

Appendix V5-1L

Doris North Project: 2015 Hydrology Compliance
Monitoring Program





Refer to File No.: 1009-0008 / 0298923-0004 Hope Bay Belt

Subject: Doris North Project 2015 Hydrology Compliance Monitoring Program

[illegible]

débits de pointe quotidiens des stations surveillées ont oscillé entre 3,2 et 6,3 m³/s. Ces débits de pointe étaient environ de 4 % à 7 % inférieurs à la moyenne de 2009 à 2014 observée aux stations TL-2 et TL-3, et de 12 % supérieurs à la moyenne de la même période à la station Roberts Hydro. Ces résultats laissent à penser que les valeurs de ruissellement plus importantes sont dues aux précipitations de juillet, qui ont généré un second pic de débit et des débits plus élevés pour le reste de la saison de surveillance, plutôt qu'à des débits de pointe anormalement élevés.

De nouveaux capteurs ont été installés au lac Doris et aux zones de retenue des résidus pour permettre une surveillance continue du niveau de l'eau à ces stations. La période de surveillance de 2015 n'a connu aucune défaillance de l'équipement ni aucun problème technique, il n'y a donc pas eu de données manquantes.

1. INTRODUCTION

ERM Consultants Canada Ltd. (ERM) monitors and reports, on behalf of TMAC, the following elements of the Doris North Gold Mine Project Certificate (NIRB No. 003, issued September 15, 2006; NIRB (2006)), Type A Water Licence (NWB Licence No. 2AM-DOH1323 Type A renewed August 16, 2013 and No. 2BE-HOP1222 Type B, renewed June 30, 2012), and IWMP (SRK 2012), as part of the annual Program:

1. Open water season volumetric discharge from Doris Creek and Roberts Lake Outflow.
2. Water level variation at Doris Lake, the Tailing Impoundment Area (TIA), and Windy Lake.

These items correspond to the following elements of the Doris North Gold Mine Project Certificate, Water Licence, and IWMP:

1. Doris North Gold Mine Project Certificate

- *Appendix C. Final Hearing Report Appendix B, Additional Comments, DFO, Item 2: [The Proponent] will monitor stage and discharge in Doris Outflow both upstream and downstream of the decant discharge point to provide information that can be used in assessing the accuracy of the impact predictions relating to fish habitat downstream.*

2. NWB Type A Water Licence No. 2AM-DOH1323

- *Part G. Item 31. The Licensee shall, following the deposition of tailings, maintain water within the Tailings Impoundment Area at an elevation of least 28.3 metres above sea level such that a minimum of four (4) metres of water cover is maintained over the tailings at all times.*
- *Part J. Item 2. The Licensee shall install appropriate instrumentation in Doris Creek at Monitoring Station TL-2, to monitor flow when ice conditions allow for such measurements to be taken, on a real time and continuous basis for any year where discharges from the Tailings Impoundment Area are planned.*
- *Part J. Item 3. The Licensee shall undertake the Water Monitoring Program detailed in the Tables of Schedule J.*

Note: This report contains discharge information from sites TL-2 and TL-3. All other requirements under this schedule are monitored by TMAC and presented in the 2AM-DOH1323 Monthly and Annual Reports.

3. NWB Type B Water Licence No. 2BE-HOP1222

- *Part J. Item 9: The Licensee shall monitor water levels in Windy Lake during open water, in order to verify that additional water withdrawal for dust suppression activities does not result in drawdown beyond naturally occurring levels.*

4. IWMP (SRK 2012)

- *Section 4.2: Continuous monitoring of Doris Lake water levels and outflows will continue under the hydrologic baseline characterization. These data will be used to calibrate the existing water balance and quality model.*

Hydrometric data collected to support habitat compensation projects and monitoring requirements for Fisheries Authorization NU-02-0117.3 are also reported here. Hydrometric baseline monitoring has been conducted in the Project area since 1996, with ERM conducting this work since 2009. The current Compliance Program has been in place since 2011.

All other aspects of water and waste water monitoring (e.g., water use and pumping volumes, etc.) are monitored by TMAC under the Surveillance Network Program (SNP) and reported monthly and annually to the NWB in accordance with the relevant clauses of Water Licences 2AM-DOH1323 and 2BE-HOP1222.

2. METHODS

The existing network of three streamflow and three water level monitoring stations for the Program were re-established at the beginning of the open water season in 2015 (Figure 1; Table 1). With the exception of the Windy Lake hydrometric monitoring station, the stations were established in the same locations as the 2014 monitoring network. The Windy Lake hydrometric station, which previously monitored lake level and streamflow, was relocated for 2015 and converted to a lake level monitoring station. Detailed site descriptions for each station can be found in Appendix A. Details regarding the standard methods used for installation of hydrometric stations, conducting stage-discharge measurements, and development of stage-discharge rating equations, and daily flow hydrographs for the Program are available in the Doris North Project 2013 Hydrology Compliance Monitoring Report (ERM Rescan 2014).

3. RESULTS AND DISCUSSION

Results from the 2015 Program are presented as follows: 1) manual stage-discharge measurements; 2) rating equations; 3) daily discharge hydrographs; 4) hydrologic indices; 5) lake water levels; 6) comparison with precipitation data; and 7) quality assurance and control (QA/QC). Results of the 2015 Program were compared to results from the 2009 to 2014 monitoring programs, which were previously reported in hydrology baseline and compliance reports (Rescan 2009, 2011a, 2011b, 2012a, 2012b; ERM Rescan 2014; ERM 2015).

3.1 Manual Stage-Discharge Measurements

In 2015, a minimum of six stage-discharge measurement visits were completed at each hydrometric station over a variety of flow conditions. These measurements were used to create new stage-discharge relationships or validate existing ones (Table 2).

Figure 1
Hydrometric Monitoring Stations, Doris North Project, 2015

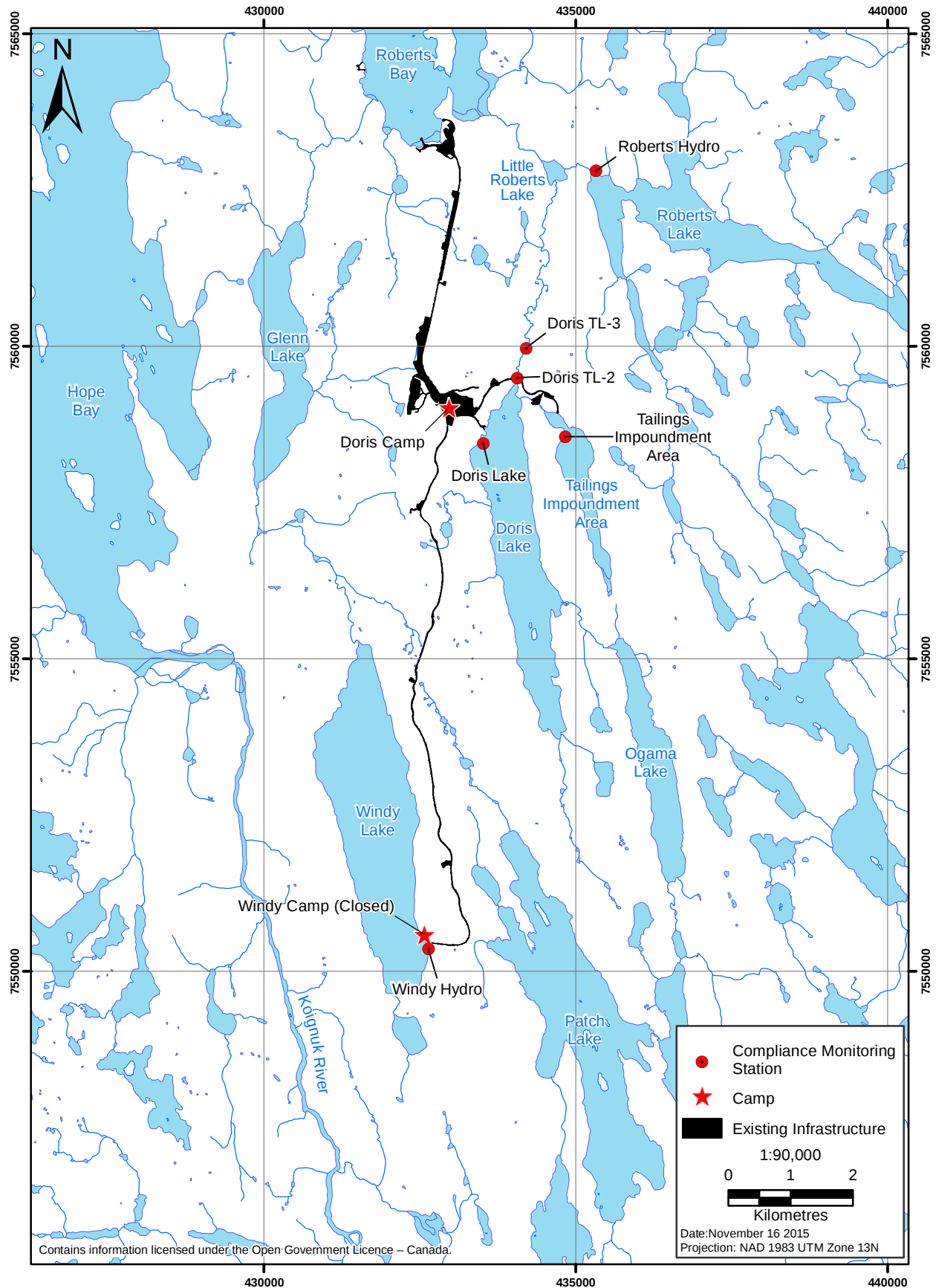


Table 1. 2015 Hydrometric Compliance Monitoring Stations, Doris North Project, 2015

Hydrometric Station	Location	UTM Coordinates ^a (Zone 13W, NAD83)		Drainage Area (km ²)	Drainage Area Covered by Lakes (%)	Monitoring Years	Period of Operation in 2015	Purpose
		Easting	Northing					
Streamflow Monitoring Stations								
Doris TL-2	Doris Lake outflow	434,059	7,559,504	94.6	20	1996-1998, 2000, 2003-2015	June 10 – September 21	Monitoring required for Project Certificate, Type A Water Licence, and IWMP
Doris TL-3	Doris Creek, downstream of waterfall	434,204	7,559,985	95.3	20	2011-2015	June 11 - September 20	Monitoring required for Project Certificate, Type A Water Licence and IWMP
Roberts Hydro	Roberts Lake outflow	435,325	7,562,815	97.9	17	2003-2015	June 11 - September 17	Supports requirements for Fisheries Authorization and No Net Loss Plan
Lake Monitoring Stations								
Doris Lake	Northwest shore of Doris Lake	433,512	7,558,452	n/a	n/a	2004-2015	July 15 - September 19	Monitoring required for Type A Water Licence and IWMP
Tailings Impoundment Area	Northwest shore of Tail Lake	434,832	7,558,560	n/a	n/a	2004-2015	July 15 - September 19	Monitoring required for Type A Water Licence
Windy Hydro	East shore of Windy Lake	432636	7550372	14.1	39	2006-2015	June 12 - September 19	Monitoring requirement for Type B Water Licence

^a Universal Transverse Mercator (UTM) Coordinates

Table 2. Summary of Manual Stage-Discharge Measurements, Doris North Project, 2015

Station and Drainage Area	Date	Stage (m) ^a	Discharge Measurement 1 (m ³ /s)	Discharge Measurement 2 (m ³ /s)	Measurement Precision as a % Difference	Equipment Used
Doris TL-2 (94.6 km ²)	6/10/2015	99.175	2.338	2.334	0.2%	Flo-mate 2000
	6/12/2015	99.203	2.485	2.576	3.6%	Swoffer
	6/13/2015	99.213	2.55	2.618	2.6%	Flo-mate 2000
	6/14/2015	99.226	2.796	2.633	6.0%	Flo-mate 2000
	6/15/2015	99.222	2.744	2.697	1.7%	Flo-mate 2000
	7/15/2015	99.048	1.279	-	-	FH950
	7/16/2015	99.037	1.236	1.243	0%	FH950
	7/17/2015	99.029	1.214	-	-	FH950
	7/19/2015	99.014	1.215	-	-	FH950
	8/14/2015	99.052	1.329	1.328	0.1%	FlowTracker
	8/15/2015	99.044	1.328	1.323	0.4%	FlowTracker
	8/17/2015	99.023	1.26	1.25	0.8%	FlowTracker
	9/1/2015	98.944	1.014	0.987	2.7%	FH950
	9/3/2015	98.942	0.982	0.961	2.2%	FH950
	9/19/2015	98.868	0.743	0.709	4.7%	FH950
	9/20/2015	98.86	0.70	0.685	2.5%	FH950
Doris TL-3 (95.3 km ²)	6/11/2015	97.72	2.547	-	-	Flo-mate 2000
	6/12/2015	97.748	2.74	2.804	2.3%	Swoffer
	6/13/2015	97.763	2.617	2.566	2.0%	Flo-mate 2000
	6/14/2015	97.771	2.619	2.671	2.0%	Flo-mate 2000
	6/15/2015	97.776	2.576	2.646	2.7%	Flo-mate 2000
	7/16/2015	97.456	1.247	1.269	2.4%	FH950
	7/20/2015	97.466	1.184	1.164	0.8%	FH950
	8/15/2015	97.523	1.406	1.463	4.0%	FlowTracker
	8/16/2015	97.508	1.388	1.41	1.6%	FlowTracker
	9/20/2015	97.317	0.707	0.688	2.7%	FH950
Roberts Hydro (97.9 km ²)	6/11/2015	99.432	1.97	2.028	2.9%	Flo-mate 2000
	6/13/2015	99.559	3.91	4.167	6.4%	Flo-mate 2000
	6/14/2015	99.595	4.696	4.709	0.3%	Flo-mate 2000
	7/16/2015	99.300	1.186	1.191	0.4%	FH950
	8/17/2015	99.244	1.054	1.022	3.1%	FlowTracker
	9/17/2015	99.110	0.365	0.385	5.3%	FH950

^a Water levels referenced to site-specific arbitrary local datum.

3.2 Stage-Discharge Rating Equations

Stage-discharge relationships (i.e., rating curves) were developed for all stream hydrometric stations in the monitoring network. Rating equations are summarized in Table 3.

Table 3. Summary of Stage-Discharge Rating Equations, Doris North Project, 2015

Hydrometric Station	Rating Equation ^a	Number of Flow Measurements Used in Curve	Root Mean Square Error (%)	Monitoring Period Used to Develop Curve (Years) ^b
Doris TL-2	$h < 99.06 : Q = 2.19(h - 98.260)^{2.170}$ $h > 99.06 : Q = 8.96(h - 98.670)^{2.010}$	16	2.5	2015
Doris TL-3	$h < 97.48 : Q = 3.08(h - 96.810)^{2.191}$ $h > 97.48 : Q = 3.00(h - 96.810)^{2.121}$	18	5.6	2014-2015
Roberts Hydro	$h < 99.42 : Q = 5.843(h - 98.869)^{1.876}$ $h > 99.42 : Q = 18.983(h - 99.002)^{2.633}$	12	7.1	2014-2015

^a Q = discharge (m^3/s); h = stage (m)

^b In some cases not all of the data collected during the year(s) listed were used in the development of the rating curve (e.g., stage measurements affected by ice were excluded).

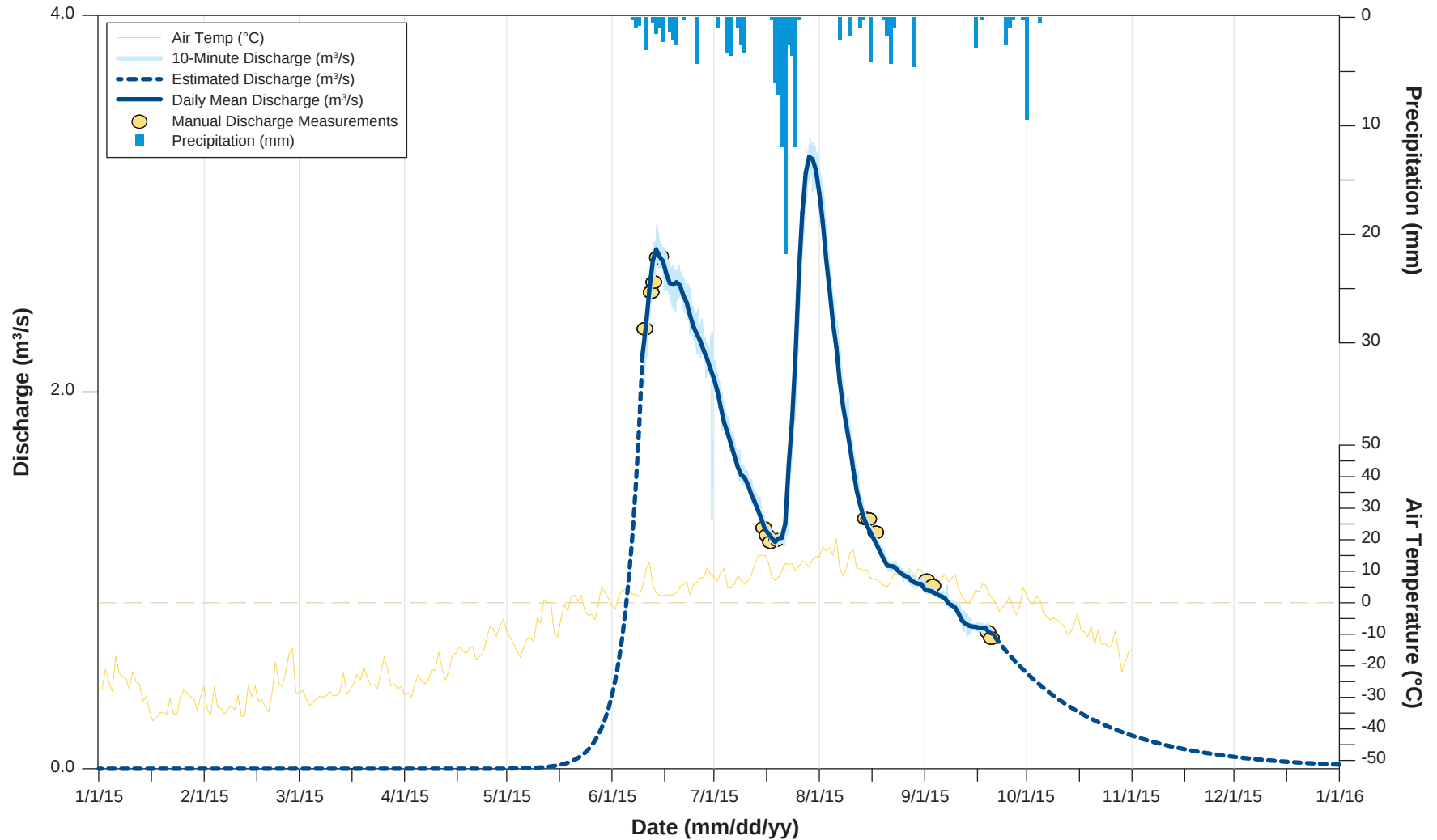
3.3 Hydrographs

Discharge hydrographs were generated at each active streamflow monitoring station by applying the rating equation to the collected stage record (Figures 2 to 4). Each hydrograph includes the 10-minute discharge showing the variance in daily measured discharge, daily mean discharge, and estimated discharge when mean daily discharge could not be calculated based on stage records. Estimation methods follow those detailed in previous reports (e.g., ERM Rescan 2014). Hydrographs also include manual flow measurements to show the goodness of fit for discharge measurements collected in 2015. Daily mean air temperature and daily precipitation collected at the Doris Climate Station were included to provide context for the hydrologic response of the stream monitored at each station. A complete summary of Doris North meteorological conditions for 2015 can be found in the Doris North Project 2015 Meteorological Compliance Monitoring Program Memorandum (ERM 2016).

3.4 Hydrologic Indices

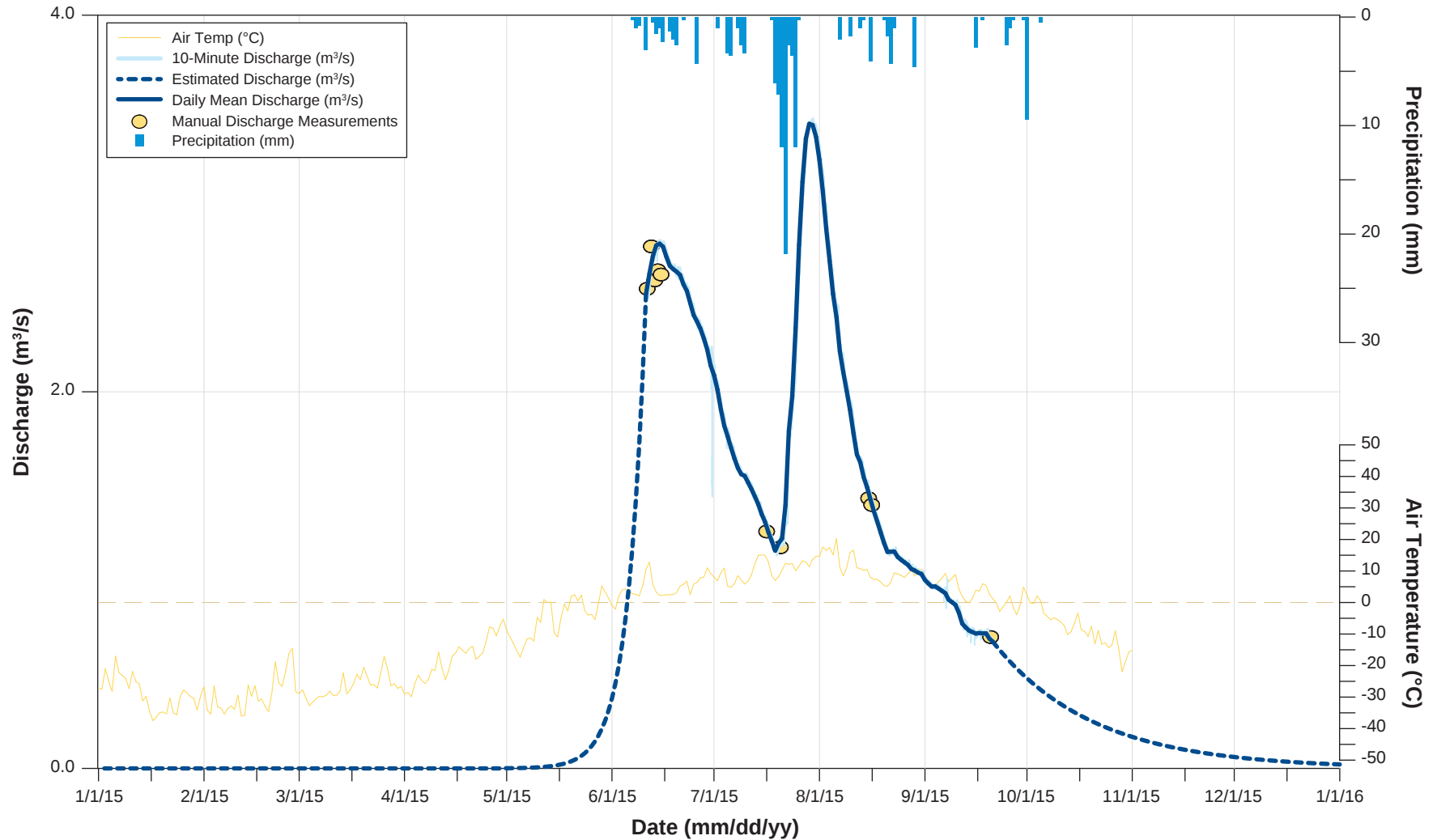
Discharge and runoff (discharge normalised to drainage area) results for 2015 are presented in Tables 4 and 5, respectively. Annual peak flow and peak unit yield (an expression of discharge normalized to drainage area) for 2015 are presented in Tables 6 and 7, respectively. Data from 2009-2014 are provided for comparison. Peak discharge normally occurs in early June coinciding with spring snow melt. However, 2015 peak flows for Doris Creek were generated by a large precipitation event that occurred at the end of July. Roberts Lake Outflow also experienced high flows related to the precipitation event, but the flows were slightly lower than those related to the June snow melt.

Figure 2
Hydrometric Station TL-2: 2015 Hydrograph



Notes: Precipitation and air temperature based on Doris Climate Station.
 Station installed June 10; demobilized September 21, 2015.
 Mean daily discharge values between May 1 and June 9 are estimated using a logarithmic growth function.
 Mean daily discharge values between September 22 and December 31 are estimated using a logarithmic growth function.
 The channel was assumed to be frozen to the bed from January 1 to May 1, 2015.

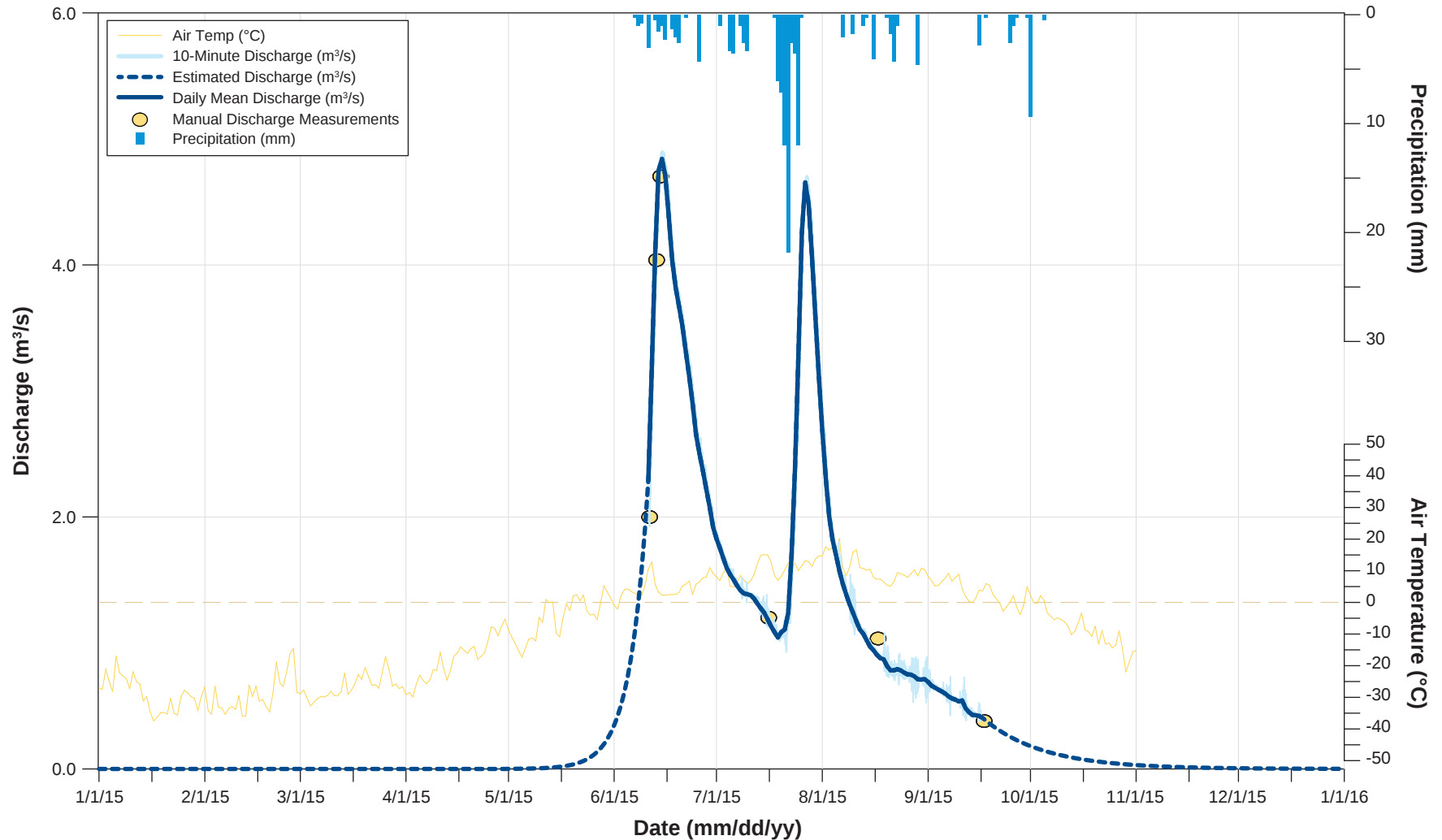
Figure 3
Hydrometric Station TL-3: 2015 Hydrograph



Notes: Precipitation and air temperature based on Doris Climate Station.
 Station installed June 11; demolished September 21, 2015.
 Mean daily discharge values between May 1 and June 10 are estimated using a logarithmic growth function.
 Mean daily discharge values between September 22 and December 31 are estimated using a logarithmic growth function.
 The channel was assumed to be frozen to the bed from January 1 to May 1, 2015.

Figure 4

Hydrometric Station Roberts Hydro: 2015 Hydrograph



Notes: Precipitation and air temperature based on Doris Climate Station.
 Station installed June 11; demolished September 17, 2015.
 Mean daily discharge values between May 1 and June 10 are estimated using a logarithmic growth function.
 Mean daily discharge values between September 18 and December 31 are estimated using a logarithmic growth function.
 The channel was assumed to be frozen to the bed from January 1 to May 1, 2015.

Table 4. Total Runoff, Doris North Project, 2009 to 2015^a

Hydrometric Station	Total Runoff (mm)										
	2009 to 2014 Annual ^b									2015 Observed ^a	2015 Annual ^b
	2009	2010	2011	2012	2013	2014	Min	Mean	Max		
Doris TL-2	99	129	191	106	41	113	41	113	191	159	187
Doris TL-3 ^c	<i>n/a</i>	<i>n/a</i>	190	108	47	120	47	116	190	162	190
Roberts Hydro ^d	98	146	162	99	61	138	61	117	162	152	168

^a Calculated from recorded values during the open water season. Site-specific periods of record for historic data are presented in baseline and compliance reports (Rescan 2009, 2011a, 2011b, 2012a, and 2012b, ERM Rescan 2014, ERM 2015), and site-specific periods of record for 2015 data are provided in Table 1.

^b Annual values include estimated data for periods when stations were demobilized, typically at the start of thaw and near freeze-up.

^c Station established in July 2011 approximately 500 m downstream of TL-2: Values were estimated for June 2011.

^d Roberts Hydro values from 2009 include estimated values for the period when the station was damaged (July 30 to Oct. 31).

Table 5. Mean Discharge, Doris North Project, 2009 to 2015^a

Hydrometric Station	Mean Discharge (m³/s)										
	2009 to 2014 Annual ^b									2015 Observed ^a	2015 Annual ^b
	2009	2010	2011	2012	2013	2014	Min	Mean	Max		
Doris TL-2	0.29	0.39	0.57	0.32	0.12	0.34	0.12	0.34	0.57	1.68	0.56
Doris TL-3 ^c	<i>n/a</i>	<i>n/a</i>	0.58	0.33	0.14	0.36	0.14	0.35	0.58	1.74	0.57
Roberts Hydro ^d	0.31	0.45	0.50	0.31	0.19	0.41	0.19	0.36	0.50	1.74	0.52

^a Calculated from recorded values during the open water season. Site-specific periods of record for historic data are presented in baseline and compliance reports (Rescan 2009, 2011a, 2011b, 2012a, and 2012b, ERM Rescan 2014, ERM 2015), and site-specific periods of record for 2015 data are provided in Table 1.

^b Annual values include estimated data for periods of when stations were demobilized.

^c Station established in July 2011: Values were estimated for June 2011.

^d Roberts Hydro values from 2009 include estimated values for the period when the station was damaged.

Table 6. Peak Flow, Doris North Project, 2009 to 2015

Hydrometric Station	Peak Flow (m ³ /s)									
	2009 to 2014									2015 (Date)
	2009	2010	2011	2012	2013	2014	Min	Mean	Max	
Doris TL-2										
Instantaneous	2.39	4.61	5.88	3.62	1.00	2.45	1.00	3.50	5.88	3.35 (July 29)
Daily	2.29	4.44	5.77	3.56	0.98	2.41	0.98	3.41	5.77	3.25 (July 29)
Doris TL-3^a										
Instantaneous	n/a	n/a	5.96	3.83	1.29	2.97	1.29	3.69	5.96	3.45 (July 30)
Daily	n/a	n/a	5.86	3.78	1.25	2.94	1.25	3.63	5.86	3.42 (July 29)
Roberts Hydro										
Instantaneous	2.55	5.84	7.47	3.63	2.01	6.54	2.01	4.30	7.47	4.90 (June 15)
Daily	2.49	5.78	7.34	3.60	1.97	6.31	1.97	4.24	7.34	4.84 (June 15)

^a Station established in July 2011. Peak flow values for 2011 were estimated with the incorporation of modelled data for June.

Table 7. Peak Unit Yield, Doris North Project, 2009 to 2015

Hydrometric Station	Peak Unit Yield (L/s/km ²)									
	2009 to 2014									2015 (Date)
	2009	2010	2011	2012	2013	2014	Min	Mean	Max	
Doris TL-2										
Instantaneous	25.24	48.57	62.19	38.29	10.55	25.94	10.55	36.97	62.19	35.39 (July 29)
Daily	24.17	46.73	60.97	37.65	10.37	25.50	10.37	35.98	60.97	34.34 (July 29)
Doris TL-3^a										
Instantaneous	n/a	n/a	62.51	40.14	13.50	31.13	13.50	38.72	62.51	36.24 (July 30)
Daily	n/a	n/a	61.50	39.66	13.15	30.85	13.15	38.10	61.51	35.92 (July 29)
Roberts Hydro										
Instantaneous	26.03	59.59	76.35	37.09	20.58	69.13	20.58	43.93	76.35	50.07 (June 15)
Daily	25.47	58.97	75.00	36.82	20.10	66.74	20.10	43.27	75.00	49.46 (June 15)

^a Station established in July 2011. Peak unit yield values for 2011 were estimated from modelled data.

3.5 Lake Water Levels

Water level monitoring was conducted at Doris Lake, the TIA, and Windy Lake (Table 8). Water level records for the 2015 season are shown in Figures 5 to 7. Pressure transducers at Doris Lake and the TIA were installed on the first ice-free site visit (July 15, 2015) to replace older malfunctioning sensors. The Doris Lake and TIA sensors were installed at a depth of > 5 m to avoid ice damage and allow water level to be continuously recorded throughout the winter season. Data from January 1 to July 15, 2015 for the TIA were not available due to sensor failure. Data from January 1 to July 15, 2015 for Doris Lake are available, but of poor quality and not considered valid due to sensor malfunction. The Windy Lake hydrometric station, which previously monitored lake level and streamflow, was relocated and converted to an open water season lake level monitoring station in 2015. The relatively large variance observed in the 10-minute water level at Windy Hydro is likely the result of relatively high wave action due to windy conditions.

Table 8. Lake Water Level Variations in Doris Lake and the TIA, Doris North Project, 2015

Lake	Lake Area (km ²)	Drainage Area at Lake Outlet (km ²)	Period of Operation in 2015	Min Water Level (m)	Max Water Level (m)	Mean Water Level (m)	Water Level Change (m)
Doris ^{ab}	3.4	94.6	July 15 - September 19	98.006	98.424	98.182	0.418
TIA ^{abc}	0.8	4.2	July 15 - September 19	93.862 (28.876)	94.218 (29.232)	94.054 (29.068)	0.356
Windy ^b	5.3	14.1	June 12 - September 19	96.498	96.703	96.612	0.205

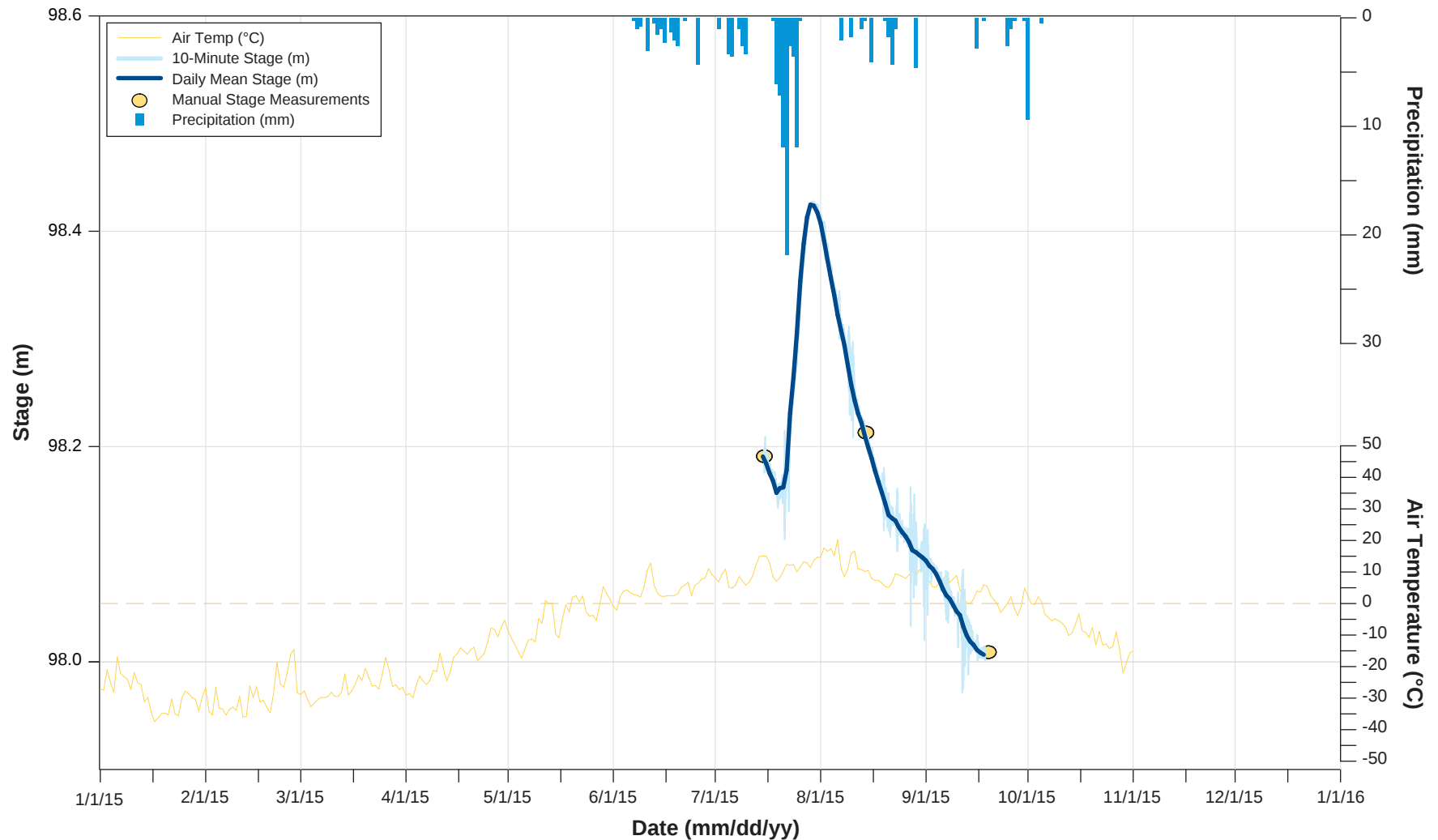
^a Data is monitored continuously. The end date in the Period of Operation column notes the last day of data collected during the final site visit. Dataloggers will collect data through winter 2015/16.

^b Water level is referenced to the local station datum.

^c Water level in masl in parenthesis.

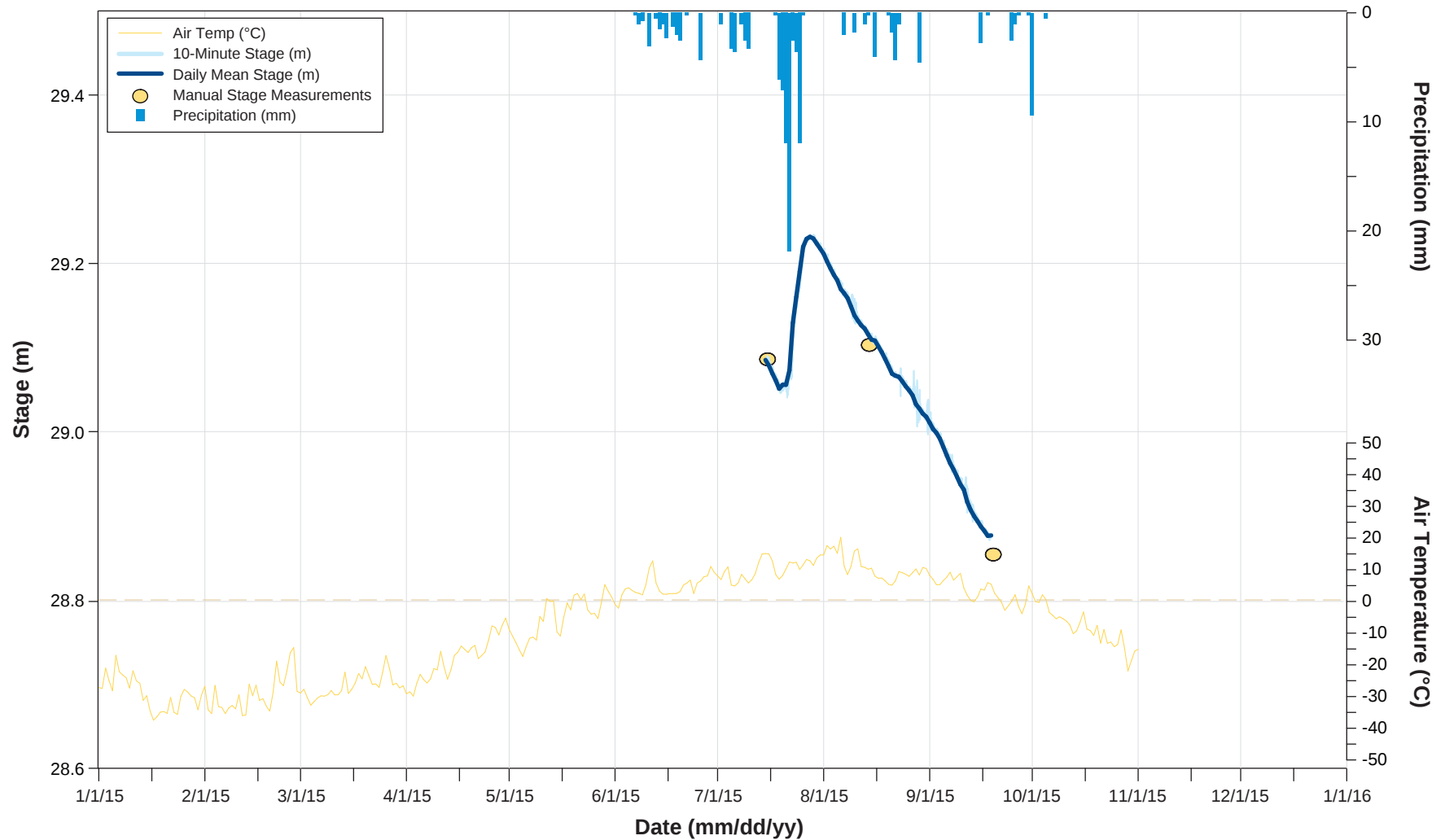
Figure 5

Annual Stage Record at Doris Lake Station, Doris North Project, 2015



Notes: Precipitation and air temperature based on Doris Climate Station.
 Sensor was replaced on July 15 and will record continuously throughout the winter.
 Data is presented from the beginning of the valid record to the last day of data collected during the final site visit (September 19).

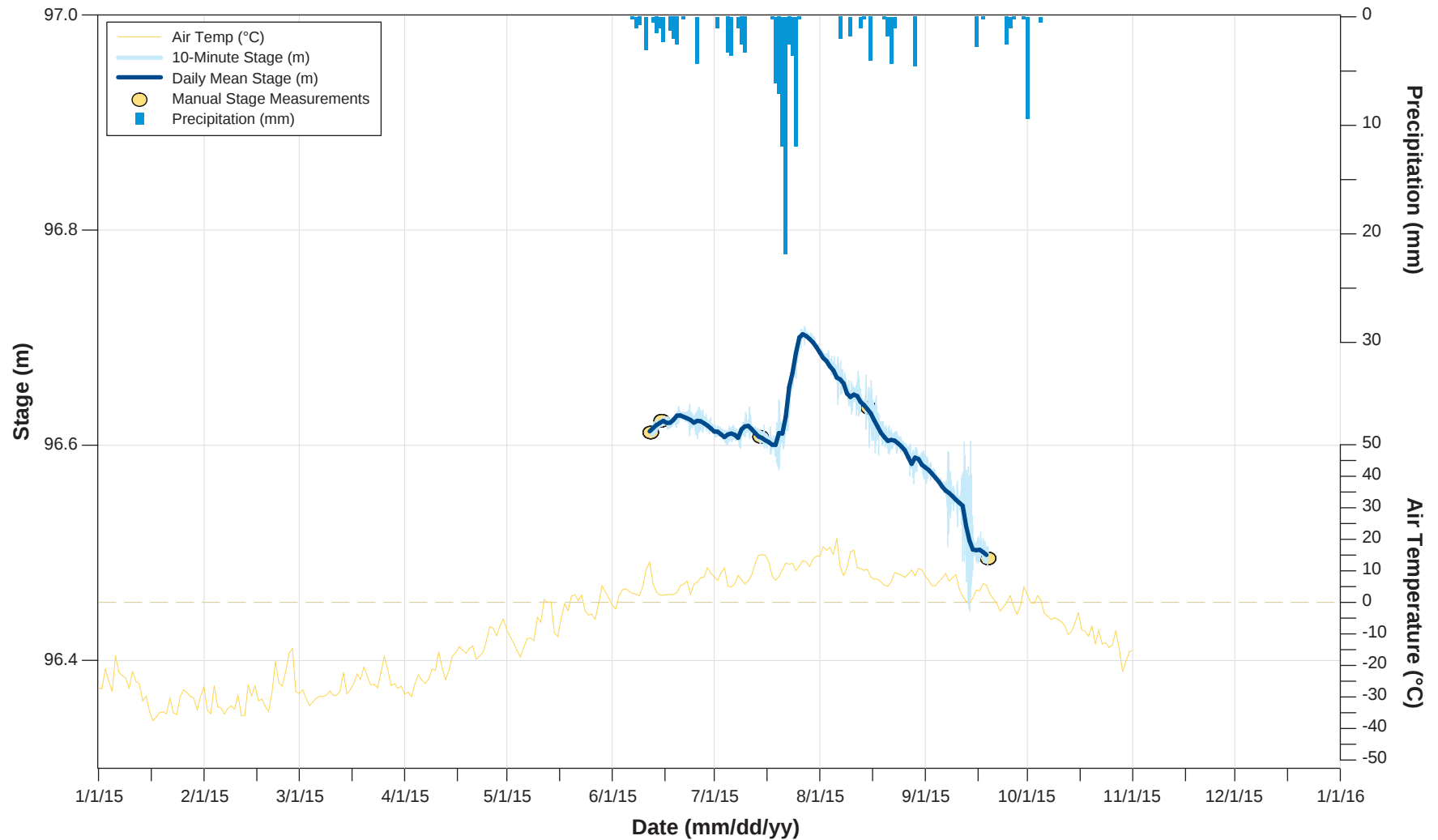
Figure 6
Stage Record at the TIA Station, Doris North Project, 2015



Notes: Precipitation and air temperature based on Doris Climate Station.
 Station installed July 15 and will record continuously throughout the winter.
 Data presented is from the beginning of the record to the last day of data collected during the final site visit (September 19).

Figure 7

Stage Record at Windy Lake Station, Doris North Project, 2015



Notes: Precipitation and air temperature based on Doris Climate Station.
 Station installed June 12 and demobilized for winter.
 Data presented is from the beginning of the record to the last day of data collected during the final site visit (September 19).

3.6 Comparison with Precipitation Data

The winter of 2014/2015 was an average precipitation year in the Arctic Tundra region according to Environment Canada's Climate Trends and Variations Bulletin (CTVB, EC 2015). The CTVB ranked the winter of 2014/2015 as the 30th wettest winter out of 68 years of record (10.9% above normal) for this region (EC 2015). This is consistent with the discharge record which shows peak flows during freshet within 15% of the average peak flows observed between 2009 and 2014.

The summer of 2015 was a wetter than average year (11th wettest out of a 68 year record, 12.6% above normal) in Arctic Tundra climatic region according to Environment Canada's CTVB. Precipitation recorded at the Doris Climate Station for the 2015 open water monitoring period (June to September) is compared with data from 2009 to 2014 in Table 9. This comparison shows the significance of the July precipitation, the majority of which occurred between July 20 and 26 (65.0 mm). The maximum daily rainfall during July 2015 was 21.8 mm and occurred on July 23.

Table 9. 2009 to 2015 Monthly Precipitation Recorded at the Doris Climate Station for the Open Water Season (June to September)

Month	Doris Climate Station Precipitation (mm)									
	2009 to 2014									2015
	2009	2010	2011	2012	2013	2014	Min	Mean	Max	
June	4.8	1.3	32.0	5.8	56.4	18.0	1.3	19.7	56.4	20.8
July	22.4	34.0	21.1	23.4	46.6	21.7	21.1	28.2	46.6	80.3
August	28.7	23.9	12.7	12.7	38.7	31.7	12.7	24.2	38.7	21.1
September	19.3	16.0	32.0	5.8	36.3	48.8	5.8	29.4	48.8	6.9

The effects of the July precipitation are clearly observed in the 2015 hydrographs and hydrologic indices. The July peak in the hydrographs suggests that similar streamflow was generated by the July rains as typically would result from freshet.

3.7 Data Quality Assurance and Control

The dynamic permafrost of the Canadian Arctic creates a challenging environment in which to collect hydrological data. Although great care is taken to minimize the uncertainty in the measurements and computed data presented in this report, it is not possible to eliminate it. Furthermore, the dynamic permafrost environment of the Project area provides a number of distinct challenges affecting data uncertainty. These challenges relate primarily to the following:

1. the stability of station infrastructure such as bench marks and water level sensors; and
2. the stability of channel banks and morphology.

A number of procedures were used, both in the field and in the office, to assess and assure data quality for each hydrometric station. Field QA/QC procedures include conducting two discharge measurements per site visit, following accepted water level surveying procedures, and conducting monthly bench mark surveys to assess bench mark stability (bench mark stability being critical to maximising stage measurement quality). Details regarding the standard methods

used for installing hydrometric stations, conducting stage-discharge measurements, and developing stage-discharge relationships for the Program are provided in the Doris North Project 2013 Hydrology Compliance Monitoring Report (ERM Rescan 2014).

Monthly bench mark surveys indicated that movement has occurred in the bench marks at stations TL-2, TL-3, and Windy Hydro. These bench marks are installed in large boulders, and the instability is likely the result of changes in the underlying permafrost and active layer caused by melting and/or frost heaving. Unstable bench marks result in increased uncertainty in surveyed water levels and stage-discharge relationships, and are a common challenge for hydrological studies in permafrost environments. Similarly, the stability of channel banks and channel morphology can also result in changes to the stage-discharge relationship. This is particularly true for small streams such as those measured in the Project area, where even small channel changes have the ability to alter the stage-discharge relationship. Any increase in uncertainty in the measurement of stage, discharge and the stage-discharge relationship propagates through the computations of discharge.

To further assess data quality, stage-discharge measurements were compared to existing stage-discharge relationships to evaluate the stability the existing relationships and identify potential erroneous measurements and/or outliers. For site TL-2, this comparison indicated that the 2015 measured data varied from the rating curve, although no individual outliers were identified in the 2015 data. It is hypothesized that minor channel instability may be the cause of the instability of the TL-2 stage-discharge relationship. Consequently, a new stage-discharge relationship was developed using only 2015 data. Sensor movements and drift were identified by instantaneous shifts in the water level record and by comparing the recorded and surveyed water levels, respectively. Minor corrections were made to the stage record to account for sensor movement and drift.

Similarly, no outliers within the 2015 measurements collected at station TL-3 were identified, however some variation between the 2015 data and the existing rating curve was observed. In this case, the stage-discharge relationship was updated by incorporating both the 2014 and 2015 data. A rating shift (a temporary change to the rating curve) was introduced for the 2015 July high-flow period to account for a change in flow condition related the decrease in snow-melt runoff between the TL-3 discharge measurement site and the monitoring station. Minor corrections were made to the stage record to account for sensor movement and drift.

At the Roberts Hydro station, all data collected in 2015 fell within 12% of the existing rating curve and the majority of the data (5 of 6 measurements) fell within 6% of the existing rating curve. Consequently, no changes were made to the relationship. Corrections were applied to the stage record to account for sensor movement/drift.

The uncertainty due to the movement of bench marks and changes in stream morphology is identified and minimized through the QA/QC procedures outlined above. Station TL-2 is also equipped with a satellite telemetry system which transmits recorded data hourly for daily review by ERM hydrologists. This data transmission allows near real-time plotting of hydrograph trends to screen for potential significant flow alterations, which can then be verified with site weather conditions. This desk-based screening of TL-2 data is then supplemented with monthly field flow measurements which include the QA/QC measures described above.

Recorded discharge at station TL-2 was used to determine the allowable pumping rate from the TIA to ensure that discharge from the TIA remained less than 10% of background flow levels. Changes to the TL-2 stage-discharge relationship for 2015 resulted in increased uncertainty in forecasting allowable pumping rates. A comparison of daily pumping rates for the season with computed discharge for site TL-2 is presented monthly and annually by TMAC as part of the NWB Monthly and Annual reports for 2AM-DOH1323.

4. SUMMARY

The 2015 open-water season was characterized by two distinct high flow periods. High flows generated by spring snow-melt (i.e., freshet) were observed in early June, with peak freshet occurring on June 15. A second peak in flows of equal or greater magnitude was generated by heavy rains in late July with peak flows for this period occurring on July 29. The winter of 2015 was a normal year in terms of precipitation (30th wettest out of 68 years), while the summer of 2015 was the 11th wettest in the past 68 years. Flows declined steadily from the end of July through the low-flow period of late August and September.

The observed runoff for the monitored watersheds ranged from 152 to 162 mm, and annual runoff ranged from 168 to 190 mm (Table 4). The annual runoff values for 2015 ranged from 43 to 65% higher than the 2009 to 2014 site-specific averages. Peak daily flows for the monitored stations ranged from 3.2 to 6.3 m³/s. These flows were approximately 4 to 7% below the 2009 to 2014 average at stations TL-2 and TL-3, respectively, and 12% above the 2009 to 2014 average at the Roberts Hydro station. These results suggest that the higher runoff values are due to the July rainfall event generating a second peak in flow and elevating flows for the remainder of the monitoring season, rather than abnormally high peak flows.

A summary of compliance target achievements is provided in Table 10. New sensors were installed at both Doris Lake and the TIA to allow for continuous water level monitoring at these stations. No equipment failures or technical problems occurred during the 2015 summer monitoring period resulting in zero missing data.

Table 10. Summary of Compliance Points

Compliance Requirement	Results
Doris North Project Certificate	
Appendix C. Proponent will monitor stage and discharge in Doris Outflow both upstream and downstream of the decant discharge point to provide information that can be used in assessing the accuracy of the impact predictions relating to fish habitat downstream.	Hydrometric station TL-2 is located upstream of the discharge location. Station TL-3 is located downstream of the discharge location. Each station collects and records stage at 10-minute intervals during the open water season. A minimum of eight discharge measurements were completed at each location and were used to convert recorded stage to discharge using a stage-discharge relationship.
Type A Water Licence 2AM-DOH1323	
Part G. Item 31. The Licensee shall, following the deposition of tailings, maintain water within the Tailings Impoundment Area at an elevation of least 28.3 metres above sea level such that a minimum of four (4) metres of water cover is maintained over the tailings at all times.	Though tailings have not yet been deposited in the TIA, water levels have been monitored almost continuously, with a data gap from September 8, 2013 to July, 2014 due to a datalogger malfunction and from September 18, 2014 to July 15, 2015 between when the temporary datalogger and pressure transducer were removed and the new sensor and datalogger were installed.
Part J. Item 2: The Licensee shall install appropriate instrumentation in Doris Creek at Monitoring Station TL-2, to monitor flow when ice conditions allow for such measurements to be taken, on a real time and continuous basis for any year where discharges from the Tailings Impoundment Area are planned.	Real time continuous monitoring was conducted at station TL-2 when ice conditions allowed, to provide flow predictions for TIA dewatering operations.
Part J. Item 3. The Licensee shall undertake the Water Monitoring Program detailed in the Tables of Schedule J ^a	Automated hydrometric stations TL-2 and TL-3 were operated throughout the open-water season in 2015. Stage-discharge measurements were collected at each site and annual discharge hydrographs were generated.
Type B Water Licence 2BB-HOP1222	
Part J. Item 9. The Licensee shall monitor water levels in Windy Lake during open water, in order to verify that additional water withdrawal for dust suppression activities does not result in drawdown beyond naturally occurring levels.	Automated hydrometric station Windy Hydro was operated throughout the open-water season in 2015. Stage measurements were collected at each site and the stage record for the monitoring season was generated.
Interim Water Management Plan	
Section 4.2: Continuous monitoring of Doris Lake water levels and outflows will continue under the hydrologic baseline characterization. These data will be used to calibrate the existing water balance and quality model.	Though mining has not yet commenced, water levels are continuously monitored in Doris Lake, although data from September 18 2015 to July 15, 2015 was discarded during the QA/QC review due to a sensor malfunction. A new sensor was installed on July 15, 2015. Doris Lake outflows were monitored at the automated TL-2 and TL-3 hydrometric stations throughout the open-water season in 2015. Stage discharge measurements were collected and annual discharge hydrographs were generated.

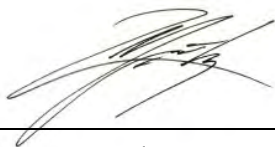
^a ERM monitors discharge at sites TL-2 and TL-3. All other requirements under this element are monitored by TMAC and presented elsewhere.

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– Appendix A –

Hydrometric Monitoring Station Information Sheets

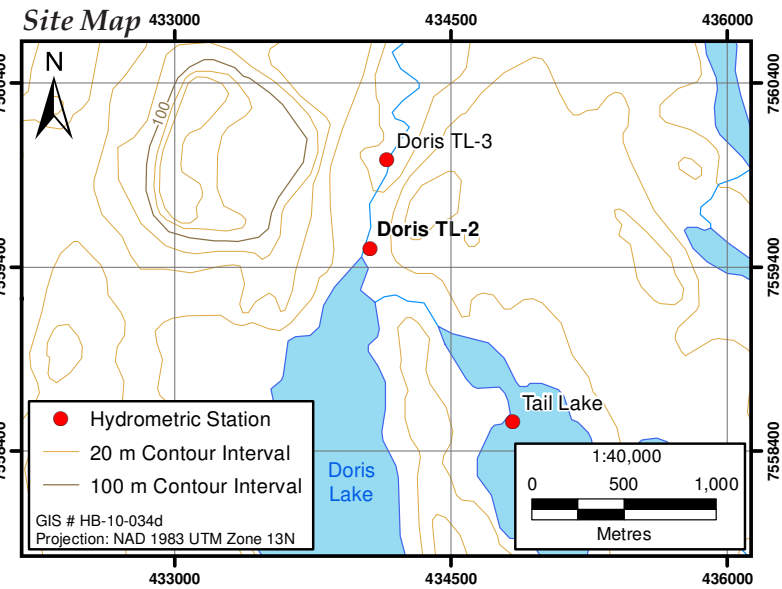
Figure A1

**Station Information Sheet for
Hydrometric Station Doris TL-2**

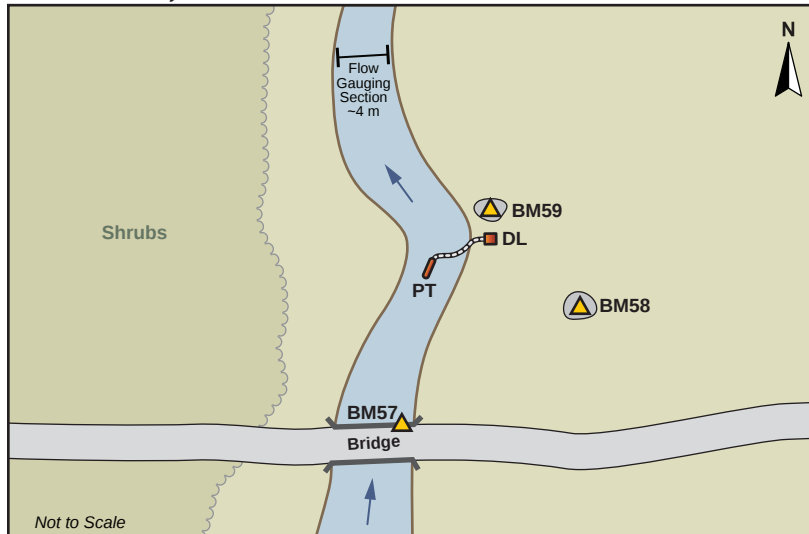


General Site Information

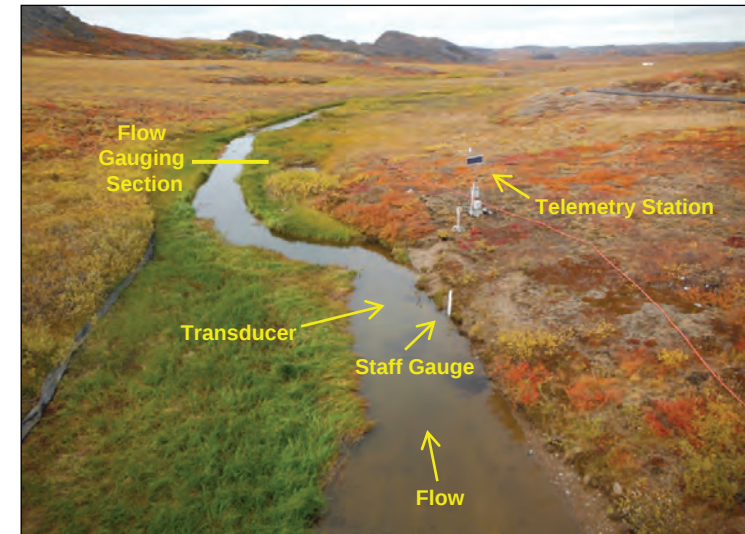
Site ID:	Doris TL-2	Drainage Area (km ²):	94.6
Site Location:	Doris Creek at Doris Lake outflow		
UTM:	NAD 83, Zone 13 W	434,059 E	7,559,504 N
Benchmarks	Elevation	Description	
BM59	100.000	Bolt in boulder	
BM58	100.593	Bolt in boulder	
BM57	102.608	Underside of bridge (right bank)	
Transducer:	PS9800		Data Logger: HOBO Energy Pro
Operating Period: 1996-1998, 2000, 2003-2015			
2015	June 10-September 22		
General Comments:			
- Access by Tail Lake road - Transducer is paired with satellite telemetry station for real-time data monitoring during open water season (sat. receiver needs replacement) - Flow gauging section is approximately 30 m downstream from station - High water flow gauging section approximately 80 m downstream from station			



Plan View of Site



Site Photo



Doris TL-2. View is downstream (north).

Figure A2

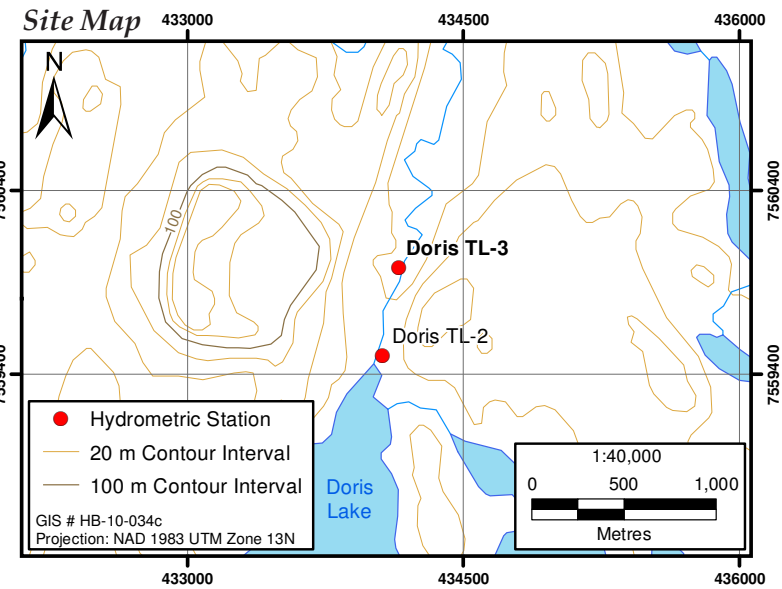
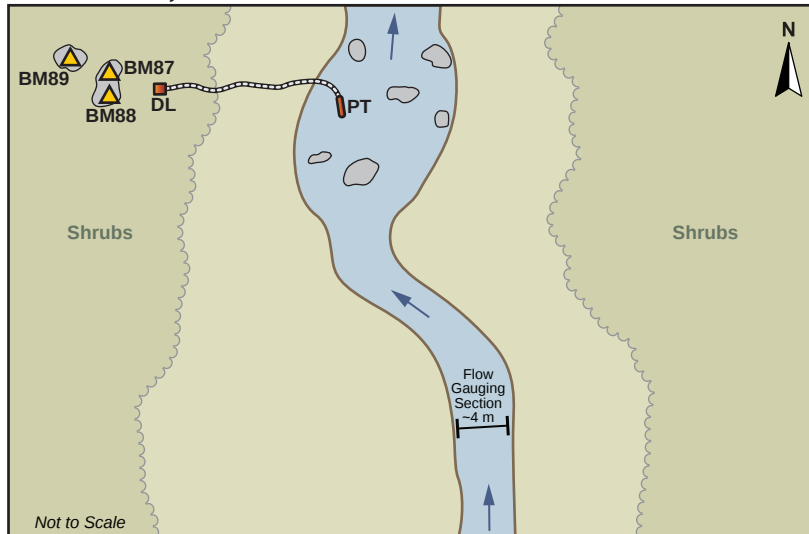
**Station Information Sheet for
Hydrometric Station Doris TL-3**



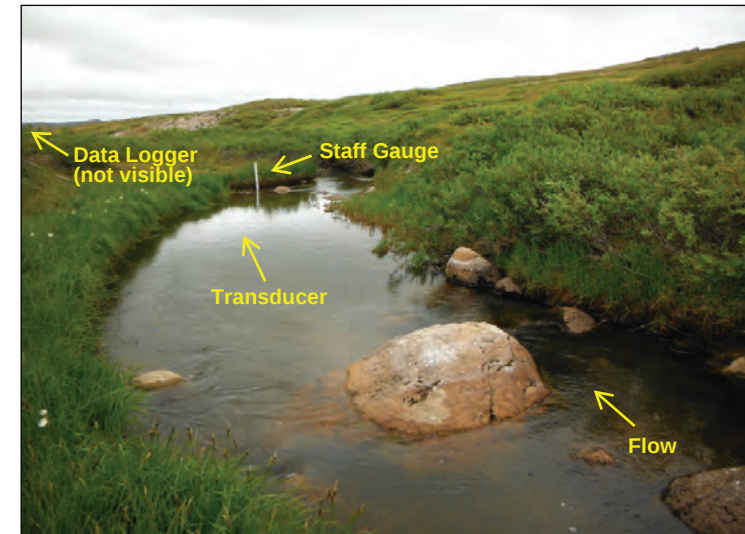
General Site Information

Site ID:	Doris TL-3	Drainage Area (km ²):	95.3
Site Location:	Doris Creek downstream from waterfall		
UTM:	NAD 83, Zone 13 W	434,204 E	7,559,985 N
Benchmarks	Elevation	Description	
BM87	100.000	Bolt in boulder	
BM88	100.945	Bolt in boulder	
BM89	100.277	Bolt in boulder	
Transducer and Data Logger:	PT2x		
Operating Period: 2011-2015			
2015	June 11-September 20		
General Comments:			
- Access by foot from Tail Lake road (approximately 500 m downstream from Doris Creek bridge and station Doris TL-2) or by helicopter - Wadeable under most flow conditions (Drysuit at high flow) - Flow gauging section is approximately 20 m upstream from station			

Plan View of Site



Site Photo



Doris TL-3. View is downstream (north).

Figure A3

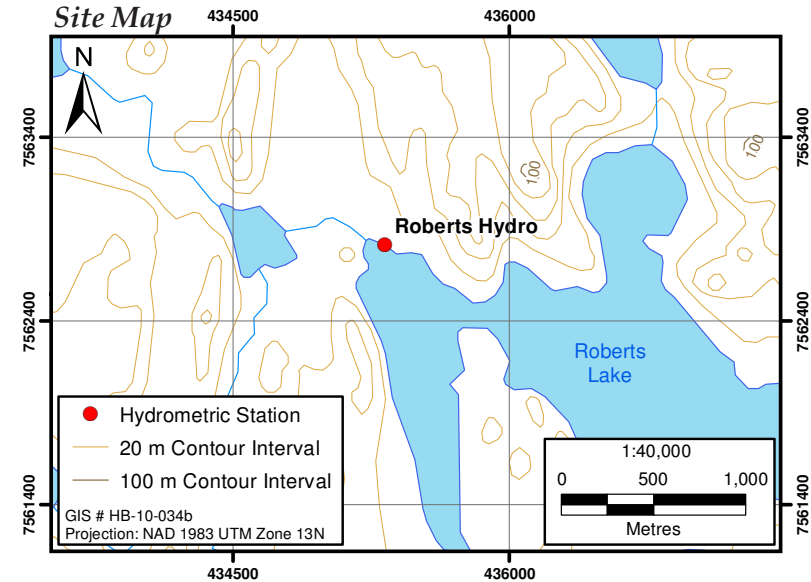
**Station Information Sheet for
Hydrometric Station Roberts Hydro**



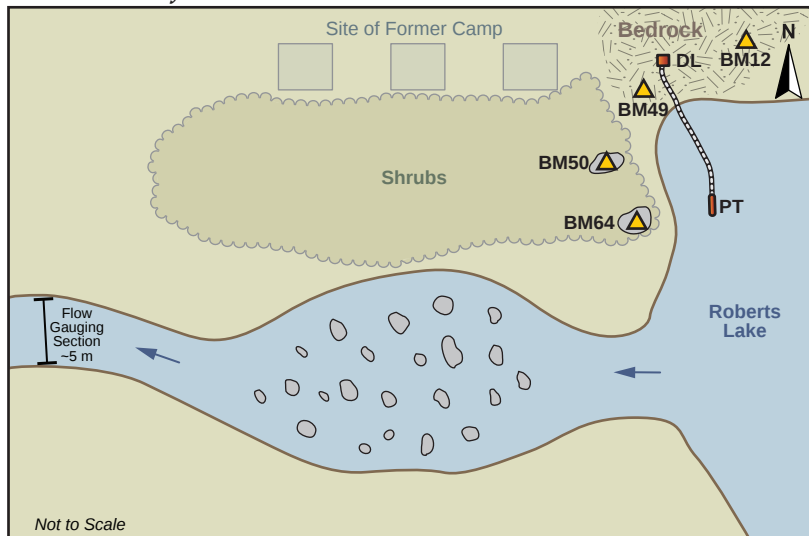
General Site Information

Site ID:	Roberts Hydro	Drainage Area (km²):	97.9
Site Location:	Roberts Lake outflow		
UTM:	NAD 83, Zone 13 W	435,325 E	7,562,815 N
Benchmarks	Elevation	Description	
BM49	100.000	Bolt in bedrock	
BM50	100.077	Bolt in boulder	
BM64	99.813	Bolt in boulder	
BM12	100.059	Bolt in bedrock	
Transducer and Data Logger:	PT2x		
Operating Period: 2003-2015			
2015	June 18 – September 21		
General Comments:			
- Access by helicopter - Wadeable under most flow conditions (Drysuit at high flows) - Flow gauging section is approximately 80 m downstream from lake outlet			

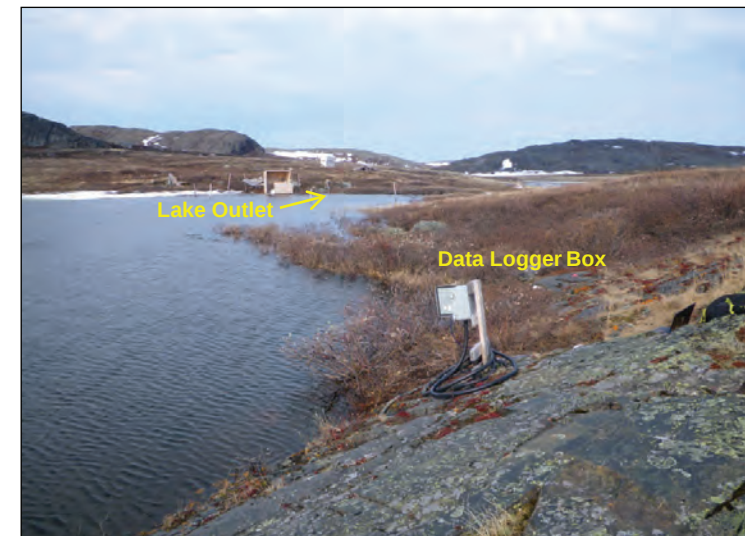
Site Map



Plan View of Site



Site Photo



Roberts Hydro. View is northwest towards lake outlet.

Figure A4

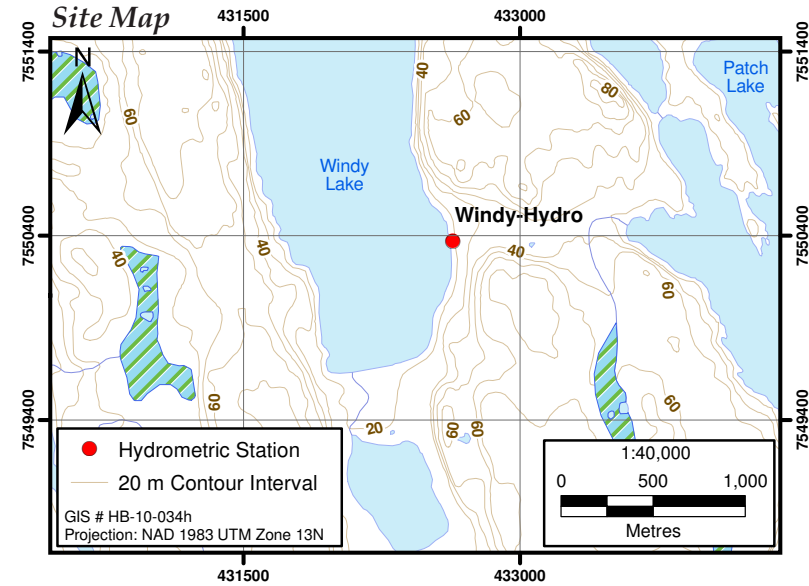
**Station Information Sheet for
Hydrometric Station Windy Hydro**



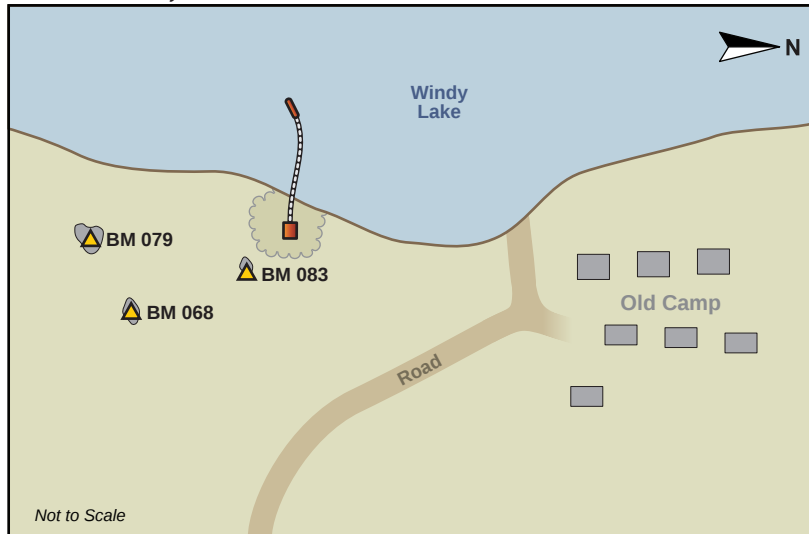
General Site Information

Site ID:	Windy Hydro	Drainage Area (km²):	14.1
Site Location:	Windy Lake outflow		
UTM:	NAD 83, Zone 13 W	432,636 E	7,550,371 N
Benchmarks	Elevation	Description	
BM79	100.012	Bolt in boulder	
BM68	100.060	Bolt in boulder	
BM83	99.057	Bolt in boulder	
Transducer and Data Logger:	PT2x		
Operating Period: 2006-2015			
2015	June 12-September 19		
General Comments:			
- Access is by Windy Lake Road - Station was relocated in 2015 to near the old Windy Camp. - As of 2015 the station monitors lake levels only, no flow measurements are taken at this location			

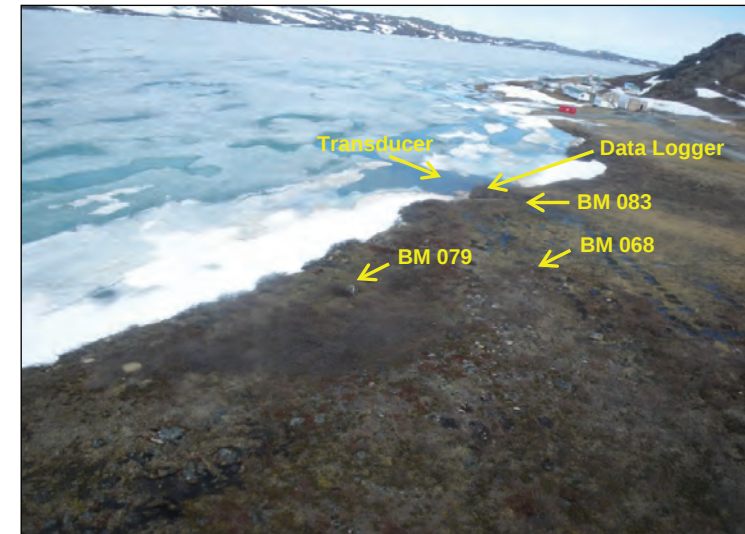
Site Map



Plan View of Site



Site Photo



Windy Hydro. View is northwest.

Figure A5

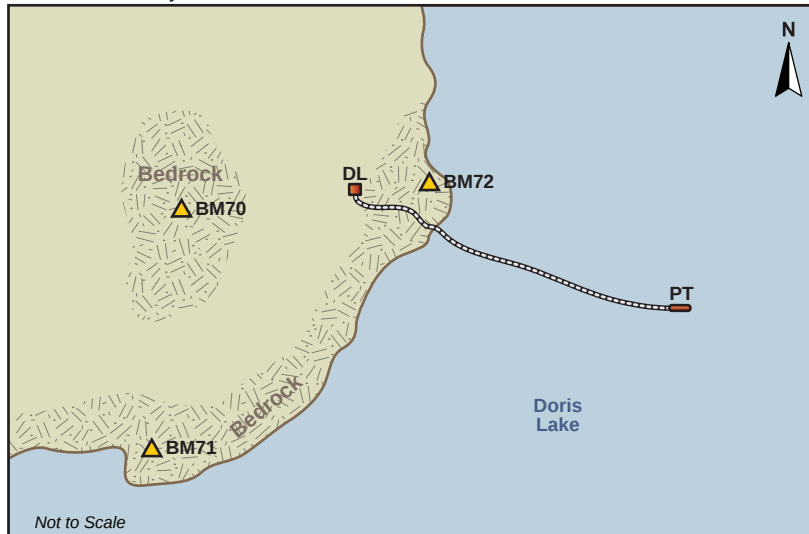
Station Information Sheet for Hydrometric Station Doris Lake



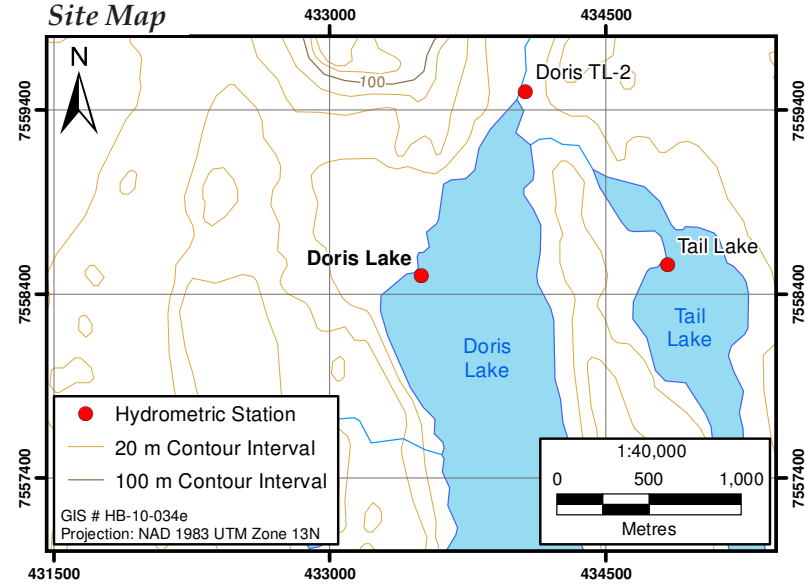
General Site Information

Site ID:	Doris Lake	Drainage Area (km ²):	94.6
Site Location:	Northwest shore of Doris Lake near Doris Camp		
UTM:	NAD 83, Zone 13 W	433,512 E	7,558,452 N
Benchmarks	Elevation	Description	
BM70	100.000	Bolt in bedrock	
BM71	99.243	Bolt in bedrock	
BM72	98.550	Bolt in bedrock	
Transducer:	KPSI 730-series	Data Logger:	DD-320
Operating Period: 2004-2015			
2015	July 15 onward (continuous operation)		
General Comments:			
- Access by foot from Doris Lake boat ramp - Station monitors lake levels only, no flow measurements are taken at this location - Station operates continuously; transducer is installed approximately 5 m deep to prevent ice damage. - Transducer was replaced in 2015			

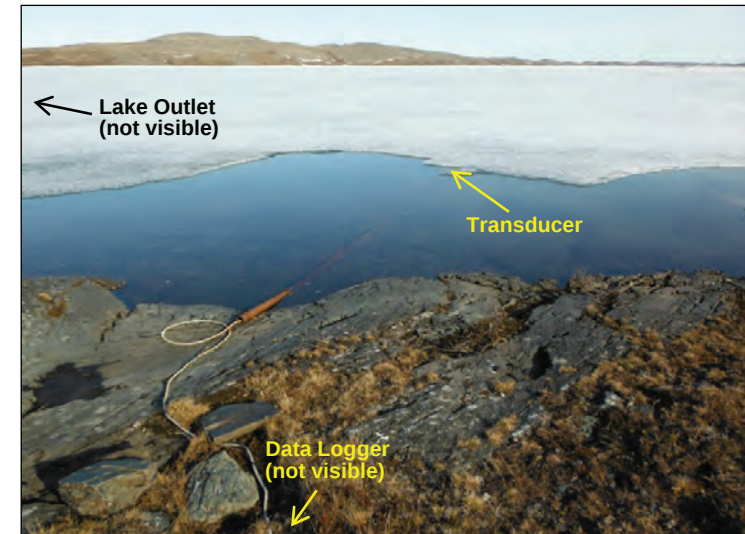
Plan View of Site



Site Map



Site Photo



Doris Lake. View is east.

Figure A6

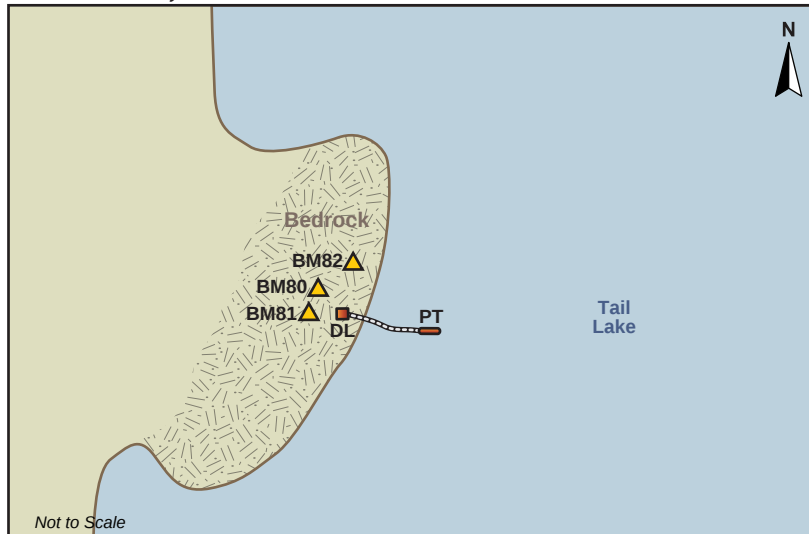
Station Information Sheet for Hydrometric Station Tail Lake



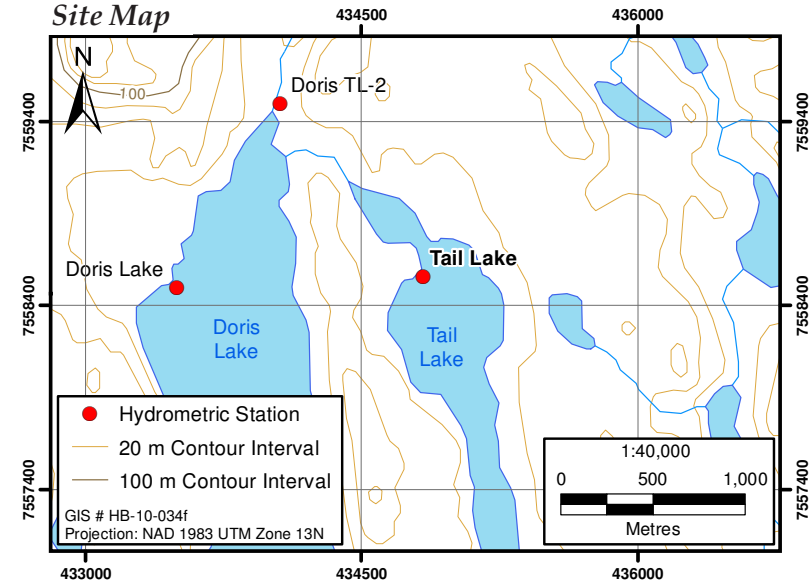
General Site Information

Site ID:	Tail Lake	Drainage Area (km ²):	4.2
Site Location:	Northwest shore of Tail Lake		
UTM:	NAD 83, Zone 13 W	434,832 E	7,558,560 N
Benchmarks	Elevation	Description	
BM80	100.000	Bolt in bedrock	
BM81	97.480	Bolt in bedrock	
BM82	98.173	Bolt in bedrock	
Transducer:	KPSI 730-series	Data Logger:	DD-320
Operating Period: 2004-2015			
2015	July 15 onward (continuous operation)		
General Comments:			
- Access by foot from North Dam (station is approximately 800 m south of dam) or by helicopter - Station monitors lake levels only, no flow measurements are taken at this location - Station operates continuously; transducer is installed approximately 5 m deep to prevent ice damage - Transducer replaced in 2015			

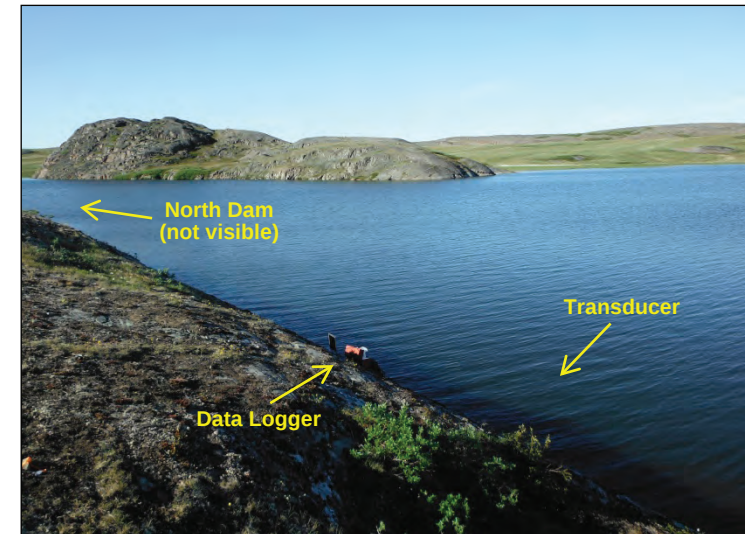
Plan View of Site



Site Map



Site Photo



Tail Lake. View is northeast.

– Appendix B –

Manual Stage and Discharge Measurements

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay					Measurement Time	Start	14:15	End	15:00	Location	Approximately 60 m upstream of PT					
Station Identification	TL-2					Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow					Flow Meter Type	Electromagnetic				Instrument Serial #	2007528					
Date Monitored	10-Jun-15					Real Time Reading	Start	Reading	1.2344	Time	12:45	Staff Gauge (m)			0.675		
Time at Site (24 hr)	Start Time:	9:45	End Time:	16:45		(m)	End	Reading	1.2316	Time	16:00	Time of SG Reading			12:45		
Personnel	Greg Langston and Coby Hall							Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation			No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions	434059	7559504	23			1	Right Bank	1.15	0.00	0.0	0.00	0			0.000	0.0	
	Sunny, moderate southwest wind.					2		1.30	0.07	0.2	0.01	-0.01			0.000	0.0	
						3		1.50	0.20	0.2	0.05	0.24			0.012	0.5	
						4		1.80	0.31	0.3	0.09	0.27			0.025	1.1	
						5		2.10	0.45	0.3	0.14	0.72			0.097	4.2	
						6		2.40	0.50	0.3	0.15	0.81			0.122	5.2	
						7		2.70	0.56	0.3	0.17	0.95			0.160	6.8	
						8		3.00	0.61	0.3	0.17	1.04			0.174	7.5	
Transducer Information						9		3.25	0.64	0.3	0.16	1.09			0.174	7.5	
DL Model	Hobo	PT Serial #	21041003			10		3.50	0.65	0.3	0.16	1.14			0.185	7.9	
Gain	0	Offset	0			11		3.75	0.66	0.3	0.17	1.1			0.182	7.8	
Status	Logging	Battery	100%			12		4.00	0.64	0.3	0.16	1.16			0.186	7.9	
# of Records	n/a	Memory Free	n/a			13		4.25	0.50	0.3	0.13	1.17			0.146	6.3	
DL Service Performed	n/a	Crest Gauges	n/a			14		4.50	0.52	0.3	0.13	1.25			0.163	6.9	
Hydrometric Leveling Survey						15		4.75	0.60	0.3	0.15	1.19			0.179	7.6	
						16		5.00	0.64	0.3	0.14	0.8			0.115	4.9	
						17		5.20	0.57	0.2	0.11	0.53			0.060	2.6	
						18		5.40	0.32	0.2	0.08	1.21			0.097	4.1	
						19		5.70	0.24	0.3	0.07	1.22			0.088	3.8	
						20		6.00	0.18	0.3	0.05	1.07			0.058	2.5	
						21		6.30	0.18	0.3	0.05	1.02			0.055	2.4	
						22		6.60	0.18	0.3	0.06	0.78			0.046	2.0	
						23		6.95	0.13	0.4	0.03	0.51			0.015	0.6	
						24		7.05	0.08	0.1	0.01	0.15			0.001	0.0	
						25	Left Bank	7.10	0.00	0.0	0.00	0			0.000	0.0	
						26											
						27											
						28											
						29											
						30											
						BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31						
BM 59	100	100.000	0.000	Established May 25, 2015	32												
BM 58	100.593	100.575	-0.018	Established May 25, 2015	33												
BM 57	102.608	102.587	-0.021	Established May 25, 2015	Total Q											2.338	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.322				First visit of the season. Real-time station installed.											
Stage from WL Survey (m)		99.175															
Pressure Transducer Reading (m)		1.233															
Pressure Transducer Elevation (m)		97.942															
Discharge (m³/s)		2.338															
Cross Sectional Area		2.440															
Average Velocity		0.958															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method												
Project Name		Hope Bay				Measurement Time		Start	15:00	End	16:00	Location	Approximately 60 m upstream of PT					
Station Identification		TL-2				Method		Velocity-area (Mid-section)				Instrument Model		Flo-mate 2000				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic				Instrument Serial #		2007528				
Date Monitored		10-Jun-15				Real Time Reading		Start	Reading	1.2344	Time	12:45	Staff Gauge (m)		0.675			
Time at Site (24 hr)		Start Time:	9:45	End Time:	16:45	(m)	End	Reading	1.2316	Time	16:00	Time of SG Reading		12:45				
Personnel		Greg Langston, Coby Hall						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%		
Weather Conditions		Sunny, moderate southwest wind.				1	Right Bank	1.15	0.00	0.0	0.00	0			0.000	0.0		
						2		1.40	0.09	0.3	0.02	-0.01			0.000	0.0		
						3		1.70	0.27	0.3	0.08	0.24			0.019	0.8		
DL Model		Hobo	PT Serial #		21041003	4		2.00	0.44	0.3	0.13	0.27			0.036	1.5		
Gain		0	Offset		0	5		2.30	0.48	0.3	0.14	0.72			0.104	4.4		
Status		Logging	Battery		100%	6		2.60	0.57	0.3	0.17	0.81			0.139	5.9		
# of Records		n/a	Memory Free		n/a	7		2.90	0.60	0.3	0.17	0.95			0.157	6.7		
DL Service Performed		n/a	Crest Gauges		n/a	8		3.15	0.62	0.3	0.16	1.04			0.161	6.9		
Hydrometric Leveling Survey						9		3.40	0.74	0.3	0.19	1.09			0.202	8.6		
Stn	BS	HI	FS	Elevation	Notes	10		3.65	0.66	0.3	0.17	1.14			0.188	8.1		
BM 59	1.657	101.657		100.000		11		3.90	0.64	0.3	0.16	1.1			0.176	7.5		
BM 58			1.082	100.575		12		4.15	0.58	0.3	0.15	1.16			0.168	7.2		
BM 57			-0.929	102.586		13		4.40	0.52	0.3	0.13	1.17			0.152	6.5		
PT			3.485	98.172		14		4.65	0.57	0.3	0.14	1.25			0.178	7.6		
WL			2.482	99.175		15		4.90	0.64	0.3	0.16	1.19			0.190	8.2		
SG			2.151	99.506		16		5.15	0.58	0.3	0.15	0.8			0.116	5.0		
						17		5.40	0.30	0.3	0.08	0.53			0.044	1.9		
						18		5.70	0.26	0.3	0.08	1.21			0.094	4.0		
						19		6.00	0.18	0.3	0.05	1.22			0.066	2.8		
TBM			1.743	99.914		20		6.30	0.18	0.3	0.05	1.07			0.058	2.5		
TBM	1.624	101.538				21		6.60	0.20	0.3	0.06	1.02			0.061	2.6		
BM 59			1.538	100.000		22		6.90	0.12	0.3	0.03	0.78			0.021	0.9		
BM 58			0.963	100.575		23		7.05	0.09	0.1	0.01	0.51			0.005	0.2		
BM 57			-1.050	102.588		24	Left Bank	7.10	0.00	0.0	0.00	0.15			0.000	0.0		
PT			3.368	98.170		25												
WL			2.364	99.174		26												
SG			2.034	99.504		27												
						28												
						29												
						30												
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31												
BM 59	100	100.000		0.000	Established May 25, 2015	32												
BM 58	100.593	100.575		-0.018	Established May 25, 2015	33												
BM 57	102.608	102.587		-0.021	Established May 25, 2015	Total Q											2.334	100.0
Summary						General Notes												
Staff Gauge Reading (m)		0.322				First visit of the season. Real-time station installed.												
Stage from WL Survey (m)		99.175																
Pressure Transducer Reading (m)		1.233																
Pressure Transducer Elevation (m)		97.942																
Discharge (m³/s)		2.334																
Cross Sectional Area		2.470																
Average Velocity		0.945																

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	9:45	End	10:30	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Swoffer					
Stream Name	Doris Lake Outflow				Flow Meter Type	Propeller				Instrument Serial #	6733					
Date Monitored	12-Jun-15				Real Time Reading	Start	Reading	1.2714	Time	9:45	Staff Gauge (m)	0.700				
Time at Site (24 hr)	Start Time:	9:45	End Time:	11:00	(m)	End	Reading	1.2742	Time	10:30	Time of SG Reading	9:45				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Mainly sunny, warm.				1	Right Bank	0.90	0.00	0.0	0.00	0			0.000	0.0	
					2		1.10	0.11	0.2	0.02	0			0.000	0.0	
					3		1.30	0.16	0.2	0.04	0.31			0.012	0.5	
					4		1.60	0.35	0.3	0.11	0.37			0.039	1.6	
					5		1.90	0.52	0.3	0.14	0.61			0.087	3.5	
					6		2.15	0.54	0.3	0.14	0.87			0.117	4.7	
					7		2.40	0.58	0.3	0.15	0.99			0.144	5.8	
					8		2.65	0.61	0.3	0.15	0.93			0.142	5.7	
					9		2.90	0.63	0.3	0.16	0.98			0.154	6.2	
					10		3.15	0.66	0.3	0.17	1.03			0.170	6.8	
					11		3.40	0.70	0.3	0.18	1.06			0.186	7.5	
					12		3.65	0.72	0.3	0.18	1.01			0.182	7.3	
					13		3.90	0.65	0.3	0.16	1.1			0.179	7.2	
					14		4.15	0.51	0.3	0.13	1.17			0.149	6.0	
					15		4.40	0.56	0.3	0.14	1.14			0.160	6.4	
					16		4.65	0.62	0.3	0.16	1.07			0.166	6.7	
					17		4.90	0.67	0.3	0.17	0.78			0.131	5.3	
					18		5.15	0.40	0.3	0.10	1.14			0.114	4.6	
					19		5.40	0.34	0.3	0.09	1.09			0.093	3.7	
					20		5.65	0.29	0.3	0.07	0.97			0.070	2.8	
					21		5.90	0.19	0.3	0.05	0.98			0.047	1.9	
					22		6.15	0.19	0.3	0.05	0.98			0.047	1.9	
					23		6.40	0.19	0.3	0.05	0.99			0.047	1.9	
					24		6.65	0.18	0.3	0.05	1.03			0.046	1.9	
					25		6.90	0.12	0.3	0.03	0.17			0.005	0.2	
					26	Left Bank	7.10	0.00	0.2	0.00	0			0.000	0.0	
					27											
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.001	0.000		32											
BM 58	100.593	100.577	-0.016		33											
BM 57	102.608	102.588	-0.020		Total Q										2.485	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.700														
Stage from WL Survey (m)		99.203														
Pressure Transducer Reading (m)		1.272														
Pressure Transducer Elevation (m)		97.932														
Discharge (m ³ /s)		2.485														
Cross Sectional Area		2.645														
Average Velocity		0.940														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	10:30	End	11:00	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		Swoffer				
Stream Name		Doris Lake Outflow				Flow Meter Type		Propeller			Instrument Serial #		6733				
Date Monitored		12-Jun-15				Real Time Reading		Start	Reading	1.2714	Time	10:30	Staff Gauge (m)		0.703		
Time at Site (24 hr)		Start Time:	9:45	End Time:	11:30	(m)	End	Reading	1.2742	Time	11:00	Time of SG Reading		11:00			
Personnel		Coby Hall, Greg Langston						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Mainly sunny, warm				1	Right Bank	0.90	0.00	0.0	0.00	0			0.000	0.0	
						2		1.25	0.16	0.4	0.06	0.17			0.010	0.4	
						3		1.60	0.37	0.4	0.12	0.32			0.038	1.5	
DL Model		Hobo	PT Serial #		21041003	4		1.90	0.51	0.3	0.17	0.66			0.109	4.2	
Gain		0	Offset		0	5		2.25	0.58	0.4	0.17	0.86			0.150	5.8	
Status		Logging	Battery		100%	6		2.50	0.60	0.3	0.15	0.96			0.144	5.6	
# of Records		n/a	Memory Free		n/a	7		2.75	0.63	0.3	0.16	0.93			0.146	5.7	
DL Service Performed		n/a	Crest Gauges		n/a	8		3.00	0.62	0.3	0.16	1.07			0.166	6.4	
Hydrometric Leveling Survey						9		3.25	0.70	0.3	0.18	1.08			0.189	7.3	
Stn	BS	HI	FS	Elevation	Notes	10		3.50	0.71	0.3	0.18	1.09			0.193	7.5	
BM 59	1.675	101.675		100.000		11		3.75	0.66	0.3	0.17	1.06			0.175	6.8	
BM 58			1.099	100.576		12		4.00	0.62	0.3	0.16	1.12			0.174	6.7	
BM 57			-0.912	102.587		13		4.25	0.52	0.3	0.13	1.12			0.146	5.7	
PT			3.526	98.149		14		4.50	0.58	0.3	0.15	1.17			0.170	6.6	
WL			2.473	99.202		15		4.75	0.65	0.3	0.16	1.23			0.200	7.8	
SG			2.167	99.508		16		5.00	0.59	0.3	0.15	0.65			0.096	3.7	
						17		5.25	0.30	0.3	0.08	1.38			0.104	4.0	
						18		5.50	0.32	0.3	0.09	1.26			0.111	4.3	
						19		5.80	0.20	0.3	0.06	1.25			0.075	2.9	
TBM			2.170	99.505		20		6.10	0.20	0.3	0.06	1.03			0.062	2.4	
TBM	2.062	101.567				21		6.40	0.20	0.3	0.06	1.15			0.069	2.7	
BM 59			1.566	100.001		22		6.70	0.16	0.3	0.04	0.95			0.038	1.5	
BM 58			0.989	100.578		23		6.90	0.14	0.2	0.03	0.44			0.012	0.5	
BM 57			-1.021	102.588		24	Left Bank	7.10	0.00	0.2	0.00	0			0.000	0.0	
PT			3.422	98.145		25											
WL			2.363	99.204		26											
SG			2.059	99.508		27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.001		0.000		32											
BM 58	100.593	100.577		-0.016		33											
BM 57	102.608	102.588		-0.020		Total Q										2.576	100.0
Summary						General Notes											
Staff Gauge Reading (m)			0.700														
Stage from WL Survey (m)			99.203														
Pressure Transducer Reading (m)			1.272														
Pressure Transducer Elevation (m)			97.932														
Discharge (m³/s)			2.576														
Cross Sectional Area			2.647														
Average Velocity			0.973														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	6:45	End	7:15	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592					
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	1.285	Time	6:45	Staff Gauge (m)	0.711				
Time at Site (24 hr)	Start Time:	6:00	End Time:	8:30	(m)	End	Reading	1.285	Time	7:20	Time of SG Reading	7:20				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Sunny, light north wind.				1	Right Bank	0.80	0.00	0.0	0.00	0			0.000	0.0	
					2		1.00	0.08	0.2	0.02	-0.04			-0.001	0.0	
					3		1.25	0.14	0.3	0.04	0.3			0.011	0.4	
					4		1.50	0.20	0.3	0.05	0.74			0.037	1.5	
					5		1.75	0.53	0.3	0.13	0.22			0.029	1.1	
					6		2.00	0.53	0.3	0.13	0.72			0.095	3.7	
					7		2.25	0.56	0.3	0.14	0.9			0.126	4.9	
					8		2.50	0.57	0.3	0.14	0.97			0.138	5.4	
					9		2.75	0.56	0.3	0.14	0.97			0.136	5.3	
					10		3.00	0.70	0.3	0.18	0.96			0.168	6.6	
					11		3.25	0.73	0.3	0.18	1.11			0.203	7.9	
					12		3.50	0.73	0.3	0.18	1.07			0.195	7.7	
					13		3.75	0.64	0.3	0.16	1.11			0.178	7.0	
					14		4.00	0.56	0.3	0.14	1.11			0.155	6.1	
					15		4.25	0.53	0.3	0.13	1.15			0.152	6.0	
					16		4.50	0.58	0.3	0.15	1.17			0.170	6.7	
					17		4.75	0.62	0.3	0.16	1.24			0.192	7.5	
					18		5.00	0.60	0.3	0.15	0.61			0.092	3.6	
					19		5.25	0.47	0.3	0.12	1.21			0.142	5.6	
					20		5.50	0.28	0.3	0.07	1.26			0.088	3.5	
					21		5.75	0.22	0.3	0.06	1.11			0.061	2.4	
					22		6.00	0.20	0.3	0.05	0.99			0.050	1.9	
					23		6.25	0.20	0.3	0.05	1.14			0.057	2.2	
					24		6.50	0.20	0.3	0.05	1.09			0.055	2.1	
					25		6.75	0.16	0.3	0.03	0.67			0.021	0.8	
					26		6.90	0.14	0.2	0.02	0			0.000	0.0	
					27	Left Bank	7.10	0.00	0.2	0.00	0			0.000	0.0	
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.001	0.000		32											
BM 58	100.593	100.578	-0.016		33											
BM 57	102.608	102.590	-0.019		Total Q										2.550	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.711														
Stage from WL Survey (m)		99.213														
Pressure Transducer Reading (m)		1.272														
Pressure Transducer Elevation (m)		97.941														
Discharge (m ³ /s)		2.550														
Cross Sectional Area		2.662														
Average Velocity		0.958														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	7:20	End	8:00	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592					
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	1.285	Time	7:20	Staff Gauge (m)	0.711				
Time at Site (24 hr)	Start Time:	6:00	End Time:	8:30	(m)	End	Reading	1.285	Time	8:00	Time of SG Reading	7:20				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Sunny, light north wind.				1	Right Bank	0.80	0.00	0.0	0.00	0			0.000	0.0	
					2		1.10	0.12	0.3	0.03	-0.02			-0.001	0.0	
					3		1.25	0.14	0.2	0.03	0.33			0.009	0.4	
					4		1.50	0.19	0.3	0.05	0.75			0.036	1.4	
					5		1.75	0.52	0.3	0.13	0.14			0.018	0.7	
					6		2.00	0.53	0.3	0.13	0.76			0.101	3.8	
					7		2.25	0.53	0.3	0.13	0.86			0.114	4.4	
					8		2.50	0.52	0.3	0.13	1.03			0.134	5.1	
					9		2.75	0.60	0.3	0.15	1.01			0.152	5.8	
					10		3.00	0.70	0.3	0.18	1			0.175	6.7	
					11		3.25	0.70	0.3	0.18	1.1			0.193	7.4	
					12		3.50	0.70	0.3	0.18	1.16			0.203	7.8	
					13		3.75	0.72	0.3	0.18	1.15			0.207	7.9	
					14		4.00	0.66	0.3	0.17	1.18			0.195	7.4	
					15		4.25	0.51	0.3	0.13	1.31			0.167	6.4	
					16		4.50	0.56	0.3	0.14	1.19			0.167	6.4	
					17		4.75	0.62	0.3	0.16	1.33			0.206	7.9	
					18		5.00	0.66	0.3	0.17	0.57			0.094	3.6	
					19		5.25	0.43	0.3	0.11	0.93			0.100	3.8	
					20		5.50	0.28	0.3	0.08	1.26			0.097	3.7	
					21		5.80	0.21	0.3	0.06	1.22			0.077	2.9	
					22		6.10	0.19	0.3	0.06	1.08			0.062	2.4	
					23		6.40	0.20	0.3	0.06	1.13			0.068	2.6	
					24		6.70	0.19	0.3	0.05	0.9			0.043	1.6	
					25		6.90	0.14	0.2	0.03	0.12			0.003	0.1	
					26	Left Bank	7.10	0.00	0.2	0.00	0			0.000	0.0	
					27											
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.001	0.000		32											
BM 58	100.593	100.578	-0.016		33											
BM 57	102.608	102.590	-0.019		Total Q										2.618	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.711														
Stage from WL Survey (m)		99.213														
Pressure Transducer Reading (m)		1.272														
Pressure Transducer Elevation (m)		97.941														
Discharge (m ³ /s)		2.618														
Cross Sectional Area		2.675														
Average Velocity		0.979														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	7:45	End	8:15	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592					
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading	1.3085	Time	7:45	Staff Gauge (m)	0.711				
Time at Site (24 hr)	Start Time:	7:30	End Time:	9:30	(m)	End	Reading	1.2962	Time	8:15	Time of SG Reading	7:20				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Foggy and cool.				1	Right Bank	2.00	0.00	0.0	0.00	0			0.000	0.0	
					2		2.40	0.12	0.4	0.04	0.09			0.004	0.1	
					3		2.70	0.18	0.3	0.05	0.64			0.035	1.2	
					4		3.00	0.53	0.3	0.15	0.24			0.035	1.3	
					5		3.25	0.55	0.3	0.14	0.74			0.102	3.6	
					6		3.50	0.56	0.3	0.14	0.9			0.126	4.5	
					7		3.75	0.52	0.3	0.13	1.02			0.133	4.7	
					8		4.00	0.60	0.3	0.15	1.05			0.158	5.6	
					9		4.25	0.72	0.3	0.18	1.04			0.187	6.7	
					10		4.50	0.72	0.3	0.18	1.17			0.211	7.5	
					11		4.75	0.74	0.3	0.19	1.14			0.211	7.5	
					12		5.00	0.73	0.3	0.18	1.19			0.217	7.8	
					13		5.25	0.67	0.3	0.17	1.25			0.209	7.5	
					14		5.50	0.54	0.3	0.14	1.33			0.180	6.4	
					15		5.75	0.56	0.3	0.14	1.34			0.188	6.7	
					16		6.00	0.62	0.3	0.16	1.35			0.209	7.5	
					17		6.25	0.68	0.3	0.17	0.57			0.097	3.5	
					18		6.50	0.42	0.3	0.11	1.2			0.126	4.5	
					19		6.75	0.28	0.3	0.07	1.3			0.091	3.3	
					20		7.00	0.23	0.3	0.06	1.26			0.072	2.6	
					21		7.25	0.21	0.3	0.05	1.16			0.061	2.2	
					22		7.50	0.20	0.3	0.05	1.08			0.054	1.9	
					23		7.75	0.22	0.3	0.06	1.12			0.062	2.2	
					24		8.00	0.18	0.3	0.05	0.72			0.032	1.2	
					25		8.25	0.08	0.3	0.02	-0.1			-0.002	-0.1	
					26	Left Bank	8.40	0.00	0.2	0.00	0			0.000	0.0	
					27											
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.000	0.000		32											
BM 58	100.593	100.578	-0.015		33											
BM 57	102.608	102.590	-0.018		Total Q										2.796	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.711														
Stage from WL Survey (m)		99.226														
Pressure Transducer Reading (m)		1.296														
Pressure Transducer Elevation (m)		97.930														
Discharge (m ³ /s)		2.796														
Cross Sectional Area		2.745														
Average Velocity		1.019														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	8:15	End	9:00	Location	Approximately 80 m downstream of PT.				
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000				
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592				
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading	1.3085	Time	7:45	Staff Gauge (m)	0.711			
Time at Site (24 hr)	Start Time:	7:30	End Time:	9:30	(m)	End	Reading	1.2962	Time	8:15	Time of SG Reading	7:20			
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Foggy and Cool				1	Right Bank	8.40	0.00	0.0	0.00	0			0.000	0.0
					2		8.15	0.14	0.3	0.05	0.12			0.005	0.2
					3		7.75	0.19	0.4	0.06	0.95			0.059	2.2
					4		7.50	0.19	0.3	0.05	1.08			0.051	1.9
					5		7.25	0.18	0.3	0.05	1.02			0.046	1.7
					6		7.00	0.23	0.3	0.06	1.16			0.067	2.5
					7		6.75	0.28	0.3	0.07	1.16			0.081	3.1
					8		6.50	0.40	0.3	0.10	1.18			0.118	4.5
					9		6.25	0.67	0.3	0.17	0.43			0.072	2.7
					10		6.00	0.61	0.3	0.15	1.23			0.188	7.1
					11		5.75	0.55	0.3	0.14	1.14			0.157	6.0
					12		5.50	0.52	0.3	0.13	1.29			0.168	6.4
					13		5.25	0.66	0.3	0.17	1.27			0.210	8.0
					14		5.00	0.72	0.3	0.18	1.17			0.211	8.0
					15		4.75	0.73	0.3	0.18	1.16			0.212	8.0
					16		4.50	0.72	0.3	0.18	1.17			0.211	8.0
					17		4.25	0.73	0.3	0.18	1.07			0.195	7.4
					18		4.00	0.48	0.3	0.12	1.12			0.134	5.1
					19		3.75	0.55	0.3	0.14	1.12			0.154	5.8
					20		3.50	0.59	0.3	0.15	0.93			0.137	5.2
					21		3.25	0.52	0.3	0.13	0.75			0.098	3.7
					22		3.00	0.51	0.3	0.14	0.26			0.036	1.4
					23		2.70	0.17	0.3	0.05	0.39			0.018	0.7
					24		2.45	0.13	0.3	0.05	0.14			0.006	0.2
					25	Left Bank	2.00	0.00	0.5	0.00	0			0.000	0.0
					26										
					27										
					28										
					29										
					30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 59	100	100.000	0.000		32										
BM 58	100.593	100.578	-0.015		33										
BM 57	102.608	102.590	-0.018		Total Q									2.633	100.0
Summary					General Notes										
Staff Gauge Reading (m)		0.711													
Stage from WL Survey (m)		99.226													
Pressure Transducer Reading (m)		1.296													
Pressure Transducer Elevation (m)		97.930													
Discharge (m ³ /s)		2.633													
Cross Sectional Area		2.672													
Average Velocity		0.985													

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	7:00	End	7:30	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592					
Date Monitored	15-Jun-15				Real Time Reading	Start	Reading	1.3003	Time	7:00	Staff Gauge (m)	0.715				
Time at Site (24 hr)	Start Time:	6:00	End Time:	8:30	(m)	End	Reading	1.3003	Time	7:30	Time of SG Reading	7:00				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Cloudy, cool, moderate north wind.				1	Right Bank	7.10	0.00	0.0	0.00	0			0.000	0.0	
					2		6.80	0.08	0.3	0.03	-0.03			-0.001	0.0	
					3		6.40	0.18	0.4	0.06	0.44			0.026	0.9	
					4		6.15	0.46	0.3	0.12	0.51			0.059	2.1	
					5		5.90	0.54	0.3	0.14	0.42			0.057	2.1	
					6		5.65	0.52	0.3	0.13	0.89			0.116	4.2	
					7		5.40	0.55	0.3	0.14	1.04			0.143	5.2	
					8		5.15	0.56	0.3	0.14	1.01			0.141	5.2	
					9		4.90	0.67	0.3	0.17	1.04			0.174	6.3	
					10		4.65	0.74	0.3	0.19	1.13			0.209	7.6	
					11		4.40	0.72	0.3	0.18	1.13			0.203	7.4	
					12		4.15	0.71	0.3	0.18	1.19			0.211	7.7	
					13		3.90	0.71	0.3	0.18	1.15			0.204	7.4	
					14		3.65	0.72	0.3	0.18	1.28			0.230	8.4	
					15		3.40	0.54	0.3	0.14	1.19			0.161	5.9	
					16		3.15	0.60	0.3	0.15	1.18			0.177	6.5	
					17		2.90	0.67	0.3	0.17	0.71			0.119	4.3	
					18		2.65	0.56	0.3	0.14	0.9			0.126	4.6	
					19		2.40	0.28	0.3	0.07	1.2			0.084	3.1	
					20		2.15	0.30	0.3	0.08	1.08			0.081	3.0	
					21		1.90	0.20	0.3	0.05	1.17			0.059	2.1	
					22		1.65	0.20	0.3	0.05	1.01			0.051	1.8	
					23		1.40	0.20	0.3	0.05	1.11			0.056	2.0	
					24		1.15	0.20	0.3	0.05	1.06			0.053	1.9	
					25		0.90	0.15	0.3	0.04	0.15			0.006	0.2	
					26	Left Bank	0.60	0.00	0.3	0.00	0			0.000	0.0	
					27											
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.000	0.000		32											
BM 58	100.593	100.577	-0.016		33											
BM 57	102.608	102.590	-0.018		Total Q										2.744	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.715														
Stage from WL Survey (m)		99.222														
Pressure Transducer Reading (m)		1.300														
Pressure Transducer Elevation (m)		97.922														
Discharge (m ³ /s)		2.744														
Cross Sectional Area		2.790														
Average Velocity		0.983														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	7:30	End	8:00	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flo-mate 2000					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6592					
Date Monitored	15-Jun-15				Real Time Reading	Start	Reading	1.3003	Time	7:30	Staff Gauge (m)	0.715				
Time at Site (24 hr)	Start Time:	6:00	End Time:	8:30	(m)	End	Reading	1.3003	Time	8:00	Time of SG Reading	7:00				
Personnel	Coby Hall, Greg Langston					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Cloudy, cool, moderate north wind.				1	Right Bank	0.60	0.00	0.0	0.00	0				0.000	0.0
					2		0.90	0.15	0.3	0.05	0.1				0.005	0.2
					3		1.25	0.20	0.4	0.06	1.06				0.064	2.4
					4		1.50	0.20	0.3	0.05	1.16				0.058	2.2
					5		1.75	0.19	0.3	0.05	1.13				0.054	2.0
					6		2.00	0.21	0.3	0.05	1.21				0.064	2.4
					7		2.25	0.28	0.3	0.07	1.31				0.092	3.4
					8		2.50	0.44	0.3	0.11	0.95				0.105	3.9
					9		2.75	0.69	0.3	0.17	0.57				0.098	3.6
					10		3.00	0.62	0.3	0.16	1.19				0.184	6.8
					11		3.25	0.55	0.3	0.14	1.33				0.183	6.8
					12		3.50	0.52	0.3	0.13	1.31				0.170	6.3
					13		3.75	0.64	0.3	0.16	1.19				0.190	7.1
					14		4.00	0.71	0.3	0.18	1.17				0.208	7.7
					15		4.25	0.72	0.3	0.18	1.13				0.203	7.5
					16		4.50	0.72	0.3	0.18	1.15				0.207	7.7
					17		4.75	0.72	0.3	0.18	1.09				0.196	7.3
					18		5.00	0.50	0.3	0.13	1.07				0.134	5.0
					19		5.25	0.55	0.3	0.14	1.07				0.147	5.5
					20		5.50	0.60	0.3	0.15	0.92				0.138	5.1
					21		5.75	0.54	0.3	0.14	0.8				0.108	4.0
					22		6.00	0.53	0.3	0.15	0.28				0.041	1.5
					23		6.30	0.22	0.3	0.07	0.65				0.043	1.6
					24		6.60	0.13	0.3	0.05	0.12				0.006	0.2
					25	Left Bank	7.10	0.00	0.5	0.00	0				0.000	0.0
					26											
					27											
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.000	0.000		32											
BM 58	100.593	100.577	-0.016		33											
BM 57	102.608	102.590	-0.018		Total Q										2.697	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.715														
Stage from WL Survey (m)		99.222														
Pressure Transducer Reading (m)		1.300														
Pressure Transducer Elevation (m)		97.922														
Discharge (m ³ /s)		2.697														
Cross Sectional Area		2.723														
Average Velocity		0.991														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method										
Project Name		Hope Bay				Measurement Time		Start	14:30	End	16:45	Location	Approximately 80 m downstream of PT.			
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950			
Stream Name		Doris Lake Outflow				Flow Meter Type		Electro-magnetic			Instrument Serial #		6593			
Date Monitored		15-Jul-15				Real Time Reading		Start	Reading	1.1149	Time	14:30	Staff Gauge (m)		0.543	
Time at Site (24 hr)		Start Time:	14:30	End Time:	17:00	(m)	End	Reading	1.1149	Time	16:35	Time of SG Reading		14:30		
Personnel		Greg Langston, Jeff Anderson						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%
		434059	7559504	23		1	Right Bank	2.50	0.00	0.0	0.00	0			0.000	0.0
Weather Conditions		Sunny, warm, moderate north wind.				2		2.70	0.50	0.2	0.10	0.43			0.043	3.4
						3		2.90	0.52	0.2	0.10	0.48			0.050	3.9
DL Model		Hobo	PT Serial #		21041003	4		3.10	0.52	0.2	0.10	0.52			0.054	4.2
Gain		0	Offset		0	5		3.30	0.54	0.2	0.11	0.54			0.058	4.6
Status		Logging	Battery		100%	6		3.50	0.50	0.2	0.10	0.56			0.056	4.4
# of Records		n/a	Memory Free		n/a	7		3.70	0.56	0.2	0.11	0.6			0.067	5.3
DL Service Performed		n/a	Crest Gauges		n/a	8		3.90	0.57	0.2	0.11	0.61			0.070	5.4
Hydrometric Leveling Survey						9		4.10	0.57	0.2	0.11	0.66			0.075	5.9
Stn	BS	HI	FS	Elevation	Notes	10		4.30	0.50	0.2	0.10	0.64			0.064	5.0
BM 59	1.594	101.594		100.000		11		4.50	0.53	0.2	0.11	0.66			0.070	5.5
BM 58			1.007	100.587		12		4.70	0.56	0.2	0.11	0.66			0.074	5.8
BM 57			-1.013	102.607		13		4.90	0.52	0.2	0.10	0.69			0.072	5.6
WL			2.546	99.048		14		5.10	0.52	0.2	0.10	0.71			0.074	5.8
SG			2.095	99.499		15		5.30	0.51	0.2	0.10	0.76			0.078	6.1
						16		5.50	0.44	0.2	0.09	0.72			0.063	5.0
						17		5.70	0.45	0.2	0.09	0.7			0.063	4.9
						18		5.90	0.44	0.2	0.09	0.65			0.057	4.5
						19		6.10	0.37	0.2	0.07	0.74			0.055	4.3
TBM			1.463	100.131		20		6.30	0.35	0.2	0.07	0.69			0.048	3.8
TBM	1.601	101.732		100.131		21		6.50	0.35	0.2	0.07	0.37			0.026	2.0
SG			2.232	99.500		22		6.70	0.32	0.2	0.08	0.24			0.019	1.5
WL			2.685	99.047		23		7.00	0.22	0.3	0.07	0.46			0.030	2.4
BM 57			-0.875	102.607		24		7.30	0.10	0.3	0.04	0.37			0.013	1.0
BM 58			1.145	100.587		25	Left Bank	7.70	0.00	0.4	0.00	0			0.000	0.0
BM 59			1.732	100.000		26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31										
BM 59	100	100.000		0.000		32										
BM 58	100.593	100.587		-0.006		33										
BM 57	102.608	102.607		-0.001		Total Q									1.279	100.0
Summary						General Notes										
Staff Gauge Reading (m)		0.543														
Stage from WL Survey (m)		99.048														
Pressure Transducer Reading (m)		1.115														
Pressure Transducer Elevation (m)		97.933														
Discharge (m³/s)		1.279														
Cross Sectional Area		2.145														
Average Velocity		0.596														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	14:00	End	14:45	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	FH950					
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6593					
Date Monitored	16-Jul-15				Real Time Reading	Start	Reading	1.1149	Time	14:00	Staff Gauge (m)	0.541				
Time at Site (24 hr)	Start Time:	13:30	End Time:	16:00	(m)	End	Reading	1.1122	Time	16:20	Time of SG Reading	14:00				
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Sunny.				1	Right Bank	2.40	0.00	0.0	0.00	0			0.000	0.0	
					2		2.70	0.07	0.3	0.02	0			0.000	0.0	
					3		2.90	0.30	0.2	0.06	0.06			0.004	0.3	
DL Model	Hobo	PT Serial #	21041003		4		3.10	0.49	0.2	0.10	0.44			0.043	3.5	
Gain	0	Offset	0		5		3.30	0.49	0.2	0.10	0.49			0.048	3.9	
Status	Logging	Battery	100%		6		3.50	0.52	0.2	0.10	0.54			0.056	4.5	
# of Records	n/a	Memory Free	n/a		7		3.70	0.52	0.2	0.10	0.54			0.056	4.5	
DL Service Performed	n/a	Crest Gauges	n/a		8		3.90	0.50	0.2	0.10	0.55			0.055	4.4	
					9		4.10	0.57	0.2	0.11	0.59			0.067	5.4	
					10		4.30	0.56	0.2	0.11	0.59			0.066	5.3	
					11		4.50	0.56	0.2	0.11	0.61			0.068	5.5	
					12		4.70	0.50	0.2	0.10	0.64			0.064	5.2	
					13		4.90	0.54	0.2	0.11	0.64			0.069	5.6	
					14		5.10	0.53	0.2	0.11	0.68			0.072	5.8	
					15		5.30	0.52	0.2	0.10	0.66			0.069	5.6	
					16		5.50	0.51	0.2	0.10	0.68			0.069	5.6	
					17		5.70	0.52	0.2	0.10	0.66			0.069	5.6	
					18		5.90	0.56	0.2	0.11	0.61			0.068	5.5	
					19		6.10	0.51	0.2	0.10	0.71			0.072	5.9	
TBM			1.780	99.907	20		6.30	0.43	0.2	0.09	0.71			0.061	4.9	
TBM	1.767	101.674		99.907	21		6.50	0.39	0.2	0.08	0.71			0.055	4.5	
PT			3.549	98.125	22		6.70	0.34	0.2	0.07	0.69			0.047	3.8	
SG			2.176	99.498	23		6.90	0.32	0.2	0.06	0.39			0.025	2.0	
WL			2.637	99.037	24	d/s of rock	7.10	0.25	0.2	0.06	0.04			0.003	0.2	
BM 58			1.086	100.588	25		7.40	0.18	0.3	0.05	0.3			0.016	1.3	
BM 59			1.673	100.001	26		7.70	0.08	0.3	0.02	0.53			0.013	1.0	
					27	Left Bank	8.00	0.00	0.3	0.00	0			0.000	0.0	
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.001	0.000		32											
BM 58	100.593	100.588	-0.005		33											
BM 57	102.608	102.608	0.000		Total Q										1.236	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.541														
Stage from WL Survey (m)		99.038														
Pressure Transducer Reading (m)		1.115														
Pressure Transducer Elevation (m)		97.923														
Discharge (m ³ /s)		1.236														
Cross Sectional Area		2.194														
Average Velocity		0.563														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	14:45	End	15:30	Location	Approximately 80 m downstream of PT.				
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	FH950				
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6593				
Date Monitored	16-Jul-15				Real Time Reading	Start	Reading	1.1149	Time	14:00	Staff Gauge (m)	0.541			
Time at Site (24 hr)	Start Time:	13:30	End Time:	16:00	(m)	End	Reading	1.1122	Time	16:20	Time of SG Reading	14:00			
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny				1	Left Bank	8.00	0.00	0.0	0.00	0			0.000	0.0
					2		7.80	0.08	0.2	0.02	0.39			0.008	0.6
					3		7.50	0.18	0.3	0.05	0.56			0.028	2.2
					4		7.25	0.22	0.3	0.06		0.68	-0.13	0.015	1.2
					5		7.00	0.32	0.3	0.08	0.1			0.008	0.6
					6		6.75	0.34	0.3	0.09	0.64			0.054	4.4
					7		6.50	0.38	0.3	0.10	0.66			0.063	5.0
					8		6.25	0.47	0.3	0.12	0.62			0.073	5.9
					9		6.00	0.52	0.3	0.13	0.64			0.083	6.7
					10		5.75	0.52	0.3	0.13	0.65			0.085	6.8
					11		5.50	0.52	0.3	0.13	0.67			0.087	7.0
					12		5.25	0.48	0.3	0.12	0.69			0.083	6.7
					13		5.00	0.56	0.3	0.14	0.65			0.091	7.3
					14		4.75	0.50	0.3	0.13	0.64			0.080	6.4
					15		4.50	0.56	0.3	0.14	0.63			0.088	7.1
					16		4.25	0.54	0.3	0.14	0.6			0.081	6.5
					17		4.00	0.54	0.3	0.14	0.59			0.080	6.4
					18		3.75	0.52	0.3	0.13	0.56			0.073	5.9
					19		3.50	0.52	0.3	0.13	0.52			0.068	5.4
					20		3.25	0.50	0.3	0.13	0.47			0.059	4.7
					21		3.00	0.42	0.3	0.09	0.4			0.038	3.0
					22		2.80	0.10	0.2	0.03	0			0.000	0.0
					23	Right Bank	2.40	0.00	0.4	0.00	0			0.000	0.0
					24										
					25										
					26										
					27										
					28										
					29										
					30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 59	100	100.001	0.000		32										
BM 58	100.593	100.588	-0.005		33										
BM 57	102.608	102.608	0.000		Total Q									1.243	100.0
Summary					General Notes										
Staff Gauge Reading (m)		0.541													
Stage from WL Survey (m)		99.038													
Pressure Transducer Reading (m)		1.115													
Pressure Transducer Elevation (m)		98.125													
Discharge (m ³ /s)		1.243													
Cross Sectional Area		2.197													
Average Velocity		0.566													

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	15:00	End	15:30	Location	Approximately 80 m downstream of PT.				
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	FH950				
Stream Name	Doris Lake Outflow				Flow Meter Type	Electro-magnetic				Instrument Serial #	6593				
Date Monitored	17-Jul-15				Real Time Reading	Start	Reading	n/a	Time	n/a	Staff Gauge (m)	0.530			
Time at Site (24 hr)	Start Time:	15:00	End Time:	15:40	(m)	End	Reading	n/a	Time	n/a	Time of SG Reading	15:40			
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny, moderate north wind.				1	Right Bank	2.30	0.00	0.0	0.00	0			0.000	0.0
					2		2.70	0.06	0.4	0.02	0.01			0.000	0.0
					3		2.95	0.42	0.3	0.11	0.41			0.043	3.5
					4		3.20	0.48	0.3	0.13	0.52	0.68	-0.13	0.052	4.3
					5		3.50	0.50	0.3	0.14	0.57			0.078	6.5
					6		3.75	0.50	0.3	0.13	0.59			0.074	6.1
					7		4.00	0.52	0.3	0.13	0.61			0.079	6.5
					8		4.25	0.54	0.3	0.14	0.62			0.084	6.9
					9		4.50	0.55	0.3	0.14	0.61			0.084	6.9
					10		4.75	0.58	0.3	0.15	0.66			0.096	7.9
					11		5.00	0.54	0.3	0.12	0.63			0.077	6.3
					12		5.20	0.50	0.2	0.10	0.67			0.067	5.5
					13		5.40	0.50	0.2	0.10	0.63			0.063	5.2
					14		5.60	0.47	0.2	0.09	0.64			0.060	5.0
					15		5.80	0.46	0.2	0.10	0.69			0.071	5.9
					16		6.05	0.46	0.3	0.12	0.63			0.072	6.0
					17		6.30	0.38	0.3	0.10	0.68			0.065	5.3
					18		6.55	0.36	0.3	0.09	0.65			0.059	4.8
					19		6.80	0.35	0.3	0.09	0.47			0.041	3.4
					20		7.05	0.24	0.3	0.06	0.31			0.019	1.5
					21		7.30	0.20	0.3	0.06	0.41			0.023	1.9
					22		7.60	0.16	0.3	0.04	0.19			0.008	0.6
					23		7.80	0.10	0.2	0.03	-0.01			0.000	0.0
					24	Left Bank	8.10	0.00	0.3	0.00	0			0.000	0.0
					25										
					26										
					27										
					28										
					29										
					30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 59	100				32										
BM 58	100.593				33										
BM 57	102.608				Total Q									1.214	100.0
Summary					General Notes										
Staff Gauge Reading (m)		0.530			Staff gauge reading only, no water level survey due to time constraints.										
Stage from WL Survey (m)		n/a													
Pressure Transducer Reading (m)		n/a													
Pressure Transducer Elevation (m)		n/a													
Discharge (m ³ /s)		1.214													
Cross Sectional Area		2.153													
Average Velocity		0.564													

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	12:45	End	13:30	Location		Approximately 80 m downstream of PT.			
Station Identification		TL-2				Method		Velocity-area (Mid-section)				Instrument Model		FH950			
Stream Name		Doris Lake Outflow				Flow Meter Type		Electro-magnetic				Instrument Serial #		6593			
Date Monitored		17-Jul-15				Real Time Reading		Start	Reading	1.089	Time	12:20	Staff Gauge (m)		0.520		
Time at Site (24 hr)		Start Time:	12:20	End Time:	14:00	(m)	End	Reading	1.089	Time	13:45	Time of SG Reading		15:40			
Personnel		Greg Langston, Jeff Anderson						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cloudy, cool, calm.				1	Right Bank	2.40	0.00	0.0	0.00	0			0.000	0.0	
						2		2.75	0.08	0.4	0.02	0.01			0.000	0.0	
Transducer Information						3		3.00	0.44	0.3	0.11	0.41			0.045	3.7	
DL Model		Hobo	PT Serial #		21041003	4		3.25	0.49	0.3	0.12	0.46			0.056	4.6	
Gain		0	Offset		0	5		3.50	0.50	0.3	0.13	0.51			0.064	5.2	
Status		Logging	Battery		100%	6		3.75	0.52	0.3	0.13	0.54			0.070	5.8	
# of Records		n/a	Memory Free		n/a	7		4.00	0.52	0.3	0.13	0.57			0.074	6.1	
DL Service Performed		n/a	Crest Gauges		n/a	8		4.25	0.55	0.3	0.14	0.59			0.081	6.7	
Hydrometric Leveling Survey						9		4.50	0.54	0.3	0.14	0.62			0.084	6.9	
Stn	BS	HI	FS	Elevation	Notes	10		4.75	0.49	0.3	0.12	0.65			0.080	6.6	
BM 59	1.821	101.821		100.000		11		5.00	0.55	0.3	0.14	0.62			0.085	7.0	
BM 58			1.236	100.585		12		5.25	0.52	0.3	0.13	0.66			0.086	7.1	
BM 57			-0.786	102.607		13		5.50	0.50	0.3	0.13	0.65			0.081	6.7	
WL			2.807	99.014		14		5.75	0.48	0.3	0.12	0.7			0.084	6.9	
SG			2.322	99.499		15		6.00	0.52	0.3	0.13	0.59			0.077	6.3	
						16		6.25	0.46	0.3	0.12	0.59			0.068	5.6	
						17		6.50	0.38	0.3	0.10	0.73			0.069	5.7	
						18		6.75	0.32	0.3	0.08	0.71			0.057	4.7	
						19		7.00	0.30	0.3	0.08	0.14			0.011	0.9	
TBM			2.382	99.439		20		7.25	0.26	0.3	0.07		0.67	-0.11	0.018	1.5	
TBM	2.425	101.864				21		7.50	0.16	0.3	0.04	0.44			0.018	1.4	
						22		7.75	0.06	0.3	0.02	0.43			0.008	0.6	
SG			2.366	99.498		23	Left Bank	8.10	0.00	0.4	0.00	0			0.000	0.0	
WL			2.849	99.015		24											
BM 57			-0.743	102.607		25											
BM 58			1.278	100.586		26											
BM 59			1.864	100.000		27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.586		-0.008		33											
BM 57	102.608	102.607		-0.001		Total Q										1.215	100.0
Summary						General Notes											
Staff Gauge Reading (m)			0.520														
Stage from WL Survey (m)			99.015														
Pressure Transducer Reading (m)			1.089														
Pressure Transducer Elevation (m)			97.926														
Discharge (m³/s)			1.215														
Cross Sectional Area			2.167														
Average Velocity			0.561														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	12:45	End	13:45	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Lake Outflow				Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	14-Aug-15				Real Time Reading	Start	Reading	1.112	Time	12:25	Staff Gauge (m)	0.555				
Time at Site (24 hr)	Start Time:	12:25	End Time:	15:25	(m)	End	Reading	1.115	Time	15:25	Time of SG Reading	12:25				
Personnel	Greg Langston, Anneli Jokela					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Cloudy, moderate wind.				1	Right Bank	2.20	0.00	0.0	0.00	0			0.000	0.0	
					2		2.70	0.11	0.5	0.04	0.168			0.006	0.5	
					3		2.90	0.44	0.2	0.09	0.499			0.044	3.3	
					4		3.10	0.50	0.2	0.10	0.541			0.054	4.1	
					5		3.30	0.50	0.2	0.10	0.553			0.055	4.2	
					6		3.50	0.51	0.2	0.10	0.591			0.060	4.5	
					7		3.70	0.52	0.2	0.10	0.593			0.062	4.6	
					8		3.90	0.54	0.2	0.11	0.63			0.068	5.1	
					9		4.10	0.57	0.2	0.11	0.647			0.074	5.5	
					10		4.30	0.56	0.2	0.11	0.681			0.076	5.7	
					11		4.50	0.57	0.2	0.11	0.719			0.082	6.2	
					12		4.70	0.50	0.2	0.10	0.725			0.073	5.5	
					13		4.90	0.55	0.2	0.11	0.72			0.079	6.0	
					14		5.10	0.54	0.2	0.11	0.702			0.076	5.7	
					15		5.30	0.52	0.2	0.10	0.646			0.067	5.1	
					16		5.50	0.50	0.2	0.10	0.685			0.069	5.2	
					17		5.70	0.55	0.2	0.11	0.676			0.074	5.6	
					18		5.90	0.53	0.2	0.11	0.49			0.052	3.9	
					19		6.10	0.48	0.2	0.10	0.285			0.027	2.1	
					20		6.30	0.40	0.2	0.08	0.709			0.057	4.3	
					21		6.50	0.37	0.2	0.07	0.614			0.045	3.4	
					22		6.70	0.35	0.2	0.07	0.479			0.034	2.5	
					23		6.90	0.34	0.2	0.09	0.485			0.041	3.1	
					24		7.20	0.20	0.3	0.06	0.449			0.027	2.0	
					25		7.50	0.15	0.3	0.05	0.345			0.016	1.2	
					26		7.80	0.12	0.3	0.05	0.237			0.011	0.9	
					27	Left Bank	8.30	0.00	0.5	0.00	0			0.000	0.0	
					28											
					29											
					30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 59	100	100.000	-0.001		32											
BM 58	100.593	100.570	-0.023		33											
BM 57	102.608	102.614	0.005		Total Q										1.329	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.555														
Stage from WL Survey (m)		99.052														
Pressure Transducer Reading (m)		1.112														
Pressure Transducer Elevation (m)		97.940														
Discharge (m ³ /s)		1.329														
Cross Sectional Area		2.277														
Average Velocity		0.584														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay					Measurement Time	Start	13:45	End	14:45	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2					Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Lake Outflow					Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	14-Aug-15					Real Time Reading	Start	Reading	1.112	Time	12:25	Staff Gauge (m)	0.555				
Time at Site (24 hr)	Start Time:	12:25	End Time:	15:25		(m)	End	Reading	1.115	Time	15:25	Time of SG Reading	12:25				
Personnel	Greg Langston, Anneli Jokela							Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation			No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	434059	7559504	23			1	Left Bank	8.30	0.00	0.0	0.00	0			0.0000	0.0	
Weather Conditions	Cloudy, moderate wind.					2		7.70	0.10	0.6	0.05	0.39			0.0195	1.5	
Transducer Information						3		7.30	0.25	0.4	0.09	0.325			0.0284	2.1	
DL Model	Hobo	PT Serial #	21041003			4		7.00	0.27	0.3	0.07	0.558			0.0377	2.8	
Gain	0	Offset	0			5		6.80	0.36	0.2	0.07	0.545			0.0392	3.0	
Status	Logging	Battery	100%			6		6.60	0.35	0.2	0.07	0.528			0.0370	2.8	
# of Records	n/a	Memory Free	n/a			7		6.40	0.39	0.2	0.08	0.662			0.0516	3.9	
DL Service Performed	n/a	Crest Gauges	n/a			8		6.20	0.47	0.2	0.09	0.63			0.0592	4.5	
Hydrometric Leveling Survey						9		6.00	0.52	0.2	0.10	0.121			0.0126	0.9	
Stn	BS	HI	FS	Elevation	Notes	10		5.80	0.55	0.2	0.11	0.593			0.0652	4.9	
BM 59	1.681	101.681		100.000		11		5.60	0.56	0.2	0.11	0.61			0.0683	5.1	
BM 58			1.112	100.569		12		5.40	0.51	0.2	0.10	0.743			0.0758	5.7	
BM 57			-0.932	102.613		13		5.20	0.50	0.2	0.10	0.717			0.0717	5.4	
WL			2.631	99.050		14		5.00	0.52	0.2	0.10	0.753			0.0783	5.9	
SG			2.179	99.502		15		4.80	0.52	0.2	0.10	0.714			0.0743	5.6	
						16		4.60	0.51	0.2	0.10	0.683			0.0697	5.2	
						17		4.40	0.56	0.2	0.11	0.662			0.0741	5.6	
						18		4.20	0.55	0.2	0.11	0.656			0.0722	5.4	
						19		4.00	0.55	0.2	0.11	0.655			0.0721	5.4	
TBM			2.228	99.453		20		3.80	0.55	0.2	0.11	0.625			0.0688	5.2	
TBM	2.270	101.723				21		3.60	0.54	0.2	0.11	0.601			0.0649	4.9	
						22		3.40	0.53	0.2	0.11	0.575			0.0610	4.6	
SG			2.223	99.500		23		3.20	0.52	0.2	0.10	0.522			0.0543	4.1	
WL			2.670	99.053		24		3.00	0.50	0.2	0.10	0.526			0.0526	4.0	
BM 57			-0.891	102.614		25		2.80	0.18	0.2	0.05	0.429			0.0193	1.5	
BM 58			1.153	100.570		26		2.50	0.09	0.3	0.03	0			0.0000	0.0	
BM 59			1.724	99.999		27	Right Bank	2.20	0.00	0.3	0.00	0			0.0000	0.0	
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes		31											
BM 59	100	100.000	-0.001			32											
BM 58	100.593	100.570	-0.023			33											
BM 57	102.608	102.614	0.005			Total Q										1.328	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.555															
Stage from WL Survey (m)		99.052															
Pressure Transducer Reading (m)		1.112															
Pressure Transducer Elevation (m)		97.940															
Discharge (m³/s)		1.328															
Cross Sectional Area		2.289															
Average Velocity		0.580															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	11:50	End	12:40	Location	Approximately 80 m downstream of PT.					
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Lake Outflow				Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	15-Aug-15				Real Time Reading	Start	Reading	1.103	Time	23:50	Staff Gauge (m)	0.546				
Time at Site (24 hr)	Start Time:	11:25	End Time:	13:50	(m)	End	Reading	1.101	Time	13:50	Time of SG Reading	11:50				
Personnel	Greg Langston, Carl Atatahak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Cloudy, moderate wind.				1	Right Bank	2.30	0.00	0.0	0.00	0			0.0000	0.0	
					2		2.60	0.09	0.3	0.02	0			0.0000	0.0	
					3		2.80	0.11	0.2	0.02	0.121			0.0027	0.2	
					4		3.00	0.49	0.2	0.10	0.53			0.0519	3.9	
					5		3.20	0.51	0.2	0.10	0.557			0.0568	4.3	
					6		3.40	0.52	0.2	0.10	0.588			0.0612	4.6	
					7		3.60	0.53	0.2	0.11	0.585			0.0620	4.7	
					8		3.80	0.54	0.2	0.11	0.614			0.0663	5.0	
					9		4.00	0.55	0.2	0.11	0.646			0.0711	5.4	
					10		4.20	0.57	0.2	0.11	0.64			0.0730	5.5	
					11		4.40	0.57	0.2	0.11	0.648			0.0739	5.6	
					12		4.60	0.57	0.2	0.11	0.678			0.0773	5.8	
					13		4.80	0.53	0.2	0.11	0.679			0.0720	5.4	
					14		5.00	0.52	0.2	0.10	0.724			0.0753	5.7	
					15		5.20	0.54	0.2	0.11	0.69			0.0745	5.6	
					16		5.40	0.53	0.2	0.11	0.706			0.0748	5.6	
					17		5.60	0.49	0.2	0.10	0.69			0.0676	5.1	
					18		5.80	0.55	0.2	0.11	0.61			0.0671	5.1	
					19		6.00	0.53	0.2	0.11	0.268			0.0284	2.1	
					20		6.20	0.48	0.2	0.10	0.523			0.0502	3.8	
					21		6.40	0.49	0.2	0.10	0.68			0.0666	5.0	
					22		6.60	0.36	0.2	0.07	0.564			0.0406	3.1	
					23		6.80	0.33	0.2	0.07	0.501			0.0331	2.5	
					24		7.00	0.29	0.2	0.06	0.217			0.0126	0.9	
					25		7.20	0.29	0.2	0.07	0.487			0.0353	2.7	
					26		7.50	0.16	0.3	0.05	0.43			0.0206	1.6	
					27		7.80	0.10	0.3	0.04	0.32			0.0128	1.0	
					28	Left Bank	8.30	0.00	0.5	0.00	0			0.000	0.0	
					29											
					30											
					31											
					32											
					33											
					Total Q										1.328	100.0
Summary					General Notes											
Staff Gauge Reading (m)		0.546														
Stage from WL Survey (m)		99.044														
Pressure Transducer Reading (m)		1.103														
Pressure Transducer Elevation (m)		97.941														
Discharge (m ³ /s)		1.328														
Cross Sectional Area		2.303														
Average Velocity		0.577														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	12:40	End	13:30	Location		Approximately 80 m downstream of PT.			
Station Identification		TL-2				Method		Velocity-area (Mid-section)				Instrument Model		Flowtracker			
Stream Name		Doris Lake Outflow				Flow Meter Type		Acoustic				Instrument Serial #		P5080			
Date Monitored		15-Aug-15				Real Time Reading		Start	Reading	1.103	Time	23:50	Staff Gauge (m)		0.546		
Time at Site (24 hr)		Start Time:	11:25	End Time:	13:50	(m)	End	Reading	1.101	Time	13:50	Time of SG Reading		11:50			
Personnel		Greg Langston, Carl Atatahak						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cloudy, moderate wind.				1	Left Bank	8.30	0.00	0.0	0.00	0			0.0000	0.0	
						2		7.75	0.10	0.6	0.04	0.399			0.0160	1.2	
Transducer Information						3		7.50	0.18	0.3	0.05	0.407			0.0183	1.4	
DL Model		Hobo	PT Serial #		21041003	4		7.25	0.26	0.3	0.07	0.456			0.0296	2.2	
Gain		0	Offset		0	5		7.00	0.30	0.3	0.07	0.219			0.0148	1.1	
Status		Logging	Battery		100%	6		6.80	0.34	0.2	0.07	0.502			0.0341	2.6	
# of Records		n/a	Memory Free		n/a	7		6.60	0.38	0.2	0.08	0.554			0.0421	3.2	
DL Service Performed		n/a	Crest Gauges		n/a	8		6.40	0.38	0.2	0.08	0.715			0.0543	4.1	
Hydrometric Leveling Survey						9		6.20	0.49	0.2	0.10	0.38			0.0372	2.8	
Stn	BS	HI	FS	Elevation	Notes	10		6.00	0.53	0.2	0.11	0.306			0.0324	2.5	
BM 59	1.585	101.585		100.000		11		5.80	0.55	0.2	0.08	0.65			0.0536	4.1	
WL			2.540	99.045		12		5.70	0.54	0.1	0.08	0.627			0.0508	3.8	
						13		5.50	0.50	0.2	0.10	0.685			0.0685	5.2	
						14		5.30	0.53	0.2	0.11	0.728			0.0772	5.8	
						15		5.10	0.56	0.2	0.11	0.699			0.0783	5.9	
						16		4.90	0.54	0.2	0.11	0.712			0.0769	5.8	
						17		4.70	0.50	0.2	0.10	0.7			0.0700	5.3	
						18		4.50	0.57	0.2	0.11	0.67			0.0764	5.8	
						19		4.30	0.56	0.2	0.11	0.646			0.0724	5.5	
TBM			2.133	99.452		20		4.10	0.55	0.2	0.11	0.659			0.0725	5.5	
TBM	2.258	101.710				21		3.90	0.54	0.2	0.11	0.645			0.0697	5.3	
WL			2.667	99.043		22		3.70	0.53	0.2	0.11	0.62			0.0657	5.0	
BM 59			1.710	100.000		23		3.50	0.53	0.2	0.11	0.606			0.0642	4.9	
						24		3.30	0.52	0.2	0.10	0.576			0.0599	4.5	
						25		3.10	0.50	0.2	0.10	0.539			0.0539	4.1	
						26		2.90	0.34	0.2	0.07	0.469			0.0319	2.4	
						27		2.70	0.10	0.2	0.03	0.079			0.0024	0.2	
						28	Right Bank	2.30	0.00	0.4	0.00	0			0.000	0.0	
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593					33											
BM 57	102.608					Total Q										1.323	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.546															
Stage from WL Survey (m)		99.044															
Pressure Transducer Reading (m)		1.103															
Pressure Transducer Elevation (m)		97.941															
Discharge (m³/s)		1.323															
Cross Sectional Area		2.289															
Average Velocity		0.578															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	13:45	End	14:30	Location	Approximately 80 m downstream of PT.				
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker				
Stream Name	Doris Lake Outflow				Flow Meter Type	Acoustic				Instrument Serial #	P5080				
Date Monitored	17-Aug-15				Real Time Reading	Start	Reading	1.079	Time	13:30	Staff Gauge (m)	0.525			
Time at Site (24 hr)	Start Time:	13:25	End Time:	15:50	(m)	End	Reading	1.086	Time	15:50	Time of SG Reading	13:30			
Personnel	Greg Langston, Robert Maksagak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Cool, cloudy, scattered showers, light wind.				1	Right Bank	2.40	0.00	0.0	0.00	0			0.0000	0.0
					2		2.70	0.07	0.3	0.02	0.049			0.0010	0.1
					3		3.00	0.42	0.3	0.11	0.489			0.0513	4.1
					4		3.20	0.49	0.2	0.10	0.555			0.0544	4.3
					5		3.40	0.50	0.2	0.10	0.562			0.0562	4.5
					6		3.60	0.51	0.2	0.10	0.597			0.0609	4.8
					7		3.80	0.53	0.2	0.11	0.592			0.0628	5.0
					8		4.00	0.53	0.2	0.11	0.633			0.0671	5.3
					9		4.20	0.55	0.2	0.11	0.638			0.0702	5.6
					10		4.40	0.55	0.2	0.11	0.644			0.0708	5.6
					11		4.60	0.55	0.2	0.11	0.671			0.0738	5.9
					12		4.80	0.50	0.2	0.10	0.714			0.0714	5.7
					13		5.00	0.56	0.2	0.11	0.669			0.0749	5.9
					14		5.20	0.54	0.2	0.11	0.683			0.0738	5.9
					15		5.40	0.50	0.2	0.10	0.705			0.0705	5.6
					16		5.60	0.50	0.2	0.10	0.676			0.0676	5.4
					17		5.80	0.49	0.2	0.10	0.67			0.0657	5.2
					18		6.00	0.51	0.2	0.10	0.344			0.0351	2.8
					19		6.20	0.46	0.2	0.09	0.383			0.0352	2.8
					20		6.40	0.39	0.2	0.08	0.659			0.0514	4.1
					21		6.60	0.36	0.2	0.07	0.544			0.0392	3.1
					22		6.80	0.32	0.2	0.06	0.43			0.0275	2.2
					23		7.00	0.25	0.2	0.05	0.502			0.0251	2.0
					24		7.20	0.22	0.2	0.04	0.507			0.0223	1.8
					25		7.40	0.23	0.2	0.06	0.326			0.0187	1.5
					26		7.70	0.10	0.3	0.04	0.317			0.0127	1.0
					27	Left Bank	8.20	0.00	0.5	0.00	0			0.0000	0.0
					28				8.2	0.00				0.000	0.0
					29				0.0	0.00				0.000	0.0
					30				0.0	0.00				0.000	0.0
					31				0.0	0.00				0.000	0.0
					32				0.0	0.00				0.000	0.0
					33				0.0	0.00				0.000	0.0
					Total Q									1.260	100.0
Summary					General Notes										
Staff Gauge Reading (m)		0.525													
Stage from WL Survey (m)		99.024													
Pressure Transducer Reading (m)		1.079													
Pressure Transducer Elevation (m)		97.945													
Discharge (m ³ /s)		1.260													
Cross Sectional Area		2.186													
Average Velocity		0.576													

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	14:45	End	15:30	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)				Instrument Model		Flowtracker			
Stream Name		Doris Lake Outflow				Flow Meter Type		Acoustic				Instrument Serial #		P5080			
Date Monitored		17-Aug-15				Real Time Reading		Start	Reading	1.079	Time	13:30	Staff Gauge (m)		0.525		
Time at Site (24 hr)		Start Time:	13:25	End Time:	15:50	(m)	End	Reading	1.086	Time	15:50	Time of SG Reading		13:30			
Personnel		Greg Langston, Robert Maksagak						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		434059	7559504	23		1	Left Bank	8.20	0.00	0.0	0.00	0			0.0000	0.0	
Weather Conditions		Cool, cloudy, scattered showers, light wind.				2			7.80	0.09	0.4	0.04	0.336			0.0129	1.0
Transducer Information						3			7.35	0.21	0.5	0.07	0.465			0.0342	2.7
DL Model		Hobo	PT Serial #		21041003	4			7.10	0.29	0.3	0.07	0.164			0.0119	1.0
Gain		0	Offset		0	5			6.85	0.33	0.3	0.08	0.506			0.0417	3.3
Status		Logging	Battery		100%	6			6.60	0.34	0.3	0.09	0.585			0.0497	4.0
# of Records		n/a	Memory Free		n/a	7			6.35	0.37	0.3	0.09	0.655			0.0606	4.8
DL Service Performed		n/a	Crest Gauges		n/a	8			6.10	0.37	0.3	0.08	0.717			0.0597	4.8
Hydrometric Leveling Survey						9			5.90	0.34	0.2	0.07	0.709			0.0482	3.9
Stn	BS	HI	FS	Elevation	Notes	10			5.70	0.39	0.2	0.08	0.672			0.0524	4.2
BM 59	1.822	101.822		100.000		11			5.50	0.51	0.2	0.10	0.667			0.0680	5.4
WL			2.799	99.023		12			5.30	0.51	0.2	0.10	0.638			0.0651	5.2
						13			5.10	0.48	0.2	0.10	0.631			0.0606	4.8
						14			4.90	0.56	0.2	0.11	0.683			0.0765	6.1
						15			4.70	0.58	0.2	0.12	0.681			0.0790	6.3
						16			4.50	0.56	0.2	0.11	0.657			0.0736	5.9
						17			4.30	0.53	0.2	0.11	0.673			0.0713	5.7
						18			4.10	0.53	0.2	0.11	0.632			0.0670	5.4
						19			3.90	0.53	0.2	0.11	0.622			0.0659	5.3
TBM			2.365	99.457		20			3.70	0.49	0.2	0.10	0.601			0.0589	4.7
TBM	2.486	101.943				21			3.50	0.47	0.2	0.09	0.594			0.0558	4.5
WL			2.919	99.024		22			3.30	0.49	0.2	0.10	0.56			0.0549	4.4
BM 59			1.942	100.001		23			3.10	0.48	0.2	0.07	0.529			0.0381	3.0
						24			3.00	0.42	0.1	0.08	0.501			0.0421	3.4
						25			2.70	0.08	0.3	0.02	0.061			0.0015	0.1
						26		Right Bank	2.40	0.00	0.3	0.00	0			0.0000	0.0
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593					33											
BM 57	102.608					Total Q										1.250	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.525															
Stage from WL Survey (m)		99.024															
Pressure Transducer Reading (m)		1.079															
Pressure Transducer Elevation (m)		97.945															
Discharge (m³/s)		1.250															
Cross Sectional Area		2.102															
Average Velocity		0.595															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	13:30	End	14:15:00 P	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		1-Sep-15				Real Time Reading		Start	Reading	1.0051	Time	13:30	Staff Gauge (m)		0.448		
Time at Site (24 hr)		Start Time:	12:55	End Time:	15:40	(m)		End	Reading	0.9996	Time	15:50	Time of SG Reading		13:30		
Personnel		Greg Langston, Fraser Ross						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cool, cloudy, moderate wind.				1	Left Bank	2.40	0.00	0.0	0.00	0			0.0000	0.0	
						2		2.70	0.13	0.3	0.03	0			0.0000	0.0	
Transducer Information						3		2.90	0.43	0.2	0.09	0.42			0.0361	3.6	
DL Model		Hobo	PT Serial #		21041003	4		3.10	0.44	0.2	0.09	0.47			0.0414	4.1	
Gain		0	Offset		0	5		3.30	0.46	0.2	0.09	0.48			0.0442	4.4	
Status		Logging	Battery		100%	6		3.50	0.47	0.2	0.09	0.51			0.0479	4.7	
# of Records		n/a	Memory Free		n/a	7		3.70	0.48	0.2	0.10	0.54			0.0518	5.1	
DL Service Performed		n/a	Crest Gauges		n/a	8		3.90	0.48	0.2	0.10	0.57			0.0547	5.4	
Hydrometric Leveling Survey						9		4.10	0.52	0.2	0.10	0.57			0.0593	5.8	
Stn	BS	HI	FS	Elevation	Notes	10		4.30	0.50	0.2	0.10	0.58			0.0580	5.7	
BM 59	1.603	101.603		100.000		11		4.50	0.50	0.2	0.10	0.58			0.0580	5.7	
BM 58			1.037	100.566		12		4.70	0.46	0.2	0.09	0.61			0.0561	5.5	
BM 57			-1.003	102.606		13		4.90	0.52	0.2	0.10	0.59			0.0614	6.1	
WL			2.659	98.944		14		5.10	0.50	0.2	0.10	0.6			0.0600	5.9	
SG			2.099	99.504		15		5.30	0.46	0.2	0.09	0.62			0.0570	5.6	
						16		5.50	0.46	0.2	0.09	0.59			0.0543	5.4	
						17		5.70	0.49	0.2	0.10	0.56			0.0549	5.4	
						18		5.90	0.47	0.2	0.09	0.57			0.0536	5.3	
						19		6.10	0.44	0.2	0.09	0.21			0.0185	1.8	
TBM			2.148	99.455		20		6.30	0.37	0.2	0.07	0.57			0.0422	4.2	
TBM	2.183	101.638				21		6.50	0.32	0.2	0.06	0.57			0.0365	3.6	
SG			2.137	99.501		22		6.70	0.30	0.2	0.06	0.46			0.0276	2.7	
WL			2.694	98.944		23		6.90	0.26	0.2	0.05	0.43			0.0224	2.2	
BM 57			-0.967	102.605		24		7.10	0.22	0.2	0.04	0.16			0.0070	0.7	
BM 58			1.072	100.566		25		7.30	0.20	0.2	0.04	0.2			0.0080	0.8	
BM 59			1.638	100.000		26		7.50	0.04	0.2	0.01	0.2			0.0028	0.3	
						27	Right Bank	8.00	0.00	0.5	0.00	0			0.0000	0.0	
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.566		-0.027		33											
BM 57	102.608	102.606		-0.002		Total Q										1.014	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.448															
Stage from WL Survey (m)		98.944															
Pressure Transducer Reading (m)		1.005															
Pressure Transducer Elevation (m)		97.939															
Discharge (m³/s)		1.014															
Cross Sectional Area		1.997															
Average Velocity		0.508															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	14:30	End	15:15:00 P	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		1-Sep-15				Real Time Reading		Start	Reading	1.0051	Time	13:30	Staff Gauge (m)		0.448		
Time at Site (24 hr)		Start Time:	12:55	End Time:	15:40	(m)	End	Reading	0.9996	Time	15:50	Time of SG Reading		13:30			
Personnel		Greg Langston, Fraser Ross						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cool, cloudy, moderate wind.				1	Left Bank	8.00	0.00	0.0	0.00	0			0.0000	0.0	
Transducer Information						2		7.60	0.04	0.4	0.01	0.2			0.0024	0.2	
						3		7.40	0.10	0.2	0.02	0.31			0.0062	0.6	
DL Model		Hobo	PT Serial #		21041003	4		7.20	0.18	0.2	0.04	0.42			0.0151	1.5	
Gain		0	Offset		0	5		7.00	0.20	0.2	0.04	0.53			0.0212	2.1	
Status		Logging	Battery		100%	6		6.80	0.27	0.2	0.05	0.4			0.0216	2.2	
# of Records		n/a	Memory Free		n/a	7		6.60	0.30	0.2	0.06	0.48			0.0288	2.9	
DL Service Performed		n/a	Crest Gauges		n/a	8		6.40	0.34	0.2	0.07	0.56			0.0381	3.9	
Hydrometric Leveling Survey						9		6.20	0.36	0.2	0.07	0.46			0.0331	3.4	
Stn	BS	HI	FS	Elevation	Notes	10		6.00	0.46	0.2	0.09	0.25			0.0230	2.3	
BM 59	1.603	101.603		100.000		11		5.80	0.48	0.2	0.10	0.57			0.0547	5.5	
BM 58			1.037	100.566		12		5.60	0.50	0.2	0.10	0.48			0.0480	4.9	
BM 57			-1.003	102.606		13		5.40	0.48	0.2	0.10	0.57			0.0547	5.5	
WL			2.659	98.944		14		5.20	0.47	0.2	0.09	0.6			0.0564	5.7	
SG			2.099	99.504		15		5.00	0.46	0.2	0.09	0.6			0.0552	5.6	
						16		4.80	0.50	0.2	0.10	0.6			0.0600	6.1	
						17		4.60	0.44	0.2	0.09	0.6			0.0528	5.3	
						18		4.40	0.51	0.2	0.10	0.59			0.0602	6.1	
						19		4.20	0.52	0.2	0.10	0.59			0.0614	6.2	
TBM			2.148	99.455		20		4.00	0.50	0.2	0.10	0.56			0.0560	5.7	
TBM	2.183	101.638				21		3.80	0.48	0.2	0.10	0.54			0.0518	5.3	
SG			2.137	99.501		22		3.60	0.48	0.2	0.10	0.51			0.0490	5.0	
WL			2.694	98.944		23		3.40	0.48	0.2	0.10	0.52			0.0499	5.1	
BM 57			-0.967	102.605		24		3.20	0.46	0.2	0.09	0.49			0.0451	4.6	
BM 58			1.072	100.566		25		3.00	0.44	0.2	0.09	0.46			0.0405	4.1	
BM 59			1.638	100.000		26		2.80	0.32	0.2	0.06	0.03			0.0019	0.2	
						27		2.60	0.04	0.2	0.01	0			0.0000	0.0	
						28	Right Bank	2.40	0.00	0.2	0.00	0			0.000	0.0	
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.566		-0.027		33											
BM 57	102.608	102.606		-0.002		Total Q										0.987	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.448															
Stage from WL Survey (m)		98.944															
Pressure Transducer Reading (m)		1.005															
Pressure Transducer Elevation (m)		97.939															
Discharge (m³/s)		0.987															
Cross Sectional Area		1.966															
Average Velocity		0.502															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	8:30	End	9:15	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		3-Sep-15				Real Time Reading		Start	Reading	0.9968	Time	8:30	Staff Gauge (m)		0.441		
Time at Site (24 hr)		Start Time:	8:30	End Time:	10:15	(m)	End	Reading	0.9996	Time	10:15	Time of SG Reading		10:15			
Personnel		Greg Langston, Fraser Ross						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		434059	7559504	23		1	Right Bank	2.40	0.00	0.0	0.00	0			0.0000	0.0	
Weather Conditions		Cool, cloudy, moderate wind.				2			2.70	0.06	0.3	0.02	0			0.0000	0.0
Transducer Information						3			2.90	0.39	0.2	0.08	0.41			0.0320	3.3
DL Model		Hobo	PT Serial #		21041003	4			3.10	0.44	0.2	0.09	0.46			0.0405	4.1
Gain		0	Offset		0	5			3.30	0.46	0.2	0.09	0.48			0.0442	4.5
Status		Logging	Battery		100%	6			3.50	0.47	0.2	0.09	0.52			0.0489	5.0
# of Records		n/a	Memory Free		n/a	7			3.70	0.47	0.2	0.09	0.52			0.0489	5.0
DL Service Performed		n/a	Crest Gauges		n/a	8			3.90	0.48	0.2	0.10	0.54			0.0518	5.3
Hydrometric Leveling Survey						9			4.10	0.51	0.2	0.10	0.56			0.0571	5.8
Stn	BS	HI	FS	Elevation	Notes	10			4.30	0.50	0.2	0.10	0.56			0.0560	5.7
BM 59	1.653	101.653		100.000		11			4.50	0.50	0.2	0.10	0.59			0.0590	6.0
BM 58			1.086	100.567		12			4.70	0.44	0.2	0.09	0.57			0.0502	5.1
BM 57			-0.952	102.605		13			4.90	0.50	0.2	0.10	0.58			0.0580	5.9
WL			2.712	98.941		14			5.10	0.49	0.2	0.10	0.58			0.0568	5.8
SG			2.150	99.503		15			5.30	0.46	0.2	0.09	0.59			0.0543	5.5
						16			5.50	0.43	0.2	0.09	0.61			0.0525	5.3
						17			5.70	0.50	0.2	0.10	0.48			0.0480	4.9
						18			5.90	0.47	0.2	0.09	0.5			0.0470	4.8
						19			6.10	0.42	0.2	0.08	0.22			0.0185	1.9
TBM			2.200	99.453		20			6.30	0.36	0.2	0.07	0.57			0.0410	4.2
TBM	2.151	101.604				21			6.50	0.33	0.2	0.07	0.57			0.0376	3.8
SG			2.101	99.503		22			6.70	0.30	0.2	0.06	0.47			0.0282	2.9
WL			2.662	98.942		23			6.90	0.26	0.2	0.05	0.41			0.0213	2.2
BM 57			-1.003	102.607		24			7.10	0.25	0.2	0.05	0.2			0.0100	1.0
BM 58			1.037	100.567		25			7.30	0.16	0.2	0.03	0.44			0.0141	1.4
BM 59			1.604	100.000		26			7.50	0.09	0.2	0.02	0.28			0.0050	0.5
						27			7.70	0.02	0.2	0.00	0.2			0.0008	0.1
						28		Left Bank	7.90	0.00	0.2	0.00	0			0.000	0.0
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.567		-0.026		33											
BM 57	102.608	102.606		-0.002		Total Q										0.982	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.441															
Stage from WL Survey (m)		98.942															
Pressure Transducer Reading (m)		0.997															
Pressure Transducer Elevation (m)		97.945															
Discharge (m³/s)		0.982															
Cross Sectional Area		1.955															
Average Velocity		0.502															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	9:15	End	10:00	Location	Approximately 80 m downstream of PT.				
Station Identification	TL-2				Method	Velocity-area (Mid-section)				Instrument Model	FH950				
Stream Name	Doris Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	6593				
Date Monitored	3-Sep-15				Real Time Reading	Start	Reading	0.9968	Time	8:30	Staff Gauge (m)	0.441			
Time at Site (24 hr)	Start Time:	8:30	End Time:	10:15	(m)	End	Reading	0.9996	Time	10:15	Time of SG Reading	10:15			
Personnel	Greg Langston, Fraser Ross					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Cool, cloudy, moderate wind.				1	Left Bank	7.90	0.00	0.0	0.00	0			0.0000	0.0
					2		7.60	0.04	0.3	0.01	0.19			0.0019	0.2
					3		7.40	0.12	0.2	0.02	0.36			0.0086	0.9
					4		7.20	0.18	0.2	0.04	0.45			0.0162	1.7
					5		7.00	0.22	0.2	0.04	0.25			0.0110	1.1
					6		6.80	0.29	0.2	0.06	0.28			0.0162	1.7
					7		6.60	0.32	0.2	0.06	0.53			0.0339	3.5
					8		6.40	0.36	0.2	0.07	0.56			0.0403	4.2
					9		6.20	0.44	0.2	0.09	0.16			0.0141	1.5
					10		6.00	0.46	0.2	0.09	0.52			0.0478	5.0
					11		5.80	0.49	0.2	0.10	0.5			0.0490	5.1
					12		5.60	0.50	0.2	0.10	0.51			0.0510	5.3
					13		5.40	0.47	0.2	0.09	0.56			0.0526	5.5
					14		5.20	0.47	0.2	0.09	0.59			0.0555	5.8
					15		5.00	0.46	0.2	0.09	0.59			0.0543	5.6
					16		4.80	0.48	0.2	0.10	0.59			0.0566	5.9
					17		4.60	0.48	0.2	0.10	0.57			0.0547	5.7
					18		4.40	0.50	0.2	0.10	0.58			0.0580	6.0
					19		4.20	0.51	0.2	0.10	0.57			0.0581	6.0
					20		4.00	0.49	0.2	0.10	0.55			0.0539	5.6
					21		3.80	0.48	0.2	0.10	0.54			0.0518	5.4
					22		3.60	0.47	0.2	0.09	0.5			0.0470	4.9
					23		3.40	0.47	0.2	0.09	0.49			0.0461	4.8
					24		3.20	0.44	0.2	0.09	0.49			0.0431	4.5
					25		3.00	0.42	0.2	0.08	0.45			0.0378	3.9
					26		2.80	0.18	0.2	0.05	0.03			0.0016	0.2
					27	Right Bank	2.40	0.00	0.4	0.00	0			0.0000	0.0
					28										
					29										
					30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 59	100	100.000	0.000		32										
BM 58	100.593	100.567	-0.026		33										
BM 57	102.608	102.606	-0.002		Total Q									0.961	100.0
Summary					General Notes										
Staff Gauge Reading (m)		0.441													
Stage from WL Survey (m)		98.942													
Pressure Transducer Reading (m)		0.997													
Pressure Transducer Elevation (m)		97.945													
Discharge (m ³ /s)		0.961													
Cross Sectional Area		1.968													
Average Velocity		0.488													

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	13:30	End	14:15	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		19-Sep-15				Real Time Reading		Start	Reading	0.946	Time	13:30	Staff Gauge (m)		0.373		
Time at Site (24 hr)		Start Time:	12:50	End Time:	15:30	(m)	End	Reading	0.9447	Time	15:30	Time of SG Reading		13:30			
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Sunny, moderate to strong downstream wind.				1	Right Bank	2.65	0.00	0.0	0.00	0			0.0000	0.0	
						2		2.80	0.36	0.2	0.06	0.27			0.0170	2.3	
						3		3.00	0.39	0.2	0.08	0.43			0.0335	4.5	
DL Model		Hobo	PT Serial #		21041003	4		3.20	0.41	0.2	0.08	0.42			0.0344	4.6	
Gain		0	Offset		0	5		3.40	0.42	0.2	0.08	0.45			0.0378	5.1	
Status		Logging	Battery		100%	6		3.60	0.42	0.2	0.08	0.47			0.0395	5.3	
# of Records		n/a	Memory Free		n/a	7		3.80	0.43	0.2	0.09	0.48			0.0413	5.6	
DL Service Performed		n/a	Crest Gauges		n/a	8		4.00	0.46	0.2	0.09	0.5			0.0460	6.2	
Hydrometric Leveling Survey						9		4.20	0.46	0.2	0.09	0.5			0.0460	6.2	
Stn	BS	HI	FS	Elevation	Notes	10		4.40	0.46	0.2	0.09	0.51			0.0469	6.3	
BM 59	1.659	101.659		100.000		11		4.60	0.43	0.2	0.09	0.51			0.0439	5.9	
BM 58			1.092	100.567		12		4.80	0.46	0.2	0.09	0.5			0.0460	6.2	
BM 57			-0.950	102.609		13		5.00	0.43	0.2	0.09	0.5			0.0430	5.8	
WL			2.784	98.875		14		5.20	0.41	0.2	0.08	0.5			0.0410	5.5	
SG			2.156	99.503		15		5.40	0.43	0.2	0.09	0.49			0.0421	5.7	
						16		5.60	0.40	0.2	0.08	0.47			0.0376	5.1	
						17		5.80	0.41	0.2	0.08	0.37			0.0303	4.1	
						18		6.00	0.38	0.2	0.08		0.57	-0.09	0.0182	2.5	
						19		6.20	0.28	0.2	0.06	0.41			0.0230	3.1	
TBM			2.201	99.458		20		6.40	0.28	0.2	0.06	0.52			0.0291	3.9	
TBM	2.252	101.710				21		6.60	0.24	0.2	0.05	0.42			0.0202	2.7	
SG			2.211	99.499		22		6.80	0.22	0.2	0.04	0.31			0.0136	1.8	
WL			2.844	98.866		23		7.00	0.20	0.2	0.05	0.16			0.0072	1.0	
WL			2.842	98.868		24		7.25	0.09	0.3	0.02	0.25			0.0056	0.8	
WL			2.839	98.871		25	Left Bank	7.50	0.00	0.3	0.00	0			0.0000	0.0	
WL			2.843	98.867		26											
WL			2.852	98.858		27											
BM 57			-0.899	102.609		28											
BM 58			1.145	100.565		29											
BM 59			1.711	99.999		30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.566		-0.027		33											
BM 57	102.608	102.609		0.001		Total Q										0.743	100.0
Summary						General Notes											
Staff Gauge Reading (m)			0.373			Water level was fluctuating significantly at the staff gauge. Strong down stream winds potentially generating seiche from Doris Lake.											
Stage from WL Survey (m)			98.868														
Pressure Transducer Reading (m)			0.946														
Pressure Transducer Elevation (m)			97.922														
Discharge (m³/s)			0.743														
Cross Sectional Area			1.695														
Average Velocity			0.439														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	14:15	End	15:00	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		19-Sep-15				Real Time Reading		Start	Reading	0.946	Time	13:30	Staff Gauge (m)		0.373		
Time at Site (24 hr)		Start Time:	12:50	End Time:	15:30	(m)		End	Reading	0.9447	Time	15:30	Time of SG Reading		13:30		
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Sunny, moderate to strong downstream wind.				1	Left Bank	7.50	0.00	0.0	0.00	0			0.0000	0.0	
						2		7.30	0.06	0.2	0.01	0.17			0.0020	0.3	
						3		7.10	0.11	0.2	0.02	0.33			0.0073	1.0	
DL Model		Hobo	PT Serial #		21041003	4		6.90	0.19	0.2	0.04	0.13			0.0049	0.7	
Gain		0	Offset		0	5		6.70	0.23	0.2	0.05	0.27			0.0124	1.8	
Status		Logging	Battery		100%	6		6.50	0.28	0.2	0.06	0.42			0.0235	3.3	
# of Records		n/a	Memory Free		n/a	7		6.30	0.31	0.2	0.06	0.48			0.0298	4.2	
DL Service Performed		n/a	Crest Gauges		n/a	8		6.10	0.35	0.2	0.07		0.56	-0.06	0.0175	2.5	
Hydrometric Leveling Survey						9		5.90	0.42	0.2	0.08	0.37			0.0311	4.4	
Stn	BS	HI	FS	Elevation	Notes	10		5.70	0.44	0.2	0.09	0.38			0.0334	4.7	
BM 59	1.659	101.659		100.000		11		5.50	0.45	0.2	0.09	0.3			0.0270	3.8	
BM 58			1.092	100.567		12		5.30	0.40	0.2	0.08	0.5			0.0400	5.6	
BM 57			-0.950	102.609		13		5.10	0.42	0.2	0.08	0.51			0.0428	6.0	
WL			2.784	98.875		14		4.90	0.45	0.2	0.09	0.49			0.0441	6.2	
SG			2.156	99.503		15		4.70	0.43	0.2	0.09	0.5			0.0430	6.1	
						16		4.50	0.38	0.2	0.08	0.51			0.0388	5.5	
						17		4.30	0.46	0.2	0.09	0.49			0.0451	6.4	
						18		4.10	0.46	0.2	0.09	0.49			0.0451	6.4	
						19		3.90	0.43	0.2	0.09	0.49			0.0421	5.9	
TBM			2.201	99.458		20		3.70	0.43	0.2	0.09	0.48			0.0413	5.8	
TBM	2.252	101.710				21		3.50	0.42	0.2	0.08	0.45			0.0378	5.3	
SG			2.211	99.499		22		3.30	0.42	0.2	0.08	0.44			0.0370	5.2	
WL			2.844	98.866		23		3.10	0.40	0.2	0.08	0.43			0.0344	4.8	
WL			2.842	98.868		24		2.90	0.38	0.2	0.08	0.38			0.0289	4.1	
WL			2.839	98.871		25		2.70	0.18	0.2	0.02	0			0.0000	0.0	
WL			2.843	98.867		26	Right Bank	2.65	0.00	0.1	0.00	0			0.0000	0.0	
WL			2.852	98.858		27											
BM 57			-0.899	102.609		28											
BM 58			1.145	100.565		29											
BM 59			1.711	99.999		30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593	100.566		-0.027		33											
BM 57	102.608	102.609		0.001		Total Q										0.709	100.0
Summary						General Notes											
Staff Gauge Reading (m)			0.373			Water level was fluctuating significantly at the staff gauge. Strong down stream winds potentially generating seiche from Doris Lake.											
Stage from WL Survey (m)			98.868														
Pressure Transducer Reading (m)			0.946														
Pressure Transducer Elevation (m)			97.922														
Discharge (m³/s)			0.709														
Cross Sectional Area			1.687														
Average Velocity			0.421														

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	15:00	End	15:45	Location	Approximately 80 m downstream of PT.				
Station Identification		TL-2				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		20-Sep-15				Real Time Reading		Start	Reading	0.936	Time	15:00	Staff Gauge (m)		0.358		
Time at Site (24 hr)		Start Time:	14:40	End Time:	16:30	(m)	End	Reading	0.938	Time	16:30	Time of SG Reading		15:00			
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Sunny, moderate wind.				1	Right Bank	7.50	0.00	0.0	0.00	0			0.0000	0.0	
						2		7.20	0.07	0.3	0.02	0.26			0.0046	0.7	
						3		7.00	0.12	0.2	0.02	0.31			0.0074	1.1	
DL Model		Hobo	PT Serial #		21041003	4		6.80	0.16	0.2	0.03	0.28			0.0090	1.3	
Gain		0	Offset		0	5		6.60	0.22	0.2	0.04	0.41			0.0180	2.6	
Status		Logging	Battery		100%	6		6.40	0.24	0.2	0.05	0.48			0.0230	3.4	
# of Records		n/a	Memory Free		n/a	7		6.20	0.26	0.2	0.05	0.42			0.0218	3.2	
DL Service Performed		n/a	Crest Gauges		n/a	8		6.00	0.35	0.2	0.07		0.57	-0.06	0.0179	2.6	
Hydrometric Leveling Survey						9		5.80	0.40	0.2	0.08	0.4			0.0320	4.7	
Stn	BS	HI	FS	Elevation	Notes	10		5.60	0.40	0.2	0.08	0.45			0.0360	5.3	
BM 59	1.565	101.565		100.000		11		5.40	0.40	0.2	0.08	0.49			0.0392	5.7	
WL			2.704	98.861		12		5.20	0.40	0.2	0.08	0.49			0.0392	5.7	
						13		5.00	0.42	0.2	0.08	0.47			0.0395	5.8	
						14		4.80	0.44	0.2	0.09	0.48			0.0422	6.2	
						15		4.60	0.44	0.2	0.09	0.5			0.0440	6.4	
						16		4.40	0.44	0.2	0.09	0.49			0.0431	6.3	
						17		4.20	0.42	0.2	0.08	0.49			0.0412	6.0	
						18		4.00	0.44	0.2	0.09	0.48			0.0422	6.2	
						19		3.80	0.42	0.2	0.08	0.47			0.0395	5.8	
TBM			2.106	99.459		20		3.60	0.42	0.2	0.08	0.45			0.0378	5.5	
TBM	2.199	101.658				21		3.40	0.40	0.2	0.08	0.43			0.0344	5.0	
WL			2.798	98.860		22		3.20	0.40	0.2	0.08	0.42			0.0336	4.9	
BM 59			1.658	100.000		23		3.00	0.38	0.2	0.08	0.42			0.0319	4.7	
						24		2.80	0.32	0.2	0.05	0.16			0.0077	1.1	
						25	Left Bank	2.70	0.00	0.1	0.00	0			0.0000	0.0	
						26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 59	100	100.000		0.000		32											
BM 58	100.593					33											
BM 57	102.608					Total Q										0.685	100.0
Summary						General Notes											
Staff Gauge Reading (m)		0.358				Station demobilized September 21 at approximately 9:00 PST.											
Stage from WL Survey (m)		98.861															
Pressure Transducer Reading (m)		0.936															
Pressure Transducer Elevation (m)		97.925															
Discharge (m³/s)		0.685															
Cross Sectional Area		1.580															
Average Velocity		0.434															

Appendix B-1. 2015 Manual Discharge Measurements at Doris Lake Outflow (TL-2)

Site Information						Discharge Measurement - Mid-Section Method																											
Project Name		Hope Bay				Measurement Time		Start		15:45		End		16:30		Location		Approximately 80 m downstream of PT.															
Station Identification		TL-2				Method		Velocity-area (Mid-section)				Instrument Model		FH950																			
Stream Name		Doris Lake Outflow				Flow Meter Type		Electromagnetic				Instrument Serial #		6593																			
Date Monitored		20-Sep-15				Real Time Reading		Start		Reading		0.936		Time		15:00		Staff Gauge (m)		0.359													
Time at Site (24 hr)		Start Time:		14:40		End Time:		16:30		(m)		End		Reading		0.938		Time		16:30		Time of SG Reading		15:00									
Personnel		Greg Langston, Kevin Esseltine						Station		Depth		Distance		Area		Velocity (m/s)				Q		% of Total Q											
Station Coordinates		Easting		Northing		Elevation				No.		Notes		(m)		(m)		(m)		(m²)		60%		20%		80%		(m³/s)		%			
		434059		7559504		23				1		Left Bank		2.70		0.00		0.0		0.00		0						0.0000		0.0			
Weather Conditions		Sunny, moderate wind.				2				2.90		0.36		0.2		0.07		0.37										0.0266		3.8			
						3				3.10		0.38		0.2		0.08		0.42										0.0319		4.5			
DL Model		Hobo		PT Serial #		21041003		4		3.30		0.40		0.2		0.08		0.43										0.0344		4.9			
Gain		0		Offset		0		5		3.50		0.40		0.2		0.08		0.45										0.0360		5.1			
Status		Logging		Battery		100%		6		3.70		0.44		0.2		0.09		0.44										0.0387		5.5			
# of Records		n/a		Memory Free		n/a		7		3.90		0.42		0.2		0.08		0.47										0.0395		5.6			
DL Service Performed		n/a		Crest Gauges		n/a		8		4.10		0.44		0.2		0.09		0.48										0.0422		6.0			
Hydrometric Leveling Survey						9				4.30		0.44		0.2		0.09		0.49										0.0431		6.1			
Stn		BS		HI		FS		Elevation		Notes		10				4.50		0.44		0.2		0.09		0.5						0.0440		6.3	
BM 59		1.565		101.565				100.000				11				4.70		0.44		0.2		0.09		0.5						0.0440		6.3	
WL						2.704		98.861				12				4.90		0.43		0.2		0.09		0.49						0.0421		6.0	
												13				5.10		0.41		0.2		0.08		0.5						0.0410		5.8	
												14				5.30		0.37		0.2		0.07		0.51						0.0377		5.4	
												15				5.50		0.37		0.2		0.07		0.5						0.0370		5.3	
												16				5.70		0.40		0.2		0.08		0.47						0.0376		5.4	
												17				5.90		0.40		0.2		0.08		0.38						0.0304		4.3	
												18				6.10		0.37		0.2		0.07				0.56		-0.1		0.0170		2.4	
												19				6.30		0.27		0.2		0.05		0.51						0.0275		3.9	
TBM						2.106		99.459				20				6.50		0.24		0.2		0.05		0.46						0.0221		3.1	
TBM		2.199		101.658								21				6.70		0.20		0.2		0.04		0.3						0.0120		1.7	
WL						2.798		98.860				22				6.90		0.12		0.2		0.02		0.37						0.0089		1.3	
BM 59						1.658		100.000				23				7.10		0.07		0.2		0.01		0.32						0.0045		0.6	
												24				7.30		0.10		0.2		0.02		0.17						0.0034		0.5	
												25		Right Bank		7.50		0.00		0.2		0.00		0						0.0000		0.0	
												26																					
												27																					
												28																					
												29																					
												30																					
BM#		Established Elevation (m)		Mean Elevation (this date) (m)		Difference (m)		Notes				31																					
BM 59		100		100.000		0.000						32																					
BM 58		100.593										33																					
BM 57		102.608										Total Q																		0.702		100.0	
Summary						General Notes																											
Staff Gauge Reading (m)				0.359		Station demobilized September 21 at approximately 9:00 PST.																											
Stage from WL Survey (m)				98.861																													
Pressure Transducer Reading (m)				0.936																													
Pressure Transducer Elevation (m)				97.925																													
Discharge (m³/s)				0.702																													
Cross Sectional Area				1.582																													
Average Velocity				0.444																													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	14:10	End	15:30	Location	Approximately 200 m upstream of PT				
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flow mate				
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528				
Date Monitored	11-Jun-15				Real Time Reading	Start	Reading	1.228	Time	13:10	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	13:00	End Time:	15:45	(m)	End	Reading	1.227	Time	15:44	Time of SG Reading	n/a			
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Cloudy, light to moderate north wind.				1	left Bank	0.70	0.00	0.0	0.00	0			0.000	0.0
					2		1.00	0.15	0.3	0.05	0.07			0.003	0.1
					3		1.30	0.26	0.3	0.07	0.64			0.042	1.6
DL Model	PT2X	PT Serial #	2122022		4		1.50	0.68	0.2	0.14	0.8			0.109	4.3
Gain	1.003996	Offset	-0.003		5		1.70	0.64	0.2	0.13	0.88			0.113	4.4
Status	Logging	Battery	100%		6		1.90	0.70	0.2	0.14	0.96			0.134	5.3
# of Records	0	Memory Free	524154		7		2.10	0.56	0.2	0.11	1			0.112	4.4
DL Service Performed	n/a	Crest Gauges	n/a		8		2.30	0.49	0.2	0.10	1.07			0.105	4.1
Hydrometric Leveling Survey					9		2.50	0.50	0.2	0.10	1.1			0.110	4.3
Stn	BS	HI	FS	Elevation	Notes	10		2.70	0.77	0.2	0.15	1.16		0.179	7.0
BM 87	1.116	101.116		100.000		11		2.90	0.83	0.2	0.17	1.18		0.196	7.7
BM 88			1.169	99.947		12		3.10	0.85	0.2	0.17	1.22		0.207	8.1
BM 89			0.871	100.245		13		3.30	0.82	0.2	0.16	1.19		0.195	7.7
PT			4.582	96.534		14		3.50	0.80	0.2	0.16	1.18		0.189	7.4
WL			3.396	97.720		15		3.70	0.85	0.2	0.17	1.09		0.185	7.3
						16		3.90	0.80	0.2	0.16	1.02		0.163	6.4
						17		4.10	0.82	0.2	0.16	0.97		0.159	6.2
						18		4.30	0.81	0.2	0.16	0.93		0.151	5.9
						19		4.50	0.80	0.2	0.16	0.75		0.120	4.7
TBM			1.570	99.546		20		4.70	0.78	0.2	0.16	0.13		0.020	0.8
TBM	1.547	101.093		99.546		21		4.90	0.20	0.2	0.04	0.65		0.026	1.0
BM 87			1.093	100.000		22		5.10	0.23	0.2	0.06	0.48		0.028	1.1
BM 88			1.146	99.947		23		5.40	0.17	0.3	0.04	0.03		0.001	0.0
BM 89			0.848	100.245		24	Right Bank	5.55	0.00	0.1	0.00	0		0.000	0.0
PT			4.559	96.534		25									
WL			3.373	97.720		26									
						27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 87	100	100.000	0.000		32										
BM 88	100.945	99.947	-0.998		33										
BM 89	102.227	100.245	-1.982		Total Q									2.547	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a			First visit of the season. Station installed.										
Stage from WL Survey (m)		97.720													
Pressure Transducer Reading (m)		1.228													
Pressure Transducer Elevation (m)		96.492													
Discharge (m ³ /s)		2.547													
Cross Sectional Area		2.746													
Average Velocity		0.927													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	13:10	End	13:50	Location	Approximately 200 m upstream of PT				
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Swoffer				
Stream Name	Doris Creek				Flow Meter Type	Propeller				Instrument Serial #	6733				
Date Monitored	12-Jun-15				Real Time Reading	Start	Reading	1.249	Time	13:10	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	12:30	End Time:	14:45:00 PM	(m)	End	Reading	1.248	Time	13:50	Time of SG Reading	n/a			
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny				1	Right Bank	2.60	0.00	0.0	0.00	0			0.000	0.0
					2		2.85	0.23	0.3	0.06	0.27			0.016	0.6
					3		3.10	0.21	0.3	0.05	0.62			0.029	1.1
DL Model	PT2X	PT Serial #	2122022		4		3.30	0.26	0.2	0.05	0.87			0.045	1.7
Gain	1.003996	Offset	-0.003		5		3.50	0.82	0.2	0.16	0.73			0.120	4.4
Status	Logging	Battery	100%		6		3.70	0.79	0.2	0.16	0.81			0.128	4.7
# of Records	149	Memory Free	524005		7		3.90	0.76	0.2	0.15	0.94			0.143	5.2
DL Service Performed	n/a	Crest Gauges	n/a		8		4.10	0.84	0.2	0.17	0.96			0.161	5.9
Hydrometric Leveling Survey					9		4.30	0.85	0.2	0.17	1.07			0.182	6.6
Stn	BS	HI	FS	Elevation	Notes	10		4.50	0.84	0.2	0.17	1.16		0.195	7.1
BM 87	0.724	100.724		100.000		11		4.70	0.76	0.2	0.15	1.22		0.185	6.8
BM 88			0.778	99.946		12		4.90	0.86	0.2	0.17	1.24		0.213	7.8
BM 89			0.479	100.245		13		5.10	0.75	0.2	0.15	1.2		0.180	6.6
WL			2.977	97.747		14		5.30	0.80	0.2	0.16	1.24		0.198	7.2
						15		5.50	0.79	0.2	0.16	1.19		0.188	6.9
						16		5.70	0.51	0.2	0.10	1.15		0.117	4.3
						17		5.90	0.58	0.2	0.12	1.02		0.118	4.3
						18		6.10	0.57	0.2	0.11	1.01		0.115	4.2
						19		6.30	0.73	0.2	0.15	0.91		0.133	4.8
TBM			1.814	98.910		20		6.50	0.67	0.2	0.13	0.87		0.117	4.3
TBM	1.997	100.907		98.910		21		6.70	0.70	0.2	0.14	0.65		0.091	3.3
BM 87			0.904	100.003		22		6.90	0.66	0.2	0.10	0.24		0.024	0.9
BM 88			0.958	99.949		23		7.00	0.34	0.1	0.09	0.49		0.042	1.5
BM 89			0.659	100.248		24	Left Bank	7.40	0.00	0.4	0.00	0		0.000	0.0
WL			3.158	97.749		25									
						26									
						27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes		31									
BM 87	100	100.002	0.001			32									
BM 88	100.945	99.948	-0.998			33									
BM 89	102.227	100.247	-1.981			Total Q								2.740	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		97.748													
Pressure Transducer Reading (m)		1.249													
Pressure Transducer Elevation (m)		96.499													
Discharge (m ³ /s)		2.740													
Cross Sectional Area		2.865													
Average Velocity		0.957													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method												
Project Name	Hope Bay				Measurement Time	Start	13:50	End	14:20	Location	Approximately 200 m upstream of PT						
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Swoffer						
Stream Name	Doris Creek				Flow Meter Type	Propeller				Instrument Serial #	6733						
Date Monitored	12-Jun-15				Real Time Reading	Start	Reading	1.249	Time	13:50	Staff Gauge (m)		n/a				
Time at Site (24 hr)	Start Time:	12:30	End Time:	14:45:00 PM	(m)	End	Reading	1.248	Time	14:20	Time of SG Reading		n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q			
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%		
	434204	7559985	0		1	Right Bank	2.60	0.00	0.0	0.00	0			0.000	0.0		
Weather Conditions	Sunny				2		2.70	0.13	0.1	0.03	0.12			0.003	0.1		
Transducer Information					3		3.00	0.26	0.3	0.07	0.46			0.030	1.1		
DL Model	PT2X	PT Serial #	2122022		4		3.20	0.26	0.2	0.05	0.7			0.036	1.3		
Gain	1.003996	Offset	-0.003		5		3.40	0.36	0.2	0.07	0.71			0.051	1.8		
Status	Logging	Battery	100%		6		3.60	0.82	0.2	0.16	0.82			0.134	4.8		
# of Records	149	Memory Free	524005		7		3.80	0.85	0.2	0.17	0.97			0.165	5.9		
DL Service Performed	n/a	Crest Gauges	n/a		8		4.00	0.85	0.2	0.17	0.95			0.162	5.8		
Hydrometric Leveling Survey					9		4.20	0.85	0.2	0.17	1.04			0.177	6.3		
Stn	BS	HI	FS	Elevation	Notes	10		4.40	0.86	0.2	0.17	1.14			0.196	7.0	
BM 87	0.724	100.724		100.000		11		4.60	0.85	0.2	0.17	1.27			0.216	7.7	
BM 88			0.778	99.946		12		4.80	0.84	0.2	0.17	1.22			0.205	7.3	
BM 89			0.479	100.245		13		5.00	0.87	0.2	0.17	1.24			0.216	7.7	
WL			2.977	97.747		14		5.20	0.75	0.2	0.15	1.23			0.185	6.6	
						15		5.40	0.80	0.2	0.16	1.23			0.197	7.0	
						16		5.60	0.55	0.2	0.11	1.19			0.131	4.7	
						17		5.80	0.50	0.2	0.10	1.15			0.115	4.1	
						18		6.00	0.67	0.2	0.13	0.92			0.123	4.4	
						19		6.20	0.73	0.2	0.15	0.95			0.139	4.9	
TBM			1.814	98.910		20		6.40	0.74	0.2	0.15	0.75			0.111	4.0	
TBM	1.997	100.907		98.910		21		6.60	0.71	0.2	0.14	0.79			0.112	4.0	
BM 87			0.904	100.003		22		6.80	0.69	0.2	0.14	0.55			0.076	2.7	
BM 88			0.958	99.949		23		7.00	0.24	0.2	0.07	0.35			0.025	0.9	
BM 89			0.659	100.248		24	Left Bank	7.40	0.00	0.4	0.00	0			0.000	0.0	
WL			3.158	97.749		25											
						26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 87	100	100.002		0.001		32											
BM 88	100.945	99.948		-0.998		33											
BM 89	102.227	100.247		-1.981		Total Q										2.804	100.0
Summary						General Notes											
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		97.748															
Pressure Transducer Reading (m)		1.249															
Pressure Transducer Elevation (m)		96.499															
Discharge (m ³ /s)		2.804															
Cross Sectional Area		2.873															
Average Velocity		0.976															

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	13:50	End	14:30	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)			Instrument Model	Flowmate						
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic			Instrument Serial #	2007528						
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	1.259	Time	13:50	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	12:30	End Time:	15:00	(m)	End	Reading	1.262	Time	14:30	Time of SG Reading	n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	434204	7559985	0		1	Right Bank	0.90	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions	Clear.				2		1.20	0.17	0.3	0.03	-0.05			-0.002	-0.1	
Transducer Information					3		1.30	0.30	0.1	0.09	0.72			0.065	2.5	
DL Model	PT2X	PT Serial #	2122022		4		1.80	0.72	0.5	0.25	0.78			0.197	7.5	
Gain	1.003996	Offset	-0.003		5		2.00	0.75	0.2	0.15	0.9			0.135	5.2	
Status	Logging	Battery	100%		6		2.20	0.73	0.2	0.15	0.98			0.143	5.5	
# of Records	309	Memory Free	523845		7		2.40	0.52	0.2	0.10	1.03			0.107	4.1	
DL Service Performed	n/a	Crest Gauges	n/a		8		2.60	0.51	0.2	0.10	1.05			0.107	4.1	
Hydrometric Leveling Survey					9		2.80	0.84	0.2	0.17		1.17	0.73	0.160	6.1	
Stn	BS	HI	FS	Elevation	Notes	10		3.00	0.82	0.2	0.16		1.13	0.95	0.171	6.5
BM 87	0.799	100.799		100.000		11		3.20	0.78	0.2	0.16		1.17	1.18	0.183	7.0
BM 88			0.852	99.947		12		3.40	0.88	0.2	0.18		1.06	1.14	0.194	7.4
BM 89			0.553	100.246		13		3.60	0.85	0.2	0.17		1.09	1.16	0.191	7.3
WL			3.036	97.763		14		3.80	0.87	0.2	0.17		1.11	1.17	0.198	7.6
						15		4.00	0.87	0.2	0.17		1.01	1.06	0.180	6.9
						16		4.20	0.69	0.2	0.14	0.97			0.134	5.1
						17		4.40	0.75	0.2	0.15	0.92			0.138	5.3
						18		4.60	0.71	0.2	0.14	0.71			0.101	3.9
						19		4.80	0.84	0.2	0.17		0.68	0.55	0.103	3.9
TBM			2.227	98.572		20		5.00	0.42	0.2	0.08	0.53			0.045	1.7
TBM	2.251	100.823		98.572		21		5.20	0.26	0.2	0.05	0.65			0.034	1.3
WL			3.061	97.762		22		5.40	0.24	0.2	0.05	0.52			0.025	1.0
BM 89			0.578	100.245		23		5.60	0.18	0.2	0.03	0.35			0.009	0.4
BM 88			0.877	99.946		24	Left Bank	5.70	0.00	0.1	0.00	0			0.000	0.0
BM 87			0.823	100.000		25										
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.000	0.000		32											
BM 88	100.945	99.947	-0.998		33											
BM 89	102.227	100.246	-1.982		Total Q										2.617	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.763														
Pressure Transducer Reading (m)		1.259														
Pressure Transducer Elevation (m)		96.504														
Discharge (m³/s)		2.617														
Cross Sectional Area		2.869														
Average Velocity		0.912														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	14:30	End	15:00	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowmate					
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528					
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	1.259	Time	14:30	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	12:30	End Time:	15:00	(m)	End	Reading	1.262	Time	15:00	Time of SG Reading	n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	434204	7559985	0		1	Right Bank	5.70	0.00	0.0	0.00	0			0.000	0.0	
					2		5.40	0.28	0.3	0.08	0.45			0.038	1.5	
					3		5.10	0.38	0.3	0.10	0.68			0.065	2.5	
DL Model	PT2X	PT Serial #	2122022		4		4.90	0.84	0.2	0.17		0.69	0.48	0.098	3.8	
Gain	1.003996	Offset	-0.003		5		4.70	0.82	0.2	0.16		0.75	0.68	0.117	4.6	
Status	Logging	Battery	100%		6		4.50	0.72	0.2	0.14	0.78			0.112	4.4	
# of Records	309	Memory Free	523845		7		4.30	0.84	0.2	0.17		1	0.79	0.150	5.9	
DL Service Performed	n/a	Crest Gauges	n/a		8		4.10	0.85	0.2	0.17		1.02	0.54	0.133	5.2	
Hydrometric Leveling Survey					9		3.90	0.88	0.2	0.18		1.03	1.12	0.189	7.4	
Stn	BS	HI	FS	Elevation	Notes	10		3.70	0.85	0.2	0.17		1.05	1.17	0.189	7.4
BM 87	0.799	100.799		100.000		11		3.50	0.86	0.2	0.17		1.17	1.22	0.206	8.0
BM 88			0.852	99.947		12		3.30	0.82	0.2	0.16		1.15	1.14	0.188	7.3
BM 89			0.553	100.246		13		3.10	0.78	0.2	0.16		1.17	1.11	0.178	6.9
WL			3.036	97.763		14		2.90	0.82	0.2	0.16		1.22	0.77	0.163	6.4
						15		2.70	0.55	0.2	0.11	1.1			0.121	4.7
						16		2.50	0.52	0.2	0.10	1.05			0.109	4.3
						17		2.30	0.58	0.2	0.12	0.97			0.113	4.4
						18		2.10	0.74	0.2	0.19	0.89			0.165	6.4
						19		1.80	0.67	0.3	0.20	0.79			0.159	6.2
TBM			2.227	98.572		20		1.50	0.38	0.3	0.11	0.65			0.074	2.9
TBM	2.251	100.823		98.572		21		1.20	0.16	0.3	0.05	0			0.000	0.0
WL			3.061	97.762		22	Left Bank	0.90	0.00	0.3	0.00	0			0.000	0.0
BM 89			0.578	100.245		23										
BM 88			0.877	99.946		24										
BM 87			0.823	100.000		25										
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.000	0.000		32											
BM 88	100.945	99.947	-0.998		33											
BM 89	102.227	100.246	-1.982		Total Q										2.566	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.763														
Pressure Transducer Reading (m)		1.259														
Pressure Transducer Elevation (m)		96.504														
Discharge (m ³ /s)		2.566														
Cross Sectional Area		2.873														
Average Velocity		0.893														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	10:00	End	10:50	Location		Approximately 200 m upstream of PT			
Station Identification		TL-3				Method		Velocity-area (Mid-section)			Instrument Model		Flowmate				
Stream Name		Doris Creek				Flow Meter Type		Electromagnetic			Instrument Serial #		2007528				
Date Monitored		14-Jun-15				Real Time Reading		Start	Reading	1.269	Time	10:00	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	10:00	End Time:	12:00	(m)		End	Reading	1.269	Time	10:50	Time of SG Reading		n/a		
Personnel		Greg Langston, Coby Hall						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		434204	7559985	0		1	Right Bank	8.10	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions		Overcast and cool.				2			7.70	0.12	0.4	0.04	0		0.000	0.0	
Transducer Information						3			7.40	0.20	0.3	0.05	0.17		0.009	0.3	
DL Model		PT2X	PT Serial #		2122022	4			7.20	0.30	0.2	0.06	0.69		0.041	1.6	
Gain		1.003996	Offset		-0.003	5			7.00	0.70	0.2	0.14	0.64		0.090	3.4	
Status		Logging	Battery		100%	6			6.80	0.66	0.2	0.13	0.77		0.102	3.9	
# of Records		434	Memory Free		523720	7			6.60	0.76	0.2	0.15	0.87		0.132	5.0	
DL Service Performed		n/a	Crest Gauges		n/a	8			6.40	0.72	0.2	0.14	0.92		0.132	5.1	
Hydrometric Leveling Survey						9			6.20	0.52	0.2	0.10	1.01		0.105	4.0	
Stn	BS	HI	FS	Elevation	Notes	10			6.00	0.52	0.2	0.10	1.12		0.116	4.4	
BM 87	0.683	100.683		100.000		11			5.80	0.82	0.2	0.16		1.22	0.75	0.162	6.2
BM 88			0.737	99.946		12			5.60	0.84	0.2	0.17		1.14	1.04	0.183	7.0
BM 89			0.439	100.244		13			5.40	0.78	0.2	0.16		1.12	1.18	0.179	6.8
WL			2.912	97.771		14			5.20	0.88	0.2	0.18		1.15	1.26	0.212	8.1
						15			5.00	0.85	0.2	0.17		1.14	1.19	0.198	7.6
						16			4.80	0.88	0.2	0.18		1.1	1.18	0.201	7.7
						17			4.60	0.86	0.2	0.17		1.11	1.03	0.184	7.0
						18			4.40	0.86	0.2	0.17		1.05	0.45	0.129	4.9
						19			4.20	0.74	0.2	0.15	0.89			0.132	5.0
TBM			2.110	98.573		20			4.00	0.72	0.2	0.14	0.68			0.098	3.7
TBM	2.023	100.596		98.573		21			3.80	0.84	0.2	0.21		0.68	0.59	0.133	5.1
WL			2.826	97.770		22			3.50	0.20	0.3	0.06	0.64			0.038	1.5
BM 89			0.351	100.245		23			3.20	0.28	0.3	0.08	0.51			0.043	1.6
BM 88			0.650	99.946		24		Left Bank	2.90	0.00	0.3	0.00	0			0.000	0.0
BM 87			0.597	99.999		25											
						26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 87	100	100.000		0.000		32											
BM 88	100.945	99.946		-0.999		33											
BM 89	102.227	100.245		-1.982		Total Q										2.619	100.0
Summary						General Notes											
Staff Gauge Reading (m)			n/a														
Stage from WL Survey (m)			97.771														
Pressure Transducer Reading (m)			1.269														
Pressure Transducer Elevation (m)			96.502														
Discharge (m³/s)			2.619														
Cross Sectional Area			2.928														
Average Velocity			0.895														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	10:50	End	11:30	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowmate					
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528					
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading	1.269	Time	10:00	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	10:00	End Time:	12:00	(m)	End	Reading	1.269	Time	11:30	Time of SG Reading	n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Overcast and cool.				1	Right Bank	2.90	0.00	0.0	0.00	0			0.000	0.0	
					2		3.00	0.24	0.1	0.05	0.35			0.017	0.6	
					3		3.30	0.28	0.3	0.07	0.61			0.043	1.6	
DL Model	PT2X	PT Serial #	2122022		4		3.50	0.22	0.2	0.04	0.81			0.036	1.3	
Gain	1.003996	Offset	-0.003		5		3.70	0.83	0.2	0.17	0.69	0.47	0.42	0.094	3.5	
Status	Logging	Battery	100%		6		3.90	0.82	0.2	0.16		0.85	0.69	0.126	4.7	
# of Records	434	Memory Free	523720		7		4.10	0.70	0.2	0.14	0.85			0.119	4.5	
DL Service Performed	n/a	Crest Gauges	n/a		8		4.30	0.78	0.2	0.16		1.03	0.81	0.144	5.4	
Hydrometric Leveling Survey					9		4.50	0.70	0.2	0.14	1.01			0.141	5.3	
Stn	BS	HI	FS	Elevation	Notes	10		4.70	0.86	0.2	0.17		1.05	1.14	0.188	7.1
BM 87	0.683	100.683		100.000		11		4.90	0.88	0.2	0.18		1.13	1.27	0.211	7.9
BM 88			0.737	99.946		12		5.10	0.88	0.2	0.18		1.16	1.25	0.212	7.9
BM 89			0.439	100.244		13		5.30	0.82	0.2	0.16		1.12	1.15	0.186	7.0
WL			2.912	97.771		14		5.50	0.78	0.2	0.16		1.23	1.14	0.185	6.9
						15		5.70	0.82	0.2	0.16		1.22	0.97	0.180	6.7
						16		5.90	0.54	0.2	0.11	1.14			0.123	4.6
						17		6.10	0.50	0.2	0.10	1.09			0.109	4.1
						18		6.30	0.57	0.2	0.11	0.98			0.112	4.2
						19		6.50	0.73	0.2	0.18	0.9			0.164	6.1
TBM			2.110	98.573		20		6.80	0.66	0.3	0.23	0.83			0.192	7.2
TBM	2.023	100.596		98.573		21		7.20	0.30	0.4	0.12	0.74			0.089	3.3
WL			2.826	97.770		22		7.60	0.24	0.4	0.11	0.01			0.001	0.0
BM 89			0.351	100.245		23	Left Bank	8.10	0.00	0.5	0.00	0			0.000	0.0
BM 88			0.650	99.946		24										
BM 87			0.597	99.999		25										
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.000	0.000		32											
BM 88	100.945	99.946	-0.999		33											
BM 89	102.227	100.245	-1.982		Total Q										2.671	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.771														
Pressure Transducer Reading (m)		1.269														
Pressure Transducer Elevation (m)		96.502														
Discharge (m ³ /s)		2.671														
Cross Sectional Area		2.900														
Average Velocity		0.921														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	9:30	End	10:00	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowmate					
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528					
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading	1.267	Time	9:00	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	9:00	End Time:	11:15	(m)	End	Reading	1.267	Time	10:50	Time of SG Reading	n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Light rain and cool.				1	Left Bank	1.10	0.00	0.0	0.00	0			0.000	0.0	
					2		1.30	0.10	0.2	0.03	-0.02			-0.001	0.0	
					3		1.60	0.22	0.3	0.07	0.16			0.011	0.4	
Transducer Information					4		1.90	0.70	0.3	0.18	0.43			0.075	2.9	
DL Model	PT2X	PT Serial #	2122022		5		2.10	0.67	0.2	0.13	0.82			0.110	4.3	
Gain	1.003996	Offset	-0.003		6		2.30	0.75	0.2	0.15	0.86			0.129	5.0	
Status	Logging	Battery	100%		7		2.50	0.59	0.2	0.12	0.88			0.104	4.0	
# of Records	559	Memory Free	523595		8		2.70	0.54	0.2	0.11	0.97			0.105	4.1	
DL Service Performed	n/a	Crest Gauges	n/a		9		2.90	0.52	0.2	0.10	1.04			0.108	4.2	
Hydrometric Leveling Survey					10		3.10	0.84	0.2	0.17		1.13	0.77	0.160	6.2	
Stn	BS	HI	FS	Elevation	Notes	11		3.30	0.81	0.2	0.16		1.15	1.05	0.178	6.9
BM 87	0.772	100.772		100.000		12		3.50	0.78	0.2	0.16		1.08	1.11	0.171	6.6
BM 88			0.826	99.946		13		3.70	0.90	0.2	0.18		1.04	1.19	0.201	7.8
BM 89			0.527	100.245		14		3.90	0.86	0.2	0.17		1.06	1.19	0.194	7.5
WL			3.006	97.766		15		4.10	0.90	0.2	0.18		1.04	1.15	0.197	7.7
						16		4.30	0.88	0.2	0.18		1.07	1.06	0.187	7.3
						17		4.50	0.70	0.2	0.14	0.93			0.130	5.1
						18		4.70	0.76	0.2	0.15		0.99	0.82	0.138	5.3
						19		4.90	0.72	0.2	0.14	0.75			0.108	4.2
TBM			2.200	98.572		20		5.10	0.82	0.2	0.16		0.73	0.6	0.109	4.2
TBM	2.217	100.789		98.572		21		5.30	0.82	0.2	0.16		0.75	0.17	0.075	2.9
WL			3.023	97.766		22		5.50	0.30	0.2	0.06	0.67			0.040	1.6
BM 89			0.543	100.246		23		5.70	0.30	0.2	0.06	0.59			0.035	1.4
BM 88			0.842	99.947		24		5.90	0.20	0.2	0.03	0.39			0.012	0.5
BM 87			0.788	100.001		25	Right Bank	6.00	0.00	0.1	0.00	0			0.000	0.0
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.001	0.001		32											
BM 88	100.945	99.947	-0.998		33											
BM 89	102.227	100.246	-1.982		Total Q										2.576	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.766														
Pressure Transducer Reading (m)		1.267														
Pressure Transducer Elevation (m)		96.499														
Discharge (m ³ /s)		2.576														
Cross Sectional Area		2.988														
Average Velocity		0.862														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	10:00	End	10:50	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)			Instrument Model	Flowmate						
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic			Instrument Serial #	2007528						
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading	1.267	Time	9:00	Staff Gauge (m)		n/a			
Time at Site (24 hr)	Start Time:	9:00	End Time:	11:15	(m)	End	Reading	1.267	Time	10:50	Time of SG Reading		n/a			
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	434204	7559985	0		1	Right Bank	6.00	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions	light rain and cool.				2		5.90	0.20	0.1	0.04	0.19			0.008	0.3	
Transducer Information					3		5.60	0.30	0.3	0.08	0.63			0.047	1.8	
DL Model	PT2X	PT Serial #	2122022		4		5.40	0.39	0.2	0.08	0.77			0.060	2.3	
Gain	1.003996	Offset	-0.003		5		5.20	0.84	0.2	0.17		0.79	0.48	0.107	4.0	
Status	Logging	Battery	100%		6		5.00	0.71	0.2	0.14	0.72			0.102	3.9	
# of Records	559	Memory Free	523595		7		4.80	0.74	0.2	0.15	0.81			0.120	4.5	
DL Service Performed	n/a	Crest Gauges	n/a		8		4.60	0.86	0.2	0.17		0.99	0.5	0.128	4.8	
Hydrometric Leveling Survey					9		4.40	0.86	0.2	0.17		1.06	0.77	0.157	5.9	
Stn	BS	HI	FS	Elevation	Notes	10		4.20	0.88	0.2	0.18		1.1	1.15	0.198	7.5
BM 87	0.772	100.772		100.000		11		4.00	0.86	0.2	0.17		1.13	1.19	0.200	7.5
BM 88			0.826	99.946		12		3.80	0.87	0.2	0.17		1.13	1.12	0.196	7.4
BM 89			0.527	100.245		13		3.60	0.83	0.2	0.17		1.18	1.15	0.193	7.3
WL			3.006	97.766		14		3.40	0.80	0.2	0.16		1.08	1.19	0.182	6.9
						15		3.20	0.82	0.2	0.16		1.25	0.74	0.163	6.2
						16		3.00	0.54	0.2	0.11	1.16			0.125	4.7
						17		2.80	0.52	0.2	0.10	1.04			0.108	4.1
						18		2.60	0.58	0.2	0.12	0.92			0.107	4.0
						19		2.40	0.74	0.2	0.15	0.9			0.133	5.0
TBM			2.200	98.572		20		2.20	0.74	0.2	0.15	0.86			0.127	4.8
TBM	2.217	100.789		98.572		21		2.00	0.72	0.2	0.18	0.7			0.126	4.8
WL			3.023	97.766		22		1.70	0.27	0.3	0.08	0.77			0.062	2.4
BM 89			0.543	100.246		23		1.40	0.12	0.3	0.04	-0.1			-0.004	-0.1
BM 88			0.842	99.947		24	Left Bank	1.10	0.00	0.3	0.00	0			0.000	0.0
BM 87			0.788	100.001		25										
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.001	0.001		32											
BM 88	100.945	99.947	-0.998		33											
BM 89	102.227	100.246	-1.982		Total Q										2.646	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.766														
Pressure Transducer Reading (m)		1.267														
Pressure Transducer Elevation (m)		96.499														
Discharge (m³/s)		2.646														
Cross Sectional Area		2.928														
Average Velocity		0.904														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	11:30	End	12:00	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	FH950					
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	6593					
Date Monitored	16-Jul-15				Real Time Reading	Start	Reading	0.988	Time	11:20	Staff Gauge (m)			n/a		
Time at Site (24 hr)	Start Time:	10:00	End Time:	12:45	(m)	End	Reading	0.988	Time	12:40	Time of SG Reading			n/a		
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	434204	7559985	0		1	Right Bank	1.20	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions	Sunny, light wind.				2		1.30	0.05	0.1	0.01	0			0.000	0.0	
Transducer Information					3		1.70	0.08	0.4	0.02	0.17			0.004	0.3	
DL Model	PT2X	PT Serial #	2122022		4		1.90	0.63	0.2	0.11	0.27			0.030	2.4	
Gain	1.003996	Offset	-0.003		5		2.05	0.68	0.2	0.10	0.46			0.047	3.8	
Status	Logging	Battery	100%		6		2.20	0.66	0.2	0.10	0.51			0.050	4.0	
# of Records	524154	Memory Free	519123		7		2.35	0.66	0.2	0.10	0.55			0.054	4.4	
DL Service Performed	n/a	Crest Gauges	n/a		8		2.50	0.63	0.2	0.09	0.55			0.052	4.2	
Hydrometric Leveling Survey					9		2.65	0.62	0.2	0.09	0.57			0.053	4.2	
Stn	BS	HI	FS	Elevation	Notes	10		2.80	0.64	0.2	0.10	0.67			0.064	5.2
BM 87	0.332	100.332		100.000		11		2.95	0.66	0.2	0.10	0.75			0.074	6.0
BM 88			0.386	99.946		12		3.10	0.68	0.2	0.10	0.74			0.075	6.1
BM 89			0.092	100.240		13		3.25	0.66	0.2	0.10	0.74			0.073	5.9
WL			2.874	97.458		14		3.40	0.66	0.2	0.10	0.78			0.077	6.2
						15		3.55	0.54	0.2	0.09	0.77			0.073	5.8
						16		3.75	0.60	0.2	0.12	0.84			0.101	8.1
						17		3.95	0.56	0.2	0.11	0.73			0.082	6.6
						18		4.15	0.39	0.2	0.08	0.68			0.053	4.3
						19		4.35	0.32	0.2	0.06	0.74			0.047	3.8
TBM			0.343	99.989		20		4.55	0.38	0.2	0.08	0.75			0.057	4.6
TBM	0.259	100.248		99.989		21		4.75	0.55	0.2	0.11	0.71			0.078	6.3
WL			2.793	97.455		22		4.95	0.55	0.2	0.14	0.69			0.095	7.6
BM 89			0.008	100.240		23		5.25	0.50	0.3	0.11	0.06			0.007	0.5
BM 88			0.302	99.946		24		5.40	0.08	0.2	0.02	-0.01			0.000	0.0
BM 87			0.248	100.000		25	Left Bank	5.70	0.00	0.3	0.00	0			0.000	0.0
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31										
BM 87	100	100.000		0.000		32										
BM 88	100.945	99.946		-0.999		33										
BM 89	102.227	100.240		-1.987		Total Q									1.247	100.0
Summary						General Notes										
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.457														
Pressure Transducer Reading (m)		0.988														
Pressure Transducer Elevation (m)		96.469														
Discharge (m³/s)		1.247														
Cross Sectional Area		2.052														
Average Velocity		0.608														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay			Measurement Time		Start	12:00	End	12:30	Location	Approximately 200 m upstream of PT				
Station Identification		TL-3			Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Doris Creek			Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		16-Jul-15			Real Time Reading		Start	Reading	0.988	Time	11:20	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	10:00	End Time:	12:45	(m)	End	Reading	0.988	Time	12:40	Time of SG Reading		n/a		
Personnel		Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
		434204	7559985	0		1	Right Bank	5.70	0.00	0.0	0.00	-0.08			0.000	0.0
Weather Conditions		Sunny, light wind.			2			5.50	0.08	0.2	0.02	0.29			0.006	0.5
Transducer Information					3			5.20	0.50	0.3	0.13	0.7			0.088	6.9
DL Model		PT2X	PT Serial #		2122022	4			5.00	0.56	0.2	0.11	0.69		0.077	6.1
Gain		1.003996	Offset		-0.003	5			4.80	0.54	0.2	0.11	0.73		0.079	6.2
Status		Logging	Battery		100%	6			4.60	0.38	0.2	0.08	0.74		0.056	4.4
# of Records		5031	Memory Free		519123	7			4.40	0.39	0.2	0.08	0.76		0.059	4.7
DL Service Performed		n/a	Crest Gauges		n/a	8			4.20	0.34	0.2	0.07	0.8		0.054	4.3
Hydrometric Leveling Survey					9			4.00	0.48	0.2	0.10	0.78			0.075	5.9
Stn	BS	HI	FS	Elevation	Notes	10			3.80	0.64	0.2	0.13	0.81		0.104	8.2
BM 87	0.332	100.332		100.000		11			3.60	0.54	0.2	0.09	0.77		0.073	5.7
BM 88			0.386	99.946		12			3.45	0.66	0.2	0.10	0.77		0.076	6.0
BM 89			0.092	100.240		13			3.30	0.66	0.2	0.08	0.75		0.062	4.9
WL			2.874	97.458		14			3.20	0.68	0.1	0.09	0.74		0.063	5.0
						15			3.05	0.68	0.2	0.10	0.72		0.073	5.8
						16			2.90	0.66	0.2	0.10	0.47		0.047	3.7
						17			2.75	0.66	0.2	0.10	0.5		0.050	3.9
						18			2.60	0.66	0.2	0.10	0.59		0.058	4.6
						19			2.45	0.66	0.2	0.10	0.52		0.051	4.1
TBM			0.343	99.989		20			2.30	0.66	0.2	0.10	0.49		0.049	3.8
TBM	0.259	100.248		99.989		21			2.15	0.68	0.2	0.10	0.54		0.055	4.3
WL			2.793	97.455		22			2.00	0.74	0.2	0.11	0.08		0.009	0.7
BM 89			0.008	100.240		23			1.85	0.62	0.2	0.09	0.06		0.006	0.4
BM 88			0.302	99.946		24			1.70	0.14	0.2	0.04	0.01		0.000	0.0
BM 87			0.248	100.000		25			1.30	0.05	0.4	0.01	0		0.000	0.0
						26		Left Bank	1.20	0.00	0.1	0.00			0.000	0.0
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31										
BM 87	100	100.000		0.000		32										
BM 88	100.945	99.946		-0.999		33										
BM 89	102.227	100.240		-1.987		Total Q									1.269	100.0
Summary					General Notes											
Staff Gauge Reading (m)			n/a													
Stage from WL Survey (m)			97.457													
Pressure Transducer Reading (m)			0.988													
Pressure Transducer Elevation (m)			96.469													
Discharge (m³/s)			1.269													
Cross Sectional Area			2.126													
Average Velocity			0.597													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	12:00	End	12:30	Location	Approximately 200 m upstream of PT				
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	FH950				
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	6593				
Date Monitored	20-Jul-15				Real Time Reading	Start	Reading	n/a	Time	n/a	Staff Gauge (m)			n/a	
Time at Site (24 hr)	Start Time:	11:50	End Time:	13:00	(m)	End	Reading	n/a	Time	n/a	Time of SG Reading			n/a	
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%
	434204	7559985	0		1	Right Bank	1.30	0.00	0.0	0.00	0			0.000	0.0
Weather Conditions	Overcast, rain last night.				2		1.50	0.08	0.2	0.02	0			0.000	0.0
Transducer Information					3		1.70	0.14	0.2	0.03	0.06			0.002	0.1
DL Model	PT2X	PT Serial #		2122022	4		1.90	0.26	0.2	0.05	0.19			0.010	0.8
Gain	1.003996	Offset		-0.003	5		2.10	0.65	0.2	0.13	0.5			0.065	5.5
Status	Logging	Battery		100%	6		2.30	0.68	0.2	0.14	0.48			0.065	5.5
# of Records	n/a	Memory Free		n/a	7		2.50	0.65	0.2	0.13	0.54			0.070	5.9
DL Service Performed	n/a	Crest Gauges		n/a	8		2.70	0.46	0.2	0.09	0.61			0.056	4.7
Hydrometric Leveling Survey					9		2.90	0.64	0.2	0.13	0.6			0.077	6.5
Stn	BS	HI	FS	Elevation	Notes	10		3.10	0.66	0.2	0.13	0.69		0.091	7.7
BM 87	0.289	100.289		100.000		11		3.30	0.64	0.2	0.13	0.69		0.088	7.5
BM 88			0.343	99.946		12		3.50	0.65	0.2	0.13	0.7		0.091	7.7
BM 89			0.048	100.241		13		3.70	0.62	0.2	0.12	0.71		0.088	7.4
WL			2.822	97.467		14		3.90	0.60	0.2	0.12	0.75		0.090	7.6
						15		4.10	0.56	0.2	0.11	0.63		0.071	6.0
						16		4.30	0.58	0.2	0.12	0.54		0.063	5.3
						17		4.50	0.48	0.2	0.10	0.58		0.056	4.7
						18		4.70	0.40	0.2	0.08	0.68		0.054	4.6
						19		4.90	0.54	0.2	0.11	0.66		0.071	6.0
TBM			2.147	98.142		20		5.10	0.54	0.2	0.11	0.65		0.070	5.9
TBM	2.194	100.336		98.142		21		5.30	0.46	0.2	0.09	0.06		0.006	0.5
WL			2.871	97.465		22	Left Bank	5.50	0.00	0.2	0.00	0		0.000	0.0
BM 89			0.096	100.240		23									
BM 88			0.390	99.946		24									
BM 87			0.337	99.999		25									
						26									
						27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31									
BM 87	100	100.000		-0.001		32									
BM 88	100.945	99.946		-0.999		33									
BM 89	102.227	100.241		-1.987		Total Q								1.184	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a			Measurement made in support of fisheries channel surveying. Laptop not available at the time, therefore no real-time PT readings.										
Stage from WL Survey (m)		97.466													
Pressure Transducer Reading (m)		n/a													
Pressure Transducer Elevation (m)		n/a													
Discharge (m³/s)		1.184													
Cross Sectional Area		2.058													
Average Velocity		0.575													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	12:30	End	13:00:00 P	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	FH950					
Stream Name	Doris Creek				Flow Meter Type	Electromagnetic				Instrument Serial #	6593					
Date Monitored	20-Jul-15				Real Time Reading	Start	Reading	n/a	Time	n/a	Staff Gauge (m)			n/a		
Time at Site (24 hr)	Start Time:	11:50	End Time:	13:00	(m)	End	Reading	n/a	Time	n/a	Time of SG Reading			n/a		
Personnel	Greg Langston, Jeff Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	434204	7559985	0		1	Left Bank	5.50	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions	Overcast, rain last night.				2		5.40	0.14	0.1	0.02	-0.01			0.000	0.0	
Transducer Information					3		5.20	0.50	0.2	0.10	0.45			0.045	3.9	
DL Model	PT12X	PT Serial #	2122022		4		5.00	0.54	0.2	0.11	0.66			0.071	6.1	
Gain	1.003996	Offset	-0.003		5		4.80	0.53	0.2	0.11	0.63			0.067	5.7	
Status	Logging	Battery	100%		6		4.60	0.38	0.2	0.08	0.71			0.054	4.6	
# of Records	n/a	Memory Free	n/a		7		4.40	0.34	0.2	0.07	0.69			0.047	4.0	
DL Service Performed	n/a	Crest Gauges	n/a		8		4.20	0.34	0.2	0.07	0.71			0.048	4.1	
Hydrometric Leveling Survey					9		4.00	0.48	0.2	0.10	0.74			0.071	6.1	
Stn	BS	HI	FS	Elevation	Notes	10		3.80	0.63	0.2	0.13	0.76		0.096	8.2	
BM 87	0.289	100.289		100.000		11		3.60	0.66	0.2	0.13	0.71		0.094	8.1	
BM 88			0.343	99.946		12		3.40	0.68	0.2	0.14	0.7		0.095	8.2	
BM 89			0.048	100.241		13		3.20	0.68	0.2	0.14	0.67		0.091	7.8	
WL			2.822	97.467		14		3.00	0.66	0.2	0.13	0.66		0.087	7.5	
						15		2.80	0.49	0.2	0.10	0.59		0.058	5.0	
						16		2.60	0.48	0.2	0.10	0.63		0.060	5.2	
						17		2.40	0.67	0.2	0.13	0.49		0.066	5.6	
						18		2.20	0.67	0.2	0.13	0.51		0.068	5.9	
						19		2.00	0.63	0.2	0.13	0.31		0.039	3.4	
TBM			2.147	98.142		20		1.80	0.22	0.2	0.04	0.14		0.006	0.5	
TBM	2.194	100.336		98.142		21		1.60	0.10	0.2	0.03	0.01		0.000	0.0	
WL			2.871	97.465		22	Right Bank	1.30	0.00	0.3	0.00	0		0.000	0.0	
BM 89			0.096	100.240		23										
BM 88			0.390	99.946		24										
BM 87			0.337	99.999		25										
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.000	-0.001		32											
BM 88	100.945	99.946	-0.999		33											
BM 89	102.227	100.241	-1.987		Total Q										1.164	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a			Measurement made in support of fisheries channel surveying. Laptop not available at the time, therefore no real-time PT readings.											
Stage from WL Survey (m)		97.466														
Pressure Transducer Reading (m)		n/a														
Pressure Transducer Elevation (m)		n/a														
Discharge (m³/s)		1.164														
Cross Sectional Area		1.962														
Average Velocity		0.593														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	10:30	End	11:15	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Creek				Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	15-Aug-15				Real Time Reading	Start	Reading	1.004	Time	10:30	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	10:30	End Time:	12:00	(m)	End	Reading	0.999	Time	13:00	Time of SG Reading	n/a				
Personnel	Greg Langston, Carl Atatahak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Overcast, rain last night.				1	Right Bank	0.80	0.00	0.0	0.00	0			0.000	0.0	
					2		1.10	0.13	0.3	0.05	0.198			0.009	0.6	
					3		1.50	0.08	0.4	0.03	0.477			0.013	0.9	
Transducer Information					4		1.80	0.62	0.3	0.16	0.651			0.101	7.2	
DL Model	PT2X	PT Serial #	2122022		5		2.00	0.67	0.2	0.13	0.604			0.081	5.8	
Gain	1.003996	Offset	-0.003		6		2.20	0.68	0.2	0.14	0.694			0.094	6.7	
Status	Logging	Battery	100%		7		2.40	0.65	0.2	0.13	0.769			0.100	7.1	
# of Records	9347	Memory Free	514807		8		2.60	0.64	0.2	0.13	0.816			0.104	7.4	
DL Service Performed	n/a	Crest Gauges	n/a		9		2.80	0.66	0.2	0.12	0.811			0.094	6.7	
Hydrometric Leveling Survey					10		2.95	0.64	0.2	0.10	0.833			0.080	5.7	
Stn	BS	HI	FS	Elevation	Notes	11		3.10	0.64	0.2	0.10	0.83			0.080	5.7
BM 87	0.242	100.242		100.000		12		3.25	0.56	0.2	0.08	0.885			0.074	5.3
BM 88			0.298	99.944		13		3.40	0.55	0.2	0.08	0.868			0.072	5.1
BM 89			0.023	100.219		14		3.55	0.62	0.2	0.09	0.855			0.080	5.7
WL			2.720	97.522		15		3.70	0.50	0.2	0.08	0.808			0.061	4.3
						16		3.85	0.35	0.2	0.05	0.756			0.040	2.8
						17		4.00	0.31	0.2	0.05	0.815			0.038	2.7
						18		4.15	0.33	0.2	0.05	0.812			0.040	2.9
						19		4.30	0.39	0.1	0.06	0.802			0.047	3.3
TBM			1.733	98.509		20		4.45	0.56	0.2	0.08	0.775			0.065	4.6
TBM	1.756	100.265		98.509		21		4.60	0.50	0.1	0.08	0.727			0.055	3.9
WL			2.741	97.524		22		4.75	0.48	0.2	0.07	0.686			0.049	3.5
BM 89			0.047	100.218		23		4.90	0.53	0.2	0.12	0.164			0.020	1.4
BM 88			0.320	99.945		24		5.20	0.14	0.3	0.04	0.25			0.011	0.7
BM 87			0.265	100.000		25	Left Bank	5.50	0.00	0.3	0.00	0			0.000	0.0
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.000	0.000		32											
BM 88	100.945	99.945	-1.000		33											
BM 89	102.227	100.219	-2.009		Total Q									1.406	100.0	
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.523														
Pressure Transducer Reading (m)		1.004														
Pressure Transducer Elevation (m)		96.519														
Discharge (m ³ /s)		1.406														
Cross Sectional Area		1.998														
Average Velocity		0.704														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	11:15	End	12:00	Location	Approximately 200 m upstream of PT				
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker				
Stream Name	Doris Creek				Flow Meter Type	Acoustic				Instrument Serial #	P5080				
Date Monitored	15-Aug-15				Real Time Reading	Start	Reading	1.004	Time	10:30	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	10:30	End Time:	12:00	(m)	End	Reading	0.999	Time	13:00	Time of SG Reading	n/a			
Personnel	Greg Langston, Carl Atatahak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Overcast, rain last night.				1	Left Bank	5.50	0.00	0.0	0.00	0			0.000	0.0
Transducer Information					2		5.20	0.11	0.3	0.03	0.193			0.005	0.4
					3		5.00	0.51	0.2	0.09	0.69			0.062	4.2
					4		4.85	0.55	0.2	0.08	0.28			0.023	1.6
					5		4.70	0.49	0.1	0.07	0.734			0.054	3.7
DL Model	PT2X	PT Serial #	2122022	6		4.55	0.55	0.2	0.08	0.735			0.061	4.1	
Gain	1.003996	Offset	-0.003	7		4.40	0.38	0.1	0.06	0.797			0.045	3.1	
Status	Logging	Battery	100%	8		4.25	0.36	0.2	0.05	0.811			0.044	3.0	
# of Records	9347	Memory Free	514807	9		4.10	0.30	0.2	0.05	0.802			0.036	2.5	
DL Service Performed	n/a	Crest Gauges	n/a	10		3.95	0.31	0.1	0.05	0.778			0.036	2.5	
Hydrometric Leveling Survey					11		3.80	0.37	0.2	0.06	0.804			0.045	3.0
Stn	BS	HI	FS	Elevation	Notes	12		3.65	0.61	0.2	0.09	0.684		0.063	4.3
BM 87	0.242	100.242		100.000		13		3.50	0.63	0.2	0.09	0.891		0.084	5.8
BM 88			0.298	99.944		14		3.35	0.55	0.2	0.08	0.889		0.073	5.0
BM 89			0.023	100.219		15		3.20	0.57	0.2	0.10	0.849		0.085	5.8
WL			2.720	97.522		16		3.00	0.63	0.2	0.13	0.846		0.107	7.3
						17		2.80	0.66	0.2	0.13	0.819		0.108	7.4
						18		2.60	0.64	0.2	0.13	0.811		0.104	7.1
						19		2.40	0.48	0.2	0.10	0.748		0.072	4.9
TBM			1.733	98.509		20		2.20	0.66	0.2	0.13	0.738		0.097	6.7
TBM	1.756	100.265		98.509		21		2.00	0.67	0.2	0.13	0.663		0.089	6.1
WL			2.741	97.524		22		1.80	0.61	0.2	0.12	0.674		0.082	5.6
BM 89			0.047	100.218		23		1.60	0.60	0.2	0.12	0.58		0.070	4.8
BM 88			0.320	99.945		24		1.40	0.09	0.2	0.02	0.494		0.011	0.8
BM 87			0.265	100.000		25		1.10	0.11	0.3	0.03	0.25		0.008	0.6
						26	Right Bank	0.80	0.00	0.3	0.00	0		0.000	0.0
						27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 87	100	100.000	0.000		32										
BM 88	100.945	99.945	-1.000		33										
BM 89	102.227	100.219	-2.009		Total Q									1.463	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		97.523													
Pressure Transducer Reading (m)		1.004													
Pressure Transducer Elevation (m)		96.519													
Discharge (m ³ /s)		1.463													
Cross Sectional Area		2.027													
Average Velocity		0.722													

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	8:15	End	9:00	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Creek				Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	16-Aug-15				Real Time Reading	Start	Reading	0.988	Time	10:30	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	8:00	End Time:	10:00	(m)	End	Reading	0.99	Time	13:00	Time of SG Reading	n/a				
Personnel	Greg Langston, Audla Buchan					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Overcast, rain last night.				1	Right Bank	0.90	0.00	0.0	0.00	0			0.000	0.0	
					2		1.20	0.09	0.3	0.03	0.304			0.008	0.6	
					3		1.50	0.09	0.3	0.02	0.607			0.014	1.0	
Transducer Information					4		1.70	0.61	0.2	0.12	0.574			0.070	5.0	
DL Model	PT2X	PT Serial #	2122022		5		1.90	0.62	0.2	0.12	0.641			0.079	5.7	
Gain	1.003996	Offset	-0.003		6		2.10	0.58	0.2	0.12	0.717			0.083	6.0	
Status	Logging	Battery	100%		7		2.30	0.66	0.2	0.13	0.745			0.098	7.1	
# of Records	9481	Memory Free	514673		8		2.50	0.46	0.2	0.09	0.711			0.065	4.7	
DL Service Performed	n/a	Crest Gauges	n/a		9		2.70	0.52	0.2	0.10	0.826			0.086	6.2	
Hydrometric Leveling Survey					10		2.90	0.66	0.2	0.13	0.797			0.105	7.6	
Stn	BS	HI	FS	Elevation	Notes	11		3.10	0.62	0.2	0.12	0.82			0.102	7.3
BM 87	0.237	100.237		100.000		12		3.30	0.66	0.2	0.12	0.82			0.095	6.8
WL			2.730	97.507		13		3.45	0.53	0.2	0.08	0.852			0.068	4.9
						14		3.60	0.60	0.2	0.09	0.842			0.076	5.5
						15		3.75	0.61	0.2	0.09	0.728			0.067	4.8
						16		3.90	0.35	0.2	0.05	0.8			0.042	3.0
						17		4.05	0.30	0.2	0.05	0.784			0.035	2.5
						18		4.20	0.30	0.2	0.05	0.785			0.035	2.5
						19		4.35	0.35	0.1	0.05	0.825			0.043	3.1
TBM			1.728	98.509		20		4.50	0.38	0.2	0.06	0.808			0.046	3.3
TBM	1.749	100.258		98.509		21		4.65	0.54	0.2	0.08	0.73			0.059	4.3
						22		4.80	0.47	0.1	0.07	0.726			0.051	3.7
						23		4.95	0.48	0.2	0.10	0.707			0.068	4.9
WL			2.750	97.508		24		5.20	0.16	0.3	0.04	-0.19			-0.008	-0.6
BM 87			0.257	100.001		25	Left Bank	5.50	0.00	0.3	0.00	0			0.000	0.0
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.001	0.000		32											
BM 88	100.945				33											
BM 89	102.227				Total Q									1.388	100.0	
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.508														
Pressure Transducer Reading (m)		0.988														
Pressure Transducer Elevation (m)		96.520														
Discharge (m ³ /s)		1.388														
Cross Sectional Area		1.916														
Average Velocity		0.724														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	9:00	End	9:45	Location	Approximately 200 m upstream of PT					
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker					
Stream Name	Doris Creek				Flow Meter Type	Acoustic				Instrument Serial #	P5080					
Date Monitored	16-Aug-15				Real Time Reading	Start	Reading	0.988	Time	10:30	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	8:00	End Time:	10:00	(m)	End	Reading	0.99	Time	13:00	Time of SG Reading	n/a				
Personnel	Greg Langston, Audla Buchan					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	Overcast, rain last night.				1	Leftt Bank	5.50	0.00	0.0	0.00	0			0.000	0.0	
					2		5.30	0.11	0.2	0.02	-0.191			-0.004	-0.3	
					3		5.10	0.50	0.2	0.10	0.707			0.071	5.0	
Transducer Information					4		4.90	0.47	0.2	0.09	0.57			0.054	3.8	
DL Model	PT2X	PT Serial #	2122022		5		4.70	0.48	0.2	0.08	0.709			0.060	4.2	
Gain	1.003996	Offset	-0.003		6		4.55	0.52	0.2	0.08	0.761			0.059	4.2	
Status	Logging	Battery	100%		7		4.40	0.35	0.1	0.05	0.81			0.043	3.0	
# of Records	9481	Memory Free	514673		8		4.25	0.30	0.2	0.05	0.791			0.036	2.5	
DL Service Performed	n/a	Crest Gauges	n/a		9		4.10	0.30	0.2	0.05	0.762			0.034	2.4	
Hydrometric Leveling Survey					10		3.95	0.33	0.1	0.05	0.782			0.039	2.7	
Stn	BS	HI	FS	Elevation	Notes	11		3.80	0.60	0.2	0.09	0.745			0.067	4.8
BM 87	0.237	100.237		100.000		12		3.65	0.61	0.2	0.09	0.852			0.078	5.5
WL			2.730	97.507		13		3.50	0.54	0.2	0.08	0.868			0.070	5.0
						14		3.35	0.54	0.2	0.08	0.87			0.070	5.0
						15		3.20	0.63	0.2	0.11	0.86			0.095	6.7
						16		3.00	0.62	0.2	0.12	0.805			0.100	7.1
						17		2.80	0.66	0.2	0.13	0.812			0.107	7.6
						18		2.60	0.63	0.2	0.13	0.757			0.095	6.8
						19		2.40	0.47	0.2	0.09	0.699			0.066	4.7
TBM			1.728	98.509		20		2.20	0.67	0.2	0.13	0.646			0.087	6.1
TBM	1.749	100.258		98.509		21		2.00	0.61	0.2	0.12	0.686			0.084	5.9
						22		1.80	0.61	0.2	0.12	0.63			0.077	5.5
						23		1.60	0.09	0.2	0.02	0.586			0.013	0.9
WL			2.750	97.508		24		1.30	0.10	0.3	0.04	0.317			0.011	0.8
BM 87			0.257	100.001		25	Right Bank	0.90	0.00	0.4	0.00	0			0.000	0.0
						26										
						27										
						28										
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 87	100	100.001	0.000		32											
BM 88	100.945				33											
BM 89	102.227				Total Q									1.410	100.0	
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		97.508														
Pressure Transducer Reading (m)		0.988														
Pressure Transducer Elevation (m)		96.520														
Discharge (m ³ /s)		1.410														
Cross Sectional Area		1.935														
Average Velocity		0.729														

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	7:15	End	8:00	Location		Approximately 200 m upstream of PT			
Station Identification		TL-3				Method		Velocity-area (Mid-section)			Instrument Model		Flowtracker				
Stream Name		Doris Creek				Flow Meter Type		Acoustic			Instrument Serial #		P5080				
Date Monitored		20-Sep-15				Real Time Reading		Start	Reading	0.796	Time	7:15	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	7:15	End Time:	9:30	(m)		End	Reading	0.796	Time	9:30	Time of SG Reading		n/a		
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
		434204	7559985	0		1	Right Bank	1.45	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions		Sunny, cool, light wind.				2			1.60	0.50	0.2	0.08	0.11		0.008	1.2	
Transducer Information						3			1.75	0.52	0.2	0.08	0.46		0.036	5.1	
DL Model		PT2X	PT Serial #		2122022	4			1.90	0.54	0.2	0.08	0.5		0.041	5.7	
Gain		1.003996	Offset		-0.003	5			2.05	0.58	0.2	0.09	0.49		0.043	6.0	
Status		Logging	Battery		100%	6			2.20	0.58	0.2	0.09	0.43		0.037	5.3	
# of Records		n/a	Memory Free		n/a	7			2.35	0.56	0.2	0.08	0.33		0.028	3.9	
DL Service Performed		n/a	Crest Gauges		n/a	8			2.50	0.60	0.2	0.09	0.55		0.050	7.0	
Hydrometric Leveling Survey						9			2.65	0.56	0.2	0.08	0.57		0.048	6.8	
Stn	BS	HI	FS	Elevation	Notes	10			2.80	0.52	0.2	0.08	0.54		0.042	6.0	
BM 87	0.301	100.301		100.000		11			2.95	0.53	0.2	0.08	0.52		0.041	5.8	
BM 88			0.357	99.944		12			3.10	0.54	0.2	0.08	0.5		0.041	5.7	
BM 89			0.092	100.209		13			3.25	0.50	0.2	0.08	0.53		0.040	5.6	
WL			2.980	97.321		14			3.40	0.52	0.2	0.08	0.53		0.041	5.8	
						15			3.55	0.49	0.2	0.07	0.54		0.040	5.6	
						16			3.70	0.26	0.2	0.05	0.55		0.025	3.5	
						17			3.90	0.19	0.2	0.04	0.48		0.018	2.6	
						18			4.10	0.21	0.2	0.04	0.49		0.021	2.9	
						19			4.30	0.28	0.2	0.06	0.5		0.028	4.0	
TBM			2.147	98.154		20			4.50	0.44	0.2	0.09	0.46		0.040	5.7	
TBM	2.096	100.250		98.154		21			4.70	0.36	0.2	0.07	0.48		0.035	4.9	
WL			2.938	97.312		22			4.90	0.38	0.2	0.07	0.09		0.006	0.8	
WL			2.933	97.317		23		Left Bank	5.05	0.00	0.1	0.00	0		0.000	0.0	
WL			2.932	97.318		24											
BM 89			0.041	100.209		25											
BM 88			0.307	99.943		26											
BM 87			0.249	100.001		27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 87	100	100.001		0.001		32											
BM 88	100.945	99.944		-1.001		33											
BM 89	102.227	100.209		-2.018		Total Q										0.707	100.0
Summary						General Notes											
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		97.317															
Pressure Transducer Reading (m)		0.796															
Pressure Transducer Elevation (m)		96.521															
Discharge (m ³ /s)		0.707															
Cross Sectional Area		1.539															
Average Velocity		0.460															

Appendix B-2. 2015 Manual Discharge Measurements at Doris Creek (TL-3)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	8:00	End	8:45	Location	Approximately 200 m upstream of PT				
Station Identification	TL-3				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker				
Stream Name	Doris Creek				Flow Meter Type	Acoustic				Instrument Serial #	P5080				
Date Monitored	20-Sep-15				Real Time Reading	Start	Reading	0.796	Time	7:15	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	7:15	End Time:	9:30	(m)	End	Reading	0.796	Time	9:30	Time of SG Reading	n/a			
Personnel	Greg Langston, Kevin Esseltine					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny, cool, light wind.				1	Left Bank	5.05	0.00	0.0	0.00	0			0.000	0.0
Transducer Information					2		4.95	0.36	0.1	0.05	0.02			0.001	0.1
					3		4.80	0.41	0.2	0.07	0.18			0.013	1.9
					4		4.60	0.36	0.2	0.07	0.49			0.035	5.1
DL Model	PT2X	PT Serial #	2122022	5		4.40	0.43	0.2	0.09	0.42			0.036	5.3	
Gain	1.003996	Offset	-0.003	6		4.20	0.24	0.2	0.05	0.51			0.024	3.6	
Status	Logging	Battery	100%	7		4.00	0.19	0.2	0.04	0.49			0.019	2.7	
# of Records	n/a	Memory Free	n/a	8		3.80	0.20	0.2	0.04	0.5			0.020	2.9	
DL Service Performed	n/a	Crest Gauges	n/a	9		3.60	0.49	0.2	0.10	0.5			0.049	7.1	
Hydrometric Leveling Survey					10		3.40	0.51	0.2	0.09	0.5			0.045	6.5
Stn	BS	HI	FS	Elevation	Notes	11		3.25	0.51	0.2	0.08	0.52		0.040	5.8
BM 87	0.301	100.301		100.000		12		3.10	0.51	0.2	0.08	0.53		0.041	5.9
BM 88			0.357	99.944		13		2.95	0.52	0.2	0.08	0.51		0.040	5.8
BM 89			0.092	100.209		14		2.80	0.52	0.2	0.08	0.52		0.041	5.9
WL			2.980	97.321		15		2.65	0.56	0.2	0.08	0.58		0.049	7.1
						16		2.50	0.60	0.2	0.09	0.5		0.045	6.5
						17		2.35	0.55	0.2	0.08	0.33		0.027	4.0
						18		2.20	0.57	0.2	0.09	0.39		0.033	4.8
						19		2.05	0.58	0.2	0.09	0.5		0.044	6.3
TBM			2.147	98.154		20		1.90	0.54	0.2	0.08	0.47		0.038	5.5
TBM	2.096	100.250		98.154		21		1.75	0.50	0.2	0.08	0.48		0.036	5.2
WL			2.938	97.312		22		1.60	0.50	0.2	0.08	0.18		0.014	2.0
WL			2.933	97.317		23	Right Bank	1.45	0.00	0.2	0.00	0		0.000	0.0
WL			2.932	97.318		24									
BM 89			0.041	100.209		25									
BM 88			0.307	99.943		26									
BM 87			0.249	100.001		27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 87	100	100.000	0.000		32										
BM 88	100.945	99.944	-1.001		33										
BM 89	102.227	100.209	-2.018		Total Q									0.688	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		97.317													
Pressure Transducer Reading (m)		0.796													
Pressure Transducer Elevation (m)		96.521													
Discharge (m ³ /s)		0.688													
Cross Sectional Area		1.557													
Average Velocity		0.442													

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method												
Project Name	Hope Bay				Measurement Time	Start	9:15 End		10:15	Location	Approximately 80 m downstream of PT						
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)				Instrument Model	Flow mate						
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528						
Date Monitored	11-Jun-15				Real Time Reading	Start	Reading	0.783		Time	9:15	Staff Gauge (m)		n/a			
Time at Site (24 hr)	Start Time:	7:00	End Time:	12:00	(m)	End	Reading	0.793		Time	11:15	Time of SG Reading		n/a			
Personnel	G.Langston, C.Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q			
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%		
Weather Conditions	light rain	435325	7562815	0	1	Right Bank	2.80	0.00	0.0	0.00	0			0.000	0.0		
					2		3.00	0.14	0.2	0.04	-0.08			-0.003	-0.2		
Transducer Information					3		3.40	0.24	0.4	0.07	0.03			0.002	0.1		
DL Model	PT2X	PT Serial #	2922010		4		3.60	0.34	0.2	0.06	0.3			0.018	0.9		
Gain	1.006543	Offset	0.218		5		3.75	0.66	0.2	0.10	0.2			0.020	1.0		
Status	Logging	Battery	100%		6		3.90	0.65	0.2	0.11	0.45			0.051	2.6		
# of Records	0	Memory Free	130705		7		4.10	0.72	0.2	0.14	0.54			0.078	3.9		
DL Service Performed	n/a	Crest Gauges	n/a		8		4.30	0.75	0.2	0.15	0.55			0.083	4.2		
Hydrometric Leveling Survey					9		4.50	0.77	0.2	0.15		0.79	0.37	0.089	4.5		
Stn	BS	HI	FS	Elevation	Notes	10		4.70	0.77	0.2	0.15		0.86	0.47	0.102	5.2	
BM 49	1.293	101.293		100.000		11		4.90	0.80	0.2	0.16		0.92	0.57	0.119	6.1	
BM 64			1.447	99.846		12		5.10	0.80	0.2	0.16		0.93	0.59	0.122	6.2	
BM 50			1.198	100.095		13		5.30	0.82	0.2	0.16		0.91	0.76	0.137	7.0	
PT			1.861	99.432		14		5.50	0.86	0.2	0.17		0.84	0.86	0.146	7.4	
WL			2.616	98.677		15		5.70	0.88	0.2	0.18		0.86	0.88	0.153	7.8	
						16		5.90	0.90	0.2	0.18		0.88	0.92	0.162	8.2	
						17		6.10	0.91	0.2	0.18		0.84	0.85	0.154	7.8	
						18		6.30	0.89	0.2	0.18		0.81	0.8	0.143	7.3	
						19		6.50	0.90	0.2	0.18		0.78	0.82	0.144	7.3	
TBM			2.439	98.854		20		6.70	0.88	0.2	0.18		0.67	0.67	0.118	6.0	
TBM	2.474	101.328		98.854		21		6.90	0.82	0.2	0.16		0.57	0.39	0.079	4.0	
BM 49			1.327	100.001		22		7.10	0.49	0.2	0.10	0.33			0.032	1.6	
BM 64			1.481	99.847		23		7.30	0.36	0.2	0.09	0.12			0.011	0.5	
BM 50			1.231	100.097		24		7.60	0.22	0.3	0.07	0.16			0.011	0.5	
PT			1.896	99.432		25	Left Bank	7.90	0.00	0.3	0.00	0			0.000	0.0	
WL			2.650	98.678		26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31												
BM 49	100	100.001	0.001		32												
BM 64	99.813	99.847	0.034		33												
BM 50	100.077	100.096	0.019		Total Q											1.970	100.0
Summary					General Notes												
Staff Gauge Reading (m)		n/a			First visit of the season. Station installed.												
Stage from WL Survey (m)		99.432															
Pressure Transducer Reading (m)		0.783															
Pressure Transducer Elevation (m)		98.649															
Discharge (m ³ /s)		1.970															
Cross Sectional Area		3.134															
Average Velocity		0.629															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay					Measurement Time	Start	10:15	End	11:15	Location	Approximately 80 m downstream of PT					
Station Identification	Roberts Hydro					Method	Velocity-area (Mid-section)			Instrument Model	Flow mate						
Stream Name	Roberts Lake Outflow					Flow Meter Type	Electromagnetic			Instrument Serial #	2007528						
Date Monitored	11-Jun-15					Real Time Reading	Start	Reading	0.783	Time	9:15	Staff Gauge (m)		n/a			
Time at Site (24 hr)	Start Time:	7:00	End Time:	12:00		(m)	End	Reading	0.793	Time	11:15	Time of SG Reading		n/a			
Personnel	G.Langston, C.Hall						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation			No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%	
Weather Conditions	light rain				1	Left Bank	7.90	0.00	0.0	0.00	0				0.000	0.0	
					2		7.50	0.26	0.4	0.09	0.17				0.015	0.8	
					3		7.20	0.44	0.3	0.11	0.27				0.030	1.5	
					4		7.00	0.81	0.2	0.16		0.5	0.19	0.056	2.8		
DL Model	PI2X	PT Serial #	2922010		5		6.80	0.83	0.2	0.17		0.6	0.54	0.095	4.7		
Gain	1.006543	Offset	0.218		6		6.60	0.86	0.2	0.17		0.73	0.79	0.131	6.4		
Status	Logging	Battery	100%		7		6.40	0.89	0.2	0.18		0.81	0.8	0.143	7.1		
# of Records	0	Memory Free	130705		8		6.20	0.90	0.2	0.18		0.85	0.84	0.152	7.5		
DL Service Performed	n/a	Crest Gauges	n/a		9		6.00	0.90	0.2	0.18		0.85	0.89	0.157	7.7		
Hydrometric Leveling Survey						10		5.80	0.90	0.2	0.18		0.84	0.86	0.153	7.5	
Stn	BS	HI	FS	Elevation	Notes	11		5.60	0.88	0.2	0.18		0.82	0.86	0.148	7.3	
BM 49	1.293	101.293		100.000		12		5.40	0.84	0.2	0.17		0.84	0.87	0.144	7.1	
BM 64			1.447	99.846		13		5.20	0.82	0.2	0.16		0.93	0.72	0.135	6.7	
BM 50			1.198	100.095		14		5.00	0.80	0.2	0.16		0.85	0.57	0.114	5.6	
WL			1.861	99.432		15		4.80	0.80	0.2	0.16		0.91	0.58	0.119	5.9	
PT			2.616	98.677		16		4.60	0.78	0.2	0.16		0.88	0.45	0.104	5.1	
						17		4.40	0.78	0.2	0.16		0.84	0.44	0.100	4.9	
						18		4.20	0.78	0.2	0.16		0.78	0.31	0.085	4.2	
						19		4.00	0.72	0.2	0.14	0.54			0.078	3.8	
TBM			2.439	98.854		20		3.80	0.66	0.2	0.17	0.42			0.069	3.4	
TBM	2.474	101.328		98.854		21		3.50	0.29	0.3	0.04	0.09			0.004	0.2	
BM 49			1.327	100.001		22		3.50	0.19	0.0	0.07	-0.04			-0.003	-0.1	
BM 64			1.481	99.847		23	Right Bank	2.80	0.00	0.7	0.00	0			0.000	0.0	
BM 50			1.231	100.097		24											
PT			2.650	98.678		25											
WL			1.896	99.432		26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31												
BM 49	100	100.001	0.001		32												
BM 64	99.813	99.847	0.034		33												
BM 50	100.077	100.096	0.019		Total Q						2.028						100.0
Summary						General Notes											
Staff Gauge Reading (m)		N/A															
Stage from WL Survey (m)		99.432															
Pressure Transducer Reading (m)		0.783															
Pressure Transducer Elevation (m)		98.649															
Discharge (m³/s)		2.028															
Cross Sectional Area		3.134															
Average Velocity		0.647															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	10:00	End	11:00	Location	Approximately 80 m downstream of PT				
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)				Instrument Model	Flow mate				
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528				
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	0.92	Time	10:00	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	9:10	End Time:	12:00	(m)	End	Reading	0.925	Time	12:00	Time of SG Reading	n/a			
Personnel	G.Langston, C.Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny				1	Right Bank	0.70	0.00	0.0	0.00	0.00			0.000	0.0
					2	flooded grass	1.00	0.09	0.3	0.04	0.01			0.000	0.0
					3	flooded grass	1.50	0.03	0.5	0.02	0.00			0.000	0.0
DL Model	PT2X	PT Serial #	2922010		4	flooded grass	2.00	0.04	0.5	0.02	0.00			0.000	0.0
Gain	1.006543	Offset	0.218		5	flooded grass	2.50	0.16	0.5	0.08	0.08			0.006	0.2
Status	Logging	Battery	100%		6	flooded grass	3.00	0.12	0.5	0.06	0.02			0.001	0.0
# of Records	292	Memory Free	130413		7	flooded grass	3.50	0.12	0.5	0.09	0.03			0.003	0.1
DL Service Performed	n/a	Crest Gauges	n/a		8		4.50	0.21	1.0	0.16	0.07			0.011	0.3
Hydrometric Leveling Survey					9		5.00	0.33	0.5	0.17	0.20			0.033	0.8
Stn	BS	HI	FS	Elevation	Notes	10		5.50	0.44	0.5	0.22	0.24		0.053	1.4
BM 49	1.230	101.230		100.000		11		6.00	0.58	0.5	0.29	0.63		0.183	4.7
BM 64			1.384	99.846		12		6.50	0.85	0.5	0.32		1.00	0.271	6.9
BM 50			1.135	100.095		13		6.75	0.90	0.3	0.23		1.16	0.84	0.225
PT						14		7.00	0.94	0.3	0.24		1.22	0.92	0.251
WL			1.672	99.558		15		7.25	0.98	0.3	0.25		0.88	1.22	0.257
						16		7.50	0.98	0.3	0.25		1.18	0.89	0.254
						17		7.75	0.98	0.3	0.25		1.17	0.93	0.257
						18		8.00	1.06	0.3	0.27		1.09	0.96	0.272
						19		8.25	1.08	0.3	0.27		1.06	0.93	0.269
TBM			1.171	100.059	BM 12	20		8.50	1.12	0.3	0.28		1.05	1.05	0.294
TBM	1.117	101.176		100.059	BM 12	21		8.75	1.18	0.3	0.30		1.08	1.05	0.314
BM 49			1.176	100.000		22		9.00	1.12	0.3	0.28		1.09	0.95	0.286
BM 64			1.329	99.847		23		9.25	1.08	0.3	0.27		1.18	0.70	0.254
BM 50			1.080	100.096		24		9.50	1.04	0.3	0.29	0.54			0.154
PT						25		9.80	0.52	0.3	0.16	1.06			0.165
WL			1.617	99.559		26		10.10	0.38	0.3	0.13	0.65			0.086
						27		10.50	0.22	0.4	0.08	0.10			0.008
						28		10.80	0.10	0.3	0.04	0.07			0.002
						29	Left Bank	11.20	0.00	0.4	0.00	0.00			0.000
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 49	100	100.000	0.000		32										
BM 64	99.813	99.847	0.034		33										
BM 50	100.077	100.096	0.019		Total Q									3.910	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		99.559													
Pressure Transducer Reading (m)		0.920													
Pressure Transducer Elevation (m)		98.638													
Discharge (m ³ /s)		3.910													
Cross Sectional Area		4.994													
Average Velocity		0.783													

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method												
Project Name	Hope Bay				Measurement Time	Start	11:00 End		0:00	Location	Approximately 80 m downstream of PT						
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)				Instrument Model	Flow mate						
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	2007528						
Date Monitored	13-Jun-15				Real Time Reading	Start	Reading	0.92	Time	11:00	Staff Gauge (m)		n/a				
Time at Site (24 hr)	Start Time:	9:10	End Time:	12:00	(m)	End	Reading	0.925	Time	12:00	Time of SG Reading		n/a				
Personnel	G.Langston, C.Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q			
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%		
	435325	7562815	0		1	Left Bank	11.20	0.00	0.0	0.00	0.00			0.000	0.0		
Weather Conditions	Sunny				2		10.80	0.10	0.4	0.04	0.06			0.003	0.1		
Transducer Information					3		10.30	0.30	0.5	0.15	0.39			0.059	1.4		
DL Model	PT2X	PT Serial #	2922010		4		9.80	0.53	0.5	0.19	1.10			0.204	4.9		
Gain	1.006543	Offset	0.218		5		9.60	0.65	0.2	0.13	1.21			0.157	3.8		
Status	Logging	Battery	100%		6		9.40	1.08	0.2	0.22		1.28	0.57	0.200	4.8		
# of Records	292	Memory Free	130413		7		9.20	1.10	0.2	0.22		1.21	0.76	0.217	5.2		
DL Service Performed	n/a	Crest Gauges	n/a		8		9.00	1.14	0.2	0.23		1.13	1.02	0.245	5.9		
Hydrometric Leveling Survey					9		8.80	1.16	0.2	0.23		1.11	1.11	0.258	6.2		
Stn	BS	HI	FS	Elevation	Notes	10		8.60	1.16	0.2	0.23		1.12	1.13	0.261	6.3	
BM 49	1.230	101.230		100.000		11		8.40	1.12	0.2	0.22		1.12	1.07	0.245	5.9	
BM 64			1.384	99.846		12		8.20	1.07	0.2	0.21		1.12	1.04	0.231	5.5	
BM 50			1.135	100.095		13		8.00	1.07	0.2	0.21		1.18	1.00	0.233	5.6	
PT						14		7.80	1.00	0.2	0.20		1.23	0.95	0.218	5.2	
WL			1.672	99.558		15		7.60	0.98	0.2	0.20		1.26	0.92	0.214	5.1	
						16		7.40	0.98	0.2	0.20		1.34	0.93	0.222	5.3	
						17		7.20	0.96	0.2	0.19		1.33	0.99	0.223	5.3	
						18		7.00	0.94	0.2	0.19		1.26	0.89	0.202	4.8	
						19		6.80	0.90	0.2	0.18		1.29	0.84	0.192	4.6	
TBM			1.171	100.059	BM 12	20		6.60	0.85	0.2	0.21		1.06	0.67	0.184	4.4	
TBM	1.117	101.176		100.059	BM 12	21		6.30	0.82	0.3	0.33		0.74	0.57	0.215	5.2	
BM 49			1.176	100.000		22		5.80	0.48	0.5	0.24	0.05			0.012	0.3	
BM 64			1.329	99.847		23		5.30	0.38	0.5	0.25	0.62			0.153	3.7	
BM 50			1.080	100.096		24	Flooded grass a	4.50	0.22	0.8	0.20	0.04			0.008	0.2	
PT						25	Flooded grass a	3.50	0.12	1.0	0.12	0.04			0.005	0.1	
WL			1.617	99.559		26	Flooded grass a	2.50	0.15	1.0	0.15	0.05			0.008	0.2	
						27	Flooded grass a	1.50	0.03	1.0	0.02	0.00			0.000	0.0	
						28	Flooded grass a	1.00	0.10	0.5	0.04	0.01			0.000	0.0	
						29	Right Bank	0.70	0.00	0.3	0.00	0.00			0.000	0.0	
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31												
BM 49	100	100.000	0.000		32												
BM 64	99.813	99.847	0.034		33												
BM 50	100.077	100.096	0.019		Total Q											4.167	100.0
Summary					General Notes												
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		99.559															
Pressure Transducer Reading (m)		0.920															
Pressure Transducer Elevation (m)		98.638															
Discharge (m ³ /s)		4.167															
Cross Sectional Area		5.001															
Average Velocity		0.833															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	14:15	End	15:15	Location	Approximately 80 m downstream of PT				
Station Identification		Roberts Hydro				Method		Velocity-area (Mid-section)			Instrument Model		Flow mate				
Stream Name		Roberts Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		2007528				
Date Monitored		14-Jun-15				Real Time Reading		Start	Reading	0.951	Time	14:15	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	14:15	End Time:	16:15	(m)		End	Reading	0.951	Time	15:15	Time of SG Reading		n/a		
Personnel		Greg Langston, Coby Hall						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		435325	7562815	0		1	Right Bank	1.00	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions		Cool and cloudy				2			1.30	0.15	0.3	0.08	0.07		0.005	0.1	
Transducer Information						3			2.00	0.16	0.7	0.14	0.01		0.001	0.0	
DL Model		PT2X	PT Serial #		2922010	4			3.00	0.22	1.0	0.22	0.02		0.004	0.1	
Gain		1.006543	Offset		0.218	5			4.00	0.20	1.0	0.20	0.03		0.006	0.1	
Status		Logging	Battery		100%	6			5.00	0.27	1.0	0.20	0.24		0.049	1.0	
# of Records		464	Memory Free		130241	7			5.50	0.30	0.5	0.15	0.75		0.113	2.4	
DL Service Performed		n/a	Crest Gauges		n/a	8			6.00	0.37	0.5	0.14	0.85		0.118	2.5	
Hydrometric Leveling Survey						9			6.25	0.46	0.3	0.12	0.73		0.084	1.8	
Stn	BS	HI	FS	Elevation	Notes	10			6.50	0.60	0.3	0.15	0.85		0.128	2.7	
BM 49	2.540	102.540		100.000		11			6.75	0.96	0.3	0.24		0.92	0.5	0.170	3.6
BM 64			2.693	99.847		12			7.00	1.04	0.3	0.26		1.06	0.64	0.221	4.7
BM 50			2.445	100.095		13			7.25	1.02	0.3	0.26	1.05			0.268	5.7
PT				102.540		14			7.50	1.06	0.3	0.27		1.28	0.85	0.282	6.0
WL			2.945	99.595		15			7.75	1.10	0.3	0.28		1.3	0.78	0.286	6.1
						16			8.00	1.10	0.3	0.28		1.27	0.8	0.285	6.1
						17			8.25	1.14	0.3	0.29		1.27	0.78	0.292	6.2
						18			8.50	1.14	0.3	0.29		1.13	0.91	0.291	6.2
						19			8.75	1.16	0.3	0.29		1.1	0.9	0.290	6.2
TBM			2.480	100.060	BM12	20			9.00	1.16	0.3	0.29		1.09	1.02	0.306	6.5
TBM	2.330	102.390		100.060		21			9.25	1.16	0.3	0.29		1.1	1.1	0.319	6.8
BM 49			2.390	100.000		22			9.50	1.18	0.3	0.30		1.13	0.99	0.313	6.7
BM 64			2.544	99.846		23			9.75	1.16	0.3	0.29		1.13	0.88	0.291	6.2
BM 50			2.295	100.095		24			10.00	1.10	0.3	0.30		1.33	0.43	0.266	5.7
PT				102.390		25			10.30	0.70	0.3	0.21	0.85			0.179	3.8
WL			2.796	99.594		26			10.60	0.49	0.3	0.17	0.71			0.122	2.6
						27			11.00	0.23	0.4	0.10	0.04			0.004	0.1
						28			11.50	0.12	0.5	0.05	0.07			0.004	0.1
						29		Left Bank	11.90	0.00	0.4	0.00	0			0.000	0.0
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 49	100	100.000		0.000		32											
BM 64	99.813	99.847		0.034		33											
BM 50	100.077	100.095		0.018		Total Q										4.696	100.0
Summary						General Notes											
Staff Gauge Reading (m)			N/A														
Stage from WL Survey (m)			99.595														
Pressure Transducer Reading (m)			0.951														
Pressure Transducer Elevation (m)			98.644														
Discharge (m³/s)			4.696														
Cross Sectional Area			5.824														
Average Velocity			0.806														

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	15:15	End	16:15	Location	Approximately 80 m downstream of PT					
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)			Instrument Model	Flow mate						
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic			Instrument Serial #	2007528						
Date Monitored	14-Jun-15				Real Time Reading	Start	Reading		Time	15:45	Staff Gauge (m)		n/a			
Time at Site (24 hr)	Start Time:	14:15	End Time:	16:15	(m)	End	Reading	0.951	Time	16:15	Time of SG Reading		n/a			
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	435325	7562815	0		1	Right Bank	11.90	0.00	0.0	0.00				0.000	0.0	
Weather Conditions	Cool and cloudy				2		11.50	0.12	0.4	0.05	0.02			0.001	0.0	
Transducer Information					3		11.00	0.22	0.5	0.10	0.05			0.005	0.1	
DL Model	PT2X	PT Serial #	2922010		4		10.60	0.49	0.4	0.20	0.67			0.131	2.8	
Gain	1.006543	Offset	0.218		5		10.20	0.74	0.4	0.26	1.09			0.282	6.0	
Status	Logging	Battery	100%		6		9.90	1.16	0.3	0.32		1.25	0.77	0.322	6.8	
# of Records	464	Memory Free	130241		7		9.65	1.18	0.3	0.30		1.13	0.88	0.296	6.3	
DL Service Performed	n/a	Crest Gauges	n/a		8		9.40	1.18	0.3	0.30		1.07	1.05	0.313	6.6	
Hydrometric Leveling Survey					9		9.15	1.16	0.3	0.29		1.09	1.11	0.319	6.8	
Stn	BS	HI	FS	Elevation	Notes	10		8.90	1.16	0.3	0.29		1.12	0.94	0.299	6.3
BM 49	2.540	102.540		100.000		11		8.65	1.16	0.3	0.29		1.13	0.76	0.274	5.8
BM 64			2.693	99.847		12		8.40	1.16	0.3	0.29		1.19	0.74	0.280	5.9
BM 50			2.445	100.095		13		8.15	1.14	0.3	0.29		1.35	0.67	0.288	6.1
PT				102.540		14		7.90	1.12	0.3	0.28		1.38	0.82	0.308	6.5
WL			2.945	99.595		15		7.65	1.12	0.3	0.28		1.37	0.8	0.304	6.5
						16		7.40	1.04	0.3	0.26	1.07			0.278	5.9
						17		7.15	1.02	0.3	0.26	1.05			0.268	5.7
						18		6.90	1.00	0.3	0.25		0.99	0.74	0.216	4.6
						19		6.65	0.97	0.3	0.29	0.28			0.081	1.7
TBM			2.480	100.060		20		6.30	0.48	0.4	0.16	0.71			0.111	2.4
TBM	2.330	102.390		100.060		21		6.00	0.35	0.3	0.14	0.97			0.136	2.9
BM 49			2.390	100.000		22		5.50	0.30	0.5	0.15	0.72			0.108	2.3
BM 64			2.544	99.846		23		5.00	0.27	0.5	0.20	0.28			0.057	1.2
BM 50			2.295	100.095		24		4.00	0.20	1.0	0.20	0.08			0.016	0.3
PT				102.390		25		3.00	0.22	1.0	0.22	0.02			0.004	0.1
WL			2.796	99.594		26		2.00	0.16	1.0	0.14	0.06			0.008	0.2
						27		1.30	0.14	0.7	0.07	0.04			0.003	0.1
						28	Left Bank	1.00	0.00	0.3	0.00	0			0.000	0.0
						29										
						30										
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31											
BM 49	100	100.000	0.000		32											
BM 64	99.813	99.847	0.034		33											
BM 50	100.077	100.095	0.018		Total Q										4.709	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		99.595														
Pressure Transducer Reading (m)		0.951														
Pressure Transducer Elevation (m)		98.644														
Discharge (m³/s)		4.709														
Cross Sectional Area		5.853														
Average Velocity		0.805														

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	6:30	End	7:10	Location	Approximately 80 m downstream of PT				
Station Identification		Roberts Hydro				Method		Velocity-area (Mid-section)				Instrument Model		FH950			
Stream Name		Roberts Lake Outflow				Flow Meter Type		Electromagnetic				Instrument Serial #		6593			
Date Monitored		16-Jul-15				Real Time Reading		Start	Reading	0.706	Time	6:45	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	6:10	End Time:	8:00	(m)	End	Reading	0.706	Time	8:00	Time of SG Reading		n/a			
Personnel		Greg Langston, Coby Hall						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		435325	7562815	0		1	Left Bank	8.40	0.00	0.0	0.00				0.000	0.0	
Weather Conditions		Sunny, light breeze				2			8.20	0.15	0.2	0.03	0			0.000	0.0
Transducer Information						3			8.00	0.20	0.2	0.04	0.08			0.003	0.3
DL Model		PI2X	PT Serial #		2922010	4			7.80	0.50	0.2	0.10	0.55			0.055	4.6
Gain		1.006543	Offset		0.218	5			7.60	0.52	0.2	0.10	0.65			0.068	5.7
Status		Logging	Battery		100%	6			7.40	0.52	0.2	0.10	0.63			0.066	5.5
# of Records		5029	Memory Free		125676	7			7.20	0.50	0.2	0.10	0.65			0.065	5.5
DL Service Performed		n/a	Crest Gauges		n/a	8			7.00	0.54	0.2	0.11	0.63			0.068	5.7
Hydrometric Leveling Survey						9			6.80	0.52	0.2	0.10	0.36			0.037	3.2
Stn	BS	HI	FS	Elevation	Notes	10			6.60	0.49	0.2	0.10	0.78			0.076	6.4
BM 49	2.487	102.487		100.000		11			6.40	0.47	0.2	0.09	0.83			0.078	6.6
BM 64			2.658	99.829		12			6.20	0.44	0.2	0.09	0.86			0.076	6.4
BM 50			2.419	100.068		13			6.00	0.40	0.2	0.09	0.72			0.065	5.5
WL			3.187	99.300	Ripples due to wind	14			5.75	0.42	0.3	0.11	0.68			0.071	6.0
						15			5.50	0.44	0.3	0.11	0.49			0.054	4.5
						16			5.25	0.45	0.3	0.11	0.48			0.054	4.6
						17			5.00	0.42	0.3	0.11	0.52			0.055	4.6
						18			4.75	0.42	0.3	0.11	0.41			0.043	3.6
						19			4.50	0.40	0.3	0.10	0.45			0.045	3.8
TBM			2.428	100.059	BM 12	20			4.25	0.40	0.3	0.10	0.28			0.028	2.4
TBM	2.367	102.426		100.059		21			4.00	0.44	0.3	0.11	0.48			0.053	4.5
WL			3.127	99.299		22			3.75	0.46	0.3	0.12	0.58			0.067	5.6
BM 50			2.358	100.068		23			3.50	0.40	0.3	0.10	0.37			0.037	3.1
BM 64			2.596	99.830		24			3.25	0.24	0.3	0.06	0.25			0.015	1.3
BM 49			2.426	100.000		25			3.00	0.20	0.3	0.06	0.13			0.008	0.7
0						26		Left Bank	2.65	0.00	0.0	0.00	0			0.000	0.0
						27						0.0	0.00			0.000	0.0
0						28						0.0	0.00			0.000	0.0
0						29						0.0	0.00			0.000	0.0
0						30						0.0	0.00			0.000	0.0
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31					0.0	0.00				0.000	0.0
BM 49	100	100.000		0.000		32					0.0	0.00				0.000	0.0
BM 64	99.813	99.830		0.016		33					0.0	0.00				0.000	0.0
BM 50	100.077	100.068		-0.009		Total Q										1.186	100.0
Summary						General Notes											
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		99.300															
Pressure Transducer Reading (m)		0.706															
Pressure Transducer Elevation (m)		98.593															
Discharge (m³/s)		1.186															
Cross Sectional Area		2.243															
Average Velocity		0.529															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method											
Project Name	Hope Bay				Measurement Time	Start	7:10	End	7:45	Location	Approximately 80 m downstream of PT					
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)				Instrument Model	FH950					
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	6593					
Date Monitored	16-Jul-15				Real Time Reading	Start	Reading	0.706	Time	6:45	Staff Gauge (m)	n/a				
Time at Site (24 hr)	Start Time:	6:10	End Time:	8:00	(m)	End	Reading	0.706	Time	8:00	Time of SG Reading	n/a				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
	435325	7562815	0		1	Right Bank	2.60	0.00	0.0	0.00				0.000	0.0	
Weather Conditions	Sunny, light breeze				2		2.90	0.15	0.3	0.05	0.04			0.002	0.2	
Transducer Information					3		3.20	0.20	0.3	0.05	0.23			0.012	1.0	
DL Model	PT2X	PT Serial #	2922010		4		3.40	0.50	0.2	0.10	0.27			0.027	2.3	
Gain	1.006543	Offset	0.218		5		3.60	0.52	0.2	0.12	0.49			0.057	4.8	
Status	Logging	Battery	100%		6		3.85	0.52	0.3	0.13	0.53			0.069	5.8	
# of Records	5029	Memory Free	125676		7		4.10	0.50	0.3	0.13	0.43			0.054	4.5	
DL Service Performed	n/a	Crest Gauges	n/a		8		4.35	0.54	0.3	0.14	0.22			0.030	2.5	
Hydrometric Leveling Survey					9		4.60	0.52	0.3	0.13	0.53			0.069	5.8	
Stn	BS	HI	FS	Elevation	Notes	10		4.85	0.49	0.3	0.12	0.48			0.059	4.9
BM 49	2.487	102.487		100.000		11		5.10	0.47	0.3	0.12	0.57			0.067	5.6
BM 64			2.658	99.829		12		5.35	0.44	0.3	0.11	0.55			0.061	5.1
BM 50			2.419	100.068		13		5.60	0.40	0.3	0.10	0.59			0.059	5.0
WL			3.187	99.300	Ripples due to wind	14		5.85	0.42	0.3	0.11	0.75			0.079	6.6
						15		6.10	0.44	0.3	0.10	0.8			0.079	6.6
						16		6.30	0.45	0.2	0.09	0.84			0.076	6.3
						17		6.50	0.42	0.2	0.08	0.81			0.068	5.7
						18		6.70	0.42	0.2	0.08	0.6			0.050	4.2
						19		6.90	0.40	0.2	0.08	0.5			0.040	3.4
TBM			2.428	100.059	BM 12	20		7.10	0.40	0.2	0.08	0.66			0.053	4.4
TBM	2.367	102.426		100.059		21		7.30	0.44	0.2	0.09	0.61			0.054	4.5
WL			3.127	99.299		22		7.50	0.46	0.2	0.09	0.62			0.057	4.8
BM 50			2.358	100.068		23		7.70	0.40	0.2	0.08	0.63			0.050	4.2
BM 64			2.596	99.830		24		7.90	0.24	0.2	0.06	0.35			0.021	1.8
BM 49			2.426	100.000		25		8.20	0.20	0.3	0.05	0			0.000	0.0
0						26	Left Bank	8.40	0.00	0.0	0.00	0			0.000	0.0
0						27				0.0	0.00				0.000	0.0
0						28				0.0	0.00				0.000	0.0
0						29				0.0	0.00				0.000	0.0
0						30				0.0	0.00				0.000	0.0
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31					0.0	0.00				0.000	0.0
BM 49	100	100.000	0.000		32					0.0	0.00				0.000	0.0
BM 64	99.813	99.830	0.016		33					0.0	0.00				0.000	0.0
BM 50	100.077	100.068	-0.009		Total Q										1.191	100.0
Summary					General Notes											
Staff Gauge Reading (m)		n/a														
Stage from WL Survey (m)		99.300														
Pressure Transducer Reading (m)		0.706														
Pressure Transducer Elevation (m)		98.593														
Discharge (m³/s)		1.191														
Cross Sectional Area		2.274														
Average Velocity		0.524														

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method												
Project Name		Hope Bay			Measurement Time		Start	7:45	End	8:45	Location	Approximately 80 m downstream of PT					
Station Identification		Roberts Hydro			Method		Velocity-area (Mid-section)			Instrument Model		Flowtracker					
Stream Name		Roberts Lake Outflow			Flow Meter Type		Electromagnetic			Instrument Serial #		P5080					
Date Monitored		17-Aug-15			Real Time Reading		Start	Reading	0.697	Time	7:45	Staff Gauge (m)		n/a			
Time at Site (24 hr)		Start Time:	7:45	End Time:	9:45	(m)	End	Reading	0.694	Time	9:45	Time of SG Reading		n/a			
Personnel		Greg Langston, Robert Maksagak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q		
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
		435325	7562815	0		1	Left Bank	8.50	0.00	0.0	0.00	0			0.000	0.0	
Weather Conditions		Cloudy, cool, light wind.			2			8.20	0.20	0.3	0.07	0.122			0.009	0.8	
Transducer Information					3			7.80	0.41	0.4	0.14	0.488			0.070	6.6	
DL Model		PT2X	PT Serial #		2922010	4			7.50	0.52	0.3	0.14	0.484		0.069	6.6	
Gain		1.006543	Offset		0.218	5			7.25	0.51	0.3	0.13	0.468		0.060	5.7	
Status		Logging	Battery		100%	6			7.00	0.51	0.3	0.13	0.512		0.065	6.2	
# of Records		9643	Memory Free		121062	7			6.75	0.52	0.3	0.13	0.56		0.073	6.9	
DL Service Performed		n/a	Crest Gauges		n/a	8			6.50	0.37	0.3	0.09	0.652		0.060	5.7	
Hydrometric Leveling Survey					9			6.25	0.44	0.3	0.11	0.717			0.079	7.5	
Stn	BS	HI	FS	Elevation	Notes	10			6.00	0.45	0.3	0.11	0.689		0.078	7.4	
BM 49	2.473	102.473		100.000	Ripples due to wind	11			5.75	0.44	0.3	0.11	0.62		0.068	6.5	
BM 50			2.418	100.055		12			5.50	0.45	0.3	0.11	0.471		0.053	5.0	
BM 64			2.686	99.787		13			5.25	0.45	0.3	0.11	0.473		0.053	5.0	
WL			3.229	99.244		14			5.00	0.45	0.3	0.11	0.338		0.038	3.6	
						15			4.75	0.42	0.3	0.11	0.278		0.029	2.8	
						16			4.50	0.44	0.3	0.11	0.43		0.047	4.5	
						17			4.25	0.47	0.3	0.12	0.169		0.020	1.9	
						18			4.00	0.47	0.3	0.12	0.335		0.039	3.7	
						19			3.75	0.47	0.3	0.12	0.384		0.045	4.3	
TBM			2.413	100.060		BM 12	20			3.50	0.43	0.3	0.11	0.362		0.039	3.7
TBM	2.297	102.357		100.060		21			3.25	0.23	0.3	0.06	0.298		0.017	1.6	
WL			3.112	99.245		22			3.00	0.25	0.3	0.07	0.318		0.022	2.1	
BM 64			2.568	99.789		23			2.70	0.17	0.3	0.07	0.306		0.021	2.0	
BM 50			2.301	100.056		24		Right Bank	2.20	0.00	0.5	0.00	0		0.000	0.0	
BM 49			2.357	100.000		25											
						26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 49	100	100.000		0.000		32											
BM 50	100.077	100.056		-0.022		33											
BM 64	99.813	99.788		-0.025		Total Q										1.054	100.0
Summary					General Notes												
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		99.245															
Pressure Transducer Reading (m)		0.697															
Pressure Transducer Elevation (m)		98.548															
Discharge (m³/s)		1.054															
Cross Sectional Area		2.373															
Average Velocity		0.444															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start	8:45	End	9:45	Location	Approximately 80 m downstream of PT				
Station Identification	Roberts Hydro				Method	Velocity-area (Mid-section)				Instrument Model	Flowtracker				
Stream Name	Roberts Lake Outflow				Flow Meter Type	Electromagnetic				Instrument Serial #	P5080				
Date Monitored	17-Aug-15				Real Time Reading	Start	Reading	0.697	Time	7:45	Staff Gauge (m)	n/a			
Time at Site (24 hr)	Start Time:	7:45	End Time:	9:45	(m)	End	Reading	0.694	Time	9:45	Time of SG Reading	n/a			
Personnel	Greg Langston, Robert Maksagak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	435325	7562815	0		1	Left Bank	2.20	0.00	0.0	0.00	0			0.000	0.0
Weather Conditions	Cloudy, cool, light wind.				2		2.80	0.19	0.6	0.10	0.308			0.032	3.2
Transducer Information					3		3.30	0.27	0.5	0.09	0.331			0.031	3.1
DL Model	PT2X	PT Serial #	2922010		4		3.50	0.44	0.2	0.08	0.357			0.027	2.7
Gain	1.006543	Offset	0.218		5		3.65	0.47	0.2	0.09	0.389			0.037	3.6
Status	Logging	Battery	100%		6		3.90	0.46	0.3	0.12	0.327			0.038	3.7
# of Records	9643	Memory Free	121062		7		4.15	0.45	0.3	0.11	0.162			0.018	1.8
DL Service Performed	n/a	Crest Gauges	n/a		8		4.40	0.45	0.3	0.11	0.394			0.044	4.3
Hydrometric Leveling Survey					9		4.65	0.43	0.3	0.11	0.185			0.020	1.9
Stn	BS	HI	FS	Elevation	Notes	10		4.90	0.45	0.3	0.11	0.291		0.033	3.2
BM 49	2.473	102.473		100.000		11		5.15	0.46	0.3	0.12	0.426		0.049	4.8
BM 50			2.418	100.055		12		5.40	0.46	0.3	0.12	0.404		0.046	4.5
BM 64			2.686	99.787		13		5.65	0.45	0.3	0.11	0.543		0.061	6.0
WL			3.229	99.244	Ripples due to wind	14		5.90	0.43	0.3	0.11	0.659		0.071	6.9
						15		6.15	0.45	0.3	0.11	0.713		0.080	7.9
						16		6.40	0.48	0.3	0.12	0.702		0.084	8.2
						17		6.65	0.50	0.3	0.13	0.559		0.070	6.8
						18		6.90	0.52	0.3	0.13	0.566		0.074	7.2
						19		7.15	0.51	0.3	0.13	0.473		0.060	5.9
TBM			2.413	100.060	BM 12	20		7.40	0.51	0.3	0.13	0.491		0.063	6.1
TBM	2.297	102.357		100.060		21		7.65	0.52	0.3	0.13	0.367		0.048	4.7
WL			3.112	99.245		22		7.90	0.24	0.3	0.06	0.437		0.026	2.6
BM 64			2.568	99.789		23		8.15	0.20	0.2	0.06	0.154		0.009	0.9
BM 50			2.301	100.056		24	Right Bank	8.50	0.00	0.3	0.00	0		0.000	0.0
BM 49			2.357	100.000		25									
						26									
						27									
						28									
						29									
						30									
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31										
BM 49	100	100.000	0.000		32										
BM 50	100.077	100.056	-0.022		33										
BM 64	99.813	99.788	-0.025		Total Q									1.022	100.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		99.245													
Pressure Transducer Reading (m)		0.697													
Pressure Transducer Elevation (m)		98.548													
Discharge (m ³ /s)		1.022													
Cross Sectional Area		2.373													
Average Velocity		0.431													

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	9:45	End	10:30	Location	Approximately 80 m downstream of PT				
Station Identification		Roberts Hydro				Method		Velocity-area (Mid-section)				Instrument Model		FH950			
Stream Name		Roberts Lake Outflow				Flow Meter Type		Electromagnetic				Instrument Serial #		6593			
Date Monitored		17-Sep-15				Real Time Reading		Start	Reading	0.582	Time	9:45	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	9:00	End Time:	12:00	(m)	End	Reading	0.582	Time	12:00	Time of SG Reading		n/a			
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cloudy, cool, light wind.				1	Left Bank	8.00	0.00	0.0	0.00	0			0.000	0.0	
						2		7.75	0.30	0.3	0.08	0.32			0.024	6.6	
						3		7.50	0.34	0.3	0.09	0.37			0.031	8.6	
						4		7.25	0.34	0.3	0.09	0.43			0.037	10.0	
DL Model		PI2X	PT Serial #		2922010	5		7.00	0.34	0.3	0.09	0.44			0.037	10.2	
Gain		1.006543	Offset		0.218	6		6.75	0.34	0.3	0.09	0.2			0.017	4.7	
Status		Logging	Battery		100%	7		6.50	0.32	0.3	0.08	0.29			0.023	6.4	
# of Records		n/a	Memory Free		n/a	8		6.25	0.31	0.3	0.08	0.41			0.032	8.7	
DL Service Performed		n/a	Crest Gauges		n/a	9		6.00	0.28	0.3	0.07	0.32			0.022	6.1	
Hydrometric Leveling Survey						10		5.75	0.28	0.3	0.07	0.32			0.022	6.1	
Stn	BS	HI	FS	Elevation	Notes	11		5.50	0.28	0.3	0.07	0.36			0.025	6.9	
BM 49	2.472	102.472		100.000		12		5.25	0.29	0.3	0.07	0.2			0.015	4.0	
BM 50			2.420	100.052		13		5.00	0.28	0.3	0.07	0.14			0.010	2.7	
BM 64			2.694	99.778		14		4.75	0.27	0.3	0.07	0.11			0.007	2.0	
WL			3.229	99.243	Ripples due to wind	15		4.50	0.26	0.3	0.07	0.15			0.010	2.7	
						16		4.25	0.28	0.3	0.07	0.19			0.013	3.6	
						17		4.00	0.28	0.3	0.07	0.22			0.015	4.2	
						18		3.75	0.29	0.3	0.07	0.2			0.015	4.0	
						19		3.50	0.28	0.3	0.07	0.13			0.009	2.5	
TBM			2.411	100.061	BM 12	20		3.25	0.16	0.3	0.04	0			0.000	0.0	
TBM	2.277	102.338		100.061		21		3.00	0.16	0.3	0.04	0			0.000	0.0	
WL			3.226	99.112		22	Right Bank	2.80	0.00	0.2	0.00	0			0.000	0.0	
BM 64			2.559	99.779		23											
BM 50			2.285	100.053		24											
BM 49			2.337	100.001		25											
						26											
						27											
						28											
						29											
						30											
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31											
BM 49	100	100.001		0.000		32											
BM 50	100.077	100.053		-0.025		33											
BM 64	99.813	99.779		-0.035		Total Q										0.365	100.0
Summary						General Notes											
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		99.178															
Pressure Transducer Reading (m)		0.582															
Pressure Transducer Elevation (m)		98.596															
Discharge (m³/s)		0.365															
Cross Sectional Area		1.416															
Average Velocity		0.258															

Appendix B-3. 2015 Manual Discharge Measurements at Roberts Lake Outflow (Roberts Hydro)

Site Information						Discharge Measurement - Mid-Section Method											
Project Name		Hope Bay				Measurement Time		Start	10:30	End	11:15	Location	Approximately 80 m downstream of PT				
Station Identification		Roberts Hydro				Method		Velocity-area (Mid-section)			Instrument Model		FH950				
Stream Name		Roberts Lake Outflow				Flow Meter Type		Electromagnetic			Instrument Serial #		6593				
Date Monitored		17-Sep-15				Real Time Reading		Start	Reading	0.582	Time	9:45	Staff Gauge (m)		n/a		
Time at Site (24 hr)		Start Time:	9:00	End Time:	12:00	(m)	End	Reading	0.582	Time	12:00	Time of SG Reading		n/a			
Personnel		Greg Langston, Kevin Esseltine						Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates		Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m²)	60%	20%	80%	(m³/s)	%	
Weather Conditions		Cloudy, cool, light wind.				1	Right Bank	3.00	0.16	0.0	0.01	0			0.000	0.0	
						2		3.15	0.16	0.2	0.03	0			0.000	0.0	
						3		3.40	0.16	0.3	0.04	0			0.000	0.0	
DL Model		PI2X	PT Serial #		2922010	4		3.65	0.28	0.3	0.07	0.21			0.015	3.8	
Gain		1.006543	Offset		0.218	5		3.90	0.28	0.3	0.07	0.23			0.016	4.2	
Status		Logging	Battery		100%	6		4.15	0.28	0.3	0.07	0.17			0.012	3.1	
# of Records		n/a	Memory Free		n/a	7		4.40	0.27	0.3	0.07	0.27			0.018	4.7	
DL Service Performed		n/a	Crest Gauges		n/a	8		4.65	0.28	0.3	0.07	0.07			0.005	1.3	
Hydrometric Leveling Survey						9		4.90	0.26	0.3	0.07	0.17			0.011	2.9	
Stn	BS	HI	FS	Elevation	Notes	10		5.15	0.28	0.3	0.07	0.21			0.015	3.8	
BM 49	2.472	102.472		100.000		11		5.40	0.29	0.3	0.07	0.3			0.022	5.6	
BM 50			2.420	100.052		12		5.65	0.28	0.3	0.07	0.35			0.025	6.4	
BM 64			2.694	99.778		13		5.90	0.28	0.3	0.07	0.34			0.024	6.2	
WL			3.229	99.243	Ripples due to wind	14		6.15	0.30	0.3	0.08	0.36			0.027	7.0	
						15		6.40	0.30	0.3	0.08	0.47			0.035	9.1	
						16		6.65	0.33	0.3	0.08	0.2			0.017	4.3	
						17		6.90	0.34	0.3	0.09	0.43			0.037	9.5	
						18		7.15	0.34	0.3	0.09	0.46			0.039	10.1	
						19		7.40	0.34	0.3	0.09	0.42			0.036	9.3	
TBM			2.411	100.061	BM 12	20		7.65	0.34	0.3	0.09	0.36			0.031	7.9	
TBM	2.277	102.338		100.061		21		7.90	0.20	0.3	0.04	0.09			0.003	0.8	
WL			3.226	99.112		22	Left Bank	8.00	0.00	0.1	0.00	0			0.000	0.0	
BM 64			2.559	99.779		23				8.0	0.00				0.000	0.0	
BM 50			2.285	100.053		24				0.0	0.00				0.000	0.0	
BM 49			2.337	100.001		25				0.0	0.00				0.000	0.0	
0						26				0.0	0.00				0.000	0.0	
						27				0.0	0.00				0.000	0.0	
0						28				0.0	0.00				0.000	0.0	
0						29				0.0	0.00				0.000	0.0	
0						30				0.0	0.00				0.000	0.0	
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes	31				0.0	0.00				0.000	0.0	
BM 49	100	100.001		0.000		32				0.0	0.00				0.000	0.0	
BM 50	100.077	100.053		-0.025		33				0.0	0.00				0.000	0.0	
BM 64	99.813	99.779		-0.035		Total Q										0.385	100.0
Summary						General Notes											
Staff Gauge Reading (m)		n/a															
Stage from WL Survey (m)		99.178															
Pressure Transducer Reading (m)		0.582															
Pressure Transducer Elevation (m)		98.596															
Discharge (m³/s)		0.385															
Cross Sectional Area		1.387															
Average Velocity		0.278															

Appendix B-4. 2015 Manual Stage Measurements at Doris Lake Station

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Doris Lake				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	15-Jul-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	8:30	End Time:	12:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Abraham Hiquiniq					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	433512	7558452	19		1				0.0	0.00				0.000	-
Weather Conditions	Sunny, moderate wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	Levellogger	PT Serial #	2047247		4				0.0	0.00				0.000	-
Gain	n/a	Offset	n/a		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	0	Memory Free	39,999		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10			0.0	0.00				0.000	-
BM 70	0.422	100.422		100.000		11			0.0	0.00				0.000	-
BM 71			1.178	99.244		12			0.0	0.00				0.000	-
BM 72			1.872	98.550		13			0.0	0.00				0.000	-
WL			2.232	98.190		14			0.0	0.00				0.000	-
						15			0.0	0.00				0.000	-
						16			0.0	0.00				0.000	-
						17			0.0	0.00				0.000	-
						18			0.0	0.00				0.000	-
						19			0.0	0.00				0.000	-
TBM			1.574	98.848		20			0.0	0.00				0.000	-
TBM	1.672	100.520		98.848		21			0.0	0.00				0.000	-
WL			2.329	98.191		22			0.0	0.00				0.000	-
BM 72			1.970	98.550		23			0.0	0.00				0.000	-
BM 71			1.276	99.244		24			0.0	0.00				0.000	-
BM 70			0.520	100.000		25			0.0	0.00				0.000	-
						26			0.0	0.00				0.000	-
						27			0.0	0.00				0.000	-
						28			0.0	0.00				0.000	-
						29			0.0	0.00				0.000	-
						30			0.0	0.00				0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes		31			0.0	0.00				0.000	-
BM 70	100	100.000	0.000			32			0.0	0.00				0.000	-
BM 71	99.243	99.244	0.001			33			0.0	0.00				0.000	-
BM 72	98.55	98.550	0.000			Total Q							0.000	0.0	
Summary					General Notes										
Staff Gauge Reading (m)	n/a				Installed new sensor.										
Stage from WL Survey (m)	98.191														
Pressure Transducer Reading (m)	1.120														
Pressure Transducer Elevation (m)	97.071														
Discharge (m ³ /s)	0.000														
Cross Sectional Area	0.000														
Average Velocity	#DIV/0!														

Appendix B-4. 2015 Manual Stage Measurements at Doris Lake Station

Site Information					Discharge Measurement - Mid-Section Method										
Project Name		Hope Bay			Measurement Time		Start		End		Location				
Station Identification		Doris Lake			Method		Velocity-area (Mid-section)				Instrument Model				
Stream Name					Flow Meter Type		Electromagnetic				Instrument Serial #				
Date Monitored		14-Aug-15			Real Time Reading		Start		Reading		Time		Staff Gauge (m)		
Time at Site (24 hr)		Start Time:		7:30	End Time:		8:30		End		Reading		Time of SG Reading		
Personnel		Greg Langston, Mark Ullikataq					Station		Depth		Distance		Area		
													Velocity (m/s)		
Station Coordinates		Easting		Northing	Elevation				No.		Notes				
		433512		7558452	0				1						
Weather Conditions		Sunny, warm, light west wind.							2						
Transducer Information									3						
DL Model		Levellogger		PT Serial #		2047247		4							
Gain		n/a		Offset		n/a		5							
Status		Logging		Battery		100%		6							
# of Records		4,324		Memory Free		35,675		7							
DL Service Performed				Crest Gauges		N/A		8							
Hydrometric Leveling Survey									9						
Stn	BS	HI	FS	Elevation	Notes		10								
BM 70	0.465	100.465		100.000			11								
BM 71			1.222	99.243			12								
BM 72			1.915	98.550			13								
WL			2.251	98.214			14								
							15								
							16								
							17								
							18								
							19								
TBM			2.014	98.451			20								
TBM	1.902	100.353		98.451			21								
WL			2.142	98.211	5 cm waves on lake		22								
BM 3			1.803	98.550			23								
BM 2			1.109	99.244			24								
BM 1			0.353	100.000			25								
							26								
							27								
							28								
							29								
							30								
BM#	Established Elevation (m)	Mean Elevation (this date) (m)		Difference (m)	Notes		31								
BM 70	100	100.000		0.000			32								
BM 71	99.243	99.244		0.001			33								
BM 72	98.55	98.550		0.000			Total Q						0.000	0.0	
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		98.213													
Pressure Transducer Reading (m)		1.220													
Pressure Transducer Elevation (m)		96.993													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-4. 2015 Manual Stage Measurements at Doris Lake Station

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Doris Lake				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	18-Sep-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	7:00	End Time:	11:00	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Kevin Esseltine					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	433512	7558452	0		1				0.0	0.00				0.000	-
Weather Conditions	Sunny, ~10 °C, moderate southwest wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	Levellogger	PT Serial #	2047247		4				0.0	0.00				0.000	-
Gain	n/a	Offset	n/a		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	9,375	Memory Free	30,624		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10			0.0	0.00				0.000	-
BM 70	0.128	100.128		100.000		11			0.0	0.00				0.000	-
BM 71			0.885	99.243		12			0.0	0.00				0.000	-
BM 72			1.578	98.550		13			0.0	0.00				0.000	-
WL			2.119	98.009		14			0.0	0.00				0.000	-
						15			0.0	0.00				0.000	-
						16			0.0	0.00				0.000	-
						17			0.0	0.00				0.000	-
						18			0.0	0.00				0.000	-
						19			0.0	0.00				0.000	-
TBM			0.841	99.287		20			0.0	0.00				0.000	-
TBM	0.769	100.056		99.287		21			0.0	0.00				0.000	-
WL			2.048	98.008		22			0.0	0.00				0.000	-
BM 72			1.507	98.549		23			0.0	0.00				0.000	-
BM 71			0.812	99.244		24			0.0	0.00				0.000	-
BM 70			0.056	100.000		25			0.0	0.00				0.000	-
						26			0.0	0.00				0.000	-
						27			0.0	0.00				0.000	-
						28			0.0	0.00				0.000	-
						29			0.0	0.00				0.000	-
						30			0.0	0.00				0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 70	100	100.000	0.000		32				0.0	0.00				0.000	-
BM 71	99.243	99.244	0.001		33				0.0	0.00				0.000	-
BM 72	98.55	98.550	-0.001		Total Q								0.000	0.0	
Summary					General Notes										
Staff Gauge Reading (m)	n/a				Relocated sensor to deeper water.										
Stage from WL Survey (m)	98.009														
Pressure Transducer Reading (m)	1.018														
Pressure Transducer Elevation (m)	96.991														
Discharge (m ³ /s)	0.000														
Cross Sectional Area	0.000														
Average Velocity	#DIV/0!														

Appendix B-5. 2015 Manual Stage Measurements at Tailings Impoundment Area

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Tailings Impoundment Area				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	15-Jul-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	12:30	End Time:	16:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Jeffrey Anderson					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Partly cloudy, warm, moderate wind.				1				0.0	0.00				0.000	-
Transducer Information					2				0.0	0.00				0.000	-
DL Model	Levellogger	PT Serial #	2047251		3				0.0	0.00				0.000	-
Gain	n/a	Offset	n/a		4				0.0	0.00				0.000	-
Status	Logging	Battery	100%		5				0.0	0.00				0.000	-
# of Records	0	Memory Free	39,999		6				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		7				0.0	0.00				0.000	-
Hydrometric Leveling Survey					8				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	9				0.0	0.00			0.000	-
BM 80	0.224	100.224		100.000		10				0.0	0.00			0.000	-
BM 82			2.048	98.176		11				0.0	0.00			0.000	-
BM 81	0.596	98.076	2.744	97.480		12				0.0	0.00			0.000	-
WL			4.004	94.072		13				0.0	0.00			0.000	-
						14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			1.438	96.638		20				0.0	0.00			0.000	-
TBM	1.264	97.902		96.638		21				0.0	0.00			0.000	-
WL			3.830	94.072		22				0.0	0.00			0.000	-
BM 81	2.836	100.317	0.421	97.481		23				0.0	0.00			0.000	-
BM 82			2.142	98.175		24				0.0	0.00			0.000	-
BM 80			0.317	100.000		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes		31				0.0	0.00			0.000	-
BM 80	100	100.000	0.000			32				0.0	0.00			0.000	-
BM 82	97.173	98.176	1.003			33				0.0	0.00			0.000	-
BM 81	98.48	97.481	-0.999			Total Q								0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a			Installed new sensor.										
Stage from WL Survey (m)		94.072													
Pressure Transducer Reading (m)		1.246													
Pressure Transducer Elevation (m)		92.826													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-5. 2015 Manual Stage Measurements at Tailings Impoundment Area

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Tailings Impoundment Area				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	14-Aug-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	7:50	End Time:	9:00	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Mark Ullikataq					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	434823	7558560	35		1				0.0	0.00				0.000	-
Weather Conditions	Cloudy, warm, calm wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	Levellogger	PT Serial #	2047251		4				0.0	0.00				0.000	-
Gain	n/a	Offset	n/a		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	4,288	Memory Free	35,711		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 80	0.240	100.240		100.000		11				0.0	0.00			0.000	-
BM 82			2.065	98.175		12				0.0	0.00			0.000	-
BM 81	0.714	98.193	2.761	97.479		13				0.0	0.00			0.000	-
WL			4.104	94.089		14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			3.621	94.572		20				0.0	0.00			0.000	-
TBM	3.716	98.288		94.572		21				0.0	0.00			0.000	-
WL			4.200	94.088		22				0.0	0.00			0.000	-
BM 81	2.747	100.224	0.811	97.477		23				0.0	0.00			0.000	-
BM 82			2.050	98.174		24				0.0	0.00			0.000	-
BM 80			0.225	99.999		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 80	100	100.000	0.000		32				0.0	0.00				0.000	-
BM 82	97.173	98.175	1.001		33				0.0	0.00				0.000	-
BM 81	98.48	97.478	-1.002		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		94.089													
Pressure Transducer Reading (m)		1.456													
Pressure Transducer Elevation (m)		92.633													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-5. 2015 Manual Stage Measurements at Tailings Impoundment Area

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Tailings Impoundment Area				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	19-Sep-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	13:00	End Time:	16:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Kevin Esseltine					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Partly cloudy, light wind.				1				0.0	0.00				0.000	-
Transducer Information					2				0.0	0.00				0.000	-
					3				0.0	0.00				0.000	-
DL Model	Levellogger	PT Serial #	2047251		4				0.0	0.00				0.000	-
Gain	n/a	Offset	n/a		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	0	Memory Free	39,999		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 80	0.263	100.263		100.000		11				0.0	0.00			0.000	-
BM 82			2.088	98.175		12				0.0	0.00			0.000	-
BM 81	0.846	98.325	2.784	97.479		13				0.0	0.00			0.000	-
WL			4.485	93.840		14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			3.749	94.576		20				0.0	0.00			0.000	-
TBM	3.878	98.454		94.576		21				0.0	0.00			0.000	-
WL			4.614	93.840		22				0.0	0.00			0.000	-
BM 81	2.808	100.290	0.972	97.482		23				0.0	0.00			0.000	-
BM 82			2.113	98.177		24				0.0	0.00			0.000	-
BM 80			0.288	100.002		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 80	100	100.000	0.000		32				0.0	0.00				0.000	-
BM 82	97.173	98.176	1.003		33				0.0	0.00				0.000	-
BM 81	98.48	97.481	-0.999		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a			Relocated sensor to deeper water.										
Stage from WL Survey (m)		93.840													
Pressure Transducer Reading (m)		1.212													
Pressure Transducer Elevation (m)		92.628													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	12-Jun-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	6:30	End Time:	8:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	432636	7550372	22		1				0.0	0.00				0.000	-
Weather Conditions	Partly cloudy, light west wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	0	Memory Free	524,139		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 1	0.748	100.748		100.000		11				0.0	0.00			0.000	-
BM 2			0.667	100.081		12				0.0	0.00			0.000	-
BM 3			1.676	99.072		13				0.0	0.00			0.000	-
PT			4.828	95.920		14				0.0	0.00			0.000	-
WL			4.135	96.613		15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			4.595	96.153		20				0.0	0.00			0.000	-
TBM	4.538	100.691		96.153		21				0.0	0.00			0.000	-
WL			4.080	96.611		22				0.0	0.00			0.000	-
PT			4.769	95.922		23				0.0	0.00			0.000	-
BM 3			1.619	99.072		24				0.0	0.00			0.000	-
BM 2			0.609	100.082		25				0.0	0.00			0.000	-
BM 1			0.691	100.000		26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 1		100.000	100.000		32				0.0	0.00				0.000	-
BM 2		100.082	100.082		33				0.0	0.00				0.000	-
BM 3		99.072	99.072		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)	n/a				Station installed for season. Relocated station from the Windy Lake outflow to near Windy Camp.										
Stage from WL Survey (m)	96.612														
Pressure Transducer Reading (m)	0.709														
Pressure Transducer Elevation (m)	95.903														
Discharge (m ³ /s)	0.000														
Cross Sectional Area	0.000														
Average Velocity	#DIV/0!														

Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	15-Jun-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	12:30	End Time:	13:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Coby Hall					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Partly cloudy				1				0.0	0.00				0.000	-
Transducer Information					2				0.0	0.00				0.000	-
					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	463	Memory Free	523,676		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 1	0.680	100.680		100.000		11				0.0	0.00			0.000	-
BM 2			0.600	100.080		12				0.0	0.00			0.000	-
BM 3			1.612	99.068		13				0.0	0.00			0.000	-
PT			4.760	95.920		14				0.0	0.00			0.000	-
WL			4.057	96.623		15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			4.557	96.123		20				0.0	0.00			0.000	-
TBM	4.682	100.805		96.123		21				0.0	0.00			0.000	-
WL			4.183	96.622		22				0.0	0.00			0.000	-
PT			4.878	95.927		23				0.0	0.00			0.000	-
BM 3			1.737	99.068		24				0.0	0.00			0.000	-
BM 2			0.724	100.081		25				0.0	0.00			0.000	-
BM 1			0.805	100.000		26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 1	100.000	100.000	0.000		32				0.0	0.00				0.000	-
BM 2	100.082	100.081	-0.001		33				0.0	0.00				0.000	-
BM 3	99.072	99.068	-0.004		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		96.623													
Pressure Transducer Reading (m)		0.709													
Pressure Transducer Elevation (m)		95.914													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	14-Jul-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	14:00	End Time:	15:00	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Robert Maksagak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny, calm				1				0.0	0.00				0.000	-
Transducer Information					2				0.0	0.00				0.000	-
					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	4,647	Memory Free	519,492		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 1	0.867	100.867		100.000		11				0.0	0.00			0.000	-
BM 2			0.819	100.048		12				0.0	0.00			0.000	-
BM 3			1.809	99.058		13				0.0	0.00			0.000	-
WL			4.259	96.608		14				0.0	0.00			0.000	-
PT			4.957	95.910		15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			4.159	96.708		20				0.0	0.00			0.000	-
TBM	4.124	100.832		96.708		21				0.0	0.00			0.000	-
PT			4.923	95.909		22				0.0	0.00			0.000	-
WL			4.225	96.607		23				0.0	0.00			0.000	-
BM 3			1.776	99.056		24				0.0	0.00			0.000	-
BM 2			0.784	100.048		25				0.0	0.00			0.000	-
BM 1			0.833	99.999		26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 1	100.000	100.000	-0.001		32				0.0	0.00				0.000	-
BM 2	100.082	100.048	-0.034		33				0.0	0.00				0.000	-
BM 3	99.072	99.057	-0.015		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		96.608													
Pressure Transducer Reading (m)		0.726													
Pressure Transducer Elevation (m)		95.882													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	15-Aug-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	7:30	End Time:	8:30	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Carl Atatahak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	432636	7550372	22		1				0.0	0.00				0.000	-
Weather Conditions	Sunny, warm, light west wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	9,212	Memory Free	514,927		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 1	0.647	100.647		100.000		11				0.0	0.00			0.000	-
BM 2			0.609	100.038		12				0.0	0.00			0.000	-
BM 3			1.602	99.045		13				0.0	0.00			0.000	-
WL			4.011	96.636		14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			3.838	96.809		20				0.0	0.00			0.000	-
TBM	3.724	100.533		96.809		21				0.0	0.00			0.000	-
WL			3.899	96.634	5 cm waves on lake	22				0.0	0.00			0.000	-
BM 3			1.488	99.045		23				0.0	0.00			0.000	-
BM 2			0.498	100.035		24				0.0	0.00			0.000	-
BM 1			0.535	99.998		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 1	100.000	100.000	0.000		32				0.0	0.00				0.000	-
BM 2	100.082	100.037	-0.045		33				0.0	0.00				0.000	-
BM 3	99.072	99.045	-0.027		Total Q									0.000	0.0
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		96.635													
Pressure Transducer Reading (m)		0.748													
Pressure Transducer Elevation (m)		95.887													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	15-Aug-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	17:00	End Time:	18:00	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Carl Atatahak					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
	432636	7550372	22		1				0.0	0.00				0.000	-
Weather Conditions	Sunny, warm, light west wind.				2				0.0	0.00				0.000	-
Transducer Information					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	9,212	Memory Free	514,927		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 1	0.988	100.988		100.000		11				0.0	0.00			0.000	-
BM 79			0.977	100.011		12				0.0	0.00			0.000	-
BM 68			0.928	100.060		13				0.0	0.00			0.000	-
BM 83			1.932	99.056		14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			1.944	99.044	BM 3	20				0.0	0.00			0.000	-
TBM	1.907	100.951		99.044		21				0.0	0.00			0.000	-
BM 83			1.894	99.057	5 cm waves on lake	22				0.0	0.00			0.000	-
BM 68			0.891	100.060		23				0.0	0.00			0.000	-
BM 79			0.939	100.012		24				0.0	0.00			0.000	-
BM 1			0.951	100.000		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes	31				0.0	0.00				0.000	-
BM 79		100.012	100.012		32				0.0	0.00				0.000	-
BM 68		100.060	100.060		33				0.0	0.00				0.000	-
BM 83		99.057	99.057		Total Q								0.000	0.0	
Summary					General Notes										
Staff Gauge Reading (m)		n/a			Established permanent bench marks (rock bolts).										
Stage from WL Survey (m)		n/a													
Pressure Transducer Reading (m)		n/a													
Pressure Transducer Elevation (m)		#VALUE!													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

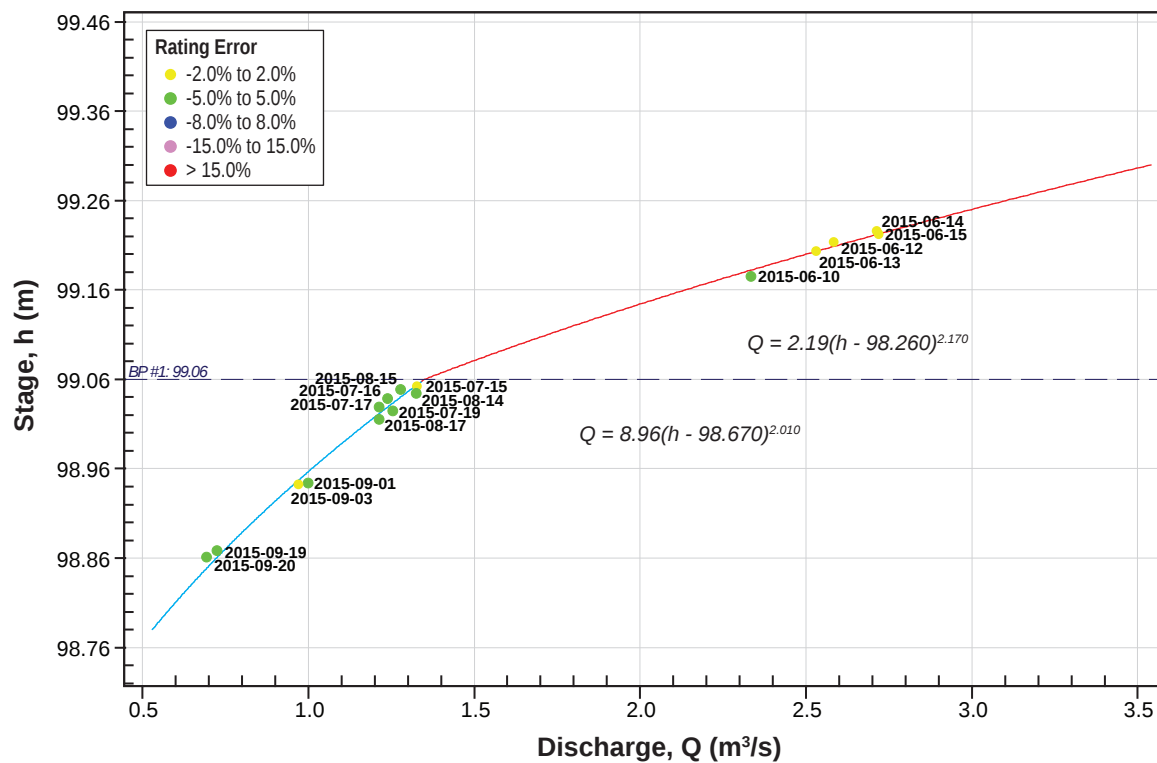
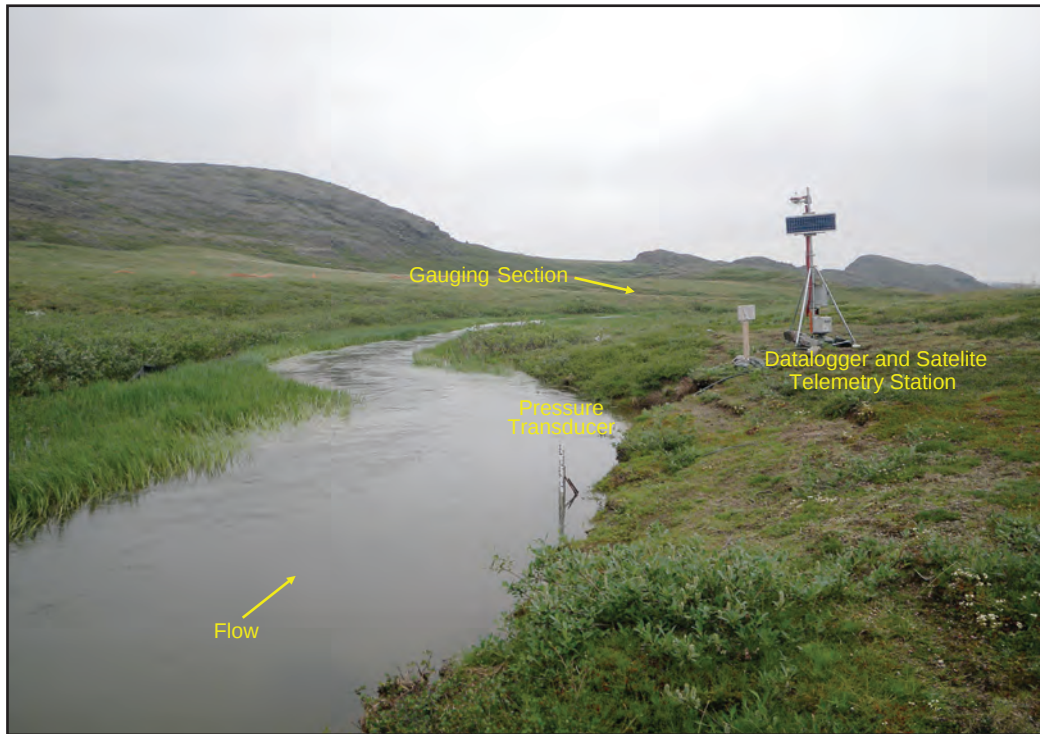
Appendix B-6. 2015 Manual Stage Measurements at Windy Lake (Windy Hydro)

Site Information					Discharge Measurement - Mid-Section Method										
Project Name	Hope Bay				Measurement Time	Start		End		Location					
Station Identification	Windy Hydro				Method	Velocity-area (Mid-section)				Instrument Model					
Stream Name					Flow Meter Type	Electromagnetic				Instrument Serial #					
Date Monitored	19-Sep-15				Real Time Reading	Start	Reading		Time		Staff Gauge (m)				
Time at Site (24 hr)	Start Time:	11:10	End Time:	12:20	(m)	End	Reading		Time		Time of SG Reading				
Personnel	Greg Langston, Kevin Esseltine					Station	Depth	Distance	Area	Velocity (m/s)			Q	% of Total Q	
Station Coordinates	Easting	Northing	Elevation		No.	Notes	(m)	(m)	(m)	(m ²)	60%	20%	80%	(m ³ /s)	%
Weather Conditions	Sunny, ~10° C, moderate southwest wind.				1				0.0	0.00				0.000	-
Transducer Information					2				0.0	0.00				0.000	-
					3				0.0	0.00				0.000	-
DL Model	PT2X	PT Serial #	21220029		4				0.0	0.00				0.000	-
Gain	1.003251	Offset	-0.001		5				0.0	0.00				0.000	-
Status	Logging	Battery	100%		6				0.0	0.00				0.000	-
# of Records	14,279	Memory Free	509,860		7				0.0	0.00				0.000	-
DL Service Performed		Crest Gauges	N/A		8				0.0	0.00				0.000	-
Hydrometric Leveling Survey					9				0.0	0.00				0.000	-
Stn	BS	HI	FS	Elevation	Notes	10				0.0	0.00			0.000	-
BM 79	0.645	100.657		100.012		11				0.0	0.00			0.000	-
BM 68			0.615	100.042		12				0.0	0.00			0.000	-
BM 83			1.619	99.038		13				0.0	0.00			0.000	-
WL			4.163	96.494		14				0.0	0.00			0.000	-
						15				0.0	0.00			0.000	-
						16				0.0	0.00			0.000	-
						17				0.0	0.00			0.000	-
						18				0.0	0.00			0.000	-
						19				0.0	0.00			0.000	-
TBM			3.802	96.855		20				0.0	0.00			0.000	-
TBM	3.662	100.517		96.855		21				0.0	0.00			0.000	-
WL			4.022	96.495	5 cm waves on lake	22				0.0	0.00			0.000	-
BM 3			1.478	99.039		23				0.0	0.00			0.000	-
BM 2			0.475	100.042		24				0.0	0.00			0.000	-
BM 1			0.504	100.013		25				0.0	0.00			0.000	-
						26				0.0	0.00			0.000	-
						27				0.0	0.00			0.000	-
						28				0.0	0.00			0.000	-
						29				0.0	0.00			0.000	-
						30				0.0	0.00			0.000	-
BM#	Established Elevation (m)	Mean Elevation (this date) (m)	Difference (m)	Notes		31				0.0	0.00			0.000	-
BM 79	100.012	100.012	0.001			32				0.0	0.00			0.000	-
BM 68	100.060	100.042	-0.018			33				0.0	0.00			0.000	-
BM 83	99.057	99.039	-0.018			Total Q							0.000	0.0	
Summary					General Notes										
Staff Gauge Reading (m)		n/a													
Stage from WL Survey (m)		96.495													
Pressure Transducer Reading (m)		0.587													
Pressure Transducer Elevation (m)		95.908													
Discharge (m ³ /s)		0.000													
Cross Sectional Area		0.000													
Average Velocity		#DIV/0!													

– Appendix C –

Rating Curves

Figure C-1
TL-2
Stage-Discharge Rating Curve



Notes: Rating period June 10 to September 20, 2015.
Pressure transducer stage readings are referenced to local (non-geodetic) datum.

Figure C-2
TL-3
Stage-Discharge Rating Curve

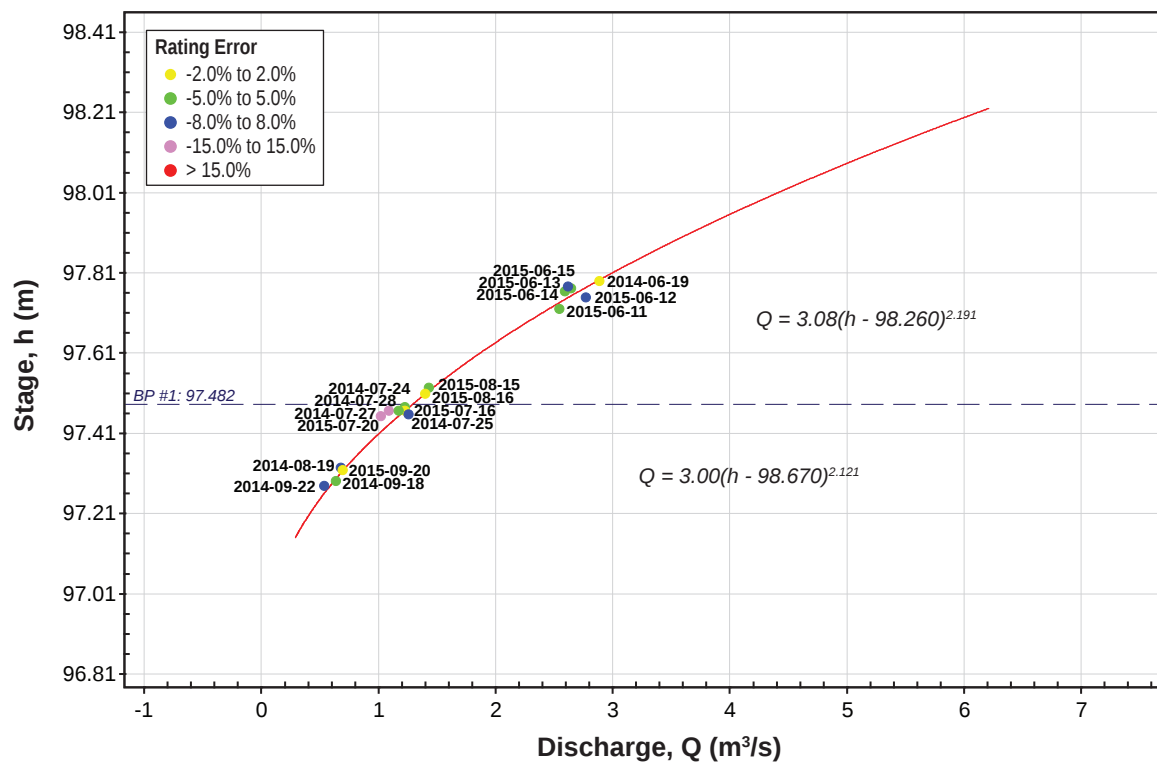
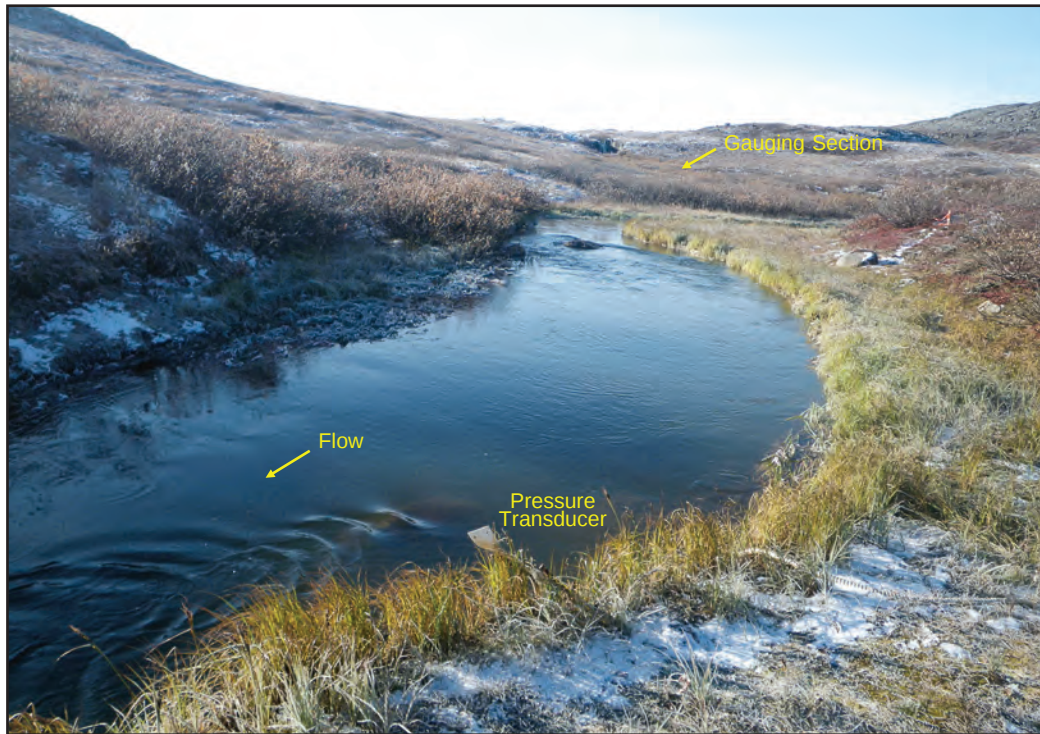
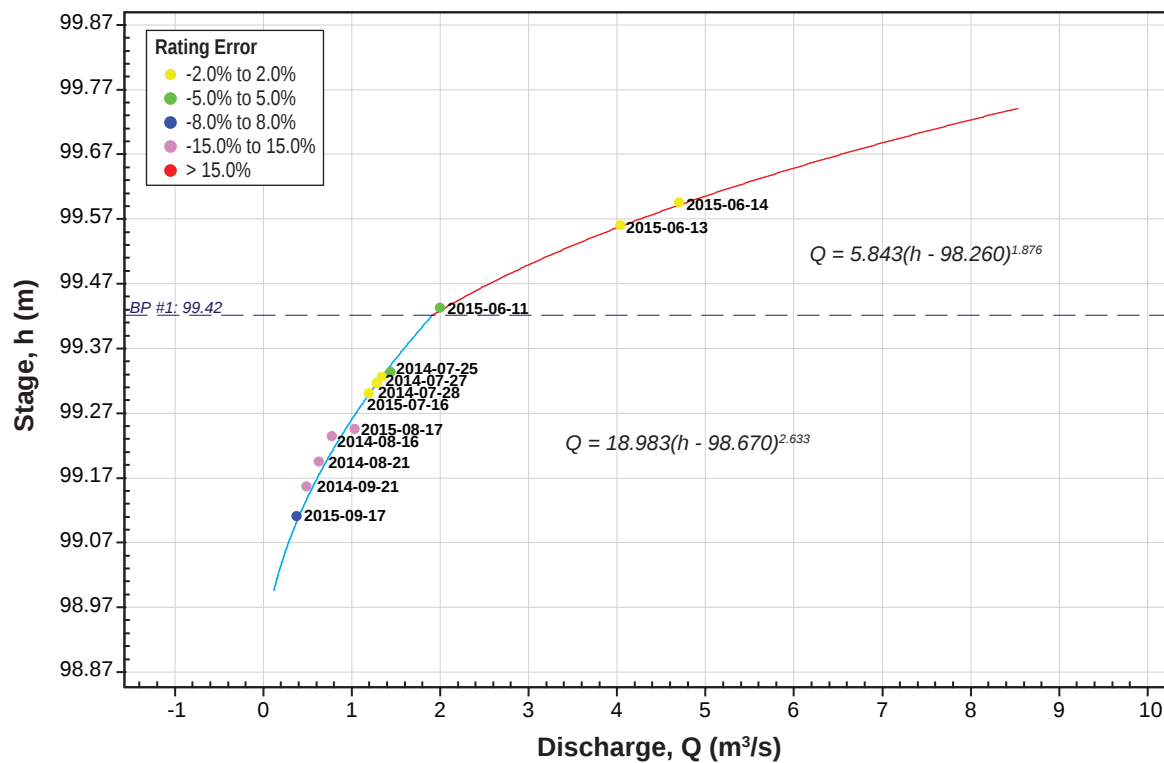


Figure C-3
Roberts Hydro
Stage-Discharge Rating Curve



– Appendix D –

Mean Daily Discharge Tables

Appendix D. Mean Daily Discharge Tables

Summary of Daily Discharge [Q, m³/s] at Hydrometric Station

TL-2, 2015

Drainage Area = 94.6 km²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	0.001	0.390	2.071	3.056	0.954	0.508	0.176	0.063
2	-	-	-	-	0.001	0.472	2.007	2.906	0.946	0.491	0.170	0.061
3	-	-	-	-	0.001	0.572	1.919	2.708	0.942	0.475	0.164	0.059
4	-	-	-	-	0.002	0.694	1.838	2.547	0.933	0.459	0.159	0.057
5	-	-	-	-	0.002	0.841	1.784	2.370	0.922	0.443	0.153	0.055
6	-	-	-	-	0.003	1.020	1.725	2.240	0.915	0.428	0.148	0.053
7	-	-	-	-	0.003	1.236	1.663	2.054	0.904	0.414	0.143	0.051
8	-	-	-	-	0.004	1.498	1.603	1.923	0.878	0.400	0.138	0.050
9	-	-	-	-	0.005	1.816	1.560	1.819	0.867	0.386	0.134	0.048
10	-	-	-	-	0.006	2.201	1.546	1.710	0.855	0.373	0.129	0.046
11	-	-	-	-	0.007	2.352	1.507	1.588	0.824	0.361	0.125	0.045
12	-	-	-	-	0.008	2.543	1.456	1.476	0.786	0.349	0.121	0.043
13	-	-	-	-	0.010	2.697	1.416	1.401	0.771	0.337	0.117	0.042
14	-	-	-	-	0.012	2.758	1.371	1.337	0.760	0.326	0.113	0.040
15	-	-	-	-	0.015	2.719	1.323	1.291	0.755	0.315	0.109	0.039
16	-	-	-	-	0.018	2.695	1.272	1.256	0.753	0.304	0.105	0.038
17	-	-	-	-	0.022	2.628	1.248	1.221	0.748	0.294	0.102	0.036
18	-	-	-	-	0.026	2.579	1.226	1.185	0.746	0.284	0.098	0.035
19	-	-	-	-	0.032	2.571	1.204	1.149	0.744	0.274	0.095	0.034
20	-	-	-	-	0.039	2.583	1.223	1.110	0.723	0.265	0.092	0.033
21	-	-	-	-	0.047	2.567	1.227	1.079	0.716	0.256	0.089	0.032
22	-	-	-	-	0.057	2.514	1.303	1.076	0.692	0.248	0.086	0.031
23	-	-	-	-	0.069	2.474	1.612	1.073	0.668	0.239	0.083	0.030
24	-	-	-	-	0.084	2.406	1.853	1.054	0.646	0.231	0.080	0.029
25	-	-	-	-	0.101	2.348	2.196	1.037	0.624	0.223	0.077	0.028
26	-	-	-	-	0.123	2.307	2.633	1.026	0.603	0.216	0.075	0.027
27	-	-	-	-	0.149	2.271	2.952	1.018	0.583	0.209	0.072	0.026
28	-	-	-	-	0.180	2.221	3.163	1.001	0.563	0.202	0.070	0.025
29	-	-	-	-	0.219	2.176	3.249	0.989	0.544	0.195	0.067	0.024
30	-	-	-	-	0.265	2.121	3.237	0.982	0.526	0.188	0.065	0.023
31	-	-	-	-	0.321	-	3.180	0.980	-	0.182	-	0.023
Mean	-	-	-	-	0.059	2.009	1.857	1.537	0.763	0.319	0.112	0.039
Max	0.000	0.000	0.000	0.000	0.321	2.758	3.249	3.056	0.954	0.508	0.176	0.063
Min	0.000	0.000	0.000	0.000	0.001	0.390	1.204	0.980	0.526	0.182	0.065	0.023
Total	0.000	0.000	0.000	0.000	1.831	60.267	57.566	47.660	22.892	9.876	3.354	1.223

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D. Mean Daily Discharge Tables

Summary of Daily Discharge [Q, m³/s] at Hydrometric Station

TL-3, 2015

Drainage Area = 95.3 km²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	0.001	0.373	2.088	3.230	1.001	0.479	0.167	0.061
2	-	-	-	-	0.001	0.452	2.011	3.061	0.982	0.463	0.162	0.059
3	-	-	-	-	0.001	0.547	1.907	2.864	0.966	0.448	0.156	0.057
4	-	-	-	-	0.002	0.662	1.820	2.694	0.967	0.433	0.151	0.055
5	-	-	-	-	0.002	0.801	1.764	2.518	0.955	0.418	0.146	0.053
6	-	-	-	-	0.003	0.969	1.703	2.397	0.943	0.404	0.141	0.051
7	-	-	-	-	0.003	1.174	1.646	2.214	0.931	0.391	0.137	0.049
8	-	-	-	-	0.004	1.421	1.596	2.104	0.896	0.378	0.132	0.048
9	-	-	-	-	0.005	1.720	1.562	2.005	0.882	0.365	0.128	0.046
10	-	-	-	-	0.006	2.081	1.553	1.903	0.868	0.353	0.123	0.045
11	-	-	-	-	0.007	2.520	1.519	1.780	0.826	0.341	0.119	0.043
12	-	-	-	-	0.008	2.627	1.483	1.667	0.768	0.330	0.115	0.042
13	-	-	-	-	0.010	2.719	1.444	1.626	0.749	0.319	0.111	0.040
14	-	-	-	-	0.012	2.777	1.403	1.547	0.732	0.308	0.108	0.039
15	-	-	-	-	0.015	2.787	1.350	1.493	0.724	0.298	0.104	0.038
16	-	-	-	-	0.018	2.770	1.309	1.428	0.716	0.288	0.101	0.036
17	-	-	-	-	0.021	2.716	1.254	1.365	0.719	0.278	0.097	0.035
18	-	-	-	-	0.026	2.669	1.206	1.310	0.717	0.269	0.094	0.034
19	-	-	-	-	0.031	2.652	1.156	1.253	0.717	0.260	0.091	0.033
20	-	-	-	-	0.038	2.638	1.197	1.196	0.688	0.252	0.088	0.032
21	-	-	-	-	0.046	2.621	1.221	1.150	0.673	0.243	0.085	0.031
22	-	-	-	-	0.055	2.571	1.396	1.151	0.650	0.235	0.082	0.030
23	-	-	-	-	0.067	2.536	1.793	1.152	0.628	0.227	0.079	0.029
24	-	-	-	-	0.081	2.471	1.977	1.123	0.608	0.220	0.077	0.028
25	-	-	-	-	0.098	2.407	2.340	1.108	0.587	0.212	0.074	0.027
26	-	-	-	-	0.119	2.373	2.781	1.094	0.568	0.205	0.072	0.026
27	-	-	-	-	0.144	2.335	3.114	1.081	0.549	0.198	0.069	0.025
28	-	-	-	-	0.174	2.283	3.344	1.059	0.530	0.192	0.067	0.024
29	-	-	-	-	0.210	2.224	3.423	1.051	0.513	0.185	0.065	0.023
30	-	-	-	-	0.255	2.140	3.417	1.040	0.496	0.179	0.063	0.023
31	-	-	-	-	0.308	-	3.354	1.033	-	0.173	-	0.022
Mean	-	-	-	-	0.057	2.034	1.907	1.668	0.752	0.302	0.107	0.038
Max	0.000	0.000	0.000	0.000	0.308	2.787	3.423	3.230	1.001	0.479	0.167	0.061
Min	0.000	0.000	0.000	0.000	0.001	0.373	1.156	1.033	0.496	0.173	0.063	0.022
Total	0.000	0.000	0.000	0.000	1.767	61.033	59.129	51.695	22.550	9.348	3.206	1.181

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D. Mean Daily Discharge Tables

Summary of Daily Discharge [Q, m³/s] at Hydrometric Station

Roberts Hydro, 2015

Drainage Area = 97.9 km²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	0.001	0.347	1.825	2.687	0.691	0.182	0.031	0.006
2	-	-	-	-	0.001	0.419	1.752	2.316	0.661	0.172	0.029	0.005
3	-	-	-	-	0.001	0.506	1.671	2.008	0.646	0.162	0.028	0.005
4	-	-	-	-	0.002	0.611	1.594	1.819	0.629	0.153	0.026	0.005
5	-	-	-	-	0.002	0.738	1.543	1.700	0.615	0.145	0.025	0.004
6	-	-	-	-	0.003	0.891	1.502	1.574	0.599	0.137	0.023	0.004
7	-	-	-	-	0.003	1.076	1.456	1.470	0.576	0.129	0.022	0.004
8	-	-	-	-	0.004	1.300	1.417	1.385	0.560	0.122	0.021	0.004
9	-	-	-	-	0.005	1.569	1.394	1.307	0.550	0.115	0.020	0.004
10	-	-	-	-	0.005	1.895	1.387	1.240	0.535	0.109	0.018	0.003
11	-	-	-	-	0.007	2.289	1.378	1.171	0.543	0.103	0.017	0.003
12	-	-	-	-	0.008	3.162	1.352	1.107	0.481	0.097	0.016	0.003
13	-	-	-	-	0.010	4.085	1.311	1.074	0.451	0.092	0.016	0.003
14	-	-	-	-	0.012	4.746	1.274	1.021	0.429	0.086	0.015	0.003
15	-	-	-	-	0.014	4.842	1.239	0.971	0.426	0.082	0.014	0.002
16	-	-	-	-	0.017	4.708	1.186	0.942	0.420	0.077	0.013	0.002
17	-	-	-	-	0.020	4.381	1.131	0.906	0.405	0.073	0.012	0.002
18	-	-	-	-	0.025	4.036	1.086	0.879	0.382	0.069	0.012	0.002
19	-	-	-	-	0.030	3.824	1.043	0.870	0.361	0.065	0.011	0.002
20	-	-	-	-	0.036	3.672	1.087	0.816	0.341	0.061	0.010	0.002
21	-	-	-	-	0.044	3.515	1.107	0.782	0.322	0.058	0.010	0.002
22	-	-	-	-	0.053	3.310	1.235	0.783	0.304	0.055	0.009	0.002
23	-	-	-	-	0.063	3.114	1.703	0.792	0.287	0.052	0.009	0.002
24	-	-	-	-	0.077	2.896	2.389	0.782	0.271	0.049	0.008	0.001
25	-	-	-	-	0.093	2.653	3.292	0.765	0.256	0.046	0.008	0.001
26	-	-	-	-	0.112	2.501	4.250	0.750	0.242	0.044	0.007	0.001
27	-	-	-	-	0.135	2.367	4.655	0.748	0.228	0.041	0.007	0.001
28	-	-	-	-	0.163	2.219	4.479	0.735	0.216	0.039	0.007	0.001
29	-	-	-	-	0.197	2.076	4.053	0.711	0.204	0.037	0.006	0.001
30	-	-	-	-	0.238	1.918	3.575	0.709	0.192	0.035	0.006	0.001
31	-	-	-	-	0.287	-	3.111	0.713	-	0.033	-	0.001
Mean	-	-	-	-	0.054	2.522	1.983	1.146	0.427	0.088	0.015	0.003
Max	0.000	0.000	0.000	0.000	0.287	4.842	4.655	2.687	0.691	0.182	0.031	0.006
Min	0.000	0.000	0.000	0.000	0.001	0.347	1.043	0.709	0.192	0.033	0.006	0.001
Total	0.000	0.000	0.000	0.000	1.666	75.664	61.478	35.532	12.824	2.714	0.456	0.083

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

– Appendix E –

Lake Water Level Tables

Appendix E. Lake Water Level Tables

Summary of Daily Stage [h, m] at Hydrometric Station

Doris Lake, 2015

Drainage Area = n/a km²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	-	98.408	98.094	-	-	-
2	-	-	-	-	-	-	-	98.391	98.089	-	-	-
3	-	-	-	-	-	-	-	98.374	98.086	-	-	-
4	-	-	-	-	-	-	-	98.357	98.082	-	-	-
5	-	-	-	-	-	-	-	98.341	98.075	-	-	-
6	-	-	-	-	-	-	-	98.322	98.068	-	-	-
7	-	-	-	-	-	-	-	98.308	98.062	-	-	-
8	-	-	-	-	-	-	-	98.294	98.058	-	-	-
9	-	-	-	-	-	-	-	98.275	98.053	-	-	-
10	-	-	-	-	-	-	-	98.257	98.047	-	-	-
11	-	-	-	-	-	-	-	98.243	98.043	-	-	-
12	-	-	-	-	-	-	-	98.231	98.033	-	-	-
13	-	-	-	-	-	-	-	98.222	98.024	-	-	-
14	-	-	-	-	-	-	-	98.210	98.019	-	-	-
15	-	-	-	-	-	-	98.191	98.199	98.016	-	-	-
16	-	-	-	-	-	-	98.184	98.189	98.011	-	-	-
17	-	-	-	-	-	-	98.175	98.177	98.009	-	-	-
18	-	-	-	-	-	-	98.168	98.167	98.007	-	-	-
19	-	-	-	-	-	-	98.157	98.157	-	-	-	-
20	-	-	-	-	-	-	98.161	98.147	-	-	-	-
21	-	-	-	-	-	-	98.162	98.136	-	-	-	-
22	-	-	-	-	-	-	98.178	98.133	-	-	-	-
23	-	-	-	-	-	-	98.231	98.131	-	-	-	-
24	-	-	-	-	-	-	98.264	98.125	-	-	-	-
25	-	-	-	-	-	-	98.305	98.120	-	-	-	-
26	-	-	-	-	-	-	98.354	98.117	-	-	-	-
27	-	-	-	-	-	-	98.388	98.111	-	-	-	-
28	-	-	-	-	-	-	98.413	98.104	-	-	-	-
29	-	-	-	-	-	-	98.425	98.102	-	-	-	-
30	-	-	-	-	-	-	98.424	98.099	-	-	-	-
31	-	-	-	-	-	-	98.418	98.097	-	-	-	-
Mean	-	-	-	-	-	-	98.270	98.211	98.049	-	-	-
Max	0.000	0.000	0.000	0.000	0.000	0.000	98.425	98.408	98.094	0.000	0.000	0.000
Min	0.000	0.000	0.000	0.000	0.000	0.000	98.157	98.097	98.007	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000	0.000	1670.598	3044.546	1764.875	0.000	0.000	0.000

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix E. Lake Water Level Tables

Summary of Daily Stage [h, m] at Hydrometric Station

TIA, 2015

Drainage Area = n/a km²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	-	94.197	93.997	-	-	-
2	-	-	-	-	-	-	-	94.188	93.989	-	-	-
3	-	-	-	-	-	-	-	94.180	93.985	-	-	-
4	-	-	-	-	-	-	-	94.172	93.978	-	-	-
5	-	-	-	-	-	-	-	94.166	93.968	-	-	-
6	-	-	-	-	-	-	-	94.155	93.958	-	-	-
7	-	-	-	-	-	-	-	94.150	93.948	-	-	-
8	-	-	-	-	-	-	-	94.145	93.941	-	-	-
9	-	-	-	-	-	-	-	94.135	93.932	-	-	-
10	-	-	-	-	-	-	-	94.124	93.923	-	-	-
11	-	-	-	-	-	-	-	94.118	93.917	-	-	-
12	-	-	-	-	-	-	-	94.112	93.903	-	-	-
13	-	-	-	-	-	-	-	94.108	93.893	-	-	-
14	-	-	-	-	-	-	-	94.102	93.886	-	-	-
15	-	-	-	-	-	-	94.071	94.095	93.880	-	-	-
16	-	-	-	-	-	-	94.064	94.094	93.873	-	-	-
17	-	-	-	-	-	-	94.055	94.087	93.868	-	-	-
18	-	-	-	-	-	-	94.047	94.080	93.862	-	-	-
19	-	-	-	-	-	-	94.037	94.072	93.863	-	-	-
20	-	-	-	-	-	-	94.042	94.064	-	-	-	-
21	-	-	-	-	-	-	94.042	94.055	-	-	-	-
22	-	-	-	-	-	-	94.059	94.053	-	-	-	-
23	-	-	-	-	-	-	94.115	94.051	-	-	-	-
24	-	-	-	-	-	-	94.146	94.046	-	-	-	-
25	-	-	-	-	-	-	94.176	94.040	-	-	-	-
26	-	-	-	-	-	-	94.206	94.035	-	-	-	-
27	-	-	-	-	-	-	94.215	94.029	-	-	-	-
28	-	-	-	-	-	-	94.218	94.019	-	-	-	-
29	-	-	-	-	-	-	94.215	94.013	-	-	-	-
30	-	-	-	-	-	-	94.209	94.007	-	-	-	-
31	-	-	-	-	-	-	94.204	94.004	-	-	-	-
Mean	-	-	-	-	-	-	94.125	94.094	93.924	-	-	-
Max	0.000	0.000	0.000	0.000	0.000	0.000	94.218	94.197	93.997	0.000	0.000	0.000
Min	0.000	0.000	0.000	0.000	0.000	0.000	94.037	94.004	93.862	0.000	0.000	0.000
Total	0.000	0.000	0.000	0.000	0.000	0.000	1600.122	2916.899	1784.563	0.000	0.000	0.000

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.