Priddis River Hazard Study

Hydraulic Modelling and Flood Inundation Mapping Report – Final

March 31, 2021

Prepared for:
Alberta Environment and Parks

Prepared by:

Stantec Consulting Ltd.

# Sign-off Sheet

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Prepared by _____

(signature)

**James Bigelow, P.Eng**

Approved by _____

(signature)

**Matt Wood, P.Eng**

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# Executive Summary

Alberta Environment and Parks (AEP) commissioned Stantec Consulting Ltd. (Stantec) in August 2017 to undertake the Priddis River Hazard Study. The primary purpose of the study is to identify and assess river and flood hazards along Fish and Priddis Creeks. The study area includes about 30 km of Fish Creek, between Range Road 40 (288 St W) and Tsuut'ina Nation; and about 20 km of Priddis Creek, between its confluence with Fish Creek and Tsuut'ina Nation.

This study is being conducted under the provincial Flood Hazard Identification Program (FHIP), the goals of which include enhancement of public safety and reduction of future flood damages through the identification of river and flood hazards. Project stakeholders include the Government of Alberta, local authorities and the public. Key municipal stakeholders include Foothills County, including the Hamlets of Priddis and Priddis Greens.

The Priddis River Hazard Study includes multiple components and deliverables. This report details the Hydraulic Model Creation and Calibration and Open Water Flood Inundation Map Production components of the study. This report uses information and findings from the Open Water Hydrology Assessment and the Survey and Base Data Collection components of the study, and its information and findings will support the Flood Hazard Identification and Flood Risk Assessment and Inventory components of the study. All hydraulic modelling fulfilled the requirements of the Priddis River Hazard Study Terms of Reference and FHIP Guidelines.

A one-dimensional hydraulic model was created in HEC-RAS Version 5.05 and consisted of a total of 264 channel cross sections along Fish Creek and 181 channel cross sections along Priddis Creek. Channel cross section data was derived from a combination of surveyed data within the channel area and LiDAR data (provided by AEP) within the overbank area. The model includes 11 bridges and 2 culverts along Fish Creek, and 9 bridges and 1 culvert along Priddis Creek. Bridge and culvert data were based on surveys completed by Stantec during Fall 2017 and Winter 2018. Channel and overbank roughness values were estimated using aerial imagery and site photos taken by Stantec during the survey completed in Fall 2017.

Hydrologic estimates were derived from the Open Water Hydrology Assessment Report prepared by Stantec.

The model was calibrated using the May 28, 1998, June 8, 2005, June 18, 2005 and June 21, 2013 flood events. These events were selected based on available highwater mark data. These events provide a range between high magnitude flood flows and what are approximately the bankfull channel flows.

A sensitivity analysis was carried out on the model to determine the effects on the 100-year flood of changing the following modelling parameters: boundary conditions, channel roughness values and overbank roughness values.

The calibrated hydraulic model accurately reflects the hydraulic conditions within the study area.

This model was used to develop flood inundation maps for the 2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750- and 1000-year open water floods throughout the study area. Water surface elevation TINs, water surface elevation grids, and flood depth grids for all mapped flood inundation scenarios were created.

The primary intended use of flood inundation maps contained in the Open Water Flood Inundation Map Library is by stakeholders in emergency response planning and preparation.

# Acknowledgements

The Priddis River Hazard Study was managed on behalf of AEP by Muhammad Durrani, M.Eng., P.Eng., with support from Kurt Morrison, M.Eng., P.Eng., and Jane Eaket, M.Sc., P.Eng., of the River Engineering and Technical Services Section.

The following personnel from Stantec contributed to this component of the study:

- Matt Wood, P. Eng., CPESC – Project Manager, Lead Project Engineer
- James Bigelow, P.Eng.- Project Engineer and Hydraulic Modeling Lead
- Catalina Tandara, CET – CAD Lead
- Marty Anderson, B.Sc. GIS Technician – GIS Support
- Marcel Chichak P.Eng. – Project Advisor and Quality Review

The project team acknowledges assistance provided by personal of the following agencies and their consultants:

- Informatics Branch, AEP
- Hamlet of Priddis
- Hamlet of Priddis Greens
- Robert Miller, Foothills County
- Water Survey of Canada

# 1.0 INTRODUCTION

The Priddis River Hazard Study was conducted by Stantec Consulting Ltd. (Stantec) on behalf of the Government of Alberta, in accordance with the study-specific terms of reference and applicable provincial guidelines.

## 1.1 STUDY BACKGROUND

Alberta Environment and Parks (AEP) commissioned Stantec in August 2017 to undertake the Priddis River Hazard Study. The study is being conducted under the provincial Flood Hazard Identification Program (FHIP), the goals of which include enhancement of public safety and reduction of future flood damages through the identification of river and flood hazards (AENV, 2011). Project stakeholders include the Government of Alberta, local authorities and the public. The key municipal stakeholder is Foothills County.

## 1.2 STUDY OBJECTIVES

The primary purpose of the Priddis River Hazard Study is to identify and assess river and flood hazards along Fish and Priddis Creeks. The study includes multiple components and deliverables.

The model and results described in this report and associated deliverables will support the flood mapping, flood risk assessment and channel stability investigation components of the overall study.

## 1.3 STUDY AREA & REACH

River stationing for the Fish Creek component starts at the downstream end of the study area at the first surveyed cross section and extends to the upstream end of the study area (Figure 1 and Figure 2). River stationing was measured along a line that passed through the surveyed thalweg points. At reaches where the creek experienced bends between two surveyed thalweg points, the line was measured from the 2016 orthographic aerial image.

The downstream end of the study area is located at the edge of the Tsuut'ina Nation boundary. No surveying was completed within Tsuut'ina Nation lands.

For the purpose of this study the study area is comprised of three model reaches of mainstem channel, which were named as: Lower Fish Creek; Upper Fish Creek; and Priddis Creek.

The Lower Fish Creek model reach extends upstream from the Tsuut'ina Nation boundary to the Priddis Creek confluence and includes the following major landmarks:

- the Tsuut'ina Nation boundary at 0+000 m;
- the Highway 22 crossing at 6+935 m;
- the Range Road 32 (Priddis Valley Road W) crossing at 7+571 m; and,
- the confluence with Priddis Creek at 7+872 m.

The Upper Fish Creek model reach extends upstream from the Priddis Creek confluence and includes the following landmarks:

- the 186 Ave W crossing at 7+909 m; and,
- the upstream end of the study reach at 32+136 m.

River stationing for the Priddis Creek model reach starts at the Fish Creek confluence and extends to the upstream end of the study area.

The Priddis Creek model reach extends upstream from its confluence with Fish Creek and includes the following major landmarks:

- the confluence with Fish Creek at 0+000 m;
- the Highway 22 crossing at 15+110 m; and,
- the upstream end of the study reach at 19+120 m.

Author: Emilie Hewko

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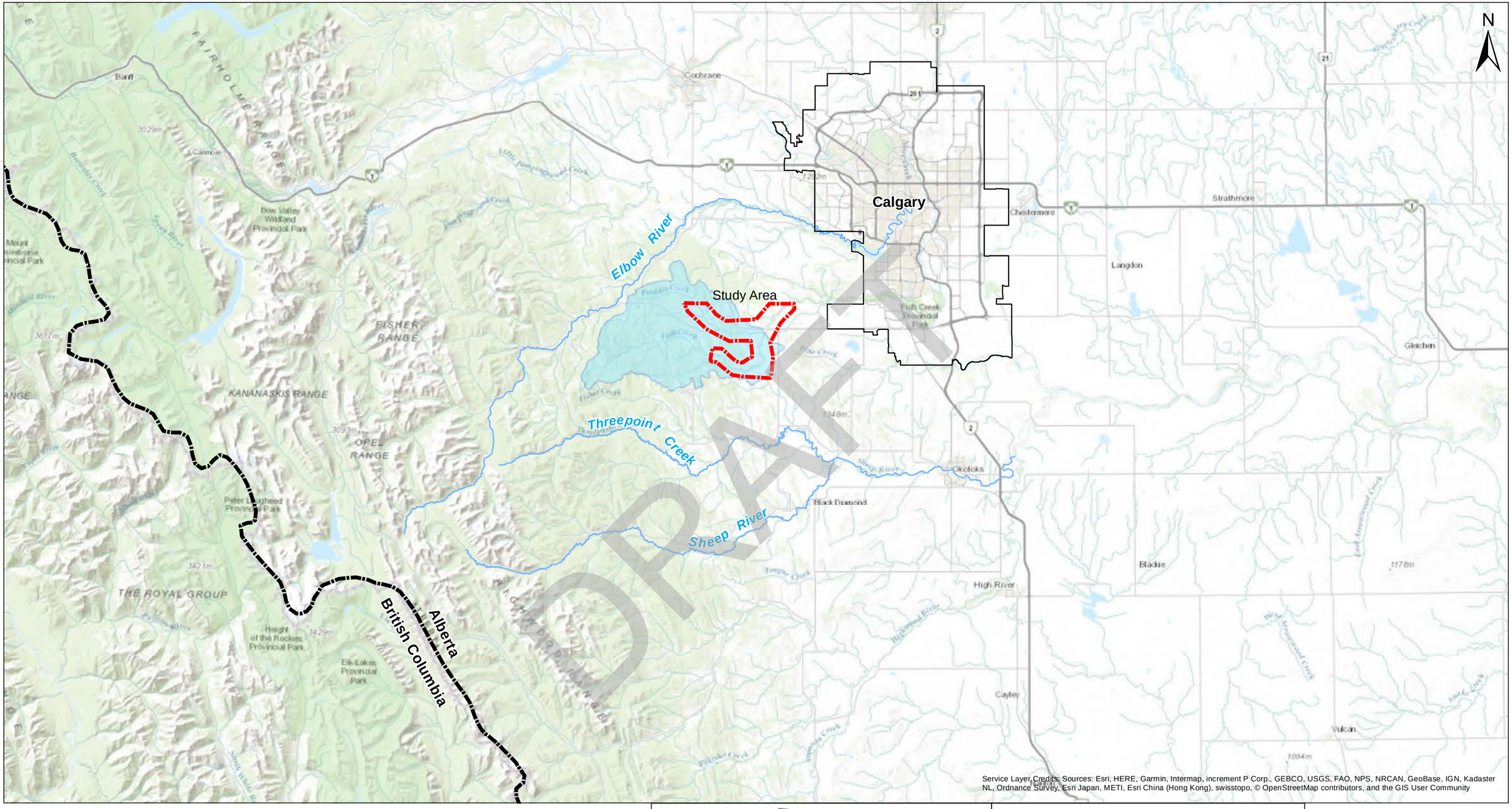


**Legend**

- Watercourse
- Study Boundary
- Calgary City Limits
- Drainage Area

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017


Alberta Government

Priddis River Hazard Study

10 5 0 10
Kilometers
1:500,000

# Location Map Key Plan

| DATE: | QA/QC: |
|---|---|
| July, 2019 | M.A. |

fig_1_priddis_location_map_key_plan
01/10/2019

Stantec

Classification: Public

Author: Marty Anderson

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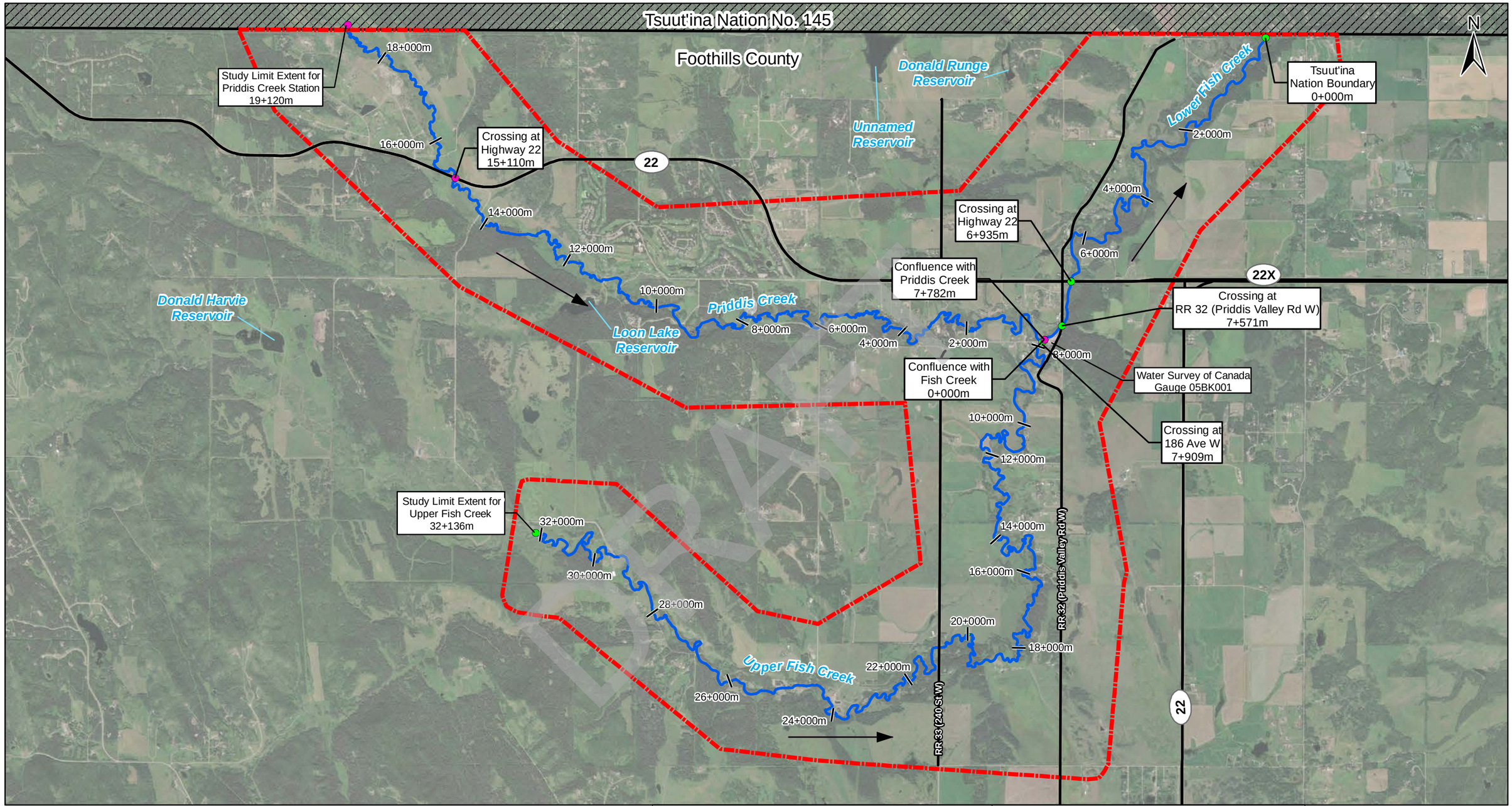



**Legend**

- Study Boundary
- Tsuut'ina Land
- Study Streams
- Highway
- Flow Direction
- Priddis Creek Stationing
- Fish Creek Stationing

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017


Alberta Government

Priddis River Hazard Study

1,000 500 0 1,000
Meters
1:50,000

Study Area Overview

Figure 2

DATE: October 2021

QA/QC:

fig_2_priddis_study_area
10/21/2021

Stantec

Classification: Public

# 2.0 FLOODING HISTORY

## 2.1 GENERAL INFORMATION

The project area lies within the foothills region on the boundary of the eastern slopes of the Rocky Mountains. The land use within the study area is primarily ranching with some agriculture. The upper watershed area and upper reach of the study area is within the Montane subregion (Natural Regions Committee, 2006) and is characterized as rolling foothills, with fluvial and glaciofluvial sands and gravels forming level to gently undulating terraces on valley bottoms. Bedrock exposures occur both in the foothills and in the valleys.

The lower watershed area and majority of the study area is within the Foothills Parkland Natural Subregion (Natural Regions Committee, 2006) and is characterized by “rolling to hilly native grasslands on southerly slopes, aspen woodlands or shrublands in low-lying areas and hay lands on undulating to rolling terrain”.

Flood events within the watershed are typically caused by extreme precipitation events from the west and southeast.

Additional descriptions of the river and valley features are provided in Section 4.0.

## 2.2 OPEN WATER FLOODS

### 2.2.1 Historic & Observed Floods

Hydrometric records collected by Water Survey of Canada (WSC) at WSC Gauge 05BK001 – Fish Creek near Priddis (Figure 3), have been recorded from 1911 to 1916 and 1956 to present. The annual maximum discharges occur between April and August and for 45% of the period of record the peak flow occurred during the month of June. The largest recorded historic flood occurred on June 26, 1915, and was estimated based on highwater mark data to have peaked at approximately 200 $m^3/s$. The other notable, historic, high flow event (i.e., greater than 100 $m^3/s$) was recorded on June 4, 1916 (135 $m^3/s$).

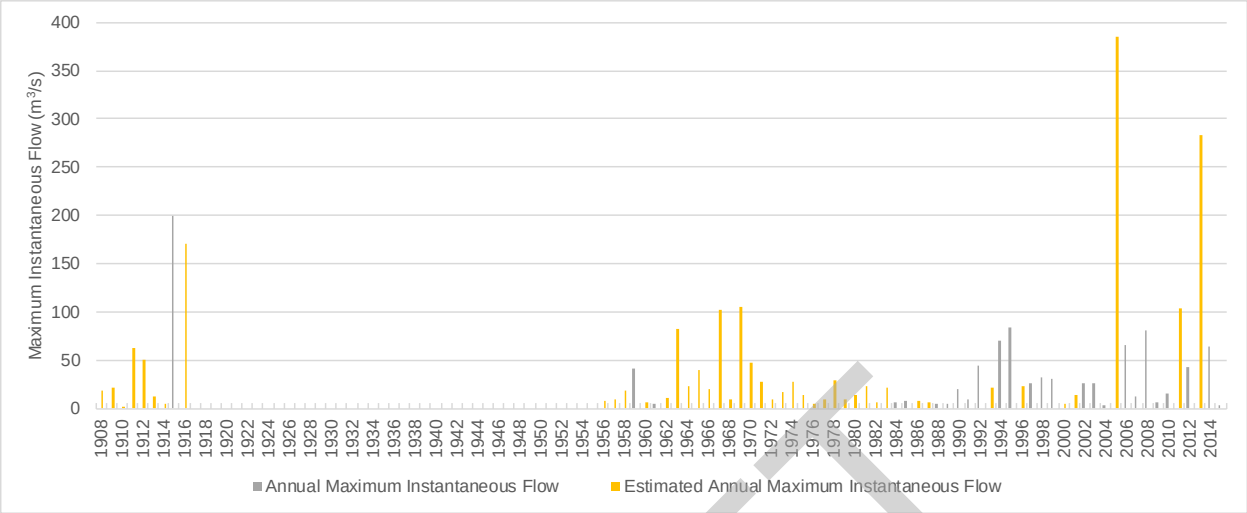
There are no recorded flow data or observed flood accounts from 1916 to 1956. During this period, the adjacent Elbow River experienced large flood events in 1923, 1929 and 1932. Flooding within the neighboring Elbow River watershed does not guarantee that flooding will occur within the Fish or Priddis Creek watersheds; but, these events are of note, as they suggest there may be important flood events that occurred in the study area and which were not captured in the hydrometric record. No peak flow estimates are available for events outside of the hydrometric record.

**Table 1: Annual Peak Flood Flows (Fish Creek near Priddis, WSC Gauge 05BK001)**

| Year | Maximum Annual Instantaneous Flow ($m^3/s$) | Year | Maximum Annual Instantaneous Flow ($m^3/s$) |
|---|---|---|---|
| 1908 | 18.8* | 1990 | 20.0 |
| 1909 | 21.2* | 1991 | 9.7 |
| 1910 | 1.6* | 1992 | 45.0 |
| 1911 | 62.6* | 1993 | 21.9* |
| 1912 | 51.1* | 1994 | 70.3 |
| 1913 | 11.7* | 1995 | 84.2 |
| 1914 | 4.0* | 1996 | 22.3* |
| 1915 | 200.0 (estimated by WSC) | 1997 | 26.6 |
| 1916 | 171.1* | 1998 | 31.9 |
| 1956 | 7.5* | 1999 | 31.3 |
| 1957 | 9.7* | 2000 | 5.1* |
| 1958 | 18.3* | 2001 | 13.2* |
| 1959 | 41.3 | 2002 | 26.0 |
| 1960 | 6.3* | 2003 | 25.6 |
| 1961 | 4.1 | 2004 | 3.9 |
| 1962 | 11.5* | 2005 | 482.0 |
| 1963 | 81.9* | 2006 | 64.8 |
| 1964 | 23.4* | 2007 | 12.6 |
| 1965 | 40.0* | 2008 | 80.6 |
| 1966 | 20.0* | 2009 | 5.5 |
| 1967 | 101.3* | 2010 | 15.6 |
| 1968 | 9.6* | 2011 | 104.0* |
| 1969 | 105.3* | 2012 | 42.5 |
| 1970 | 47.4* | 2013 | 218.0 |
| 1971 | 27.0* | 2014 | 63.4 |
| 1972 | 9.5* | 2015 | 3.1 |
| 1973 | 16.2* | | |
| 1974 | 28.1* | | |
| 1975 | 13.4* | | |
| 1976 | 4.2* | | |
| 1977 | 9.1* | | |
| 1978 | 28.7* | | |
| 1979 | 8.5* | | |
| 1980 | 14.5* | | |
| 1981 | 23.0* | | |
| 1982 | 6.1* | | |
| 1983 | 21.6* | | |
| 1984 | 5.6 | | |
| 1985 | 8.3 | | |
| 1986 | 7.8* | | |
| 1987 | 6.5* | | |
| 1988 | 4.1 | | |
| 1989 | 5.0 | | |

* Peak flow as estimated in Bow, Elbow, Highwood, and Sheep River Hydrology Assessment (Golder, 2017)

**Figure 3: Recorded Peak Flood Series (Fish Creek near Priddis, WSC Gauge 05BK001)**




## 2.2.2 Recent & Recorded Floods

Recently, there have been three notable high flow events recorded within the study area:

- June 8, 2005;
- June 18, 2005; and,
- June 21, 2013.

From June 1 until June 8, 2005, a precipitation event occurred that caused both Priddis and Fish Creeks to overtop their banks and impact bridges. A peak flow of 114.9 m³/s (WSC, 2018) was measured on June 8, 2005, by WSC at the gauge located in the Lower Fish Creek reach. This was approximately a 15-year flood event in the Lower Fish Creek reach. Using the same natural flow distribution factors as those listed in Section 3.1, the Stantec-estimated flows for this event in the Upper Fish Creek and Priddis Creek reaches are 63.4 m³/s and 47.1 m³/s, respectively.

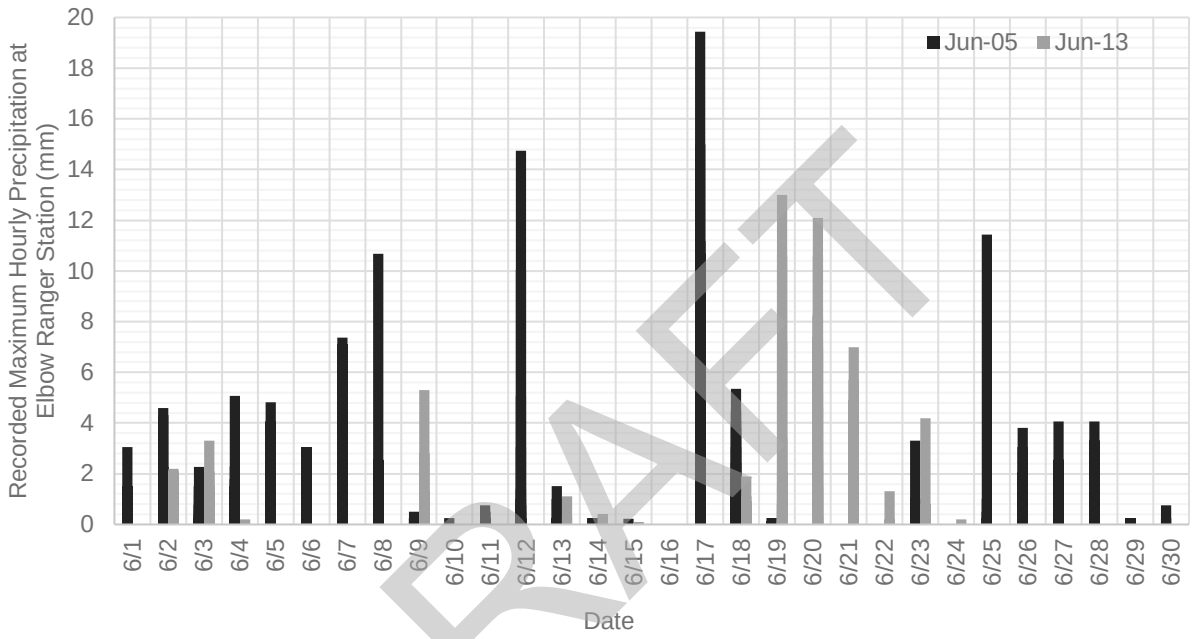
From June 17 to June 19, 2005, additional rain fell within the catchment area causing Loon Lake Dam (located in the Priddis Creek watershed, Figure 2) to be overtopped and breach. This caused a second flood peak in both Priddis Creek and lower Fish Creek. The precipitation and dam breach caused floodwaters to overtop both banks and impact to bridges. Debris that was mobilized during the June 8 event likely exacerbated the flooding that occurred during the second event. The WSC-reported peak flow within lower Fish Creek was 482 m³/s (WSC, 2018). Based on the current flood frequency analysis, this event is considered to be in the order of a 250-year flood event for lower Fish Creek. Based on a detailed hydrologic analysis of the event and naturalization of the flows, the corresponding Stantec-estimated flow for upper Fish Creek is 117.5 m³/s for this event.

The most recent flood event within the study area occurred on June 21, 2013. The WSC-reported peak flow in lower Fish Creek for this event was 218 m³/s (WSC, 2018). The corresponding Stantec-estimated flows during this period are 120.3 ³/s for upper Fish Creek and 89.4 m³/s for Priddis Creek. This event caused significant flood damage in Fish Creek downstream of the study area, however, no information was available describing flood damage within the

study area. One highwater mark for this event was measured by WSC at the Priddis Valley Road W Bridge, located downstream of the WSC gauge.

Figure 4 below illustrates the hourly recorded rainfall amounts at the Elbow Ranger Station (located approximately 15 km west of the study area) during the three recent flood events. Note that the two June 2005 events are combined in this series and represented by the solid black "Jun-05" bars.

**Figure 4: Recent Flood Events – Precipitation Records**






## 2.3 ICE JAM FLOODS

A review of publicly available historic information on ice jam flooding within the study area, and a search of photos and articles available in the Glenbow Museum photo archives, indicated that there is no evidence of significant ice jam flooding along the study area. Foothills County has received reports of minor ice jams along Fish Creek. A review of the historical flood record shows that ice-affected flooding in Fish and Priddis Creeks in the study area is rare and ice jam flooding would be much less severe than open water flooding. The configuration of the watershed, located in the foothills of the Rocky Mountains, tends to produce flood events caused primarily by excessive precipitation resulting from moist air from the southeast invading the foothills belt. Therefore, the current study does not examine ice jam flood hazards in further detail. Ice jam floods typically occur through one of two mechanisms. The first is during a mechanical breakup when elevated flows in the watercourse lift intact and competent ice cover such that it breaks it up in pieces that get entrained in the event's flow. These entrained pieces (ice floes) accumulate at structures and shallow points in the river channel forming an ice jam. These ice jams can back-up water very quickly and cause flooding. Ice jams caused at break-up typically require a thicker, bridged ice cover and sufficient flow to lift the intact ice and move it down the channel. Thermal degradation of the ice cover prior to its mechanical breakup can reduce the strength and size of ice floes, and subsequently reduce the risk of ice jam flooding.

The second mechanism that can induce ice jams is the generation of frazil ice within the watercourse. Frazil ice is a 'slush' ice that forms in super-cooled water. Its formation requires cold air temperatures and the presence of open water leads to come into contact with that cold air. In locations where Froude numbers are low enough, or where conductive materials can draw small amounts of latent energy from the super-cooled water, frazil ice will nucleate out of the water and become entrained in the flow. This frazil can quickly accumulate under an intact ice cover and on the bed. The frazil accumulations thicken the ice cover and concentrate flow under the ice into varying locations across the channel. Continuous accumulation of frazil can lift the intact ice cover and cause mechanical break-up. Frazil ice jams occur in very cold periods when open water flooding is not expected. The flood's combination of ice and water, as well as the freezing of flooded areas can make these types of ice jam flood particularly hazardous and damaging.

Though observation during the field survey and a site visit conducted on November 25, 2018, Stantec observed that much of the ice in Priddis Creek was partially frozen to bed, with small amounts of flow passing through the shallow thalweg. The most prominent concentrations of flow was in the runs and pools. It is possible that flow is typically intermittent (sub-surface) under the ice cover, with portions of the creek completely freezing to bed at shallow bars and riffles. It is also possible that continuity of flow is maintained within lenses and channels that form within the ice that is otherwise groundfast to the channel bed. Open water leads were observed earlier in the winter of 2017/2018 and throughout the winter of 2018/2019. If present during cold periods, these open water leads would create frazil, but the flows rates during frazil formation would be so low that it is expected the creek would freeze over and halt the production of frazil. The risk of frazil induced ice jamming within the study area is expected to be low.

Baseflow is low in the fall and winter and there is little flow depth in the creek leading into freeze-up and throughout the winter months. Because of this, the creek does not have much opportunity to develop a thick, and extensive ice cover. Instead the ice cover is thin, but of varying thickness, and largely ground fast on the shallow bars and riffles that are characteristic of these watercourses. The lack of a thick contiguous ice cover reduces the risk that ice jams caused by mechanical break-up in the study area. Subsequently, the risk of an ice jam occurring and causing flooding is expected to be low.

The headwaters of Fish and Priddis Creeks are within the foothills of the Rocky Mountains. Unlike the neighboring Elbow River, whose headwaters remain snowbound until late-May and early-June, the freshet period on Fish and Priddis Creeks typically occurs in early to late May with the earlier warming of the low-lands. This does pose some risk that the watershed melts while there is still some intact ice in the channel. Chinook winds can also influence the timing of the spring freshet but these winds are also have a drying effect causing snow to sublimate rather than melt. This phenomenon can significantly reduce a snow pack without major increases in baseflow. Flood causing rains generally occur in June and long after the channel ice has melted.

Though the watershed's location in the foothills presents the potential for runoff when there is still intact ice in the channel, the ice that is present is likely in such small thickness, low strength, groundfast, or of such discontinuity that there is a low potential for ice jam induced flooding on Priddis Creek. Though climate change could affect the risk, the low baseflow in the creek limits the ice cover's characteristics, therefore the risk of ice jams would remain low in the study area under a changing climate.

# 3.0 AVAILABLE DATA

## 3.1 HYDROLOGY SUMMARY

Hydrologic inputs to the model were required at each of the upstream ends of the Priddis Creek, Upper Fish Creek and Lower Fish Creek model reaches. An open water hydrologic analysis was undertaken as part of this study to develop flood frequency estimates for the study area during the 2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750-, and 1000-year open water floods (Stantec, 2019). Table 2 lists the estimated drainage areas and Table 3 lists the peak flows derived from the hydrologic analysis and used in hydraulic modelling.

**Table 2: Study Drainage Areas**

| Model Reach | Drainage Area |
|---|---|
| Upper Fish Creek | 149 km² |
| Priddis Creek | 112 km² |
| Lower Fish Creek | 261 km² |

**Table 3: Study Flood Frequency Flow Estimates**

| Flood Return Period | Model Reach Flood Flow (m³/s) | | |
|---|---|---|---|
| | Upper Fish Creek (Upstream of Priddis Creek) | Lower Fish Creek (Downstream of Priddis Creek) | Priddis Creek |
| 2-year | 11 | 19 | 8 |
| 5-year | 30 | 52 | 22 |
| 10-year | 51 | 89 | 38 |
| 20-year | 79 | 139 | 60 |
| 35-year | 108 | 190 | 82 |
| 50-year | 131 | 230 | 99 |
| 75-year | 160 | 280 | 120 |
| 100-year | 184 | 322 | 138 |
| 200-year | 250 | 438 | 188 |
| 350-year | 314 | 551 | 237 |
| 500-year | 359 | 630 | 271 |
| 750-year | 413 | 725 | 312 |
| 1000-year | 471 | 826 | 355 |

## 3.2 DIGITAL TERRAIN MODEL DATA

AEP provided Stantec with a Digital Elevation Model (DEM) based on Bare Earth Light Detection and Ranging (LiDAR) data collected in Fall 2017 for the purposes of this study. The data was collected by Airborne Imaging Inc. on July 23, 2005, and October 20, 2017. The data was compiled in accordance the Priddis River Hazard Study Terms of Reference (AEP, 2017) and FHIP Guidelines (AENV, 2011).

## 3.3 SURVEY DATA

Between September 2017 and May 2018, Stantec executed a program to survey channel cross sections, hydraulic structures and other features. Stantec survey crews collected measurements along the channel at cross sections locations agreed upon with AEP as well as survey data of all hydraulic structures such as bridges, culverts and other features deemed potentially important for flood mapping.

Details regarding the survey procedures, controls and related information is provided in the Survey and Base Data Collection Report (Stantec, 2019) prepared as part of this study.

## 3.4 EXISTING MODELS

AEP has an existing HEC-RAS hydraulic model of Fish and Priddis Creeks, prepared for the Priddis Flood Risk Mapping Study (AENV, 2004). The 38 sections of the model were used to model approximately 4 km of Fish Creek and 1.4 km of Priddis Creek. The study area was largely centered around the confluence between the creeks.

The spatial extent of the 2004 study was significantly smaller than the current Priddis River Hazard Study which includes about 30 km of Fish Creek and about 20 km of Priddis Creek. Where appropriate, the location and alignment of the cross-sections prepared for the current study match those from the previous study for comparative purposes.

## 3.5 HIGHWATER MARKS

Highwater mark (HWM) data from the following flood events were surveyed by the AEP (AENV, 1998, 2006a, and 2006b) or WSC, and supplied to Stantec for hydraulic model creation and calibration:

- May 28, 1998;
- June 8, 2005;
- June 18, 2005; and,
- June 21, 2013.

HWM data is available primarily in the vicinity of the confluence between Fish and Priddis Creeks. HWM data in the upper and lower study reaches were not available at the time of writing of this report.

Table 4 lists the available flood events with HWM data and the estimated corresponding flows in each of the study reaches for the respective flood events.

**Table 4: Highwater Mark Events and Flows**

| Event | Estimated Return Period of Event (Fish Creek at Priddis) | Estimated Maximum Instantaneous Discharge ($m^3/s$) | | |
|---|---|---|---|---|
| | | Upper Fish Creek | Priddis Creek | Lower Fish Creek |
| May 28, 1998 | 3-year | 17.6 | 12.7 | 31.9 |
| June 8, 2005 | 15-year | 63.4 | 45.8 | 114.9 |
| June 18, 2005 | 250-year | 117.5 | 365.0 | 482.0 |
| June 21, 2013 | 50-year | 120.3 | 89.4 | 218.0 |

Table 5, Table 6, Table 7 and Table 8 summarize the available HWM data for each of the flood events. Figure 5, Figure 6 and Figure 7 illustrate the locations of the HWM data for the 1998 and 2005 flood events.

All HWM data was entered into the HEC-RAS model as Observed Water Surfaces for comparison to modeled results, with the exception of data that was either between two sections or sections with more than one HWM. The tables below specify the points included in the model.

**Table 5: May 28, 1998 Flood Event Highwater Mark Data (AEP)**

| HWM ID | Description | Current Model Section | HWM Elevation (m) | Included in Model |
|---|---|---|---|---|
| 98-Prid-2 | In line with spike 5 m east of fenceline | 5 | 1163.27 | Yes |
| 98-Fish-9 | In line with TBM (spike in spruce tree) | 75 | 1163.57 | Yes |
| 98-Fish-8 | In line with TBM (spike in tree along fenceline) | 72 | 1161.93 | Yes |
| 98-Fish-7 | In line with TBM (three stand pipe gas lines) | 64 | 1160.12 | Yes |
| 98-Fish-6a | 5 m u/s of culvert | 59 | 1157.03 | Yes |
| 98-Fish-6b | 5 m d/s of culvert | 58 | 1157.10 | Yes |
| 98-Fish-6c | Priddis Creek, 10 m u/s of confluence | 57 | 1157.21 | Yes |
| 98-Fish-5 | In line with TBM (spike at base of power pole) | 54 | 1156.47 | Yes |
| 98-Fish-4a | 35 m u/s of Priddis Bridge, left bank | 52 | 1155.76 | Yes |
| 98-Fish-4b | 1 m u/s of Priddis Bridge | 50 | 1155.63 | Yes |
| 98-Fish-4c | 1 m d/s of Priddis Bridge, right bank | 49 | 1155.54 | Yes |
| 98-Fish-4d | 20 m d/s of Priddis Bridge, right bank | 48 | 1155.58 | Yes |
| 98-Fish-4e | 50 m d/s of Priddis Bridge, right bank | 47 | 1155.37 | Yes |
| 98-Fish-3 | Halfway between Hwy 22 and Priddis Bridge | 45 | 1154.20 | Yes |
| 98-Fish-2a | 3 m u/s of Highway 22 bridge | 40 | 1153.47 | Yes |
| 98-Fish-2b | 1 m d/s of Highway 22 bridge | 39 | 1153.48 | Yes |
| 98-Fish-2c | 50 m d/s of Highway 22 bridge | 37 | 1153.36 | Yes |
| 98-Fish-1 | D/S of Highway 22 bridge at curve in road | 32-33 | 1151.60 | No |

**Table 6: June 8, 2005 Flood Event Highwater Mark Data (AEP)**

| HWM ID | Description | Current Model Section | HWM Elevation (m) | Included in Model |
|---|---|---|---|---|
| 05.1-Fish-1a | Left bank vegetation | Sections 32 and 33 | 1152.81 | No |
| 05.1-Fish-2a | Left bank, 2 m d/s of Highway 22 bridge | Section 39 | 1154.76 | Yes |
| 05.1-Fish-2b | Left bank, 15 m d/s of Highway 22 bridge | Section 37 | 1154.38 | Yes |
| 05.1-Fish-2c | Left bank, 5 m u/s of Highway 22 bridge | Section 40 | 1154.77 | Yes |
| 05.1-Fish-4a | Left bank, 10 m d/s of Priddis Valley Road Bridge | Section 49 | 1156.71 | Yes |
| 05.1-Fish-4b | Right bank, 3 m d/s of Priddis Valley Road Bridge | Section 50 | 1157.12 | Yes |
| 05.1-Fish-4c | Right bank, 1 m u/s of Priddis Valley Road Bridge | Section 51 | 1157.21 | Yes |
| 05.1-Fish-4d | Right bank, 10 m u/s of Priddis Valley Road Bridge | Section 52 | 1157.29 | No |
| 05.1-Fish-4e | Left bank, 10 m u/s of Priddis Valley Road Bridge | Section 52 | 1157.09 | No |
| 05.1-Fish-5a | Right bank near playground | Section 54 | 1157.89 | Yes |
| 05.1-Fish-6a | Left bank, 3 m u/s from top of culvert | Section 59 | 1159.00 | Yes |
| 05.1-Fish-6b | Left bank, 15 m u/s from top of culvert | Section 60 | 1158.96 | Yes |
| 05.1-Fish-6c | Left bank, 5 m d/s from top of culvert | Section 58 | 1158.83 | Yes |
| 05.1-Fish-6d | Right bank, 8 m d/s from top of culvert | Section 57 | 1158.64 | Yes |
| 05.1-Fish-7a | Right bank, 350 m south of Hamlet of Priddis intersection | Section 64 | 1161.11 | Yes |
| 05.1-Prid-2a | Right bank, 520 m west of Hamlet of Priddis intersection | Section 5 | 1164.00 | Yes |

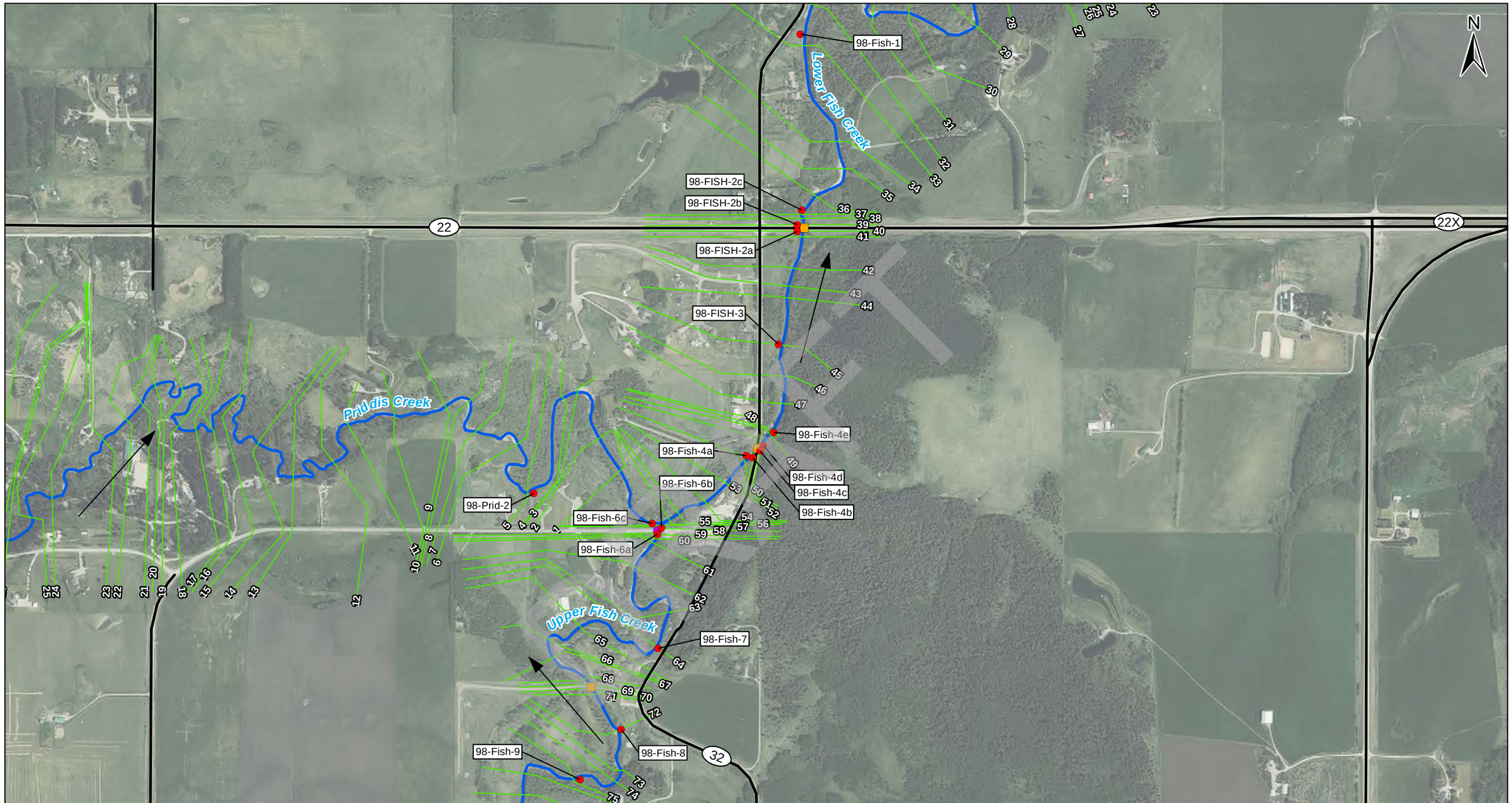
**Table 7: June 18, 2005 Flood Event Highwater Mark Data (AEP)**

| HWM ID | Description | Current Model Section | HWM Elevation (m) | Included in Model |
|---|---|---|---|---|
| 05.2-Fish-1a | Left bank vegetation | Sections 32 and 33 | 1152.96 | No |
| 05.2-Fish-2a | Left bank, 2 m d/s of Highway 22 bridge | Section 39 | 1155.42 | Yes |
| 05.2-Fish-2b | Left bank, 5 m d/s of Highway 22 bridge | Section 39 | 1154.81 | No |
| 05.2-Fish-2c | Left bank, 3 m u/s of Highway 22 Bridge | Section 40 | 1155.51 | No |
| 05.2-Fish-2e | Left bank 5 m u/s of Highway 22 Bridge along ditch | Section 40 | 1155.96 | Yes |
| 05.2-Fish-2f | Waterline on earth fill on SW corner of HWY22 and Priddis Valley Road | Section 41 | 1156.14 | No |
| 05.2-Fish-4a | Left bank, 3 m d/s of Priddis Valley Road Bridge | Section 50 | 1157.87 | No |
| 05.2-Fish-4b | Right bank 2 m d/s of Priddis Valley Road Bridge | Section 50 | 1158.44 | Yes |
| 05.2-Fish-4c | Right Bank, 2 m u/s of Priddis Valley Road Bridge | Section 51 | 1158.66 | No |
| 05.2-Fish-4e | U/s side of Priddis Valley Road Bridge at top of sidewalk | Section 51 | 1158.87 | Yes |
| 05.2-Fish-5a | Right bank near playground | Section 54 | 1159.38 | Yes |
| 05.2-Fish-5b | Right bank, on playground fence post | Section 54 | 1159.30 | No |
| 05.2-Fish-5d | Right bank, by skating rink | Sections 55 and 54 | 1159.20 | No |
| 05.2-Fish-6a | Left bank, 10 m u/s of culvert | Section 61 | 1158.98 | Yes |
| 05.2-Fish-6c | Left bank, Priddis Creek confluence, d/s of culvert | Section 57 | 1160.19 | Yes |
| 05.2-Fish-7a | Right bank, 350 m south of Hamlet of Priddis intersection | Section 64 | 1161.29 | Yes |
| 05.2-Prid-2a | Right bank, 520 m west of Hamlet of Priddis intersection | Section 5 | 1164.78 | Yes |

**Table 8: June 21, 2013 Flood Event Highwater Mark Data (WSC)**

| HWM ID | Description | Current Model Section | HWM Elevation (m) | Included in Model |
|---|---|---|---|---|
| WSC | Measured by WSC on June 26, 2013 at assumed datum elevation of 4.659 m. Survey notes indicate the HWM was measured “100 m downstream of bridge”. Stantec assumes the referenced bridge is the Priddis Valley Road W (Range Road 32 Bridge). | Section 48 (approx.) | 1157.48 | Yes |

Author: Emilie Hewko




**Legend**

- Watercourses
- Highway
- Cross Sections
- Flow Direction
- Study Boundary

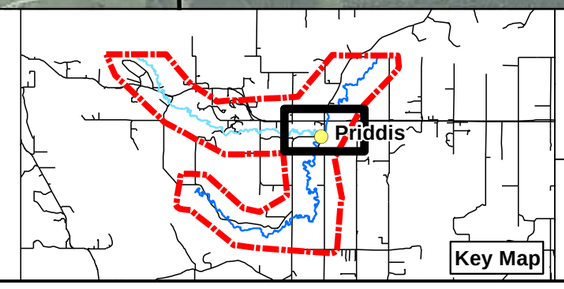
**Highwater Mark Date**

- May 28, 1998

**Hydraulic Structures**

- Bridge
- Culvert

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017




Alberta Government

Priddis River Hazard Study

150 75 0 150
Meters
1:10,000

# May 28, 1998 Flood Event Highwater Mark Locations

Figure 5

DATE: July, 2019

QA/QC:

fig_5_priddis_Highwater_Mark_1998
01/11/2019

Stantec

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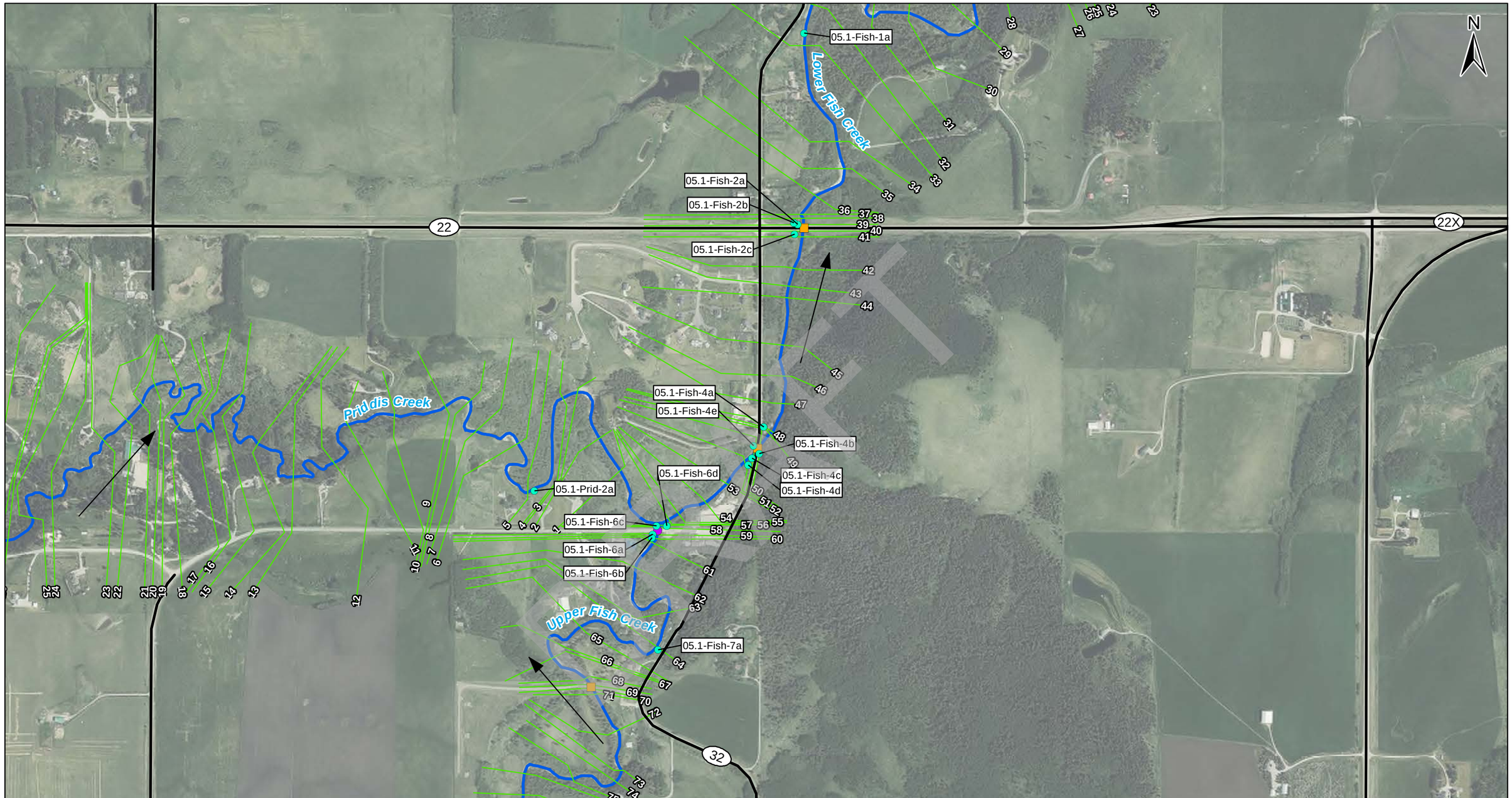
Classification: Public

Author: Emilie Hewko

U:\110773627\gis\map_mxd\Model_Creation_Report\fig_6_priddis_Highwater_Mark_June79_2005.mxd




**Legend**

- Watercourses
- Highway
- Cross Sections
- Flow Direction
- Study Boundary

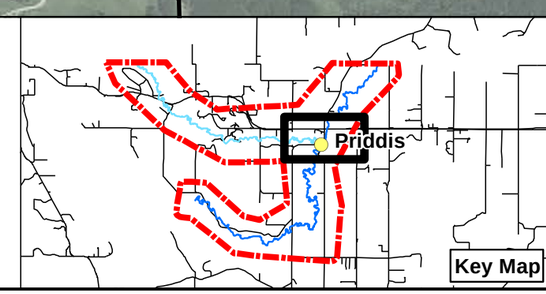
**Highwater Mark Date**

- June 7-9, 2005

**Hydraulic Structures**

- Bridge
- Culvert

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017




Alberta Government

Priddis River Hazard Study

150 75 0 150
Meters
1:10,000

June 8, 2005 Flood Event
Highwater Mark Locations

Figure 6

DATE: July, 2019

QA/QC:

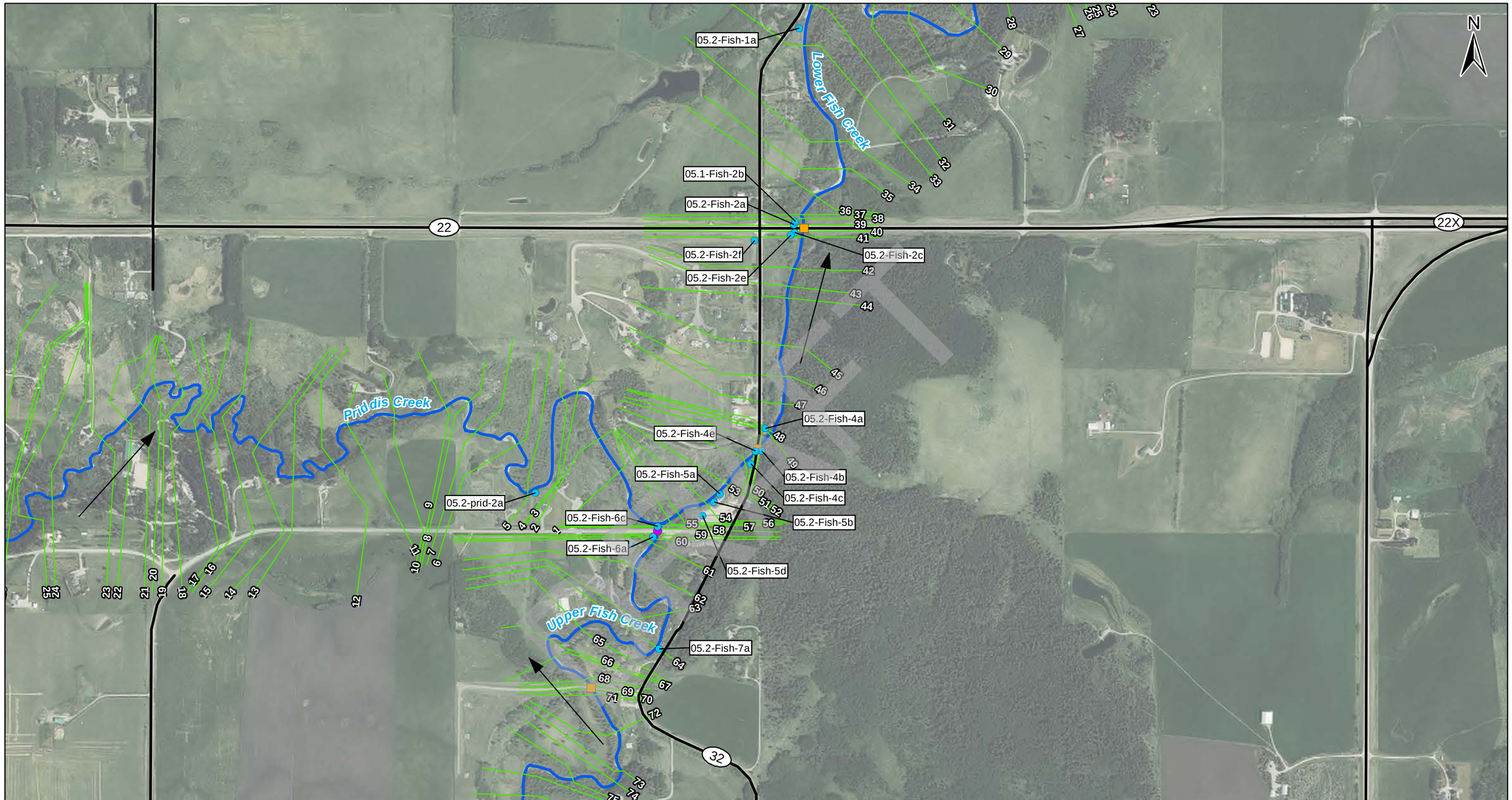
fig_6_priddis_Highwater_Mark_June79_2005
01/11/2019

Stantec

Classification: Public

Author: Emilie Hewko

U:\110773627\gis\map_mxd\Model_Creation_Report\fig_7_priddis_Highwater_Mark_June1719_2005.mxd




**Legend**

- Watercourses
- Highway
- Cross Sections
- Flow Direction
- Study Boundary

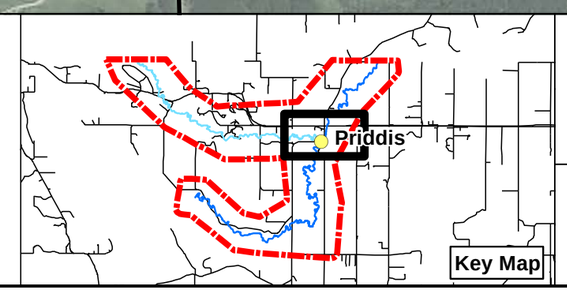
**Highwater Mark Date**

- June 17-19, 2005

**Hydraulic Structures**

- Bridge
- Culvert

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017




Alberta Government

Priddis River Hazard Study

150 75 0 150
Meters
1:10,000

# June 18, 2005 Flood Event Highwater Mark Locations

Figure 7

DATE: July, 2019

QA/QC:

fig_7_priddis_Highwater_Mark_June1719_2005
01/11/2019

Stantec

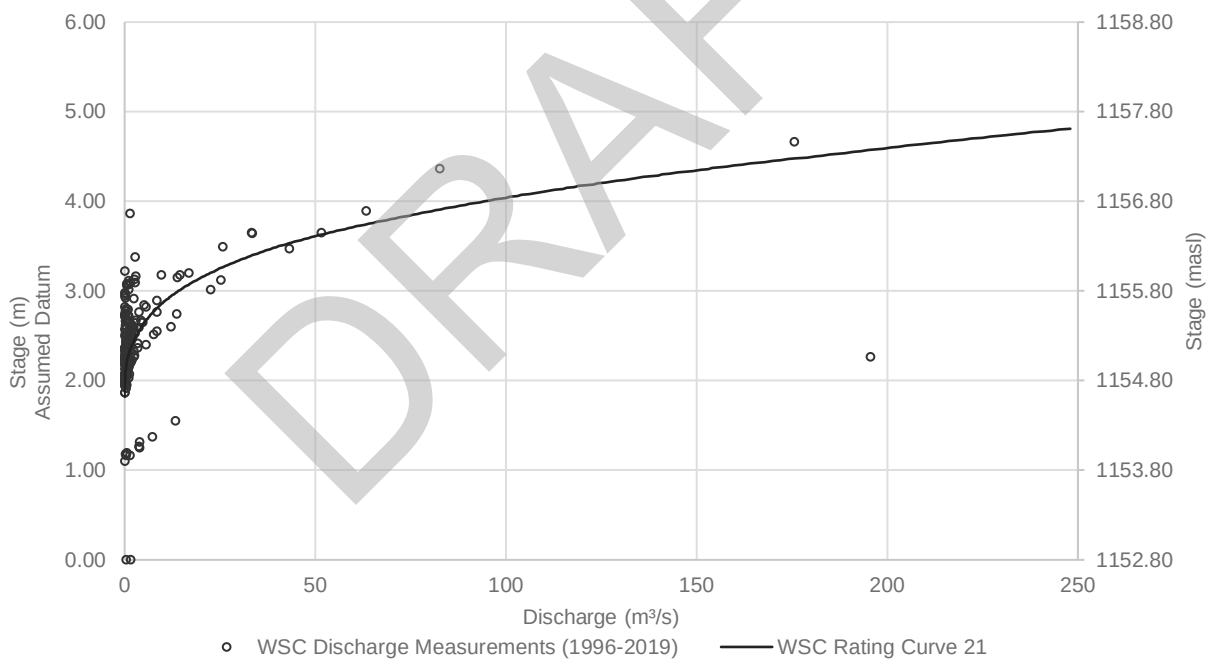
Classification: Public

## 3.6 GAUGE DATA & RATING CURVES

The only hydrometric monitoring station within the study area is at Fish Creek near Priddis (WSC Gauge 05BK001). This station is located on Fish Creek at 50.88547°,-114.32684°, approximately 135 m downstream of the confluence with Priddis Creek. This location is approximately at Section 54 of the current model.

The station has a gross drainage area of 261 km² and has been seasonally active from 1908 to 1917 and 1956 to present. The total record length is 69 years, with 27 years of recorded annual maximum instantaneous flows. The current rating curve for the station (Table 21, updated October 29, 2013) is provided in Figure 8 below. The station is based on a local assumed datum and is not tied to any local benchmarks (pers. com. WSC Staff). In order to obtain water levels adjusted to the project's geodetic datum, Stantec assumed that the thalweg of the creek (1154.62 m in the geodetic datum as surveyed in Fall 2017) was equal to the stage when no discharge is measured in the creek (1.80 m in the local datum). A shift from the gauge datum to the geodetic datum of 1152.82 m was applied to the Table 21 rating curve and results in the rating curve provided in Figure 8. Discharge measurements collected by WSC from 1996 to 2019 (and provided to Stantec for this study) are illustrated on Figure 8.

**Figure 8: Adjusted Rating Curve for Fish Creek near Priddis (WSC Table 21)**






## 3.7 FLOOD PHOTOGRAPHY

Photographs taken at the measured HWM locations following the June 2005 flood events were made available by AEP and used for this report. These photos were taken after the peak had passed but were useful in observing flow patterns during periods of high flow. Photo 1 below provides an example of one of the photos that was captured after the June 18, 2005 flood event while the creek was still under flood conditions.

**Photo 1 - Looking upstream (southwest) at Fish Creek from Priddis Valley Road W Bridge (AEP, HWM Report June 18-19, 2005)**


Both aerial and ground photography was not available for any of the other flood events within the study area.

# 4.0 RIVER AND VALLEY FEATURES

## 4.1 GENERAL DESCRIPTION

The project area includes about 30 km of Fish Creek and about 20 km of Priddis Creek, located within the foothills of southwestern Alberta, just east of the Eastern Slopes of the Rocky Mountains.

In general, Priddis and Fish Creeks originate in the foothills and flow eastward towards the Hamlet of Priddis and the City of Calgary. The creeks go through various levels of confinement as they follow an irregular meandering pattern through the valley bottom. Priddis Creek is located in a meltwater channel (or tunnel channel) that was connected to the Elbow Valley; and as a result, is an underfit channel that experiences very little confinement, except in locations where it abuts rock or has been altered through development.

Upper Fish Creek has a different glacial legacy than lower Fish and Priddis Creeks, and exhibits more confinement in its valley within the foothills. Confinement of upper Fish Creek decreases as it leaves the foothills and enters the plains to the east. This transition occurs within the study reach and the wide, flat valley bottom that is present in much of the study reach is conducive to shallow, but expansive flooding when flood waters overtop the creek banks.

Oxbows, remnant channels and abandoned side channels can be observed within the floodplain throughout much of the study reach. There is no visible evidence of scrolling, suggesting much of the lateral channel migration was sudden, induced by floods and further instigated by debris in those floods.

Development and land use in the study area is limited to ranching and agriculture. There are a several number of rural private residences along the creek, and Priddis is located at the confluence of Priddis and Fish Creeks.

Land is primarily undeveloped upstream of the study area, with some ranching areas in the east and resource extraction in the form of forestry, oil and gas and grazing leases more prevalent in the uppermost headwaters. The headwaters also contain the McLean Creek Public Land Use Zone. Downstream of the study area, Fish Creek travels through Tsuut'ina Nation and Fish Creek Provincial Park, before joining the Bow River in southeastern Calgary.

## 4.2 CHANNEL CHARACTERISTICS

At its confluence with Fish Creek in the Hamlet of Priddis, Priddis Creek has a catchment area of 107 km². The study reach includes the lower 19 km of the creek channel immediately upstream of the confluence. The first 10 km of the creek (within the study area) features a meandering to tortuously meandering channel within a 300 m to 400 m wide valley. The 10 m to 15 m wide channel features low (0.5 m to 1.5 m high), vegetated, 2:1 sloped (H:V) banks, an absence of large woody debris and beaver activity including dams across the entire creek causing significant local impoundments (Photo 2 and Photo 3). Channel migration was noted to be minor within this reach and is likely caused by beaver activities as opposed to flooding or erosion. This area is sparsely developed within the floodplain with primarily grass and shrub vegetation.

**Photo 2: Looking downstream at typical cross section in upper Priddis Creek (Stantec, October 2017)**

**Photo 3: Beaver Dam Impacts in upper Priddis Creek (Stantec, October 2017)**

At Section 81 (9.3 km upstream of the Fish Creek confluence), the valley narrows to 35 m wide. This constriction, caused by the existing topography, marks a significant change in channel and floodplain characteristics of the creek.

Downstream of the constriction, and for 9.3 km to the confluence, the valley widens to a maximum of 900 m wide. This reach features evidence of historic terraces and significant channel migration. This reach is developed with many private buildings and developed land on both sides of the creek. Vegetation within this area is more mature and features large trees immediately adjacent to the active channel (Photo 4). Beaver activity within this reach appears to be much less prevalent than the upper reach.

**Photo 4: Looking upstream at typical cross section in lower Priddis Creek (Stantec, October 2017)**

Upper Fish Creek can also be considered as two distinct reaches with the division between the two located at the culvert crossing at Highway 33 (240 St W, Section 143). The 12 km upstream of this point features a channel within a relatively narrow 100 m to 200 m wide valley, some development, a mix between small and mature vegetation and a total of 7 bridges that have varying impacts on flood hydraulics. The 12 km downstream of this point features a tortuously meandering channel within a 300 to 400 m wide valley, some development, and for the most part, a lack of mature vegetation. Evidence of channel migration is significant within this lower 12 km. Photo 5 illustrates a typical cross section and overbank area within the Upper Fish Creek reach.

**Photo 5: Looking downstream at typical cross section in upper Fish Creek (Stantec, October 2017)**

The final reach is Lower Fish Creek, below the confluence with Priddis Creek. The valley width at this reach increases as the channel moves downstream from 350 m to 600 m wide. Channel migration is a key characteristic of

this reach with evidence of abandoned side channels and oxbows within the floodplain. Development is high (for this study area) at the upstream end of the reach but decreases as the channel moves downstream (Photo 6).

**Photo 6: Looking upstream at typical cross section in lower Fish Creek (Stantec, October 2017)**

## 4.3 FLOODPLAIN CHARACTERISTICS

The floodplain within the study area varies between low brush dominated by willows and alders within the less confined reaches and mature vegetation within the more confined reaches. This is most likely due to topography and presence of the water table. The floodplains include vegetated remnant channels and sub-channels in many areas. These channels will activate and convey flow once the creeks overtop their banks. Some of the channels feature undersized local culverts that we expect have been designed for local stormwater drainage as opposed to flood conveyance. Floodplain blockages are rare due to the relatively low development in the study area.

The wide flat valley bottoms of both creeks are bisected at many locations with elevated roads that have hydraulic impacts to overland flood conveyance. Highway 22 is one of those elevated roads as it crosses Priddis Creek within this reach at Section 145 via an 8.15 m wide bridge-sized CSP arch-culvert (Photo 7). Note the standing water under the bridge at the time of the photo was due to a beaver dam downstream of the structure.

**Photo 7: Looking downstream at the Highway 22 Bridge over Priddis Creek (Stantec, 2018)**

The fill within the floodplain that makes up the approaches to this bridge causes a constriction to the entire valley during flood events.

Downstream of the valley constriction at Section 81, the floodplain adjacent to Priddis Creek is mature and denser vegetation along with increased development immediately adjacent to the creek. This reach includes five smaller bridges or culverts spanning the creek. Many of these structures are perched and during flood flows would allow for flooding on both sides of the structure. Many side channels were identified within this reach that could become activated during flood events due to minor elevation changes caused by debris jams or beaver activity.

The Fish Creek floodplain features a mix of mature vegetation, small vegetation and sparse development adjacent to the creek. Hydraulically, the most notable feature within the upper Fish Creek floodplain is the culvert (Photo 8) under Range Road 33 (240 Street W) (FC-CULVT-2). The approaches within the floodplain down to the culvert are greater than 5 m high and cause severe back-flooding during major flood events as shown by modelling.

**Photo 8: Looking upstream at the Range Road 33 (240 St W) Culvert (FC-CULVT-2) over Fish Creek (Stantec, 2018)**

Both creeks feature many topographic depressions within the floodplain. These are likely to have been caused by remnant channels, abandoned oxbows and, to a lesser extent, anthropogenic activities. These depressions will fill during flood events due to increased groundwater levels but will not convey a significant amount of flow.

## 4.4 BRIDGES CULVERTS & WEIRS

There are 21 bridges and 4 culverts spanning the two creeks within the study area. 19 of the structures are privately owned while six structures are owned by the Government of Alberta. Due to the relatively narrow width of the creeks, many of the bridges span the entire active channel with no piers. The types of bridges vary from concrete highway bridges to private, wooden pedestrian bridges.

All structures were surveyed by Stantec to capture the structure geometry using a combination of GNSS RTK survey, conventional surveying and tape measurements. All hydraulic structures located on Fish Creek are listed in Table 9 and all hydraulic structures located on Priddis Creek are listed in Table 10. The surveyed bridge details included length of span, width of bridge, top of curb/solid guard rail elevations, low chord elevations, number of piers along with width and location, type and shape of piers, roadway profiles, and bridge wingwalls. Surveyed culvert details included culvert type, culvert shape, entrance condition, dimensions and barrel length, upstream and downstream invert elevations, and top of roadway profile.

There are two small structures (PC-BRDG-1 and PC-CULVT-1) in lower Priddis Creek that are located on an abandoned side-channel approximately 40 m from the main channel of Priddis Creek. These structures were not included in the model as they were not located on the main channel and are not expected to significantly impact the conveyance area of the channel.

There are no weirs identified within the study area.

**Table 9: Fish Creek Hydraulic Structures**

| Model Hydraulic Structure ID No. | AT Bridge File No. | Description | Fish Creek Station (m) | | Included in Model |
|---|---|---|---|---|---|
| | | | Start | End | |
| **FC-BRDG-1** | 2047 | Highway 22x Bridge | 6+929 | 6+945 | Yes |
| **FC-BRDG-2** | 1312 | Priddis Valley Road W Bridge | 7+552 | 7+577 | Yes |
| **FC-CLVT-1** | 1322 | 186 AVE West Bridge | 7+904 | 7+923 | Yes |
| **FC-BRDG-3** | - | Local Bridge at 50°52'52.18"N, 114°19'53.07"W | 8+923 | 8+931 | Yes |
| **FC-BRDG-4** | - | Local Bridge at 50°51'36.01"N, 114°19'51.18"W | 15+523 | 15+530 | Yes |
| **FC-CLVT-2** | 1314 | 240 Street West Culvert Bridge | 20+646 | 20+696 | Yes |
| **FC-BRDG-5** | - | Local Bridge at 50°50'27.70"N, 114°21'44.01"W | 23+226 | 23+229 | Yes |
| **FC-BRDG-6** | - | Local Bridge at 50°50'36.36"N, 114°22'32.19"W | 24+968 | 24+973 | Yes |
| **FC-BRDG-7** | - | Local Bridge at 50°50'35.52"N, 114°22'41.80"W | 25+163 | 25+167 | Yes |
| **FC-BRDG-8** | - | Local Bridge at 50°50'38.11"N, 114°23'17.10"W | 26+038 | 26+039 | Yes |
| **FC-BRDG-9** | - | Coalmine Road Bridge | 26+708 | 26+724 | Yes |
| **FC-BRDG-10** | - | Local Bridge at 50°51'9.90"N, 114°24'9.38"W | 28+033 | 28+039 | Yes |
| **FC-BRDG-11** | - | Coalmine Road Bridge | 29+377 | 29+388 | Yes |

**Table 10: Priddis Creek Hydraulic Structures**

| Model Hydraulic Structure ID | AT Bridge File No. | Description | Priddis Creek Station (m) | | Included in Model |
|---|---|---|---|---|---|
| | | | Start | End | |
| **PC-CLVT-1** | - | Local Culvert at 50°53'19.77"N, 114°21'43.12"W | 5+078 | 5+081 | No |
| **PC-BRDG-1** | - | Local Bridge at 50°53'19.66"N, 114°21'49.77"W | 5+290 | 5+294 | No |
| **PC-BRDG-2** | - | 256 St West Bridge | 6+023 | 6+043 | Yes |
| **PC-BRDG-3** | - | Local Bridge at 50°53'18.28"N, 114°22'28.75"W | 6+545 | 6+549 | Yes |
| **PC-BRDG-4** | - | Local Bridge at 50°53'15.85"N, 114°23'2.75"W | 7+671 | 7+675 | Yes |
| **PC-BRDG-5** | - | Local Bridge at 50°53'11.89"N, 114°23'8.26"W | 8+055 | 8+059 | Yes |
| **PC-BRDG-6** | - | Local Bridge at 50°53'12.75"N, 114°23'51.65"W | 9+385 | 9+398 | Yes |
| **PC-CLVT-2** | - | Local Culvert at 50°53'28.65"N, 114°24'33.14"W | 10+872 | 10+886 | Yes |
| **PC-BRDG-7** | - | Local Bridge at 50°53'31.77"N, 114°24'43.56"W | 11+212 | 11+215 | Yes |
| **PC-BRDG-8** | 428 | Coalmine Road Bridge | 14+168 | 14+185 | Yes |
| **PC-BRDG-9** | 429 | Highway 22x Bridge | 15+100 | 15+118 | Yes |
| **PC-BRDG-10** | - | Township Road 225 (162 Ave W) Bridge | 15+713 | 15+727 | Yes |

Author: Marty Anderson

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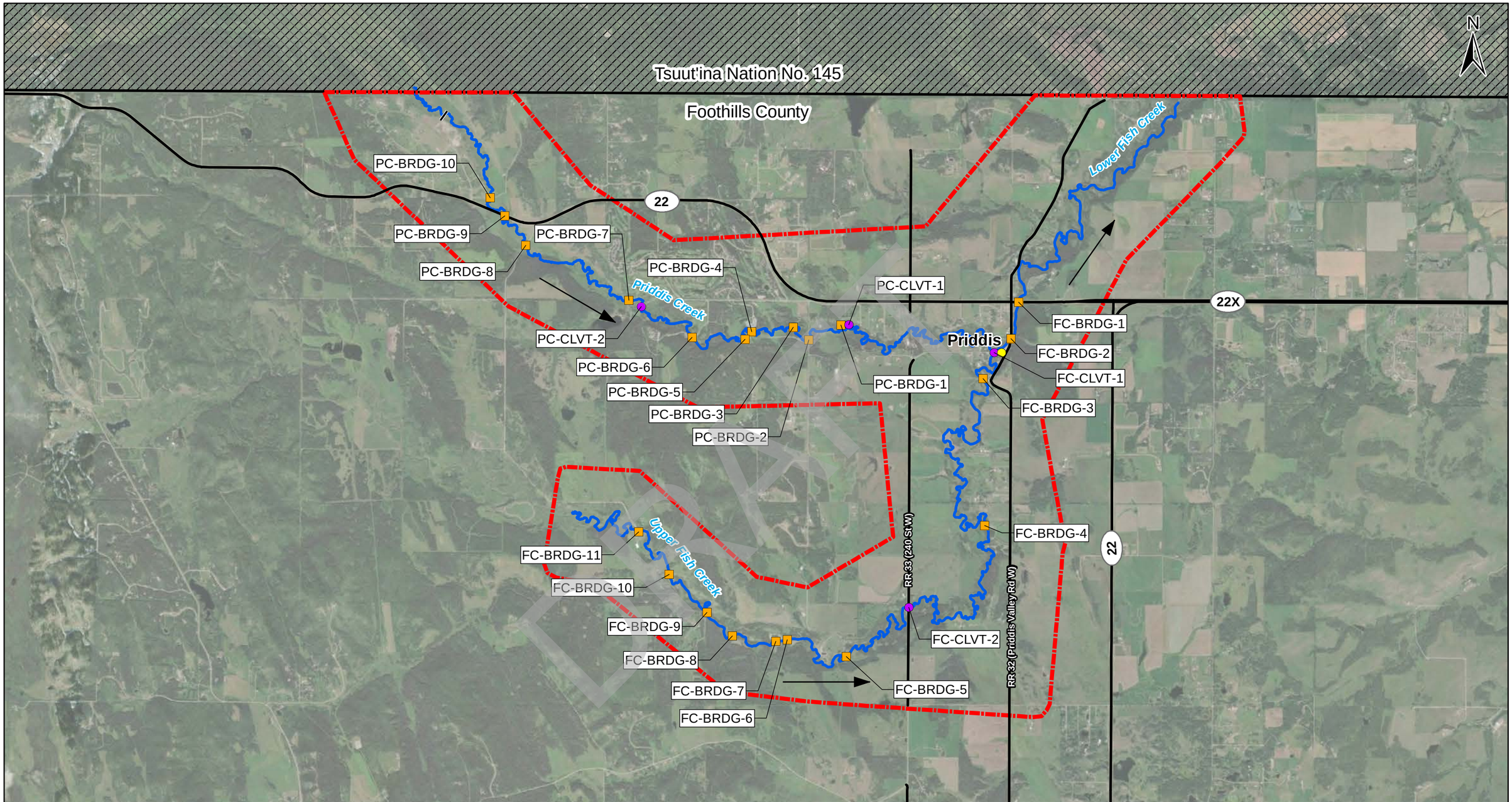



**Legend**

- Study Boundary
- Tsuut'ina Land
- Study Streams
- Highway
- Flow Direction

**Hydraulic Structures**

- Bridge
- Culvert

Projection: NAD 1983 3TM 114
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017


Alberta Government

Priddis River Hazard Study

Hydraulic Structure Locations

1,200 600 0 1,200
Meters
1:60,000

Figure 9

DATE: October 2021

QA/QC:

fig_9_hydraulic_structure_locations
10/21/2021

Stantec

Classification: Public

## 4.5 FLOOD CONTROL STRUCTURES

There are no structures identified by Foothills County within the study area with a dedicated flood control or flood attenuation purposes. There are 4 privately owned dams within the study area; however, based on the hydrological analysis, these structures provide no flood attenuation for Priddis or Fish Creeks. None of these dams are in-line with the main channel and were not included in the hydraulic modelling.

## 4.6 OTHER FEATURES

There were no other identified features that were included in the hydraulic model.

# 5.0 MODEL CONSTRUCTION

## 5.1 HEC-RAS PROGRAM

### 5.1.1 Theoretical Aspects

HEC-RAS is a software program that was first developed by the United States Army Corps of Engineers in 1995 and has been continuously updated as knowledge and modelling techniques have become more refined (USACE, 2016). At the time of the preparation of this document, Model 5.0.5 (released in June 2018) was the most current version of the software and was used for the creation of the Priddis River Hazard Study hydraulic model.

The one-dimensional HEC-RAS software is designed to execute hydraulic calculations for a full network of natural and constructed channels, overbank/floodplain areas and more. For steady flow water surface profiles, the basic computational procedure is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction (Manning's equation) and contraction/expansion effects (via a coefficient multiplied by the change in velocity head). The momentum equation is used in situations where the water surface profile is rapidly varied. These situations may occur during mixed flow regime calculations and evaluating hydraulics at bridges or river confluences. The software is also designed for application in floodplain management and flood hazard studies to evaluate floodway encroachments for two-zone hazard delineation.

Bridges and culverts can be entered into the software to compute the energy losses through these structures. Bridge routines allow modelling of the structure using low flow, pressure flow or high flows with the energy equation only. Culvert hydraulics are based on U.S. Federal Highway Administrations (FHWA) standard equations and can model many different types of culvert structures and materials.

### 5.1.2 General Model Setup

The Priddis River Hazard Study hydraulic model was set up using the following procedure:

1) Development of the Geometric Surface: The geometric surface for the hydraulic model was developed by combining surveyed channel data and floodplain LiDAR data. The model is one-dimensional and only performs calculations at the cross section locations, therefore there was no need to develop a two-dimensional model that included the entire bathymetry of the river through the study reaches.

Selection and alignment of all cross sections was determined prior to the survey to meet the requirements of the FHIP and are discussed in detail in Section 5.2.1. At each section, channel surveys were completed to delineate the water's edge, top of bank, thalweg and other features to accurately characterize the channel. Each cross section survey included approximately 20 m of overbank shots beyond the observed top of bank.

To merge the surveyed channel data and the floodplain DEM data, Stantec completed a CIVL3D procedure of converting the surveyed points into narrow surfaces for each section. The three-dimensional narrow surfaces represented an accurate depiction of the surveyed channel (and overbank) for each section. The narrow surfaces were then exported into a compatible raster format to be incorporated into the DEM data using the raster calculator. At the locations of the survey, the DEM elevations were replaced by the surveyed surfaces to create a combined surface. This eliminated the need for any interpolation or modifying raw survey data, increasing the elevation accuracy of data that would be entered into the model geometry file.

Stantec notes that the combined surface was used for model development only. As per direction from AEP, the combined surface is not intended to be used to map inundation areas, flood depth grid creation or subsequent surface analyses.

2) Definition of HEC-RAS Properties: The HEC-RAS properties data included confirmation of cross section locations, overbank locations, channel thalweg locations and manning's roughness areas. Additional discussion regarding the assumptions and procedures for modelling this data is provided in Section 5.2 of this report.

3) Compilation of data in HEC-GeoRAS: The combined surface and HEC-RAS properties were compiled using HEC-GeoRAS software Version 10.2 (USACE, 2018b). HEC-GeoRAS is a set of procedures, tools and utilities for processing geospatial data in ArcGIS to allow for the preparation of geometric data for import into HEC-RAS. The result of this step was a geometric export file that could be opened in HEC-RAS and formed the basis of the initial geometry model file.

4) Refining of the Geometric Data in HEC-RAS: Once the base geometry file was imported to HEC-RAS, Stantec manually added bridges, culverts and ineffective flow areas within the study area. Additional discussion regarding the assumptions and procedures for modelling these features is provided in Section 5.2 of this report.

5) Input of Hydrologic Data: Hydrologic data for the model was entered manually based on the Open Water Hydrology Assessment Report (Stantec, 2019). Additional information regarding the origin of data is provided in Section 3.1 of this report.

6) Running the Model: The model was then run using the subcritical flow regime.

7) Model Refinement: Following the initial successful run of the model, each of the profiles were analyzed to review and fix conflicts by adjusting ineffective flow areas as required to balance conveyance. Additional discussion regarding the usage of ineffective flow areas is provided in Section 5.4.3 of this report.

8) Model Calibration: The model was compared to the observed HWM data for three flood events and roughness values were adjusted as required. Additional discussion regarding the calibration process is provided in Section 5.3 of this report.

## 5.2 GEOMETRIC BASE DATA

### 5.2.1 Cross Section Data

The locations and alignments of the cross sections for the model were selected based on the following guiding principles:

- For selection only, the locations and alignments were based on 2016 ortho-imagery and 1 m LiDAR data (flown in 2005) and, where the 1 m LiDAR was not available, 15 m LiDAR DEM.
- Sections were selected at all representative locations throughout the channel. These include where changes occur in slope, cross sectional area or channel roughness, at the upstream and downstream faces of bridges, and other channel restrictions.
- Where an abrupt change in topography or roughness occurs, several cross sections were used to describe the change.
- Sections were extended into the entire expected flood hazard zone of the main channel in excess of the expected 1000-year flood event.
- Intervals between sections were selected to adequately define river geometry and ensure the assumption of uniform flow within a section is valid.
- Sections have been aligned to be perpendicular to the expected flow lines for flood events from the 2-year to the 1000-year flood events. Where irregularities in the topography challenged the alignment at all flood levels, alignments were selected to focus on the expected 100-year flood flow.
- The number of vertices was minimized.

A total of 261 cross sections were surveyed for Fish Creek, while 181 cross sections were surveyed for Priddis Creek. Survey data was captured by Stantec in Fall 2018. The in-channel cross sections delineated the water's edge, top of bank, thalweg and other features to accurately characterize the river channel. Beyond the top of bank on both sides, the surveyed cross sections included 20 m into the overbank area. Additional discussion regarding the methodology, controls and techniques that were implemented as part of the survey can be found in the Survey and Base Data Collection Report (Stantec, 2019).

The LiDAR data used for cross-section data beyond the limits of the survey was collected by others for AEP and was provided to Stantec on February 2, 2018, for overbank modelling purposes. LiDAR and survey data were merged using the technique described in Section 5.1.2 of this report.

As per the FHIP Guidelines (AEP, 2011), the reach should extend sufficient distance downstream of the study area so that normal flow depths are obtained by the time calculations reach the study area. Discussion regarding the downstream boundary condition assumptions are provided in Section 5.6.1 of this report.

### 5.2.2 Bridges, Culverts & Weirs

There are 21 bridges and 4 culverts within the study area. Geometry of each structure was surveyed using a combination of GNSS RTK survey, conventional surveying and tape measurements. Photographs and detailed profile sketches including field measurements were created for each hydraulic structure. The surveyed bridge details

included length of span, width of bridge, top of curb/solid guard rail elevations, low chord elevations, number of piers along with width and location, type and shape of piers, roadway profiles, and bridge wingwalls. Surveyed culvert details included culvert type, culvert shape, entrance condition, dimensions and barrel length, upstream and downstream invert elevations, and top of roadway profile. This data was then manually entered into the model geometry file.

In some instances, as-built information was available for some structures. This information was considered as a reference however, where there were discrepancies, the survey data governed.

Additional structure information including photos and sketches of each structure can be found in the Survey and Base Data Collection Report (Stantec, 2019).

Structures were modelled using energy low flow methods and pressure and/or weir for high flow methods. For the pressure and weir flow calculations, a coefficient of 0.8 was used for all structures in accordance with standard procedures (USACE, 2016). Ineffective flow areas were manually applied to the sections immediately upstream and downstream of all structures. The locations, elevations and extents of these ineffective areas is discussed in detail in Section 5.4.3 of this report.

### 5.2.3 Flood Control Structures

There were no identified flood control structures within the study area.

### 5.2.4 Other Features

No other features of note were identified for inclusion into the hydraulic model.

## 5.3 MODEL CALIBRATION

### 5.3.1 Methodology

Calibration of the model to observed low and high flow events is critical to ensuring the hydraulic model reflects physical conditions as close as possible. The primary model parameter that can be adjusted to calibrate the model is the Manning's roughness value. Selection of an accurate roughness value includes a review of available literature, site photos taken by Stantec surveyors in Fall 2017 and current aerial imagery of the study area. In addition to the above, roughness values that were used in the 1993 calibrated HEC-RAS model were considered as a starting point for the channel roughness values for each reach.

### 5.3.2 Low Flow Calibration

The model was calibrated from a low flow perspective using highwater mark data from the May 28, 1998 flood event.

AEP collected HWM data for May 28, 1998 flood event, a flood with a peak flow of 31.9 $m^3/s$ within lower Fish Creek. For the most part, this event was confined within the channel and was therefore used in this analysis to validate the channel and bank roughness values. HWM data was limited to the area adjacent to the confluence of Fish and Priddis Creeks. This limitation resulted in no significant calibration adjustments from the initial values.

Using the same flow distribution factors as described in Section 3.1, the estimated flows during this period is 17.6 $m^3/s$ within upper Fish Creek, 31.9 $m^3/s$ within lower Fish Creek and 12.7 $m^3/s$ within Priddis Creek. Based on the current flood frequency analyses, this event was equal to an event between the 2-year and 5-year flood events. Table 11 lists the results of the calibration to the May 28, 1998 flood event.

**Table 11: May 28, 1998 Flood Event Calibration Results**

| Creek | Reach | HWM ID | River Station | Cross Section | Observed High Water Level (m) | Modelled High Water Level (m) | Difference (m) |
|---|---|---|---|---|---|---|---|
| Priddis | Tributary | 98-Prid-2 | 827 | 5 | 1163.27 | 1163.21 | -0.06 |
| Fish | Upper | 98-Fish-9 | 9342 | 75 | 1163.57 | 1164.04 | +0.47 |
| | | 98-Fish-8 | 9063 | 72 | 1161.96 | 1162.65 | +0.69 |
| | | 98-Fish-7 | 8377 | 64 | 1160.12 | 1160.04 | -0.08 |
| | | 98-Fish-6a | 7924 | 59 | 1157.03 | 1157.13 | +0.10 |
| | | 98-Fish-6b | 7904 | 58 | 1157.10 | 1157.17 | +0.07 |
| | | 98-Fish-6c | 7898 | 57 | 1157.21 | 1157.16 | -0.05 |
| | Lower | 98-Fish-5 | 7761 | 54 | 1156.47 | 1156.28 | -0.19 |
| | | 98-Fish-4a | 7609 | 52 | 1155.76 | 1155.46 | -0.30 |
| | | 98-Fish-4b | 7548 | 50 | 1155.63 | 1155.62 | -0.01 |
| | | 98-Fish-4c | 7509 | 49 | 1155.54 | 1155.53 | -0.01 |
| | | 98-Fish-4d | 7499 | 48 | 1155.58 | 1155.50 | -0.08 |
| | | 98-Fish-4e | 7417 | 47 | 1155.37 | 1155.25 | -0.12 |
| | | 98-Fish-3 | 7258 | 45 | 1154.20 | 1154.29 | +0.09 |
| | | 98-Fish-2a | 6945 | 40 | 1153.47 | 1153.94 | +0.47 |
| | | 98-Fish-2b | 6928 | 39 | 1153.48 | 1153.91 | +0.43 |
| | | 98-Fish-2c | 6898 | 37 | 1153.36 | 1153.84 | +0.48 |
| | | 98-Fish-1 | 6361-6249 | 32-33 | 1151.60 | 1152.01 | +0.41 |
| | | | | | | **Average** | **+0.13** |

Based on the above modelled and observed water level comparisons, Stantec considers the model to be suitably-calibrated for bankfull flood (typically assumed to be between a 2-year to 5-year flood) events. Minor modifications to the channel roughness in the Upper Fish Creek model reach were made as a result of this calibration exercise.

### 5.3.3 High Flow Calibration

Within the overbank area, the model was calibrated using two different high flow events.

High Flow Calibration Event #1:

On June 8, 2005, a flood event occurred along Fish and Priddis Creeks due to a rainfall event. Floodwaters overtopped both banks and impacted bridges. The peak flow within lower Fish Creek was 114.9 m³/s (WSC, 2018) and is estimated to have been a 15-year flood event. Using the same flow distribution factors as described in Section 3.1, the estimated corresponding peak flows during this period are 63.4 $m^3/s$ within upper Fish Creek and 45.8 $m^3/s$ within Priddis Creek.

Table 12 provides a comparison of the observed and the modelled water levels for the same flows.

**Table 12: June 8, 2005 Flood Event Calibration Results**

| Creek | Reach | HWM ID | River Station | Cross Section | Observed High Water Level (m) | Modelled High Water Level (m) | Difference (m) |
|---|---|---|---|---|---|---|---|
| Priddis | Tributary | 05.1-Prid-2a | 827 | 5 | 1164.00 | 1164.10 | +0.10 |
| Fish | Upper | 05.1-Fish-7a | 8377 | 64 | 1161.11 | 1161.06 | -0.05 |
| | | 05.1-Fish-6b | 7936 | 60 | 1158.96 | 1159.61 | +0.65 |
| | | 05.1-Fish-6a | 7924 | 59 | 1159.00 | 1159.55 | +0.55 |
| | | 05.1-Fish-6c | 7904 | 58 | 1158.84 | 1159.46 | +0.62 |
| | | 05.1-Fish-6d | 7898 | 57 | 1158.64 | 1159.47 | +0.83 |
| | Lower | 05.1-Fish-5a | 7761 | 54 | 1157.89 | 1157.26 | -0.63 |
| | | 05.1-Fish-4e | 7609 | 52 | 1157.09 | 1156.67 | -0.42 |
| | | 05.1-Fish-4d | 7609 | 52 | 1157.29 | 1156.67 | -0.62 |
| | | 05.1-Fish-4c | 7578 | 51 | 1157.21 | 1156.99 | -0.22 |
| | | 05.1-Fish-4b | 7548 | 50 | 1157.12 | 1156.96 | -0.16 |
| | | 05.1-Fish-4a | 7509 | 49 | 1156.71 | 1156.65 | -0.06 |
| | | 05.1-Fish-2c | 6945 | 40 | 1154.77 | 1154.82 | +0.05 |
| | | 05.1-Fish-2a | 6928 | 39 | 1154.76 | 1154.68 | -0.08 |
| | | 05.1-Fish-2b | 6898 | 37 | 1154.38 | 1154.52 | +0.14 |
| | | | | | | **Average** | **+0.05** |



Based on calibration for the June 5, 2008 flood HWM data, Stantec considers the model to be well-calibrated for flows in the order of 15-year flood. No modifications to the model were made as a result of this calibration exercise.

High Flow Calibration Event #2:

On June 18, 2005, shortly after the June 8 event, a second flood peak was recorded within the study area as a result of precipitation and the failure of Loon Lake Dam in the Priddis Creek watershed. The resulting flood caused higher water levels than the June 8 event, overtopping of both banks and damage to bridges. The reported peak flow within lower Fish Creek for this event is 482 m³/s (WSC, 2018). Based on the current flood frequency analysis, the dam breach caused an approximate 250-year flood within lower Fish Creek. Based on a detailed hydrologic analysis of the event and naturalization of flows, the corresponding estimated flow within upper Fish Creek was 117.5 $m^3/s$.

Table 13 provides a comparison of the observed and the modelled water levels for the same flows.

**Table 13: June 18, 2005 Flood Event Calibration Results**

| Creek | Reach | HWM ID | River Station | Cross Section | Observed High Water Level (m) | Modelled High Water Level (m) | Difference (m) |
|---|---|---|---|---|---|---|---|
| Priddis | Tributary | 05.2-Prid-2a | 827 | 5 | 1164.78 | 1165.04 | +0.26 |
| Fish | Upper | 05.2-Fish-7a | 8377 | 64 | 1161.29 | 1161.44 | +0.15 |
| | | 05.2-Fish-6a | 7936-7924 | 60-59 | 1158.98 | 1160.81 | +1.83 |
| | | 05.2-Fish-6c | 7904 | 58 | 1160.19 | 1160.85 | +0.66 |
| | Lower | 05.2-Fish-5d | 7842-7761 | 55-54 | 1159.20 | 1160.21 | +1.01 |
| | | 05.2-Fish-5b | 7761 | 54 | 1159.30 | 1159.90 | +0.60 |
| | | 05.2-Fish-5a | 7761-7685 | 54-53 | 1159.38 | 1159.80 | +0.42 |
| | | 05.2-Fish-4e | 7578 | 51 | 1158.87 | 1159.75 | +0.88 |
| | | 05.2-Fish-4c | 7578 | 51 | 1158.66 | 1159.75 | +1.09 |
| | | 05.2-Fish-4b | 7548 | 50 | 1158.45 | 1159.70 | +1.25 |
| | | 05.2-Fish-4a | 7548 | 50 | 1157.87 | 1159.70 | +1.83 |
| | | 05.2-Fish-2f | 6961 | 41 | 1156.14 | 1157.70 | +1.56 |
| | | 05.2-Fish-2d | 6945 | 40 | 1155.96 | 1157.31 | +1.35 |
| | | 05.2-Fish-2c | 6945 | 40 | 1155.51 | 1157.31 | +1.80 |
| | | 05.2-Fish-2a | 6928 | 39 | 1155.42 | 1155.75 | +0.33 |
| | | 05.2-Fish-2b | 6928 | 39 | 1154.81 | 1155.75 | +0.94 |
| | | 05.2-Fish-1a | 6305 | 32 | 1152.96 | 1153.57 | +0.61 |
| | | | | | | **Average** | **+0.97** |

A comparison of the modelled water level and the observed high water marks for the June 18, 2005 flood event results in the model consistently overestimating the water levels within the creeks. Commentary regarding these calibration results is provided in Section 5.3.5.

<u>High Flow Calibration Event #3:</u>

On June 21, 2013, a flood peak was recorded within the study area as a result of a heavy precipitation event combined with snowmelt. The reported peak flow in lower Fish Creek for this event was 218 m³/s (WSC, 2018). The estimated flows during this period were 120.3 m³/s within upper Fish Creek and 89.4 m³/s within Priddis Creek.

Table 14 provides a comparison of the observed and the modelled water levels for the same flows.

**Table 14: June 21, 2013 Flood Event Calibration Results**

| Creek | Reach | HWM ID | River Station | Cross Section | Observed High Water Level (m) | Modelled High Water Level (m) | Difference (m) |
|---|---|---|---|---|---|---|---|
| Fish | Lower | N/A | 7499 | 48 | 1147.48 | 1147.47 | -0.01 |
| | | | | | | **Average** | **-0.01** |

Based on calibration to for the June 21, 2013 flood HWM data, Stantec considers the model to be well-calibrated for flows in the order of 50-year flood. No modifications to the model were made as a result of this calibration exercise.

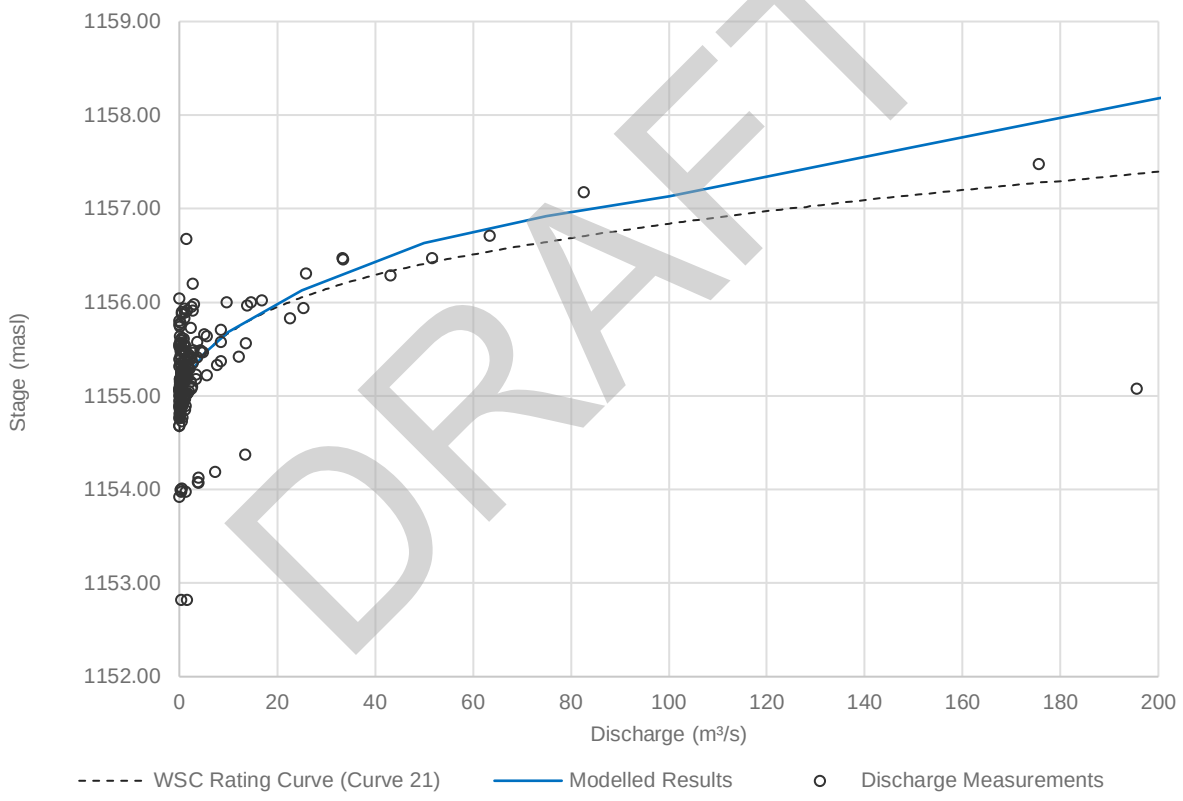
Commentary regarding these calibration results is provided in Section 5.3.5.

### 5.3.4 Gauge Data & Rating Curves

WSC Gauge 05BK001 (Fish Creek near Priddis) is located at Section 54 of the current hydraulic model. Based on the data provided by WSC, we understand that the flow and water level measurement location for the station is the Priddis Valley Road W (Range Road 32) bridge downstream of the gauge. However, WSC has noted that the bridge angle to the flow is extreme and that the next downstream bridge (Highway 22) would be more suitable for a bridge measurement (WSC, 2015).

Figure 10 illustrates a comparison of the WSC station stage-discharge relationship using WSC's most current rating curve (Table 21, developed in 2017) and the corresponding simulated relationship based on modelled water levels using the current hydraulic model prepared for the this study.

**Figure 10: WSC Rating Curve Comparison – Fish Creek near Priddis**



### 5.3.5 Calibration Results

The available calibration data for this study, for both Fish Creek and Priddis Creek, is centered around the Hamlet of Priddis. No calibration data is available in the upstream reaches of the study area. In terms of flood events, the data includes an approximate 2- to 5-year flood event (May 28, 1998), an approximate 15-year flood event (June 8, 2005), an approximate 250-year flood event (June 18, 2005) and an approximate 50-year flood event (June 21, 2013).

In general, Stantec's modelled results are well-calibrated to available discharge measurements. This is especially true for lower flows. It can be seen that the highest discharge measurement (approximately 195 $m^3/s$) appears to have a very low measured water level. This measurement appears to skew the WSC curve downward. If this measurement is neglected, the model results represent the measurement very well.

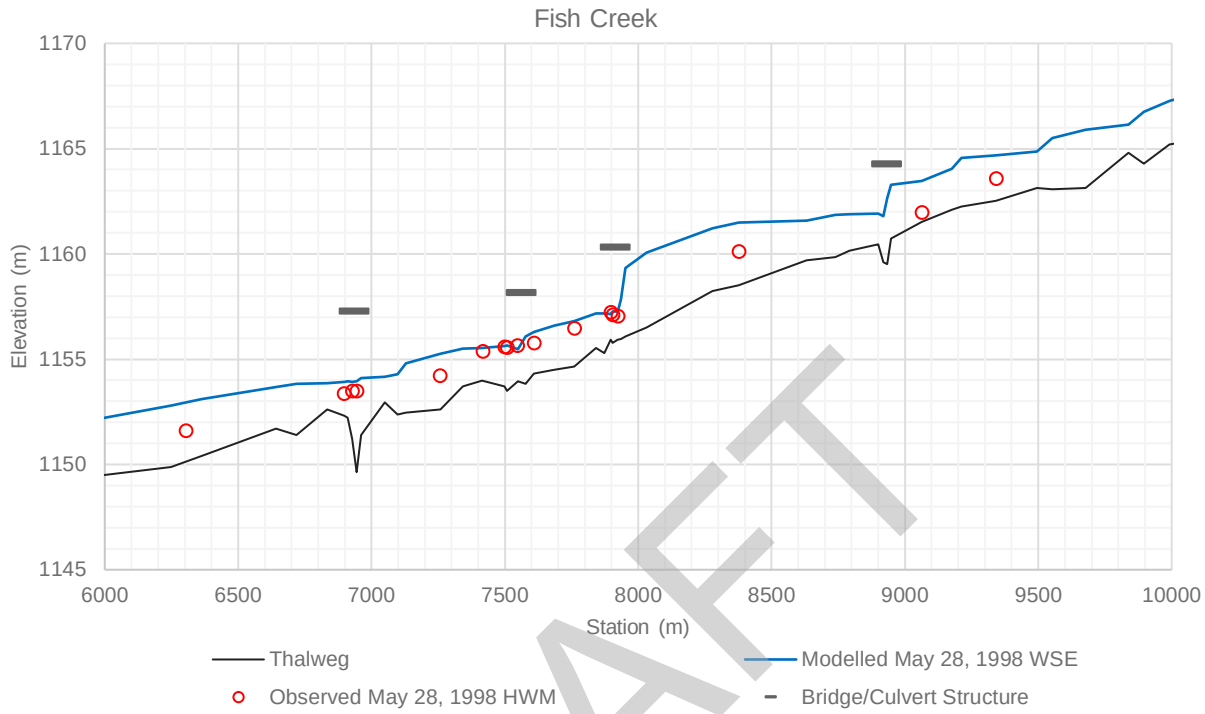
The model is well-calibrated for flows in the order of 2- to 5-year, 15-year and 75- to 100-year flood events, with average differences between the observed and modelled water levels of +0.13 m, +0.05 m and -0.01 m respectively.

As discussed in the previous section, the model is well-calibrated for all but the largest discharge measurements at the WSC gauge location. It is acknowledged that the model is less well-calibrated to the June 18, 2005 high flow event. Stantec has the following comments related to the June 18, 2005 flood event that may explain this:

- There are significant differences between HWM data measured within close proximity to each other for this flood event. For example: 05.2-Fish-2c and 05.2-Fish-2e are about 2 m from each other (spatially) yet have and elevation difference of 0.46 m. The discrepancy in these HWMs may be due to the two significant flood events occurring within a few weeks of each other and being improperly attributed to a given flood event.
- It is possible that the WSC-reported peak flow for this event may be overestimated. The reported flow of 482 $m^3/s$ (WSC, 2018) was based on the rating curve at the time and WSC high water level estimates. Additional information regarding how the reported flow was determined was not available at the time of the preparation of this report.
- The exact location of the HWM data are unknown. Available documentation does not provide coordinates for each measured HMM, but instead provides a description of the location. This is particularly relevant in areas adjacent to the bridges, where the water surface profile can change significantly over short distances.

Figure 11, Figure 12, Figure 13 and Figure 14 illustrate the modelled water surface elevation profiles and comparison to the available high-water mark data. No HWMs were collected on Priddis Creek during the June 21, 2013 flood event, therefore no profile is provided for Priddis Creek for that event.

**Figure 11: Calibration Profiles (May 28, 1998 Flood Event)**



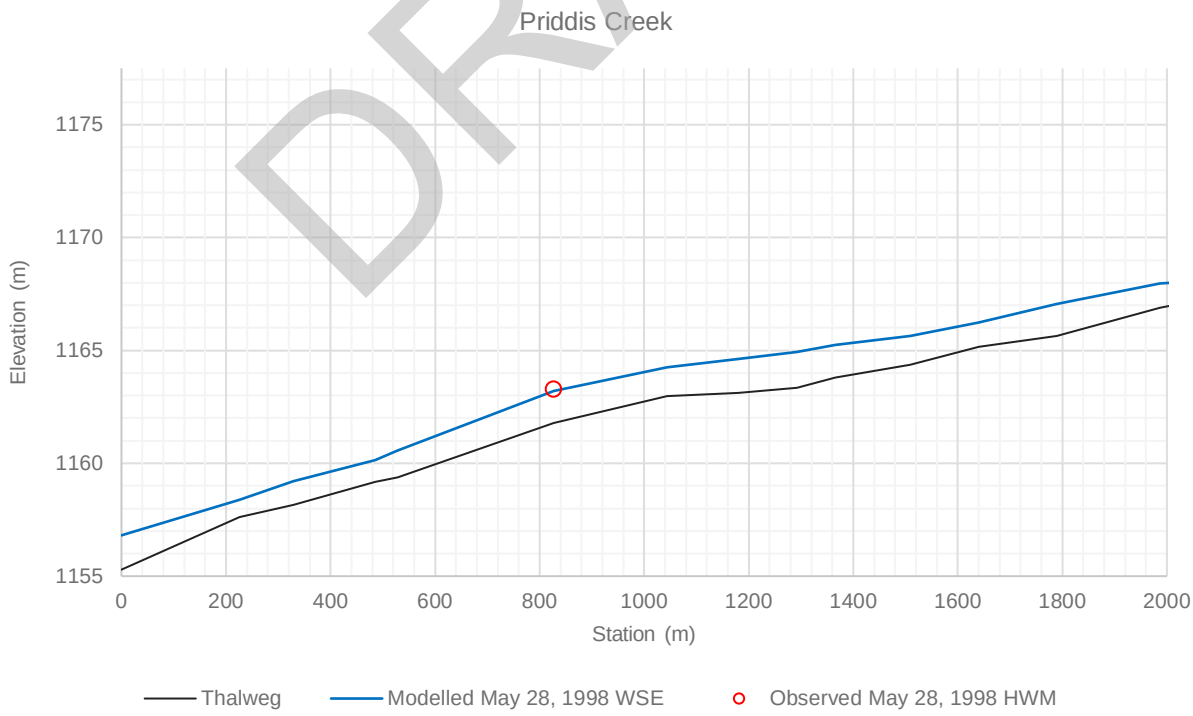
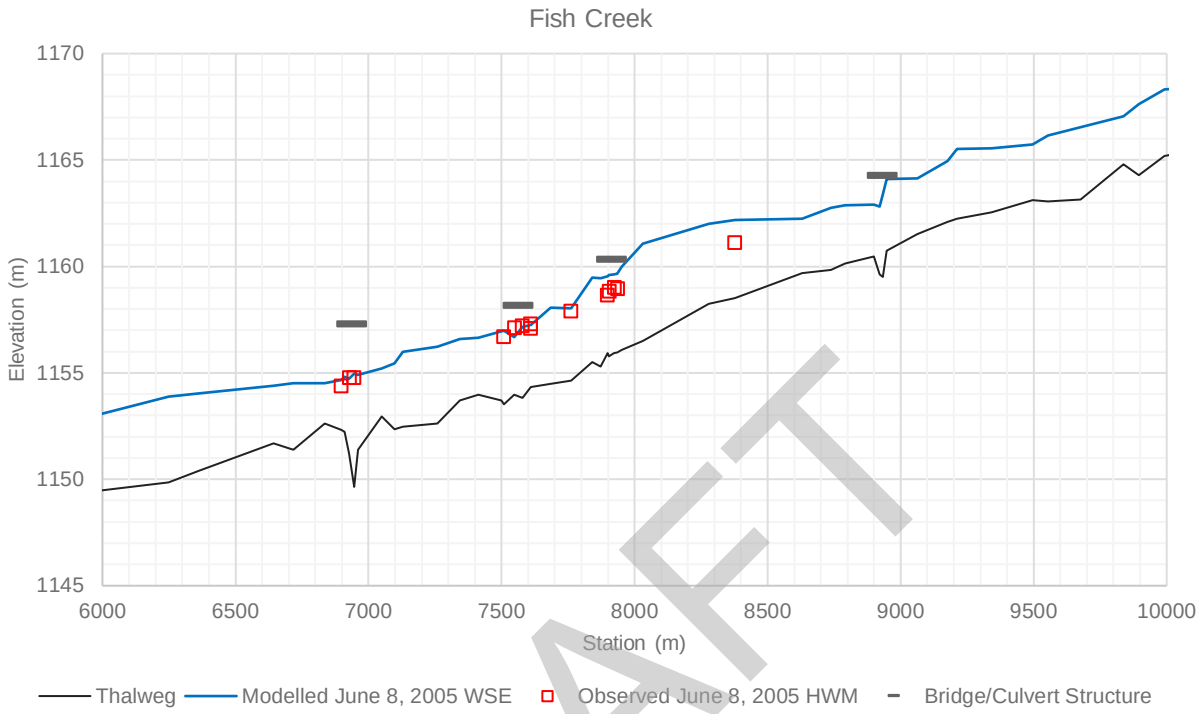



**Figure 12: Calibration Profiles (June 8, 2005 Flood Event)**



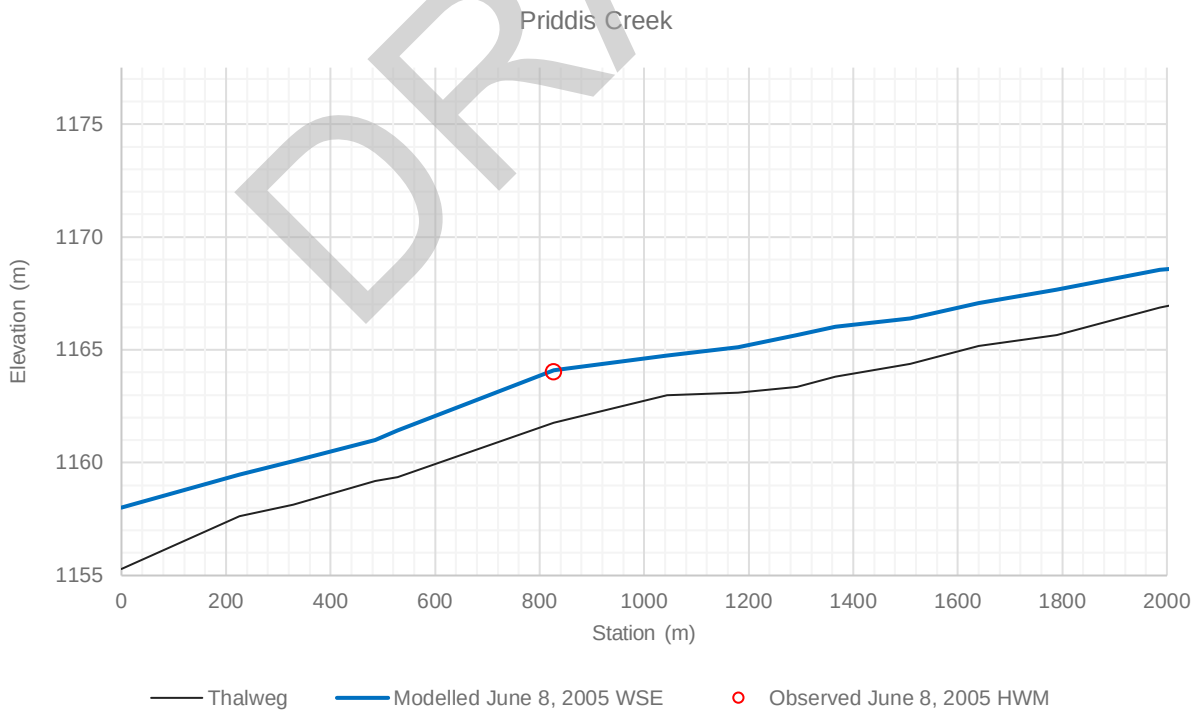
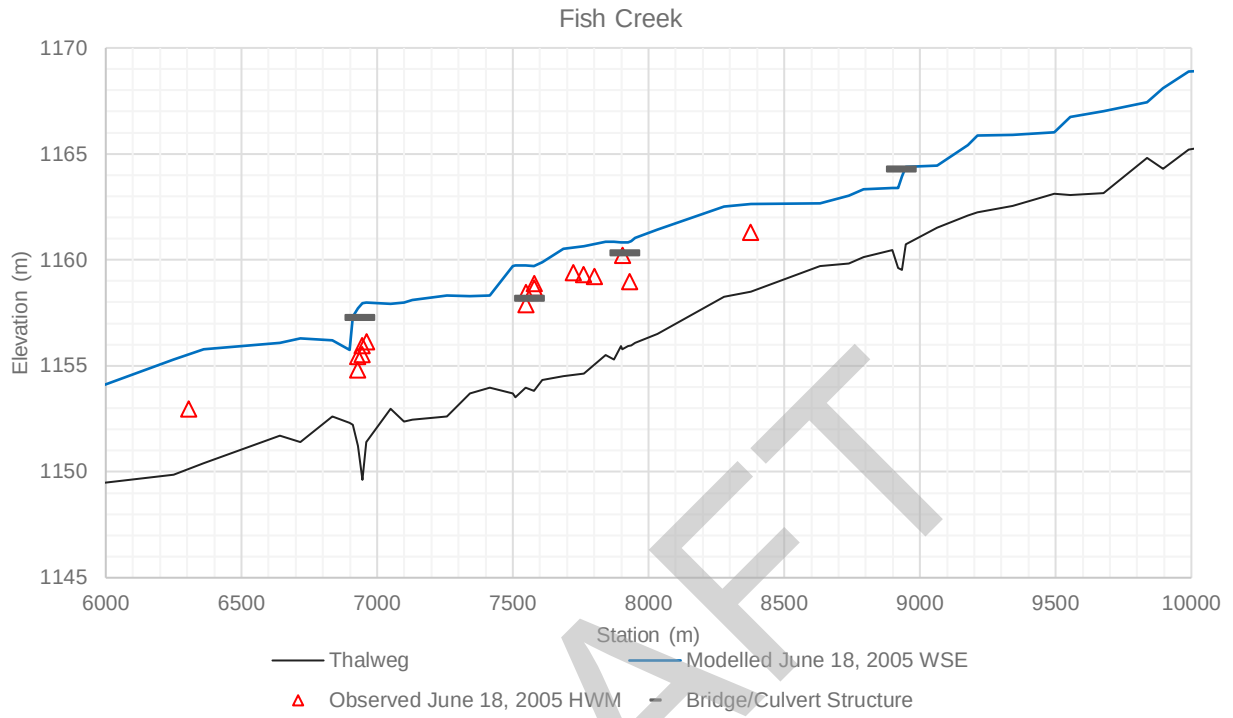



**Figure 13: Calibration Profiles (June 18, 2005 Flood Event)**



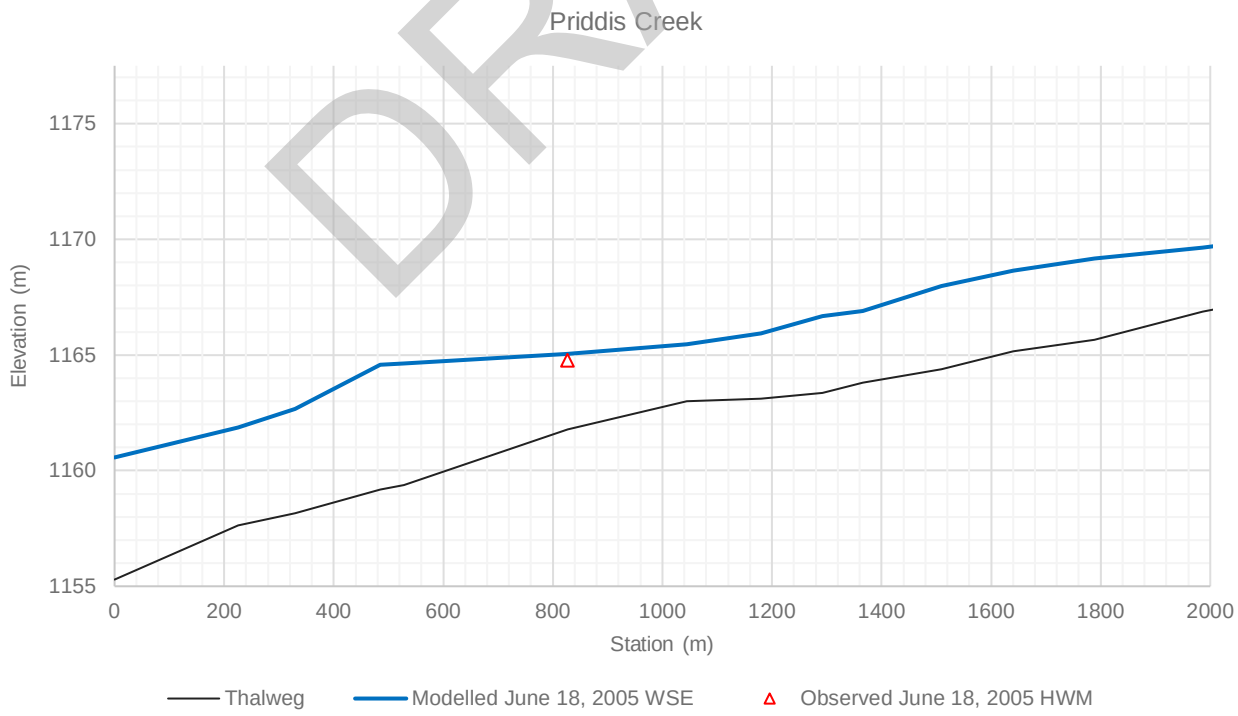
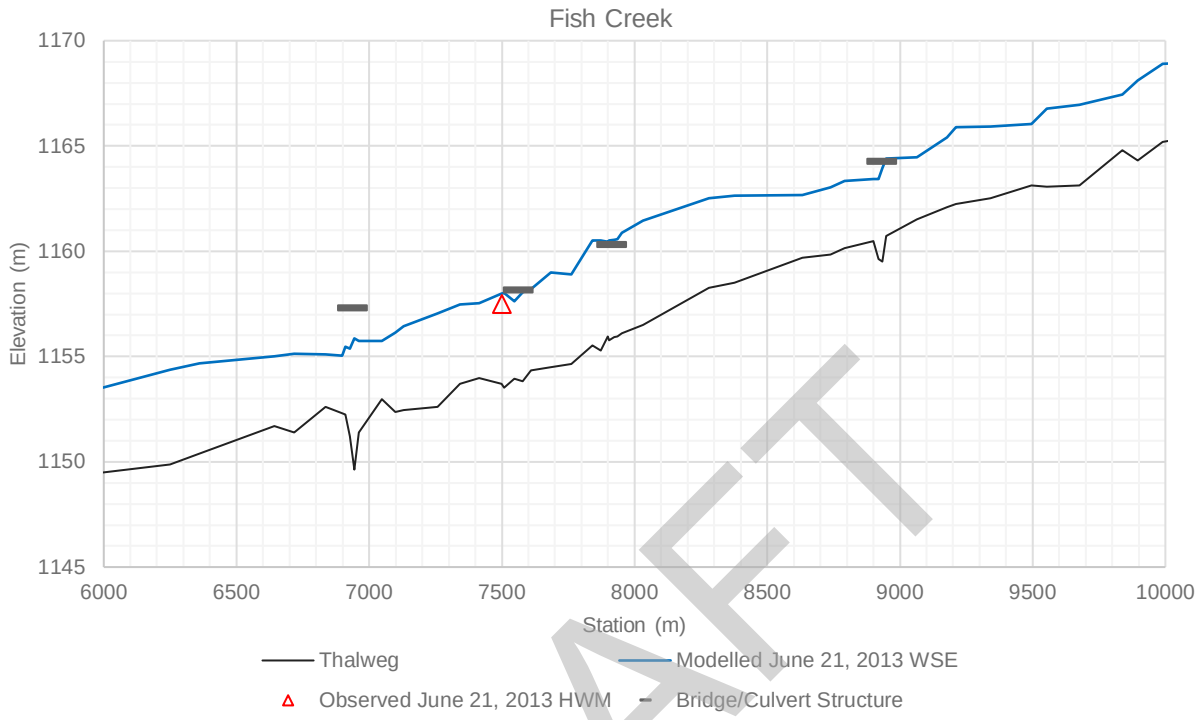



**Figure 14: Calibration Profile (June 21, 2013 Flood Event)**



## 5.4 MODEL PARAMETERS & OPTIONS

### 5.4.1 Manning Roughness Values

The Manning's roughness value (n) is estimated across each cross section to reflect friction losses both within the channel and overbank area. The selection of Manning's roughness values for this study was based on a review of widely available literature, site photos taken by Stantec surveyors in Fall 2017 and a current aerial imagery of the study area. Open Channel Hydraulics (Chow, 1959) was used as the primary literature source with additional input from the Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains (Arcement and Schneider, 1989).

#### 5.4.1.1 Channel Roughness

Modelled channel roughness values were determined separately for each of the three study model reaches (Upper Fish Creek, Priddis Creek and Lower Fish Creek) and are provided in Table 15 below. Representative photos of each of the reaches is provided in Photo 9, Photo 10 and Photo 11 below.

**Table 15: Channel Roughness Values**

| Reach | Modelled n-value |
|---|---|
| Upper Fish Creek | 0.037 |
| Priddis Creek | 0.040 |
| Lower Fish Creek | 0.030 |

The Lower Fish Creek and Priddis Creek model reach channel roughness values match those that were used in the 2004 Priddis Flood Risk Mapping Study (AENV, 2004). The roughness in the Upper Fish Creek model reach was updated from 0.035 to 0.037 based on low and high flow calibration.

**Photo 9: Typical Priddis Creek Channel Photos (Channel n= 0.040)**

**Photo 10: Typical Upper Fish Creek Channel Photos (Channel n= 0.037)**

**Photo 11: Typical Lower Fish Creek Channel Photos (Channel n= 0.030)**

#### 5.4.1.2 Overbank Roughness

The modelled overbank roughness values were determined based on aerial imagery, site visit observations and site photos. Overbank areas were classified based on land use and mapped using GIS tools for inclusion into the hydraulic model. Each of the classifications and their modelled roughness value are provided in Table 16 below.

**Table 16: Channel Roughness Values (Chow, 1959)**

| Current Land Use | | Modelled n-value |
|---|---|---|
| Pasture, High Grass | | 0.045 |
| Brush | Light Density | 0.050 |
| | Scattered, Heavy Weeds | 0.060 |
| Trees and Brush – Medium Density | | 0.100 |
| Trees – High Density, heavy stand | | 0.120 |

### 5.4.2 Expansion and Contraction Coefficients

As the geometry of the channel changes from section to section, energy is lost through the expansion or contraction of flow between respective sections. HEC-RAS models these energy losses as the absolute difference in velocity heads between adjacent cross section and expansion or contraction coefficients. An expansion coefficient is applied when the conveyance area of a downstream section is larger than the one immediately upstream of it. A contraction coefficient is applied when the conveyance area of the downstream section is smaller than the one immediately upstream of it. Table 17 provides the modelled expansion and contraction coefficients that were used for this study based on recommendations in HEC-RAS literature (USACE, 1995, 2016, and 2018a).

**Table 17: Expansion and Contraction Coefficients**

| Transition Type | Application | Contraction Coefficient | Expansion Coefficient |
|---|---|---|---|
| Gradual Transitions | All Typical Sections | 0.1 | 0.3 |
| Bridge Sections | Sections Adjacent to Bridges and Culverts | 0.3 | 0.5 |

### 5.4.3 Obstructions & Ineffective Flow Areas

Obstructions are applied at cross sections to model buildings or other features within the cross-sectional area that do not convey flow. The majority of the study area is rural with very few buildings or structures located within the 100-year flood area or lower. No obstructions were used within the model.

Ineffective flow areas allow for the modelling of areas that contain water but do not actively convey flow. These are generally areas that will experience ponding but no velocity during the modelled event. Ineffective area can be permanent or non-permanent. Permanent ineffective flow areas do not convey flow for all flood events and function similar to an obstruction. Non-permanent ineffective flow areas convey flow once a pre-determined (by the modeler) elevation is exceeded. Below this elevation, the non-permanent ineffective flow area functions the same as a permanent ineffective flow area. Both permanent and non-permanent ineffective flow areas were used in the model.

Ineffective flow areas were used in the model to model the effects three different scenarios:

1. <u>Obstructions due to bridge abutments in the channel and overbank area</u>

Permanent ineffective flow areas were applied to model contraction and expansion of flow through culverts or bridges. The limitations of the one-dimensional model results in the modeler needing to estimate the upstream and downstream effects of a structure on the flow before and after it passes under or through the structure. The contraction ratio (CR) is defined as the angle (in terms of a ratio) from the edge of the abutments extending upstream and away from the thalweg of the channel. The expansion ratio (ER) is defined as the angle (in terms of a ratio) from the edge of the abutments extending downstream and away from the thalweg of the channel.

The Flow Transitions in Bridge Backwater Analysis (USACE, 1995) document indicates support for the traditional rule of thumb of a 1:1 CR and therefore Stantec has applied the 1:1 CR for this study as a general rule. In terms of the ER, the traditional ratio of 4:1 rule of thumb was determined to over predict the expansion reach length for most situations. Stantec has applied an ER of 3:1 for this study as a general rule. In some locations these ratios have been manually adjusted to reflect the structure layout, structure skew and local topography for specific bridges.

The contraction and expansion lengths for the Priddis River Hazard Study hydraulic model are structure-specific and were determined based on channel, structure and hydraulic conditions at each relevant location.

2. Reduction in conveyance area within overbank depressions

There are many depressions within the floodplains of both creeks that are likely remnant channels, abandoned oxbows or anthropogenic activities (gravel pits, ponds, etc.). During minor flood events, water level rises within many of these depressions due to the increase in the groundwater table. During larger flood events, the creeks can overtop their banks and enter the depressions; thus, connecting them to the main creek channel. The elevation at which this overtopping occurs depends on the local topography adjacent to each depression. Flood conveyance is provided within these areas once overtopping occurs. This conveyance is restricted to the depth above the overtopping elevation, the area of the depression below this elevation does not provide conveyance during a flood event.

These overbank depressions (remnant channels, abandoned oxbows and anthropogenic disturbances) were incorporated into the hydraulic model as permanent ineffective flow areas. The elevation of the ineffective flow area was site-specific and determined based on the topographical conditions at its connection to the main channel upstream of the site. Where a remnant channel extends through more than one section, the elevation of the ineffective area was determined based on the upper cross section, i.e., the elevation at which overtopping occurs into a remnant channel is carried downstream through the remainder of the channel.

3. Reduction in conveyance area within irregular overbank areas

Through some of the study area, the overbank area is not smooth, and the cross sections reflected this in showing small rises and dips when imported into the model. These irregular areas may have been caused by local beaver activities and some development within the overbank. As these areas are generally not connected to the main channel, they will not convey flow until the banks are overtopped. In general, we noted that the banks overtop into these areas during lower return period events and are completely inundated during medium and higher return period events.

These areas were incorporated into the model by extending a permanent ineffective flow area through the area to effectively flatten out the overbank and conservatively assume that there is no conveyance within the dips before and after the overbank is inundated.

4. Adjustment to remove conflicting profile lines

During initial model runs, many of the modelled water surface profiles were shown to cross each other at some locations. This was particularly noticeable in areas near bridge or culvert structures. The locations, elevations and permanency of the ineffective areas were adjusted to fix conflicting profile lines and better reflect expected conditions during a flood event. In working with the model, we noted that extremely minor changes (often in the order of 0.01 m) to these ineffective flow areas yielded sometimes significant impacts to the modelled water surface elevations profiles. This indicates that the existing physical features in the study area result in the model being sensitive to ineffective flow areas.

### 5.4.4 Flow Splits, Islands & Diversions

The channel geometries of Priddis and Fish Creeks within the study area do not feature significant flow splits, islands or diversions. None of these features were modelled.

## 5.5 OPEN WATER FLOOD FREQUENCY PROFILES

Based on the hydraulic model and the flood frequency analyses (Section 3.1), open water flood frequency tables and profiles have been developed for the study area. These profiles illustrate the 2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750- and 1000-year flood events and are provided in Appendix A. Computed water surface elevation data in tabular format are provided in Appendix B.

Author: D. Merrick

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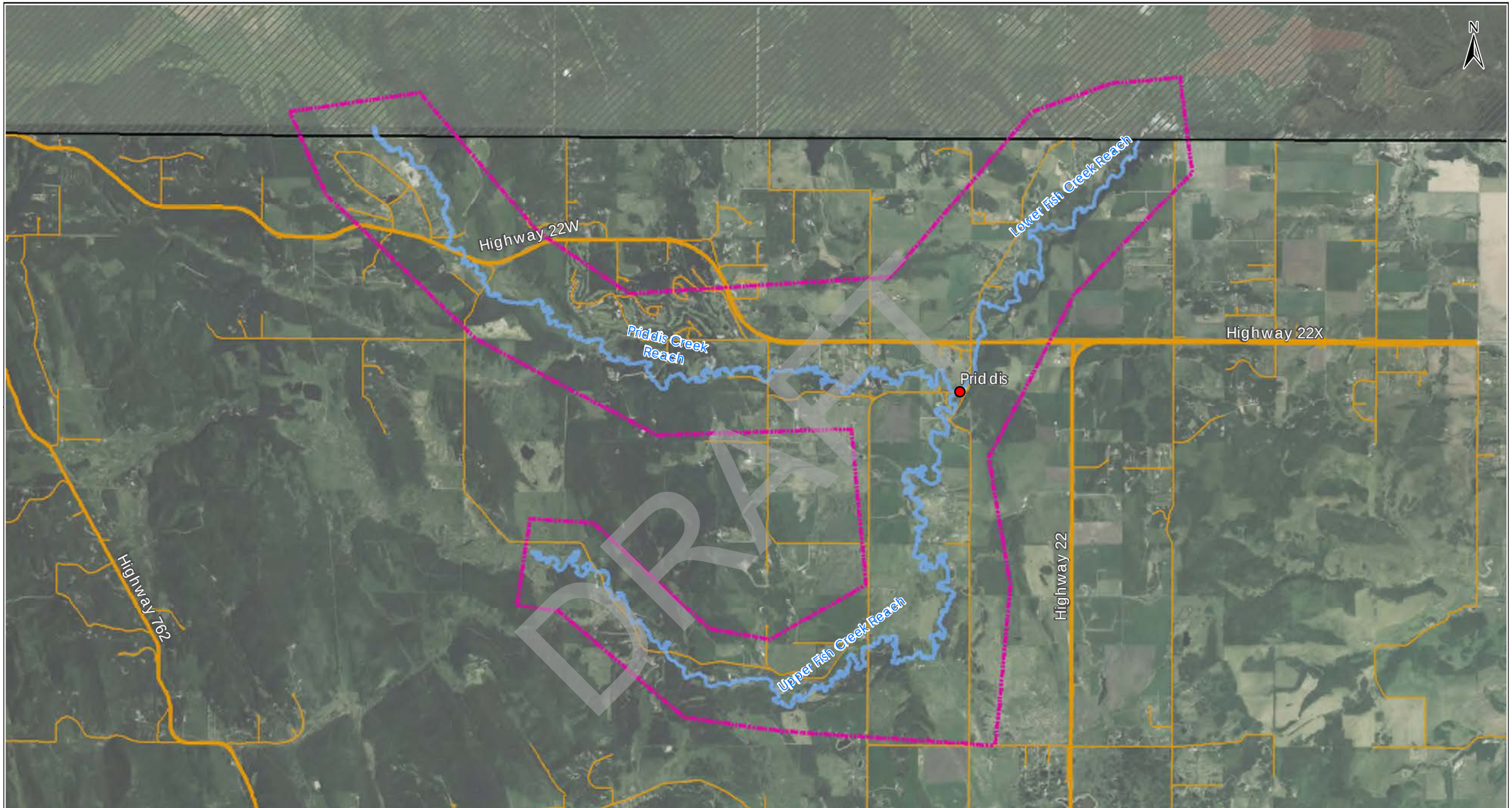



Study Limit

Tsuut'ina Nation

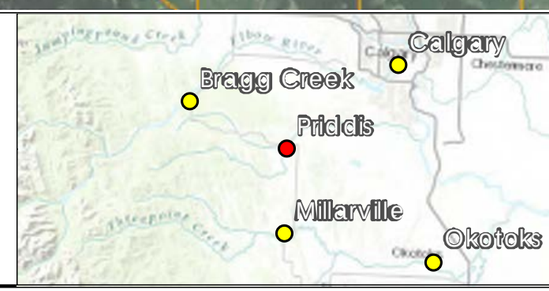
Creek

Major Road

Local Road

Priddis

Projection: Canada Albers Equal Area Conic
Source: Stantec Consulting Ltd., Contains information licensed under the Open Government license.
Spatial Data Warehouse Ltd.,
Imagery: 2017




Alberta Government

Priddis River Hazard Study

1,000 500 0 1,000
Meters
1:60,000

Model Flow Zones

Figure 15

DATE: July, 2019

QA/QC:

fig_9_priddis_Hydraulic_Structure_Locations
7/25/2019

Stantec

Classification: Public

# 5.6 MODEL SENSITIVITY

## 5.6.1 Ineffective Flow Areas

As noted in Section 5.4.3, the model is extremely sensitive to the location, elevation and permanency of ineffective flow areas. Application of ineffective areas was an iterative process that required each feature (remnant channel, depression in the floodplain and structure) to be looked at on a site-by-site basis. We noted that very minor adjustments to the ineffective flow areas could have significant impacts on the hydraulics at and upstream of the applied ineffective flow area.

## 5.6.2 Boundary Conditions

HEC-RAS software requires a boundary condition at the downstream limit of the model for sub-critical flow calculations. As part of the FHIP Guidelines (ANEV, 2011), downstream model sections must be located sufficiently downstream of the study limits such that computed water levels are not significantly affected by variation of boundary condition parameters.

Stantec used the normal flow depth at a slope of 0.003 m/m at Section 1 based on the surveyed thalweg profile of the channel in the downstream sections and at the direction of AEP project manager.

The model was only run using sub-critical flow profiles therefore no upstream boundary conditions were used.

## 5.6.3 Manning Roughness

A sensitivity analysis was completed on the calibrated Manning's roughness values (n) to assess their influence on the water surface profile through the study area. The 100-year event was used as the baseline discharge for this analysis. This sensitivity analysis was completed for the channel, the overbank and the channel and overbank combined. Each analysis considered changing n-values by +10%, +20%, -10% and +20%. All other model parameters remained unchanged for this sensitivity analysis.

### 5.6.3.1 Channel Roughness

The channel roughness values were modified in accordance with the above. The results of the channel roughness sensitivity analysis are illustrated in Table 18 and Appendix C.

**Table 18: Channel Roughness Sensitivity Analysis**

| | | Channel Roughness Variation | | | | |
|---|---|---|---|---|---|---|
| **Reach** | | **-20%** | **-10%** | **0%** | **10%** | **20%** |
| **Average Difference (m)** | Priddis Creek | -0.02 | -0.02 | 0.00 | -0.01 | 0.00 |
| | Upper Fish Creek | -0.02 | -0.02 | 0.00 | -0.01 | 0.00 |
| | Lower Fish Creek | -0.03 | -0.02 | 0.00 | 0.03 | 0.06 |

### 5.6.3.2 Overbank Roughness

The overbank roughness values were modified in accordance with the above. The results of the overbank roughness sensitivity analysis are illustrated in Table 19 and Appendix C.

**Table 19: Overbank Roughness Sensitivity Analysis**

| | | Overbank Roughness Variation | | | | |
|---|---|---|---|---|---|---|
| **Reach** | | **-20%** | **-10%** | **0%** | **10%** | **20%** |
| **Average Difference (m)** | Priddis Creek | -0.06 | -0.03 | 0.00 | 0.03 | 0.05 |
| | Upper Fish Creek | -0.11 | -0.05 | 0.00 | 0.01 | 0.05 |
| | Lower Fish Creek | -0.08 | -0.03 | 0.00 | 0.03 | 0.06 |

#### 5.6.3.3 Channel and Overbank Roughness

The channel and overbank roughness values were modified in accordance with the above. The results of the channel and overbank roughness sensitivity analysis are illustrated in Table 20 and Appendix C.

**Table 20: Channel and Overbank Roughness Sensitivity Analysis**

| | | Overbank Roughness Variation | | | | |
|---|---|---|---|---|---|---|
| **Reach** | | **-20%** | **-10%** | **0%** | **10%** | **20%** |
| **Average Difference (m)** | Priddis Creek | -0.07 | -0.04 | 0.00 | 0.04 | 0.08 |
| | Upper Fish Creek | -0.09 | -0.05 | 0.00 | 0.02 | 0.07 |
| | Lower Fish Creek | -0.10 | -0.05 | 0.00 | 0.06 | 0.12 |

# 6.0 FLOOD INUNDATION MAPS

Flood inundation maps show the areas of ground that could be potentially inundated by flood water under one or more flood scenarios for existing conditions. The calibrated HEC-RAS model prepared for this study was used to create flood inundation maps for the 2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750- and 1000-year open water floods throughout the study area. In addition, water surface elevation TINs, water surface elevation grids, and flood depth grids for all mapped flood inundation areas were created.

The primary intended use of flood inundation maps is by stakeholders in emergency response planning and preparation. The set of flood inundation maps produced as part of this study are referred to as the Open Water Flood Inundation Map Library.

## 6.1 METHODOLOGY

### 6.1.1 Direct Flood Inundation Areas

Initial flood inundation areas were determined by the water surface elevation TIN derived directly from the hydraulic model results with no manual edits. These initial areas were then reviewed and adjusted with respect to the scenarios described in Table 21. All manual adjustments to the inundation areas were completed in accordance with the Priddis River Hazard Study Terms of Reference (AEP, 2018), FHIP Guidelines (AENV, 2011) and with the approval of the AEP project team.

**Table 21: Flood Inundation Mapping Manual Edit Scenarios**

| Scenario | Applicability to Priddis River Hazard Study |
|---|---|
| Scenario 1: Isolated Areas: Potentially inundated areas that have no direct hydraulic or overland flow connection to the main channel. These are typically areas of low ground, and may potentially be inundated due to groundwater seepage or storm sewer backup. | Isolated areas have been removed from the inundation maps for simplicity, in accordance with direction from the AEP project team. |
| Scenario 2: Single Overtopping Point: At locations where inundated areas are connected to the main channel at a single overtopping point (spill point), the inundation extent is re-evaluated using a constant water level which is equal to that at the spill point. | There were many areas within the study area where inundated areas were connected to the main channel at a single overtopping point and the inundation extent was re-evaluated using a constant water level equal to that at the spill point. The number of Scenario 2 areas varied with respect to each of the different return periods. |
| Scenario 3: Multiple Overtopping Points: If there are multiple overtopping points related to a single overflow area, the inundation extent is based on the hydraulic gradient in the main channel between the overtopping points. The inundation extent upstream of the most upstream overtopping point and downstream of the most downstream overtopping point are evaluated using the estimated water level at these bounding spill points. | There were many areas within the study area where multiple overtopping points occurred. The inundation area was based on the hydraulic gradient between the upstream overtopping point and downstream overtopping point. |
| Scenario 4: Single Overtopping Point Causing Overtopping Downstream: If a single overtopping point exists, the inundation extent is re-evaluated using a constant water level which is equal to that at the spill point (Scenario 2). However, if this constant water level causes another overtopping point downstream, the inundation extent is re-evaluated using a linear interpolation between the water level at the upstream spill point and the ground elevation at the downstream re-entry point. | Scenario 4 locations were rare within the study area. Where these locations were identified, the inundation extent was modified in accordance with the Terms of Reference. |
| Scenario 5: Potential Flood Inundation due to Flood Control Structure Failure: In areas where identified flood control structures separate protected areas from the main channel, these areas are mapped as flooded assuming that the flood control structure had failed and were inundated to the river water level calculated at the flood control structure under non-failure conditions. | No Flood Control Structures exist within the study area. No adjustments to the inundation areas was required under Scenario 5. |

Flood inundation maps were prepared for each of the return periods. These maps identify the flood inundation extents and include the overland flow areas resulting from overtopping points (as detailed above). The overland flow areas are shown as part of the inundation extent and not as a separate symbology. The Flood Inundation Maps are provided in Appendix D: Open Water Flood Inundation Map Library.

Manual edits were applied to each of the flood inundation maps in accordance with the above methodology. We note that due to the geomorphology of the creeks and risks such as wood debris jams or the activation of remnant channels, there is a high risk of channel switching or avulsion beyond the areas identified in the inundation areas identified. Conservative manual edits were applied where possible to identify such areas.

During the 75-year and greater flood events, floodwaters overtop the right (south) bank of Fish Creek (downstream of 240 St W between river stations 18161 and 18614) and flow south across a private road and into agricultural land. The inundation extent of these floodwaters to the south is unknown as it is beyond the study limits and mapping boundary.

### 6.1.2 Potential Flood Control Structure Failure

No flood control structures exist within the study area therefore adjustments to the inundation areas to consider potential flood control structure failures was not required.

## 6.2 FLOOD IMPACTS

### 6.2.1 Residential Areas

As noted in Section 4.0, the study area is sparsely populated with rural residential properties. The flood inundation mapping identifies that in general, flood impacts to residential areas begin at approximately the 35-year return period for the Priddis Creek and Lower Fish Creek model reaches. Flood impacts to residential areas in the Upper Fish Creek model reach begin at approximately the 50-year return period.

During the 100-year event, many of the oxbows, remnant channels and abandoned side channels within the floodplain are inundated and likely convey flow.

### 6.2.2 Commercial & Industrial Areas

Commercial and industrial facilities within the study are limited to the area near the confluence of Priddis and Fish Creeks in the Hamlet of Priddis. These commercial buildings include the Priddis Community Hall (including an outdoor skating rink and playground), the Priddis General Store and Plaza (including four small businesses) and the Priddis View & Bistro restaurant. The flood inundation maps indicate that the Priddis General Store and Plaza is the first commercial area affected by overland flooding during the 35-year flood event. The Priddis Community Hall and Priddis View & Bistro restaurant are affected by overland flooding during the 75-year flood event and above.

# 7.0 CONCLUSIONS

This report details the Hydraulic Model Creation and Calibration and Open Water Flood Inundation Map Production components of the Priddis River Hazard Study. Its information and findings will support the Flood Hazard Idenitfication and Flood Risk Assessment and Inventory components of the study. All hydraulic modelling fulfilled the requirements of the Priddis River Hazard Study Terms of Reference (AEP, 2017) and FHIP Guidelines (AENV, 2011).

A one-dimensional hydraulic model was created in HEC-RAS Version 5.05 and consisted of a total of 264 channel cross sections along Fish Creek and 181 channel cross sections along Priddis Creek. Channel cross section data was derived from a combination of surveyed data within the channel area and LiDAR data (provided by AEP) within the overbank area. The model includes 11 bridges and 2 culverts along Fish Creek, and 9 bridges and 1 culvert along Priddis Creek. Bridge and culvert data were based on surveys completed by Stantec during Fall 2017 and Winter

2018. Channel and overbank roughness values were estimated using aerial imagery and site photos taken by Stantec during the survey completed in Fall 2017.

Modelled flood hydrology was derived from the Open Water Hydrology Assessment Report (Stantec, 2019).

The model was calibrated using the May 28, 1998, June 8, 2005, June 18, 2005, and June 21, 2013 flood events. A sensitivity analysis was carried out on the model to determine the effects on the 100-year flood event from changing the following modelling parameters: boundary conditions, channel roughness values and overbank roughness values. Though not quantified in a sensitivity analysis, Stantec found the model found to be most sensitive to the selection and implementation of ineffective flow areas.

The calibrated hydraulic model adequately reflects hydraulic conditions within the study area, and is suitable for use in other Priddis River Hazard Study components.

The model was used to develop flood inundation maps for the for the 2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750- and 1000-year open water floods throughout the study area. Water surface elevation TINs, water surface elevation grids, and flood depth grids for all mapped flood inundation scenarios were created.

The primary intended use of flood inundation maps contained in the Open Water Flood Inundation Map Library is by stakeholders in emergency response planning and preparation.

# 8.0 REFERENCES

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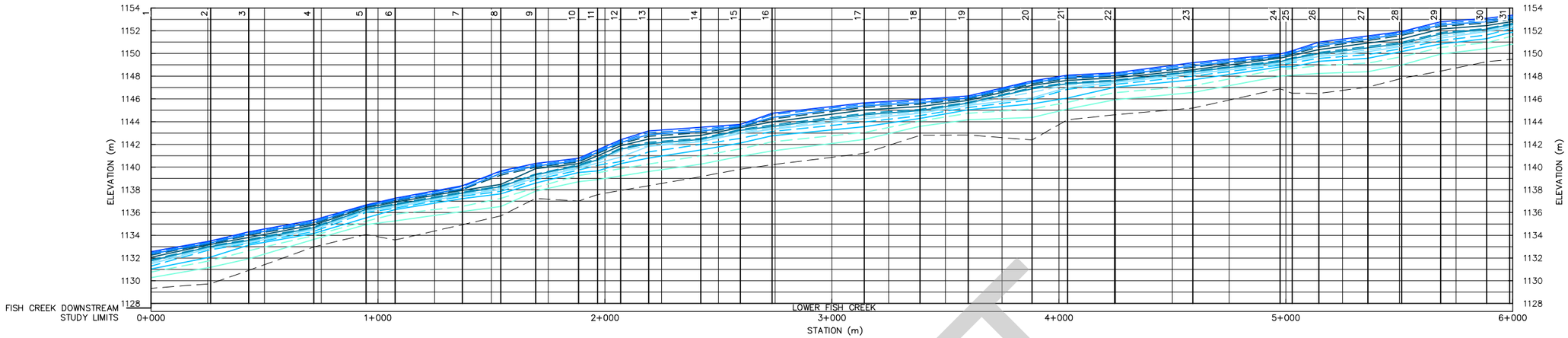
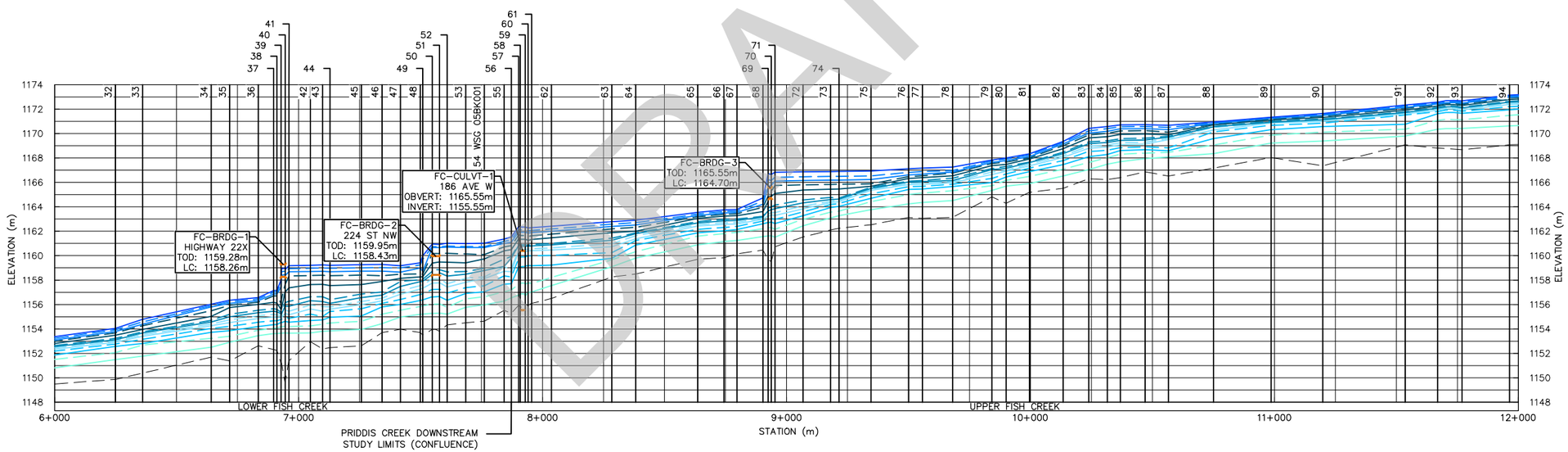
U.S. Army Corps of Engineers (USACE). 2018b. HEC-GeoRAS River Analysis System – April 2018.

# Appendix A OPEN WATER FLOOD FREQUENCY PROFILES

2019/09/30 10:43 AM By: Tandara, Catalina



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- WS 10-yr
- WS 20-yr
- WS 35-yr
- WS 50-yr
- WS 75-yr
- WS 100-yr
- WS 200-yr
- WS 350-yr
- WS 500-yr
- WS 750-yr
- WS 1000-yr
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

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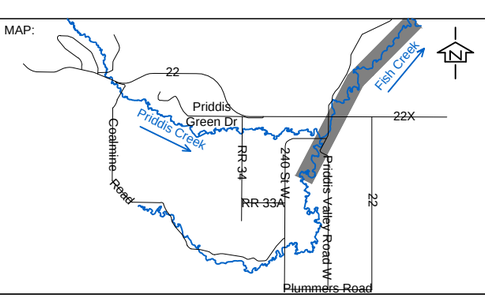


Alberta Government

Priddis River Hazard Study

SURVEYED THALWEG AND COMPUTED FLOOD FREQUENCY PROFILES - FISH CREEK
STA 0+000 TO 12+000

SCALE:
H 1:20 000 V 1:400
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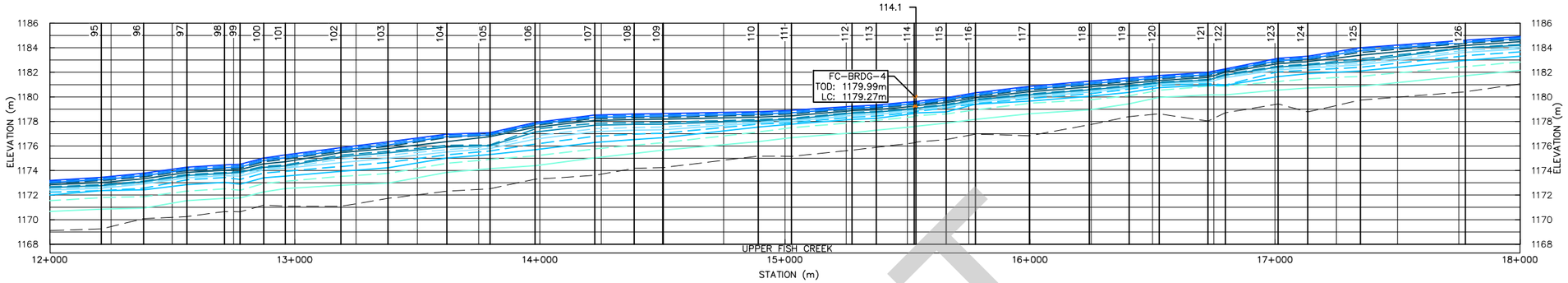
0 4 12 20m

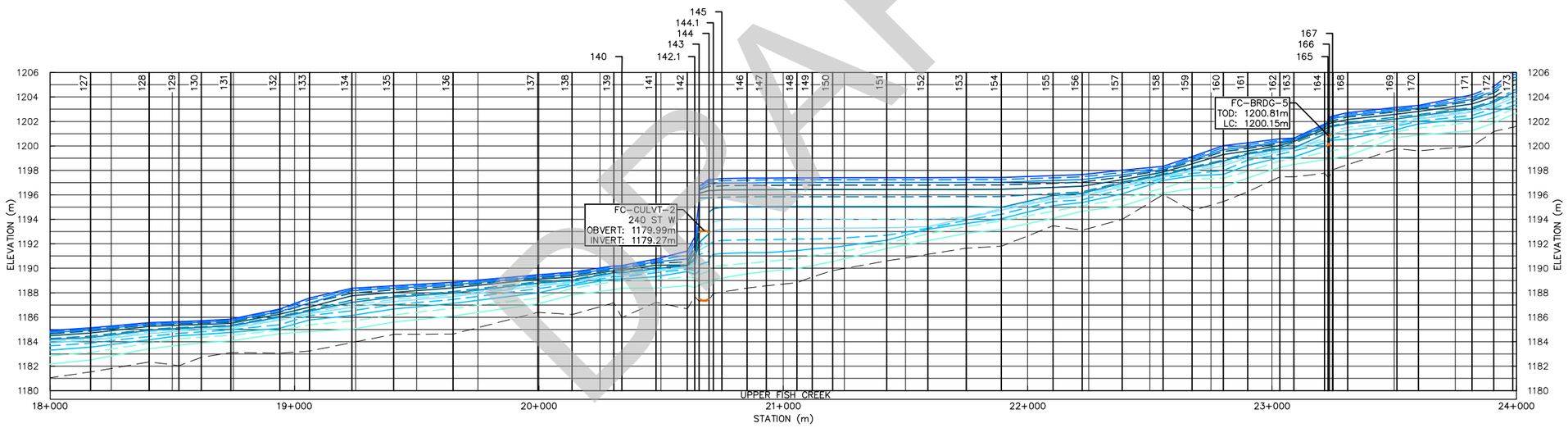
DATE: February 2018

QA/QC:

Stantec

FIGURE A1





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- WS 350-yr
- WS 500-yr
- WS 750-yr
- WS 1000-yr
- HEC-RAS SECTION
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- BRIDGE LOW CHORD (LC)
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- CULVERT INVERT

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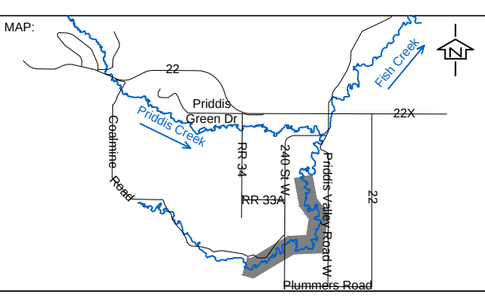


Alberta Government

Priddis River Hazard Study

SURVEYED THALWEG AND COMPUTED FLOOD FREQUENCY PROFILES - FISH CREEK
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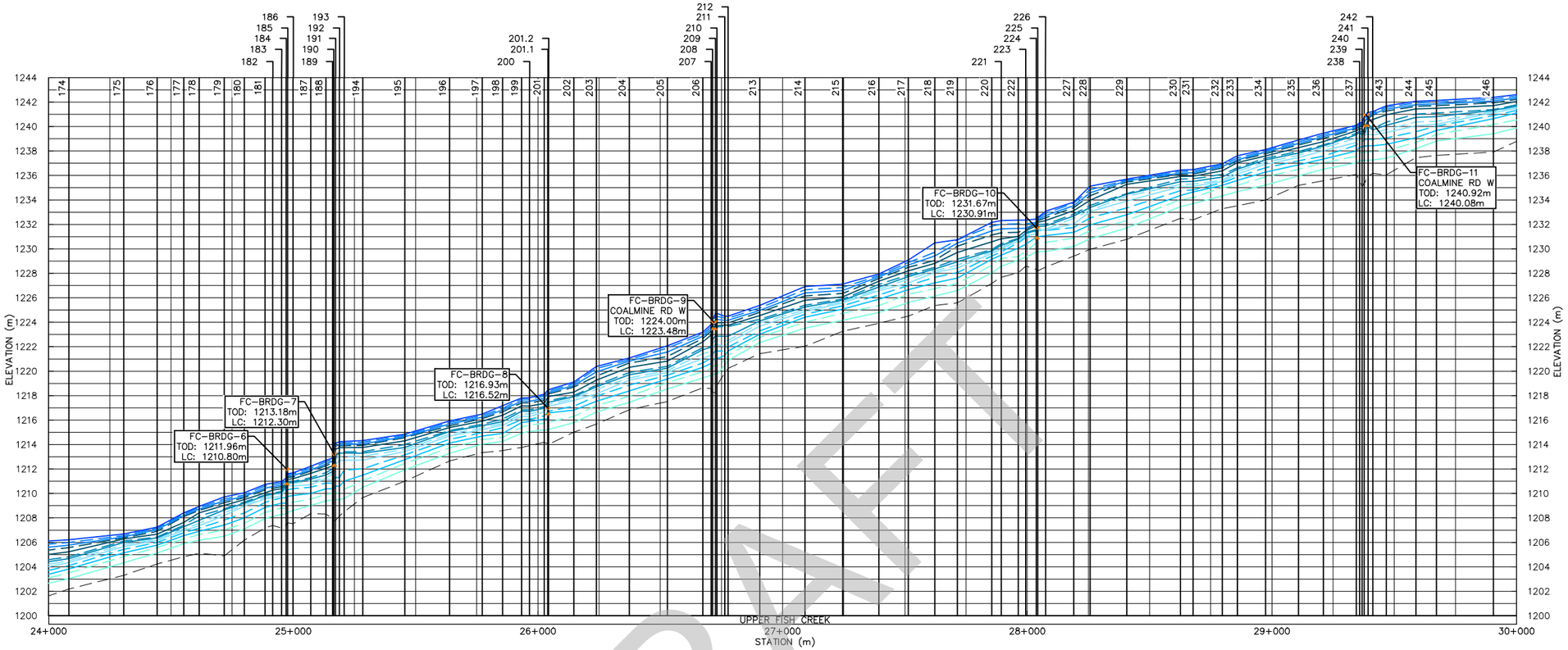
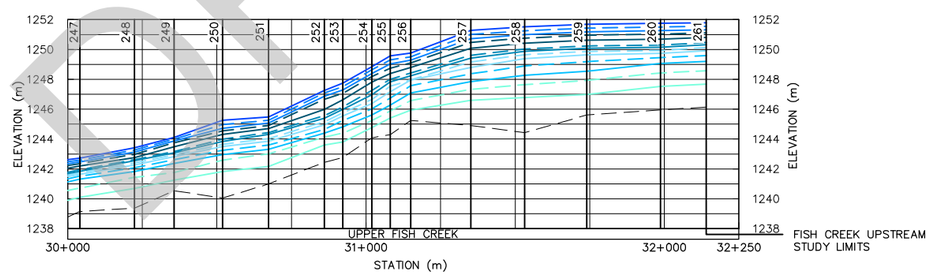
DATE: February 2018

QA/QC:

Stantec

FIGURE A2





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- WS 350-yr
- WS 500-yr
- WS 750-yr
- WS 1000-yr
- HEC-RAS SECTION
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- BRIDGE LOW CHORD (LC)
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- CULVERT INVERT

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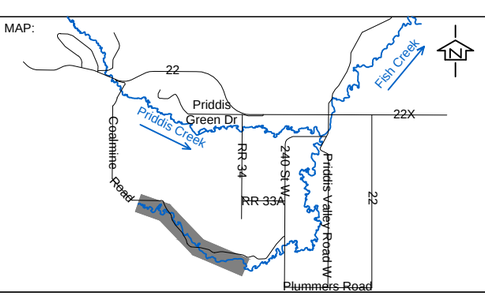


Alberta Government

Priddis River Hazard Study

SURVEYED THALWEG AND COMPUTED FLOOD FREQUENCY PROFILES - FISH CREEK
STA 24+000 TO 32+250

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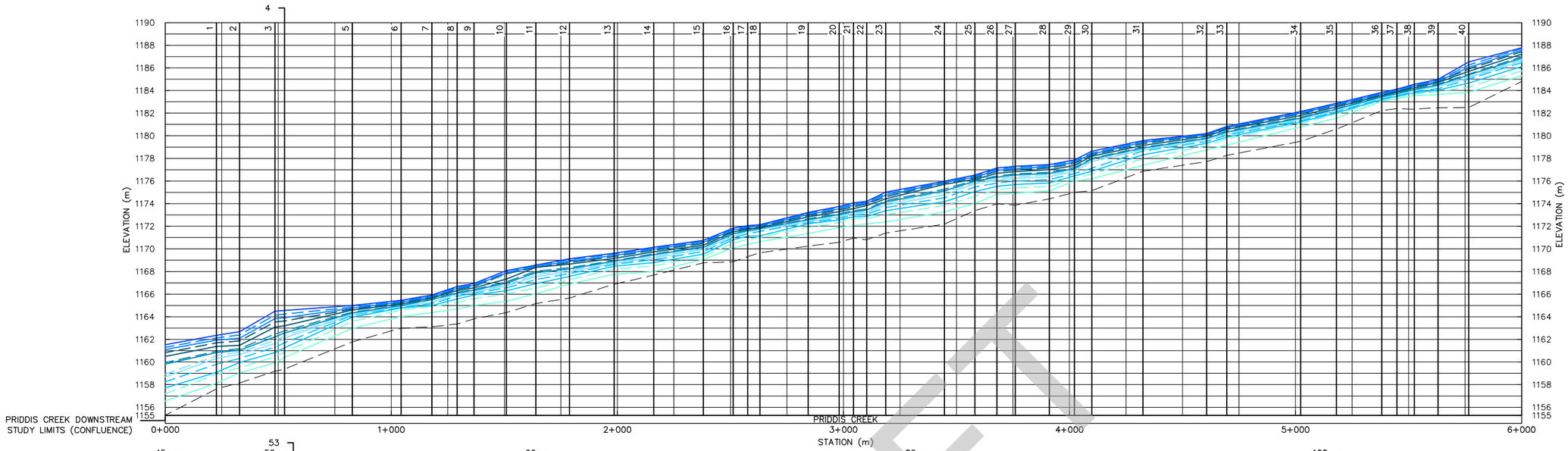
DATE: February 2018

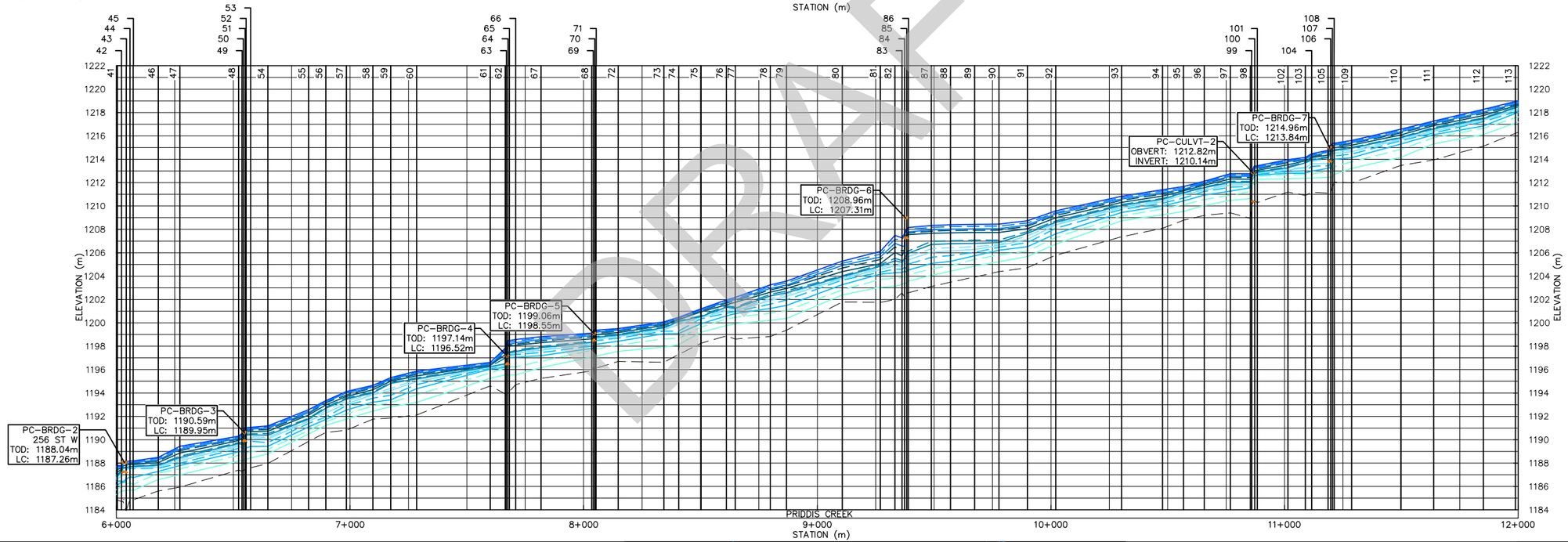
QA/QC:

Stantec

FIGURE A3

2019/09/30 10:43 AM By: Tandara, Catalina



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- WS 750-yr
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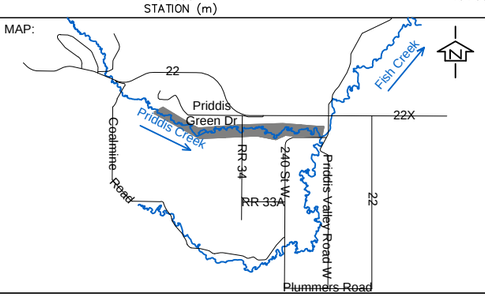


Alberta Government

Priddis River Hazard Study

SURVEYED THALWEG AND COMPUTED FLOOD FREQUENCY PROFILES - PRIDDIS CREEK
STA 0+000 TO 12+000

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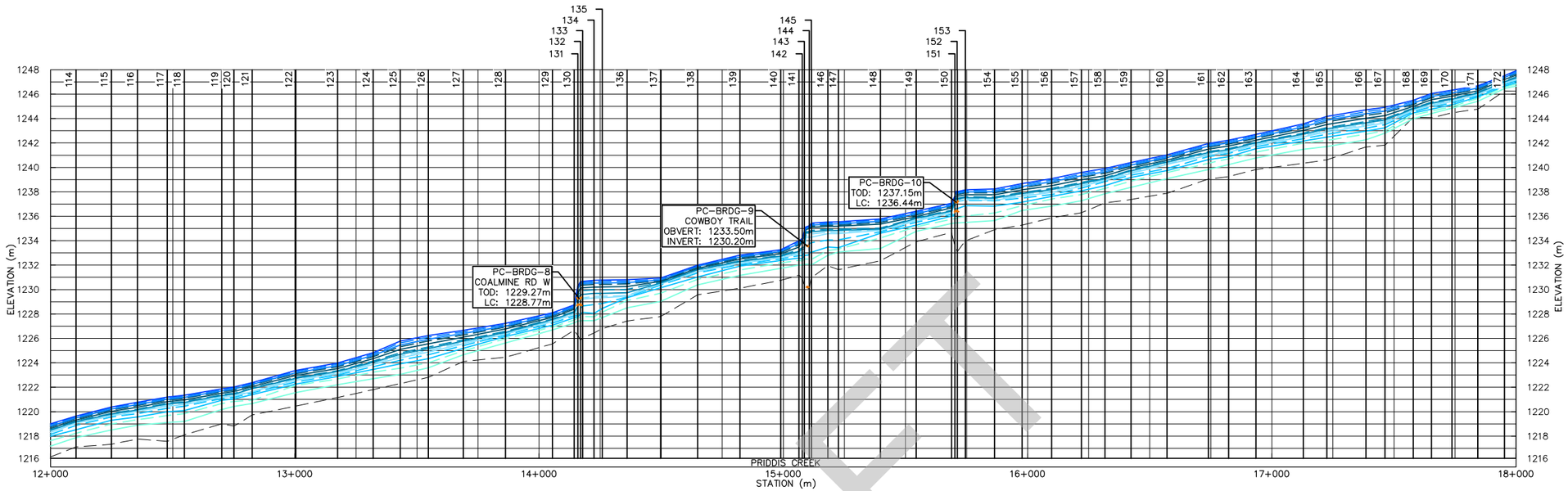
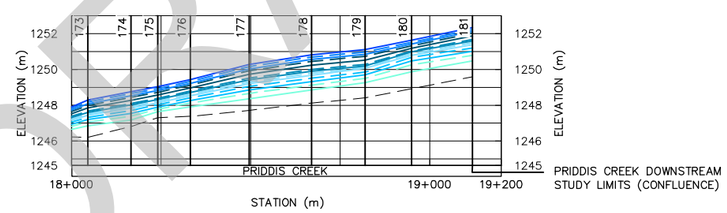
DATE: February 2018

QA/QC:

Stantec

FIGURE A4





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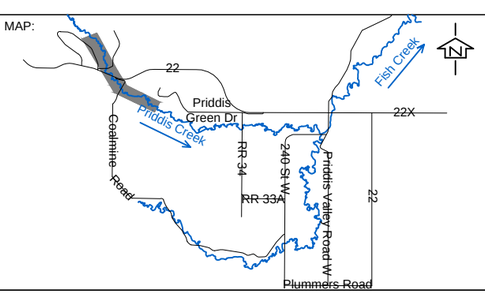
- WS 75-yr
- WS 100-yr
- WS 200-yr
- WS 350-yr
- WS 500-yr
- WS 750-yr
- WS 1000-yr
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

SURVEYED THALWEG AND COMPUTED FLOOD FREQUENCY PROFILES - PRIDDIS CREEK
STA 12+000 TO 19+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

DATE: February 2018

QA/QC:

Stantec

FIGURE A5

# Appendix B OPEN WATER FLOOD FREQUENCY LEVELS

Stantec

**Open Water Flood Frequency Water Levels**

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 19120 | 181 | 1249.59 | 1250.48 | 1250.79 | 1251.01 | 1251.20 | 1251.38 | 1251.49 | 1251.59 | 1251.67 | 1251.87 | 1252.02 | 1252.12 | 1252.23 | 1252.34 |
| Priddis Creek | Priddis Creek | 18950 | 180 | 1248.92 | 1249.87 | 1250.26 | 1250.47 | 1250.67 | 1250.78 | 1250.87 | 1250.98 | 1251.03 | 1251.17 | 1251.32 | 1251.42 | 1251.52 | 1251.63 |
| Priddis Creek | Priddis Creek | 18820 | 179 | 1248.41 | 1249.27 | 1249.50 | 1249.70 | 1249.85 | 1250.06 | 1250.13 | 1250.19 | 1250.28 | 1250.52 | 1250.73 | 1250.85 | 1250.97 | 1251.11 |
| Priddis Creek | Priddis Creek | 18671 | 178 | 1248.12 | 1248.85 | 1249.13 | 1249.32 | 1249.51 | 1249.67 | 1249.78 | 1249.90 | 1250.00 | 1250.24 | 1250.45 | 1250.56 | 1250.69 | 1250.82 |
| Priddis Creek | Priddis Creek | 18496 | 177 | 1247.71 | 1248.36 | 1248.66 | 1248.85 | 1249.05 | 1249.20 | 1249.30 | 1249.41 | 1249.51 | 1249.73 | 1249.92 | 1250.03 | 1250.16 | 1250.27 |
| Priddis Creek | Priddis Creek | 18332 | 176 | 1247.38 | 1247.91 | 1248.12 | 1248.26 | 1248.42 | 1248.54 | 1248.62 | 1248.71 | 1248.79 | 1248.97 | 1249.13 | 1249.23 | 1249.33 | 1249.43 |
| Priddis Creek | Priddis Creek | 18241 | 175 | 1247.30 | 1247.64 | 1247.78 | 1247.90 | 1248.03 | 1248.14 | 1248.22 | 1248.31 | 1248.38 | 1248.56 | 1248.72 | 1248.82 | 1248.93 | 1249.04 |
| Priddis Creek | Priddis Creek | 18166 | 174 | 1246.81 | 1247.17 | 1247.39 | 1247.54 | 1247.70 | 1247.83 | 1247.92 | 1248.02 | 1248.10 | 1248.28 | 1248.44 | 1248.54 | 1248.65 | 1248.76 |
| Priddis Creek | Priddis Creek | 18046 | 173 | 1246.21 | 1246.85 | 1247.06 | 1247.20 | 1247.32 | 1247.44 | 1247.52 | 1247.60 | 1247.67 | 1247.85 | 1247.99 | 1248.08 | 1248.19 | 1248.29 |
| Priddis Creek | Priddis Creek | 17953 | 172 | 1246.25 | 1246.45 | 1246.57 | 1246.66 | 1246.79 | 1246.88 | 1246.95 | 1247.01 | 1247.08 | 1247.21 | 1247.30 | 1247.37 | 1247.44 | 1247.51 |
| Priddis Creek | Priddis Creek | 17844 | 171 | 1244.77 | 1245.40 | 1245.64 | 1245.76 | 1245.86 | 1245.95 | 1246.01 | 1246.08 | 1246.15 | 1246.28 | 1246.40 | 1246.49 | 1246.58 | 1246.68 |
| Priddis Creek | Priddis Creek | 17738 | 170 | 1244.47 | 1244.85 | 1244.99 | 1245.14 | 1245.29 | 1245.40 | 1245.48 | 1245.58 | 1245.65 | 1245.83 | 1245.99 | 1246.09 | 1246.21 | 1246.33 |
| Priddis Creek | Priddis Creek | 17654 | 169 | 1244.07 | 1244.40 | 1244.62 | 1244.77 | 1244.95 | 1245.08 | 1245.16 | 1245.26 | 1245.34 | 1245.54 | 1245.70 | 1245.81 | 1245.94 | 1246.06 |
| Priddis Creek | Priddis Creek | 17580 | 168 | 1244.11 | 1243.98 | 1244.30 | 1244.45 | 1244.57 | 1244.67 | 1244.73 | 1244.80 | 1244.85 | 1245.01 | 1245.16 | 1245.26 | 1245.38 | 1245.50 |
| Priddis Creek | Priddis Creek | 17464 | 167 | 1241.82 | 1242.80 | 1242.99 | 1243.25 | 1243.50 | 1243.64 | 1243.76 | 1243.89 | 1243.99 | 1244.24 | 1244.47 | 1244.61 | 1244.77 | 1244.92 |
| Priddis Creek | Priddis Creek | 17385 | 166 | 1241.67 | 1242.27 | 1242.71 | 1242.96 | 1243.21 | 1243.40 | 1243.52 | 1243.65 | 1243.76 | 1244.03 | 1244.26 | 1244.40 | 1244.56 | 1244.72 |
| Priddis Creek | Priddis Creek | 17225 | 165 | 1240.62 | 1241.71 | 1242.22 | 1242.48 | 1242.72 | 1242.90 | 1243.02 | 1243.15 | 1243.25 | 1243.51 | 1243.73 | 1243.86 | 1244.02 | 1244.17 |
| Priddis Creek | Priddis Creek | 17129 | 164 | 1240.33 | 1241.48 | 1241.99 | 1242.16 | 1242.35 | 1242.50 | 1242.60 | 1242.72 | 1242.81 | 1243.02 | 1243.20 | 1243.31 | 1243.44 | 1243.56 |
| Priddis Creek | Priddis Creek | 16935 | 163 | 1239.83 | 1240.78 | 1241.24 | 1241.53 | 1241.71 | 1241.84 | 1241.91 | 1242.00 | 1242.06 | 1242.23 | 1242.39 | 1242.49 | 1242.60 | 1242.71 |
| Priddis Creek | Priddis Creek | 16823 | 162 | 1239.24 | 1240.23 | 1240.70 | 1240.87 | 1241.15 | 1241.24 | 1241.33 | 1241.44 | 1241.53 | 1241.75 | 1241.91 | 1242.01 | 1242.12 | 1242.22 |
| Priddis Creek | Priddis Creek | 16740 | 161 | 1239.05 | 1239.83 | 1240.33 | 1240.63 | 1240.88 | 1240.99 | 1241.11 | 1241.20 | 1241.29 | 1241.51 | 1241.66 | 1241.76 | 1241.86 | 1241.96 |
| Priddis Creek | Priddis Creek | 16572 | 160 | 1237.88 | 1239.08 | 1239.58 | 1239.73 | 1239.91 | 1240.25 | 1240.31 | 1240.43 | 1240.49 | 1240.59 | 1240.74 | 1240.80 | 1240.91 | 1241.03 |
| Priddis Creek | Priddis Creek | 16424 | 159 | 1237.37 | 1238.36 | 1238.88 | 1239.18 | 1239.37 | 1239.51 | 1239.60 | 1239.71 | 1239.79 | 1239.97 | 1240.10 | 1240.20 | 1240.30 | 1240.41 |
| Priddis Creek | Priddis Creek | 16318 | 158 | 1237.09 | 1237.85 | 1238.28 | 1238.50 | 1238.84 | 1238.95 | 1239.02 | 1239.08 | 1239.14 | 1239.32 | 1239.51 | 1239.63 | 1239.77 | 1239.90 |
| Priddis Creek | Priddis Creek | 16221 | 157 | 1236.29 | 1237.28 | 1237.78 | 1238.09 | 1238.31 | 1238.46 | 1238.56 | 1238.68 | 1238.77 | 1239.00 | 1239.19 | 1239.32 | 1239.45 | 1239.58 |
| Priddis Creek | Priddis Creek | 16099 | 156 | 1235.87 | 1236.83 | 1237.41 | 1237.63 | 1237.79 | 1237.95 | 1238.06 | 1238.18 | 1238.28 | 1238.51 | 1238.71 | 1238.82 | 1238.96 | 1239.09 |
| Priddis Creek | Priddis Creek | 15978 | 155 | 1235.28 | 1236.48 | 1236.87 | 1237.16 | 1237.48 | 1237.64 | 1237.74 | 1237.86 | 1237.95 | 1238.16 | 1238.34 | 1238.44 | 1238.56 | 1238.68 |
| Priddis Creek | Priddis Creek | 15865 | 154 | 1234.90 | 1235.64 | 1236.27 | 1236.82 | 1237.28 | 1237.32 | 1237.40 | 1237.50 | 1237.57 | 1237.76 | 1237.92 | 1238.02 | 1238.11 | 1238.23 |
| Priddis Creek | Priddis Creek | 15746 | 153 | 1233.99 | 1235.49 | 1236.01 | 1236.86 | 1237.30 | 1237.35 | 1237.43 | 1237.52 | 1237.60 | 1237.76 | 1237.91 | 1238.00 | 1238.08 | 1238.17 |
| Priddis Creek | Priddis Creek | 15713 | 152 | 1233.11 | 1235.47 | 1235.88 | 1236.62 | 1237.24 | 1237.25 | 1237.33 | 1237.41 | 1237.48 | 1237.64 | 1237.78 | 1237.87 | 1237.94 | 1238.02 |
| Priddis Creek | Priddis Creek | 15708 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 15703 | 151 | 1233.52 | 1235.45 | 1235.80 | 1236.03 | 1236.12 | 1236.98 | 1237.06 | 1237.15 | 1237.19 | 1237.33 | 1237.44 | 1237.49 | 1237.59 | 1237.67 |
| Priddis Creek | Priddis Creek | 15689 | 150 | 1234.67 | 1235.40 | 1235.75 | 1236.01 | 1236.16 | 1236.29 | 1236.40 | 1236.42 | 1236.49 | 1236.69 | 1236.81 | 1236.89 | 1236.98 | 1237.07 |
| Priddis Creek | Priddis Creek | 15544 | 149 | 1233.91 | 1234.76 | 1235.14 | 1235.28 | 1235.51 | 1235.63 | 1235.72 | 1235.84 | 1235.88 | 1235.96 | 1236.11 | 1236.19 | 1236.30 | 1236.40 |

Stantec

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 15398 | 148 | 1232.35 | 1233.36 | 1234.22 | 1234.61 | 1234.73 | 1234.84 | 1234.91 | 1234.95 | 1235.03 | 1235.36 | 1235.50 | 1235.59 | 1235.69 | 1235.78 |
| Priddis Creek | Priddis Creek | 15226 | 147 | 1231.63 | 1233.07 | 1233.31 | 1233.43 | 1234.06 | 1234.59 | 1234.71 | 1234.85 | 1234.95 | 1235.18 | 1235.28 | 1235.37 | 1235.45 | 1235.55 |
| Priddis Creek | Priddis Creek | 15183 | 146 | 1231.49 | 1232.80 | 1233.20 | 1233.47 | 1234.05 | 1234.58 | 1234.70 | 1234.84 | 1234.94 | 1235.18 | 1235.27 | 1235.36 | 1235.44 | 1235.53 |
| Priddis Creek | Priddis Creek | 15116 | 145 | 1230.98 | 1232.02 | 1232.48 | 1233.06 | 1233.84 | 1234.30 | 1234.55 | 1234.73 | 1234.85 | 1235.11 | 1235.19 | 1235.27 | 1235.35 | 1235.44 |
| Priddis Creek | Priddis Creek | 15107 | 144 | 1230.08 | 1232.08 | 1232.57 | 1233.06 | 1233.77 | 1234.30 | 1234.44 | 1234.63 | 1234.75 | 1235.01 | 1235.02 | 1235.09 | 1235.14 | 1235.22 |
| Priddis Creek | Priddis Creek | 15096 | | Culvert | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 15086 | 143 | 1230.20 | 1232.07 | 1232.50 | 1232.81 | 1233.03 | 1233.08 | 1233.17 | 1233.30 | 1233.47 | 1233.87 | 1234.55 | 1234.64 | 1234.70 | 1234.76 |
| Priddis Creek | Priddis Creek | 15078 | 142 | 1230.94 | 1232.01 | 1232.32 | 1232.49 | 1232.79 | 1233.00 | 1233.14 | 1233.31 | 1233.42 | 1233.91 | 1234.01 | 1234.06 | 1234.14 | 1234.19 |
| Priddis Creek | Priddis Creek | 15064 | 141 | 1231.17 | 1232.01 | 1232.40 | 1232.59 | 1232.77 | 1232.92 | 1233.02 | 1233.12 | 1233.25 | 1233.47 | 1233.65 | 1233.75 | 1233.87 | 1233.99 |
| Priddis Creek | Priddis Creek | 14990 | 140 | 1230.76 | 1231.73 | 1232.18 | 1232.39 | 1232.51 | 1232.61 | 1232.65 | 1232.74 | 1232.80 | 1232.93 | 1233.05 | 1233.12 | 1233.20 | 1233.27 |
| Priddis Creek | Priddis Creek | 14823 | 139 | 1230.11 | 1231.16 | 1231.61 | 1231.92 | 1232.05 | 1232.16 | 1232.25 | 1232.30 | 1232.35 | 1232.50 | 1232.60 | 1232.66 | 1232.73 | 1232.83 |
| Priddis Creek | Priddis Creek | 14650 | 138 | 1229.57 | 1230.38 | 1230.83 | 1231.03 | 1231.36 | 1231.46 | 1231.47 | 1231.62 | 1231.66 | 1231.74 | 1231.84 | 1231.90 | 1231.99 | 1232.00 |
| Priddis Creek | Priddis Creek | 14498 | 137 | 1227.79 | 1229.03 | 1229.70 | 1230.15 | 1230.37 | 1230.46 | 1230.51 | 1230.53 | 1230.60 | 1230.67 | 1230.74 | 1230.79 | 1230.82 | 1230.95 |
| Priddis Creek | Priddis Creek | 14361 | 136 | 1227.42 | 1228.50 | 1229.10 | 1229.34 | 1229.38 | 1229.46 | 1229.51 | 1229.75 | 1230.01 | 1230.25 | 1230.46 | 1230.57 | 1230.69 | 1230.81 |
| Priddis Creek | Priddis Creek | 14259 | 135 | 1226.81 | 1227.71 | 1228.15 | 1228.45 | 1228.86 | 1229.33 | 1229.45 | 1229.69 | 1229.97 | 1230.21 | 1230.43 | 1230.54 | 1230.65 | 1230.77 |
| Priddis Creek | Priddis Creek | 14225 | 134 | 1226.44 | 1227.45 | 1227.78 | 1228.05 | 1228.77 | 1229.32 | 1229.44 | 1229.69 | 1229.97 | 1230.20 | 1230.42 | 1230.53 | 1230.64 | 1230.76 |
| Priddis Creek | Priddis Creek | 14179 | 133 | 1226.03 | 1227.45 | 1227.81 | 1228.13 | 1228.65 | 1229.22 | 1229.32 | 1229.60 | 1229.92 | 1230.14 | 1230.36 | 1230.46 | 1230.57 | 1230.68 |
| Priddis Creek | Priddis Creek | 14170 | 132 | 1225.86 | 1227.43 | 1227.74 | 1228.00 | 1228.44 | 1229.14 | 1229.23 | 1229.55 | 1229.89 | 1230.11 | 1230.33 | 1230.43 | 1230.53 | 1230.64 |
| Priddis Creek | Priddis Creek | 14164 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 14159 | 131 | 1226.23 | 1227.41 | 1227.67 | 1227.78 | 1227.88 | 1228.18 | 1228.40 | 1228.65 | 1228.83 | 1229.74 | 1230.00 | 1230.10 | 1230.19 | 1230.30 |
| Priddis Creek | Priddis Creek | 14144 | 130 | 1226.67 | 1227.27 | 1227.51 | 1227.69 | 1227.85 | 1227.98 | 1228.04 | 1228.13 | 1228.19 | 1228.38 | 1228.50 | 1228.56 | 1228.64 | 1228.74 |
| Priddis Creek | Priddis Creek | 14055 | 129 | 1225.55 | 1226.69 | 1226.94 | 1227.08 | 1227.26 | 1227.38 | 1227.45 | 1227.54 | 1227.59 | 1227.72 | 1227.84 | 1227.92 | 1228.01 | 1228.10 |
| Priddis Creek | Priddis Creek | 13863 | 128 | 1224.46 | 1225.62 | 1225.99 | 1226.16 | 1226.28 | 1226.35 | 1226.43 | 1226.49 | 1226.58 | 1226.78 | 1226.92 | 1227.02 | 1227.12 | 1227.23 |
| Priddis Creek | Priddis Creek | 13690 | 127 | 1224.11 | 1224.66 | 1224.98 | 1225.19 | 1225.41 | 1225.57 | 1225.67 | 1225.79 | 1225.87 | 1226.10 | 1226.28 | 1226.40 | 1226.53 | 1226.66 |
| Priddis Creek | Priddis Creek | 13547 | 126 | 1222.81 | 1223.60 | 1224.00 | 1224.34 | 1224.66 | 1224.89 | 1225.03 | 1225.18 | 1225.29 | 1225.56 | 1225.79 | 1225.94 | 1226.10 | 1226.24 |
| Priddis Creek | Priddis Creek | 13432 | 125 | 1222.30 | 1223.06 | 1223.56 | 1223.92 | 1224.21 | 1224.42 | 1224.54 | 1224.70 | 1224.81 | 1225.10 | 1225.32 | 1225.46 | 1225.62 | 1225.78 |
| Priddis Creek | Priddis Creek | 13322 | 124 | 1221.81 | 1222.70 | 1223.23 | 1223.46 | 1223.69 | 1223.87 | 1223.98 | 1224.06 | 1224.14 | 1224.34 | 1224.50 | 1224.61 | 1224.72 | 1224.84 |
| Priddis Creek | Priddis Creek | 13175 | 123 | 1221.16 | 1222.21 | 1222.68 | 1222.89 | 1223.01 | 1223.11 | 1223.17 | 1223.29 | 1223.35 | 1223.53 | 1223.68 | 1223.77 | 1223.88 | 1223.99 |
| Priddis Creek | Priddis Creek | 13004 | 122 | 1220.46 | 1221.57 | 1222.15 | 1222.27 | 1222.43 | 1222.58 | 1222.69 | 1222.73 | 1222.81 | 1222.97 | 1223.11 | 1223.19 | 1223.29 | 1223.37 |
| Priddis Creek | Priddis Creek | 12826 | 121 | 1219.73 | 1220.67 | 1220.94 | 1221.39 | 1221.54 | 1221.63 | 1221.66 | 1221.89 | 1221.93 | 1222.06 | 1222.18 | 1222.25 | 1222.30 | 1222.38 |
| Priddis Creek | Priddis Creek | 12751 | 120 | 1218.82 | 1220.43 | 1220.84 | 1221.03 | 1221.17 | 1221.28 | 1221.36 | 1221.44 | 1221.50 | 1221.65 | 1221.77 | 1221.85 | 1221.93 | 1222.02 |
| Priddis Creek | Priddis Creek | 12701 | 119 | 1219.01 | 1220.18 | 1220.67 | 1220.93 | 1221.07 | 1221.18 | 1221.26 | 1221.33 | 1221.39 | 1221.52 | 1221.64 | 1221.71 | 1221.79 | 1221.86 |
| Priddis Creek | Priddis Creek | 12548 | 118 | 1218.10 | 1219.20 | 1219.84 | 1220.09 | 1220.46 | 1220.58 | 1220.63 | 1220.75 | 1220.81 | 1220.96 | 1221.10 | 1221.18 | 1221.27 | 1221.35 |
| Priddis Creek | Priddis Creek | 12478 | 117 | 1217.58 | 1219.11 | 1219.68 | 1220.00 | 1220.27 | 1220.46 | 1220.54 | 1220.63 | 1220.70 | 1220.83 | 1220.95 | 1221.02 | 1221.11 | 1221.19 |
| Priddis Creek | Priddis Creek | 12356 | 116 | 1217.76 | 1218.90 | 1219.35 | 1219.57 | 1219.84 | 1220.02 | 1220.08 | 1220.15 | 1220.20 | 1220.37 | 1220.50 | 1220.59 | 1220.68 | 1220.77 |
| Priddis Creek | Priddis Creek | 12249 | 115 | 1217.33 | 1218.51 | 1218.99 | 1219.31 | 1219.57 | 1219.65 | 1219.71 | 1219.80 | 1219.87 | 1220.02 | 1220.15 | 1220.22 | 1220.31 | 1220.39 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 12104 | 114 | 1217.11 | 1217.88 | 1218.24 | 1218.52 | 1218.87 | 1219.06 | 1219.13 | 1219.18 | 1219.22 | 1219.32 | 1219.42 | 1219.49 | 1219.57 | 1219.64 |
| Priddis Creek | Priddis Creek | 11988 | 113 | 1216.21 | 1217.10 | 1217.56 | 1217.93 | 1218.07 | 1218.21 | 1218.36 | 1218.41 | 1218.46 | 1218.57 | 1218.68 | 1218.75 | 1218.85 | 1218.94 |
| Priddis Creek | Priddis Creek | 11851 | 112 | 1215.12 | 1216.12 | 1216.64 | 1216.84 | 1217.21 | 1217.33 | 1217.39 | 1217.46 | 1217.54 | 1217.74 | 1217.91 | 1218.03 | 1218.16 | 1218.27 |
| Priddis Creek | Priddis Creek | 11639 | 111 | 1213.95 | 1215.32 | 1215.84 | 1216.10 | 1216.26 | 1216.41 | 1216.51 | 1216.61 | 1216.71 | 1216.87 | 1217.00 | 1217.08 | 1217.17 | 1217.27 |
| Priddis Creek | Priddis Creek | 11498 | 110 | 1213.47 | 1214.17 | 1214.84 | 1215.30 | 1215.59 | 1215.70 | 1215.76 | 1215.84 | 1215.88 | 1216.08 | 1216.25 | 1216.36 | 1216.47 | 1216.58 |
| Priddis Creek | Priddis Creek | 11288 | 109 | 1211.97 | 1213.22 | 1213.77 | 1214.13 | 1214.43 | 1214.65 | 1214.79 | 1214.95 | 1215.02 | 1215.20 | 1215.34 | 1215.42 | 1215.51 | 1215.60 |
| Priddis Creek | Priddis Creek | 11213 | 108 | 1212.05 | 1212.71 | 1213.37 | 1213.99 | 1214.29 | 1214.52 | 1214.67 | 1214.74 | 1214.81 | 1214.98 | 1215.12 | 1215.20 | 1215.29 | 1215.37 |
| Priddis Creek | Priddis Creek | 11205 | 107 | 1211.63 | 1212.47 | 1213.03 | 1213.63 | 1214.14 | 1214.42 | 1214.56 | 1214.75 | 1214.81 | 1214.98 | 1215.11 | 1215.19 | 1215.27 | 1215.35 |
| Priddis Creek | Priddis Creek | 11198 | 106 | 1211.18 | 1212.45 | 1212.90 | 1213.14 | 1213.81 | 1214.22 | 1214.41 | 1214.59 | 1214.65 | 1214.79 | 1214.89 | 1214.97 | 1215.04 | 1215.09 |
| Priddis Creek | Priddis Creek | 11190 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 11187 | 105 | 1211.10 | 1212.46 | 1212.92 | 1213.22 | 1213.45 | 1213.62 | 1214.06 | 1214.15 | 1214.20 | 1214.35 | 1214.47 | 1214.61 | 1214.70 | 1214.77 |
| Priddis Creek | Priddis Creek | 11116 | 104 | 1211.18 | 1212.40 | 1212.77 | 1212.98 | 1213.40 | 1213.63 | 1213.79 | 1213.93 | 1213.99 | 1214.13 | 1214.23 | 1214.31 | 1214.39 | 1214.47 |
| Priddis Creek | Priddis Creek | 11090 | 103 | 1210.90 | 1212.38 | 1212.71 | 1212.81 | 1213.01 | 1213.26 | 1213.32 | 1213.70 | 1213.76 | 1213.87 | 1213.97 | 1214.02 | 1214.09 | 1214.16 |
| Priddis Creek | Priddis Creek | 11015 | 102 | 1211.19 | 1212.32 | 1212.64 | 1212.80 | 1212.96 | 1213.09 | 1213.18 | 1213.28 | 1213.35 | 1213.53 | 1213.71 | 1213.79 | 1213.88 | 1213.97 |
| Priddis Creek | Priddis Creek | 10884 | 101 | 1210.30 | 1212.29 | 1212.55 | 1212.64 | 1212.73 | 1212.79 | 1212.84 | 1212.90 | 1212.93 | 1213.06 | 1213.17 | 1213.26 | 1213.35 | 1213.44 |
| Priddis Creek | Priddis Creek | 10873 | 100 | 1210.42 | 1211.80 | 1212.46 | 1212.55 | 1212.61 | 1212.69 | 1212.73 | 1212.78 | 1212.83 | 1213.01 | 1213.17 | 1213.26 | 1213.33 | 1213.41 |
| Priddis Creek | Priddis Creek | 10867 | | Culvert | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 10860 | 99 | 1210.16 | 1210.92 | 1211.29 | 1211.61 | 1212.17 | 1212.28 | 1212.33 | 1212.41 | 1212.46 | 1212.58 | 1212.65 | 1212.72 | 1212.78 | 1212.83 |
| Priddis Creek | Priddis Creek | 10854 | 98 | 1208.94 | 1210.63 | 1211.23 | 1211.56 | 1211.67 | 1211.81 | 1211.93 | 1212.02 | 1212.10 | 1212.28 | 1212.44 | 1212.54 | 1212.65 | 1212.76 |
| Priddis Creek | Priddis Creek | 10769 | 97 | 1209.41 | 1210.48 | 1210.94 | 1211.27 | 1211.61 | 1211.81 | 1211.94 | 1212.04 | 1212.12 | 1212.30 | 1212.46 | 1212.55 | 1212.66 | 1212.76 |
| Priddis Creek | Priddis Creek | 10657 | 96 | 1209.20 | 1210.05 | 1210.55 | 1210.93 | 1211.25 | 1211.34 | 1211.42 | 1211.56 | 1211.62 | 1211.79 | 1211.90 | 1211.98 | 1212.05 | 1212.12 |
| Priddis Creek | Priddis Creek | 10569 | 95 | 1208.78 | 1209.53 | 1210.11 | 1210.42 | 1210.68 | 1210.99 | 1211.06 | 1211.13 | 1211.17 | 1211.30 | 1211.37 | 1211.43 | 1211.55 | 1211.67 |
| Priddis Creek | Priddis Creek | 10478 | 94 | 1208.10 | 1209.25 | 1209.74 | 1210.01 | 1210.24 | 1210.38 | 1210.47 | 1210.57 | 1210.66 | 1210.86 | 1211.03 | 1211.14 | 1211.27 | 1211.39 |
| Priddis Creek | Priddis Creek | 10303 | 93 | 1207.37 | 1208.74 | 1209.14 | 1209.44 | 1209.70 | 1209.84 | 1209.94 | 1210.05 | 1210.13 | 1210.31 | 1210.48 | 1210.59 | 1210.72 | 1210.83 |
| Priddis Creek | Priddis Creek | 10021 | 92 | 1205.79 | 1206.73 | 1207.31 | 1207.63 | 1208.10 | 1208.38 | 1208.49 | 1208.61 | 1208.71 | 1208.99 | 1209.19 | 1209.32 | 1209.44 | 1209.58 |
| Priddis Creek | Priddis Creek | 9900 | 91 | 1204.72 | 1205.67 | 1206.15 | 1206.53 | 1206.87 | 1207.14 | 1207.45 | 1207.67 | 1207.81 | 1208.06 | 1208.27 | 1208.37 | 1208.55 | 1208.73 |
| Priddis Creek | Priddis Creek | 9778 | 90 | 1204.38 | 1205.23 | 1205.82 | 1206.22 | 1206.48 | 1206.62 | 1206.71 | 1206.88 | 1207.08 | 1207.74 | 1207.93 | 1208.05 | 1208.28 | 1208.44 |
| Priddis Creek | Priddis Creek | 9674 | 89 | 1203.92 | 1204.87 | 1205.43 | 1205.74 | 1206.03 | 1206.28 | 1206.52 | 1206.81 | 1207.07 | 1207.73 | 1207.93 | 1208.05 | 1208.27 | 1208.43 |
| Priddis Creek | Priddis Creek | 9571 | 88 | 1203.48 | 1204.42 | 1204.90 | 1205.26 | 1205.76 | 1206.16 | 1206.44 | 1206.77 | 1207.03 | 1207.71 | 1207.90 | 1208.02 | 1208.24 | 1208.40 |
| Priddis Creek | Priddis Creek | 9489 | 87 | 1203.11 | 1204.07 | 1204.63 | 1205.08 | 1205.61 | 1206.05 | 1206.35 | 1206.70 | 1206.98 | 1207.67 | 1207.84 | 1207.95 | 1208.17 | 1208.32 |
| Priddis Creek | Priddis Creek | 9391 | 86 | 1202.58 | 1203.57 | 1204.11 | 1204.53 | 1205.02 | 1205.41 | 1205.67 | 1205.96 | 1206.15 | 1207.55 | 1207.70 | 1207.78 | 1208.01 | 1208.16 |
| Priddis Creek | Priddis Creek | 9383 | 85 | 1202.55 | 1203.46 | 1203.99 | 1204.40 | 1204.94 | 1205.34 | 1205.60 | 1205.89 | 1206.10 | 1207.41 | 1207.51 | 1207.53 | 1207.85 | 1208.00 |
| Priddis Creek | Priddis Creek | 9379 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 9374 | 84 | 1202.19 | 1203.41 | 1203.99 | 1204.42 | 1204.76 | 1205.09 | 1205.33 | 1205.55 | 1205.73 | 1206.20 | 1206.24 | 1206.56 | 1207.50 | 1207.65 |
| Priddis Creek | Priddis Creek | 9363 | 83 | 1202.58 | 1203.31 | 1203.90 | 1204.32 | 1204.59 | 1204.83 | 1204.99 | 1205.19 | 1205.33 | 1205.74 | 1206.15 | 1206.57 | 1207.12 | 1207.29 |
| Priddis Creek | Priddis Creek | 9332 | 82 | 1202.00 | 1203.14 | 1203.82 | 1204.29 | 1204.59 | 1204.89 | 1205.10 | 1205.32 | 1205.51 | 1206.03 | 1206.51 | 1206.81 | 1207.15 | 1207.48 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 9270 | 81 | 1201.75 | 1203.05 | 1203.73 | 1204.17 | 1204.34 | 1204.55 | 1204.69 | 1204.85 | 1204.96 | 1205.06 | 1205.42 | 1205.64 | 1205.87 | 1206.12 |
| Priddis Creek | Priddis Creek | 9108 | 80 | 1201.79 | 1202.38 | 1202.82 | 1203.27 | 1203.67 | 1203.80 | 1203.88 | 1203.97 | 1204.03 | 1204.38 | 1204.70 | 1204.91 | 1205.09 | 1205.28 |
| Priddis Creek | Priddis Creek | 8869 | 79 | 1199.38 | 1200.37 | 1201.04 | 1201.49 | 1201.96 | 1202.27 | 1202.45 | 1202.58 | 1202.72 | 1202.95 | 1203.14 | 1203.24 | 1203.42 | 1203.57 |
| Priddis Creek | Priddis Creek | 8800 | 78 | 1198.83 | 1200.22 | 1200.84 | 1201.23 | 1201.61 | 1201.92 | 1202.06 | 1202.30 | 1202.45 | 1202.62 | 1202.82 | 1202.95 | 1203.12 | 1203.26 |
| Priddis Creek | Priddis Creek | 8650 | 77 | 1198.62 | 1199.91 | 1200.48 | 1200.80 | 1200.98 | 1201.05 | 1201.20 | 1201.26 | 1201.35 | 1201.76 | 1201.91 | 1202.00 | 1202.07 | 1202.19 |
| Priddis Creek | Priddis Creek | 8611 | 76 | 1198.88 | 1199.76 | 1200.32 | 1200.60 | 1200.82 | 1201.04 | 1201.19 | 1201.34 | 1201.46 | 1201.55 | 1201.69 | 1201.77 | 1201.87 | 1201.97 |
| Priddis Creek | Priddis Creek | 8503 | 75 | 1198.26 | 1199.20 | 1199.64 | 1199.93 | 1200.35 | 1200.45 | 1200.46 | 1200.55 | 1200.61 | 1200.95 | 1201.05 | 1201.10 | 1201.15 | 1201.20 |
| Priddis Creek | Priddis Creek | 8408 | 74 | 1197.30 | 1198.14 | 1198.68 | 1199.09 | 1199.30 | 1199.87 | 1200.06 | 1200.13 | 1200.17 | 1200.27 | 1200.35 | 1200.41 | 1200.46 | 1200.48 |
| Priddis Creek | Priddis Creek | 8344 | 73 | 1196.63 | 1197.93 | 1198.64 | 1199.08 | 1199.29 | 1199.41 | 1199.50 | 1199.58 | 1199.66 | 1199.78 | 1199.89 | 1199.95 | 1200.03 | 1200.09 |
| Priddis Creek | Priddis Creek | 8149 | 72 | 1196.70 | 1197.56 | 1198.11 | 1198.43 | 1198.70 | 1198.84 | 1198.90 | 1198.96 | 1199.03 | 1199.17 | 1199.29 | 1199.37 | 1199.44 | 1199.51 |
| Priddis Creek | Priddis Creek | 8054 | 71 | 1196.13 | 1197.16 | 1197.76 | 1198.17 | 1198.48 | 1198.60 | 1198.68 | 1198.77 | 1198.84 | 1199.00 | 1199.13 | 1199.20 | 1199.28 | 1199.38 |
| Priddis Creek | Priddis Creek | 8048 | 70 | 1195.57 | 1197.19 | 1197.79 | 1198.16 | 1198.48 | 1198.60 | 1198.68 | 1198.77 | 1198.83 | 1198.99 | 1199.11 | 1199.19 | 1199.27 | 1199.37 |
| Priddis Creek | Priddis Creek | 8045 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 8042 | 69 | 1196.21 | 1197.07 | 1197.66 | 1197.80 | 1198.25 | 1198.38 | 1198.44 | 1198.51 | 1198.56 | 1198.69 | 1198.83 | 1198.89 | 1198.96 | 1198.98 |
| Priddis Creek | Priddis Creek | 8035 | 68 | 1195.89 | 1197.07 | 1197.66 | 1197.83 | 1198.02 | 1198.15 | 1198.24 | 1198.34 | 1198.43 | 1198.63 | 1198.79 | 1198.89 | 1199.01 | 1199.13 |
| Priddis Creek | Priddis Creek | 7818 | 67 | 1195.24 | 1196.18 | 1196.71 | 1197.19 | 1197.46 | 1197.64 | 1197.76 | 1197.89 | 1197.99 | 1198.32 | 1198.46 | 1198.58 | 1198.71 | 1198.82 |
| Priddis Creek | Priddis Creek | 7709 | 66 | 1194.72 | 1195.55 | 1196.24 | 1197.05 | 1197.29 | 1197.42 | 1197.50 | 1197.57 | 1197.65 | 1198.08 | 1198.18 | 1198.31 | 1198.45 | 1198.58 |
| Priddis Creek | Priddis Creek | 7682 | 65 | 1194.13 | 1195.56 | 1196.24 | 1197.04 | 1197.25 | 1197.36 | 1197.41 | 1197.45 | 1197.50 | 1198.02 | 1198.08 | 1198.20 | 1198.35 | 1198.48 |
| Priddis Creek | Priddis Creek | 7676 | 64 | 1193.97 | 1195.56 | 1196.25 | 1197.04 | 1197.25 | 1197.36 | 1197.41 | 1197.45 | 1197.50 | 1198.03 | 1198.10 | 1198.22 | 1198.36 | 1198.49 |
| Priddis Creek | Priddis Creek | 7673 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 7669 | 63 | 1193.86 | 1195.55 | 1196.15 | 1196.20 | 1196.32 | 1196.38 | 1196.51 | 1196.84 | 1196.91 | 1197.07 | 1197.77 | 1197.85 | 1198.01 | 1198.11 |
| Priddis Creek | Priddis Creek | 7665 | 62 | 1193.92 | 1195.55 | 1196.15 | 1196.20 | 1196.30 | 1196.35 | 1196.38 | 1196.49 | 1197.00 | 1197.28 | 1197.45 | 1197.58 | 1197.70 | 1197.83 |
| Priddis Creek | Priddis Creek | 7600 | 61 | 1194.61 | 1195.27 | 1195.71 | 1196.05 | 1196.12 | 1196.18 | 1196.20 | 1196.26 | 1196.28 | 1196.36 | 1196.41 | 1196.45 | 1196.52 | 1196.62 |
| Priddis Creek | Priddis Creek | 7289 | 60 | 1192.11 | 1193.20 | 1193.85 | 1194.36 | 1194.72 | 1194.98 | 1195.15 | 1195.21 | 1195.29 | 1195.46 | 1195.60 | 1195.69 | 1195.78 | 1195.87 |
| Priddis Creek | Priddis Creek | 7175 | 59 | 1191.86 | 1192.82 | 1193.18 | 1193.42 | 1193.81 | 1194.21 | 1194.39 | 1194.83 | 1194.88 | 1195.01 | 1195.11 | 1195.17 | 1195.25 | 1195.32 |
| Priddis Creek | Priddis Creek | 7098 | 58 | 1191.76 | 1192.45 | 1192.90 | 1193.21 | 1193.55 | 1193.84 | 1193.93 | 1194.01 | 1194.09 | 1194.29 | 1194.44 | 1194.51 | 1194.58 | 1194.66 |
| Priddis Creek | Priddis Creek | 6985 | 57 | 1190.82 | 1191.78 | 1192.21 | 1192.54 | 1192.92 | 1193.07 | 1193.32 | 1193.49 | 1193.57 | 1193.71 | 1193.83 | 1194.01 | 1194.08 | 1194.13 |
| Priddis Creek | Priddis Creek | 6897 | 56 | 1190.61 | 1191.23 | 1191.53 | 1191.75 | 1191.95 | 1192.31 | 1192.48 | 1192.69 | 1192.78 | 1192.97 | 1193.16 | 1193.22 | 1193.28 | 1193.35 |
| Priddis Creek | Priddis Creek | 6824 | 55 | 1189.87 | 1190.48 | 1190.80 | 1191.10 | 1191.40 | 1191.57 | 1191.69 | 1191.78 | 1191.84 | 1192.11 | 1192.25 | 1192.32 | 1192.43 | 1192.57 |
| Priddis Creek | Priddis Creek | 6649 | 54 | 1187.97 | 1188.79 | 1189.17 | 1189.44 | 1189.76 | 1190.07 | 1190.20 | 1190.38 | 1190.52 | 1190.73 | 1190.88 | 1190.99 | 1191.09 | 1191.18 |
| Priddis Creek | Priddis Creek | 6575 | 53 | 1187.60 | 1188.43 | 1188.98 | 1189.42 | 1189.88 | 1190.16 | 1190.29 | 1190.42 | 1190.51 | 1190.69 | 1190.83 | 1190.91 | 1190.99 | 1191.07 |
| Priddis Creek | Priddis Creek | 6556 | 52 | 1187.37 | 1188.33 | 1188.87 | 1189.31 | 1189.79 | 1190.10 | 1190.24 | 1190.39 | 1190.49 | 1190.66 | 1190.79 | 1190.86 | 1190.94 | 1191.03 |
| Priddis Creek | Priddis Creek | 6551 | 51 | 1187.44 | 1188.27 | 1188.73 | 1189.08 | 1189.60 | 1189.96 | 1190.11 | 1190.31 | 1190.42 | 1190.60 | 1190.73 | 1190.80 | 1190.89 | 1190.97 |
| Priddis Creek | Priddis Creek | 6546 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 6544 | 50 | 1187.39 | 1188.24 | 1188.71 | 1188.97 | 1189.17 | 1189.31 | 1189.72 | 1189.88 | 1190.07 | 1190.29 | 1190.40 | 1190.46 | 1190.53 | 1190.59 |
| Priddis Creek | Priddis Creek | 6539 | 49 | 1187.31 | 1188.24 | 1188.72 | 1189.00 | 1189.23 | 1189.33 | 1189.33 | 1189.59 | 1189.75 | 1190.15 | 1190.31 | 1190.38 | 1190.47 | 1190.54 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 6524 | 48 | 1187.40 | 1188.16 | 1188.65 | 1188.96 | 1189.26 | 1189.44 | 1189.55 | 1189.67 | 1189.76 | 1189.93 | 1190.05 | 1190.12 | 1190.21 | 1190.31 |
| Priddis Creek | Priddis Creek | 6272 | 47 | 1185.95 | 1187.00 | 1187.52 | 1187.79 | 1187.99 | 1188.20 | 1188.34 | 1188.48 | 1188.59 | 1188.87 | 1189.08 | 1189.20 | 1189.32 | 1189.45 |
| Priddis Creek | Priddis Creek | 6180 | 46 | 1185.61 | 1186.60 | 1187.14 | 1187.28 | 1187.58 | 1187.67 | 1187.74 | 1187.82 | 1187.88 | 1188.05 | 1188.18 | 1188.27 | 1188.40 | 1188.49 |
| Priddis Creek | Priddis Creek | 6073 | 45 | 1184.86 | 1185.66 | 1186.18 | 1186.76 | 1187.53 | 1187.60 | 1187.65 | 1187.71 | 1187.75 | 1187.89 | 1187.99 | 1188.05 | 1188.12 | 1188.19 |
| Priddis Creek | Priddis Creek | 6059 | 44 | 1184.85 | 1185.69 | 1186.30 | 1186.84 | 1187.54 | 1187.61 | 1187.66 | 1187.71 | 1187.76 | 1187.90 | 1187.99 | 1188.06 | 1188.12 | 1188.19 |
| Priddis Creek | Priddis Creek | 6042 | 43 | 1183.98 | 1185.66 | 1186.21 | 1186.63 | 1187.50 | 1187.55 | 1187.59 | 1187.64 | 1187.67 | 1187.82 | 1187.92 | 1187.99 | 1188.06 | 1188.13 |
| Priddis Creek | Priddis Creek | 6033 | | Bridge | | | | | | | | | | | | | |
| Priddis Creek | Priddis Creek | 6022 | 42 | 1184.72 | 1185.62 | 1186.10 | 1186.36 | 1186.47 | 1186.90 | 1187.17 | 1187.31 | 1187.39 | 1187.47 | 1187.58 | 1187.63 | 1187.71 | 1187.79 |
| Priddis Creek | Priddis Creek | 6004 | 41 | 1184.83 | 1185.34 | 1185.75 | 1186.13 | 1186.49 | 1186.64 | 1186.78 | 1186.89 | 1187.00 | 1187.25 | 1187.46 | 1187.60 | 1187.73 | 1187.80 |
| Priddis Creek | Priddis Creek | 5766 | 40 | 1182.49 | 1183.83 | 1184.31 | 1184.66 | 1185.00 | 1185.12 | 1185.20 | 1185.37 | 1185.45 | 1185.69 | 1185.90 | 1186.03 | 1186.25 | 1186.53 |
| Priddis Creek | Priddis Creek | 5631 | 39 | 1182.48 | 1183.65 | 1183.89 | 1184.04 | 1184.17 | 1184.37 | 1184.46 | 1184.50 | 1184.58 | 1184.71 | 1184.80 | 1184.84 | 1184.92 | 1184.99 |
| Priddis Creek | Priddis Creek | 5526 | 38 | 1182.35 | 1183.55 | 1183.69 | 1183.80 | 1183.90 | 1183.98 | 1184.03 | 1184.09 | 1184.13 | 1184.24 | 1184.34 | 1184.40 | 1184.47 | 1184.54 |
| Priddis Creek | Priddis Creek | 5449 | 37 | 1182.39 | 1183.30 | 1183.42 | 1183.50 | 1183.57 | 1183.64 | 1183.69 | 1183.74 | 1183.78 | 1183.88 | 1183.96 | 1184.01 | 1184.07 | 1184.13 |
| Priddis Creek | Priddis Creek | 5382 | 36 | 1182.23 | 1183.05 | 1183.13 | 1183.21 | 1183.29 | 1183.36 | 1183.40 | 1183.44 | 1183.48 | 1183.57 | 1183.65 | 1183.70 | 1183.77 | 1183.84 |
| Priddis Creek | Priddis Creek | 5181 | 35 | 1180.59 | 1181.54 | 1181.94 | 1182.02 | 1182.13 | 1182.22 | 1182.28 | 1182.36 | 1182.41 | 1182.55 | 1182.67 | 1182.73 | 1182.80 | 1182.87 |
| Priddis Creek | Priddis Creek | 5023 | 34 | 1179.51 | 1180.79 | 1181.08 | 1181.23 | 1181.33 | 1181.44 | 1181.50 | 1181.57 | 1181.63 | 1181.78 | 1181.94 | 1182.00 | 1182.07 | 1182.14 |
| Priddis Creek | Priddis Creek | 4696 | 33 | 1178.26 | 1179.16 | 1179.72 | 1179.88 | 1180.05 | 1180.16 | 1180.24 | 1180.34 | 1180.41 | 1180.56 | 1180.66 | 1180.71 | 1180.78 | 1180.83 |
| Priddis Creek | Priddis Creek | 4607 | 32 | 1177.72 | 1178.75 | 1179.13 | 1179.33 | 1179.50 | 1179.65 | 1179.71 | 1179.77 | 1179.81 | 1179.96 | 1180.06 | 1180.11 | 1180.15 | 1180.20 |
| Priddis Creek | Priddis Creek | 4325 | 31 | 1176.86 | 1177.39 | 1177.96 | 1178.32 | 1178.65 | 1178.74 | 1178.81 | 1178.90 | 1178.98 | 1179.14 | 1179.30 | 1179.41 | 1179.50 | 1179.57 |
| Priddis Creek | Priddis Creek | 4099 | 30 | 1175.14 | 1176.21 | 1176.61 | 1176.86 | 1177.13 | 1177.73 | 1177.86 | 1177.96 | 1178.02 | 1178.20 | 1178.32 | 1178.39 | 1178.49 | 1178.63 |
| Priddis Creek | Priddis Creek | 4023 | 29 | 1175.00 | 1175.99 | 1176.26 | 1176.45 | 1176.65 | 1176.85 | 1176.95 | 1177.08 | 1177.20 | 1177.37 | 1177.54 | 1177.65 | 1177.76 | 1177.86 |
| Priddis Creek | Priddis Creek | 3911 | 28 | 1174.42 | 1175.14 | 1175.51 | 1175.83 | 1176.13 | 1176.38 | 1176.55 | 1176.68 | 1176.77 | 1176.99 | 1177.15 | 1177.25 | 1177.36 | 1177.46 |
| Priddis Creek | Priddis Creek | 3760 | 27 | 1173.86 | 1174.91 | 1175.39 | 1175.69 | 1175.99 | 1176.23 | 1176.38 | 1176.54 | 1176.63 | 1176.84 | 1177.00 | 1177.09 | 1177.20 | 1177.31 |
| Priddis Creek | Priddis Creek | 3680 | 26 | 1173.98 | 1174.81 | 1175.24 | 1175.53 | 1175.82 | 1176.06 | 1176.18 | 1176.34 | 1176.45 | 1176.68 | 1176.84 | 1176.93 | 1177.04 | 1177.15 |
| Priddis Creek | Priddis Creek | 3582 | 25 | 1173.38 | 1174.01 | 1174.65 | 1175.06 | 1175.47 | 1175.75 | 1175.83 | 1175.98 | 1176.07 | 1176.15 | 1176.27 | 1176.36 | 1176.44 | 1176.52 |
| Priddis Creek | Priddis Creek | 3447 | 24 | 1172.18 | 1173.28 | 1173.83 | 1174.18 | 1174.52 | 1174.78 | 1175.01 | 1175.14 | 1175.27 | 1175.72 | 1175.82 | 1175.86 | 1175.92 | 1175.98 |
| Priddis Creek | Priddis Creek | 3187 | 23 | 1171.40 | 1172.37 | 1173.03 | 1173.38 | 1173.65 | 1173.86 | 1174.00 | 1174.15 | 1174.26 | 1174.43 | 1174.60 | 1174.75 | 1174.88 | 1175.02 |
| Priddis Creek | Priddis Creek | 3104 | 22 | 1170.81 | 1172.20 | 1172.68 | 1172.87 | 1173.07 | 1173.21 | 1173.31 | 1173.44 | 1173.53 | 1173.83 | 1173.98 | 1174.05 | 1174.12 | 1174.21 |
| Priddis Creek | Priddis Creek | 3045 | 21 | 1170.96 | 1172.07 | 1172.65 | 1172.84 | 1172.99 | 1173.12 | 1173.20 | 1173.30 | 1173.37 | 1173.56 | 1173.72 | 1173.85 | 1173.95 | 1174.06 |
| Priddis Creek | Priddis Creek | 2982 | 20 | 1170.59 | 1171.88 | 1172.33 | 1172.56 | 1172.71 | 1172.85 | 1172.94 | 1173.03 | 1173.11 | 1173.29 | 1173.44 | 1173.55 | 1173.65 | 1173.75 |
| Priddis Creek | Priddis Creek | 2845 | 19 | 1170.24 | 1171.35 | 1171.91 | 1172.23 | 1172.32 | 1172.42 | 1172.50 | 1172.58 | 1172.67 | 1172.84 | 1172.96 | 1173.04 | 1173.13 | 1173.22 |
| Priddis Creek | Priddis Creek | 2631 | 18 | 1169.66 | 1170.64 | 1171.02 | 1171.14 | 1171.55 | 1171.69 | 1171.74 | 1171.80 | 1171.81 | 1171.89 | 1171.98 | 1172.03 | 1172.08 | 1172.15 |
| Priddis Creek | Priddis Creek | 2577 | 17 | 1169.32 | 1170.37 | 1170.84 | 1171.13 | 1171.34 | 1171.49 | 1171.54 | 1171.61 | 1171.65 | 1171.75 | 1171.84 | 1171.90 | 1171.98 | 1172.05 |
| Priddis Creek | Priddis Creek | 2513 | 16 | 1168.85 | 1170.10 | 1170.51 | 1170.82 | 1171.00 | 1171.13 | 1171.29 | 1171.32 | 1171.37 | 1171.50 | 1171.61 | 1171.67 | 1171.75 | 1171.83 |
| Priddis Creek | Priddis Creek | 2381 | 15 | 1168.77 | 1169.06 | 1169.32 | 1169.53 | 1169.78 | 1169.95 | 1170.02 | 1170.14 | 1170.19 | 1170.33 | 1170.49 | 1170.58 | 1170.67 | 1170.76 |
| Priddis Creek | Priddis Creek | 2161 | 14 | 1167.68 | 1167.99 | 1168.49 | 1168.79 | 1169.05 | 1169.22 | 1169.34 | 1169.49 | 1169.56 | 1169.73 | 1169.88 | 1169.97 | 1170.06 | 1170.14 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Priddis Creek | Priddis Creek | 1986 | 13 | 1166.88 | 1167.75 | 1168.22 | 1168.46 | 1168.64 | 1168.75 | 1168.82 | 1168.90 | 1168.97 | 1169.17 | 1169.33 | 1169.42 | 1169.53 | 1169.61 |
| Priddis Creek | Priddis Creek | 1789 | 12 | 1165.65 | 1166.90 | 1167.29 | 1167.56 | 1167.82 | 1167.98 | 1168.10 | 1168.24 | 1168.35 | 1168.65 | 1168.79 | 1168.90 | 1169.04 | 1169.13 |
| Priddis Creek | Priddis Creek | 1640 | 11 | 1165.17 | 1166.04 | 1166.55 | 1166.92 | 1167.29 | 1167.55 | 1167.71 | 1167.88 | 1168.02 | 1168.36 | 1168.37 | 1168.46 | 1168.55 | 1168.57 |
| Priddis Creek | Priddis Creek | 1509 | 10 | 1164.37 | 1165.37 | 1166.02 | 1166.31 | 1166.56 | 1166.73 | 1166.82 | 1166.97 | 1167.08 | 1167.34 | 1167.79 | 1167.85 | 1167.91 | 1168.08 |
| Priddis Creek | Priddis Creek | 1366 | 9 | 1163.81 | 1164.99 | 1165.59 | 1165.93 | 1166.07 | 1166.19 | 1166.27 | 1166.35 | 1166.41 | 1166.56 | 1166.69 | 1166.77 | 1166.85 | 1166.94 |
| Priddis Creek | Priddis Creek | 1292 | 8 | 1163.36 | 1164.70 | 1165.26 | 1165.58 | 1165.83 | 1165.98 | 1166.01 | 1166.10 | 1166.16 | 1166.32 | 1166.44 | 1166.51 | 1166.59 | 1166.67 |
| Priddis Creek | Priddis Creek | 1180 | 7 | 1163.11 | 1164.38 | 1164.91 | 1164.99 | 1165.16 | 1165.29 | 1165.47 | 1165.52 | 1165.56 | 1165.66 | 1165.74 | 1165.80 | 1165.87 | 1165.93 |
| Priddis Creek | Priddis Creek | 1044 | 6 | 1162.99 | 1164.02 | 1164.59 | 1164.78 | 1164.83 | 1164.91 | 1164.95 | 1165.00 | 1165.03 | 1165.13 | 1165.24 | 1165.30 | 1165.37 | 1165.45 |
| Priddis Creek | Priddis Creek | 827 | 5 | 1161.78 | 1162.97 | 1163.58 | 1163.96 | 1164.13 | 1164.20 | 1164.27 | 1164.34 | 1164.41 | 1164.59 | 1164.67 | 1164.76 | 1164.85 | 1165.00 |
| Priddis Creek | Priddis Creek | 528 | 4 | 1159.37 | 1160.41 | 1160.86 | 1161.26 | 1161.70 | 1162.11 | 1162.31 | 1162.56 | 1162.75 | 1163.20 | 1163.63 | 1163.91 | 1164.23 | 1164.56 |
| Priddis Creek | Priddis Creek | 485 | 3 | 1159.19 | 1159.91 | 1160.47 | 1160.83 | 1161.30 | 1161.64 | 1161.88 | 1162.22 | 1162.47 | 1163.08 | 1163.54 | 1163.83 | 1164.16 | 1164.48 |
| Priddis Creek | Priddis Creek | 329 | 2 | 1158.15 | 1159.04 | 1159.49 | 1159.95 | 1160.31 | 1160.67 | 1160.88 | 1161.04 | 1161.17 | 1161.48 | 1161.87 | 1162.11 | 1162.39 | 1162.67 |
| Priddis Creek | Priddis Creek | 226 | 1 | 1157.62 | 1158.12 | 1158.91 | 1159.09 | 1159.80 | 1160.33 | 1160.56 | 1160.83 | 1160.95 | 1161.29 | 1161.57 | 1161.87 | 1162.03 | 1162.27 |
| Fish Creek | Upper Fish Creek | 32136 | 261 | 1246.14 | 1247.68 | 1248.57 | 1249.19 | 1249.59 | 1249.92 | 1250.13 | 1250.32 | 1250.47 | 1250.81 | 1251.11 | 1251.32 | 1251.55 | 1251.79 |
| Fish Creek | Upper Fish Creek | 31982 | 260 | 1245.96 | 1247.52 | 1248.42 | 1249.06 | 1249.45 | 1249.74 | 1249.93 | 1250.14 | 1250.29 | 1250.69 | 1251.03 | 1251.25 | 1251.50 | 1251.75 |
| Fish Creek | Upper Fish Creek | 31735 | 259 | 1245.61 | 1246.99 | 1247.92 | 1248.54 | 1249.19 | 1249.63 | 1249.86 | 1250.08 | 1250.23 | 1250.62 | 1250.95 | 1251.18 | 1251.43 | 1251.68 |
| Fish Creek | Upper Fish Creek | 31527 | 258 | 1244.43 | 1246.77 | 1247.65 | 1248.27 | 1248.89 | 1249.38 | 1249.65 | 1249.88 | 1250.03 | 1250.42 | 1250.76 | 1250.99 | 1251.25 | 1251.51 |
| Fish Creek | Upper Fish Creek | 31347 | 257 | 1244.90 | 1246.60 | 1247.33 | 1247.84 | 1248.37 | 1248.80 | 1249.16 | 1249.42 | 1249.61 | 1250.09 | 1250.47 | 1250.73 | 1251.01 | 1251.28 |
| Fish Creek | Upper Fish Creek | 31145 | 256 | 1245.25 | 1245.94 | 1246.58 | 1247.08 | 1247.57 | 1247.95 | 1247.96 | 1248.23 | 1248.42 | 1248.80 | 1249.10 | 1249.29 | 1249.51 | 1249.76 |
| Fish Creek | Upper Fish Creek | 31077 | 255 | 1244.29 | 1245.41 | 1245.88 | 1246.27 | 1246.74 | 1247.16 | 1247.53 | 1247.83 | 1248.00 | 1248.39 | 1248.74 | 1249.02 | 1249.30 | 1249.58 |
| Fish Creek | Upper Fish Creek | 31015 | 254 | 1244.08 | 1244.76 | 1245.24 | 1245.61 | 1246.01 | 1246.37 | 1246.65 | 1246.96 | 1247.26 | 1247.82 | 1248.19 | 1248.39 | 1248.64 | 1248.85 |
| Fish Creek | Upper Fish Creek | 30918 | 253 | 1242.77 | 1243.81 | 1244.39 | 1244.82 | 1245.25 | 1245.55 | 1245.75 | 1245.98 | 1246.15 | 1246.63 | 1247.05 | 1247.29 | 1247.51 | 1247.74 |
| Fish Creek | Upper Fish Creek | 30856 | 252 | 1242.44 | 1243.60 | 1244.13 | 1244.40 | 1244.63 | 1244.95 | 1245.16 | 1245.39 | 1245.57 | 1245.98 | 1246.67 | 1246.87 | 1247.08 | 1247.26 |
| Fish Creek | Upper Fish Creek | 30668 | 251 | 1240.99 | 1242.17 | 1243.00 | 1243.31 | 1243.60 | 1243.85 | 1244.03 | 1244.31 | 1244.43 | 1244.70 | 1244.91 | 1245.07 | 1245.25 | 1245.47 |
| Fish Creek | Upper Fish Creek | 30515 | 250 | 1240.05 | 1241.82 | 1242.59 | 1242.96 | 1243.25 | 1243.49 | 1243.65 | 1243.84 | 1243.99 | 1244.31 | 1244.54 | 1244.71 | 1244.97 | 1245.26 |
| Fish Creek | Upper Fish Creek | 30352 | 249 | 1240.54 | 1241.26 | 1241.76 | 1242.36 | 1242.62 | 1242.82 | 1242.94 | 1243.08 | 1243.16 | 1243.48 | 1243.74 | 1243.88 | 1243.99 | 1244.12 |
| Fish Creek | Upper Fish Creek | 30219 | 248 | 1239.37 | 1240.69 | 1241.43 | 1241.82 | 1242.07 | 1242.27 | 1242.40 | 1242.55 | 1242.62 | 1242.75 | 1242.97 | 1243.13 | 1243.27 | 1243.42 |
| Fish Creek | Upper Fish Creek | 30036 | 247 | 1239.15 | 1240.10 | 1240.71 | 1241.32 | 1241.51 | 1241.64 | 1241.74 | 1241.83 | 1241.94 | 1242.19 | 1242.35 | 1242.46 | 1242.59 | 1242.71 |
| Fish Creek | Upper Fish Creek | 29900 | 246 | 1237.92 | 1239.41 | 1240.17 | 1240.66 | 1240.90 | 1241.13 | 1241.24 | 1241.33 | 1241.39 | 1241.72 | 1241.94 | 1242.08 | 1242.24 | 1242.39 |
| Fish Creek | Upper Fish Creek | 29668 | 245 | 1237.64 | 1238.83 | 1239.35 | 1239.69 | 1240.04 | 1240.20 | 1240.43 | 1240.81 | 1241.11 | 1241.50 | 1241.71 | 1241.85 | 1242.00 | 1242.14 |
| Fish Creek | Upper Fish Creek | 29584 | 244 | 1237.46 | 1238.19 | 1238.70 | 1239.10 | 1239.57 | 1240.08 | 1240.38 | 1240.75 | 1241.02 | 1241.44 | 1241.65 | 1241.79 | 1241.93 | 1242.07 |
| Fish Creek | Upper Fish Creek | 29463 | 243 | 1236.04 | 1237.42 | 1238.06 | 1238.55 | 1239.08 | 1239.51 | 1239.77 | 1240.11 | 1240.36 | 1240.97 | 1241.28 | 1241.42 | 1241.57 | 1241.70 |
| Fish Creek | Upper Fish Creek | 29407 | 242 | 1236.17 | 1237.27 | 1237.94 | 1238.44 | 1238.93 | 1239.31 | 1239.47 | 1239.73 | 1239.84 | 1240.58 | 1240.95 | 1241.02 | 1241.11 | 1241.22 |
| Fish Creek | Upper Fish Creek | 29388 | 241 | 1235.95 | 1237.24 | 1237.92 | 1238.43 | 1238.95 | 1239.39 | 1239.63 | 1239.98 | 1240.21 | 1240.43 | 1240.66 | 1240.82 | 1241.01 | 1241.16 |
| Fish Creek | Upper Fish Creek | 29383 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 29372 | 240 | 1235.41 | 1237.24 | 1237.91 | 1238.41 | 1238.92 | 1239.28 | 1239.40 | 1239.50 | 1239.53 | 1239.53 | 1240.29 | 1240.36 | 1240.58 | 1240.78 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 29364 | 239 | 1235.08 | 1237.24 | 1237.88 | 1238.34 | 1238.78 | 1239.11 | 1239.27 | 1239.34 | 1239.58 | 1239.79 | 1240.00 | 1240.11 | 1240.22 | 1240.34 |
| Fish Creek | Upper Fish Creek | 29354 | 238 | 1235.62 | 1237.21 | 1237.84 | 1238.32 | 1238.79 | 1239.18 | 1239.39 | 1239.55 | 1239.64 | 1239.84 | 1239.99 | 1240.08 | 1240.18 | 1240.29 |
| Fish Creek | Upper Fish Creek | 29340 | 237 | 1236.09 | 1237.05 | 1237.58 | 1238.00 | 1238.48 | 1238.70 | 1239.05 | 1239.33 | 1239.44 | 1239.66 | 1239.81 | 1239.91 | 1240.02 | 1240.10 |
| Fish Creek | Upper Fish Creek | 29206 | 236 | 1235.57 | 1236.53 | 1237.04 | 1237.34 | 1237.59 | 1238.02 | 1238.27 | 1238.41 | 1238.50 | 1238.76 | 1239.03 | 1239.17 | 1239.32 | 1239.47 |
| Fish Creek | Upper Fish Creek | 29104 | 235 | 1235.19 | 1235.98 | 1236.51 | 1236.87 | 1237.20 | 1237.47 | 1237.66 | 1237.84 | 1237.98 | 1238.28 | 1238.49 | 1238.62 | 1238.76 | 1238.90 |
| Fish Creek | Upper Fish Creek | 28969 | 234 | 1234.00 | 1235.21 | 1235.89 | 1236.29 | 1236.64 | 1236.93 | 1237.10 | 1237.28 | 1237.42 | 1237.61 | 1237.79 | 1237.92 | 1238.02 | 1238.12 |
| Fish Creek | Upper Fish Creek | 28854 | 233 | 1233.51 | 1234.70 | 1235.19 | 1235.61 | 1235.89 | 1236.12 | 1236.34 | 1236.52 | 1236.63 | 1237.05 | 1237.21 | 1237.28 | 1237.43 | 1237.62 |
| Fish Creek | Upper Fish Creek | 28792 | 232 | 1233.29 | 1234.33 | 1235.00 | 1235.20 | 1235.41 | 1235.52 | 1235.63 | 1235.87 | 1236.09 | 1236.39 | 1236.62 | 1236.74 | 1236.86 | 1236.96 |
| Fish Creek | Upper Fish Creek | 28672 | 231 | 1232.37 | 1233.71 | 1234.20 | 1234.66 | 1234.82 | 1235.12 | 1235.30 | 1235.53 | 1235.73 | 1235.94 | 1236.12 | 1236.22 | 1236.35 | 1236.48 |
| Fish Creek | Upper Fish Creek | 28621 | 230 | 1232.50 | 1233.46 | 1234.03 | 1234.36 | 1234.76 | 1235.10 | 1235.27 | 1235.51 | 1235.71 | 1235.92 | 1236.10 | 1236.20 | 1236.33 | 1236.45 |
| Fish Creek | Upper Fish Creek | 28402 | 229 | 1230.78 | 1231.71 | 1232.31 | 1232.79 | 1233.35 | 1233.91 | 1234.30 | 1234.48 | 1234.53 | 1235.29 | 1235.47 | 1235.57 | 1235.64 | 1235.71 |
| Fish Creek | Upper Fish Creek | 28252 | 228 | 1229.96 | 1230.84 | 1231.48 | 1231.97 | 1232.54 | 1233.04 | 1233.16 | 1233.39 | 1233.56 | 1233.99 | 1234.35 | 1234.58 | 1234.83 | 1235.13 |
| Fish Creek | Upper Fish Creek | 28185 | 227 | 1229.41 | 1230.20 | 1230.87 | 1231.35 | 1231.74 | 1232.03 | 1232.51 | 1232.70 | 1232.84 | 1233.13 | 1233.38 | 1233.54 | 1233.74 | 1233.82 |
| Fish Creek | Upper Fish Creek | 28070 | 226 | 1228.50 | 1229.79 | 1230.53 | 1231.09 | 1231.51 | 1231.54 | 1231.61 | 1231.88 | 1232.02 | 1232.32 | 1232.55 | 1232.73 | 1232.91 | 1233.09 |
| Fish Creek | Upper Fish Creek | 28038 | 225 | 1228.21 | 1229.76 | 1230.48 | 1231.01 | 1231.51 | 1231.56 | 1231.66 | 1231.85 | 1232.01 | 1232.17 | 1232.30 | 1232.37 | 1232.47 | 1232.56 |
| Fish Creek | Upper Fish Creek | 28037 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 28032 | 224 | 1228.32 | 1229.75 | 1230.47 | 1230.97 | 1231.09 | 1231.23 | 1231.39 | 1231.48 | 1231.58 | 1231.89 | 1232.04 | 1232.11 | 1232.18 | 1232.44 |
| Fish Creek | Upper Fish Creek | 27989 | 223 | 1228.59 | 1229.32 | 1229.86 | 1230.37 | 1230.96 | 1231.11 | 1231.18 | 1231.27 | 1231.35 | 1231.49 | 1231.62 | 1231.68 | 1232.04 | 1232.36 |
| Fish Creek | Upper Fish Creek | 27959 | 222 | 1228.04 | 1229.08 | 1229.36 | 1230.07 | 1230.50 | 1230.64 | 1230.73 | 1230.80 | 1230.86 | 1231.02 | 1231.35 | 1231.68 | 1232.05 | 1232.35 |
| Fish Creek | Upper Fish Creek | 27889 | 221 | 1227.69 | 1228.60 | 1229.23 | 1229.50 | 1229.77 | 1229.99 | 1230.13 | 1230.30 | 1230.42 | 1230.83 | 1231.32 | 1231.65 | 1232.02 | 1232.33 |
| Fish Creek | Upper Fish Creek | 27850 | 220 | 1227.17 | 1228.03 | 1228.68 | 1229.15 | 1229.41 | 1229.61 | 1229.75 | 1229.85 | 1229.94 | 1230.58 | 1231.14 | 1231.48 | 1231.87 | 1232.18 |
| Fish Creek | Upper Fish Creek | 27709 | 219 | 1225.58 | 1226.60 | 1227.17 | 1227.61 | 1228.06 | 1228.45 | 1228.67 | 1228.94 | 1229.16 | 1229.71 | 1230.22 | 1230.48 | 1230.74 | 1230.75 |
| Fish Creek | Upper Fish Creek | 27618 | 218 | 1225.37 | 1226.14 | 1226.75 | 1227.22 | 1227.68 | 1228.07 | 1228.20 | 1228.36 | 1228.50 | 1228.82 | 1229.06 | 1229.43 | 1229.73 | 1230.49 |
| Fish Creek | Upper Fish Creek | 27509 | 217 | 1224.49 | 1225.61 | 1226.30 | 1226.67 | 1227.01 | 1227.21 | 1227.52 | 1227.73 | 1227.87 | 1228.21 | 1228.49 | 1228.68 | 1228.88 | 1229.08 |
| Fish Creek | Upper Fish Creek | 27389 | 216 | 1223.92 | 1224.81 | 1225.36 | 1225.89 | 1226.23 | 1226.58 | 1226.72 | 1226.89 | 1227.10 | 1227.36 | 1227.59 | 1227.71 | 1227.83 | 1227.95 |
| Fish Creek | Upper Fish Creek | 27241 | 215 | 1223.26 | 1224.17 | 1224.74 | 1225.08 | 1225.36 | 1225.59 | 1225.69 | 1225.80 | 1225.90 | 1226.07 | 1226.36 | 1226.60 | 1226.86 | 1227.12 |
| Fish Creek | Upper Fish Creek | 27087 | 214 | 1222.04 | 1223.52 | 1224.02 | 1224.42 | 1224.66 | 1224.87 | 1225.03 | 1225.24 | 1225.40 | 1225.80 | 1226.16 | 1226.39 | 1226.65 | 1226.92 |
| Fish Creek | Upper Fish Creek | 26902 | 213 | 1221.43 | 1222.36 | 1222.77 | 1223.02 | 1223.30 | 1223.68 | 1223.93 | 1224.10 | 1224.24 | 1224.55 | 1224.82 | 1224.98 | 1225.18 | 1225.38 |
| Fish Creek | Upper Fish Creek | 26773 | 212 | 1220.23 | 1220.88 | 1221.31 | 1221.66 | 1221.98 | 1222.32 | 1222.51 | 1222.87 | 1223.65 | 1223.76 | 1223.94 | 1224.16 | 1224.33 | 1224.49 |
| Fish Creek | Upper Fish Creek | 26759 | 211 | 1219.87 | 1220.48 | 1220.92 | 1221.28 | 1221.67 | 1222.03 | 1222.46 | 1222.85 | 1223.66 | 1223.76 | 1223.95 | 1224.17 | 1224.35 | 1224.50 |
| Fish Creek | Upper Fish Creek | 26727 | 210 | 1218.84 | 1219.74 | 1220.46 | 1221.02 | 1221.63 | 1222.19 | 1222.54 | 1222.87 | 1223.62 | 1223.72 | 1223.95 | 1224.24 | 1224.48 | 1224.71 |
| Fish Creek | Upper Fish Creek | 26721 | 209 | 1218.23 | 1219.79 | 1220.49 | 1221.05 | 1221.64 | 1222.19 | 1222.54 | 1222.86 | 1223.60 | 1223.67 | 1223.83 | 1224.13 | 1224.41 | 1224.67 |
| Fish Creek | Upper Fish Creek | 26720 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 26709 | 208 | 1218.27 | 1219.75 | 1220.39 | 1220.89 | 1221.44 | 1221.95 | 1222.26 | 1222.51 | 1222.87 | 1222.88 | 1223.48 | 1223.78 | 1223.99 | 1224.22 |
| Fish Creek | Upper Fish Creek | 26706 | 207 | 1218.57 | 1219.67 | 1220.22 | 1220.65 | 1221.06 | 1221.31 | 1221.62 | 1221.95 | 1222.05 | 1222.96 | 1223.28 | 1223.44 | 1223.64 | 1223.83 |
| Fish Creek | Upper Fish Creek | 26670 | 206 | 1218.65 | 1219.44 | 1219.97 | 1220.31 | 1220.68 | 1221.05 | 1221.44 | 1221.76 | 1221.94 | 1222.41 | 1222.69 | 1222.86 | 1223.03 | 1223.19 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 26524 | 205 | 1217.52 | 1218.56 | 1219.06 | 1219.37 | 1219.68 | 1219.89 | 1220.04 | 1220.24 | 1220.40 | 1220.83 | 1221.21 | 1221.56 | 1221.89 | 1222.09 |
| Fish Creek | Upper Fish Creek | 26368 | 204 | 1216.85 | 1217.46 | 1217.95 | 1218.39 | 1218.86 | 1219.27 | 1219.46 | 1219.70 | 1219.90 | 1220.32 | 1220.67 | 1220.82 | 1220.95 | 1221.09 |
| Fish Creek | Upper Fish Creek | 26234 | 203 | 1215.67 | 1216.67 | 1217.21 | 1217.55 | 1217.95 | 1218.15 | 1218.51 | 1218.72 | 1218.85 | 1219.28 | 1219.60 | 1219.94 | 1220.22 | 1220.38 |
| Fish Creek | Upper Fish Creek | 26142 | 202 | 1215.01 | 1215.80 | 1216.30 | 1216.82 | 1217.14 | 1217.61 | 1217.76 | 1217.91 | 1218.01 | 1218.29 | 1218.70 | 1218.84 | 1218.98 | 1219.11 |
| Fish Creek | Upper Fish Creek | 26039 | 201.2 | 1214.01 | 1215.25 | 1215.82 | 1216.60 | 1216.72 | 1217.11 | 1217.28 | 1217.46 | 1217.60 | 1217.93 | 1218.13 | 1218.25 | 1218.37 | 1218.49 |
| Fish Creek | Upper Fish Creek | 26037 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 26036 | 201.1 | 1214.07 | 1215.22 | 1215.77 | 1216.07 | 1216.66 | 1217.09 | 1217.25 | 1217.42 | 1217.56 | 1217.89 | 1218.09 | 1218.21 | 1218.33 | 1218.44 |
| Fish Creek | Upper Fish Creek | 26020 | 201 | 1214.19 | 1215.18 | 1215.75 | 1216.08 | 1216.34 | 1216.67 | 1216.84 | 1216.99 | 1217.10 | 1217.36 | 1217.63 | 1217.79 | 1217.96 | 1218.11 |
| Fish Creek | Upper Fish Creek | 25961 | 200 | 1213.91 | 1215.08 | 1215.59 | 1215.89 | 1216.07 | 1216.29 | 1216.49 | 1216.71 | 1216.84 | 1217.16 | 1217.40 | 1217.54 | 1217.71 | 1217.83 |
| Fish Creek | Upper Fish Creek | 25928 | 199 | 1213.77 | 1214.93 | 1215.43 | 1215.80 | 1216.04 | 1216.30 | 1216.50 | 1216.72 | 1216.86 | 1217.17 | 1217.41 | 1217.55 | 1217.71 | 1217.82 |
| Fish Creek | Upper Fish Creek | 25851 | 198 | 1213.51 | 1214.25 | 1214.59 | 1214.92 | 1215.38 | 1215.59 | 1215.71 | 1215.88 | 1216.08 | 1216.42 | 1216.68 | 1216.84 | 1216.97 | 1217.18 |
| Fish Creek | Upper Fish Creek | 25768 | 197 | 1213.34 | 1214.03 | 1214.41 | 1214.70 | 1214.98 | 1215.22 | 1215.38 | 1215.55 | 1215.66 | 1215.92 | 1216.12 | 1216.24 | 1216.37 | 1216.50 |
| Fish Creek | Upper Fish Creek | 25634 | 196 | 1212.66 | 1213.29 | 1213.73 | 1214.12 | 1214.43 | 1214.69 | 1214.86 | 1215.07 | 1215.14 | 1215.39 | 1215.54 | 1215.68 | 1215.81 | 1215.94 |
| Fish Creek | Upper Fish Creek | 25451 | 195 | 1211.00 | 1211.94 | 1212.46 | 1212.77 | 1213.15 | 1213.42 | 1213.61 | 1213.76 | 1214.00 | 1214.31 | 1214.57 | 1214.64 | 1214.75 | 1214.85 |
| Fish Creek | Upper Fish Creek | 25279 | 194 | 1209.66 | 1210.51 | 1211.04 | 1211.50 | 1212.02 | 1212.73 | 1213.05 | 1213.30 | 1213.42 | 1213.77 | 1213.94 | 1214.05 | 1214.18 | 1214.32 |
| Fish Creek | Upper Fish Creek | 25203 | 193 | 1208.51 | 1209.58 | 1210.34 | 1211.00 | 1211.91 | 1212.72 | 1213.05 | 1213.30 | 1213.42 | 1213.75 | 1213.91 | 1214.02 | 1214.14 | 1214.26 |
| Fish Creek | Upper Fish Creek | 25184 | 192 | 1208.15 | 1209.50 | 1210.04 | 1210.59 | 1211.30 | 1212.70 | 1213.04 | 1213.30 | 1213.41 | 1213.75 | 1213.90 | 1214.00 | 1214.13 | 1214.25 |
| Fish Creek | Upper Fish Creek | 25168 | 191 | 1207.79 | 1209.48 | 1210.03 | 1210.62 | 1211.32 | 1212.36 | 1212.81 | 1213.07 | 1213.14 | 1213.62 | 1213.75 | 1213.85 | 1213.97 | 1214.09 |
| Fish Creek | Upper Fish Creek | 25164 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 25160 | 190 | 1207.75 | 1209.47 | 1209.96 | 1210.28 | 1210.78 | 1211.31 | 1211.68 | 1212.54 | 1212.77 | 1212.89 | 1213.30 | 1213.41 | 1213.53 | 1213.62 |
| Fish Creek | Upper Fish Creek | 25155 | 189 | 1207.98 | 1209.47 | 1210.00 | 1210.40 | 1210.83 | 1211.05 | 1211.58 | 1211.78 | 1212.01 | 1212.25 | 1212.54 | 1212.66 | 1212.77 | 1212.88 |
| Fish Creek | Upper Fish Creek | 25129 | 188 | 1208.31 | 1209.40 | 1209.94 | 1210.38 | 1210.86 | 1211.22 | 1211.28 | 1211.51 | 1211.71 | 1212.05 | 1212.26 | 1212.42 | 1212.58 | 1212.72 |
| Fish Creek | Upper Fish Creek | 25067 | 187 | 1208.35 | 1209.03 | 1209.55 | 1210.01 | 1210.51 | 1210.72 | 1211.01 | 1211.18 | 1211.30 | 1211.64 | 1211.84 | 1211.92 | 1212.08 | 1212.23 |
| Fish Creek | Upper Fish Creek | 24994 | 186 | 1207.52 | 1208.60 | 1209.29 | 1209.84 | 1210.39 | 1210.63 | 1210.81 | 1210.91 | 1210.99 | 1211.20 | 1211.36 | 1211.46 | 1211.58 | 1211.68 |
| Fish Creek | Upper Fish Creek | 24972 | 185 | 1207.60 | 1208.45 | 1209.20 | 1209.76 | 1210.29 | 1210.64 | 1210.81 | 1210.89 | 1210.97 | 1211.16 | 1211.31 | 1211.41 | 1211.53 | 1211.62 |
| Fish Creek | Upper Fish Creek | 24971 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 24966 | 184 | 1207.42 | 1208.31 | 1208.76 | 1209.20 | 1209.68 | 1210.46 | 1210.56 | 1210.66 | 1210.73 | 1210.87 | 1211.01 | 1211.08 | 1211.15 | 1211.26 |
| Fish Creek | Upper Fish Creek | 24947 | 183 | 1207.18 | 1208.30 | 1208.81 | 1209.22 | 1209.63 | 1209.78 | 1209.98 | 1210.09 | 1210.18 | 1210.38 | 1210.55 | 1210.68 | 1210.83 | 1210.97 |
| Fish Creek | Upper Fish Creek | 24911 | 182 | 1207.38 | 1208.13 | 1208.62 | 1209.03 | 1209.48 | 1209.65 | 1209.79 | 1209.94 | 1210.02 | 1210.28 | 1210.44 | 1210.57 | 1210.72 | 1210.86 |
| Fish Creek | Upper Fish Creek | 24880 | 181 | 1207.18 | 1207.96 | 1208.46 | 1208.85 | 1209.26 | 1209.55 | 1209.67 | 1209.82 | 1209.88 | 1210.04 | 1210.29 | 1210.44 | 1210.60 | 1210.74 |
| Fish Creek | Upper Fish Creek | 24795 | 180 | 1206.18 | 1207.10 | 1207.56 | 1208.01 | 1208.40 | 1208.98 | 1209.11 | 1209.22 | 1209.30 | 1209.50 | 1209.66 | 1209.76 | 1209.87 | 1210.07 |
| Fish Creek | Upper Fish Creek | 24713 | 179 | 1204.90 | 1206.50 | 1207.03 | 1207.41 | 1207.83 | 1208.19 | 1208.41 | 1208.66 | 1208.74 | 1209.03 | 1209.25 | 1209.40 | 1209.55 | 1209.72 |
| Fish Creek | Upper Fish Creek | 24610 | 178 | 1205.11 | 1206.18 | 1206.63 | 1206.91 | 1207.17 | 1207.37 | 1207.56 | 1207.81 | 1208.17 | 1208.41 | 1208.61 | 1208.72 | 1208.85 | 1208.95 |
| Fish Creek | Upper Fish Creek | 24548 | 177 | 1204.83 | 1205.90 | 1206.28 | 1206.56 | 1206.78 | 1206.97 | 1207.10 | 1207.29 | 1207.41 | 1207.63 | 1208.12 | 1208.21 | 1208.32 | 1208.42 |
| Fish Creek | Upper Fish Creek | 24438 | 176 | 1204.23 | 1205.14 | 1205.57 | 1205.78 | 1206.01 | 1206.16 | 1206.26 | 1206.37 | 1206.45 | 1206.67 | 1206.91 | 1207.05 | 1207.16 | 1207.25 |
| Fish Creek | Upper Fish Creek | 24303 | 175 | 1203.31 | 1204.34 | 1204.84 | 1205.15 | 1205.44 | 1205.66 | 1205.81 | 1206.00 | 1206.12 | 1206.29 | 1206.38 | 1206.45 | 1206.56 | 1206.69 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 24079 | 174 | 1202.19 | 1203.03 | 1203.51 | 1203.82 | 1204.10 | 1204.35 | 1204.51 | 1204.68 | 1204.83 | 1205.24 | 1205.58 | 1205.78 | 1206.00 | 1206.22 |
| Fish Creek | Upper Fish Creek | 23985 | 173 | 1201.56 | 1202.61 | 1203.06 | 1203.33 | 1203.66 | 1203.97 | 1204.16 | 1204.38 | 1204.56 | 1204.99 | 1205.35 | 1205.59 | 1205.85 | 1206.10 |
| Fish Creek | Upper Fish Creek | 23903 | 172 | 1201.18 | 1201.87 | 1202.29 | 1202.73 | 1203.07 | 1203.23 | 1203.39 | 1203.56 | 1203.70 | 1204.00 | 1204.33 | 1204.50 | 1204.68 | 1204.87 |
| Fish Creek | Upper Fish Creek | 23814 | 171 | 1199.98 | 1201.24 | 1201.92 | 1202.25 | 1202.50 | 1202.77 | 1202.87 | 1203.03 | 1203.14 | 1203.42 | 1203.66 | 1203.81 | 1203.98 | 1204.17 |
| Fish Creek | Upper Fish Creek | 23594 | 170 | 1199.60 | 1200.88 | 1201.46 | 1201.80 | 1202.02 | 1202.19 | 1202.29 | 1202.44 | 1202.56 | 1202.81 | 1203.01 | 1203.12 | 1203.22 | 1203.32 |
| Fish Creek | Upper Fish Creek | 23506 | 169 | 1199.77 | 1200.66 | 1201.16 | 1201.34 | 1201.63 | 1201.77 | 1201.97 | 1202.21 | 1202.36 | 1202.61 | 1202.79 | 1202.90 | 1203.03 | 1203.16 |
| Fish Creek | Upper Fish Creek | 23305 | 168 | 1198.48 | 1199.18 | 1199.76 | 1200.57 | 1200.90 | 1201.28 | 1201.51 | 1201.80 | 1201.91 | 1202.16 | 1202.36 | 1202.48 | 1202.60 | 1202.72 |
| Fish Creek | Upper Fish Creek | 23343 | 167 | 1198.05 | 1199.00 | 1199.64 | 1200.46 | 1200.63 | 1200.98 | 1201.22 | 1201.58 | 1201.65 | 1201.91 | 1202.05 | 1202.23 | 1202.33 | 1202.45 |
| Fish Creek | Upper Fish Creek | 23230 | 166 | 1197.48 | 1198.93 | 1199.53 | 1200.39 | 1200.44 | 1200.66 | 1201.01 | 1201.53 | 1201.61 | 1201.82 | 1201.98 | 1202.08 | 1202.20 | 1202.31 |
| Fish Creek | Upper Fish Creek | 23229 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 23225 | 165 | 1197.46 | 1198.92 | 1199.52 | 1199.98 | 1200.20 | 1200.33 | 1201.06 | 1201.18 | 1201.31 | 1201.52 | 1201.67 | 1201.75 | 1201.85 | 1201.94 |
| Fish Creek | Upper Fish Creek | 23210 | 164 | 1197.77 | 1198.87 | 1199.49 | 1199.98 | 1200.23 | 1200.43 | 1200.62 | 1200.96 | 1201.16 | 1201.34 | 1201.50 | 1201.60 | 1201.69 | 1201.79 |
| Fish Creek | Upper Fish Creek | 23085 | 163 | 1197.47 | 1198.49 | 1198.91 | 1199.10 | 1199.59 | 1199.80 | 1199.84 | 1199.84 | 1200.25 | 1200.36 | 1200.45 | 1200.49 | 1200.56 | 1200.64 |
| Fish Creek | Upper Fish Creek | 23027 | 162 | 1197.47 | 1198.24 | 1198.77 | 1199.05 | 1199.31 | 1199.53 | 1199.64 | 1199.76 | 1199.85 | 1200.05 | 1200.21 | 1200.32 | 1200.45 | 1200.59 |
| Fish Creek | Upper Fish Creek | 22896 | 161 | 1196.26 | 1197.39 | 1197.92 | 1198.41 | 1198.84 | 1199.06 | 1199.20 | 1199.33 | 1199.42 | 1199.58 | 1199.79 | 1199.93 | 1200.09 | 1200.24 |
| Fish Creek | Upper Fish Creek | 22796 | 160 | 1195.45 | 1196.62 | 1197.37 | 1197.67 | 1197.97 | 1198.37 | 1198.56 | 1198.76 | 1198.85 | 1199.30 | 1199.54 | 1199.69 | 1199.86 | 1200.02 |
| Fish Creek | Upper Fish Creek | 22668 | 159 | 1194.71 | 1196.50 | 1197.27 | 1197.55 | 1197.76 | 1197.94 | 1198.05 | 1198.19 | 1198.28 | 1198.53 | 1198.74 | 1198.87 | 1199.00 | 1199.13 |
| Fish Creek | Upper Fish Creek | 22550 | 158 | 1195.02 | 1196.14 | 1196.55 | 1197.18 | 1197.35 | 1197.46 | 1197.55 | 1197.63 | 1197.70 | 1197.86 | 1197.99 | 1198.07 | 1198.18 | 1198.33 |
| Fish Creek | Upper Fish Creek | 22382 | 157 | 1194.00 | 1195.08 | 1195.68 | 1196.08 | 1196.48 | 1196.68 | 1196.81 | 1196.95 | 1197.05 | 1197.23 | 1197.47 | 1197.64 | 1197.83 | 1198.01 |
| Fish Creek | Upper Fish Creek | 22219 | 156 | 1193.11 | 1194.66 | 1195.10 | 1195.37 | 1195.59 | 1195.89 | 1196.03 | 1196.14 | 1196.24 | 1196.70 | 1197.04 | 1197.25 | 1197.47 | 1197.65 |
| Fish Creek | Upper Fish Creek | 22099 | 155 | 1193.47 | 1194.09 | 1194.66 | 1195.13 | 1195.46 | 1195.66 | 1195.80 | 1195.95 | 1196.10 | 1196.60 | 1196.95 | 1197.16 | 1197.39 | 1197.57 |
| Fish Creek | Upper Fish Creek | 21888 | 154 | 1191.80 | 1193.19 | 1193.89 | 1194.04 | 1194.42 | 1194.75 | 1194.87 | 1194.98 | 1195.86 | 1196.45 | 1196.81 | 1197.03 | 1197.26 | 1197.43 |
| Fish Creek | Upper Fish Creek | 21744 | 153 | 1191.65 | 1192.85 | 1193.39 | 1193.66 | 1193.92 | 1194.12 | 1194.17 | 1195.07 | 1195.86 | 1196.45 | 1196.80 | 1197.02 | 1197.25 | 1197.41 |
| Fish Creek | Upper Fish Creek | 21584 | 152 | 1191.14 | 1192.25 | 1192.82 | 1193.18 | 1193.28 | 1193.40 | 1194.01 | 1195.05 | 1195.85 | 1196.44 | 1196.80 | 1197.01 | 1197.24 | 1197.40 |
| Fish Creek | Upper Fish Creek | 21418 | 151 | 1190.60 | 1191.62 | 1192.02 | 1192.30 | 1192.70 | 1193.31 | 1194.01 | 1195.05 | 1195.85 | 1196.44 | 1196.79 | 1197.01 | 1197.23 | 1197.40 |
| Fish Creek | Upper Fish Creek | 21198 | 150 | 1189.82 | 1190.55 | 1191.23 | 1191.71 | 1192.42 | 1193.27 | 1193.99 | 1195.05 | 1195.85 | 1196.43 | 1196.79 | 1197.01 | 1197.23 | 1197.40 |
| Fish Creek | Upper Fish Creek | 21114 | 149 | 1189.29 | 1190.22 | 1191.04 | 1191.57 | 1192.40 | 1193.27 | 1193.99 | 1195.05 | 1195.85 | 1196.43 | 1196.79 | 1197.01 | 1197.23 | 1197.39 |
| Fish Creek | Upper Fish Creek | 21051 | 148 | 1188.82 | 1189.98 | 1190.79 | 1191.45 | 1192.39 | 1193.26 | 1193.99 | 1195.04 | 1195.85 | 1196.43 | 1196.79 | 1197.00 | 1197.23 | 1197.39 |
| Fish Creek | Upper Fish Creek | 20926 | 147 | 1188.57 | 1189.73 | 1190.54 | 1191.28 | 1192.33 | 1193.24 | 1193.97 | 1195.04 | 1195.84 | 1196.42 | 1196.78 | 1196.99 | 1197.21 | 1197.37 |
| Fish Creek | Upper Fish Creek | 20847 | 146 | 1188.38 | 1189.55 | 1190.40 | 1191.27 | 1192.32 | 1193.23 | 1193.97 | 1195.03 | 1195.84 | 1196.42 | 1196.77 | 1196.98 | 1197.20 | 1197.36 |
| Fish Creek | Upper Fish Creek | 20743 | 145 | 1188.06 | 1189.19 | 1190.22 | 1191.21 | 1192.28 | 1193.19 | 1193.93 | 1194.98 | 1195.82 | 1196.40 | 1196.75 | 1196.96 | 1197.17 | 1197.33 |
| Fish Creek | Upper Fish Creek | 20709 | 144.1 | 1187.94 | 1189.08 | 1190.17 | 1191.12 | 1192.17 | 1193.07 | 1193.80 | 1194.86 | 1195.77 | 1196.35 | 1196.70 | 1196.91 | 1197.12 | 1197.27 |
| Fish Creek | Upper Fish Creek | 20691 | 144 | 1187.41 | 1188.97 | 1189.95 | 1190.82 | 1191.94 | 1192.87 | 1193.62 | 1194.60 | 1195.75 | 1196.35 | 1196.70 | 1196.91 | 1197.12 | 1197.27 |
| Fish Creek | Upper Fish Creek | 20671 | | Culvert | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 20651 | 143 | 1187.31 | 1188.62 | 1189.12 | 1189.76 | 1190.45 | 1191.34 | 1191.73 | 1192.06 | 1192.30 | 1192.90 | 1193.40 | 1193.71 | 1194.10 | 1195.45 |
| Fish Creek | Upper Fish Creek | 20633 | 142.1 | 1187.70 | 1188.43 | 1189.18 | 1189.49 | 1189.84 | 1190.18 | 1190.40 | 1190.64 | 1190.83 | 1191.29 | 1191.69 | 1191.94 | 1192.24 | 1192.54 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 20603 | 142 | 1186.68 | 1188.56 | 1189.31 | 1189.73 | 1189.93 | 1190.05 | 1190.13 | 1190.21 | 1190.25 | 1190.26 | 1190.50 | 1190.77 | 1191.10 | 1191.41 |
| Fish Creek | Upper Fish Creek | 20475 | 141 | 1187.21 | 1188.39 | 1189.06 | 1189.30 | 1189.63 | 1189.75 | 1189.85 | 1189.97 | 1190.06 | 1190.26 | 1190.42 | 1190.53 | 1190.64 | 1190.75 |
| Fish Creek | Upper Fish Creek | 20335 | 140 | 1185.97 | 1188.36 | 1188.96 | 1189.12 | 1189.30 | 1189.43 | 1189.54 | 1189.63 | 1189.69 | 1189.82 | 1189.95 | 1190.03 | 1190.13 | 1190.22 |
| Fish Creek | Upper Fish Creek | 20302 | 139 | 1187.18 | 1188.25 | 1188.90 | 1189.12 | 1189.31 | 1189.44 | 1189.54 | 1189.63 | 1189.69 | 1189.81 | 1189.93 | 1190.01 | 1190.10 | 1190.20 |
| Fish Creek | Upper Fish Creek | 20131 | 138 | 1186.22 | 1187.82 | 1188.34 | 1188.58 | 1188.71 | 1188.83 | 1188.90 | 1189.00 | 1189.07 | 1189.27 | 1189.41 | 1189.50 | 1189.59 | 1189.69 |
| Fish Creek | Upper Fish Creek | 19991 | 137 | 1186.40 | 1187.10 | 1187.55 | 1187.99 | 1188.33 | 1188.55 | 1188.67 | 1188.79 | 1188.89 | 1189.11 | 1189.22 | 1189.29 | 1189.38 | 1189.47 |
| Fish Creek | Upper Fish Creek | 19644 | 136 | 1184.63 | 1186.09 | 1186.73 | 1187.13 | 1187.45 | 1187.68 | 1187.82 | 1187.98 | 1188.10 | 1188.40 | 1188.54 | 1188.65 | 1188.75 | 1188.86 |
| Fish Creek | Upper Fish Creek | 19401 | 135 | 1184.60 | 1185.60 | 1186.20 | 1186.67 | 1187.03 | 1187.27 | 1187.45 | 1187.63 | 1187.74 | 1188.02 | 1188.23 | 1188.37 | 1188.46 | 1188.57 |
| Fish Creek | Upper Fish Creek | 19230 | 134 | 1183.93 | 1185.02 | 1185.69 | 1186.14 | 1186.53 | 1186.80 | 1187.00 | 1187.22 | 1187.39 | 1187.75 | 1187.97 | 1188.15 | 1188.24 | 1188.36 |
| Fish Creek | Upper Fish Creek | 19056 | 133 | 1183.23 | 1184.82 | 1185.37 | 1185.78 | 1186.14 | 1186.29 | 1186.39 | 1186.51 | 1186.60 | 1186.82 | 1187.14 | 1187.16 | 1187.41 | 1187.56 |
| Fish Creek | Upper Fish Creek | 18936 | 132 | 1183.07 | 1184.66 | 1184.92 | 1185.10 | 1185.39 | 1185.75 | 1185.88 | 1186.01 | 1186.09 | 1186.24 | 1186.40 | 1186.47 | 1186.61 | 1186.68 |
| Fish Creek | Upper Fish Creek | 18765 | 131 | 1183.11 | 1184.07 | 1184.52 | 1184.76 | 1184.97 | 1185.11 | 1185.20 | 1185.28 | 1185.34 | 1185.50 | 1185.62 | 1185.68 | 1185.76 | 1185.84 |
| Fish Creek | Upper Fish Creek | 18614 | 130 | 1182.72 | 1183.90 | 1184.36 | 1184.59 | 1184.80 | 1184.97 | 1185.08 | 1185.16 | 1185.22 | 1185.40 | 1185.51 | 1185.57 | 1185.64 | 1185.71 |
| Fish Creek | Upper Fish Creek | 18522 | 129 | 1182.04 | 1183.71 | 1184.25 | 1184.48 | 1184.69 | 1184.86 | 1184.99 | 1185.08 | 1185.15 | 1185.34 | 1185.46 | 1185.51 | 1185.58 | 1185.65 |
| Fish Creek | Upper Fish Creek | 18400 | 128 | 1182.35 | 1183.43 | 1183.89 | 1184.15 | 1184.43 | 1184.65 | 1184.80 | 1184.92 | 1185.01 | 1185.24 | 1185.37 | 1185.42 | 1185.49 | 1185.55 |
| Fish Creek | Upper Fish Creek | 18161 | 127 | 1181.53 | 1182.50 | 1183.12 | 1183.56 | 1183.89 | 1184.10 | 1184.21 | 1184.34 | 1184.45 | 1184.71 | 1184.87 | 1184.96 | 1185.05 | 1185.13 |
| Fish Creek | Upper Fish Creek | 17772 | 126 | 1180.41 | 1181.71 | 1182.46 | 1182.96 | 1183.35 | 1183.62 | 1183.78 | 1183.98 | 1184.01 | 1184.18 | 1184.35 | 1184.44 | 1184.52 | 1184.62 |
| Fish Creek | Upper Fish Creek | 17343 | 125 | 1179.74 | 1180.85 | 1181.67 | 1182.10 | 1182.40 | 1182.62 | 1182.76 | 1182.91 | 1183.08 | 1183.39 | 1183.61 | 1183.75 | 1183.88 | 1184.00 |
| Fish Creek | Upper Fish Creek | 17129 | 124 | 1178.77 | 1180.72 | 1181.46 | 1181.88 | 1182.17 | 1182.34 | 1182.45 | 1182.57 | 1182.66 | 1182.86 | 1183.01 | 1183.10 | 1183.20 | 1183.31 |
| Fish Creek | Upper Fish Creek | 17008 | 123 | 1179.42 | 1180.54 | 1181.24 | 1181.65 | 1182.04 | 1182.19 | 1182.30 | 1182.42 | 1182.50 | 1182.70 | 1182.84 | 1182.93 | 1183.04 | 1183.14 |
| Fish Creek | Upper Fish Creek | 16793 | 122 | 1178.70 | 1180.16 | 1180.87 | 1180.94 | 1180.96 | 1181.57 | 1181.66 | 1181.77 | 1181.84 | 1182.00 | 1182.10 | 1182.16 | 1182.21 | 1182.27 |
| Fish Creek | Upper Fish Creek | 16722 | 121 | 1178.03 | 1180.15 | 1180.87 | 1180.94 | 1181.08 | 1181.19 | 1181.27 | 1181.35 | 1181.42 | 1181.58 | 1181.71 | 1181.80 | 1181.90 | 1182.00 |
| Fish Creek | Upper Fish Creek | 16522 | 120 | 1178.62 | 1179.96 | 1180.53 | 1180.75 | 1180.92 | 1181.01 | 1181.08 | 1181.14 | 1181.19 | 1181.33 | 1181.46 | 1181.54 | 1181.64 | 1181.74 |
| Fish Creek | Upper Fish Creek | 16400 | 119 | 1178.39 | 1179.44 | 1180.08 | 1180.37 | 1180.63 | 1180.72 | 1180.76 | 1180.85 | 1180.92 | 1181.09 | 1181.24 | 1181.33 | 1181.44 | 1181.55 |
| Fish Creek | Upper Fish Creek | 16237 | 118 | 1177.73 | 1178.94 | 1179.75 | 1180.04 | 1180.24 | 1180.37 | 1180.46 | 1180.56 | 1180.63 | 1180.81 | 1180.95 | 1181.05 | 1181.16 | 1181.27 |
| Fish Creek | Upper Fish Creek | 15992 | 117 | 1176.83 | 1178.62 | 1179.47 | 1179.65 | 1179.85 | 1179.98 | 1180.07 | 1180.16 | 1180.24 | 1180.41 | 1180.56 | 1180.65 | 1180.75 | 1180.85 |
| Fish Creek | Upper Fish Creek | 15773 | 116 | 1176.97 | 1178.16 | 1178.94 | 1179.39 | 1179.45 | 1179.58 | 1179.65 | 1179.73 | 1179.79 | 1179.93 | 1180.05 | 1180.13 | 1180.23 | 1180.32 |
| Fish Creek | Upper Fish Creek | 15653 | 115 | 1176.52 | 1177.85 | 1178.61 | 1178.77 | 1179.10 | 1179.17 | 1179.23 | 1179.31 | 1179.38 | 1179.53 | 1179.66 | 1179.74 | 1179.83 | 1179.92 |
| Fish Creek | Upper Fish Creek | 15530 | 114.1 | 1176.32 | 1177.61 | 1178.46 | 1178.69 | 1178.81 | 1178.91 | 1178.99 | 1179.07 | 1179.13 | 1179.27 | 1179.36 | 1179.44 | 1179.53 | 1179.62 |
| Fish Creek | Upper Fish Creek | 15526 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 15523 | 114 | 1176.25 | 1177.56 | 1178.39 | 1178.63 | 1178.73 | 1178.84 | 1178.92 | 1179.01 | 1179.08 | 1179.23 | 1179.36 | 1179.44 | 1179.53 | 1179.62 |
| Fish Creek | Upper Fish Creek | 15368 | 113 | 1175.89 | 1177.28 | 1178.08 | 1178.25 | 1178.43 | 1178.57 | 1178.66 | 1178.75 | 1178.81 | 1178.96 | 1179.09 | 1179.16 | 1179.25 | 1179.34 |
| Fish Creek | Upper Fish Creek | 15269 | 112 | 1175.66 | 1177.05 | 1177.89 | 1178.15 | 1178.34 | 1178.49 | 1178.58 | 1178.67 | 1178.72 | 1178.87 | 1178.99 | 1179.06 | 1179.15 | 1179.23 |
| Fish Creek | Upper Fish Creek | 15022 | 111 | 1175.16 | 1176.67 | 1177.49 | 1177.77 | 1177.88 | 1177.99 | 1178.06 | 1178.16 | 1178.25 | 1178.45 | 1178.61 | 1178.70 | 1178.81 | 1178.91 |
| Fish Creek | Upper Fish Creek | 14886 | 110 | 1175.18 | 1176.34 | 1177.13 | 1177.54 | 1177.78 | 1177.88 | 1177.95 | 1178.06 | 1178.15 | 1178.35 | 1178.50 | 1178.59 | 1178.70 | 1178.80 |
| Fish Creek | Upper Fish Creek | 14499 | 109 | 1174.24 | 1175.66 | 1176.27 | 1176.67 | 1177.03 | 1177.32 | 1177.54 | 1177.77 | 1177.92 | 1178.17 | 1178.33 | 1178.42 | 1178.54 | 1178.64 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 14380 | 108 | 1174.18 | 1175.39 | 1176.05 | 1176.51 | 1176.96 | 1177.29 | 1177.50 | 1177.75 | 1177.89 | 1178.14 | 1178.30 | 1178.39 | 1178.50 | 1178.60 |
| Fish Creek | Upper Fish Creek | 14219 | 107 | 1173.61 | 1175.03 | 1175.76 | 1176.28 | 1176.78 | 1177.16 | 1177.41 | 1177.68 | 1177.84 | 1178.08 | 1178.23 | 1178.32 | 1178.43 | 1178.52 |
| Fish Creek | Upper Fish Creek | 13975 | 106 | 1173.29 | 1174.39 | 1175.18 | 1175.69 | 1176.15 | 1176.56 | 1176.82 | 1177.13 | 1177.38 | 1177.51 | 1177.67 | 1177.76 | 1177.81 | 1177.91 |
| Fish Creek | Upper Fish Creek | 13792 | 105 | 1172.52 | 1174.15 | 1174.91 | 1175.31 | 1175.59 | 1175.79 | 1175.95 | 1176.03 | 1176.07 | 1176.75 | 1176.88 | 1176.91 | 1177.00 | 1177.07 |
| Fish Creek | Upper Fish Creek | 13616 | 104 | 1172.32 | 1173.85 | 1174.58 | 1175.02 | 1175.27 | 1175.50 | 1175.70 | 1175.92 | 1176.05 | 1176.35 | 1176.68 | 1176.76 | 1176.86 | 1176.97 |
| Fish Creek | Upper Fish Creek | 13375 | 103 | 1171.73 | 1172.97 | 1173.75 | 1174.22 | 1174.66 | 1174.99 | 1175.25 | 1175.43 | 1175.56 | 1175.79 | 1175.96 | 1176.09 | 1176.21 | 1176.34 |
| Fish Creek | Upper Fish Creek | 13186 | 102 | 1171.09 | 1172.79 | 1173.52 | 1173.93 | 1174.33 | 1174.64 | 1174.92 | 1175.12 | 1175.25 | 1175.45 | 1175.58 | 1175.65 | 1175.75 | 1175.86 |
| Fish Creek | Upper Fish Creek | 12956 | 101 | 1171.09 | 1172.53 | 1173.12 | 1173.53 | 1173.93 | 1174.18 | 1174.25 | 1174.37 | 1174.45 | 1174.71 | 1174.92 | 1175.03 | 1175.15 | 1175.27 |
| Fish Creek | Upper Fish Creek | 12868 | 100 | 1171.18 | 1172.25 | 1172.94 | 1173.40 | 1173.79 | 1174.04 | 1174.14 | 1174.26 | 1174.35 | 1174.54 | 1174.71 | 1174.82 | 1174.92 | 1175.02 |
| Fish Creek | Upper Fish Creek | 12771 | 99 | 1170.64 | 1171.76 | 1172.39 | 1172.87 | 1173.27 | 1173.54 | 1173.72 | 1173.85 | 1173.92 | 1174.09 | 1174.20 | 1174.28 | 1174.38 | 1174.50 |
| Fish Creek | Upper Fish Creek | 12708 | 98 | 1170.66 | 1171.74 | 1172.51 | 1173.03 | 1173.43 | 1173.57 | 1173.66 | 1173.76 | 1173.84 | 1174.01 | 1174.15 | 1174.24 | 1174.34 | 1174.45 |
| Fish Creek | Upper Fish Creek | 12555 | 97 | 1170.25 | 1171.55 | 1172.32 | 1172.85 | 1173.24 | 1173.40 | 1173.49 | 1173.60 | 1173.68 | 1173.85 | 1173.98 | 1174.07 | 1174.17 | 1174.27 |
| Fish Creek | Upper Fish Creek | 12378 | 96 | 1170.08 | 1170.93 | 1171.87 | 1172.43 | 1172.55 | 1172.90 | 1173.00 | 1173.09 | 1173.14 | 1173.32 | 1173.48 | 1173.57 | 1173.68 | 1173.78 |
| Fish Creek | Upper Fish Creek | 12205 | 95 | 1169.25 | 1170.85 | 1171.79 | 1172.36 | 1172.36 | 1172.54 | 1172.64 | 1172.76 | 1172.84 | 1173.02 | 1173.16 | 1173.25 | 1173.35 | 1173.44 |
| Fish Creek | Upper Fish Creek | 11989 | 94 | 1169.08 | 1170.63 | 1171.49 | 1171.94 | 1172.21 | 1172.39 | 1172.47 | 1172.58 | 1172.65 | 1172.79 | 1172.92 | 1172.98 | 1173.07 | 1173.15 |
| Fish Creek | Upper Fish Creek | 11765 | 93 | 1168.68 | 1170.43 | 1171.13 | 1171.66 | 1171.83 | 1171.94 | 1172.05 | 1172.11 | 1172.16 | 1172.30 | 1172.40 | 1172.48 | 1172.58 | 1172.67 |
| Fish Creek | Upper Fish Creek | 11664 | 92 | 1168.81 | 1170.36 | 1171.09 | 1171.62 | 1171.80 | 1171.92 | 1172.01 | 1172.09 | 1172.14 | 1172.25 | 1172.35 | 1172.42 | 1172.50 | 1172.58 |
| Fish Creek | Upper Fish Creek | 11531 | 91 | 1169.08 | 1169.80 | 1170.35 | 1170.76 | 1171.53 | 1171.62 | 1171.66 | 1171.72 | 1171.77 | 1171.91 | 1172.06 | 1172.15 | 1172.25 | 1172.34 |
| Fish Creek | Upper Fish Creek | 11194 | 90 | 1167.36 | 1169.41 | 1170.17 | 1170.60 | 1170.87 | 1170.99 | 1171.06 | 1171.14 | 1171.19 | 1171.32 | 1171.43 | 1171.50 | 1171.57 | 1171.64 |
| Fish Creek | Upper Fish Creek | 10982 | 89 | 1168.04 | 1169.25 | 1169.95 | 1170.39 | 1170.73 | 1170.86 | 1170.86 | 1170.94 | 1171.01 | 1171.11 | 1171.20 | 1171.25 | 1171.30 | 1171.34 |
| Fish Creek | Upper Fish Creek | 10746 | 88 | 1167.17 | 1168.23 | 1168.66 | 1169.15 | 1169.62 | 1170.29 | 1170.50 | 1170.57 | 1170.59 | 1170.71 | 1170.79 | 1170.83 | 1170.88 | 1170.95 |
| Fish Creek | Upper Fish Creek | 10561 | 87 | 1166.52 | 1168.02 | 1168.29 | 1168.43 | 1168.53 | 1168.71 | 1168.79 | 1168.91 | 1169.02 | 1169.21 | 1169.45 | 1169.52 | 1169.60 | 1169.68 |
| Fish Creek | Upper Fish Creek | 10466 | 86 | 1166.87 | 1167.88 | 1168.24 | 1168.42 | 1168.58 | 1168.70 | 1168.79 | 1168.89 | 1168.97 | 1169.18 | 1169.37 | 1169.49 | 1169.63 | 1169.78 |
| Fish Creek | Upper Fish Creek | 10364 | 85 | 1166.40 | 1167.60 | 1168.19 | 1168.37 | 1168.54 | 1168.66 | 1168.74 | 1168.85 | 1168.93 | 1169.15 | 1169.34 | 1169.46 | 1169.60 | 1169.73 |
| Fish Creek | Upper Fish Creek | 10311 | 84 | 1166.23 | 1167.43 | 1167.94 | 1168.15 | 1168.30 | 1168.45 | 1168.57 | 1168.69 | 1168.79 | 1169.01 | 1169.20 | 1169.32 | 1169.46 | 1169.59 |
| Fish Creek | Upper Fish Creek | 10234 | 83 | 1166.30 | 1166.96 | 1167.48 | 1167.99 | 1168.26 | 1168.41 | 1168.53 | 1168.65 | 1168.74 | 1168.97 | 1169.16 | 1169.28 | 1169.42 | 1169.55 |
| Fish Creek | Upper Fish Creek | 10129 | 82 | 1165.51 | 1166.42 | 1166.91 | 1167.24 | 1167.73 | 1167.96 | 1168.03 | 1168.12 | 1168.18 | 1168.33 | 1168.45 | 1168.53 | 1168.61 | 1168.70 |
| Fish Creek | Upper Fish Creek | 9991 | 81 | 1165.19 | 1165.88 | 1166.43 | 1166.81 | 1167.12 | 1167.30 | 1167.47 | 1167.57 | 1167.63 | 1167.81 | 1167.96 | 1168.06 | 1168.18 | 1168.29 |
| Fish Creek | Upper Fish Creek | 9896 | 80 | 1164.30 | 1165.70 | 1166.17 | 1166.44 | 1166.70 | 1166.91 | 1166.99 | 1167.15 | 1167.31 | 1167.48 | 1167.66 | 1167.78 | 1167.92 | 1168.00 |
| Fish Creek | Upper Fish Creek | 9837 | 79 | 1164.81 | 1165.35 | 1165.72 | 1165.99 | 1166.32 | 1166.65 | 1166.85 | 1167.06 | 1167.14 | 1167.38 | 1167.54 | 1167.65 | 1167.77 | 1167.82 |
| Fish Creek | Upper Fish Creek | 9676 | 78 | 1163.14 | 1164.51 | 1165.32 | 1165.66 | 1165.84 | 1165.98 | 1166.07 | 1166.16 | 1166.34 | 1166.55 | 1166.76 | 1166.86 | 1166.97 | 1167.26 |
| Fish Creek | Upper Fish Creek | 9553 | 77 | 1163.06 | 1164.35 | 1165.12 | 1165.45 | 1165.69 | 1165.85 | 1165.96 | 1166.08 | 1166.16 | 1166.39 | 1166.55 | 1166.68 | 1166.89 | 1167.18 |
| Fish Creek | Upper Fish Creek | 9496 | 76 | 1163.13 | 1164.24 | 1165.01 | 1165.43 | 1165.66 | 1165.82 | 1165.92 | 1166.03 | 1166.11 | 1166.33 | 1166.47 | 1166.61 | 1166.82 | 1167.12 |
| Fish Creek | Upper Fish Creek | 9342 | 75 | 1162.53 | 1163.76 | 1164.43 | 1164.70 | 1165.05 | 1165.36 | 1165.43 | 1165.52 | 1165.61 | 1165.69 | 1165.88 | 1166.23 | 1166.54 | 1166.93 |
| Fish Creek | Upper Fish Creek | 9211 | 74 | 1162.25 | 1163.27 | 1163.65 | 1164.04 | 1164.28 | 1164.42 | 1164.53 | 1164.63 | 1164.71 | 1165.46 | 1165.86 | 1166.19 | 1166.50 | 1166.90 |
| Fish Creek | Upper Fish Creek | 9176 | 73 | 1162.10 | 1163.09 | 1163.56 | 1163.94 | 1164.19 | 1164.34 | 1164.44 | 1164.59 | 1164.76 | 1165.44 | 1165.84 | 1166.18 | 1166.49 | 1166.89 |

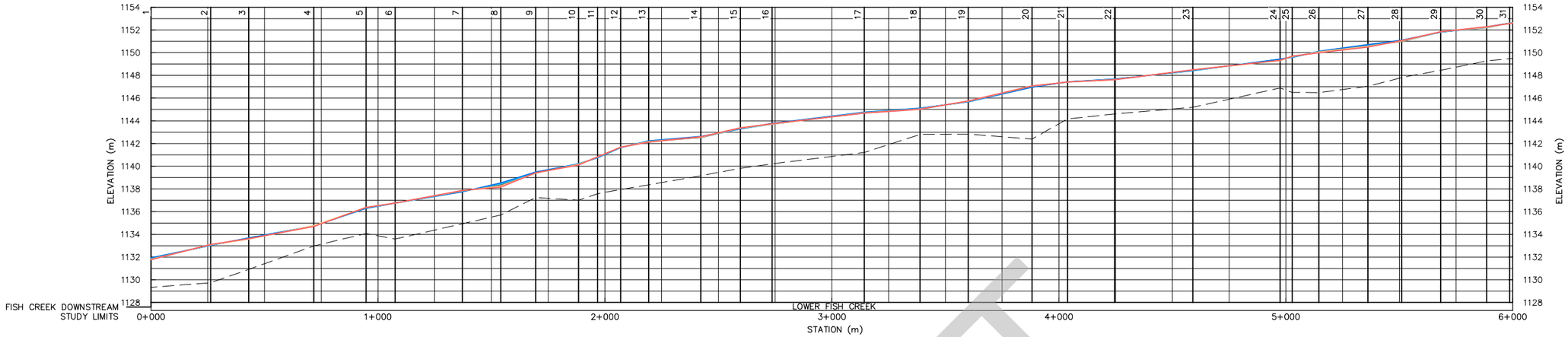
| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Upper Fish Creek | 9063 | 72 | 1161.53 | 1162.45 | 1162.98 | 1163.27 | 1163.59 | 1163.84 | 1164.06 | 1164.33 | 1164.57 | 1165.38 | 1165.80 | 1166.15 | 1166.46 | 1166.87 |
| Fish Creek | Upper Fish Creek | 8948 | 71 | 1160.74 | 1161.51 | 1162.16 | 1162.63 | 1162.98 | 1163.29 | 1163.53 | 1163.85 | 1164.14 | 1165.08 | 1165.75 | 1166.11 | 1166.42 | 1166.83 |
| Fish Creek | Upper Fish Creek | 8933 | 70 | 1159.52 | 1161.63 | 1162.31 | 1162.75 | 1163.05 | 1163.32 | 1163.52 | 1163.77 | 1164.00 | 1164.84 | 1165.25 | 1165.76 | 1166.15 | 1166.65 |
| Fish Creek | Upper Fish Creek | 8932 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 8920 | 69 | 1159.62 | 1161.61 | 1162.29 | 1162.72 | 1163.00 | 1163.25 | 1163.44 | 1163.69 | 1163.92 | 1164.44 | 1164.88 | 1165.60 | 1166.20 | 1166.70 |
| Fish Creek | Upper Fish Creek | 8899 | 68 | 1160.47 | 1161.56 | 1162.21 | 1162.62 | 1162.83 | 1162.99 | 1163.09 | 1163.18 | 1163.22 | 1163.61 | 1163.97 | 1164.20 | 1164.46 | 1164.74 |
| Fish Creek | Upper Fish Creek | 8792 | 67 | 1160.14 | 1161.24 | 1161.90 | 1162.14 | 1162.40 | 1162.60 | 1162.73 | 1162.88 | 1163.00 | 1163.27 | 1163.44 | 1163.54 | 1163.66 | 1163.78 |
| Fish Creek | Upper Fish Creek | 8739 | 66 | 1159.84 | 1161.15 | 1161.80 | 1162.04 | 1162.31 | 1162.57 | 1162.70 | 1162.85 | 1162.96 | 1163.24 | 1163.40 | 1163.50 | 1163.62 | 1163.75 |
| Fish Creek | Upper Fish Creek | 8631 | 65 | 1159.70 | 1160.89 | 1161.60 | 1161.87 | 1162.16 | 1162.43 | 1162.55 | 1162.68 | 1162.80 | 1163.06 | 1163.20 | 1163.29 | 1163.41 | 1163.54 |
| Fish Creek | Upper Fish Creek | 8377 | 64 | 1158.50 | 1159.80 | 1160.32 | 1160.87 | 1161.24 | 1161.37 | 1161.64 | 1161.80 | 1161.86 | 1162.01 | 1162.29 | 1162.49 | 1162.67 | 1162.87 |
| Fish Creek | Upper Fish Creek | 8279 | 63 | 1158.25 | 1159.09 | 1159.66 | 1159.79 | 1160.25 | 1160.74 | 1160.97 | 1161.26 | 1161.43 | 1161.86 | 1162.15 | 1162.36 | 1162.54 | 1162.74 |
| Fish Creek | Upper Fish Creek | 8032 | 62 | 1156.50 | 1157.55 | 1158.22 | 1159.23 | 1160.03 | 1160.46 | 1160.64 | 1160.88 | 1161.01 | 1161.40 | 1161.67 | 1161.93 | 1162.11 | 1162.34 |
| Fish Creek | Upper Fish Creek | 7951 | 61 | 1156.09 | 1157.02 | 1157.73 | 1159.19 | 1160.00 | 1160.42 | 1160.58 | 1160.80 | 1160.91 | 1161.25 | 1161.50 | 1161.79 | 1161.96 | 1162.20 |
| Fish Creek | Upper Fish Creek | 7936 | 60 | 1155.95 | 1156.98 | 1157.77 | 1159.19 | 1159.99 | 1160.40 | 1160.55 | 1160.76 | 1160.85 | 1161.15 | 1161.41 | 1161.75 | 1161.93 | 1162.18 |
| Fish Creek | Upper Fish Creek | 7924 | 59 | 1155.92 | 1156.71 | 1157.68 | 1159.14 | 1159.91 | 1160.34 | 1160.51 | 1160.76 | 1160.88 | 1161.24 | 1161.52 | 1161.84 | 1162.01 | 1162.26 |
| Fish Creek | Upper Fish Creek | 7914 | | Culvert | | | | | | | | | | | | | |
| Fish Creek | Upper Fish Creek | 7904 | 58 | 1155.78 | 1156.79 | 1157.66 | 1159.07 | 1159.78 | 1160.35 | 1160.58 | 1160.84 | 1160.96 | 1161.30 | 1161.58 | 1161.87 | 1162.04 | 1162.28 |
| Fish Creek | Upper Fish Creek | 7898 | 57 | 1155.94 | 1156.77 | 1157.66 | 1159.09 | 1159.80 | 1160.33 | 1160.56 | 1160.83 | 1160.95 | 1161.29 | 1161.57 | 1161.87 | 1162.03 | 1162.27 |
| Fish Creek | Lower Fish Creek | 7872 | 56 | 1155.29 | 1156.56 | 1157.20 | 1157.71 | 1158.24 | 1158.68 | 1158.92 | 1159.82 | 1159.94 | 1160.35 | 1160.65 | 1161.00 | 1161.15 | 1161.41 |
| Fish Creek | Lower Fish Creek | 7842 | 55 | 1155.52 | 1156.28 | 1157.04 | 1157.66 | 1158.27 | 1158.53 | 1158.76 | 1159.04 | 1159.71 | 1160.00 | 1160.42 | 1160.88 | 1161.02 | 1161.26 |
| Fish Creek | Lower Fish Creek | 7761 | 54 | 1154.64 | 1155.97 | 1156.63 | 1157.04 | 1157.56 | 1158.10 | 1158.27 | 1158.71 | 1158.98 | 1159.61 | 1160.38 | 1160.83 | 1160.95 | 1161.21 |
| Fish Creek | Lower Fish Creek | 7685 | 53 | 1154.50 | 1155.77 | 1156.46 | 1156.90 | 1157.38 | 1157.82 | 1158.15 | 1158.48 | 1158.70 | 1159.42 | 1160.14 | 1160.67 | 1160.75 | 1160.99 |
| Fish Creek | Lower Fish Creek | 7609 | 52 | 1154.33 | 1155.21 | 1155.77 | 1156.36 | 1156.93 | 1157.43 | 1157.70 | 1158.33 | 1158.67 | 1159.47 | 1160.20 | 1160.70 | 1160.78 | 1161.03 |
| Fish Creek | Lower Fish Creek | 7578 | 51 | 1153.82 | 1155.30 | 1156.06 | 1156.66 | 1157.27 | 1157.78 | 1158.12 | 1158.60 | 1158.85 | 1159.49 | 1160.17 | 1160.66 | 1160.72 | 1160.93 |
| Fish Creek | Lower Fish Creek | 7563 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Lower Fish Creek | 7548 | 50 | 1153.96 | 1155.27 | 1156.03 | 1156.63 | 1157.24 | 1157.75 | 1158.09 | 1158.46 | 1158.72 | 1159.39 | 1160.18 | 1160.67 | 1160.73 | 1160.95 |
| Fish Creek | Lower Fish Creek | 7509 | 49 | 1153.51 | 1155.22 | 1155.89 | 1156.39 | 1156.88 | 1157.33 | 1157.61 | 1157.91 | 1158.07 | 1158.29 | 1158.49 | 1158.73 | 1159.70 | 1159.99 |
| Fish Creek | Lower Fish Creek | 7499 | 48 | 1153.70 | 1155.20 | 1155.84 | 1156.33 | 1156.82 | 1157.27 | 1157.56 | 1157.87 | 1158.04 | 1158.26 | 1158.50 | 1158.99 | 1159.24 | 1159.42 |
| Fish Creek | Lower Fish Creek | 7414 | 47 | 1153.97 | 1154.98 | 1155.53 | 1156.01 | 1156.42 | 1156.83 | 1157.13 | 1157.48 | 1157.88 | 1158.15 | 1158.48 | 1158.65 | 1159.00 | 1159.18 |
| Fish Creek | Lower Fish Creek | 7343 | 46 | 1153.70 | 1154.44 | 1155.21 | 1155.81 | 1156.09 | 1156.29 | 1156.51 | 1156.78 | 1157.03 | 1157.89 | 1158.37 | 1158.73 | 1159.02 | 1159.27 |
| Fish Creek | Lower Fish Creek | 7258 | 45 | 1152.62 | 1153.96 | 1154.62 | 1155.06 | 1155.65 | 1156.00 | 1156.25 | 1156.58 | 1156.86 | 1157.64 | 1158.41 | 1158.74 | 1159.01 | 1159.26 |
| Fish Creek | Lower Fish Creek | 7129 | 44 | 1152.47 | 1153.85 | 1154.49 | 1154.96 | 1155.43 | 1155.61 | 1155.80 | 1156.09 | 1156.39 | 1157.54 | 1158.36 | 1158.69 | 1158.97 | 1159.22 |
| Fish Creek | Lower Fish Creek | 7098 | 43 | 1152.36 | 1153.81 | 1154.38 | 1154.74 | 1155.02 | 1155.45 | 1155.84 | 1156.25 | 1156.63 | 1157.66 | 1158.40 | 1158.73 | 1159.00 | 1159.24 |
| Fish Creek | Lower Fish Creek | 7049 | 42 | 1152.96 | 1153.66 | 1154.25 | 1154.69 | 1155.21 | 1155.64 | 1155.95 | 1156.32 | 1156.64 | 1157.63 | 1158.37 | 1158.70 | 1158.97 | 1159.22 |
| Fish Creek | Lower Fish Creek | 6961 | 41 | 1151.40 | 1153.66 | 1154.20 | 1154.56 | 1154.87 | 1155.16 | 1155.45 | 1155.86 | 1156.26 | 1157.36 | 1158.35 | 1158.68 | 1158.94 | 1159.19 |
| Fish Creek | Lower Fish Creek | 6945 | 40 | 1149.63 | 1153.67 | 1154.24 | 1154.63 | 1154.97 | 1155.28 | 1155.54 | 1155.87 | 1156.17 | 1157.03 | 1157.65 | 1158.38 | 1158.64 | 1158.87 |

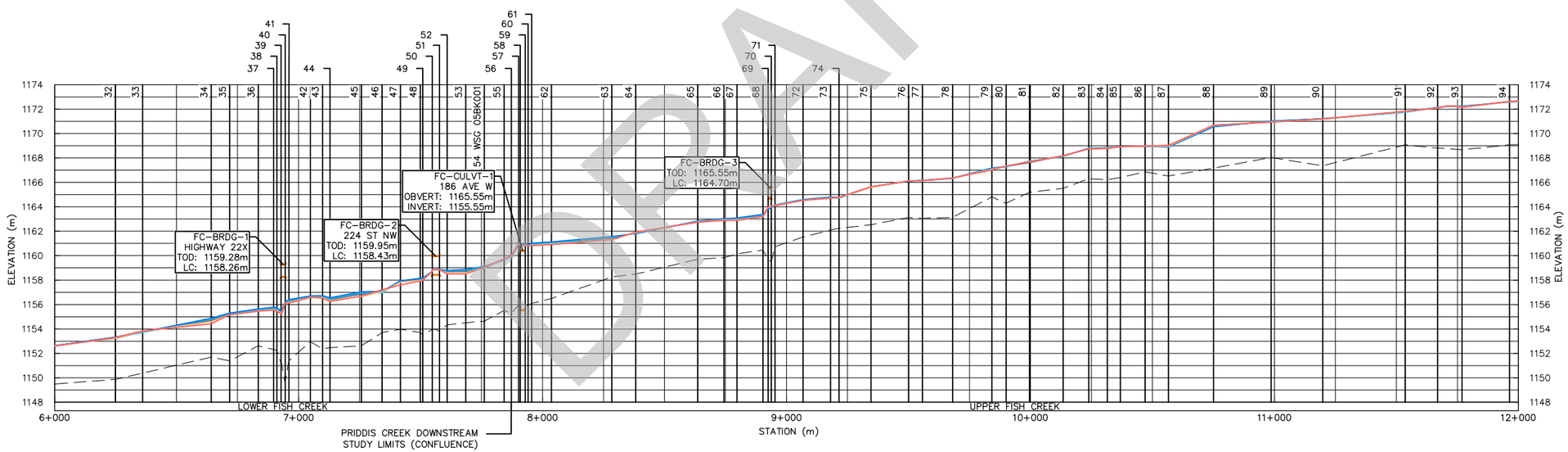
| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Lower Fish Creek | 6937 | | Bridge | | | | | | | | | | | | | |
| Fish Creek | Lower Fish Creek | 6928 | 39 | 1151.22 | 1153.66 | 1154.19 | 1154.53 | 1154.78 | 1154.95 | 1155.09 | 1155.25 | 1155.36 | 1155.61 | 1156.10 | 1157.44 | 1157.78 | 1158.00 |
| Fish Creek | Lower Fish Creek | 6911 | 38 | 1152.23 | 1153.62 | 1154.08 | 1154.37 | 1154.68 | 1154.95 | 1155.15 | 1155.40 | 1155.60 | 1156.11 | 1156.71 | 1156.87 | 1157.03 | 1157.17 |
| Fish Creek | Lower Fish Creek | 6898 | 37 | 1152.32 | 1153.61 | 1154.06 | 1154.35 | 1154.67 | 1154.97 | 1155.19 | 1155.45 | 1155.65 | 1156.18 | 1156.71 | 1156.86 | 1157.01 | 1157.15 |
| Fish Creek | Lower Fish Creek | 6835 | 36 | 1152.62 | 1153.45 | 1153.89 | 1154.20 | 1154.55 | 1154.86 | 1155.08 | 1155.33 | 1155.54 | 1156.01 | 1156.19 | 1156.32 | 1156.44 | 1156.57 |
| Fish Creek | Lower Fish Creek | 6718 | 35 | 1151.39 | 1152.90 | 1153.40 | 1153.85 | 1154.21 | 1154.53 | 1154.74 | 1155.00 | 1155.20 | 1155.75 | 1155.94 | 1156.10 | 1156.22 | 1156.34 |
| Fish Creek | Lower Fish Creek | 6642 | 34 | 1151.70 | 1152.50 | 1153.23 | 1153.73 | 1154.04 | 1154.26 | 1154.40 | 1154.58 | 1154.70 | 1155.02 | 1155.50 | 1155.80 | 1155.91 | 1156.02 |
| Fish Creek | Lower Fish Creek | 6361 | 33 | 1150.39 | 1151.78 | 1152.69 | 1152.82 | 1153.16 | 1153.39 | 1153.53 | 1153.67 | 1153.76 | 1153.97 | 1154.27 | 1154.38 | 1154.58 | 1154.78 |
| Fish Creek | Lower Fish Creek | 6249 | 32 | 1149.87 | 1151.49 | 1152.06 | 1152.57 | 1152.77 | 1152.91 | 1153.02 | 1153.12 | 1153.23 | 1153.49 | 1153.68 | 1153.79 | 1153.92 | 1154.05 |
| Fish Creek | Lower Fish Creek | 5986 | 31 | 1149.47 | 1150.78 | 1151.47 | 1151.82 | 1152.15 | 1152.31 | 1152.42 | 1152.52 | 1152.61 | 1152.78 | 1152.95 | 1153.07 | 1153.20 | 1153.33 |
| Fish Creek | Lower Fish Creek | 5884 | 30 | 1149.27 | 1150.43 | 1150.96 | 1151.30 | 1151.63 | 1151.93 | 1152.02 | 1152.13 | 1152.19 | 1152.45 | 1152.67 | 1152.80 | 1152.95 | 1153.09 |
| Fish Creek | Lower Fish Creek | 5682 | 29 | 1148.45 | 1149.95 | 1150.52 | 1150.83 | 1151.13 | 1151.36 | 1151.53 | 1151.70 | 1151.83 | 1152.15 | 1152.38 | 1152.51 | 1152.64 | 1152.78 |
| Fish Creek | Lower Fish Creek | 5510 | 28 | 1147.80 | 1148.98 | 1149.71 | 1150.16 | 1150.42 | 1150.62 | 1150.72 | 1150.86 | 1150.98 | 1151.29 | 1151.59 | 1151.72 | 1151.84 | 1151.93 |
| Fish Creek | Lower Fish Creek | 5361 | 27 | 1147.04 | 1148.40 | 1149.14 | 1149.58 | 1149.91 | 1150.15 | 1150.32 | 1150.49 | 1150.62 | 1150.91 | 1151.14 | 1151.27 | 1151.41 | 1151.54 |
| Fish Creek | Lower Fish Creek | 5146 | 26 | 1146.48 | 1148.23 | 1148.93 | 1149.31 | 1149.56 | 1149.74 | 1149.85 | 1149.98 | 1150.09 | 1150.34 | 1150.55 | 1150.70 | 1150.84 | 1151.00 |
| Fish Creek | Lower Fish Creek | 5028 | 25 | 1146.50 | 1148.09 | 1148.66 | 1148.84 | 1149.19 | 1149.34 | 1149.44 | 1149.54 | 1149.61 | 1149.81 | 1149.95 | 1150.03 | 1150.15 | 1150.24 |
| Fish Creek | Lower Fish Creek | 4975 | 24 | 1146.89 | 1148.00 | 1148.61 | 1148.82 | 1148.97 | 1149.08 | 1149.19 | 1149.28 | 1149.37 | 1149.59 | 1149.68 | 1149.76 | 1149.86 | 1149.95 |
| Fish Creek | Lower Fish Creek | 4590 | 23 | 1145.19 | 1146.56 | 1147.16 | 1147.68 | 1148.01 | 1148.20 | 1148.28 | 1148.38 | 1148.44 | 1148.57 | 1148.78 | 1148.91 | 1149.05 | 1149.19 |
| Fish Creek | Lower Fish Creek | 4245 | 22 | 1144.60 | 1145.93 | 1146.55 | 1147.02 | 1147.28 | 1147.42 | 1147.47 | 1147.57 | 1147.65 | 1147.84 | 1147.99 | 1148.08 | 1148.18 | 1148.28 |
| Fish Creek | Lower Fish Creek | 4038 | 21 | 1144.17 | 1145.11 | 1145.70 | 1146.07 | 1146.86 | 1147.00 | 1147.22 | 1147.34 | 1147.43 | 1147.63 | 1147.79 | 1147.87 | 1147.98 | 1148.08 |
| Fish Creek | Lower Fish Creek | 3882 | 20 | 1142.39 | 1144.37 | 1145.12 | 1145.57 | 1145.93 | 1146.09 | 1146.59 | 1146.88 | 1146.98 | 1147.18 | 1147.33 | 1147.45 | 1147.51 | 1147.59 |
| Fish Creek | Lower Fish Creek | 3601 | 19 | 1142.83 | 1144.17 | 1144.74 | 1145.03 | 1145.24 | 1145.44 | 1145.54 | 1145.64 | 1145.70 | 1145.87 | 1145.99 | 1146.08 | 1146.14 | 1146.25 |
| Fish Creek | Lower Fish Creek | 3388 | 18 | 1142.80 | 1143.59 | 1144.05 | 1144.28 | 1144.53 | 1144.73 | 1144.86 | 1144.98 | 1145.08 | 1145.33 | 1145.55 | 1145.67 | 1145.82 | 1145.95 |
| Fish Creek | Lower Fish Creek | 3143 | 17 | 1141.21 | 1142.44 | 1143.05 | 1143.55 | 1143.95 | 1144.26 | 1144.43 | 1144.61 | 1144.73 | 1145.03 | 1145.27 | 1145.39 | 1145.53 | 1145.65 |
| Fish Creek | Lower Fish Creek | 2736 | 16 | 1140.21 | 1141.43 | 1142.23 | 1142.75 | 1143.13 | 1143.31 | 1143.43 | 1143.56 | 1143.70 | 1143.98 | 1144.24 | 1144.37 | 1144.62 | 1144.74 |
| Fish Creek | Lower Fish Creek | 2597 | 15 | 1139.81 | 1140.94 | 1141.60 | 1142.11 | 1142.53 | 1142.96 | 1143.09 | 1143.23 | 1143.32 | 1143.47 | 1143.53 | 1143.59 | 1143.68 | 1143.76 |
| Fish Creek | Lower Fish Creek | 2422 | 14 | 1139.16 | 1140.25 | 1140.99 | 1141.51 | 1141.99 | 1142.24 | 1142.33 | 1142.44 | 1142.52 | 1142.79 | 1143.02 | 1143.17 | 1143.33 | 1143.51 |
| Fish Creek | Lower Fish Creek | 2193 | 13 | 1138.36 | 1139.61 | 1140.27 | 1140.80 | 1141.34 | 1141.83 | 1141.90 | 1142.06 | 1142.19 | 1142.48 | 1142.71 | 1142.85 | 1143.01 | 1143.18 |
| Fish Creek | Lower Fish Creek | 2070 | 12 | 1137.95 | 1139.22 | 1139.87 | 1140.31 | 1140.50 | 1140.88 | 1141.44 | 1141.57 | 1141.66 | 1141.88 | 1142.06 | 1142.17 | 1142.29 | 1142.40 |
| Fish Creek | Lower Fish Creek | 1967 | 11 | 1137.58 | 1138.90 | 1139.50 | 1139.66 | 1140.15 | 1140.36 | 1140.53 | 1140.64 | 1140.76 | 1141.00 | 1141.20 | 1141.30 | 1141.41 | 1141.52 |
| Fish Creek | Lower Fish Creek | 1884 | 10 | 1137.01 | 1138.72 | 1139.27 | 1139.52 | 1139.74 | 1139.90 | 1140.01 | 1140.11 | 1140.21 | 1140.31 | 1140.46 | 1140.56 | 1140.67 | 1140.78 |
| Fish Creek | Lower Fish Creek | 1695 | 9 | 1137.24 | 1137.89 | 1138.20 | 1138.59 | 1138.89 | 1139.07 | 1139.19 | 1139.32 | 1139.38 | 1139.86 | 1139.98 | 1140.09 | 1140.19 | 1140.32 |
| Fish Creek | Lower Fish Creek | 1541 | 8 | 1135.71 | 1136.53 | 1137.24 | 1137.65 | 1137.86 | 1138.04 | 1138.15 | 1138.28 | 1138.34 | 1138.48 | 1139.29 | 1139.43 | 1139.60 | 1139.66 |
| Fish Creek | Lower Fish Creek | 1372 | 7 | 1134.93 | 1136.09 | 1136.54 | 1137.22 | 1137.43 | 1137.53 | 1137.62 | 1137.72 | 1137.81 | 1137.95 | 1138.03 | 1138.10 | 1138.28 | 1138.35 |
| Fish Creek | Lower Fish Creek | 1076 | 6 | 1133.58 | 1135.27 | 1135.86 | 1136.27 | 1136.39 | 1136.52 | 1136.60 | 1136.69 | 1136.76 | 1136.90 | 1137.03 | 1137.09 | 1137.17 | 1137.26 |
| Fish Creek | Lower Fish Creek | 947 | 5 | 1134.07 | 1134.94 | 1135.24 | 1135.54 | 1136.00 | 1136.13 | 1136.21 | 1136.28 | 1136.30 | 1136.44 | 1136.51 | 1136.57 | 1136.63 | 1136.67 |

| Watercourse | Flow Zone | River Station (m) | Section ID | Channel Thalweg Elevation (m) | Computed Water Surface Elevation (m) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2-year | 5-year | 10-year | 20-year | 35-year | 50-year | 75-year | 100-year | 200-year | 350-year | 500-year | 750-year | 1000-year |
| Fish Creek | Lower Fish Creek | 717 | 4 | 1132.98 | 1133.63 | 1133.98 | 1134.16 | 1134.33 | 1134.52 | 1134.58 | 1134.68 | 1134.75 | 1134.91 | 1135.03 | 1135.12 | 1135.24 | 1135.34 |
| Fish Creek | Lower Fish Creek | 430 | 3 | 1130.91 | 1131.93 | 1132.65 | 1133.13 | 1133.26 | 1133.36 | 1133.45 | 1133.54 | 1133.63 | 1133.81 | 1134.00 | 1134.10 | 1134.19 | 1134.30 |
| Fish Creek | Lower Fish Creek | 263 | 2 | 1129.74 | 1131.18 | 1131.77 | 1132.08 | 1132.75 | 1132.88 | 1132.95 | 1133.01 | 1133.06 | 1133.19 | 1133.27 | 1133.33 | 1133.43 | 1133.50 |
| Fish Creek | Lower Fish Creek | 0 | 1 | 1129.33 | 1130.27 | 1130.77 | 1131.04 | 1131.29 | 1131.49 | 1131.62 | 1131.76 | 1131.86 | 1132.07 | 1132.26 | 1132.35 | 1132.45 | 1132.55 |

# Appendix C MODEL SENSITIVITY PROFILES

2019/09/30 11:01 AM By: Tandara, Catalina



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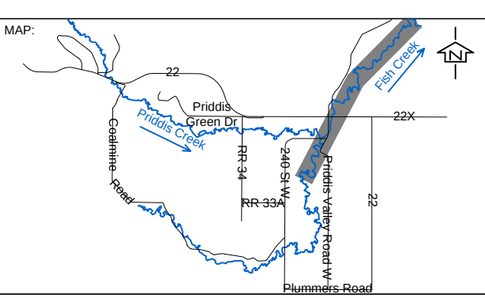
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL SENSITIVITY PROFILE - FISH CREEK STA 0+000 TO 12+000

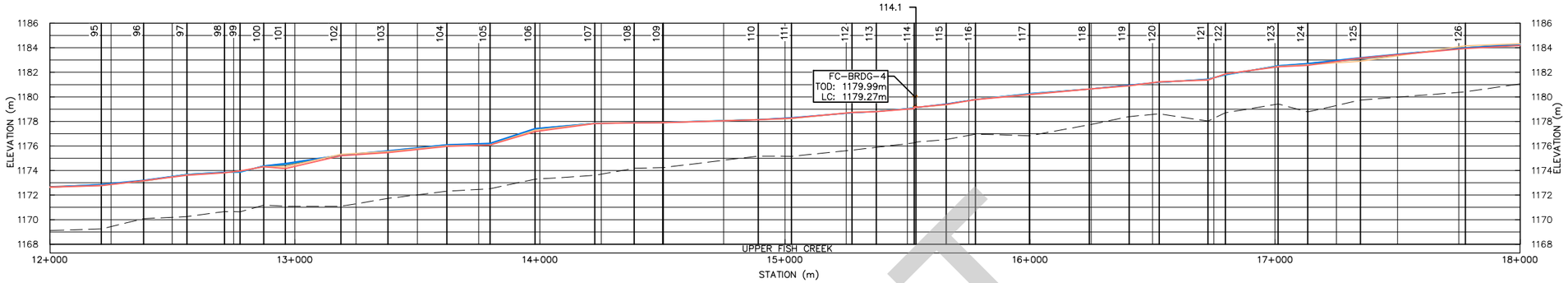
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

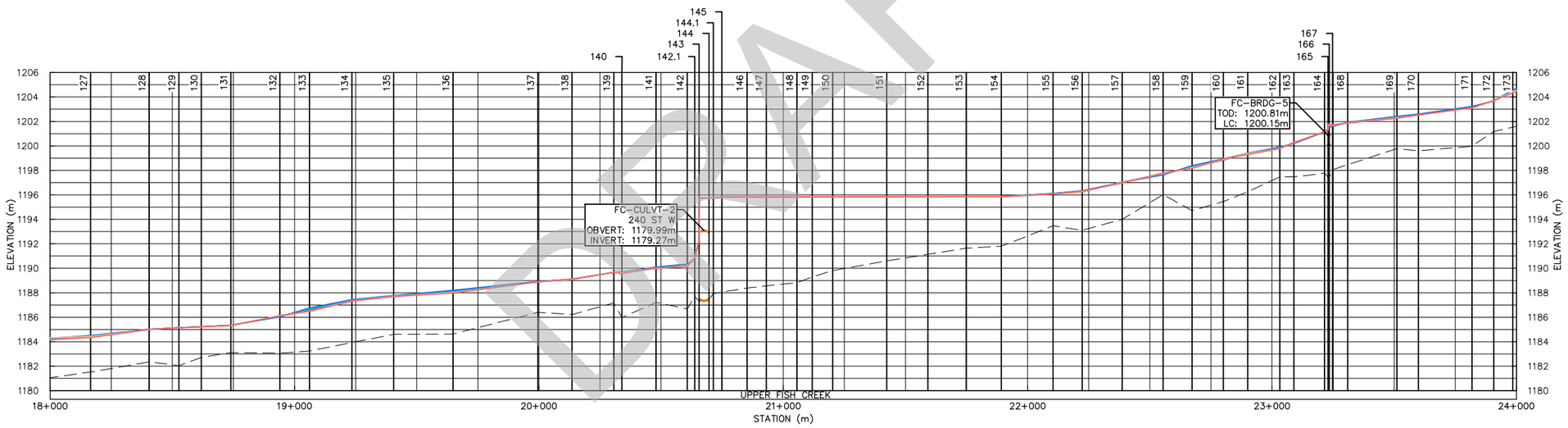
DATE: February 2018

QA/QC:

Stantec

FIGURE 1.0





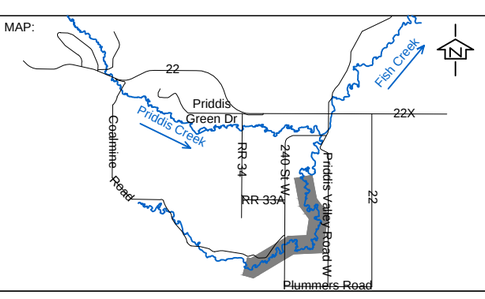



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL SENSITIVITY PROFILE - FISH CREEK STA 12+000 TO 24+000

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

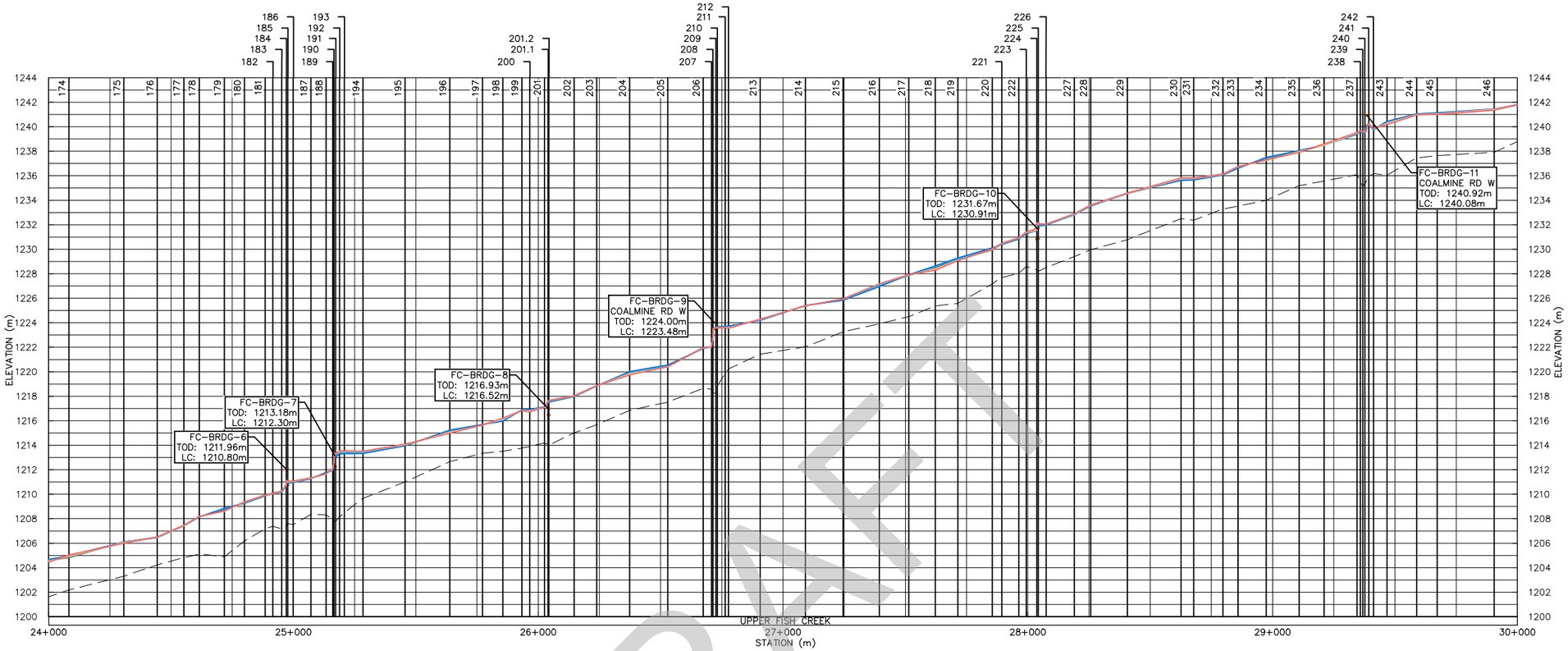
DATE: February 2018

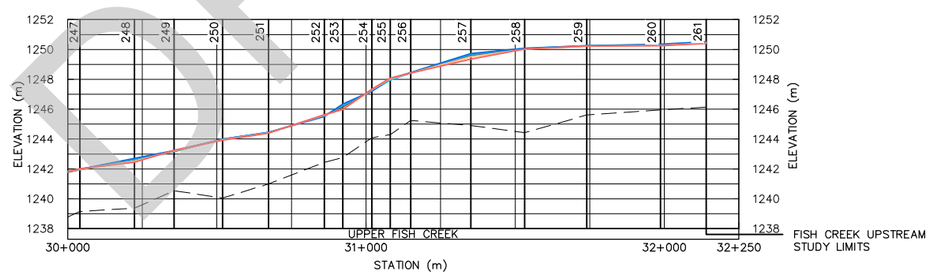
QA/QC:

Stantec

FIGURE 2.0

2019/09/30 11:01 AM By: Tandara, Catalina



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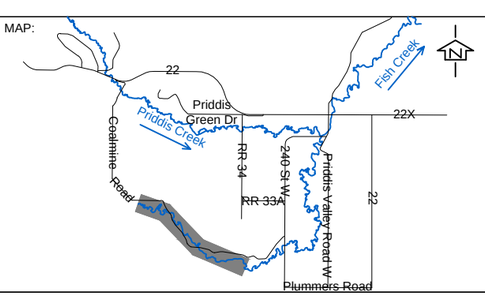
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL SENSITIVITY PROFILE - FISH CREEK STA 24+000 TO 32+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

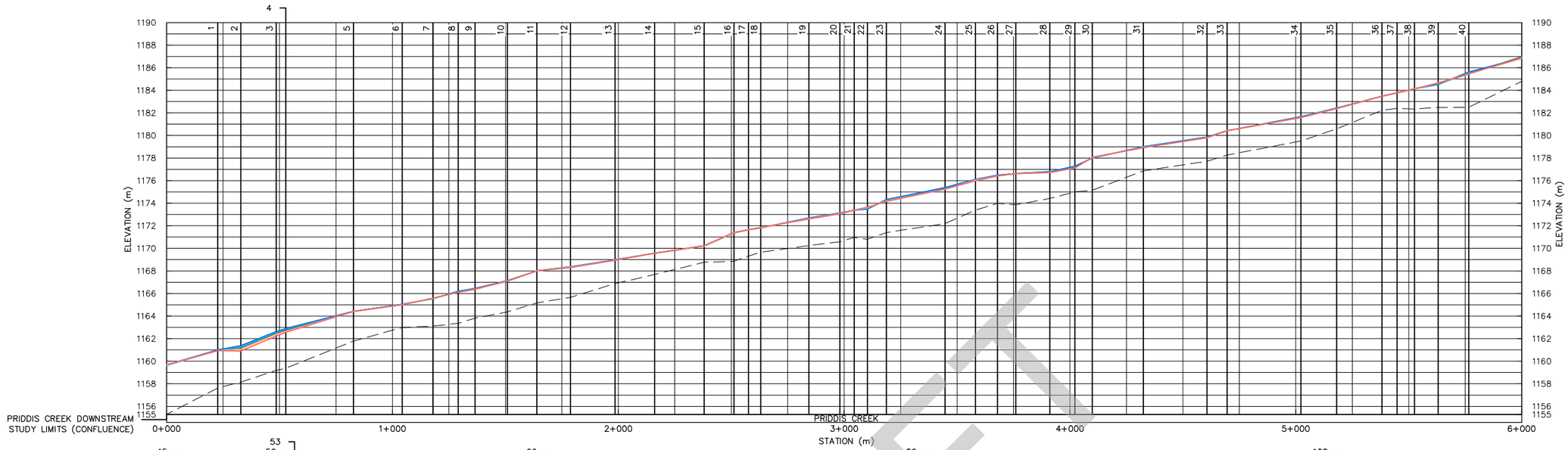
DATE: February 2018

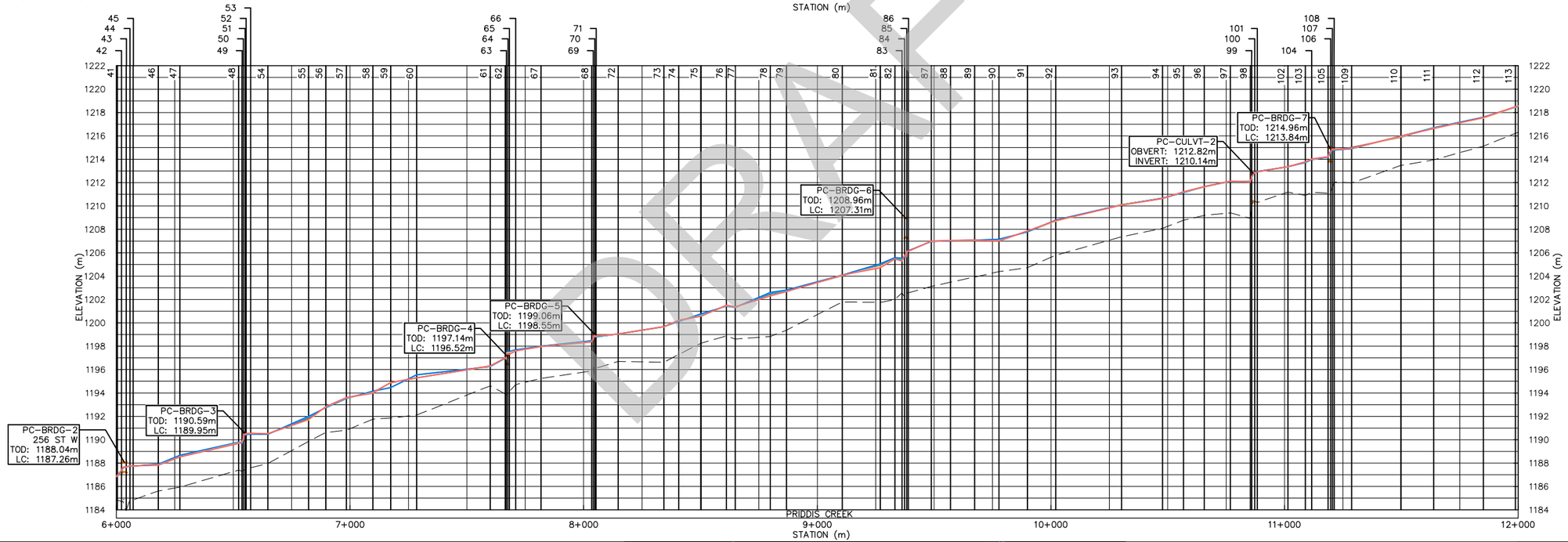
QA/QC:

Stantec

FIGURE 3.0

2019/09/30 11:01 AM By: Tandara, Catalina



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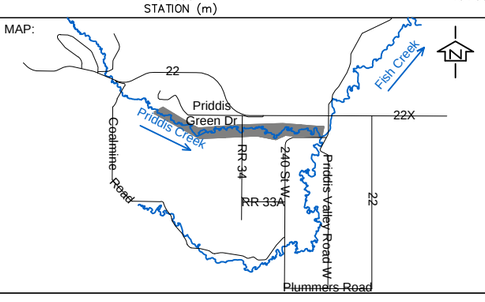
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL SENSITIVITY PROFILE - PRIDDIS CREEK
STA 0+000 TO 12+000

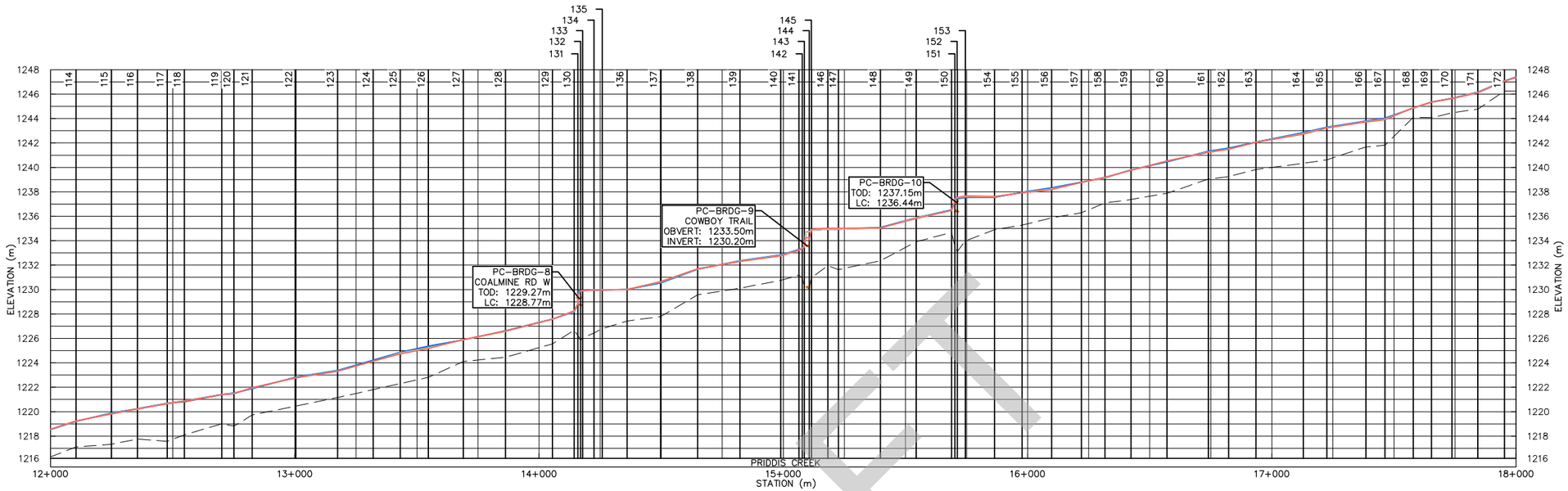
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

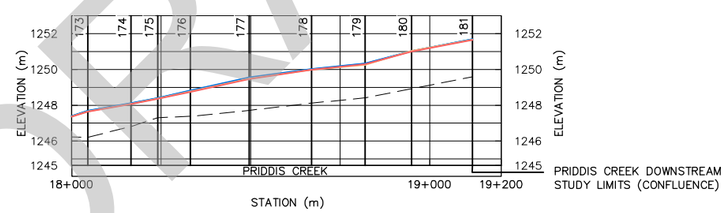
DATE: February 2018

QA/QC:

Stantec

FIGURE 4.0





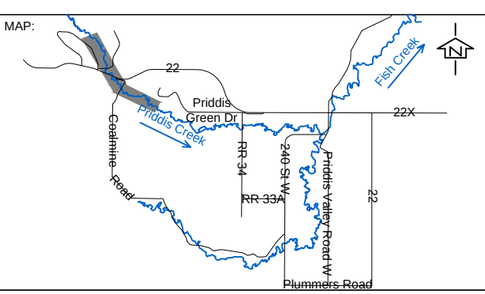



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL SENSITIVITY PROFILE - PRIDDIS CREEK
STA 12+000 TO 19+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

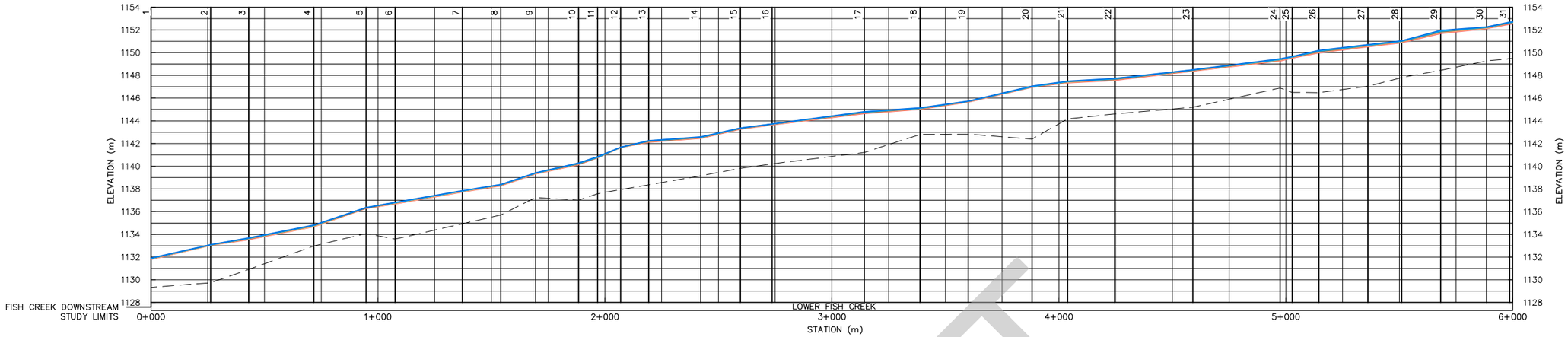
DATE: February 2018

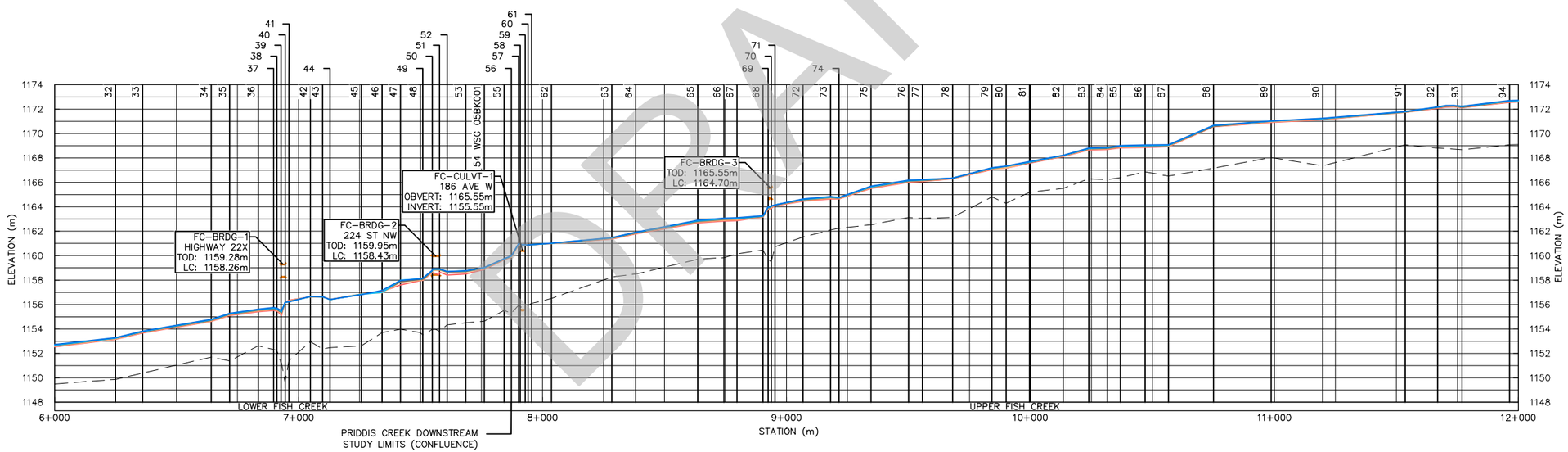
QA/QC:

Stantec

FIGURE 5.0

2019/09/30 11:08 AM By: Tandara, Catalina



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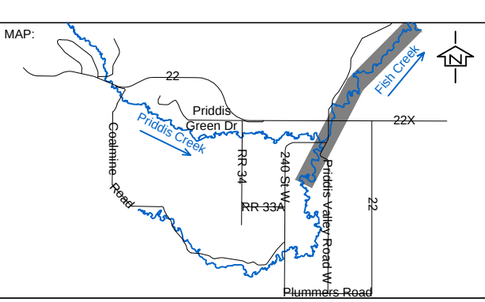
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

OVERBANK SENSITIVITY PROFILE
- FISH CREEK
STA 0+000 TO 12+000

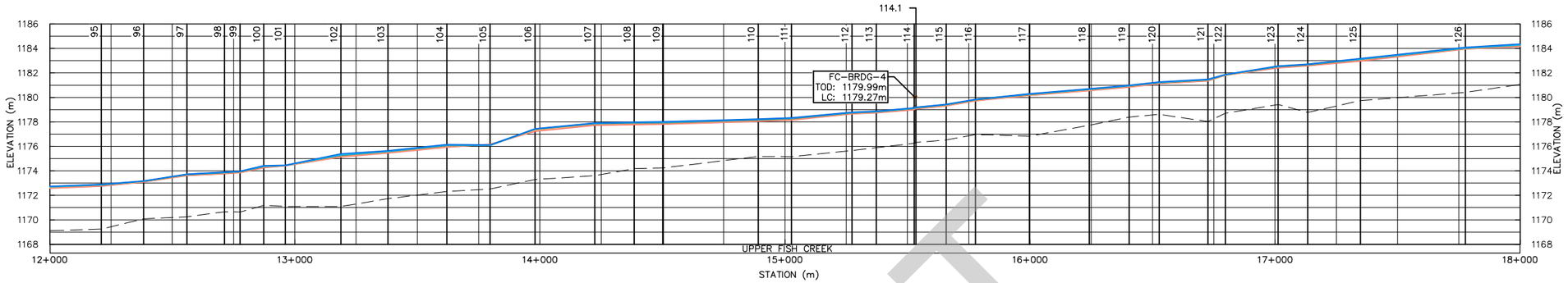
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

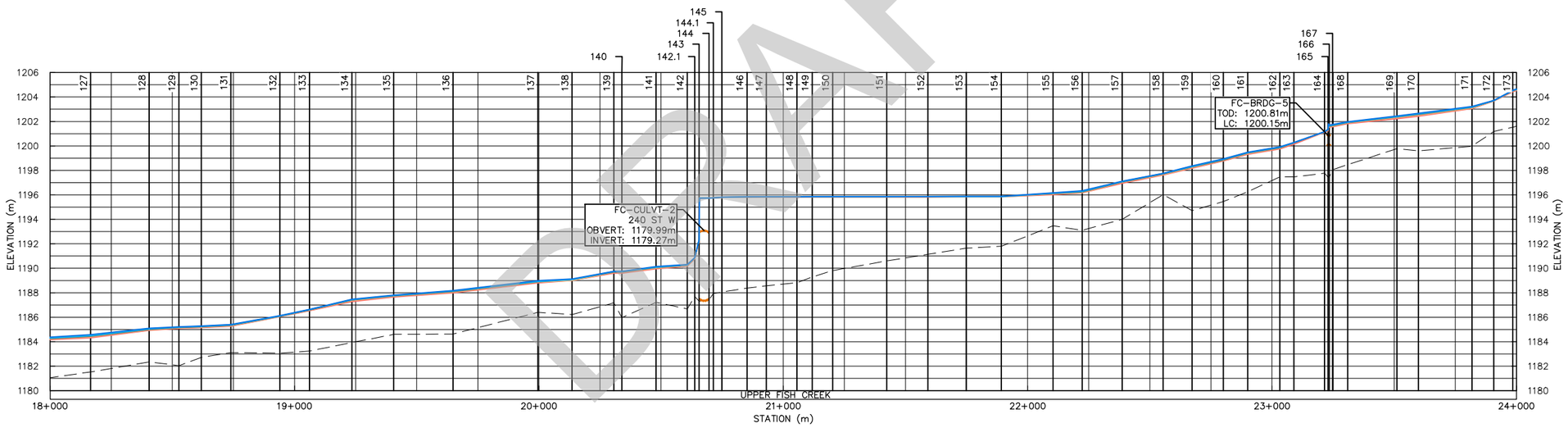
DATE: February 2018

QA/QC:

Stantec

FIGURE 6.0





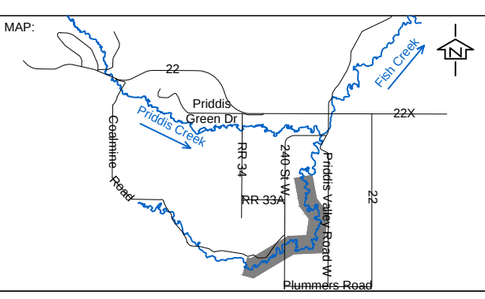



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

OVERBANK SENSITIVITY PROFILES
- FISH CREEK
STA 12+000 TO 24+000

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

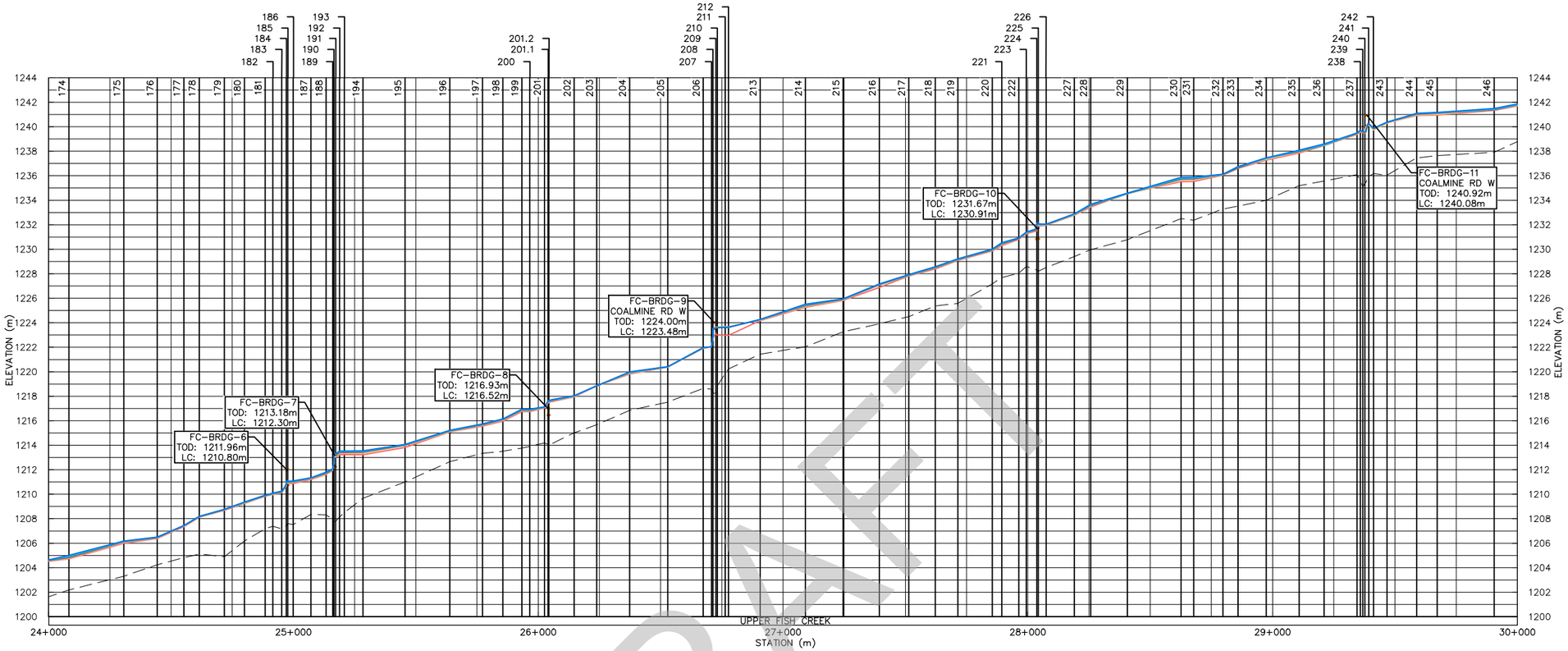
DATE: February 2018

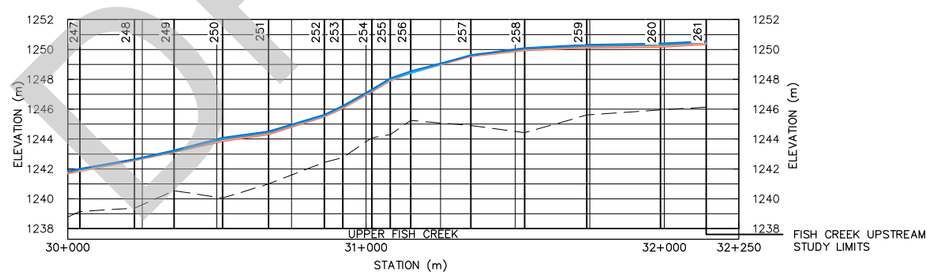
QA/QC:

Stantec

FIGURE 7.0

2019/09/30 11:08 AM By: Tandara, Catalina



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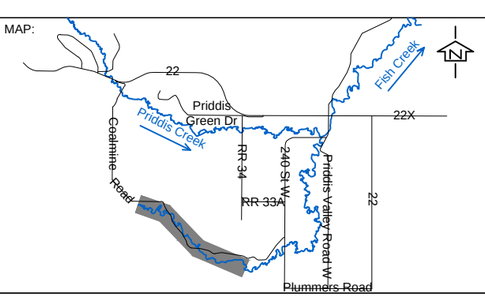
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

OVERBANK SENSITIVITY PROFILES
- FISH CREEK
STA 24+000 TO 32+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

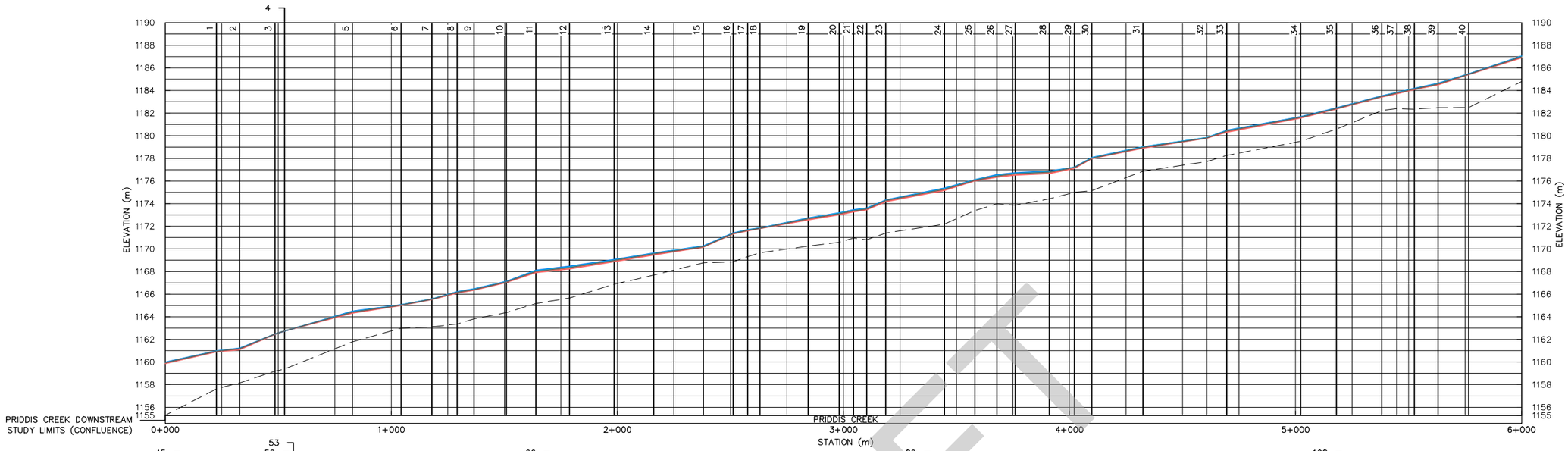
DATE: February 2018

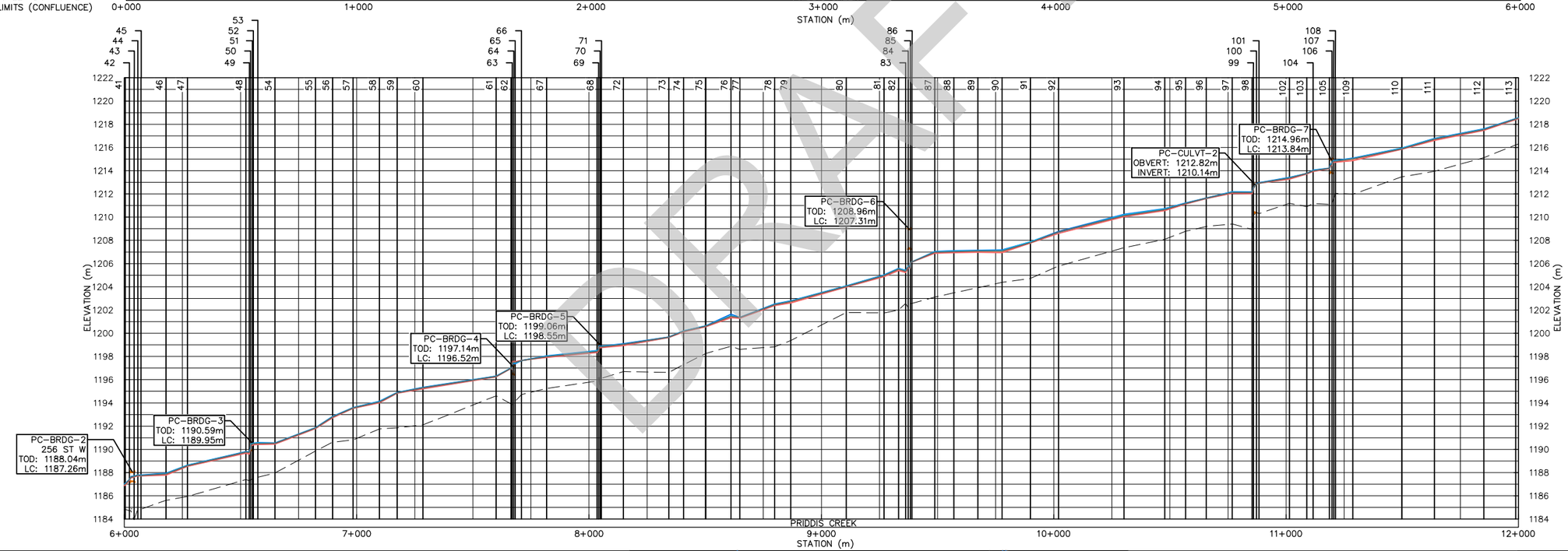
QA/QC:

Stantec

FIGURE 8.0

2019/09/30 11:08 AM By: Tandara, Catalina



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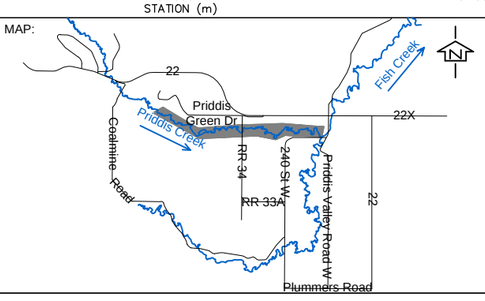
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

OVERBANK SENSITIVITY PROFILES
- PRIDDIS CREEK
STA 0+000 TO 12+000

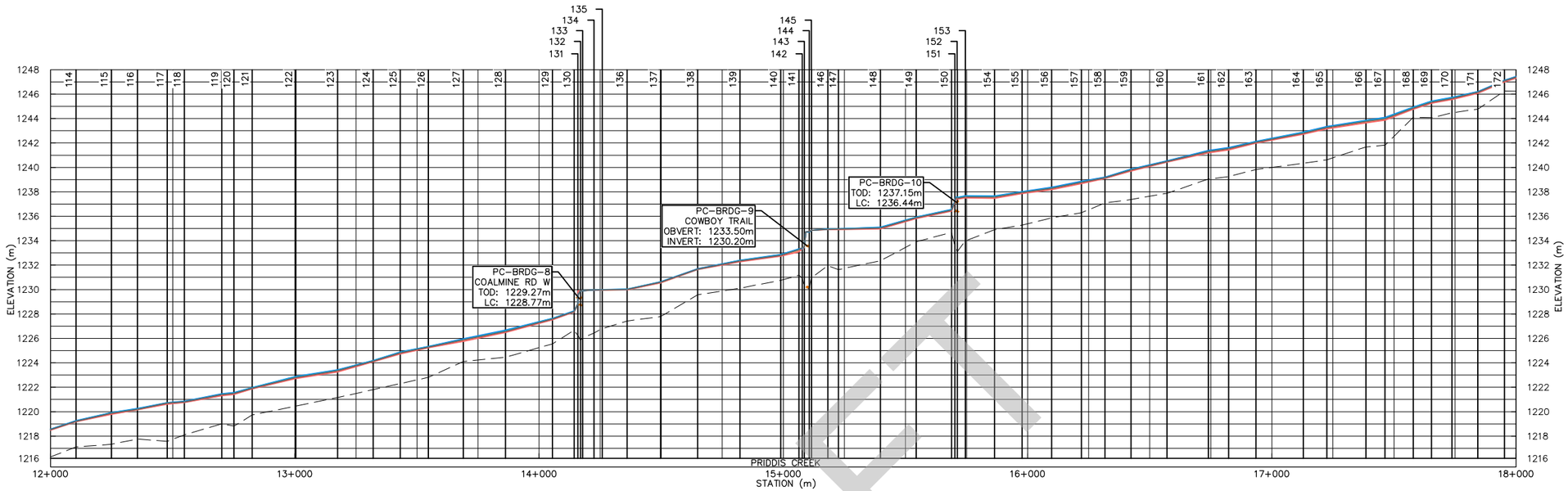
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

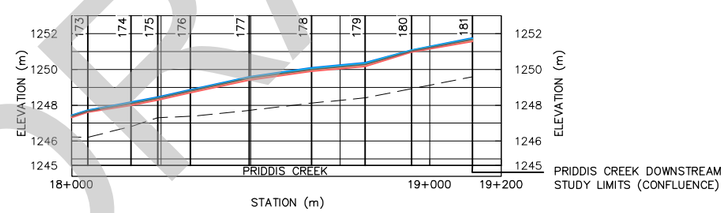
DATE: February 2018

QA/QC:

Stantec

FIGURE 9.0





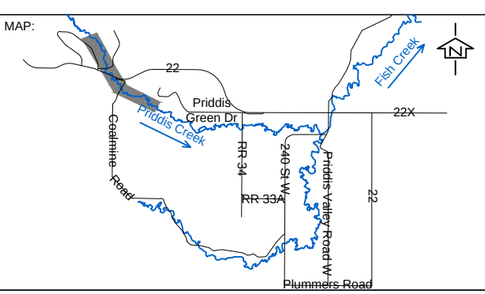



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

OVERBANK SENSITIVITY PROFILES
- PRIDDIS CREEK
STA 12+000 TO 19+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

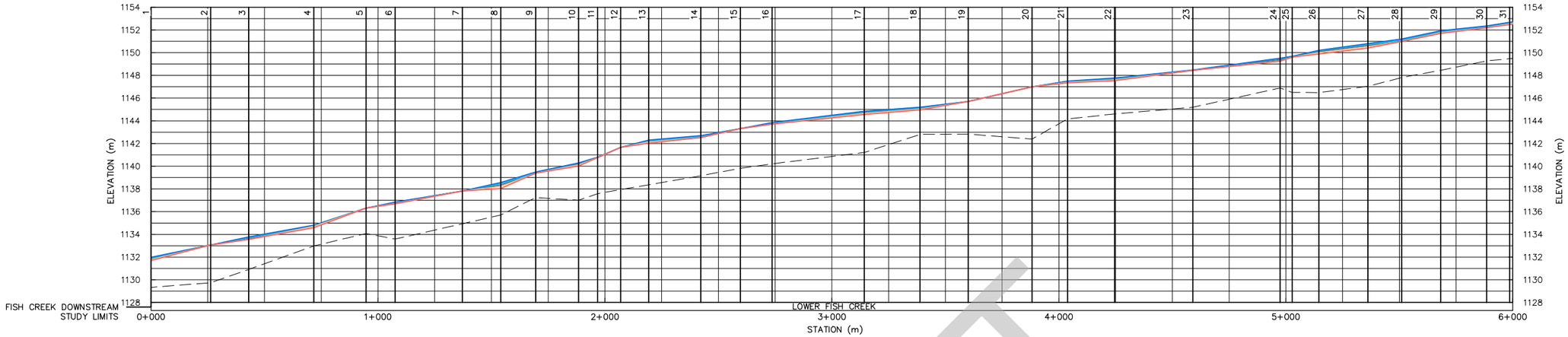
DATE: February 2018

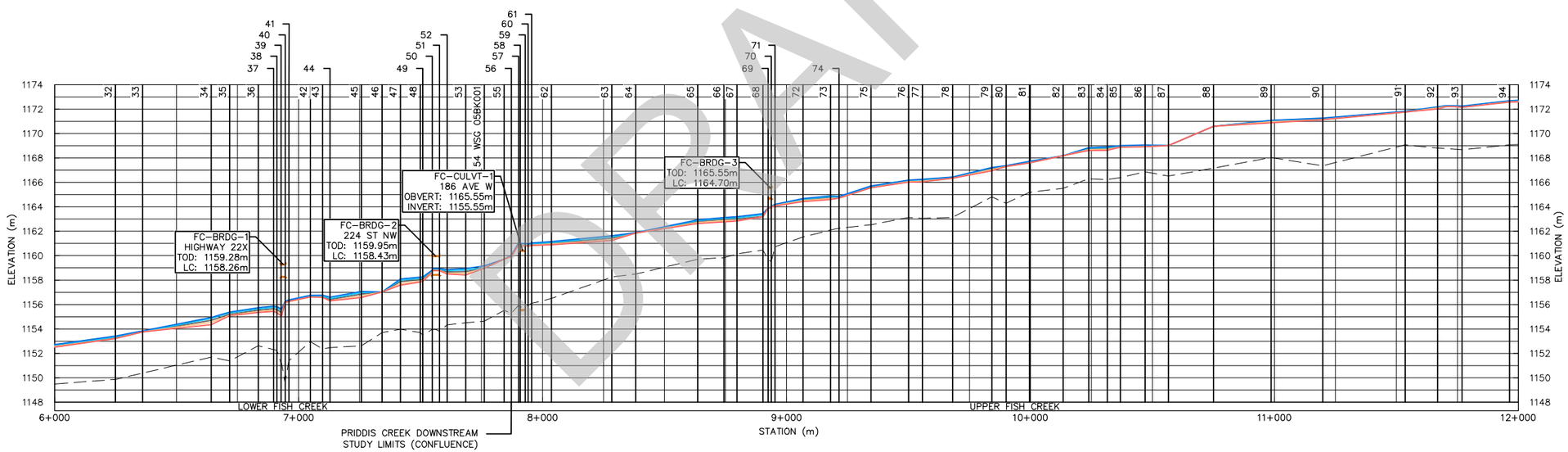
QA/QC:

Stantec

FIGURE 10.0

2019/09/30 11:14 AM By: Tandara, Catalina



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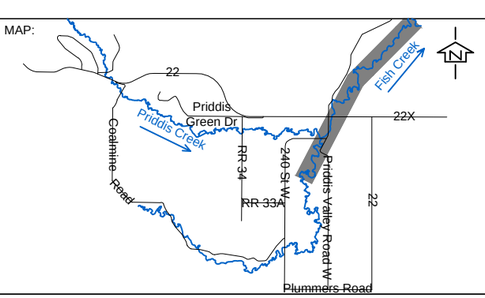
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL AND OVERBANK SENSITIVITY
PROFILE - FISH CREEK
STA 0+000 TO 12+000

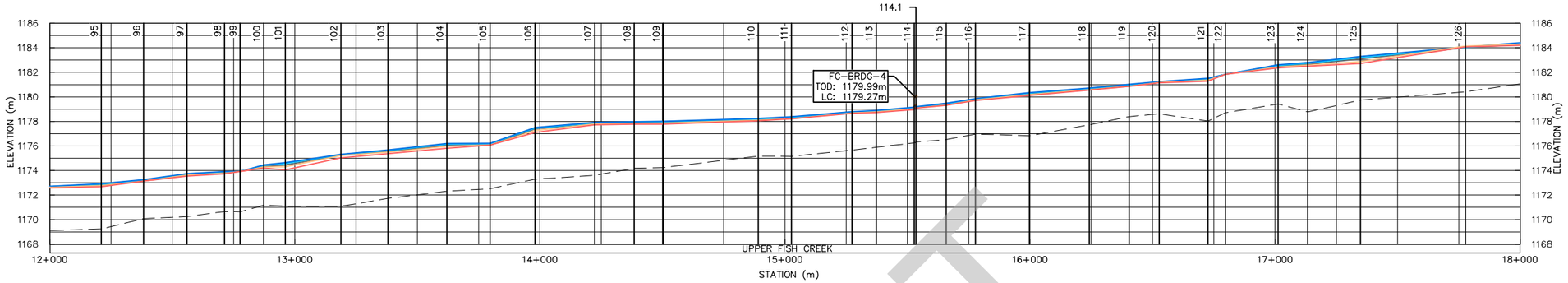
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

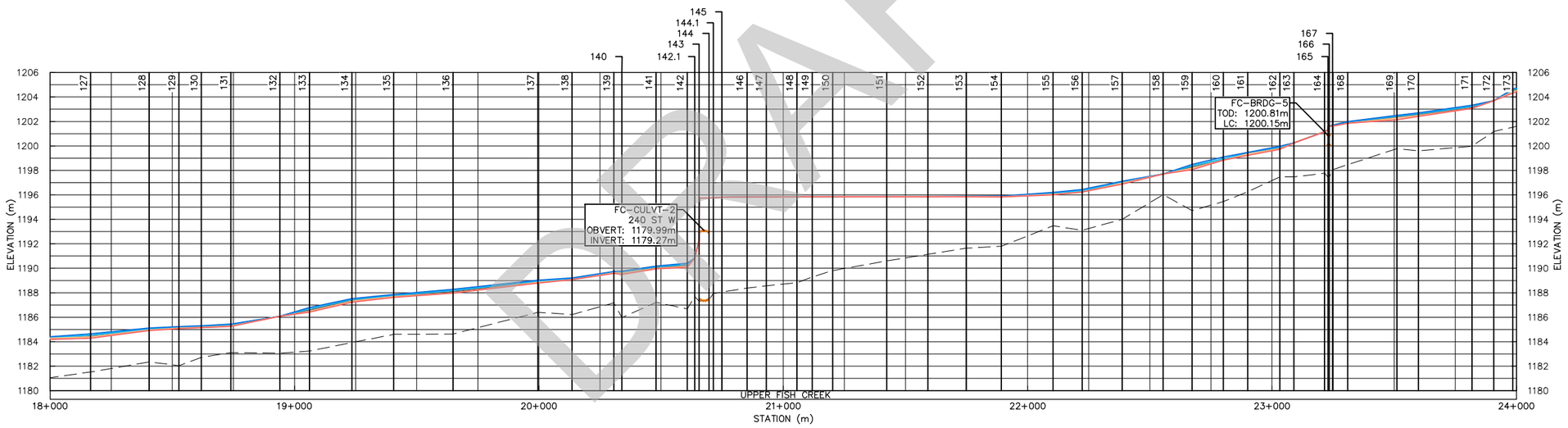
DATE: February 2018

QA/QC:

Stantec

FIGURE 11.0





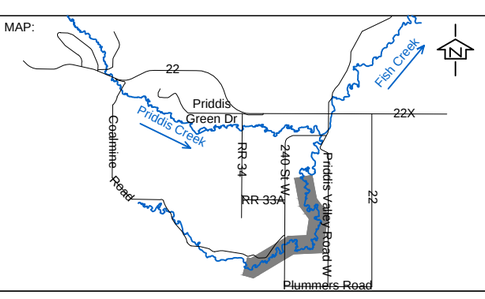



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:

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Priddis River Hazard Study

CHANNEL AND OVERBANK SENSITIVITY PROFILES - FISH CREEK STA 12+000 TO 24+000

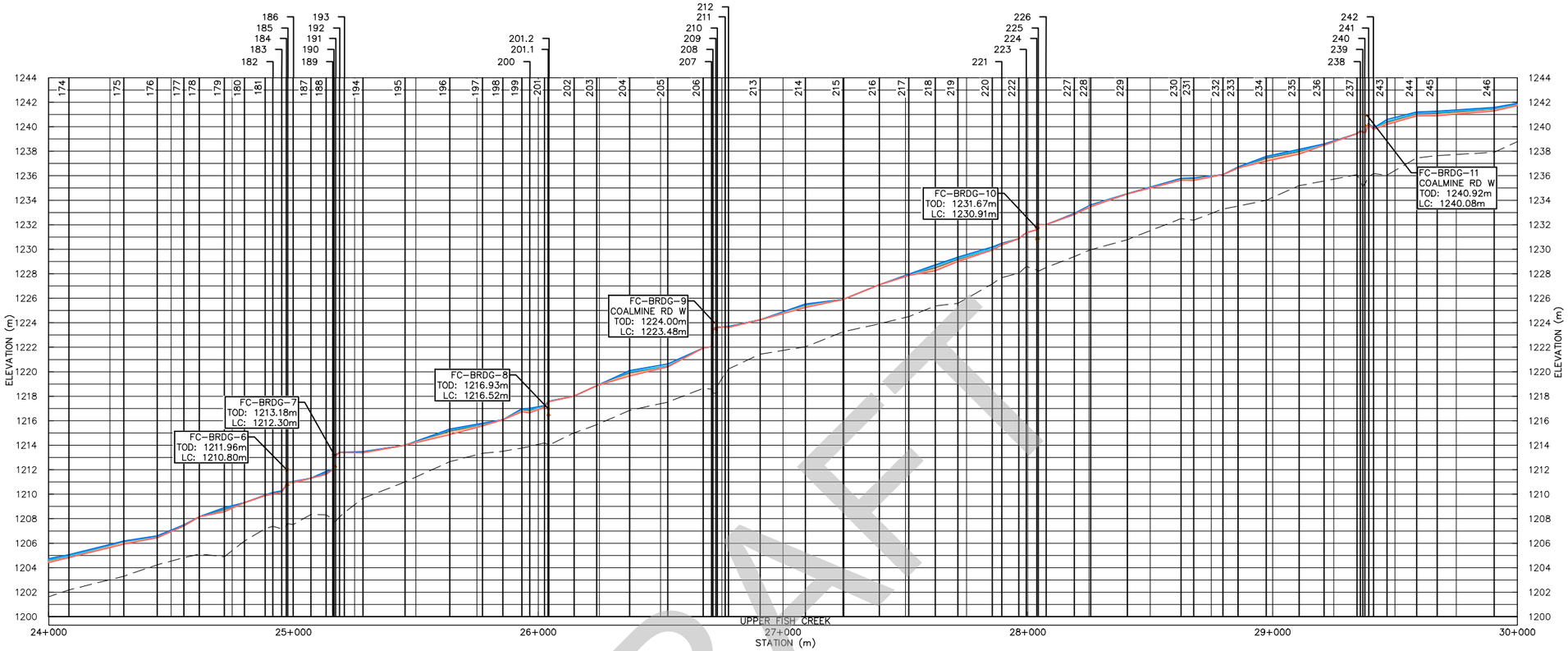
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

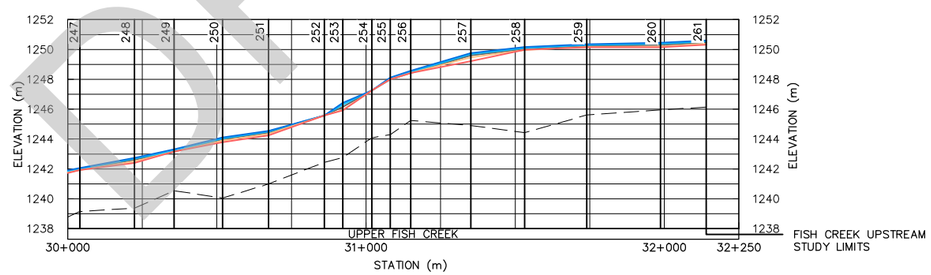
DATE: February 2018

QA/QC:

Stantec

FIGURE 12.0





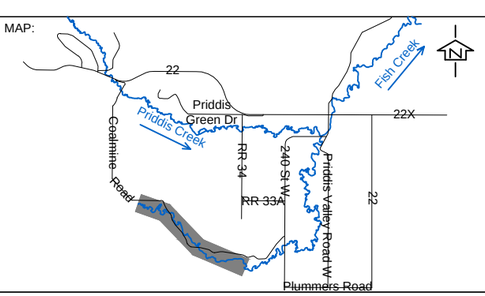



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:

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Priddis River Hazard Study

CHANNEL AND OVERBANK SENSITIVITY PROFILES - FISH CREEK
STA 24+000 TO 32+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

DATE: February 2018

QA/QC:

Stantec

FIGURE 13.0

2019/09/30 11:15 AM By: Tandara, Catalina

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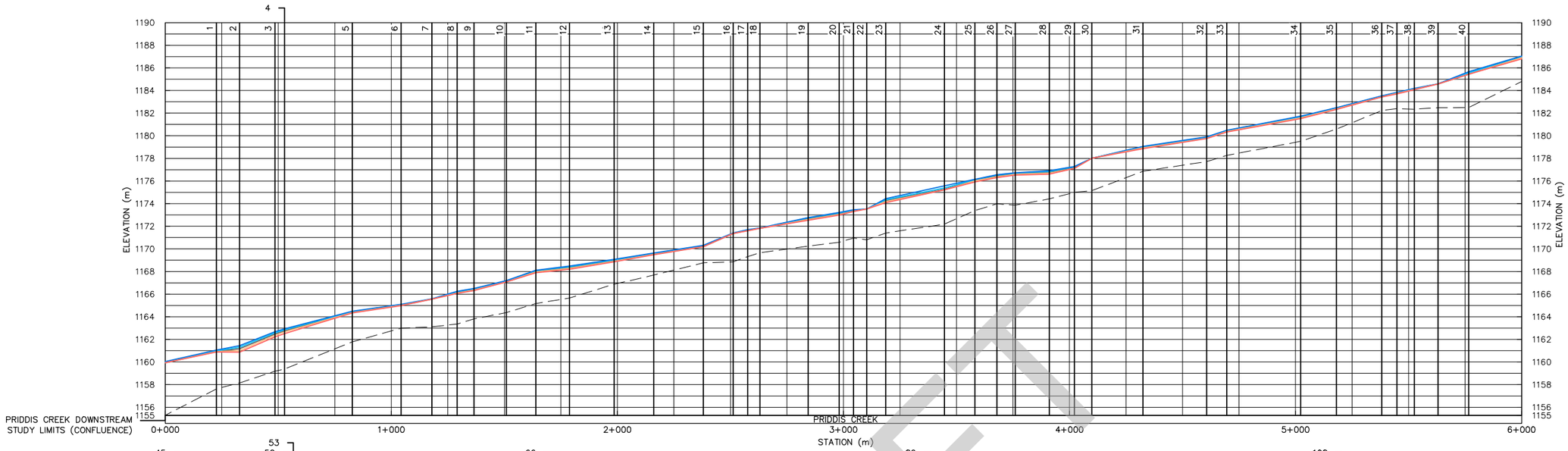
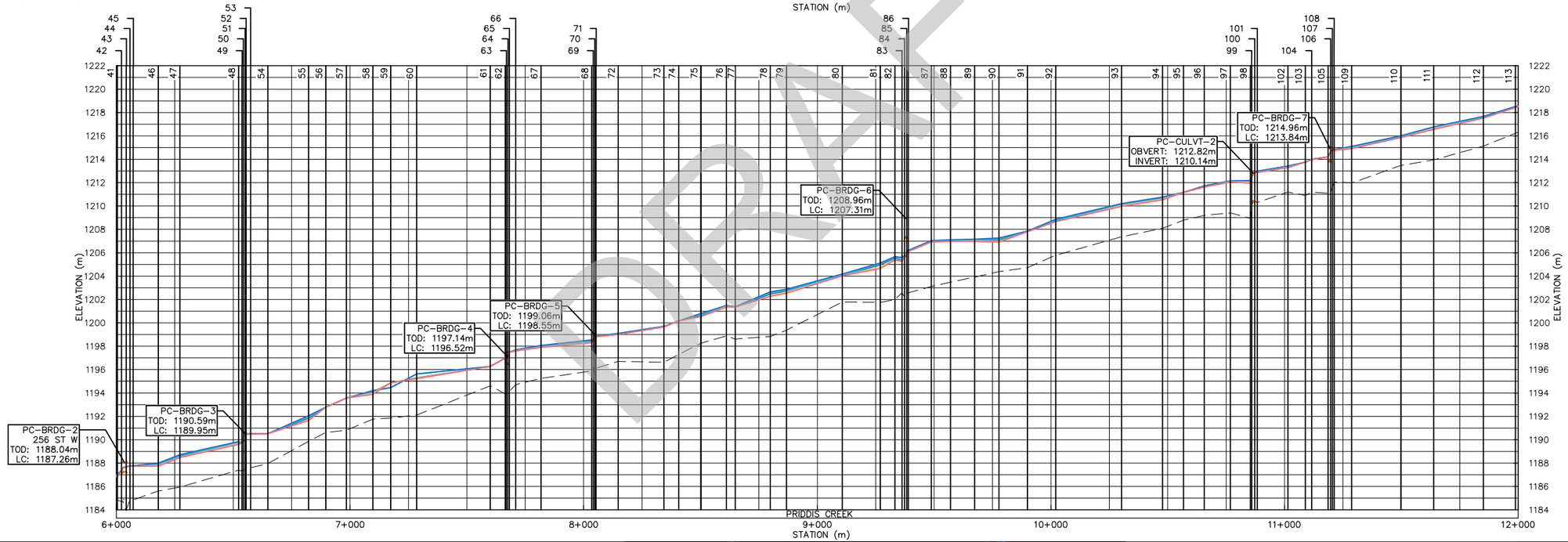


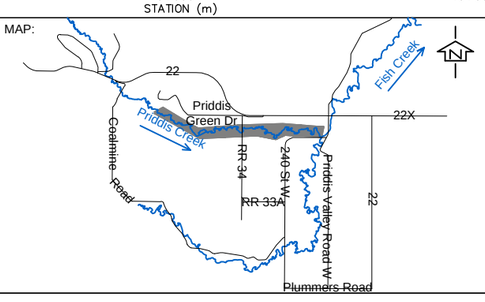



ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL AND OVERBANK SENSITIVITY PROFILES - PRIDDIS CREEK
STA 0+000 TO 12+000

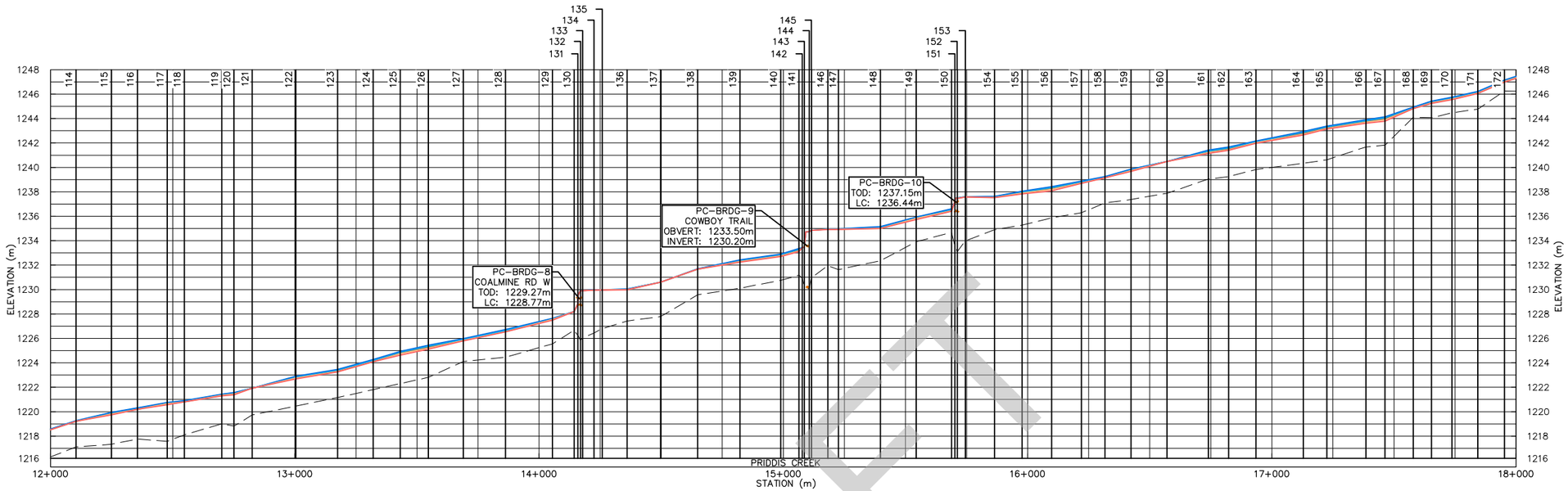
SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

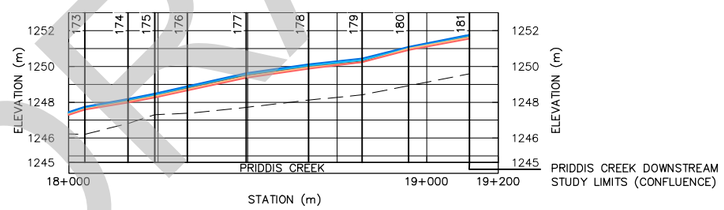
DATE: February 2018

QA/QC:

Stantec

FIGURE 14.0



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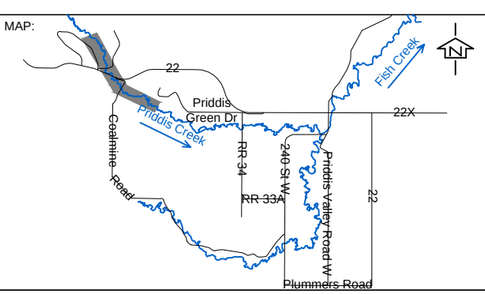
ORIGINAL SHEET - ANSI B 11"x17"

LEGEND:

- SURVEYED THALWEG
- MANNING'S ROUGHNESS +20%
- MANNING'S ROUGHNESS +10%
- MANNING'S ROUGHNESS
- MANNING'S ROUGHNESS −10%
- MANNING'S ROUGHNESS −20%
- HEC-RAS SECTION
- BRIDGE TOP OF DECK (TOD)
- BRIDGE LOW CHORD (LC)
- CULVERT OBVERT
- CULVERT INVERT

LOCATION MAP:




Alberta Government

Priddis River Hazard Study

CHANNEL AND OVERBANK SENSITIVITY PROFILES - PRIDDIS CREEK
STA 12+000 TO 19+250

SCALE:
H 1:20 000 V 1:400
0 200 600 1000m
0 4 12 20m

DATE: February 2018

QA/QC:

Stantec

FIGURE 15.0

# Appendix D OPEN WATER FLOOD INUNDATION MAP LIBRARY

(Provided as a separate document)