APPENDIX 4

TETRA TECH EBA

December 18, 2014

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FILE: ENVMIN03009-01
Via Email: david@canadianzinc.com

Canadian Zinc Corporation
Suite 1710 - 650 West Georgia Street
Vancouver, BC V6B 4N9

Attention: Mr. David Harpley

Subject: Stream Crossing Design Water Levels for Prairie Creek Mine Access Road
Northwest Territories

1.0 INTRODUCTION

Tetra Tech EBA Inc, (Tetra Tech) was retained by Canadian Zinc Corporation (CZN) in November 2014 to determine design open water levels for 18 stream crossings along the access road from the CZN Prairie Creek Mine to the Liard Highway #7 east of Nahanni Butte, NWT. This work generally follows the methods used for a similar study conducted by Tetra Tech in 2012 for seven initial crossings for the same road. The study was performed under the direction of Mr. Bill Rozeboom who has provided water resources engineering support for the Prairie Creek Mine Project since 2008, and has participated in aerial and ground inspections of the access road in the mine vicinity and along Sundog Creek.

The majority of the crossings that are evaluated in the present work correspond to streams with potential fisheries habitat usage, based on prior analyses and aquatic surveys in 2014 by Hatfield Consultants. The aquatic surveys were generally made at the proposed crossing location, but in some cases, alignment adjustments also made in 2014 have moved the road to be either just upstream or downstream of the survey locations.

The road alignment revisions have altered the locations of the road Kilometer Post (KP) markers which measure distance from the mine site at KP 0. The KP markers used for aquatic surveys in 2014 and prior years are based on the original alignment. To minimize confusion, this report identifies stream crossings according to the KP markers that correspond to the 2014 alignment, and also presents the Hatfield KP markers for each stream (for which aquatic surveys were done in 2014). A summary of the 18 stream crossings is given below, with KPs for both the 2014 alignment and the Hatfield surveys, where applicable.

1. KP 6.1 Casket Creek
2. KP 13.4 Funeral Creek
3. KP 25.3 Sundog Trib.
4. KP 28.4 Sundog Creek (Hatfield KP 28.4)
5. KP 39.4 Sundog Trib. (Hatfield KP 39.8)
6. KP 46.2 Polje Trib. (Hatfield KP 47.0)
7. KP 49.6 Polje Trib. (Hatfield KP 50.2)
8. KP 53.5 Polje Trib. (Hatfield KP 54.3)
9. KP 87.2 Old Road at Tetcela Trib.

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10. KP 89.7 Old Road at Tetcela Mainstem
11. KP 112.4 Grainger Trib. (Hatfield KP 122.8)
12. KP 123.4 Grainger River (Hatfield KP 123.7)
13. KP 124.8 Grainger River (Hatfield KP 125.1)
14. KP 131.2 Grainger Trib. (Hatfield KP 131.3)
15. KP 133.2 Grainger Trib. (Hatfield KP 133.7)
16. KP 134.9 Grainger Trib. (Hatfield KP 135.6)
17. KP 136.5 Grainger Trib. (Hatfield KP 136.7)
18. KP 154.9 Liard Trib. (Hatfield KP 154.4)

2.0 DESIGN APPROACH

Design water levels were determined on the basis of HEC-RAS modelling of open water 100-year peak flows, based on normal flow for a single cross section at the approximate crossing centreline location. Flows were estimated using the same regional analysis approach developed for the 2012 study. The design water levels are preliminary results for existing conditions, without hydraulic effects of road embankments, abutments, or piers which may be proposed at a future stage of design.

For most crossings, channel geometry and gradient were determined from high-resolution LiDAR elevation data obtained (flown) in June 2012 with 15 cm vertical accuracy and horizontal point density at around one point per square metre. Because of alignment changes, LiDAR data were not available for the last three crossings at KPs 134.9, 136.5, and 154.9. Unless otherwise stated, the LiDAR-derived section for each crossing was used as is, without adjustment for bathymetry (depth below the LiDAR surface elevation), which is a conservative approach for estimation of high water levels.

At the final three crossings, hydraulic analyses for each stream were made at a downstream location for which LiDAR data were available, generally within 400 m of the road crossing. Channel gradients and channel location in the road crossing vicinity were estimated on the basis of 1:50:000 scale NTS mapping and digital elevation models, and supplemented by Google Earth imagery. The water surface elevations computed for the downstream sections cannot be applied directly to the road crossing location, but the computed flow depths and velocities should be similar.

Estimates of Manning “n” hydraulic roughness values for the channel and floodplain areas were made on the basis of photographs provided by CZN, which showed the site conditions. These included aerial reconnaissance images taken on various dates and ground photographs taken by Hatfield Consultants during site surveys in late September 2014.

As indicated, the water levels provided herein are for open water flow conditions. There is a possibility of ice-influenced high water levels that could be higher than occur for open water conditions. Canadian Zinc has reported that the 2014 field survey program had specifically looked for, but did not find, out-of-channel high water marks such as debris or damaged vegetation at the crossing locations. Although there is no evidence at this time that ice conditions will govern the design high water levels, the potential for ice effects should be considered further at the time of final design.

3.0 100-YEAR DESIGN DISCHARGES

Tributary basin areas for each of the crossing locations were determined from digital analysis of GeoBase 1:50,000 scale Canadian Digital Elevation Data derived from the National Topographic Data Base. The watershed analysis was done using Global Mapper software, with a visual inspection of the delineation results against 1:50,000 scale Toporama mapping to confirm that the results were reasonable and to make adjustments as necessary. The watersheds for two streams with very small basin areas (less than 1.5 km^2) were adjusted on the basis of drainage patterns which could be inferred from Google Earth imagery.

Design discharges were estimated on the basis of a regional hydrology analysis completed for the 2012 design assessment using Water Survey of Canada peak flow data for Prairie Creek at Cadillac Mine (495 km^2), Flat River near the Mouth (8560 km^2), and South Nahanni River above Virginia Falls (14500 km^2). A best fit trend line of drainage area to 100-year discharge was determined on the basis of these three stations and used to estimate 100-year discharges at the crossing locations. The trend line equation is given below, with discharge (Q) in m^3/s and basin area (A) in km^2.

$$Q_{100} = 1.888\ A^{0.751}$$

Further analysis of the peak flow records for the same three streams was performed to determine equations with multiplier coefficients which can be used to convert the 100-year flows (proposed for the design of the road crossings) to 10-year and 250-year flows identified in the Mackenzie Valley Review Board's September 2014 Terms of Reference for the Prairie Creek All Season Road and Airstrip. The equations are given below, e.g., the 10-year flow is estimated as 0.7 times the 100-year flow, together with the range of original coefficients to indicate the accuracy of the estimate.

$Q_{10} = 0.70 \times Q_{100}$ (individual coefficients ranged from 0.57 to 0.81)

$Q_{250} = 1.15 \times Q_{100}$ (individual coefficients ranged from 1.05 to 1.21)

Figure 1 shows the 2014 access road alignment together with the extents of the watersheds that drain to each of the crossings being assessed, and the locations of corresponding aquatic survey sites. Basin area sizes and design flows for each of the crossings are presented in Table 1 together with computed design water level and flow velocity information.

The crossings have watersheds which range in size from less than 1.2 km^2 to a maximum of 727 km^2. In contrast, the regional equation being used to estimate 100-year design flows is based on frequency analyses of relatively large basins for which suitable long-term flow records are available, the smallest of which is the 495 km^2 Prairie Creek basin. The accuracy of the regional analysis equation is uncertain for the very small drainages which make up about one-half of the streams being assessed. The hydrology and hydraulics of these small streams should be re-assessed on a site-by-site basis if the crossing designs for these locations are sensitive to the estimated design flows and water levels.

The watershed for Polje Tributary at Road KP 53.5 (Hatfield KP 54.3) originates from the floodplain area of the Polje Creek main channel. Flood flows and water levels in this tributary channel will therefore be associated with Polje Creek main channel watershed, rather than an independent watershed. Design flows and water levels for the Polje Creek main channel, including the tributary, were assessed in the 2012 study and are carried forward into the present report.

4.0 DESIGN 100-YEAR FLOWS AND WATER LEVELS

The results of the hydrologic and hydraulic analyses for each of the 18 road crossings are summarized and presented in the Table and Figures sections at the end of this report. Site photographs are included for reference in an additional section. In each of the summary sections — Table, Figures, Photographs — results are presented in ascending order based on the 2014 road alignment KP at each crossing.

Table 1 presents a summary of the basin areas, design flows, and hydraulic characteristics for each stream at or near the crossing vicinity.

Two figures are presented for each crossing to show (1) its location and (2) the HEC-RAS model output plot with the design flood water level, energy grade line, and extent of inundation. The plan view location figures are based on CZN 2012 LiDAR imagery where available, and Google Earth imagery otherwise. The figures show the 2014 access road alignment, are annotated to show the direction of flow, and show the location where a single channel cross section to assess channel hydraulic parameters was "cut" from the LiDAR-derived elevation model. All cross sections are presented with a downstream orientation, i.e., looking downstream. At the few sites where the Hatfield 2014 aquatic surveys were offset from the 2014 road alignment, the survey site locations are explicitly labelled. Labels are not provided for the majority of sites for which the aquatic surveys were at the 2014 road crossing location.

The figures for each crossing are presented with expanded captions to identify any unique or complicating features for each site. The combination of Table 1 and figures with expanded captioning is presented in lieu of separate report sections for each crossing which would duplicate or otherwise present the same information.

As stated above, the design water levels presented in this report are preliminary values for open water flow conditions only, using a simplified model approach. Further consideration of ice effects which may affect hydraulic performance is recommended, as is additional modelling to assess effects of road embankments, abutments, or piers which may be proposed at a future stage of design.

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Canadian Zinc Corporation and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Canadian Zinc Corporation, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement.

6.0 CLOSURE

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

Sincerely,
Tetra Tech EBA Inc.

Dec 18, 2014

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Date Dec 18 2014
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TABLE

Table 1 - Summary of Design Flows and Water Levels

									100-year flow computed hydraulic parameters						
2014 Road KP	Stream Name	Type	Basin Area, km^2	100-yr Q m^3/s	Slope m/m	Manning "n" channel	Manning "n" overbank	Min xsec elev, m	Water Surface width, m	Water Surface elev, m	Water Surface depth, m	Energy Grade elev, m	Energy Grade depth m	Velocity m/s	Notes
6.1	Casket Creek	alluvial fan	15.2	14.6	0.027	0.055	0.055	922.24	11	923.17	0.93	923.42	1.18	2.2	Analysis assumes water confined to left flowpath at existing bridge
13.4	Funeral Creek	incised alluvial	1.5	2.6	0.113	0.055	0.07	1241.39	6 to 8	1241.78	0.39	1242.04	0.65	2.4	Top width from outer bank to outer bank is 8 m.
25.3	Sundog Trib.	incised bedrock	5.8	7.1	0.090	0.055	0.07	1076.78	8	1077.3	0.52	1077.66	0.88	2.7	--
28.4	Sundog Creek	split flow	40.2	30.2	0.023	0.055	0.055	985.32	36	986.3	0.98	986.48	1.16	2.0	Top width is the sum of two channels over approx 50 m total width
39.4	Sundog Trib.	trib @ confluence	91.7	56.2	0.008	0.055	0.055	788.75	65	789.95	1.2	790.05	1.3	1.5	There may be additional flow from main channel if main and trib floods are coincident
	Sundog Main	main @ confluence	270.5	126.6	0.013	0.055	0.055	-	-	789.53	-	-	-	1.4	Main channel hydraulics give lower water level, so design should use tributary values
46.2	Polje Trib.	small incised	2.5	3.7	0.039	0.05	0.1	806.01	24	806.52	0.51	806.6	0.59	2.2	Small gravel-bed channel, 0.5 m wide and 0.5 m deep, with vegetated floodplain
49.6	Polje Trib.	small incised	2.3	3.6	0.038	0.05	0.1	754.8	11	755.51	0.71	755.57	0.77	1.1	Small gravel-bed channel, less than 0.5 m wide and 1 m deep, with vegetated floodplain
53.6	Polje Trib.	floodplain channel	n/a	n/a	0.002	-	0.1	707.8	-	710.4	2.6	-	-	< 1.7	Trib and main channels are hydraulically connected; WLs from 2012 main channel analysis
87.4	Tetcela Trib.	gravel channel	89.0	55.0	0.018	0.04	0.1	292.54	60	293.83	1.29	294.27	1.73	3.5	Single Xsec approach does not address rapidly varying channel width (35m u/s to 15 m d/s)
89.7	Tetcela Mainstem	gravel channel	727.0	266.1	0.003	0.03	0.1	267.93	329	270.34	2.41	270.7	2.77	3.1	main channel is about 25 m wide
122.4	Grainger Trib.	bouldery channel	11.1	11.5	0.021	0.04	0.1	547.68	32	548.44	0.76	548.63	0.95	2.9	main channel is about 2 m wide
123.4	Grainger River	cobble chanel	40.0	30.1	0.009	0.03	0.1	538.47	20	539.49	1.02	539.81	1.34	2.5	main channel is about 10 m wide
124.8	Grainger River	cobble chanel	41.5	31.0	0.020	0.03	0.1	511.85	41	512.61	0.76	513.09	1.24	3.2	top width given for main channel only
131.2	Grainger Trib.	small incised	2.2	3.4	0.066	0.06	0.1	612.25	7	612.87	0.62	613.13	0.88	3.0	--
133.2	Grainger Trib.	small incised	3.7	5.0	0.042	0.06	0.1	622.2	29	622.8	0.6	622.87	0.67	1.5	--
134.9	Grainger Trib.	small incised	3.4	4.8	0.074	0.06	0.1	-	-	-	0.49	-	0.64	2.8	Road crossing is out of LIDAR range; cross section taken about 300 m downstream
136.5	Grainger Trib.	small incised	1.2	2.1	0.082	0.06	0.1	-	-	-	0.47	-	0.71	2.7	Road crossing is out of LIDAR range; cross section taken about 400 m downstream
154.9	Liard Trib.	small incised	1.1	2.1	0.097	0.06	0.1	-	-	-	0.43	-	0.7	2.9	Road crossing out of LIDAR range; cross section taken about 300 m downstream

Notes: 100-year discharges estimated by regional regression equation, Q100 = 1.888 A^0.751
Energy elevations and depths refer to the energy grade line; water elevaton plus velocity head
Velocity refers to main channel velocity.

FIGURES

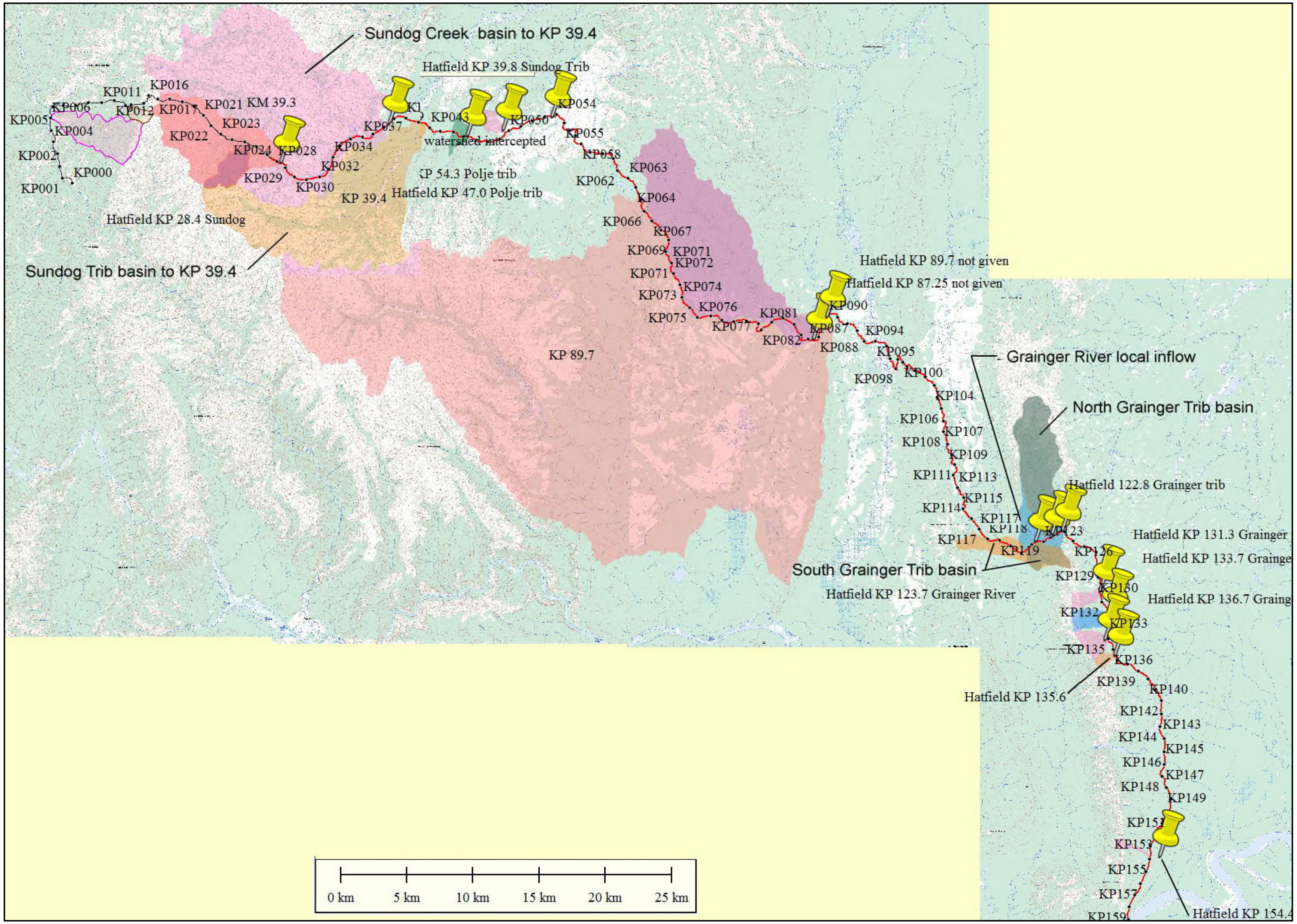

Figure 1: Prairie Creek Mine Access Road. 2014 Alignment with Kilometer Post (KP) markers, Hatfield 2014 Aquatic Survey Sites, and Watersheds to Road Crossings.

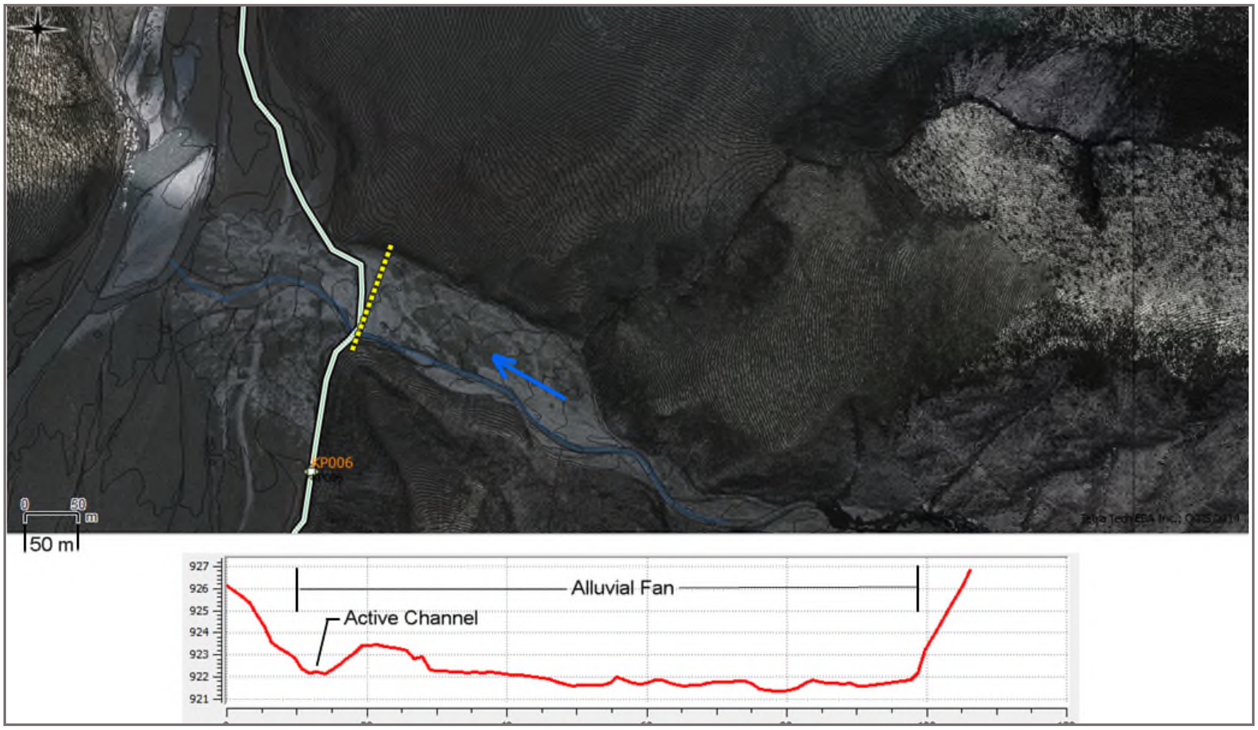

Figure 2: KP 6.1, Casket Creek, 2014 road alignment shown on 2012 orthophoto image. Channel cross section view taken at yellow dashed line showing full extent of alluvial fan, viewing downstream.

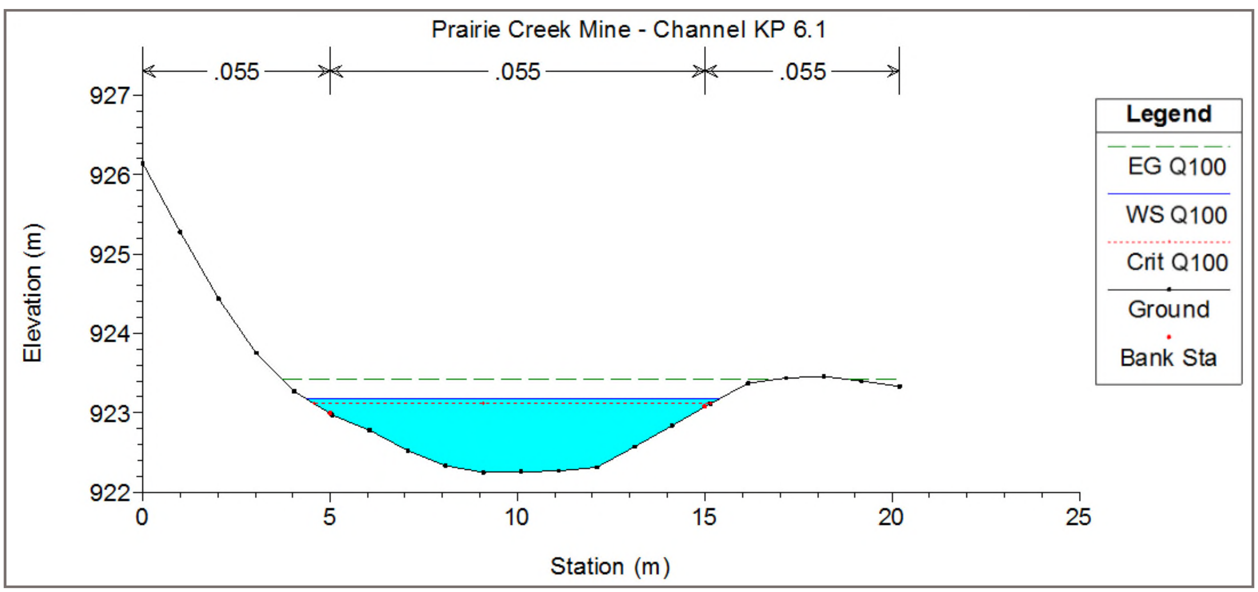

Figure 3: KP 6.1, Casket Creek, HEC-RAS model result for 100-year flood. Results shown are for scenario in which flow is confined to the presently active main channel on the left side of the alluvial fan where a bridge presently exists.

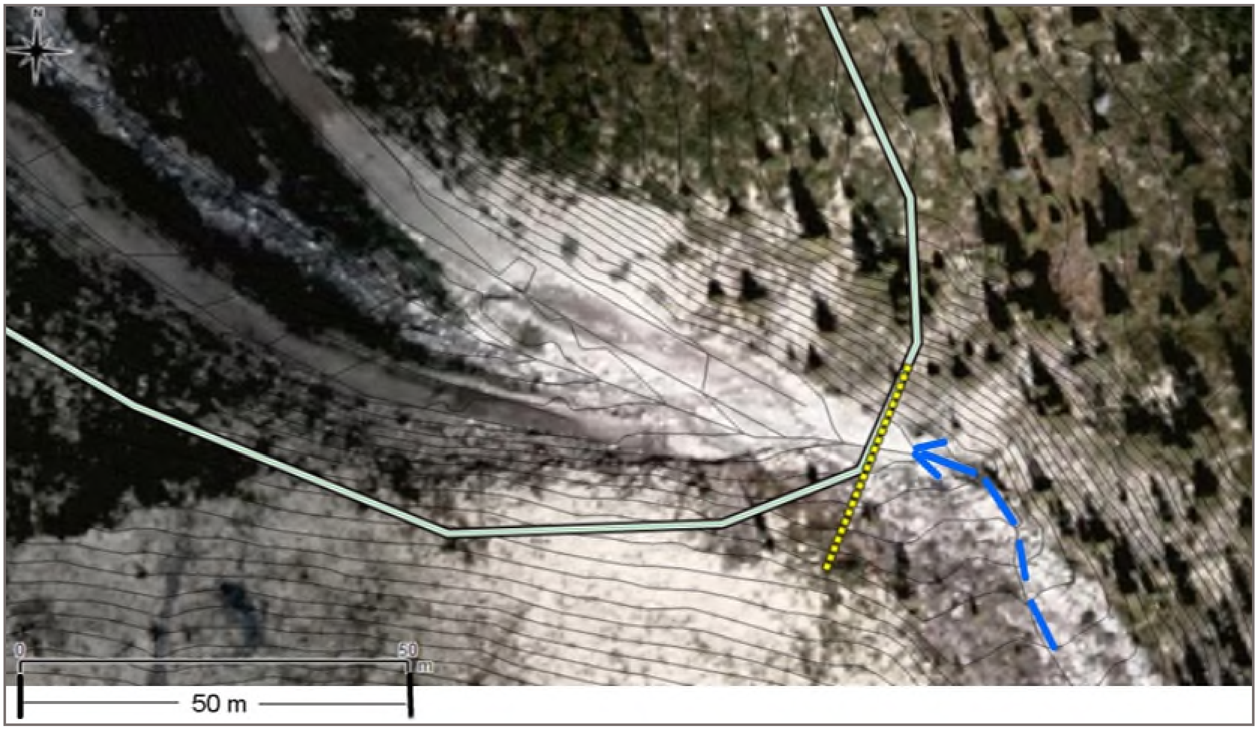

Figure 4: KP 13.4, Funeral Creek. 2014 road alignment shown on 2012 orthophoto image. Flow is right to left. Channel cross section view taken at yellow dashed line viewing downstream.

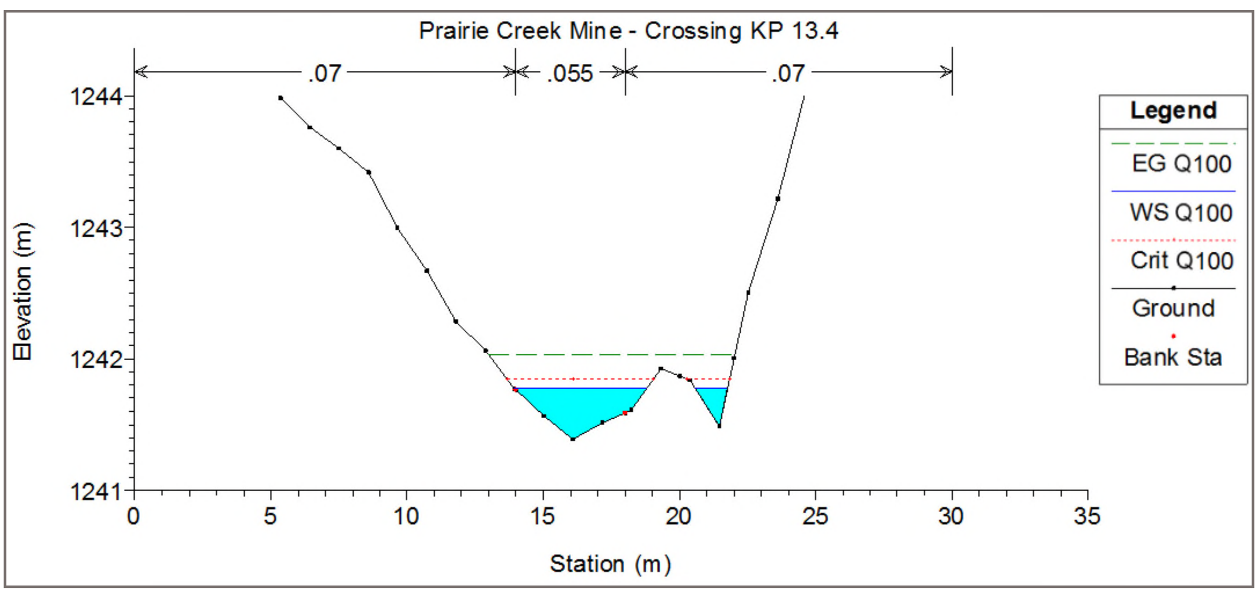

Figure 5: KP 6.1, Funeral Creek, HEC-RAS model result for 100-year flood.

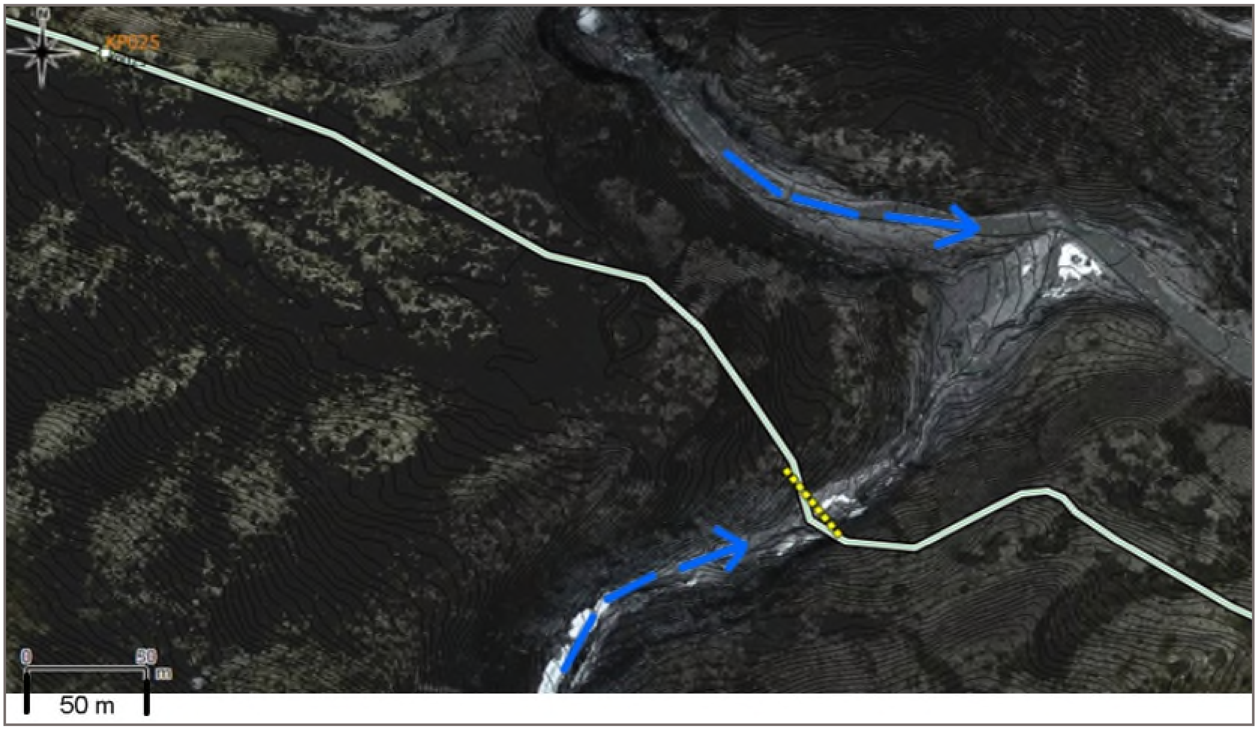

Figure 6: KP 25.3, Sundog Tributary. 2014 road alignment shown on 2012 orthophoto image. Flow is left to right. Channel cross section view taken at yellow dashed line viewing downstream.

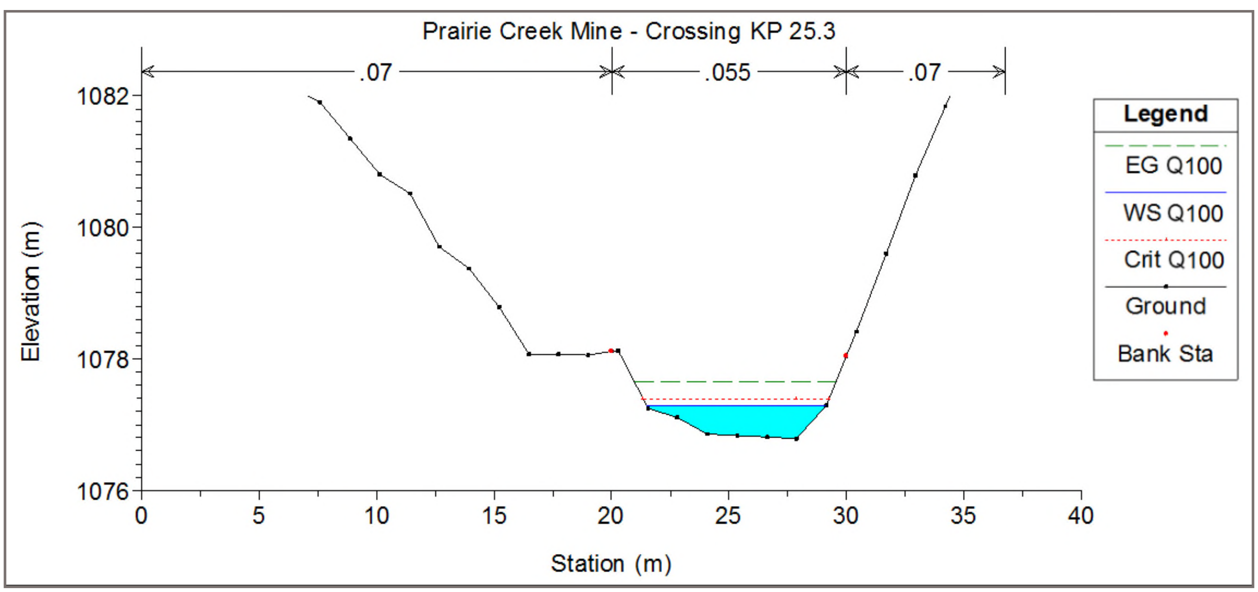

Figure 7: KP 25.3, Sundog Tributary, HEC-RAS model result for 100-year flood.

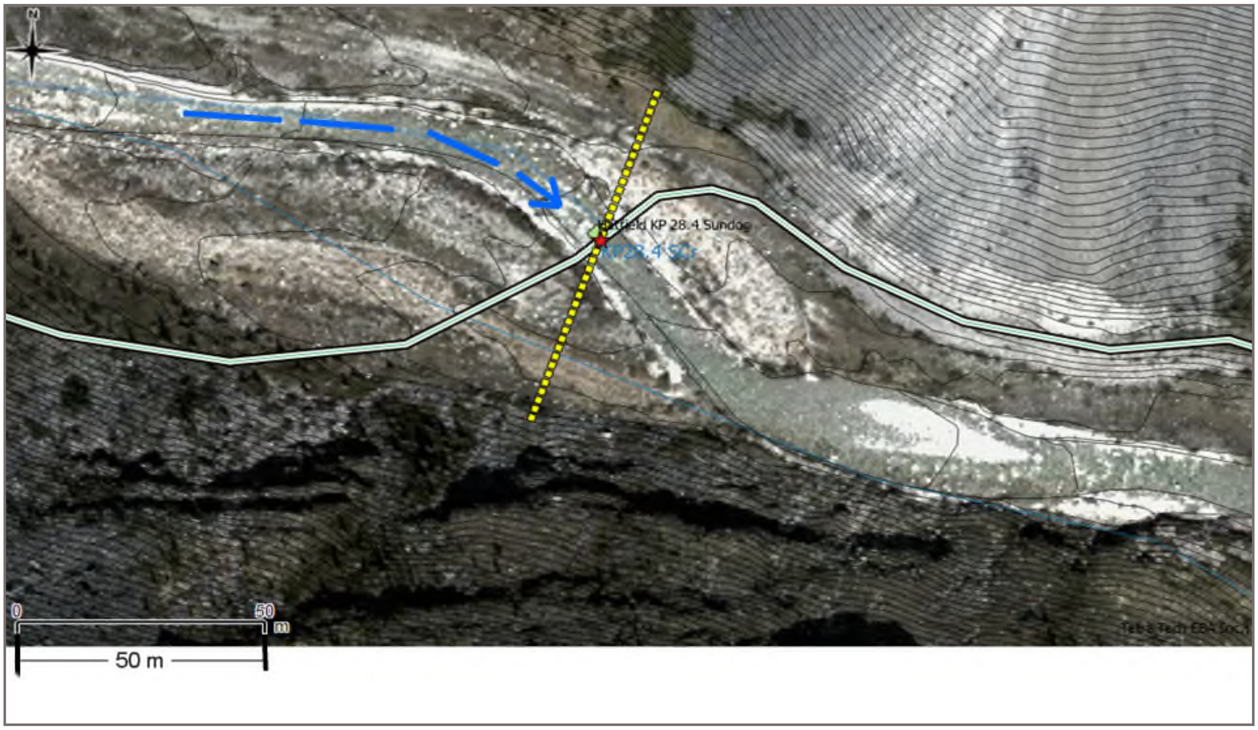

Figure 8: KP 28.4 Sundog Creek (Hatfield KP 28.4). 2014 road alignment shown on 2012 orthophoto image. Flow is left to right. Channel cross section view taken at yellow dashed line viewing downstream.

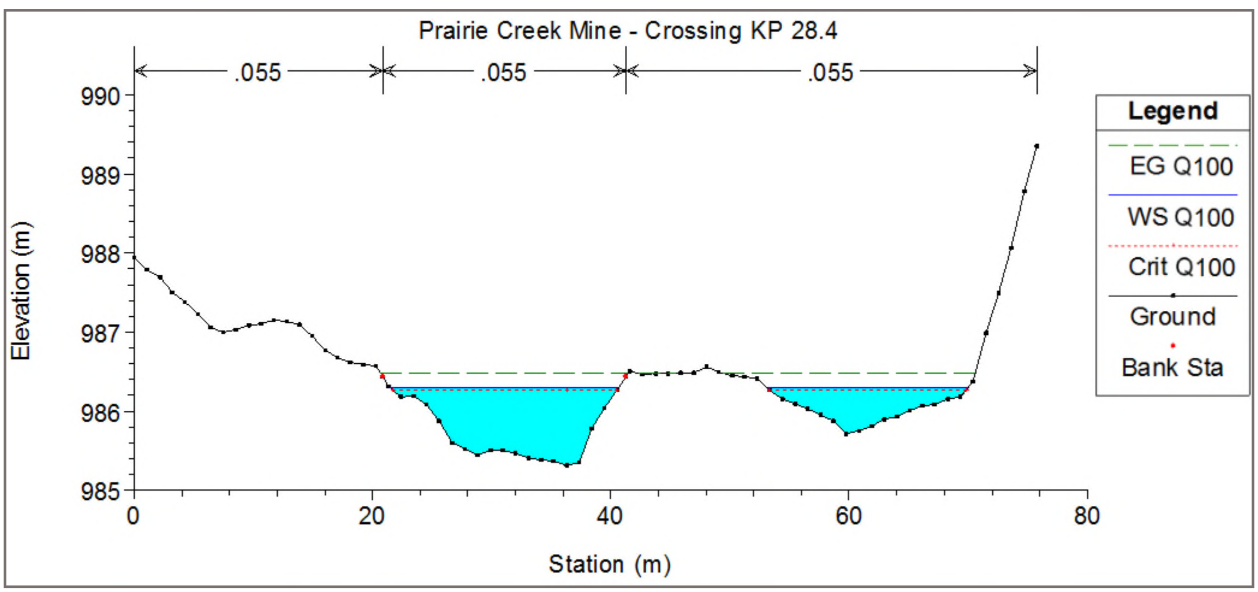

Figure 9: KP 28.4 Sundog Creek (Hatfield KP 28.4). HEC-RAS model result for 100-year flood. Note that split flow is expected under flood conditions.

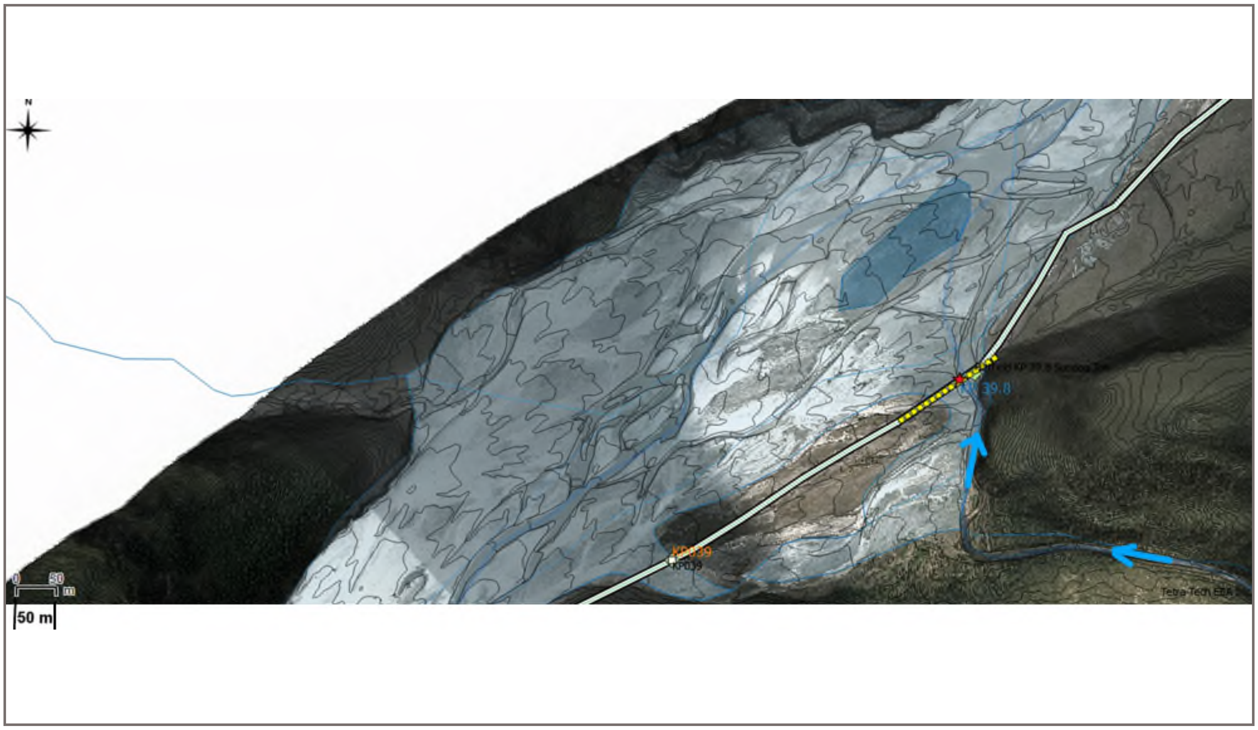

Figure 10: KP 39.4 Sundog Trib. (Hatfield KP 39.8). 2014 road alignment shown on 2012 orthophoto image. Flow is bottom to top. Channel cross section view taken at yellow dashed line viewing downstream. Note that crossing location may also receive split flow from Sundog Creek main channel.

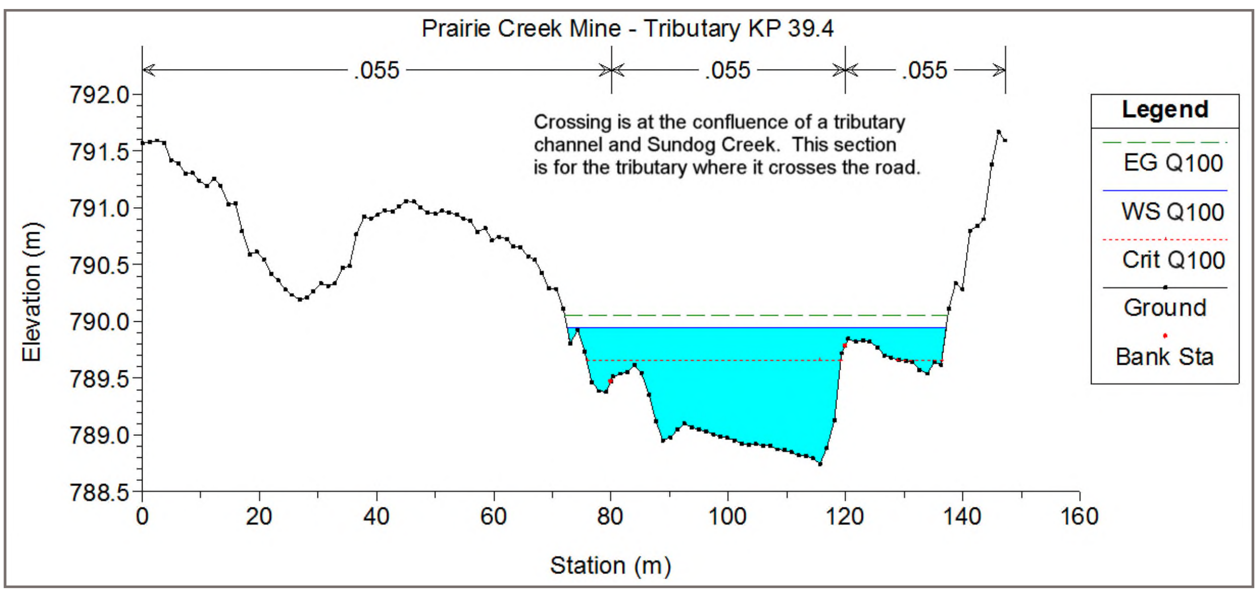

Figure 11: KP 39.4 Sundog Trib. (Hatfield KP 39.8). HEC-RAS model result for 100-year flood. See Figures 12 and 13 for water level determined for Sundog Creek main channel at this same location.

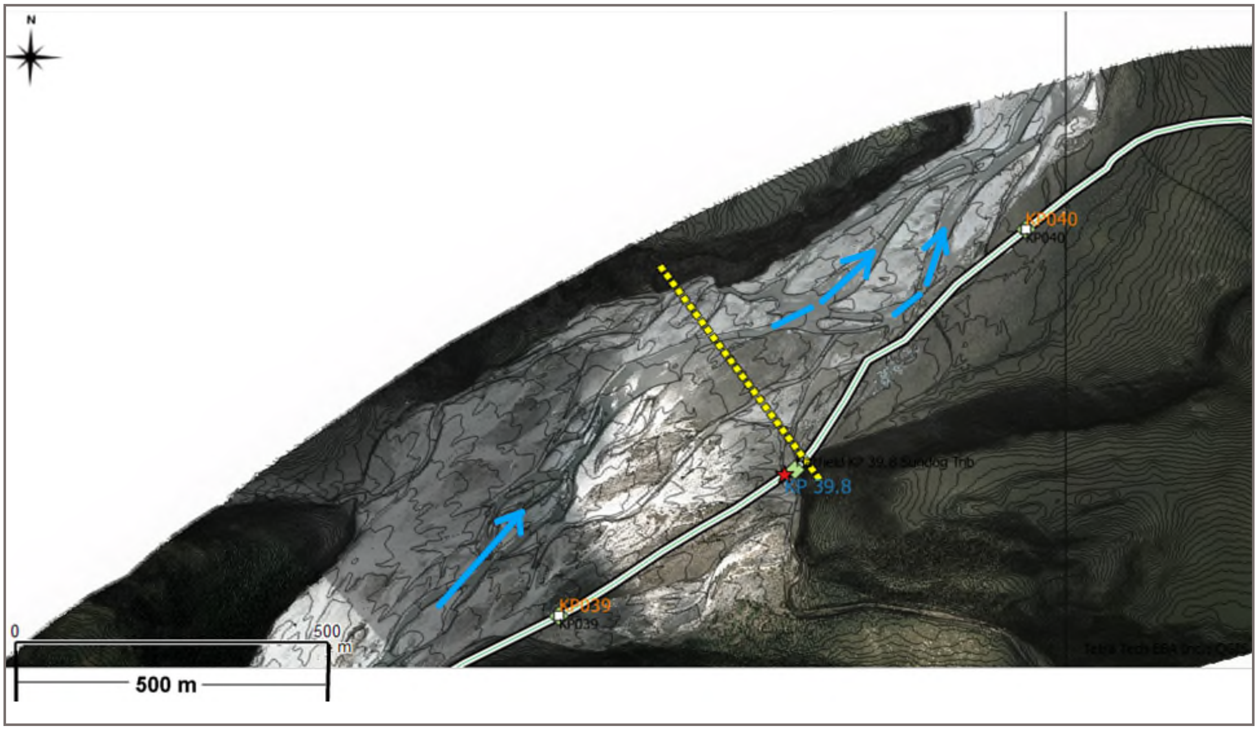

Figure 12: KP 39.4 Sundog Creek main channel at confluence with tributary (Hatfield KP 39.8). 2014 road alignment shown on 2012 orthophoto image. Flow is left to right. Channel cross section view taken at yellow dashed line viewing downstream.

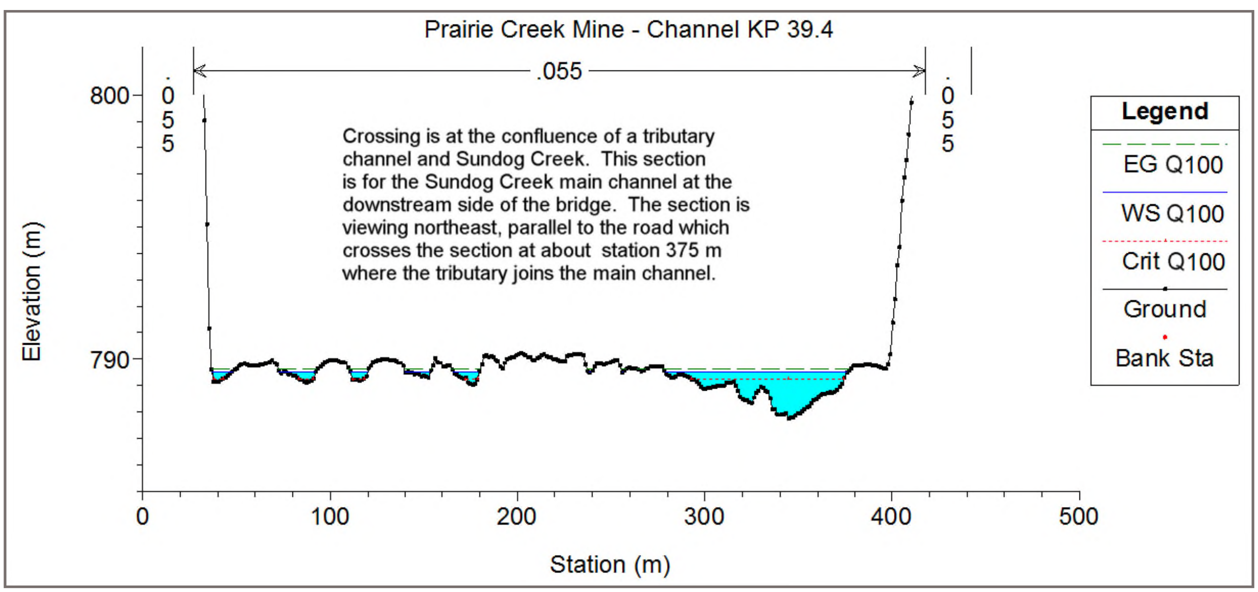

Figure 13: KP 39.4 Sundog Creek main channel at confluence with tributary (Hatfield KP 39.8). HEC-RAS model result for 100-year flood.

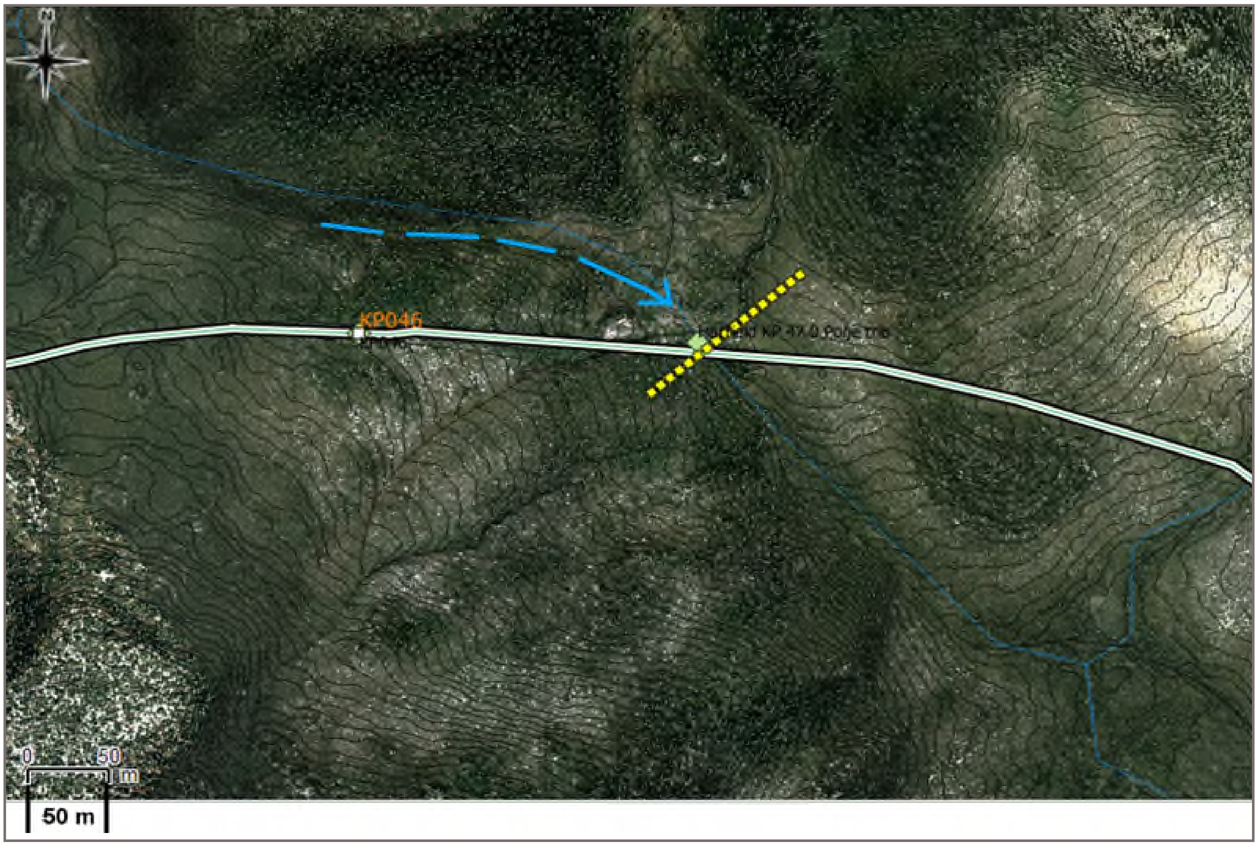

Figure 14: KP 46.2 Polje Trib. (Hatfield KP 47.0). 2014 road alignment shown on 2012 orthophoto image. Flow is left to right. Channel cross section view taken at yellow dashed line viewing downstream.

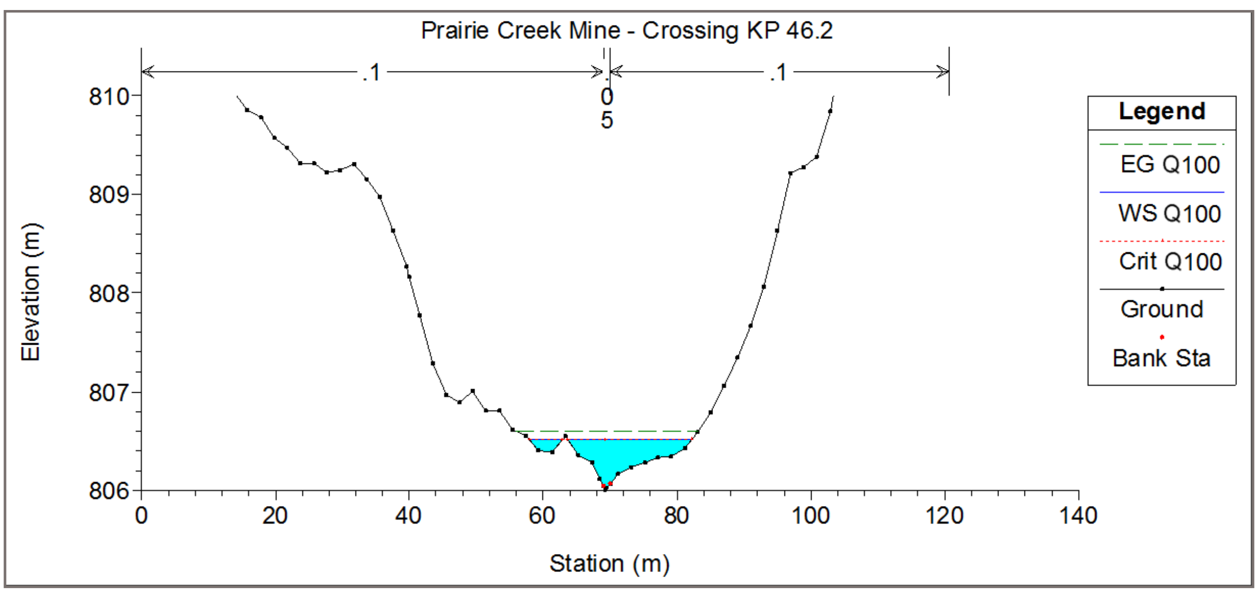

Figure 15: KP 46.2 Polje Trib. (Hatfield KP 47.0). HEC-RAS model result for 100-year flood.

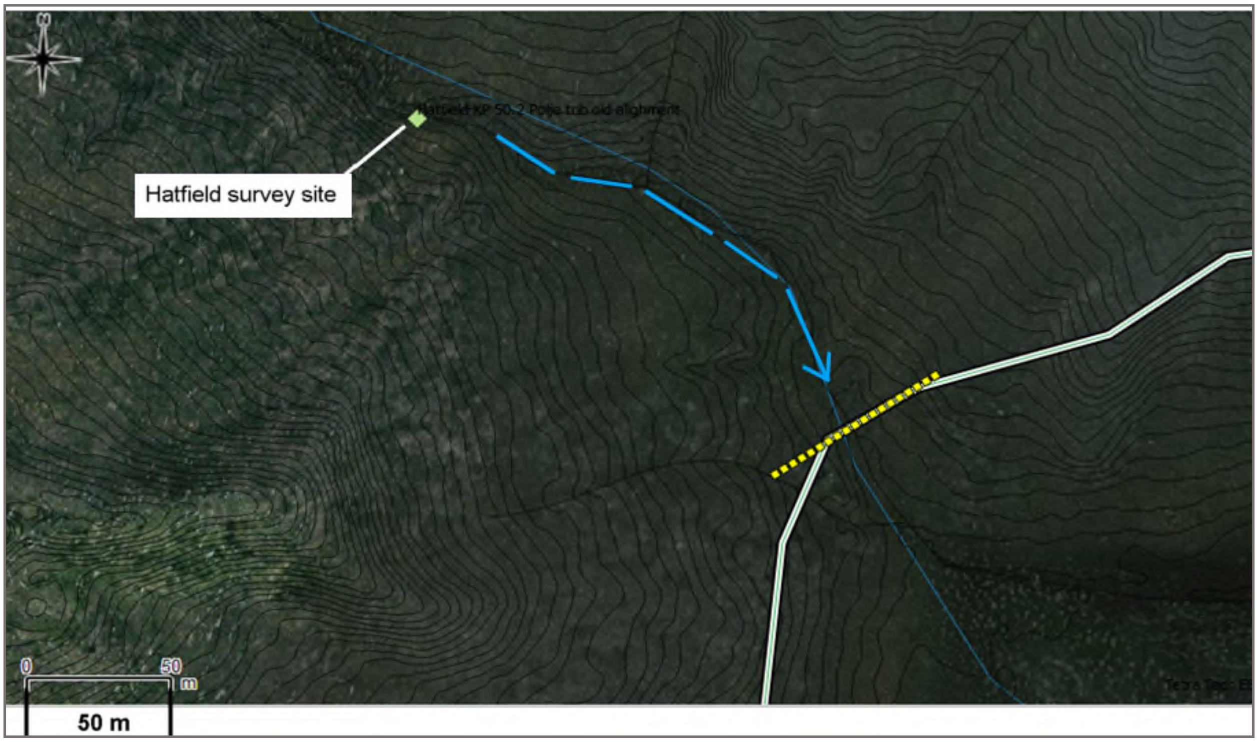

Figure 16: KP 49.6 Polje Trib. (Hatfield KP 50.2). 2014 road alignment shown on 2012 orthophoto image. Flow is top to bottom. Channel cross section view taken at yellow dashed line viewing downstream. Hatfield aquatic survey on this stream is at location shown, upstream from the 2014 road alignment.

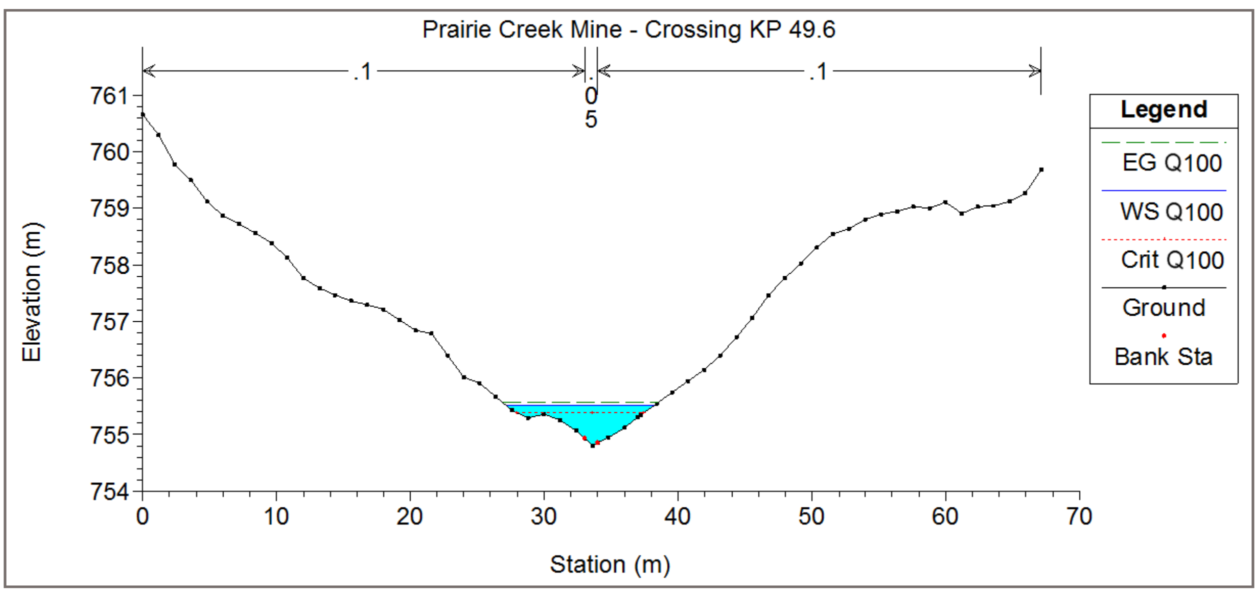

Figure 17: KP 49.6 Polje Trib. (Hatfield KP 50.2). HEC-RAS model result for 100-year flood.

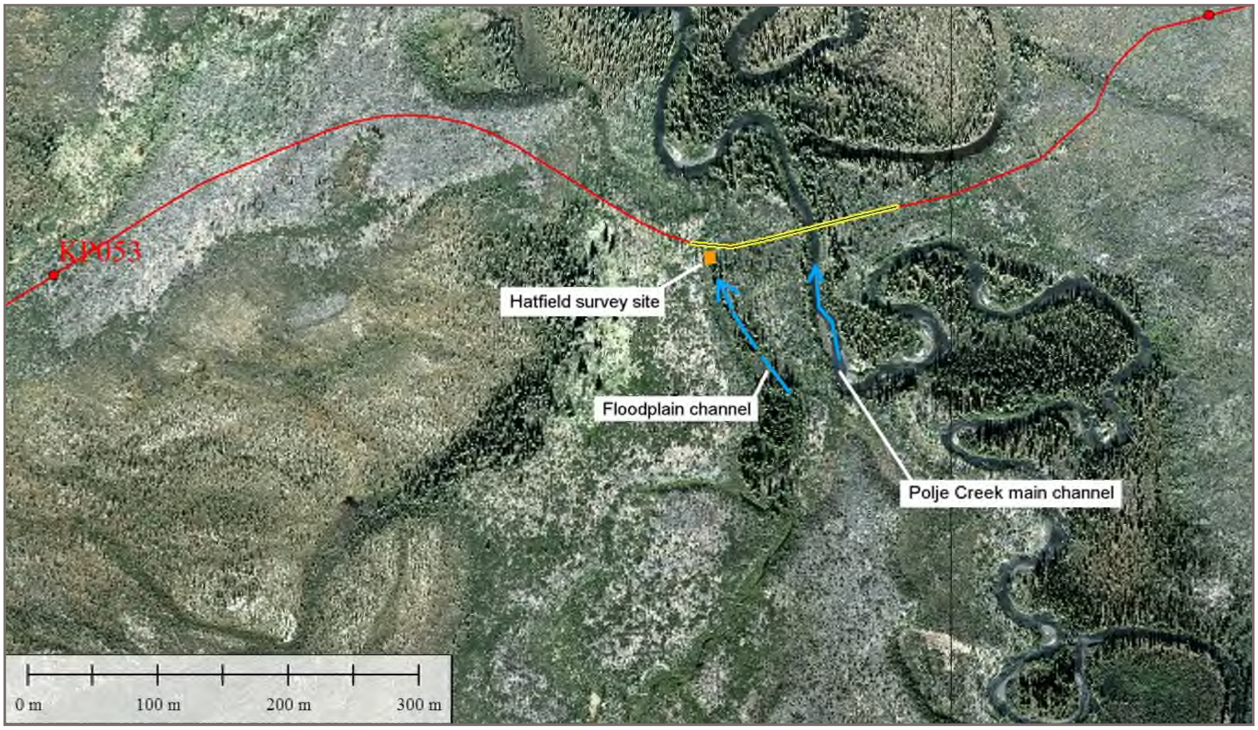

Figure 18: KP 53.6 Polje Trib. (Hatfield KP 54.3). 2014 road alignment shown on 2012 orthophoto image. Flow is bottom to top. Channel cross section view taken at yellow line viewing downstream.

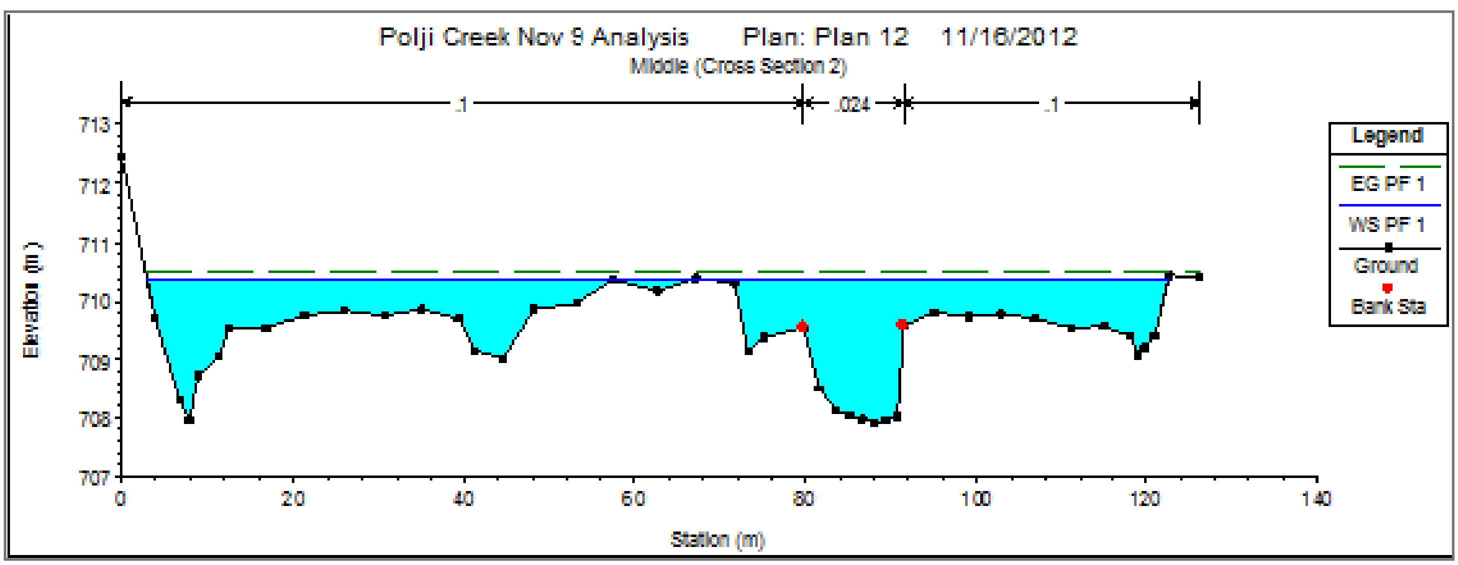

Figure 19: KP 53.6 Polje Trib. (Hatfield KP 54.3). HEC-RAS model results copied from analysis done in 2012 for 100-year flood on Polje Creek. The channel identified in Hatfield 2014 records as Polje Trib at KP 54.3 is located between about Stations 5 m and 10 m in the above figure. The main Polje Creek channel is located between about Stations 80 and 90 m.

Figure 20: KP 87.4 Tetcela Trib at Old Road. 2014 road alignment shown on 2012 orthophoto image. Flow is top to bottom. Channel cross section view taken at yellow dashed line viewing downstream.

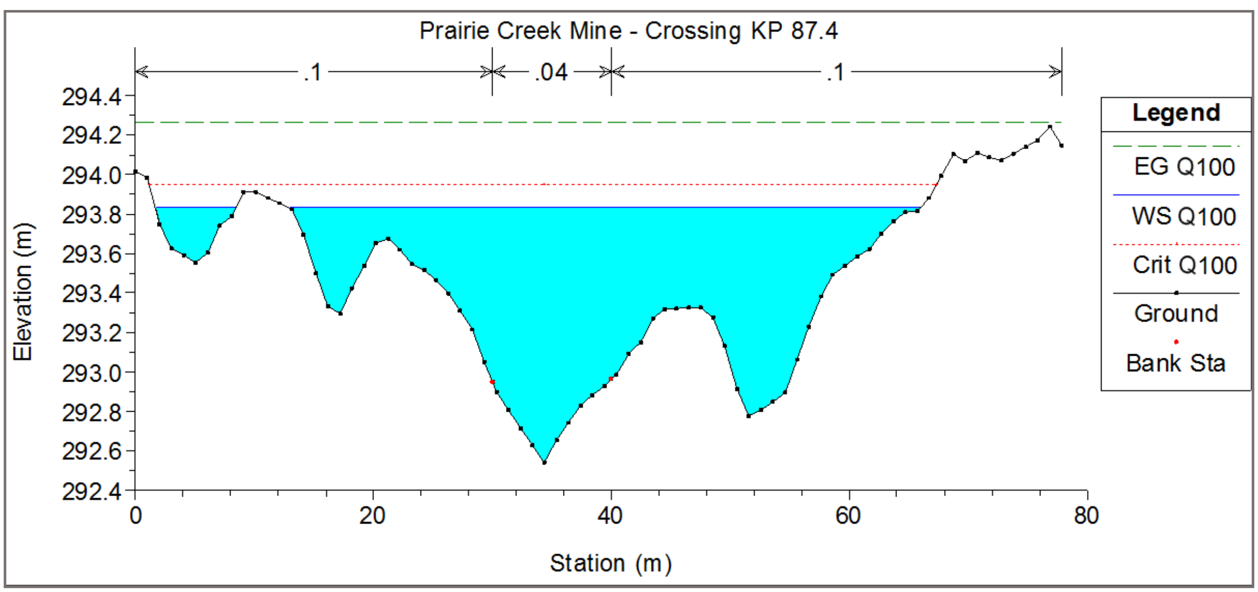

Figure 21: KP 87.4 Tetcela Trib at Old Road. HEC-RAS model result for 100-year flood. Single section methodology used for preliminary calculations may not accurately characterize flows though this reach due to rapidly-varying channel width which narrows to less than 20 m at a constriction immediately downstream from the crossing.

Figure 22: KP 89.7 Tetcela Mainstem at Old Road. 2014 road alignment shown on 2012 orthophoto image. Flow is bottom to top. Channel cross section view taken at yellow dashed line viewing downstream.

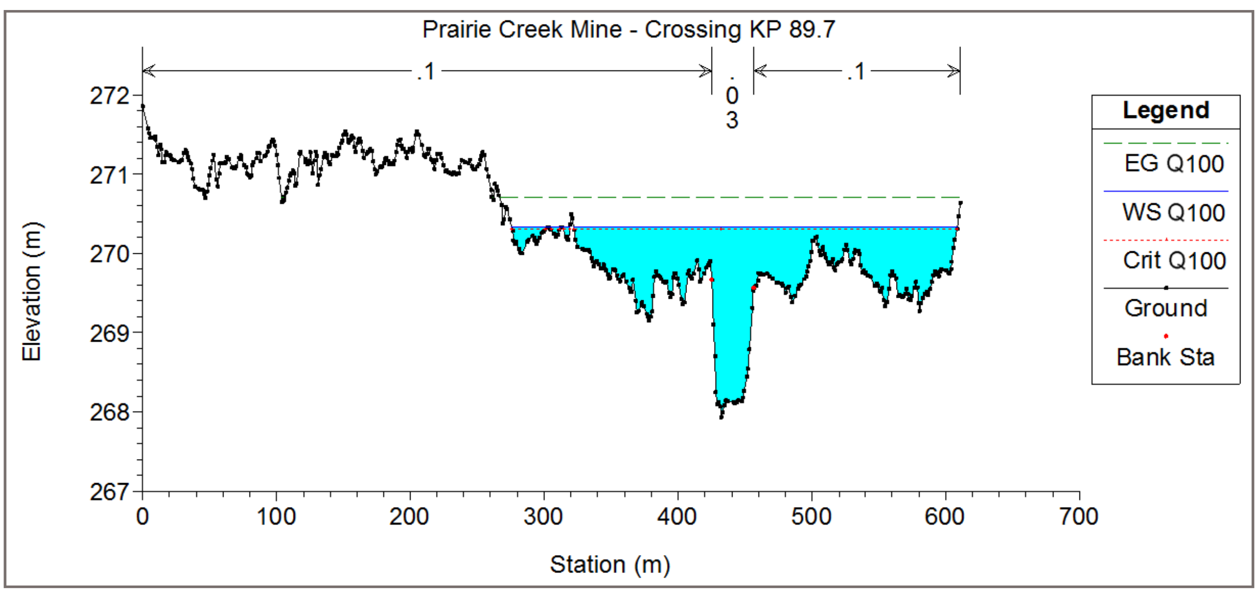

Figure 23: KP 89.7 Tetcela Mainstem at Old Road. HEC-RAS model result for 100-year flood.

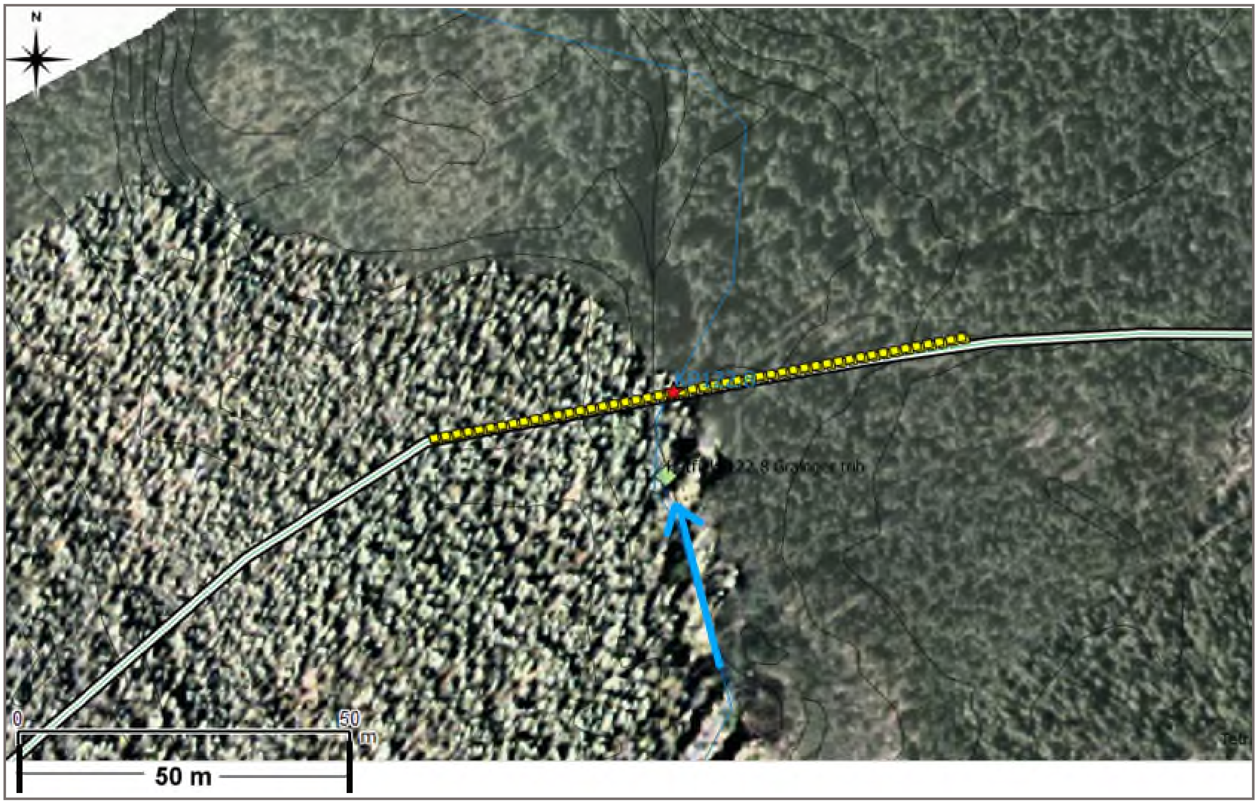

Figure 24: KP 122.4 Grainger Trib. (Hatfield KP 122.8). 2014 road alignment shown on 2012 orthophoto image. Flow is bottom to top. Channel cross section view taken at yellow dashed line viewing downstream.

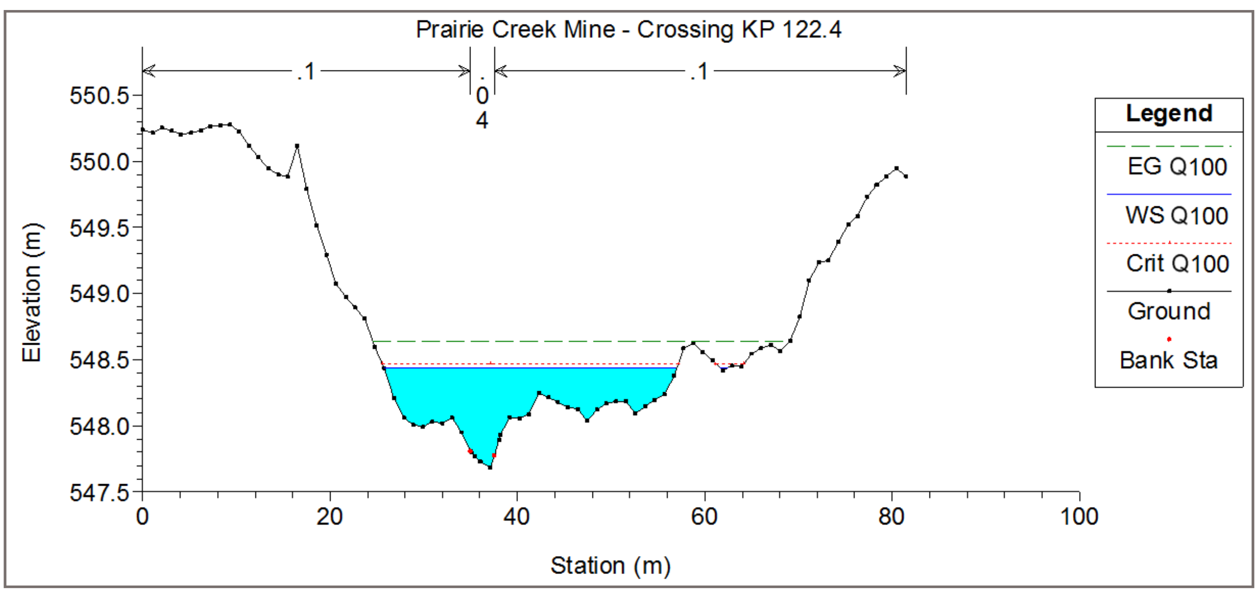

Figure 25: KP 122.4 Grainger Trib. (Hatfield KP 122.8). HEC-RAS model result for 100-year flood.

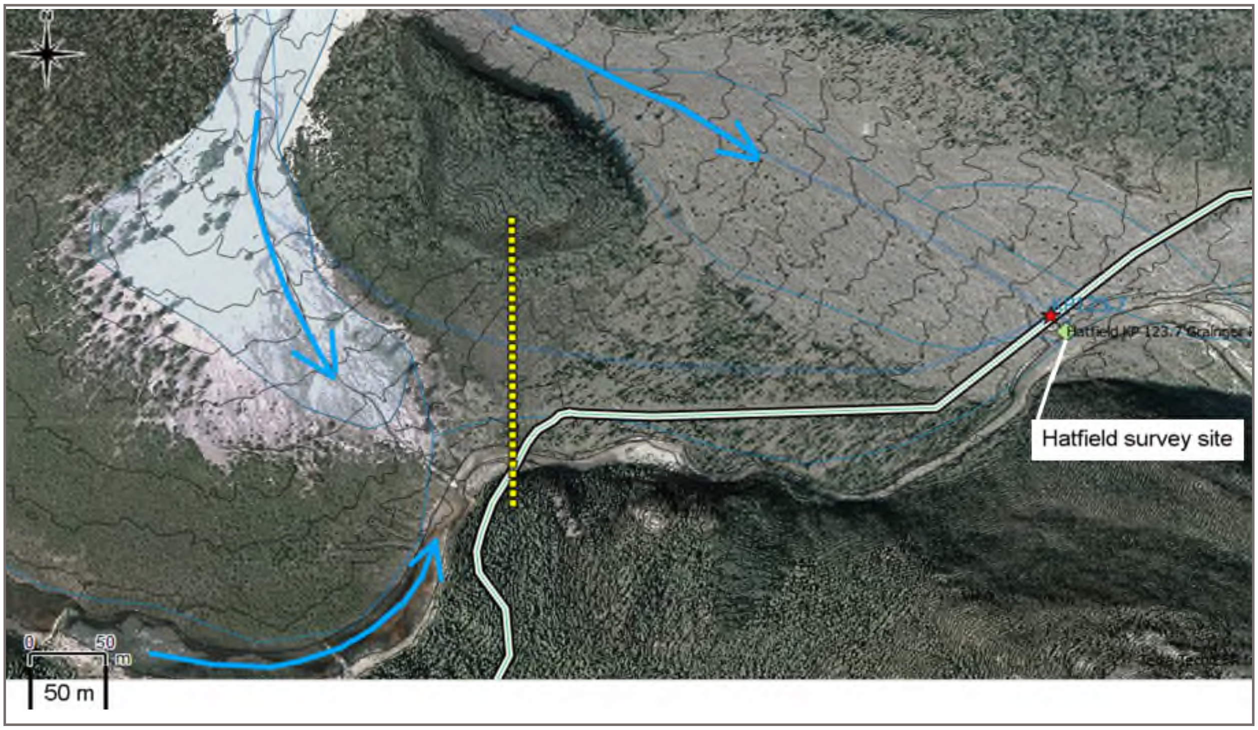

Figure 26: KP 123.4 Grainger River (Hatfield KP 123.7). 2014 road alignment shown on 2012 orthophoto image. Flow is generally left to right. Channel cross section view taken at yellow dashed line viewing downstream. The major watershed above the road crossing is from the north, and flood condition split flows are possible as indicated by the upper flow arrows. The scenario assumed for hydraulic modelling

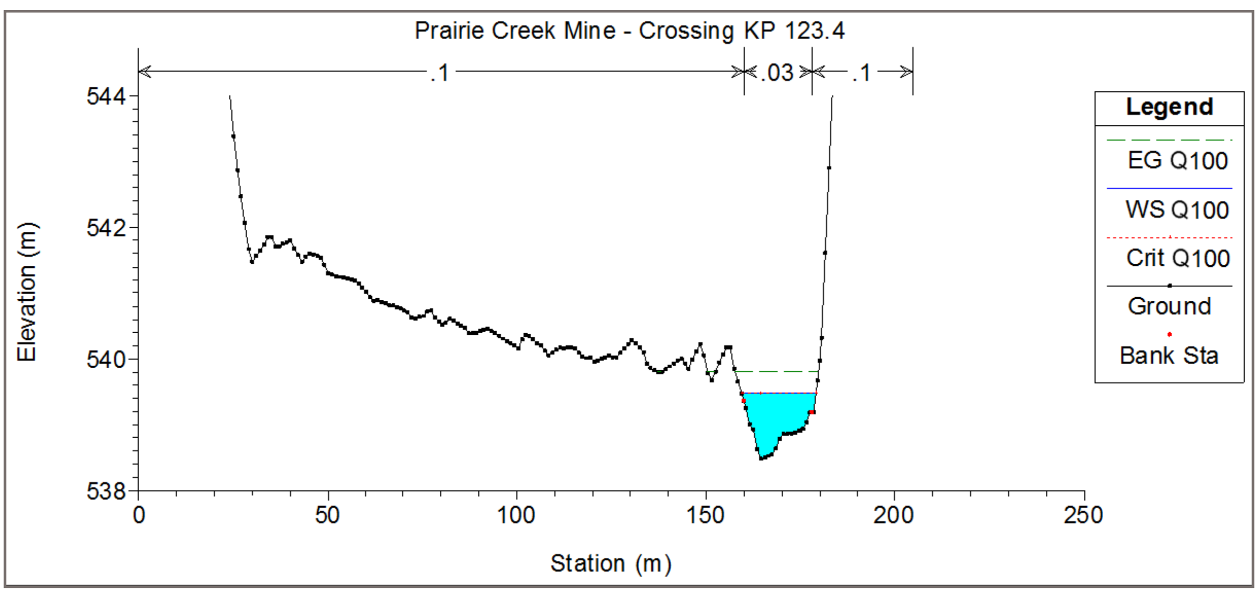

Figure 27: KP 123.4 Grainger River (Hatfield KP 123.7). HEC-RAS model result for 100-year flood.

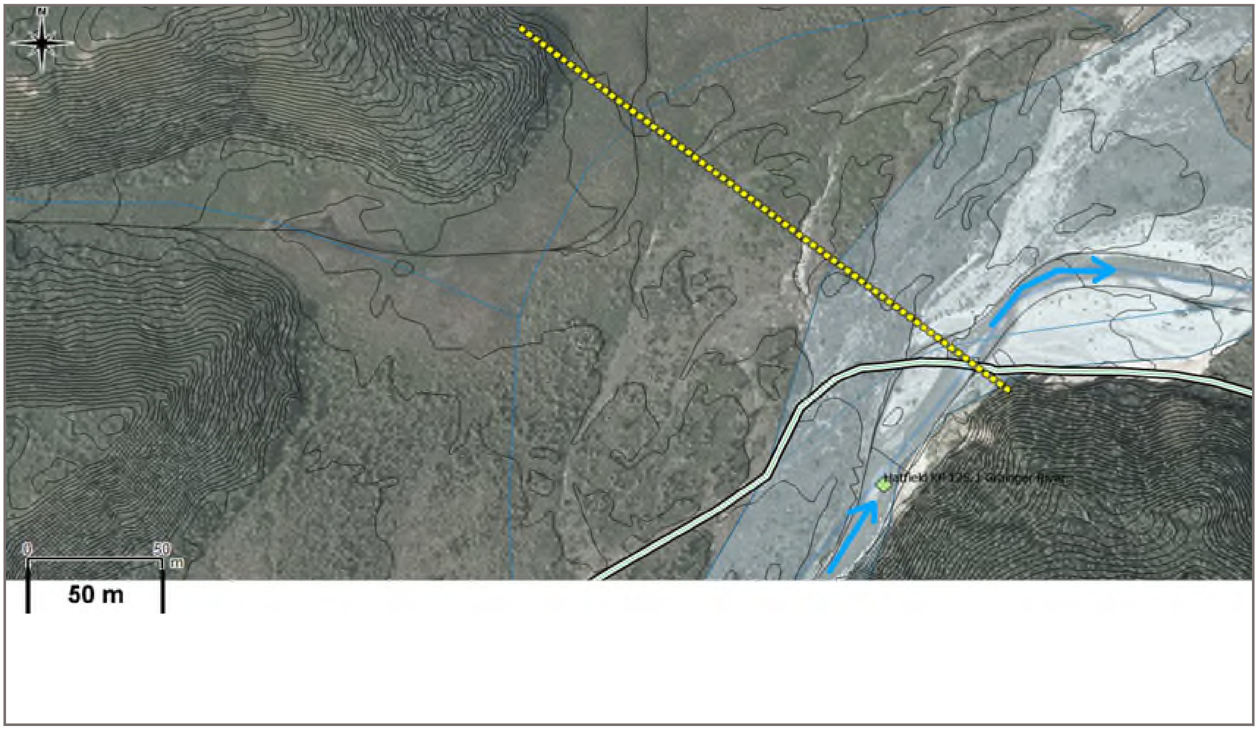

Figure 28: KP 124.8 Grainger River (Hatfield KP 125.1). 2014 road alignment shown on 2012 orthophoto image. Flow is generally left to right. Channel cross section view taken at yellow dashed line viewing downstream.

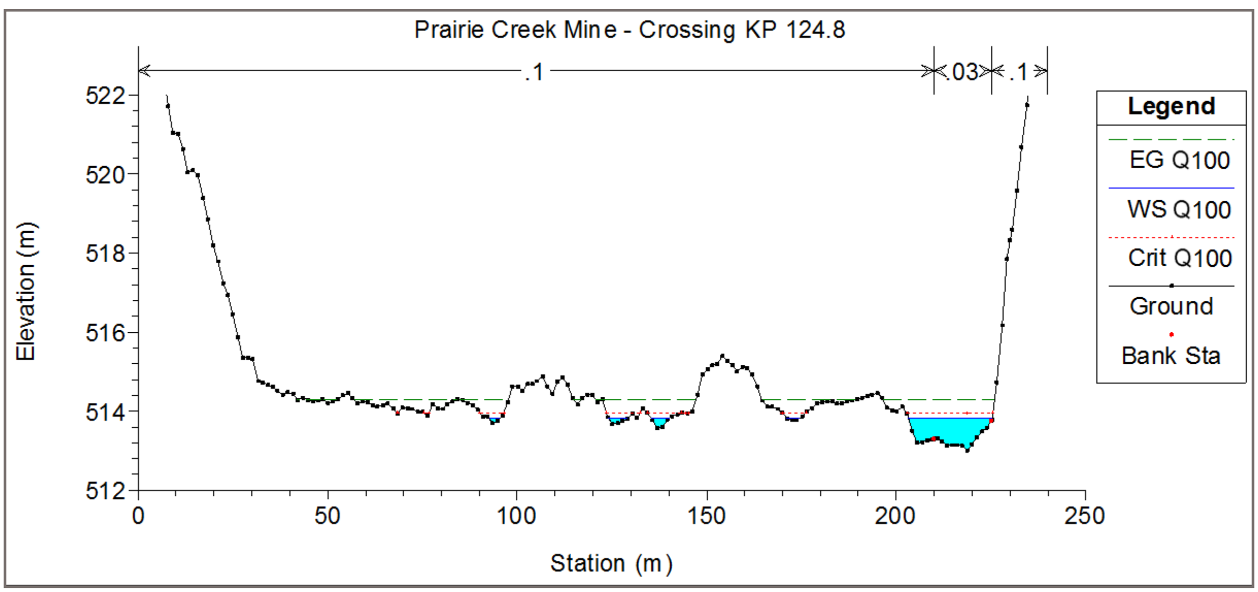

Figure 29: KP 124.8 Grainger River (Hatfield KP 125.1). HEC-RAS model result for 100-year flood.

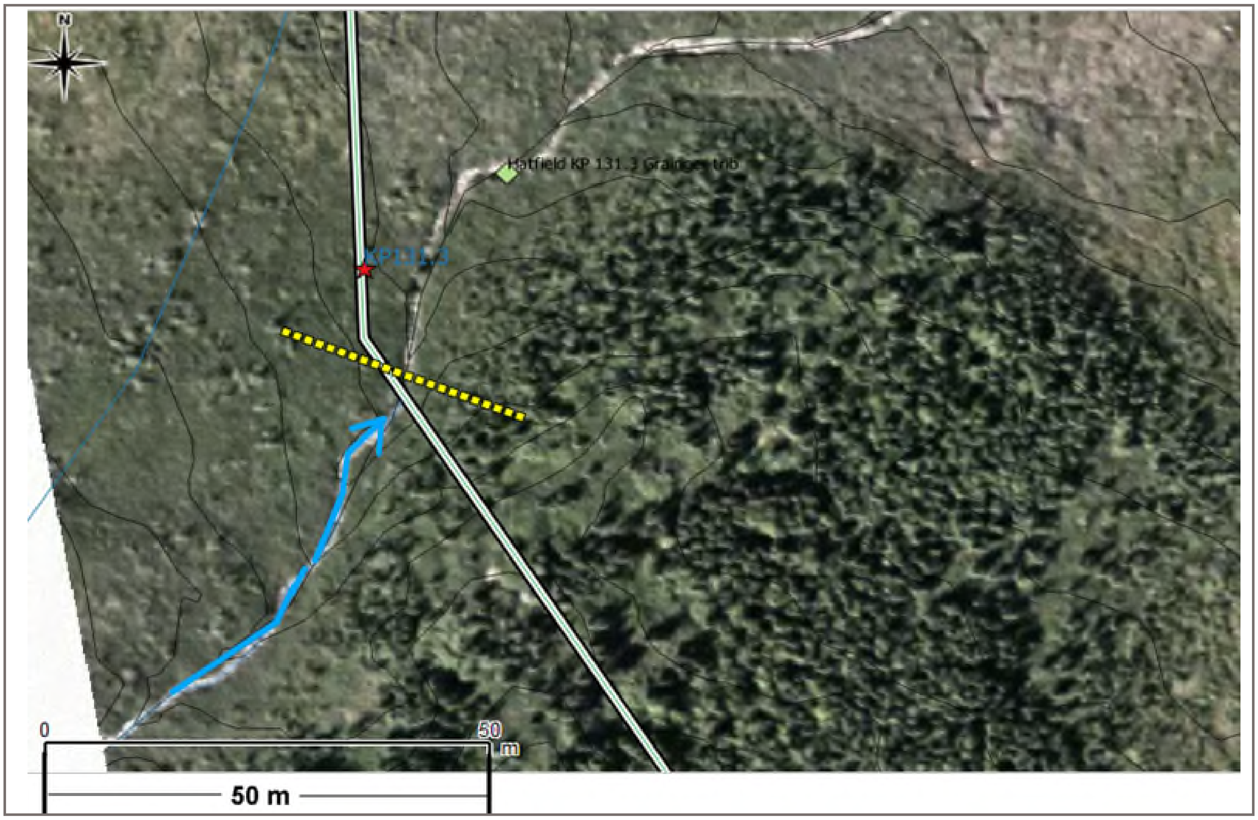

Figure 30: KP 131.2 Grainger Trib. (Hatfield KP 131.3). 2014 road alignment shown on 2012 orthophoto image. Flow is generally left to right. Channel cross section view taken at yellow dashed line viewing

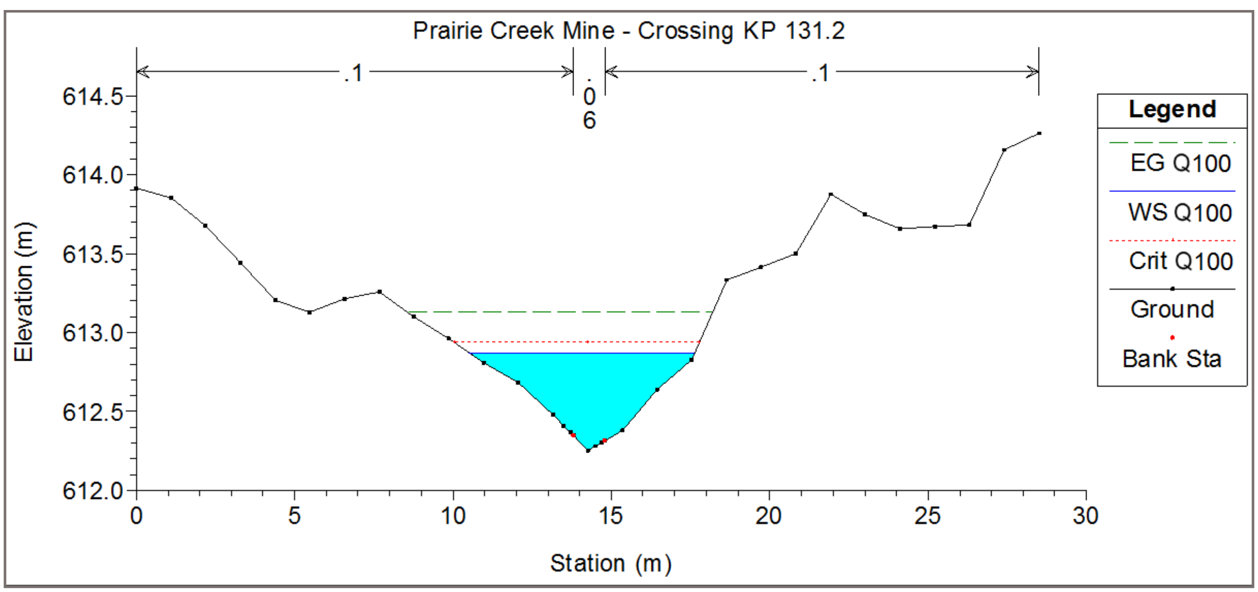

Figure 31: KP 131.2 Grainger Trib. (Hatfield KP 131.3). HEC-RAS model result for 100-year flood.

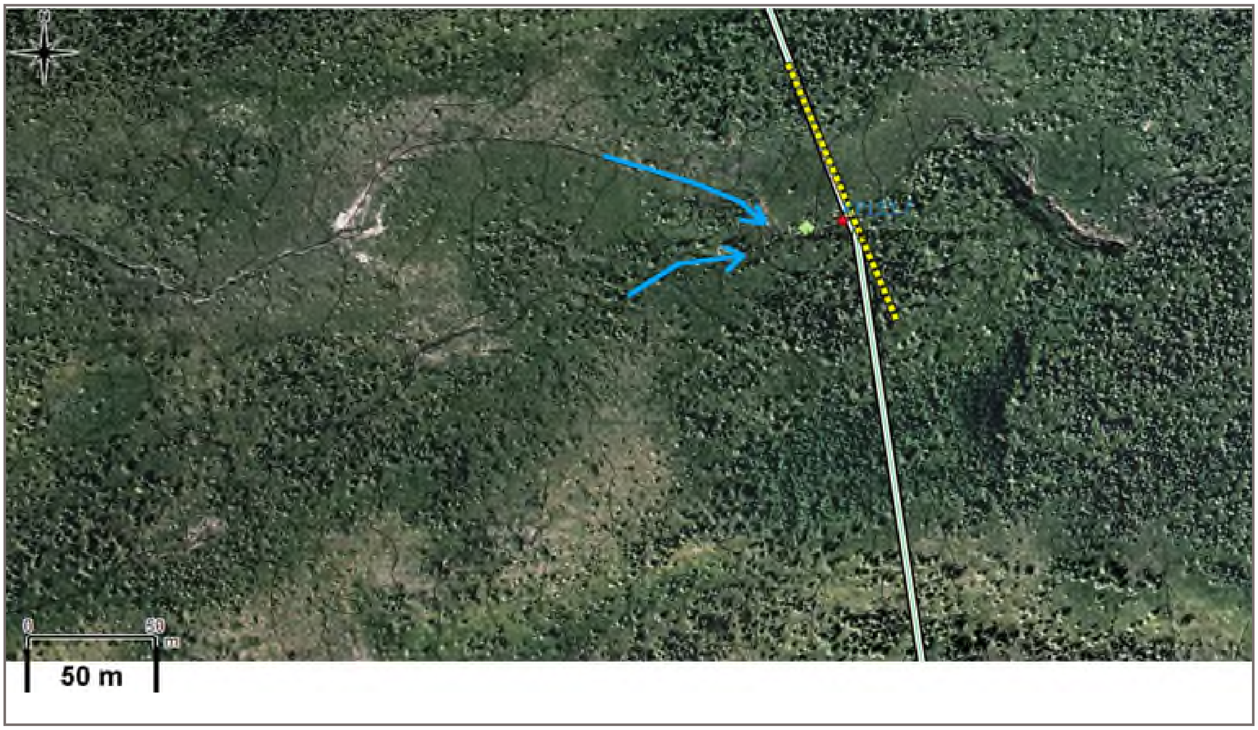

Figure 32: KP 133.2 Grainger Trib. (Hatfield KP 133.7). 2014 road alignment shown on 2012 orthophoto image. Flow is left to right. Channel cross section view taken at yellow dashed line viewing downstream.

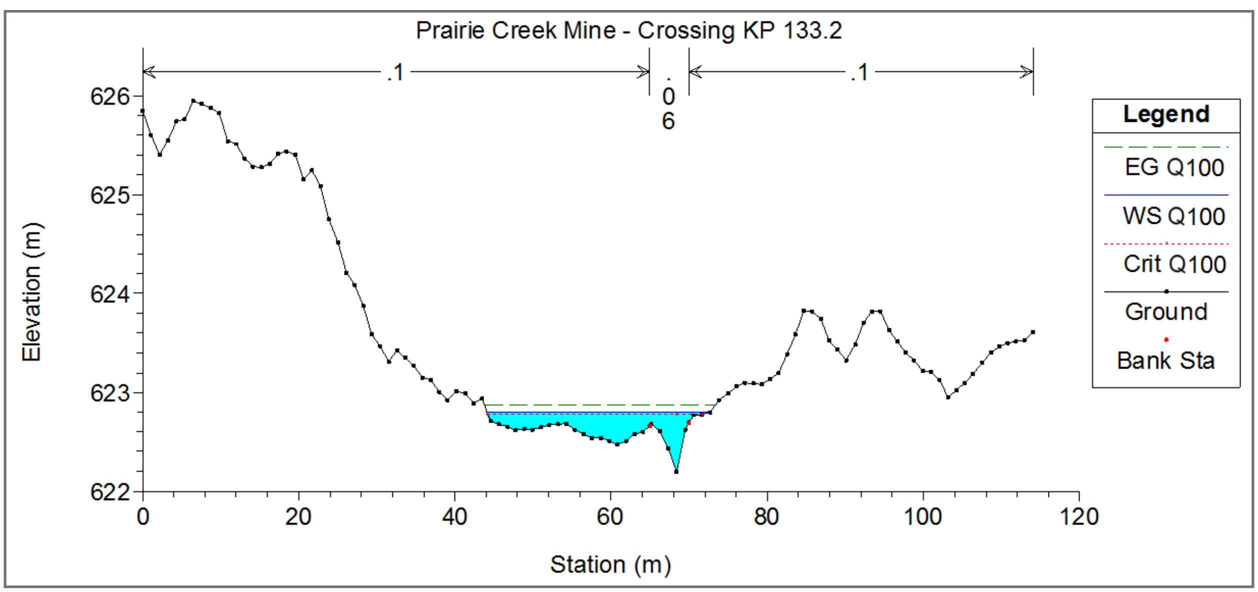

Figure 33: KP 133.2 Grainger Trib. (Hatfield KP 133.7). HEC-RAS model result for 100-year flood.

Figure 34: KP 134.9 Grainger Trib. (Hatfield KP 135.6). 2014 road alignment shown on Google Earth image. Flow is left to right. 2012 LiDAR data and orthophoto imagery not available for the 2014 crossing location due to alignment change. Channel cross section view taken at yellow dashed line viewing downstream, and located downstream from road crossing in reach with available LiDAR data.

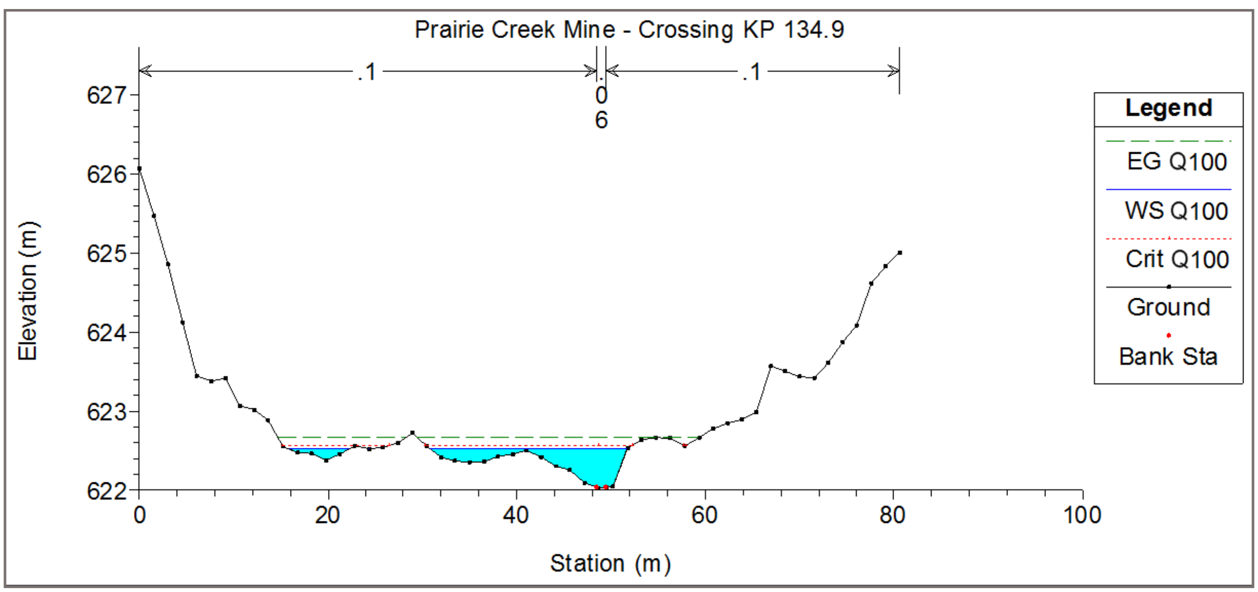

Figure 35: KP 134.9 Grainger Trib. (Hatfield KP 135.6). HEC-RAS model result for 100-year flood at section located about 300 m downstream of road crossing where LiDAR elevation data are available. Modelled flow depths and widths (but not elevations) should be similar to those that will occur at the road crossing.

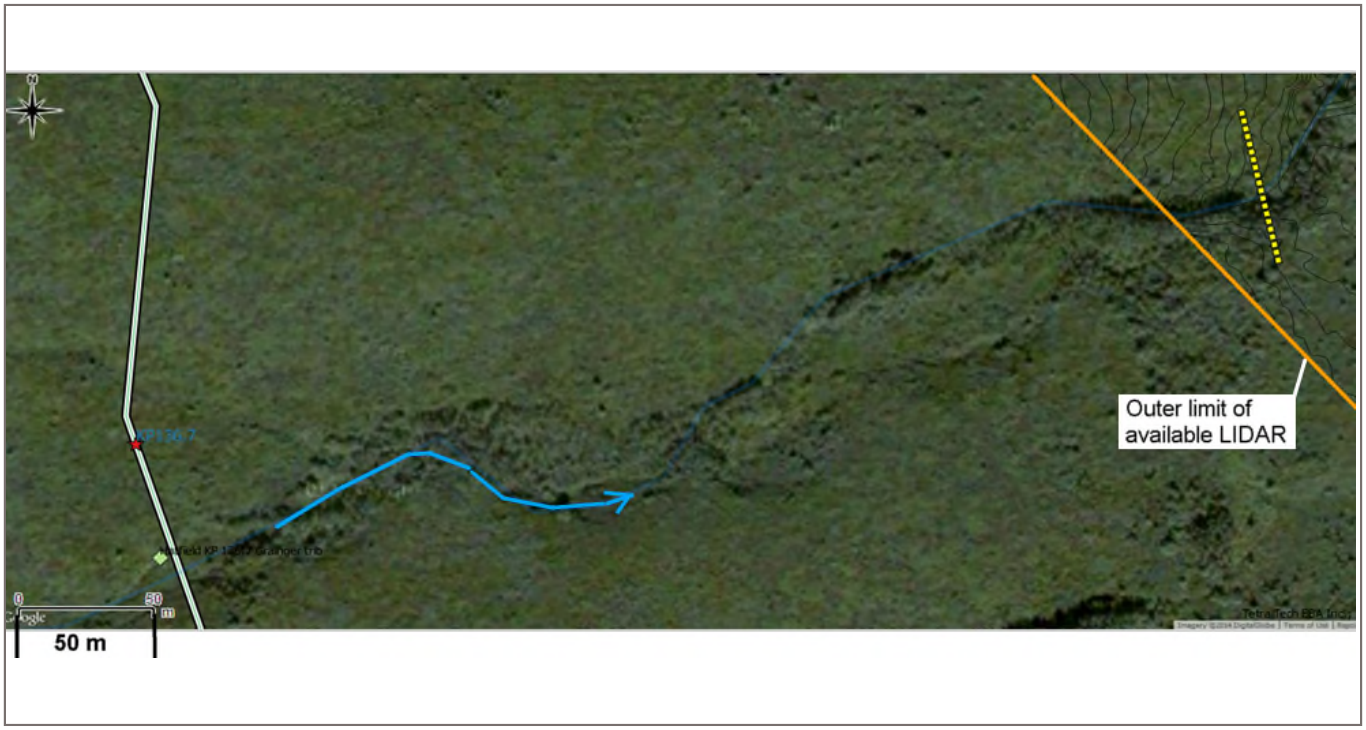

Figure 36: KP 136.5 Grainger Trib. (Hatfield KP 136.7). 2014 road alignment shown on Google Earth image. Flow is left to right. 2012 LiDAR data and orthophoto imagery not available for the 2014 crossing location due to alignment change. Channel cross section view taken at yellow dashed line viewing downstream, and located downstream from road crossing in reach with available LiDAR data.

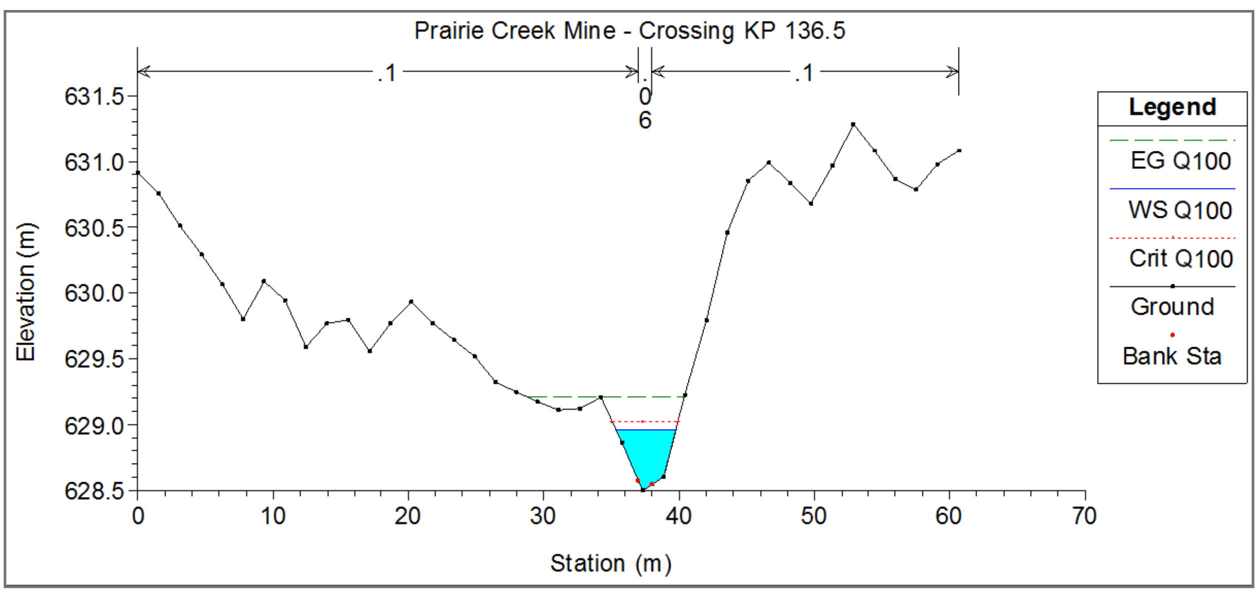

Figure 37: KP 136.5 Grainger Trib. (Hatfield KP 136.7). HEC-RAS model result for 100-year flood at section located about 400 m downstream of road crossing where LiDAR elevation data are available. Modelled flow depths and widths (but not elevations) should be similar to those that will occur at the road crossing.

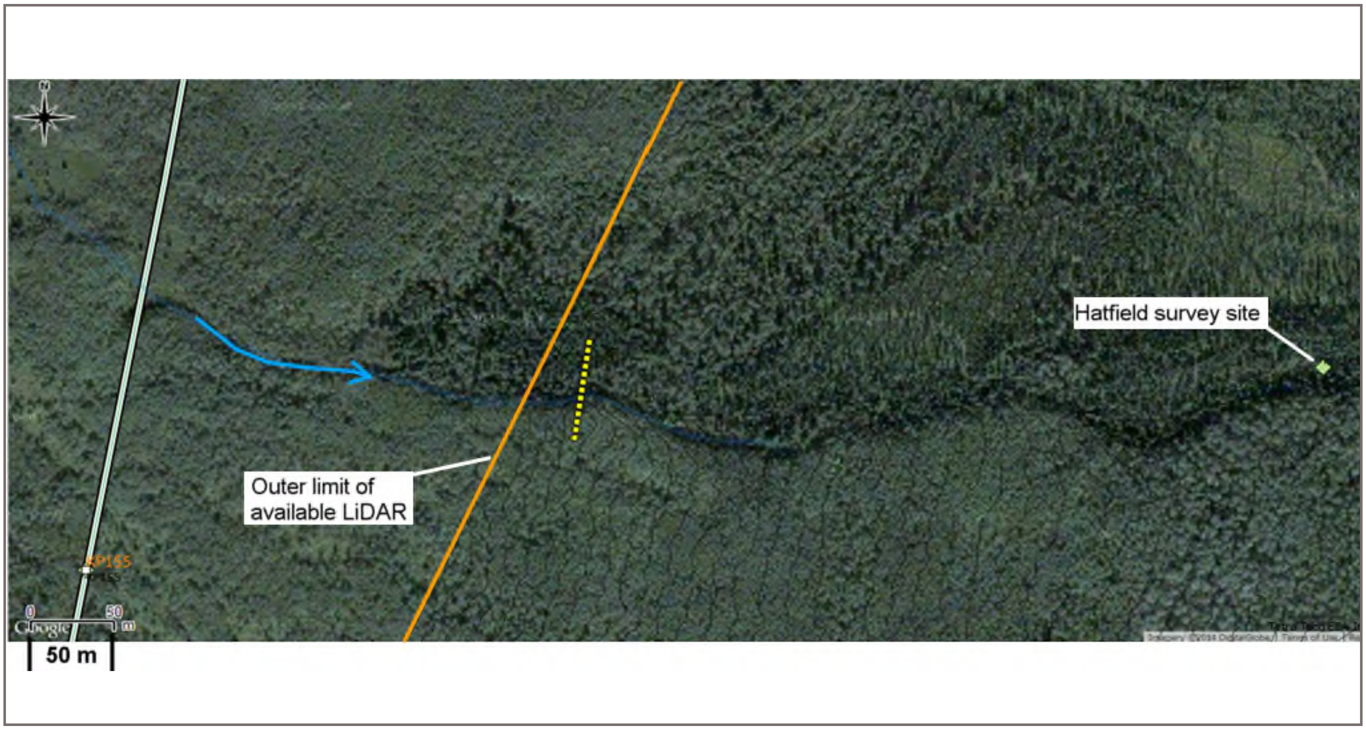

Figure 38: KP 154.9 Liard Trib. (Hatfield KP 154.4). 2014 road alignment shown on Google Earth image. Flow is left to right. 2012 LiDAR data and orthophoto imagery not available for the 2014 crossing location due to alignment change. Channel cross section view taken at yellow dashed line viewing downstream, and located downstream from road crossing in reach with available LiDAR data.

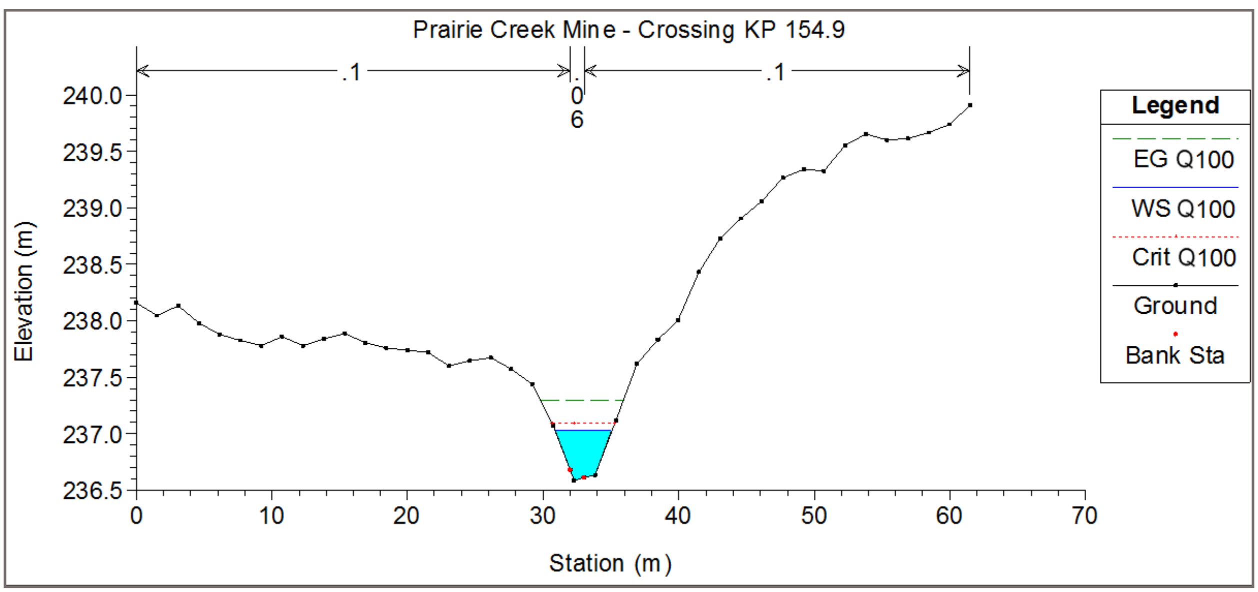

Figure 39: KP 154.9 Liard Trib. (Hatfield KP 154.4). HEC-RAS model result for 100-year flood at section located about 300 m downstream of road crossing where LiDAR elevation data are available. Modelled flow depths and widths (but not elevations) should be similar to those that will occur at the road crossing.

PHOTOGRAPHS

Photo 1: KP 6.1, Casket Creek. Aerial image viewing upstream, 2008. Active alluvial fan area with split flows and shifting of the main channel being likely during major flood events.

Photo 2: KP 6.1, Casket Creek. Ground image viewing upstream to bridge, 2008.

Photo 3: KP 6.1, Funeral Creek. View upstream to incised channel at original hairpin crossing. New crossing will be about 50 m upstream from original crossing.

Photo 4: KP 6.1, Funeral Creek. View downstream at original hairpin crossing.

Photo 5: KP 25.3 Sundog Tributary. Incised channel with bedrock control.

Photo 6: KP 25.3 Sundog Tributary. Incised channel with bedrock control.

Photo 7: KP 28.4 Sundog Creek (Hatfield KP 28.4), viewing upstream.

Photo 8: KP 28.4 Sundog Creek (Hatfield KP 28.4), viewing downstream.
Photo taken September 2014.

Photo 9: KP 39.4 Sundog Trib. (Hatfield KP 39.8), viewing downstream. Crossing is at confluence with main channel Sundog Creek at top of image.

Photo 10: KP 39.4 Sundog Trib. (Hatfield KP 39.8), viewing downstream along dry tributary channel. Crossing is at confluence with main channel Sundog Creek at top of image. Photo taken September 2014.

Photo 11: KP 46.2 Polje Trib. (Hatfield KP 47.0). Viewing upstream.
Photo taken September 2014.

Photo 12: KP 46.2 Polje Trib. (Hatfield KP 47.0).
Photo taken September 2014.

Photo 13: KP 49.6 Polje Trib. (Hatfield KP 50.2). Viewing upstream.
Photo taken September 2014.

Photo 14: KP 53.6 Polje Trib. (Hatfield KP 54.3). Viewing upstream. Photo taken September 2014.

Photo 15: KP 53.6 Polje Trib. (Hatfield KP 54.3). Survey tape is visible, stretched across channel.

Photo 16: KP 87.4 Tetcela Trib at Old Road.

Photo 17: KP 87.4 Tetcela Trib at Old Road. Viewing downstream.
Photo taken September 2014.

Photo 18: KP 89.7 Tetcela Mainstem at Old Road.

Photo 19: KP 89.7 Tetcela Mainstem at Old Road. Viewing upstream.
Photo taken September 2014.

Photo 20: KP 122.4 Grainger Trib. (Hatfield KP 122.8). Viewing upstream. Photo taken September 2014.

Photo 21: KP 122.4 Grainger Trib. (Hatfield KP 122.8). Photo taken September 2014.

Photo 22: KP 123.4 Grainger River (Hatfield KP 123.7). Viewing upstream.
Photo taken September 2014.

Photo 23: KP 123.4 Grainger River (Hatfield KP 123.7). Viewing downstream.
Photo taken September 2014.

Photo 24: KP 124.8 Grainger River (Hatfield KP 125.1). Viewing downstream. Photo taken September 2014.

Photo 25: KP 124.8 Grainger River (Hatfield KP 125.1). Photo taken September 2014.

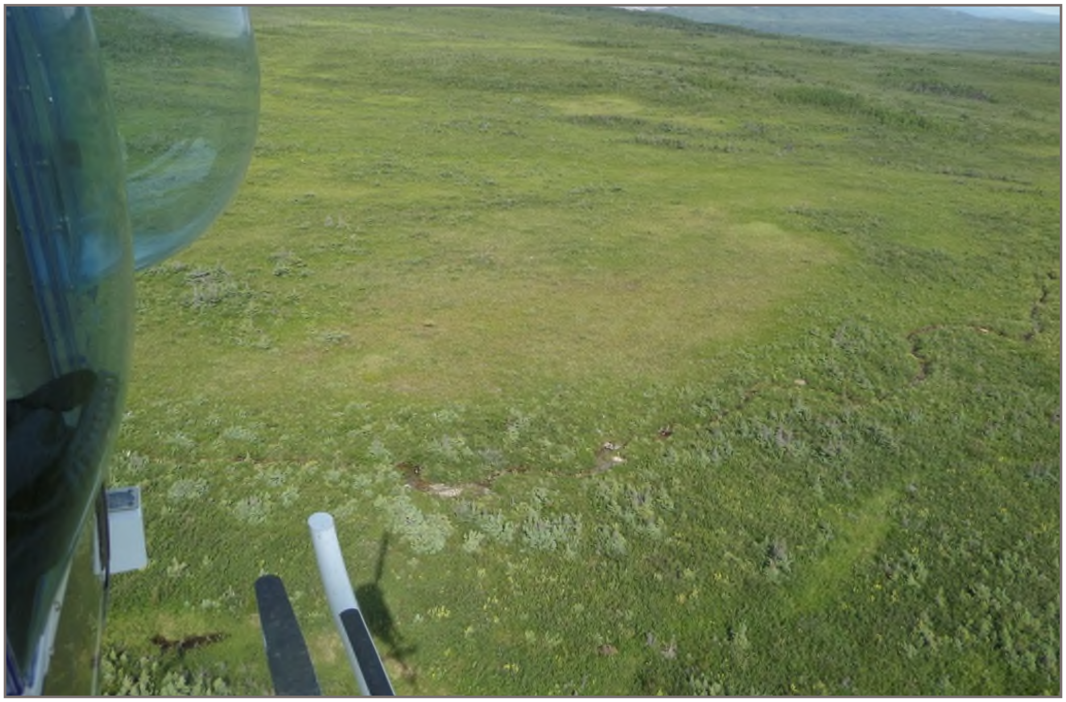

Photo 26: KP 131.2 Grainger Trib. (Hatfield KP 131.3).

Photo 27: KP 131.2 Grainger Trib. (Hatfield KP 131.3). Viewing upstream.
Photo taken September 2014.

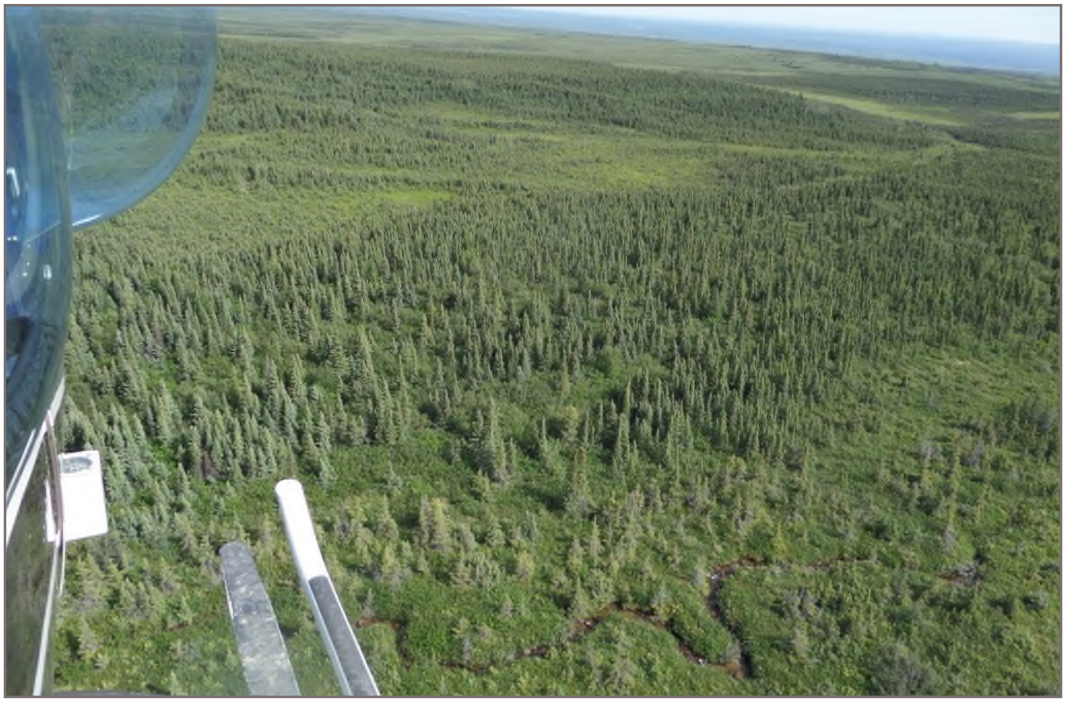

Photo 28: KP 133.2 Grainger Trib. (Hatfield KP 133.7).

Photo 29: KP 133.2 Grainger Trib. (Hatfield KP 133.7). Viewing upstream.
Photo taken September 2014.

Photo 30: KP 134.9 Grainger Trib. (Hatfield KP 135.6) Viewing downstream.
Photo taken September 2014.

Photo 31: KP 136.5 Grainger Trib. (Hatfield KP 136.7). Viewing downstream.
Photo taken September 2014.

Photo 32: KP 154.9 Liard Trib. (Hatfield KP 154.4). Flow left to right.
Photo taken September 2014