APPENDIX 6.5-C
Knight Piésold Surface Water Hydrology Flow Changes Letter

Knight Piésold
CONSULTING

TRANSMITTAL

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TO: Avanti Kitsault Mine Ltd
880 - 580 Hornby Street
Vancouver, BC V6C 3B6

DATE: November 2, 2011

FILE NO.: VA101-343/9-A.01

ATTENTION: Mr. Craig Nelsen

CONT. NO.: VA11-01523

RE: Hydrology, Hydrogeology, Climatology & Environmental Assessment

ITEM NO.	DESCRIPTION
1.	1 PDF – Letter KITSAULT MINE PROJECT - SURFACE WATER HYDROLOGY FLOW CHANGES VA11-00964_v2 July 5, 2011

REMARKS:

Signed: Michael Coutts

Approved: for Erin Rainey

Knight Piésold
CONSULTING

File No.:VA101-343/9-A.01
Cont. No.:VA11-00964

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July 5, 2011

Mr. Craig Nelsen
President & CEO
Avanti Kitsault Mine Ltd
880 - 580 Hornby Street
Vancouver, BC V6C 3B6

Dear Craig,

Re: Kitsault Mine Project – Surface Water Hydrology Flow Changes

INTRODUCTION

Knight Piésold Ltd. (KP) has completed an assessment of the potential impacts to surface water hydrology as a result of the construction and operation of the Tailings Management Facility (TMF) and Open Pit for the Kitsault Project. Potential flow changes were estimated for Lime Creek, Clary Creek, Lake 901 inlet and outlet, Clary Lake inlet and outlet, and the Illiance River. Flow changes were assessed based on the comparison of estimated baseline conditions to the flow conditions for: construction, Year 13 and Year 15 of operations, closure and post-closure. The purpose of this letter is to provide information to AMEC Environmental to assist in their evaluation of the effects to freshwater fisheries as a result of potential surface water flow changes.

Changes in the lake levels for Lake 901 and Clary Lake are discussed in the KP letter "Lake Level Fluctuations in Clary Lake and Lake 901" (Knight Piésold, 2011a).

METHODOLOGY

Monthly Flow

A watershed model was developed to estimate the baseline long-term surface water and groundwater flow patterns in the project area (Knight Piésold, 2011b). The model was calibrated to available stream flow records in the Kitsault mine project area. The key mine structures for each stage of the project were then superimposed on the modeled sub-catchments to assess the expected flow changes due to the proposed mine development.

Figure 1 presents the locations for which monthly flow values were estimated by the watershed model. The monthly and annual average flow values for all nodes for each period of the mine life are included in Appendix A. This discussion will focus on the potential flow reductions at the following six nodes, as these locations were deemed most vital in terms of effects to freshwater fisheries. The six locations are:

- Lower Lime Creek near the mouth (LCK-H2)
- Clary Creek (CCK-H1.5), which is a tributary to Clary Lake at a point downstream of the confluence of the Lake 901 outlet creek (CCK-H1) and the Lake 493 outlet creek (493-OUT)
- Clary Creek at the outlet of Clary Lake (CCK-H2)
- Inlet of Lake 901(901-IN)
- Outlet of Lake 901 (901-OUT), and
- Illiance River downstream of the confluence of Illiance River and Clary Creek (CCK-H3).

7-Day Low Flow and Peak Instantaneous Flow

In addition to changes in monthly flow, changes to 7-day low flows and peak instantaneous flows were estimated for five locations within the Kitsault Project area. The five locations are:

- Lime Creek below the Patsy Creek/Lime Creek confluence (LCK-H1)
- Lower Lime Creek near the mouth (LCK-H2)
- Clary Creek at the outlet of Clary Lake (CCK-H2)
- Clary Creek near the mouth (CCK-H3), and
- Illiance River downstream of the confluence with Clary Creek (Illiance R).

The baseline 7-day low flow and peak instantaneous flow values were derived from a regional hydrologic model developed by Obedkoff (2001), which presents 7-day 10-year low flow (7Q10) and 10-year peak instantaneous discharge estimates for both the Lime and Patsy Creek Water Survey of Canada (WSC) stations. Scaling factors were used to adjust the 10-year estimates to other return periods, for both the peak and low flow estimates. Area proration of these Lime Creek extreme flow values provided the basis for estimating flows at both LCK-H1 and LCK-H2, while a similar area proration of the Patsy Creek extreme flow values was used to develop flow estimates for CCK-H2, CCK-H3, and the Illiance River. More details of how the peak and low flows were derived using the information in Obedkoff can be found in the KP "Engineering Hydrometeorology Report" (Knight Piésold, 2011c). For construction, operations, closure and post-closure conditions, the peak and low flow return period values were scaled from the baseline estimates according to effective changes in drainage area.

WATER MANAGEMENT

The Water Management Plan for the Kitsault project is outlined in the report "Water Management", (Knight Piésold, 2011d). Numerous design elements were included to achieve the objectives of the site wide water management plan. The major design elements that have the largest potential for affecting downstream flows, in addition to the TMF and Open Pit, are briefly described below:

- South diversion channel: This channel will divert flow from a large portion of the Patsy Creek catchment around the TMF and East Waste Rock Management Facility (WRMF) to Patsy Creek, downstream of the East WRMF.
- Patsy Creek diversion: This diversion will transfer Patsy Creek flows from the South diversion channel along a bench on the south wall of the Open Pit to Lime Creek.

The diversion channels were assumed to have an approximate efficiency of 85% due to leakage losses from the channels and flow from the upslope catchments passing under the channels.

At Year 15 of operations, low grade ore will begin to be processed and the Open Pit will begin to fill. The filling of the Open Pit is assumed to be the worst-case-scenario for flow reductions within Lime Creek, as water that was previously discharged to Lime Creek will be directed to the Open Pit filling. Three potential scenarios for the Patsy Creek diversion were explored through this analysis, as follows:

- Scenario A – The Patsy Creek diversion is maintained and the TMF excess water is discharged directly to Lime Creek (consistent with the Water Management Plan). The Open Pit filling inputs are direct precipitation, and discharge from the South water management pond and the LG stockpile sediment control pond.
- Scenario B – The Patsy Creek diversion is maintained and the TMF excess water is discharged into the Open Pit.
- Scenario C – The Patsy Creek diversion channel is breached and the TMF excess water is discharged into the Open Pit, therefore filling the Open Pit at a faster rate than with Scenario B.

During the closure phase, which extends from the end of mining operations to when the Open Pit has been filled, the South Diversion channel will continue to divert water around the TMF and East WRMF to Patsy Creek, and the Patsy Creek diversion will continue to direct water around the Open Pit into Lime Creek (for Scenarios A and B). During post-closure, the Open Pit will be fully flooded and the overflow water will be released to Lime Creek. The Patsy Creek diversion will be decommissioned; however the lower portion of the South diversion channel will be maintained to divert runoff around the East WRMF into perpetuity.

POTENTIAL FLOW CHANGES

The monthly and annual percentage flow changes from baseline conditions for the six locations are presented in Tables 1 through 6. These tables include the monthly average, minimum and maximum percent flow change for each of the following time periods during the mine life:

- Baseline (pre-mine)
- Construction
- Year 13
- Year 15
- Closure, and
- Post Closure.

The Year 15 A, B, and C scenarios only affect the flow values in Lime Creek, and are therefore only presented in Table 1. The monthly average, minimum, maximum, 10th percentile, 25th percentile, 75th percentile, and 90th percentile flow values are presented in Appendix A. The following sections describe the potential flow changes for the average monthly results for the six key locations.

Lime Creek

The average monthly and annual flow changes from baseline conditions in Lime Creek at LCK-H2 are summarized in Table 1 for construction, operations (Year 13 and 15), closure and post-closure conditions. The monthly flow reductions vary seasonally around the mean annual value depending on variations in the relative contributions of flows from different areas of the Lime Creek basin. For example, the Patsy Creek basin, where most of the mine facilities are located, is in the higher elevation areas of the Lime Creek basin where the snowpack tends to be greatest, and therefore the freshet flows are reduced to a greater extent in Lime Creek compared to the late summer and winter low flows because the higher elevation areas contribute proportionally more runoff during the freshet months.

Monthly and annual flow changes for the Year 15 scenarios A, B and C are also included in Table 1. Scenario C is the worst-case scenario in terms of flow reductions in Lime Creek because less flow is being diverted around the Open Pit to Lime Creek compared to scenarios A and B. However, the scenario C flow reductions will likely be shorter in duration than scenarios A and B because the Open Pit will fill faster under Scenario C, and once the pit is full it will commence discharging into Lime Creek.

The annual flow change at closure is slightly less than the change during construction and end of operations because the reclamation of some disturbed areas will include the reinstatement of some natural flow paths into Lime Creek. In post-closure, the flow is greater than baseline conditions because of flow contributions from the Open Pit lake and the TMF lake.

Clary Creek

The annual flow changes in Clary Creek at the tributary inlet (CCK-H1.5) and Clary Creek near the Clary Lake outlet (CCK-H2) are respectively summarized in Table 2 and Table 3, for construction, operations (Year 13 and 15), closure and post-closure conditions.

The flow reductions at the tributary inlet to Clary Lake commence during the construction period and are similar in magnitude throughout operations due to the loss of inflow area to Lake 901. In closure, the flow reductions decrease because pumping operations from the North water management ponds' are decommissioned and pond overflow is directed to Lake 901.

Flow reductions at the outlet of Clary Lake are greatest during operations due to the constant freshwater withdrawal required to support mining operations. During operations, flow reductions are greatest during the winter low flow months because at this time of year most of the water is trapped in the snowpack and there is very little inflow to the lake, while at the same time the constant freshwater withdrawal is maintained.

Lake 901

The flow reductions at the main inlet (901-IN) and main outlet (901-OUT) of Lake 901 are summarized in Table 4 and Table 5, respectively.

Table 4 presents the total inlet flow to Lake 901 during baseline conditions, which is contributed from two main inlets to the lake, inlet 901 and inlet 887, as shown on AMEC's figure "Interim Locator Point Map 1, Stream Affected by Footprint", included in Appendix B. For baseline conditions, the total contributing area to the Lake 901 inlet is split approximately 63% and 37% between inlet 901 and inlet 887, respectively. After the mine development, the ratio of contributing area from inlet 901 and inlet 887 changes to approximately 45% and 55%, respectively. The total contributing area to Lake 901 at the outlet is reduced up to 52% from baseline conditions due to the mine development. The resulting flow reductions are summarized in Table 4. In closure and post-closure, the flow reductions decrease because additional water contributes to the inlet from the overflow of the north water management ponds.

In an attempt to mitigate the flow reductions in Lake 901, water will be diverted from neighbouring Lake 493 to Lake 901. The diverted flow volume from Lake 493 was assumed to maintain the baseline volume of Lake 901; therefore the outlet flows from Lake 901 do not change during construction and operations, as shown in Table 5. The seepage collection system at the TMF will be decommissioned at the end of operations, and therefore during closure and post-closure the outlet flow increases from baseline conditions due to this combined with overflow from the northeast water management ponds. This is especially evident in the winter low flow months, as the seepage flows contribute to Lake 901 at a constant rate.

The resulting monthly flow values at the outlet of Lake 493 due to this diversion are included in Appendix A. The proposed diversion from Lake 493 may also function as a fish compensation to replace the spawning habitat lost at the two main inlet channels of Lake 901. Further details of the fish compensation and mitigation flows from Lake 493 are included in the KP letter "Fish Habitat Compensation Channel", (Knight Piésold, 2011e).

Illiance River

Although flows in much of the Illiance River (see Figure 1) will not change throughout the life of the mine, Illiance River flows were determined from the watershed model to better understand flow changes downstream of the confluence of the Illiance River and Clary Creek (CCK-H3). Predicted flows from CCK-H3 for each mining scenario were added to Illiance River average monthly flows in order to calculate

the percentage change in flows downstream of the confluence of the Illiance River and Clary Creek. Node CCK-H3 is located on Clary Creek, upstream of the confluence. Table 6 presents the monthly and annual flow changes downstream of the confluence of the Illiance River and Clary Creek.

7-Day Low Flow and Peak Instantaneous Flow

The 7-day low flow and peak instantaneous flow values for various return periods for locations in Lime Creek, Clary Creek and the Illiance River are summarized in Tables 7 through 11. The return period low flow and peak flow estimates for each phase in the mine life were scaled from the baseline values based on drainage area. Therefore, with a drainage area reduction or increase the corresponding low flow and peak flow estimates decrease or increase correspondingly.

REFERENCES

Knight Piésold (2011a). *Lake Level Fluctuations in Clary Lake and Lake 901*. Ref no. VA11-00965, July 2011.

Knight Piésold (2011b). *Avanti Kitsault Mine Ltd., Kitsault Project – Hydrogeology and Watershed Model*. Ref. No. VA101-343/9-3 Rev 0, June 2011.

Knight Piésold (2011c). *Avanti Kitsault Mine Ltd., Kitsault Project – Engineering Hydrometeorology Report*. Ref no. VA101-343/9-1 Rev 1, January 2011.

Knight Piésold (2011d). *Avanti Kitsault Mine Ltd., Kitsault Project – Water Management*. Ref no. VA101-343/9-4 Rev 1, June 2011.

Knight Piésold (2011e). *Fish Habitat Compensation Channel*. Ref no. VA11-00966, July 2011.

Obedkoff, W. (2001). *Streamflow in the Skeena Region*. British Columbia Ministry of Environment, Resources Inventory Branch, Water Inventory Section. June 2001.

We trust that this letter meets your current requirements. Should any questions or further clarification be required, please contact the undersigned.

Yours truly,
KNIGHT PIESOLD LTD.

Signed:
Erin Rainey, P.Eng.
Project Engineer

Reviewed:
Jaime Cathcart, Ph.D., P.Eng.
Specialist Hydrotechnical Engineer

Ken Brouwer, P.Eng.
Managing Director

Attachments:

Table 1 Rev 0	Surface Water Hydrology Flow Changes – Lime Creek (Node LCK-H2)
Table 2 Rev 0	Surface Water Hydrology Flow Changes – Clary Creek (Node CCK-H1.5)
Table 3 Rev 0	Surface Water Hydrology Flow Changes – Clary Creek (Node CCK-H2)
Table 4 Rev 0	Surface Water Hydrology Flow Changes – Lake 901 at Inlet (Node 901-IN)
Table 5 Rev 0	Surface Water Hydrology Flow Changes – Lake 901 at Outlet (Node 901-OUT)
Table 6 Rev 0	Surface Water Hydrology Flow Changes – Illiance River downstream of confluence with Clary Creek (Node Illiance River)
Table 7 Rev 0	Return Period Low Flow and Peak Flow Discharges – LCK-H1
Table 8 Rev 0	Return Period Low Flow and Peak Flow Discharges – LCK-H2
Table 9 Rev 0	Return Period Low Flow and Peak Flow Discharges – CCK-H2
Table 10 Rev 0	Return Period Low Flow and Peak Flow Discharges – CCK-H3
Table 11 Rev 0	Return Period Low Flow and Peak Flow Discharges – Illiance River
Figure 1 Rev 0	Watershed Model Streamflow Nodes
Appendix A	Monthly Surface Water Flows
Appendix B	AMEC figure – Interim Locator Point Map 1, Stream Affected by Footprint

Copy To: Shane Uren (Avanti Kitsault Mine Ltd)
Brad Horne (AMEC Earth & Environmental Limited (Burnaby))

/er

Knight Piésold
CONSULTING

TABLE 1

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
LIME CREEK (NODE LCK-H2)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	0.36	0.40	0.74	1.87	4.15	4.18	3.20	2.18	2.17	2.74	1.11	0.49	1.97
	Minimum	m^3/s	0.21	0.18	0.18	0.24	1.28	0.80	0.45	1.11	0.55	0.43	0.33	0.27	0.18
	Maximum	m^3/s	0.75	3.02	2.69	3.80	6.23	7.64	6.47	4.42	5.26	7.90	5.23	1.79	7.90
Construction: Phase 1	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 2 & 3	Average	%	9%	-19%	-16%	-20%	-25%	-26%	-22%	-17%	-17%	-17%	-9%	2%	-20%
	Minimum	%	-29%	-27%	-29%	-19%	-27%	-19%	-20%	-22%	-22%	-31%	-28%	-28%	-29%
	Maximum	%	-9%	-8%	-10%	-20%	-26%	-18%	-15%	-16%	-15%	-9%	-8%	-13%	-9%
Yr 13	Average	%	-8%	-8%	-9%	-14%	-19%	-18%	-12%	-9%	-11%	-13%	-4%	-5%	-14%
	Minimum	%	-26%	-23%	-9%	-3%	-2%	-6%	-6%	-20%	0%	-28%	-26%	-26%	-21%
	Maximum	%	-7%	-6%	-8%	-8%	-21%	-6%	-6%	0%	-3%	-8%	-7%	-8%	-8%
Yr 15 A	Average	%	-18%	-18%	-17%	-22%	-26%	-25%	-17%	-13%	-15%	-21%	-13%	-15%	-20%
	Minimum	%	-29%	-27%	-28%	-20%	-9%	-12%	-16%	-22%	-21%	-31%	-28%	-28%	-28%
	Maximum	%	-10%	-16%	-20%	-24%	-28%	-14%	-14%	-6%	-9%	-20%	-17%	-13%	-17%
Yr 15 B	Average	%	-23%	-20%	-18%	-22%	-26%	-25%	-20%	-17%	-19%	-23%	-22%	-23%	-23%
	Minimum	%	-29%	-27%	-28%	-20%	-9%	-12%	-16%	-22%	-21%	-31%	-28%	-28%	-28%
	Maximum	%	-17%	-16%	-20%	-24%	-28%	-17%	-18%	-12%	-14%	-20%	-23%	-13%	-20%
Yr 15 C	Average	%	-27%	-23%	-20%	-25%	-32%	-34%	-30%	-26%	-26%	-29%	-26%	-27%	-29%
	Minimum	%	-29%	-27%	-32%	-22%	-31%	-22%	-23%	-22%	-29%	-31%	-28%	-28%	-32%
	Maximum	%	-17%	-19%	-24%	-29%	-33%	-31%	-34%	-31%	-30%	-28%	-30%	-13%	-28%
Closure	Average	%	-18%	-17%	-18%	-21%	-24%	-20%	-13%	-8%	-13%	-18%	-8%	-5%	-17%
	Minimum	%	-28%	-26%	-28%	-19%	-8%	-12%	-15%	-21%	-20%	-30%	-28%	-28%	-28%
	Maximum	%	9%	-15%	-19%	-11%	-26%	-11%	-11%	-1%	-5%	-19%	-13%	-13%	-14%
Post Closure	Average	%	-8%	-5%	1%	2%	3%	5%	3%	-2%	0%	3%	4%	-4%	2%
	Minimum	%	-9%	-7%	-8%	-5%	0%	-10%	-15%	-8%	4%	-8%	-10%	-10%	-8%
	Maximum	%	-3%	2%	3%	4%	5%	4%	5%	1%	1%	3%	4%	-1%	3%

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NOTES:

1. THE PERCENT FLOW CHANGE IS ESTIMATED BY THE FORMULA $(Q - Q_{PREMINE}) / Q_{PREMINE}$, WHERE Q = FLOW IN EACH SCENARIO.
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE MONTHLY FLOW VALUES AND PERCENT CHANGES REPRESENT THE AVERAGE, MINIMUM OR MAXIMUM FOR A GIVEN MONTH BASED ON THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.
4. THE ANNUAL FLOW VALUES AND PERCENT CHANGES REPRESENT THE AVERAGE, MINIMUM OR MAXIMUM BASED ON ALL MONTHS FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.
5. CONSTRUCTION PHASE 1: WATER IS BEING PUMPED TO LIME CREEK FROM BEHIND TEMPORARY COFFERDAMS, FLOWS ASSUMED TO BE MAINTAINED AT BASELINE LEVELS.
6. CONSTRUCTION PHASE 2 & 3: WATER IS STORED BEHIND THE SOUTH EMBANKMENT.
7. SCENARIO A: PATSY CREEK DIVERSION CHANNEL IS MAINTAINED, TMF EXCESS WATER IS BEING DISCHARGED TO LIME CREEK.
8. SCENARIO B: PATSY CREEK DIVERSION IS MAINTAINED, TMF EXCESS WATER IS BEING DISCHARGED INTO OPEN PIT.
9. SCENARIO C: PATSY CREEK DIVERSION IS BREACHED, TMF EXCESS WATER IS BEING DISCHARGED INTO THE OPEN PIT.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold CONSULTING

TABLE 2

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
CLARY CREEK (NODE CCK-H1.5)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	0.07	0.05	0.10	0.38	1.09	1.10	0.69	0.39	0.41	0.64	0.23	0.10	0.44
	Minimum	m^3/s	0.03	0.02	0.02	0.02	0.24	0.10	0.07	0.13	0.11	0.11	0.07	0.05	0.02
	Maximum	m^3/s	0.10	0.44	0.63	0.91	1.75	1.85	1.69	1.01	1.21	1.87	1.39	0.18	1.87
Construction: Phase 1 & 2	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 3	Average	%	-21%	-21%	-23%	-25%	-24%	-22%	-18%	-16%	-18%	-22%	-23%	-22%	-21%
	Minimum	%	-20%	-19%	-19%	-19%	-17%	-18%	-16%	-17%	-20%	-18%	-21%	-20%	-19%
	Maximum	%	-22%	-24%	-24%	-25%	-25%	-23%	-23%	-18%	-20%	-24%	-24%	-23%	-24%
Yr 13	Average	%	-20%	-20%	-22%	-24%	-24%	-22%	-18%	-15%	-18%	-22%	-23%	-22%	-21%
	Minimum	%	-16%	-13%	-11%	-13%	-17%	-18%	-15%	-17%	-19%	-17%	-19%	-18%	-11%
	Maximum	%	-22%	-24%	-24%	-25%	-25%	-23%	-23%	-18%	-20%	-24%	-24%	-23%	-24%
Yr 15	Average	%	-20%	-20%	-22%	-24%	-24%	-22%	-18%	-15%	-18%	-22%	-23%	-22%	-21%
	Minimum	%	-16%	-13%	-11%	-13%	-17%	-18%	-15%	-17%	-19%	-17%	-19%	-18%	-11%
	Maximum	%	-22%	-24%	-24%	-25%	-25%	-23%	-23%	-18%	-20%	-24%	-24%	-23%	-24%
Closure	Average	%	9%	12%	-4%	-16%	-20%	-17%	-12%	-7%	-10%	-16%	-10%	2%	-14%
	Minimum	%	26%	47%	60%	57%	-7%	1%	7%	2%	0%	-3%	2%	12%	60%
	Maximum	%	10%	-16%	-17%	-19%	-21%	-19%	-18%	-12%	-15%	-19%	-18%	5%	-19%
Post Closure	Average	%	9%	12%	-4%	-16%	-20%	-17%	-12%	-7%	-10%	-16%	-10%	2%	-14%
	Minimum	%	26%	47%	60%	57%	-7%	1%	8%	2%	0%	-3%	2%	12%	60%
	Maximum	%	10%	-16%	-16%	-19%	-21%	-19%	-18%	-12%	-15%	-19%	-18%	5%	-19%

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20110704.xlsx]CCK-H1.5

NOTES:

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4. THE ANNUAL FLOW VALUES AND PERCENT CHANGES REPRESENT THE AVERAGE, MINIMUM OR MAXIMUM BASED ON ALL MONTHS FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.
5. CONSTRUCTION PHASE 1 & 2: BASELINE CONDITIONS, NO CHANGE IN FLOWS.
6. CONSTRUCTION PHASE 3: NORTH EMBANKMENT IS CONSTRUCTED, BEGINS TO STORE WATER; NORTHEAST WATER MANAGEMENT PONDS BEING CONSTRUCTED.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold CONSULTING

TABLE 3

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
CLARY CREEK (NODE CCK-H2)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	0.23	0.18	0.33	1.15	3.44	3.76	2.73	1.78	1.70	2.13	0.78	0.35	1.55
	Minimum	m^3/s	0.12	0.08	0.07	0.07	0.90	0.53	0.33	0.77	0.46	0.42	0.26	0.17	0.07
	Maximum	m^3/s	0.36	1.37	1.97	2.84	5.56	6.17	5.63	3.82	4.30	5.87	4.39	0.62	6.17
Construction: Phase 1 & 2	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 3	Average	%	-6%	-6%	-7%	-8%	-8%	-6%	-5%	-3%	-4%	-7%	-7%	-6%	-6%
	Minimum	%	-5%	-5%	-5%	-5%	-4%	-4%	-4%	-3%	-5%	-5%	-5%	-5%	-5%
	Maximum	%	-7%	-8%	-8%	-8%	-8%	-7%	-7%	-5%	-6%	-7%	-8%	-7%	-7%
Yr 13	Average	%	-21%	-24%	-17%	-11%	-9%	-7%	-6%	-5%	-6%	-8%	-11%	-16%	-8%
	Minimum	%	-32%	-43%	-48%	-49%	-8%	-10%	-13%	-7%	-12%	-12%	-18%	-24%	-49%
	Maximum	%	-16%	-10%	-9%	-9%	-8%	-7%	-8%	-6%	-6%	-8%	-8%	-12%	-7%
Yr 15	Average	%	-21%	-24%	-17%	-11%	-9%	-7%	-6%	-5%	-6%	-8%	-11%	-16%	-8%
	Minimum	%	-32%	-43%	-49%	-49%	-8%	-10%	-13%	-7%	-12%	-12%	-18%	-24%	-49%
	Maximum	%	-16%	-10%	-9%	-9%	-8%	-7%	-8%	-6%	-6%	-8%	-8%	-12%	-7%
Closure	Average	%	2%	3%	-1%	-5%	-6%	-5%	-3%	-2%	-3%	-5%	-3%	0%	-4%
	Minimum	%	7%	12%	15%	16%	-2%	0%	2%	0%	0%	-1%	1%	3%	16%
	Maximum	%	3%	-5%	-5%	-6%	-7%	-6%	-6%	-3%	-4%	-6%	-6%	1%	-6%
Post Closure	Average	%	2%	3%	-1%	-5%	-6%	-5%	-3%	-2%	-3%	-5%	-3%	0%	-4%
	Minimum	%	7%	12%	15%	16%	-2%	0%	2%	0%	0%	-1%	1%	3%	16%
	Maximum	%	3%	-5%	-5%	-6%	-7%	-6%	-6%	-3%	-4%	-6%	-6%	1%	-6%

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20110704.xlsx]CCK-H2

NOTES:

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6. CONSTRUCTION PHASE 3: NORTH EMBANKMENT IS CONSTRUCTED, BEGINS TO STORE WATER; NORTHEAST WATER MANAGEMENT PONDS BEING CONSTRUCTED.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold CONSULTING

TABLE 4

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
LAKE 901 AT INLET (NODE 901-IN)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	0.02	0.02	0.03	0.12	0.35	0.34	0.20	0.10	0.11	0.19	0.07	0.03	0.13
	Minimum	m^3/s	0.01	0.01	0.00	0.01	0.08	0.03	0.02	0.04	0.03	0.03	0.02	0.01	0.00
	Maximum	m^3/s	0.03	0.13	0.18	0.29	0.58	0.60	0.54	0.31	0.36	0.55	0.41	0.06	0.60
Construction: Phase 1 & 2	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 3	Average	%	-67%	-69%	-79%	-79%	-75%	-71%	-63%	-61%	-66%	-74%	-76%	-69%	-71%
	Minimum	%	-65%	-65%	-69%	-63%	-49%	-63%	-58%	-59%	-69%	-62%	-66%	-65%	-69%
	Maximum	%	-69%	-84%	-82%	-77%	-75%	-74%	-73%	-63%	-68%	-80%	-82%	-72%	-74%
Yr 13	Average	%	-65%	-65%	-76%	-78%	-75%	-70%	-63%	-60%	-66%	-73%	-76%	-68%	-71%
	Minimum	%	-52%	-44%	-40%	-44%	-49%	-61%	-54%	-58%	-67%	-60%	-61%	-58%	-40%
	Maximum	%	-69%	-84%	-82%	-76%	-75%	-74%	-73%	-63%	-68%	-80%	-82%	-72%	-74%
Yr 15	Average	%	-65%	-65%	-76%	-78%	-75%	-70%	-63%	-60%	-66%	-73%	-76%	-68%	-71%
	Minimum	%	-52%	-45%	-41%	-44%	-49%	-61%	-54%	-58%	-67%	-60%	-61%	-58%	-41%
	Maximum	%	-69%	-84%	-82%	-76%	-75%	-74%	-73%	-63%	-68%	-80%	-82%	-72%	-74%
Closure	Average	%	29%	40%	-13%	-51%	-62%	-55%	-41%	-27%	-39%	-54%	-31%	5%	-46%
	Minimum	%	87%	159%	224%	195%	-20%	3%	27%	1%	1%	-9%	8%	39%	224%
	Maximum	%	34%	-55%	-57%	-58%	-63%	-61%	-58%	-44%	-49%	-65%	-63%	15%	-61%
Post Closure	Average	%	29%	40%	-13%	-51%	-62%	-55%	-41%	-27%	-39%	-54%	-31%	5%	-46%
	Minimum	%	87%	159%	224%	195%	-20%	3%	27%	1%	1%	-9%	8%	39%	224%
	Maximum	%	34%	-55%	-57%	-58%	-63%	-61%	-58%	-44%	-49%	-65%	-63%	15%	-61%

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20110704.xlsx]Lake 901 In

NOTES:

1. THE PERCENT FLOW CHANGE IS ESTIMATED BY THE FORMULA $(Q - Q_{PREMINE}) / Q_{PREMINE}$; WHERE Q = FLOW IN EACH SCENARIO.
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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold CONSULTING

TABLE 5

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
LAKE 901 AT OUTLET (NODE 901-OUT)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	m^3/s	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	m^3/s	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
Construction: Phase 1 & 2	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 3	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Yr 13	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Yr 15	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Closure	Average	%	24%	39%	18%	1%	0%	0%	0%	1%	0%	0%	0%	7%	1%
	Minimum	%	80%	147%	195%	168%	0%	3%	27%	0%	1%	0%	7%	36%	195%
	Maximum	%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%
Post Closure	Average	%	24%	39%	18%	1%	0%	0%	0%	1%	0%	0%	0%	7%	1%
	Minimum	%	80%	147%	195%	168%	0%	3%	27%	0%	1%	0%	7%	36%	195%
	Maximum	%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20110704.xlsx]Lake 901 Out

NOTES:

1. THE PERCENT FLOW CHANGE IS ESTIMATED BY THE FORMULA $(Q - Q_{PREMINE}) / Q_{PREMINE}$; WHERE Q = FLOW IN EACH SCENARIO.
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REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold CONSULTING

TABLE 6

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

SURFACE WATER HYDROLOGY FLOW CHANGES
ILLIANCE RIVER DOWNSTREAM OF CONFLUENCE WITH CLARY CREEK (NODE ILLIANCE RIVER)

05/07/2011 12:33

Scenario	Description	Units	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pre-mine	Average	m^3/s	1.04	0.81	1.23	8.92	23.39	20.85	13.12	4.93	6.05	8.88	2.67	1.56	7.79
	Minimum	m^3/s	0.89	0.65	0.83	7.43	20.13	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.65
	Maximum	m^3/s	1.21	2.74	3.37	10.98	25.81	23.96	16.75	7.25	9.18	13.99	7.36	2.03	25.81
Construction: Phase 1 & 2	Average	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Minimum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Maximum	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction: Phase 3	Average	%	-1%	-1%	-2%	-1%	-1%	-1%	-1%	-1%	-1%	-2%	-2%	-1%	-1%
	Minimum	%	-1%	-1%	0%	0%	0%	0%	0%	-1%	0%	0%	-1%	-1%	-1%
	Maximum	%	-2%	-4%	-4%	-2%	-2%	-2%	-2%	-3%	-3%	-3%	-4%	-2%	-2%
Yr 13	Average	%	-5%	-5%	-5%	-1%	-1%	-1%	-1%	-2%	-2%	-2%	-3%	-4%	-2%
	Minimum	%	-4%	-6%	-4%	0%	0%	0%	0%	-1%	-1%	-1%	-2%	-3%	-6%
	Maximum	%	-4%	-5%	-5%	-2%	-2%	-2%	-3%	-3%	-3%	-3%	-5%	-3%	-2%
Yr 15	Average	%	-5%	-5%	-5%	-1%	-1%	-1%	-1%	-2%	-2%	-2%	-3%	-4%	-2%
	Minimum	%	-4%	-6%	-4%	0%	0%	0%	0%	-1%	-1%	-1%	-2%	-3%	-6%
	Maximum	%	-4%	-5%	-5%	-2%	-2%	-2%	-3%	-3%	-3%	-3%	-5%	-3%	-2%
Closure	Average	%	1%	1%	0%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	0%	-1%
	Minimum	%	1%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
	Maximum	%	0%	-2%	-3%	-2%	-1%	-1%	-2%	-2%	-2%	-3%	-3%	0%	-1%
Post Closure	Average	%	1%	1%	0%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	0%	-1%
	Minimum	%	1%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
	Maximum	%	0%	-2%	-3%	-2%	-1%	-1%	-2%	-2%	-2%	-3%	-3%	0%	-1%

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20110704.xlsx]Illiance River

NOTES:

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0	05JUL'11	ISSUED WITH LETTER VA11-00964	ER	VM	KJB

Knight Piésold
CONSULTING

TABLE 7

AVANTI KITSAULT MINE LTD.
KITSAULT PROJECT

RETURN PERIOD LOW FLOW AND PEAK FLOW DISCHARGES
LCK-H1

Print Jun/27/11 10:26:08

Period	DA (km^2)	Return Period 7-Day Low Flow Discharge (m^3/s)					
		Mean	5 year	10 year	20 year	50 year	100 year
Baseline	25.1	0.11	0.07	0.05	0.04	0.03	0.02
Construction and Year 13	19.1	0.08	0.05	0.04	0.03	0.02	0.02
Year 15 (Scenarios A and B)	19.1	0.08	0.05	0.04	0.03	0.02	0.02
Year 15 (Scenario C)	15.3	0.07	0.04	0.03	0.02	0.02	0.01
Closure	19.1	0.08	0.05	0.04	0.03	0.02	0.02
Post-Closure	27.9	0.12	0.07	0.06	0.05	0.03	0.03

Period	DA (km^2)	Return Period Peak Instantaneous Discharge (m^3/s)						
		Mean	5 year	10 year	20 year	50 year	100 year	200 year
Baseline	25.1	21	32	42	53	68	78	89
Construction and Year 13	19.1	16	24	32	40	52	60	68
Year 15 (Scenarios A and B)	19.1	16	24	32	40	52	60	68
Year 15 (Scenario C)	15.3	13	19	26	32	41	48	54
Closure	19.1	16	24	32	40	52	60	68
Post-Closure	27.9	23	35	47	59	75	87	99

M:\1\01\00343\09\A\Data\Task 200 (Hydrometeorology)\Rev 1\Hydrology\[AMEC requests.xlsx]LCK-H1

NOTES:

1. BASELINE VALUES ESTIMATED ACCORDING TO INFORMATION IN OBEDKOFF'S "STREAMFLOW IN THE SKEENA REGION" (OBEDKOFF, 2001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	MH	ER	KJB

Knight Piésold
CONSULTING

TABLE 8

AVANTI KITSAULT MINE LTD.
KITSAULT PROJECT

RETURN PERIOD LOW FLOW AND PEAK FLOW DISCHARGES
LCK-H2

Print Jun/27/11 10:26:08

Period	DA (km^2)	Return Period 7-Day Low Flow Discharge (m^3/s)					
		Mean	5 year	10 year	20 year	50 year	100 year
Baseline	39.4	0.17	0.10	0.08	0.06	0.05	0.04
Construction	32.6	0.14	0.09	0.07	0.05	0.04	0.03
Year 13	32.6	0.14	0.09	0.07	0.05	0.04	0.03
Year 15 (Scenarios A and B)	32.6	0.14	0.09	0.07	0.05	0.04	0.03
Year 15 (Scenario C)	28.7	0.13	0.08	0.06	0.05	0.03	0.03
Closure	32.6	0.14	0.09	0.07	0.05	0.04	0.03
Post-Closure	41.4	0.18	0.11	0.08	0.07	0.05	0.04

Period	DA (km^2)	Return Period Peak Instantaneous Discharge (m^3/s)						
		Mean	5 year	10 year	20 year	50 year	100 year	200 year
Baseline	39.4	33	50	67	83	106	123	140
Construction	32.6	27	41	55	69	88	102	116
Year 13	32.6	27	41	55	69	88	102	116
Year 15 (Scenarios A and B)	32.6	27	41	55	69	88	102	116
Year 15 (Scenario C)	28.7	24	36	48	61	78	90	102
Closure	32.6	27	41	55	69	88	102	116
Post-Closure	41.4	34	52	70	87	112	129	147

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NOTES:

1. BASELINE VALUES ESTIMATED ACCORDING TO INFORMATION IN OBEDKOFF'S "STREAMFLOW IN THE SKEENA REGION" (OBEDKOFF, 2001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	MH	ER	KJB

Knight Piésold
CONSULTING

TABLE 9

AVANTI KITSAULT MINE LTD.
KITSAULT PROJECT

RETURN PERIOD LOW FLOW AND PEAK FLOW DISCHARGES
CCK-H2

Print Jun/27/11 10:26:08

Period	DA (km^2)	Return Period 7-Day Low Flow Discharge (m^3/s)					
		Mean	5 year	10 year	20 year	50 year	100 year
Baseline	29.7	0.11	0.09	0.06	0.04	0.02	0.01
Construction, Year 13 and Year 15	27.5	0.10	0.08	0.05	0.03	0.02	0.01
Closure and Post-Closure	27.9	0.10	0.08	0.05	0.03	0.02	0.01

Period	DA (km^2)	Return Period Peak Instantaneous Discharge (m^3/s)						
		Mean	5 year	10 year	20 year	50 year	100 year	200 year
Baseline	29.7	27	39	48	57	68	76	84
Construction, Year 13 and Year 15	27.5	25	36	45	53	64	71	78
Closure and Post-Closure	27.9	26	36	45	54	64	72	80

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NOTES:

1. BASELINE VALUES ESTIMATED ACCORDING TO INFORMATION IN OBEDKOFF'S "STREAMFLOW IN THE SKEENA REGION" (OBEDKOFF, 2001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	MH	ER	KJB

Knight Piésold
CONSULTING

TABLE 10

AVANTI KITSAULT MINE LTD.
KITSAULT PROJECT

RETURN PERIOD LOW FLOW AND PEAK FLOW DISCHARGES
CCK-H3

Print Jun/27/11 10:26:08

Period	DA (km^2)	Return Period 7-Day Low Flow Discharge (m^3/s)					
		Mean	5 year	10 year	20 year	50 year	100 year
Baseline	36.8	0.13	0.11	0.07	0.05	0.03	0.02
Construction, Year 13 and Year 15	34.5	0.13	0.10	0.07	0.04	0.02	0.02
Closure and Post-Closure	35.0	0.13	0.10	0.07	0.04	0.02	0.02

Period	DA (km^2)	Return Period Peak Instantaneous Discharge (m^3/s)						
		Mean	5 year	10 year	20 year	50 year	100 year	200 year
Baseline	36.8	33	47	58	69	83	92	102
Construction, Year 13 and Year 15	34.5	31	44	55	65	78	87	96
Closure and Post-Closure	35.0	31	45	56	66	79	88	98

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NOTES:

1. BASELINE VALUES ESTIMATED ACCORDING TO INFORMATION IN OBEDKOFF'S "STREAMFLOW IN THE SKEENA REGION" (OBEDKOFF, 2001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	MH	ER	KJB

Knight Piésold
CONSULTING

TABLE 11

AVANTI KITSAULT MINE LTD.
KITSAULT PROJECT

RETURN PERIOD LOW FLOW AND PEAK FLOW DISCHARGES
ILLIANCE RIVER

Print Jun/27/11 10:26:08

Period	DA (km^2)	Return Period 7-Day Low Flow Discharge (m^3/s)					
		Mean	5 year	10 year	20 year	50 year	100 year
Baseline	127.1	0.46	0.37	0.24	0.16	0.09	0.06
Construction, Year 13 and Year 15	124.9	0.45	0.36	0.24	0.16	0.09	0.06
Closure and Post-Closure	125.4	0.46	0.36	0.24	0.16	0.09	0.06

Period	DA (km^2)	Return Period Peak Instantaneous Discharge (m^3/s)						
		Mean	5 year	10 year	20 year	50 year	100 year	200 year
Baseline	127.1	100	143	177	210	252	281	311
Construction, Year 13 and Year 15	124.9	98	140	174	207	248	277	306
Closure and Post-Closure	125.4	99	141	175	208	249	278	308

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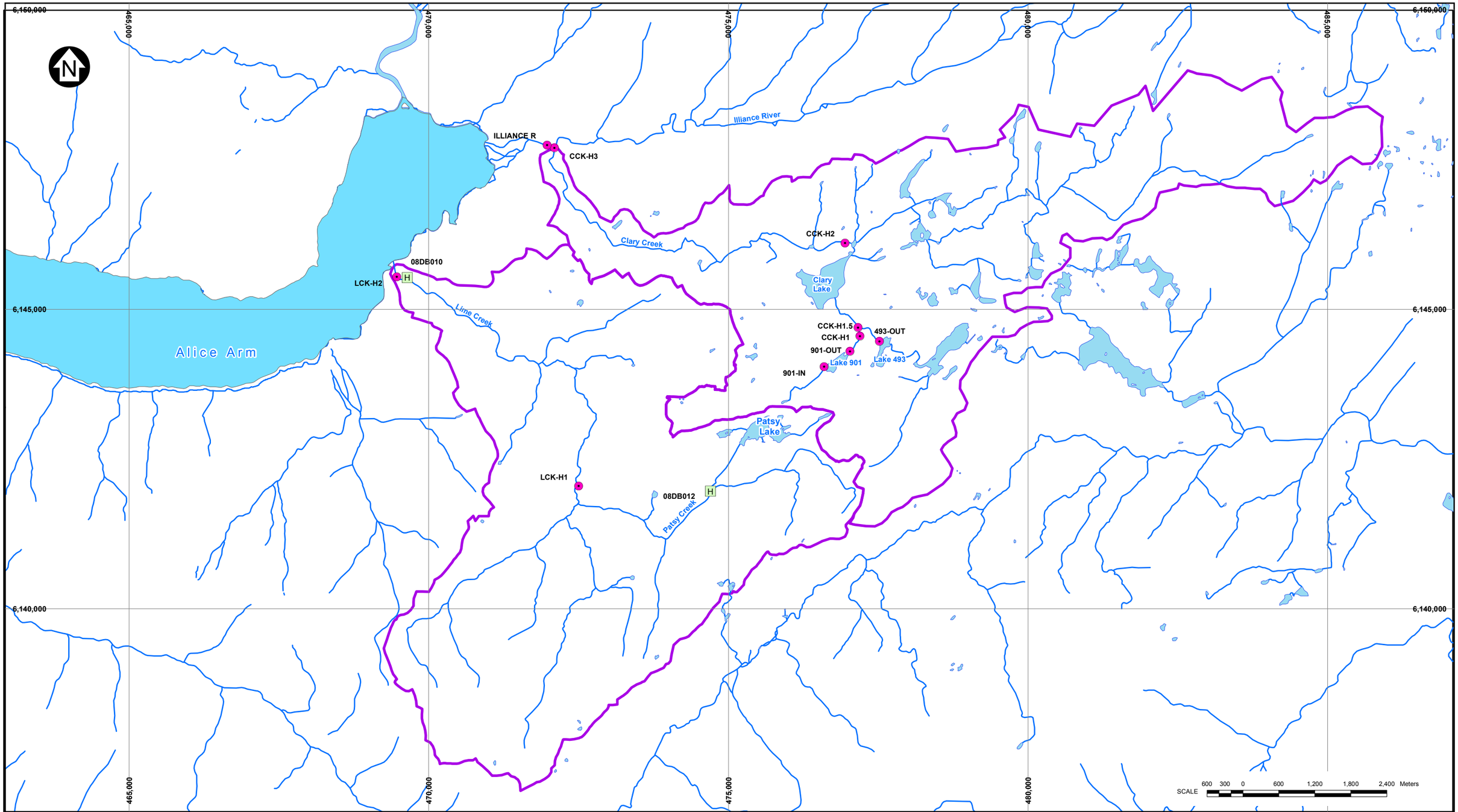
NOTES:

1. BASELINE VALUES ESTIMATED ACCORDING TO INFORMATION IN OBEDKOFF'S "STREAMFLOW IN THE SKEENA REGION" (OBEDKOFF, 2001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER VA11-00964	MH	ER	KJB



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LEGEND:

GENERAL

- WATERSHED MODEL STREAMFLOW NODE
- WATER URVEY OF CANADA STREAMFLOW GAUGE
- RIVER
- 100 M CONTOUR
- MAJOR WATERSHED BOUNDARY
- LAKE

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	05JUL'11	ISSUED WITH LETTER	AMD	AMD	EER	GLS

Node	Name
LCK-H1	Lime Creek downstream from confluence with Patsy Creek
LCK-H2	Lower Lime Creek near the mouth
901-IN	Inlet to Lake 901
901-OUT	Outlet of Lake 901
493-OUT	Outlet of Lake 493
CCK-H1	Upper Clary Creek downstream of Lake 901
CCK-H1.5	Upper Clary Creek downstream of confluence of Lake 901 outlet and Lake 493 outlet
CCK-H2	Clary Creek at the outlet of Clary Lake
CCK-H3	Clary Creek upstream of the confluence with Illiance River
08DB010	Lime Creek near the mouth (WSC)
08DB012	Patsy Creek near the mouth (WSC)
ILLIANCE R	Illiance River downstream of confluence with Clary Creek

NOTES:

1. BASE MAP: TRIM MAP.

2. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD83 UTM ZONE 9N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:60,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. CONTOUR INTERVAL IS 100 METRES.

AVANTI KITSAULT MINE LTD

KITSAULT PROJECT

WATERSHED MODEL STREAMFLOW NODES

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-343/9	VA11-00964

FIGURE 1 REV 0

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APPENDIX A

MONTHLY SURFACE WATER FLOWS

(Pages A-1 to A-8)

Knight Piésold CONSULTING

TABLE A1

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

PRE-MINE MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Pre-mine	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.21	0.19	0.28	0.89	2.76	3.26	2.73	1.87	1.68	1.67	0.53	0.28	1.36
	Minimum	0.14	0.11	0.11	0.11	1.12	0.71	0.37	0.99	0.39	0.31	0.23	0.18	0.11
	Maximum	0.28	1.02	1.37	2.20	4.42	5.29	4.81	3.62	3.88	4.13	2.86	0.44	5.29
	10th Percentile	0.19	0.15	0.13	0.24	2.16	2.28	1.37	1.20	1.05	0.97	0.34	0.24	-
	25th Percentile	0.20	0.16	0.13	0.36	2.43	2.78	1.81	1.41	1.32	1.13	0.36	0.25	-
	75th Percentile	0.24	0.20	0.30	1.23	3.10	3.70	3.72	2.06	1.98	2.20	0.47	0.33	-
	90th Percentile	0.25	0.22	0.63	1.69	3.54	4.14	4.00	3.09	2.33	2.74	0.77	0.36	-
LCK-H2	Average	0.36	0.40	0.74	1.87	4.15	4.18	3.20	2.18	2.17	2.74	1.11	0.49	1.97
	Minimum	0.21	0.18	0.18	0.24	1.28	0.80	0.45	1.11	0.55	0.43	0.33	0.27	0.18
	Maximum	0.75	3.02	2.69	3.80	6.23	7.64	6.47	4.42	5.26	7.90	5.23	1.79	7.90
	10th Percentile	0.30	0.24	0.23	0.88	3.29	2.64	1.53	1.40	1.26	1.45	0.51	0.36	-
	25th Percentile	0.31	0.26	0.30	1.18	3.72	3.29	2.00	1.64	1.53	1.86	0.55	0.39	-
	75th Percentile	0.40	0.35	1.01	2.49	4.74	5.08	4.37	2.38	2.62	3.55	1.38	0.53	-
	90th Percentile	0.44	0.70	1.52	2.86	5.06	5.61	4.94	3.67	3.25	4.48	1.74	0.63	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.07	0.05	0.10	0.38	1.09	1.10	0.69	0.39	0.41	0.64	0.23	0.10	0.44
	Minimum	0.03	0.02	0.02	0.02	0.24	0.10	0.07	0.13	0.11	0.11	0.07	0.05	0.02
	Maximum	0.10	0.44	0.63	0.91	1.75	1.85	1.69	1.01	1.21	1.87	1.39	0.18	1.87
	10th Percentile	0.05	0.04	0.03	0.07	0.84	0.61	0.19	0.19	0.20	0.34	0.13	0.08	-
	25th Percentile	0.06	0.04	0.03	0.16	0.97	0.84	0.33	0.21	0.27	0.46	0.14	0.08	-
	75th Percentile	0.08	0.05	0.11	0.55	1.21	1.38	1.03	0.48	0.54	0.80	0.19	0.13	-
	90th Percentile	0.09	0.06	0.31	0.70	1.40	1.56	1.17	0.89	0.62	1.00	0.40	0.14	-
CCK-H2	Average	0.23	0.18	0.33	1.15	3.44	3.76	2.73	1.78	1.70	2.13	0.78	0.35	1.55
	Minimum	0.12	0.08	0.07	0.07	0.90	0.53	0.33	0.77	0.46	0.42	0.26	0.17	0.07
	Maximum	0.36	1.37	1.97	2.84	5.56	6.17	5.63	3.82	4.30	5.87	4.39	0.62	6.17
	10th Percentile	0.18	0.13	0.09	0.20	2.58	2.42	1.07	1.02	0.96	1.21	0.46	0.27	-
	25th Percentile	0.19	0.14	0.10	0.48	3.08	2.97	1.66	1.20	1.29	1.50	0.48	0.29	-
	75th Percentile	0.27	0.19	0.34	1.69	3.79	4.45	3.83	2.11	2.09	2.70	0.66	0.44	-
	90th Percentile	0.29	0.21	0.97	2.26	4.43	5.10	4.26	3.30	2.47	3.39	1.29	0.48	-
CCK-H3	Average	0.29	0.26	0.50	1.60	4.24	4.38	3.05	1.96	1.95	2.66	1.04	0.45	1.87
	Minimum	0.14	0.10	0.10	0.11	0.97	0.58	0.36	0.83	0.55	0.45	0.29	0.20	0.10
	Maximum	0.46	2.19	2.65	3.66	6.66	7.49	6.68	4.29	5.08	7.78	5.72	0.92	7.78
	10th Percentile	0.23	0.17	0.13	0.45	3.40	2.71	1.16	1.07	1.05	1.44	0.56	0.34	-
	25th Percentile	0.25	0.18	0.15	0.79	3.77	3.43	1.78	1.29	1.43	1.89	0.61	0.37	-
	75th Percentile	0.34	0.26	0.57	2.27	4.70	5.42	4.28	2.33	2.40	3.33	0.96	0.55	-
	90th Percentile	0.38	0.31	1.43	2.80	5.34	6.12	4.83	3.72	2.89	4.20	1.76	0.61	-
901-IN	Average	0.02	0.02	0.03	0.12	0.35	0.34	0.20	0.10	0.11	0.19	0.07	0.03	0.13
	Minimum	0.01	0.01	0.00	0.01	0.08	0.03	0.02	0.04	0.03	0.03	0.02	0.01	0.00
	Maximum	0.03	0.13	0.18	0.29	0.58	0.60	0.54	0.31	0.36	0.55	0.41	0.06	0.60
	10th Percentile	0.02	0.01	0.01	0.02	0.27	0.16	0.04	0.05	0.04	0.10	0.04	0.02	-
	25th Percentile	0.02	0.01	0.01	0.05	0.32	0.25	0.08	0.05	0.07	0.14	0.04	0.03	-
	75th Percentile	0.02	0.02	0.03	0.18	0.40	0.45	0.30	0.12	0.15	0.24	0.06	0.04	-
	90th Percentile	0.03	0.02	0.09	0.22	0.46	0.51	0.35	0.25	0.18	0.30	0.11	0.05	-
901-OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.04	0.03	0.06	0.21	0.60	0.64	0.44	0.26	0.27	0.38	0.13	0.06	0.26
	Minimum	0.02	0.01	0.01	0.01	0.14	0.06	0.05	0.09	0.07	0.07	0.04	0.03	0.01
	Maximum	0.06	0.25	0.36	0.50	0.96	1.06	0.96	0.64	0.74	1.07	0.79	0.10	1.07
	10th Percentile	0.03	0.02	0.01	0.04	0.46	0.40	0.13	0.14	0.14	0.21	0.08	0.04	-
	25th Percentile	0.03	0.02	0.02	0.09	0.54	0.51	0.23	0.15	0.18	0.27	0.08	0.05	-
	75th Percentile	0.04	0.03	0.06	0.31	0.66	0.77	0.65	0.33	0.34	0.48	0.11	0.07	-
	90th Percentile	0.05	0.03	0.18	0.41	0.77	0.88	0.72	0.56	0.39	0.59	0.23	0.08	-
ILLIANCE R	Average	1.04	0.81	1.23	8.92	23.39	20.85	13.12	4.93	6.05	8.88	2.67	1.56	7.79
	Minimum	0.89	0.65	0.83	7.43	20.13	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.65
	Maximum	1.21	2.74	3.37	10.98	25.81	23.96	16.75	7.25	9.18	13.99	7.36	2.03	25.81
	10th Percentile	0.98	0.72	0.86	7.77	22.56	19.18	11.23	4.04	5.15	7.65	2.19	1.45	-
	25th Percentile	1.00	0.73	0.88	8.11	22.92	19.90	11.84	4.26	5.54	8.11	2.24	1.48	-
	75th Percentile	1.09	0.81	1.30	9.59	23.85	21.89	14.35	5.30	6.50	9.55	2.59	1.66	-
	90th Percentile	1.13	0.86	2.16	10.12	24.50	22.60	14.90	6.68	6.99	10.42	3.40	1.71	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A1 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A2

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

CONSTRUCTION PHASE 1 MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Pre-mine	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.21	0.19	0.28	0.89	2.76	3.26	2.73	1.87	1.68	1.67	0.53	0.28	1.36
	Minimum	0.14	0.11	0.11	0.11	1.12	0.71	0.37	0.99	0.39	0.31	0.23	0.18	0.11
	Maximum	0.28	1.02	1.37	2.20	4.42	5.29	4.81	3.62	3.88	4.13	2.86	0.44	5.29
	10th Percentile	0.19	0.15	0.13	0.24	2.16	2.28	1.37	1.20	1.05	0.97	0.34	0.24	-
	25th Percentile	0.20	0.16	0.13	0.36	2.43	2.78	1.81	1.41	1.32	1.13	0.36	0.25	-
	75th Percentile	0.24	0.20	0.30	1.23	3.10	3.70	3.72	2.06	1.98	2.20	0.47	0.33	-
	90th Percentile	0.25	0.22	0.63	1.69	3.54	4.14	4.00	3.09	2.33	2.74	0.77	0.36	-
LCK-H2	Average	0.36	0.40	0.74	1.87	4.15	4.18	3.20	2.18	2.17	2.74	1.11	0.49	1.97
	Minimum	0.21	0.18	0.18	0.24	1.28	0.80	0.45	1.11	0.55	0.43	0.33	0.27	0.18
	Maximum	0.75	3.02	2.69	3.80	6.23	7.64	6.47	4.42	5.26	7.90	5.23	1.79	7.90
	10th Percentile	0.30	0.24	0.23	0.88	3.29	2.64	1.53	1.40	1.26	1.45	0.51	0.36	-
	25th Percentile	0.31	0.26	0.30	1.18	3.72	3.29	2.00	1.64	1.53	1.86	0.55	0.39	-
	75th Percentile	0.40	0.35	1.01	2.49	4.74	5.08	4.37	2.38	2.62	3.55	1.38	0.53	-
	90th Percentile	0.44	0.70	1.52	2.86	5.06	5.61	4.94	3.67	3.25	4.48	1.74	0.63	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.07	0.05	0.10	0.38	1.09	1.10	0.69	0.39	0.41	0.64	0.23	0.10	0.44
	Minimum	0.03	0.02	0.02	0.02	0.24	0.10	0.07	0.13	0.11	0.11	0.07	0.05	0.02
	Maximum	0.10	0.44	0.63	0.91	1.75	1.85	1.69	1.01	1.21	1.87	1.39	0.18	1.87
	10th Percentile	0.05	0.04	0.03	0.07	0.84	0.61	0.19	0.19	0.20	0.34	0.13	0.08	-
	25th Percentile	0.06	0.04	0.03	0.16	0.97	0.84	0.33	0.21	0.27	0.46	0.14	0.08	-
	75th Percentile	0.08	0.05	0.11	0.55	1.21	1.38	1.03	0.48	0.54	0.80	0.19	0.13	-
	90th Percentile	0.09	0.06	0.31	0.70	1.40	1.56	1.17	0.89	0.62	1.00	0.40	0.14	-
CCK-H2	Average	0.23	0.18	0.33	1.15	3.44	3.76	2.73	1.78	1.70	2.13	0.78	0.35	1.55
	Minimum	0.12	0.08	0.07	0.07	0.90	0.53	0.33	0.77	0.46	0.42	0.26	0.17	0.07
	Maximum	0.36	1.37	1.97	2.84	5.56	6.17	5.63	3.82	4.30	5.87	4.39	0.62	6.17
	10th Percentile	0.18	0.13	0.09	0.20	2.58	2.42	1.07	1.02	0.96	1.21	0.46	0.27	-
	25th Percentile	0.19	0.14	0.10	0.48	3.08	2.97	1.66	1.20	1.29	1.50	0.48	0.29	-
	75th Percentile	0.27	0.19	0.34	1.69	3.79	4.45	3.83	2.11	2.09	2.70	0.66	0.44	-
	90th Percentile	0.29	0.21	0.97	2.26	4.43	5.10	4.26	3.30	2.47	3.39	1.29	0.48	-
CCK-H3	Average	0.29	0.26	0.50	1.60	4.24	4.38	3.05	1.96	1.95	2.66	1.04	0.45	1.87
	Minimum	0.14	0.10	0.10	0.11	0.97	0.58	0.36	0.83	0.55	0.45	0.29	0.20	0.10
	Maximum	0.46	2.19	2.65	3.66	6.66	7.49	6.68	4.29	5.08	7.78	5.72	0.92	7.78
	10th Percentile	0.23	0.17	0.13	0.45	3.40	2.71	1.16	1.07	1.05	1.44	0.56	0.34	-
	25th Percentile	0.25	0.18	0.15	0.79	3.77	3.43	1.78	1.29	1.43	1.89	0.61	0.37	-
	75th Percentile	0.34	0.26	0.57	2.27	4.70	5.42	4.28	2.33	2.40	3.33	0.96	0.55	-
	90th Percentile	0.38	0.31	1.43	2.80	5.34	6.12	4.83	3.72	2.89	4.20	1.76	0.61	-
901-IN	Average	0.02	0.02	0.03	0.12	0.35	0.34	0.20	0.10	0.11	0.19	0.07	0.03	0.13
	Minimum	0.01	0.01	0.00	0.01	0.08	0.03	0.02	0.04	0.03	0.03	0.02	0.01	0.00
	Maximum	0.03	0.13	0.18	0.29	0.58	0.60	0.54	0.31	0.36	0.55	0.41	0.06	0.60
	10th Percentile	0.02	0.01	0.01	0.02	0.27	0.16	0.04	0.05	0.04	0.10	0.04	0.02	-
	25th Percentile	0.02	0.01	0.01	0.05	0.32	0.25	0.08	0.05	0.07	0.14	0.04	0.03	-
	75th Percentile	0.02	0.02	0.03	0.18	0.40	0.45	0.30	0.12	0.15	0.24	0.06	0.04	-
	90th Percentile	0.03	0.02	0.09	0.22	0.46	0.51	0.35	0.25	0.18	0.30	0.11	0.05	-
901-OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.04	0.03	0.06	0.21	0.60	0.64	0.44	0.26	0.27	0.38	0.13	0.06	0.26
	Minimum	0.02	0.01	0.01	0.01	0.14	0.06	0.05	0.09	0.07	0.07	0.04	0.03	0.01
	Maximum	0.06	0.25	0.36	0.50	0.96	1.06	0.96	0.64	0.74	1.07	0.79	0.10	1.07
	10th Percentile	0.03	0.02	0.01	0.04	0.46	0.40	0.13	0.14	0.14	0.21	0.08	0.04	-
	25th Percentile	0.03	0.02	0.02	0.09	0.54	0.51	0.23	0.15	0.18	0.27	0.08	0.05	-
	75th Percentile	0.04	0.03	0.06	0.31	0.66	0.77	0.65	0.33	0.34	0.48	0.11	0.07	-
	90th Percentile	0.05	0.03	0.18	0.41	0.77	0.88	0.72	0.56	0.39	0.59	0.23	0.08	-
ILLIANCE R	Average	1.04	0.81	1.23	8.92	23.39	20.85	13.12	4.93	6.05	8.88	2.67	1.56	7.79
	Minimum	0.89	0.65	0.83	7.43	20.13	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.65
	Maximum	1.21	2.74	3.37	10.98	25.81	23.96	16.75	7.25	9.18	13.99	7.36	2.03	25.81
	10th Percentile	0.98	0.72	0.86	7.77	22.56	19.18	11.23	4.04	5.15	7.65	2.19	1.45	-
	25th Percentile	1.00	0.73	0.88	8.11	22.92	19.90	11.84	4.26	5.54	8.11	2.24	1.48	-
	75th Percentile	1.09	0.81	1.30	9.59	23.85	21.89	14.35	5.30	6.50	9.55	2.59	1.66	-
	90th Percentile	1.13	0.86	2.16	10.12	24.50	22.60	14.90	6.68	6.99	10.42	3.40	1.71	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A2 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A3

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

CONSTRUCTION PHASE 2 MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Construction	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.25	0.12	0.17	0.54	1.78	2.23	2.06	1.54	1.34	1.23	0.44	0.30	1.00
	Minimum	0.08	0.07	0.06	0.06	0.74	0.57	0.29	0.75	0.27	0.18	0.14	0.11	0.06
	Maximum	0.47	0.81	1.07	1.48	2.92	4.01	3.91	2.94	3.19	3.50	2.52	0.54	4.01
	10th Percentile	0.11	0.09	0.07	0.14	1.23	1.55	1.06	0.95	0.79	0.59	0.18	0.14	-
	25th Percentile	0.11	0.09	0.08	0.24	1.42	1.84	1.49	1.13	0.98	0.73	0.19	0.15	-
	75th Percentile	0.42	0.11	0.15	0.68	2.06	2.69	2.73	1.85	1.53	1.60	0.53	0.46	-
	90th Percentile	0.43	0.14	0.35	1.12	2.47	3.16	3.13	2.49	1.91	2.18	0.61	0.48	-
LCK-H2	Average	0.39	0.32	0.62	1.50	3.11	3.09	2.48	1.82	1.81	2.26	1.01	0.50	1.58
	Minimum	0.15	0.13	0.13	0.19	0.93	0.65	0.36	0.87	0.43	0.30	0.24	0.19	0.13
	Maximum	0.68	2.78	2.41	3.06	4.60	6.26	5.47	3.70	4.48	7.17	4.82	1.56	7.17
	10th Percentile	0.22	0.18	0.17	0.78	2.32	1.92	1.22	1.10	0.94	1.15	0.34	0.26	-
	25th Percentile	0.25	0.19	0.24	1.03	2.65	2.35	1.72	1.32	1.33	1.40	0.55	0.31	-
	75th Percentile	0.54	0.27	0.88	1.86	3.61	3.73	3.36	2.10	2.22	2.88	1.15	0.62	-
	90th Percentile	0.61	0.61	1.28	2.49	4.12	4.68	3.79	3.00	2.71	3.79	1.67	0.71	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.07	0.05	0.10	0.38	1.09	1.10	0.69	0.39	0.41	0.64	0.23	0.10	0.44
	Minimum	0.03	0.02	0.02	0.02	0.24	0.10	0.07	0.13	0.11	0.11	0.07	0.05	0.02
	Maximum	0.10	0.44	0.63	0.91	1.75	1.85	1.69	1.01	1.21	1.87	1.39	0.18	1.87
	10th Percentile	0.05	0.04	0.03	0.07	0.84	0.61	0.19	0.19	0.20	0.34	0.13	0.08	-
	25th Percentile	0.06	0.04	0.03	0.16	0.97	0.84	0.33	0.21	0.27	0.46	0.14	0.08	-
	75th Percentile	0.08	0.05	0.11	0.55	1.21	1.38	1.03	0.48	0.54	0.80	0.19	0.13	-
	90th Percentile	0.09	0.06	0.31	0.70	1.40	1.56	1.17	0.89	0.62	1.00	0.40	0.14	-
CCK-H2	Average	0.23	0.18	0.33	1.15	3.44	3.76	2.73	1.78	1.70	2.13	0.78	0.35	1.55
	Minimum	0.12	0.08	0.07	0.07	0.90	0.53	0.33	0.77	0.46	0.42	0.26	0.17	0.07
	Maximum	0.36	1.37	1.97	2.84	5.56	6.17	5.63	3.82	4.30	5.87	4.39	0.62	6.17
	10th Percentile	0.18	0.13	0.09	0.20	2.58	2.42	1.07	1.02	0.96	1.21	0.46	0.27	-
	25th Percentile	0.19	0.14	0.10	0.48	3.08	2.97	1.66	1.20	1.29	1.50	0.48	0.29	-
	75th Percentile	0.27	0.19	0.34	1.69	3.79	4.45	3.83	2.11	2.09	2.70	0.66	0.44	-
	90th Percentile	0.29	0.21	0.97	2.26	4.43	5.10	4.26	3.30	2.47	3.39	1.29	0.48	-
CCK-H3	Average	0.29	0.26	0.50	1.60	4.24	4.38	3.05	1.96	1.95	2.66	1.04	0.45	1.87
	Minimum	0.14	0.10	0.10	0.11	0.97	0.58	0.36	0.83	0.55	0.45	0.29	0.20	0.10
	Maximum	0.46	2.19	2.65	3.66	6.66	7.49	6.68	4.29	5.08	7.78	5.72	0.92	7.78
	10th Percentile	0.23	0.17	0.13	0.45	3.40	2.71	1.16	1.07	1.05	1.44	0.56	0.34	-
	25th Percentile	0.25	0.18	0.15	0.79	3.77	3.43	1.78	1.29	1.43	1.89	0.61	0.37	-
	75th Percentile	0.34	0.26	0.57	2.27	4.70	5.42	4.28	2.33	2.40	3.33	0.96	0.55	-
	90th Percentile	0.38	0.31	1.43	2.80	5.34	6.12	4.83	3.72	2.89	4.20	1.76	0.61	-
901-IN	Average	0.02	0.02	0.03	0.12	0.35	0.34	0.20	0.10	0.11	0.19	0.07	0.03	0.13
	Minimum	0.01	0.01	0.00	0.01	0.08	0.03	0.02	0.04	0.03	0.03	0.02	0.01	0.00
	Maximum	0.03	0.13	0.18	0.29	0.58	0.60	0.54	0.31	0.36	0.55	0.41	0.06	0.60
	10th Percentile	0.02	0.01	0.01	0.02	0.27	0.16	0.04	0.05	0.04	0.10	0.04	0.02	-
	25th Percentile	0.02	0.01	0.01	0.05	0.32	0.25	0.08	0.05	0.07	0.14	0.04	0.03	-
	75th Percentile	0.02	0.02	0.03	0.18	0.40	0.45	0.30	0.12	0.15	0.24	0.06	0.04	-
	90th Percentile	0.03	0.02	0.09	0.22	0.46	0.51	0.35	0.25	0.18	0.30	0.11	0.05	-
901-OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.04	0.03	0.06	0.21	0.60	0.64	0.44	0.26	0.27	0.38	0.13	0.06	0.26
	Minimum	0.02	0.01	0.01	0.01	0.14	0.06	0.05	0.09	0.07	0.07	0.04	0.03	0.01
	Maximum	0.06	0.25	0.36	0.50	0.96	1.06	0.96	0.64	0.74	1.07	0.79	0.10	1.07
	10th Percentile	0.03	0.02	0.01	0.04	0.46	0.40	0.13	0.14	0.14	0.21	0.08	0.04	-
	25th Percentile	0.03	0.02	0.02	0.09	0.54	0.51	0.23	0.15	0.18	0.27	0.08	0.05	-
	75th Percentile	0.04	0.03	0.06	0.31	0.66	0.77	0.65	0.33	0.34	0.48	0.11	0.07	-
	90th Percentile	0.05	0.03	0.18	0.41	0.77	0.88	0.72	0.56	0.39	0.59	0.23	0.08	-
ILLIANCE R	Average	1.04	0.81	1.23	8.92	23.39	20.85	13.12	4.93	6.05	8.88	2.67	1.56	7.79
	Minimum	0.89	0.65	0.83	7.43	20.13	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.65
	Maximum	1.21	2.74	3.37	10.98	25.81	23.96	16.75	7.25	9.18	13.99	7.36	2.03	25.81
	10th Percentile	0.98	0.72	0.86	7.77	22.56	19.18	11.23	4.04	5.15	7.65	2.19	1.45	-
	25th Percentile	1.00	0.73	0.88	8.11	22.92	19.90	11.84	4.26	5.54	8.11	2.24	1.48	-
	75th Percentile	1.09	0.81	1.30	9.59	23.85	21.89	14.35	5.30	6.50	9.55	2.59	1.66	-
	90th Percentile	1.13	0.86	2.16	10.12	24.50	22.60	14.90	6.68	6.99	10.42	3.40	1.71	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A3 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A4

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

CONSTRUCTION PHASE 3 MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Construction	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.25	0.12	0.17	0.54	1.78	2.23	2.06	1.54	1.34	1.23	0.44	0.30	1.00
	Minimum	0.08	0.07	0.06	0.06	0.74	0.57	0.29	0.75	0.27	0.18	0.14	0.11	0.06
	Maximum	0.47	0.81	1.07	1.48	2.92	4.01	3.91	2.94	3.19	3.50	2.52	0.54	4.01
	10th Percentile	0.11	0.09	0.07	0.14	1.23	1.55	1.06	0.95	0.79	0.59	0.18	0.14	-
	25th Percentile	0.11	0.09	0.08	0.24	1.42	1.84	1.49	1.13	0.98	0.73	0.19	0.15	-
	75th Percentile	0.42	0.11	0.15	0.68	2.06	2.69	2.73	1.85	1.53	1.60	0.53	0.46	-
	90th Percentile	0.43	0.14	0.35	1.12	2.47	3.16	3.13	2.49	1.91	2.18	0.61	0.48	-
LCK-H2	Average	0.39	0.32	0.62	1.50	3.11	3.09	2.48	1.82	1.81	2.26	1.01	0.50	1.58
	Minimum	0.15	0.13	0.13	0.19	0.93	0.65	0.36	0.87	0.43	0.30	0.24	0.19	0.13
	Maximum	0.68	2.78	2.41	3.06	4.60	6.26	5.47	3.70	4.48	7.17	4.82	1.56	7.17
	10th Percentile	0.22	0.18	0.17	0.78	2.32	1.92	1.22	1.10	0.94	1.15	0.34	0.26	-
	25th Percentile	0.25	0.19	0.24	1.03	2.65	2.35	1.72	1.32	1.33	1.40	0.55	0.31	-
	75th Percentile	0.54	0.27	0.88	1.86	3.61	3.73	3.36	2.10	2.22	2.88	1.15	0.62	-
	90th Percentile	0.61	0.61	1.28	2.49	4.12	4.68	3.79	3.00	2.71	3.79	1.67	0.71	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.05	0.04	0.08	0.28	0.82	0.86	0.57	0.33	0.34	0.50	0.18	0.08	0.34
	Minimum	0.03	0.02	0.02	0.02	0.20	0.08	0.06	0.11	0.09	0.09	0.05	0.04	0.02
	Maximum	0.08	0.33	0.48	0.69	1.32	1.43	1.30	0.83	0.97	1.43	1.06	0.14	1.43
	10th Percentile	0.04	0.03	0.02	0.05	0.63	0.51	0.16	0.17	0.17	0.27	0.10	0.06	-
	25th Percentile	0.04	0.03	0.02	0.12	0.75	0.68	0.28	0.19	0.23	0.36	0.11	0.06	-
	75th Percentile	0.06	0.04	0.08	0.42	0.91	1.05	0.84	0.41	0.44	0.63	0.15	0.10	-
	90th Percentile	0.07	0.05	0.24	0.54	1.06	1.19	0.94	0.72	0.50	0.78	0.30	0.11	-
CCK-H2	Average	0.21	0.17	0.31	1.06	3.17	3.52	2.61	1.71	1.63	1.99	0.73	0.33	1.45
	Minimum	0.11	0.08	0.07	0.07	0.86	0.51	0.32	0.75	0.44	0.40	0.24	0.16	0.07
	Maximum	0.34	1.27	1.82	2.61	5.13	5.74	5.24	3.63	4.06	5.43	4.06	0.58	5.74
	10th Percentile	0.17	0.12	0.09	0.19	2.37	2.32	1.04	0.99	0.93	1.14	0.43	0.26	-
	25th Percentile	0.18	0.13	0.09	0.44	2.83	2.80	1.61	1.17	1.25	1.40	0.45	0.27	-
	75th Percentile	0.25	0.18	0.31	1.55	3.51	4.12	3.63	2.03	1.99	2.53	0.61	0.41	-
	90th Percentile	0.27	0.20	0.90	2.08	4.09	4.71	4.06	3.14	2.35	3.16	1.20	0.45	-
CCK-H3	Average	0.28	0.25	0.47	1.51	3.97	4.14	2.93	1.90	1.87	2.52	0.99	0.43	1.77
	Minimum	0.13	0.09	0.10	0.11	0.93	0.56	0.35	0.80	0.52	0.43	0.28	0.19	0.09
	Maximum	0.44	2.09	2.50	3.44	6.23	7.07	6.29	4.10	4.84	7.34	5.39	0.89	7.34
	10th Percentile	0.22	0.16	0.12	0.44	3.20	2.60	1.14	1.05	1.02	1.37	0.53	0.33	-
	25th Percentile	0.24	0.17	0.14	0.75	3.53	3.26	1.72	1.27	1.39	1.79	0.57	0.35	-
	75th Percentile	0.32	0.24	0.55	2.13	4.40	5.08	4.09	2.25	2.30	3.16	0.92	0.52	-
	90th Percentile	0.36	0.30	1.35	2.63	5.01	5.74	4.60	3.56	2.75	3.99	1.67	0.57	-
901-IN	Average	0.01	0.01	0.01	0.02	0.09	0.10	0.07	0.04	0.04	0.05	0.02	0.01	0.04
	Minimum	0.00	0.00	0.00	0.00	0.04	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00
	Maximum	0.01	0.02	0.03	0.07	0.14	0.15	0.15	0.11	0.12	0.11	0.07	0.02	0.15
	10th Percentile	0.01	0.00	0.00	0.00	0.06	0.06	0.02	0.02	0.02	0.03	0.01	0.01	-
	25th Percentile	0.01	0.00	0.00	0.01	0.08	0.09	0.03	0.02	0.03	0.03	0.01	0.01	-
	75th Percentile	0.01	0.01	0.01	0.04	0.10	0.12	0.11	0.04	0.05	0.06	0.02	0.01	-
	90th Percentile	0.01	0.01	0.01	0.05	0.11	0.13	0.13	0.09	0.06	0.08	0.02	0.01	-
901-OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.02	0.02	0.03	0.12	0.34	0.40	0.31	0.20	0.19	0.24	0.08	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.10	0.05	0.04	0.06	0.05	0.05	0.03	0.02	0.01
	Maximum	0.04	0.14	0.21	0.28	0.53	0.64	0.57	0.46	0.50	0.63	0.46	0.06	0.64
	10th Percentile	0.02	0.01	0.01	0.02	0.25	0.30	0.11	0.11	0.11	0.14	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.05	0.30	0.36	0.18	0.13	0.14	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.17	0.39	0.46	0.46	0.25	0.23	0.30	0.07	0.04	-
	90th Percentile	0.03	0.02	0.10	0.22	0.42	0.50	0.49	0.40	0.27	0.37	0.13	0.05	-
ILLIANCE R	Average	1.03	0.80	1.20	8.83	23.13	20.61	13.00	4.86	5.98	8.74	2.62	1.54	7.69
	Minimum	0.88	0.64	0.83	7.43	20.09	17.03	10.42	3.77	4.62	6.65	1.91	1.30	0.64
	Maximum	1.19	2.64	3.23	10.76	25.38	23.54	16.36	7.07	8.94	13.56	7.03	2.00	25.38
	10th Percentile	0.97	0.71	0.85	7.75	22.35	19.07	11.21	4.01	5.12	7.58	2.16	1.43	-
	25th Percentile	0.98	0.72	0.87	8.07	22.68	19.73	11.79	4.23	5.50	8.01	2.21	1.46	-
	75th Percentile	1.07	0.79	1.28	9.45	23.56	21.55	14.16	5.22	6.41	9.38	2.56	1.63	-
	90th Percentile	1.11	0.85	2.08	9.95	24.16	22.22	14.67	6.52	6.86	10.20	3.30	1.68	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A4 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A5

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

YEAR 13 MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	YEAR 13	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.19	0.16	0.22	0.65	2.01	2.55	2.40	1.71	1.47	1.34	0.50	0.26	1.12
	Minimum	0.09	0.07	0.07	0.10	0.90	0.67	0.35	0.76	0.40	0.19	0.15	0.11	0.07
	Maximum	0.49	0.87	1.12	1.90	3.30	4.90	4.54	3.73	3.82	3.61	2.56	0.71	4.90
	10th Percentile	0.12	0.09	0.09	0.21	1.38	1.63	1.11	0.94	0.81	0.63	0.20	0.15	-
	25th Percentile	0.12	0.10	0.11	0.30	1.60	2.00	1.53	1.14	1.03	0.78	0.22	0.16	-
	75th Percentile	0.19	0.15	0.27	0.80	2.34	3.21	3.50	2.08	1.76	1.79	0.64	0.28	-
	90th Percentile	0.43	0.21	0.46	1.22	2.72	3.60	4.01	2.96	2.06	2.43	0.76	0.49	-
LCK-H2	Average	0.33	0.37	0.67	1.61	3.34	3.41	2.82	1.99	1.93	2.37	1.07	0.46	1.70
	Minimum	0.15	0.14	0.16	0.23	1.26	0.76	0.42	0.89	0.55	0.31	0.24	0.20	0.14
	Maximum	0.69	2.85	2.49	3.50	4.95	7.15	6.11	4.41	5.12	7.28	4.87	1.66	7.28
	10th Percentile	0.23	0.20	0.21	0.86	2.48	1.99	1.26	1.07	0.96	1.10	0.35	0.27	-
	25th Percentile	0.26	0.22	0.27	1.10	2.85	2.48	1.75	1.34	1.38	1.48	0.54	0.32	-
	75th Percentile	0.37	0.32	0.95	2.00	3.86	4.28	4.01	2.42	2.41	3.03	1.26	0.60	-
	90th Percentile	0.56	0.66	1.39	2.59	4.42	5.03	4.73	3.65	2.90	4.09	1.71	0.70	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.05	0.04	0.08	0.29	0.82	0.86	0.57	0.33	0.34	0.50	0.18	0.08	0.35
	Minimum	0.03	0.02	0.02	0.02	0.20	0.08	0.06	0.11	0.09	0.09	0.05	0.04	0.02
	Maximum	0.08	0.33	0.48	0.69	1.32	1.43	1.30	0.83	0.97	1.43	1.06	0.14	1.43
	10th Percentile	0.04	0.03	0.02	0.05	0.63	0.51	0.16	0.17	0.17	0.27	0.10	0.06	-
	25th Percentile	0.04	0.03	0.02	0.12	0.75	0.68	0.28	0.19	0.23	0.36	0.11	0.07	-
	75th Percentile	0.06	0.04	0.08	0.42	0.91	1.05	0.84	0.41	0.44	0.63	0.15	0.10	-
	90th Percentile	0.07	0.05	0.24	0.54	1.06	1.19	0.94	0.72	0.50	0.78	0.30	0.11	-
CCK-H2	Average	0.18	0.14	0.27	1.03	3.14	3.48	2.57	1.68	1.60	1.95	0.69	0.30	1.42
	Minimum	0.08	0.05	0.04	0.04	0.82	0.48	0.29	0.72	0.41	0.37	0.21	0.13	0.04
	Maximum	0.30	1.24	1.78	2.58	5.10	5.71	5.20	3.60	4.03	5.40	4.02	0.54	5.71
	10th Percentile	0.14	0.09	0.06	0.16	2.34	2.29	1.01	0.96	0.90	1.10	0.40	0.22	-
	25th Percentile	0.15	0.10	0.06	0.41	2.80	2.77	1.57	1.14	1.22	1.36	0.42	0.24	-
	75th Percentile	0.22	0.14	0.28	1.52	3.48	4.08	3.60	2.00	1.96	2.50	0.58	0.38	-
	90th Percentile	0.24	0.17	0.87	2.05	4.05	4.68	4.02	3.11	2.32	3.12	1.16	0.41	-
CCK-H3	Average	0.24	0.22	0.44	1.48	3.94	4.11	2.89	1.87	1.84	2.49	0.95	0.40	1.74
	Minimum	0.10	0.06	0.07	0.08	0.90	0.52	0.32	0.77	0.49	0.40	0.24	0.16	0.06
	Maximum	0.41	2.05	2.46	3.41	6.19	7.04	6.26	4.07	4.80	7.31	5.36	0.86	7.31
	10th Percentile	0.19	0.13	0.09	0.40	3.17	2.57	1.10	1.02	0.99	1.33	0.50	0.29	-
	25th Percentile	0.20	0.14	0.11	0.72	3.50	3.23	1.69	1.24	1.36	1.76	0.54	0.32	-
	75th Percentile	0.29	0.21	0.52	2.10	4.37	5.05	4.06	2.22	2.27	3.13	0.89	0.49	-
	90th Percentile	0.33	0.27	1.32	2.60	4.98	5.71	4.57	3.53	2.72	3.95	1.64	0.54	-
901-IN	Average	0.01	0.01	0.01	0.03	0.09	0.10	0.08	0.04	0.04	0.05	0.02	0.01	0.04
	Minimum	0.00	0.00	0.00	0.00	0.04	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00
	Maximum	0.01	0.02	0.03	0.07	0.14	0.16	0.15	0.11	0.12	0.11	0.07	0.02	0.16
	10th Percentile	0.01	0.00	0.00	0.01	0.06	0.06	0.02	0.02	0.02	0.03	0.01	0.01	-
	25th Percentile	0.01	0.00	0.00	0.01	0.08	0.09	0.04	0.02	0.03	0.03	0.01	0.01	-
	75th Percentile	0.01	0.01	0.01	0.04	0.10	0.12	0.12	0.04	0.05	0.06	0.02	0.01	-
	90th Percentile	0.01	0.01	0.02	0.05	0.11	0.13	0.13	0.09	0.06	0.08	0.02	0.01	-
901-OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.02	0.02	0.04	0.12	0.34	0.40	0.31	0.20	0.19	0.24	0.08	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.10	0.05	0.04	0.06	0.05	0.05	0.03	0.02	0.01
	Maximum	0.04	0.14	0.21	0.28	0.53	0.64	0.57	0.46	0.50	0.63	0.46	0.06	0.64
	10th Percentile	0.02	0.01	0.01	0.02	0.25	0.30	0.11	0.11	0.11	0.14	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.05	0.30	0.36	0.18	0.13	0.14	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.17	0.39	0.46	0.46	0.25	0.23	0.30	0.07	0.04	-
	90th Percentile	0.03	0.02	0.10	0.22	0.42	0.50	0.49	0.40	0.27	0.37	0.13	0.05	-
ILLIANCE R	Average	0.99	0.77	1.17	8.80	23.09	20.58	12.96	4.83	5.94	8.71	2.58	1.51	7.66
	Minimum	0.85	0.61	0.80	7.40	20.05	17.00	10.38	3.74	4.59	6.62	1.88	1.27	0.61
	Maximum	1.16	2.60	3.19	10.72	25.35	23.51	16.33	7.03	8.91	13.52	6.99	1.97	25.35
	10th Percentile	0.94	0.68	0.82	7.72	22.32	19.04	11.17	3.98	5.09	7.55	2.13	1.40	-
	25th Percentile	0.95	0.69	0.84	8.04	22.65	19.70	11.76	4.20	5.46	7.98	2.17	1.43	-
	75th Percentile	1.04	0.76	1.25	9.42	23.52	21.52	14.13	5.19	6.37	9.35	2.52	1.60	-
	90th Percentile	1.07	0.82	2.05	9.91	24.13	22.18	14.64	6.49	6.82	10.17	3.27	1.65	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A5 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A6

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

YEAR 15 MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	YEAR 15	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1 Scenario A	Average	0.15	0.12	0.16	0.50	1.73	2.29	2.24	1.63	1.37	1.15	0.40	0.21	1.00
	Minimum	0.08	0.07	0.06	0.06	0.74	0.62	0.31	0.75	0.28	0.18	0.14	0.11	0.06
	Maximum	0.47	0.58	0.82	1.49	2.82	4.34	3.99	3.42	3.50	2.75	2.02	0.53	4.34
	10th Percentile	0.11	0.09	0.07	0.13	1.20	1.55	1.10	0.92	0.79	0.53	0.18	0.14	-
	25th Percentile	0.11	0.09	0.08	0.19	1.39	1.88	1.49	1.12	0.97	0.69	0.19	0.15	-
	75th Percentile	0.14	0.11	0.19	0.66	1.98	2.80	3.22	1.95	1.61	1.52	0.53	0.19	-
	90th Percentile	0.17	0.14	0.36	1.02	2.45	3.16	3.58	2.81	1.93	2.15	0.56	0.46	-
LCK-H2 Scenario A	Average	0.30	0.33	0.61	1.46	3.06	3.15	2.66	1.90	1.83	2.17	0.97	0.41	1.57
	Minimum	0.15	0.13	0.13	0.19	1.16	0.71	0.38	0.87	0.43	0.30	0.24	0.19	0.13
	Maximum	0.68	2.55	2.16	2.88	4.46	6.59	5.55	4.15	4.79	6.33	4.32	1.56	6.59
	10th Percentile	0.22	0.18	0.17	0.76	2.32	1.92	1.25	1.05	0.94	1.03	0.34	0.26	-
	25th Percentile	0.24	0.19	0.24	0.99	2.63	2.38	1.72	1.32	1.33	1.40	0.50	0.30	-
	75th Percentile	0.31	0.27	0.87	1.86	3.48	3.85	3.73	2.26	2.25	2.79	1.15	0.44	-
	90th Percentile	0.43	0.61	1.28	2.32	4.01	4.55	4.34	3.42	2.71	3.83	1.54	0.64	-
LCK-H1 Scenario B	Average	0.13	0.11	0.15	0.49	1.73	2.26	2.12	1.52	1.29	1.08	0.30	0.17	0.95
	Minimum	0.08	0.07	0.06	0.06	0.74	0.62	0.31	0.75	0.28	0.18	0.14	0.11	0.06
	Maximum	0.19	0.58	0.82	1.49	2.82	4.07	3.71	3.14	3.22	2.66	1.74	0.25	4.07
	10th Percentile	0.11	0.09	0.07	0.13	1.20	1.55	1.10	0.92	0.79	0.53	0.18	0.14	-
	25th Percentile	0.11	0.09	0.08	0.19	1.39	1.88	1.49	1.12	0.97	0.68	0.19	0.15	-
	75th Percentile	0.14	0.11	0.15	0.66	1.98	2.73	2.94	1.70	1.53	1.33	0.26	0.19	-
	90th Percentile	0.15	0.14	0.30	1.02	2.45	3.05	3.30	2.53	1.84	1.93	0.41	0.20	-
LCK-H2 Scenario B	Average	0.28	0.32	0.60	1.46	3.06	3.12	2.54	1.80	1.75	2.11	0.86	0.37	1.52
	Minimum	0.15	0.13	0.13	0.19	1.16	0.71	0.38	0.87	0.43	0.30	0.24	0.19	0.13
	Maximum	0.62	2.55	2.16	2.88	4.46	6.31	5.27	3.88	4.52	6.33	4.04	1.56	6.33
	10th Percentile	0.22	0.18	0.17	0.76	2.32	1.92	1.25	1.05	0.94	1.03	0.34	0.26	-
	25th Percentile	0.24	0.19	0.24	0.99	2.63	2.38	1.72	1.32	1.31	1.40	0.41	0.30	-
	75th Percentile	0.31	0.27	0.87	1.86	3.48	3.75	3.53	2.00	2.17	2.61	1.08	0.39	-
	90th Percentile	0.34	0.61	1.28	2.32	4.01	4.55	4.06	3.14	2.69	3.59	1.45	0.45	-
LCK-H1 Scenario C	Average	0.12	0.10	0.14	0.44	1.49	1.92	1.81	1.35	1.15	0.93	0.26	0.16	0.82
	Minimum	0.08	0.07	0.06	0.06	0.71	0.54	0.28	0.75	0.24	0.18	0.14	0.11	0.06
	Maximum	0.16	0.46	0.65	1.17	2.47	3.00	2.73	2.30	2.37	2.00	1.34	0.21	3.00
	10th Percentile	0.11	0.09	0.07	0.12	1.11	1.49	1.06	0.91	0.79	0.49	0.18	0.14	-
	25th Percentile	0.11	0.09	0.07	0.17	1.28	1.76	1.38	1.08	0.93	0.61	0.19	0.14	-
	75th Percentile	0.14	0.11	0.15	0.62	1.73	2.17	2.33	1.50	1.35	1.22	0.22	0.18	-
	90th Percentile	0.15	0.12	0.30	0.88	1.94	2.37	2.52	2.02	1.52	1.56	0.37	0.19	-
LCK-H2 Scenario C	Average	0.27	0.31	0.59	1.40	2.82	2.77	2.23	1.62	1.61	1.95	0.83	0.36	1.40
	Minimum	0.15	0.13	0.12	0.19	0.87	0.63	0.35	0.87	0.39	0.30	0.24	0.19	0.12
	Maximum	0.62	2.44	2.03	2.72	4.20	5.24	4.29	3.04	3.67	5.67	3.64	1.56	5.67
	10th Percentile	0.21	0.17	0.17	0.76	2.15	1.84	1.22	1.05	0.94	1.03	0.33	0.26	-
	25th Percentile	0.22	0.18	0.23	0.97	2.50	2.20	1.55	1.26	1.15	1.32	0.37	0.28	-
	75th Percentile	0.29	0.26	0.85	1.80	3.19	3.35	2.93	1.79	1.94	2.52	1.07	0.37	-
	90th Percentile	0.31	0.60	1.27	2.16	3.44	3.76	3.30	2.50	2.39	3.24	1.35	0.45	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.05	0.04	0.08	0.29	0.82	0.86	0.57	0.33	0.34	0.50	0.18	0.08	0.35
	Minimum	0.03	0.02	0.02	0.02	0.20	0.08	0.06	0.11	0.09	0.09	0.05	0.04	0.02
	Maximum	0.08	0.33	0.48	0.69	1.32	1.43	1.30	0.83	0.97	1.43	1.06	0.14	1.43
	10th Percentile	0.04	0.03	0.02	0.05	0.63	0.51	0.16	0.17	0.17	0.27	0.10	0.06	-
	25th Percentile	0.04	0.03	0.02	0.12	0.75	0.68	0.28	0.19	0.23	0.36	0.11	0.07	-
	75th Percentile	0.06	0.04	0.08	0.42	0.91	1.05	0.84	0.41	0.44	0.63	0.15	0.10	-
	90th Percentile	0.07	0.05	0.24	0.54	1.06	1.19	0.94	0.72	0.50	0.78	0.30	0.11	-
CCK-H2	Average	0.18	0.14	0.27	1.03	3.14	3.48	2.57	1.68	1.60	1.95	0.69	0.30	1.42
	Minimum	0.08	0.05	0.04	0.04	0.82	0.48	0.29	0.72	0.41	0.37	0.21	0.13	0.04
	Maximum	0.30	1.24	1.78	2.58	5.10	5.71	5.20	3.60	4.03	5.40	4.02	0.54	5.71
	10th Percentile	0.14	0.09	0.06	0.16	2.34	2.29	1.01	0.96	0.90	1.10	0.40	0.22	-
	25th Percentile	0.15	0.10	0.06	0.41	2.80	2.77	1.57	1.14	1.22	1.36	0.42	0.24	-
	75th Percentile	0.22	0.14	0.28	1.52	3.48	4.08	3.60	2.00	1.96	2.50	0.58	0.38	-
	90th Percentile	0.24	0.17	0.87	2.05	4.05	4.68	4.02	3.11	2.32	3.12	1.16	0.41	-
CCK-H3	Average	0.24	0.22	0.44	1.48	3.94	4.11	2.89	1.87	1.84	2.49	0.95	0.40	1.74
	Minimum	0.10	0.06	0.07	0.08	0.90	0.52	0.32	0.77	0.49	0.40	0.24	0.16	0.06
	Maximum	0.41	2.05	2.46	3.41	6.19	7.04	6.26	4.07	4.80	7.31	5.36	0.86	7.31
	10th Percentile	0.19	0.13	0.09	0.40	3.17	2.57	1.10	1.02	0.99	1.33	0.50	0.29	-
	25th Percentile	0.20	0.14	0.11	0.72	3.50	3.23	1.69	1.24	1.36	1.76	0.54	0.32	-
	75th Percentile	0.29	0.21	0.52	2.10	4.37	5.05	4.06	2.22	2.27	3.13	0.89	0.49	-
	90th Percentile	0.33	0.27	1.32	2.60	4.98	5.71	4.57	3.53	2.72	3.95	1.64	0.54	-
901- IN	Average	0.01	0.01	0.01	0.03	0.09	0.10	0.08	0.04	0.04	0.05	0.02	0.01	0.04
	Minimum	0.00	0.00	0.00	0.00	0.04	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00
	Maximum	0.01	0.02	0.03	0.07	0.14	0.16	0.15	0.11	0.12	0.11	0.07	0.02	0.16
	10th Percentile	0.01	0.00	0.00	0.01	0.06	0.06	0.02	0.02	0.02	0.03	0.01	0.01	-
	25th Percentile	0.01	0.00	0.00	0.01	0.08	0.09	0.04	0.02	0.03	0.03	0.01	0.01	-
	75th Percentile	0.01	0.01	0.01	0.04	0.10	0.12	0.12	0.04	0.05	0.06	0.02	0.01	-
	90th Percentile	0.01	0.01	0.02	0.05	0.11	0.13	0.13	0.09	0.06	0.08	0.02	0.01	-
901- OUT	Average	0.02	0.02	0.04	0.15	0.43	0.41	0.22	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.01	0.01	0.01	0.01	0.08	0.03	0.02	0.04	0.04	0.03	0.02	0.02	0.01
	Maximum	0.04	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.07	0.72
	10th Percentile	0.02	0.01	0.01	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.02	0.02	0.04	0.12	0.34	0.40	0.31	0.20	0.19	0.24	0.08	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.10	0.05	0.04	0.06	0.05	0.05	0.03	0.02	0.01
	Maximum	0.04	0.14	0.21	0.28	0.53	0.64	0.57	0.46	0.50	0.63	0.46	0.06	0.64
	10th Percentile	0.02	0.01	0.01	0.02	0.25	0.30	0.11	0.11	0.11	0.14	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.05	0.30	0.36	0.18	0.13	0.14	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.17	0.39	0.46	0.46	0.25	0.23	0.30	0.07	0.04	-
	90th Percentile	0.03	0.02	0.10	0.22	0.42	0.50	0.49	0.40	0.27	0.37	0.13	0.05	-
ILLIANCE R	Average	0.99	0.77	1.17	8.80	23.09	20.58	12.96	4.83	5.94	8.71	2.58	1.51	7.66
	Minimum	0.85	0.61	0.80	7.40	20.05	17.00	10.38	3.74	4.59	6.62	1.88	1.27	0.61
	Maximum	1.16	2.60	3.19	10.72	25.35	23.51	16.33	7.03	8.91	13.52	6.99	1.97	25.35
	10th Percentile	0.94	0.68	0.82	7.72	22.32	19.04	11.17	3.98	5.09	7.55	2.13	1.40	-
	25th Percentile	0.95	0.69	0.84	8.04	22.65	19.70	11.76	4.20	5.46	7.98	2.17	1.43	-
	75th Percentile	1.04	0.76	1.25	9.42	23.52	21.52	14.13	5.19	6.37	9.35	2.52	1.60	-
	90th Percentile	1.07	0.82	2.05	9.91	24.13	22.18	14.64	6.49	6.82	10.17	3.27	1.65	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A6 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. ALL SCENARIOS FOR YEAR 15 OF MINE LIFE WHEN LOW GRADE ORE IS BEING PROCESSED AND THE OPEN PIT IS FILLING.
4. SCENARIO A: PATSY CREEK DIVERSION CHANNEL IS MAINTAINED, TMF EXCESS WATER IS BEING DISCHARGED TO LIME CREEK.
5. SCENARIO B: PATSY CREEK DIVERSION IS MAINTAINED, TMF EXCESS WATER IS BEING DISCHARGED INTO OPEN PIT.
6. SCENARIO C: PATSY CREEK DIVERSION IS BREACHED, TMF EXCESS WATER IS BEING DISCHARGED INTO THE OPEN PIT.
7. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A7

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

CLOSURE MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Closure	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.15	0.13	0.15	0.50	1.82	2.47	2.33	1.71	1.42	1.21	0.45	0.26	1.05
	Minimum	0.08	0.07	0.06	0.06	0.74	0.62	0.31	0.75	0.28	0.18	0.14	0.11	0.06
	Maximum	0.67	0.62	0.82	1.76	3.29	4.54	4.19	3.62	3.70	2.95	2.21	0.73	4.54
	10th Percentile	0.11	0.09	0.07	0.13	1.20	1.55	1.10	0.92	0.79	0.53	0.18	0.14	-
	25th Percentile	0.11	0.09	0.08	0.19	1.41	1.88	1.58	1.12	0.97	0.69	0.19	0.15	-
	75th Percentile	0.14	0.11	0.15	0.66	2.12	3.20	3.42	2.10	1.73	1.68	0.72	0.19	-
	90th Percentile	0.16	0.14	0.30	1.02	2.54	3.53	3.77	3.00	2.08	2.25	0.74	0.66	-
LCK-H2	Average	0.30	0.34	0.61	1.47	3.17	3.35	2.77	2.00	1.89	2.25	1.02	0.46	1.63
	Minimum	0.15	0.13	0.13	0.19	1.17	0.71	0.38	0.88	0.44	0.30	0.24	0.19	0.13
	Maximum	0.82	2.56	2.17	3.37	4.63	6.82	5.78	4.37	5.02	6.36	4.54	1.56	6.82
	10th Percentile	0.22	0.18	0.17	0.76	2.34	1.94	1.25	1.06	0.94	1.04	0.34	0.27	-
	25th Percentile	0.24	0.19	0.24	0.99	2.67	2.44	1.79	1.32	1.34	1.41	0.47	0.31	-
	75th Percentile	0.31	0.27	0.87	1.87	3.78	4.25	3.94	2.45	2.30	2.95	1.25	0.47	-
	90th Percentile	0.39	0.70	1.28	2.33	4.17	5.05	4.56	3.64	2.84	3.86	1.62	0.86	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.07	0.06	0.10	0.32	0.87	0.91	0.61	0.36	0.37	0.54	0.21	0.10	0.38
	Minimum	0.04	0.03	0.03	0.03	0.22	0.10	0.08	0.13	0.11	0.10	0.07	0.05	0.03
	Maximum	0.12	0.37	0.53	0.74	1.38	1.50	1.38	0.89	1.03	1.51	1.14	0.19	1.51
	10th Percentile	0.06	0.04	0.04	0.07	0.67	0.55	0.19	0.20	0.19	0.30	0.12	0.08	-
	25th Percentile	0.06	0.05	0.04	0.14	0.79	0.72	0.32	0.22	0.26	0.40	0.13	0.09	-
	75th Percentile	0.08	0.06	0.10	0.46	0.96	1.11	0.90	0.46	0.47	0.67	0.19	0.12	-
	90th Percentile	0.09	0.07	0.27	0.59	1.11	1.26	1.00	0.78	0.54	0.82	0.34	0.14	-
CCK-H2	Average	0.23	0.19	0.33	1.09	3.22	3.57	2.65	1.75	1.66	2.02	0.76	0.35	1.49
	Minimum	0.13	0.09	0.08	0.08	0.88	0.53	0.33	0.77	0.46	0.41	0.26	0.18	0.08
	Maximum	0.37	1.30	1.86	2.67	5.20	5.82	5.32	3.69	4.13	5.51	4.13	0.62	5.82
	10th Percentile	0.19	0.14	0.10	0.21	2.41	2.36	1.07	1.01	0.96	1.16	0.45	0.28	-
	25th Percentile	0.20	0.14	0.11	0.46	2.88	2.85	1.64	1.20	1.28	1.44	0.48	0.29	-
	75th Percentile	0.27	0.20	0.34	1.59	3.56	4.18	3.69	2.08	2.03	2.58	0.65	0.43	-
	90th Percentile	0.30	0.22	0.93	2.12	4.15	4.78	4.11	3.20	2.39	3.20	1.23	0.48	-
CCK-H3	Average	0.30	0.27	0.49	1.54	4.02	4.19	2.97	1.93	1.90	2.56	1.02	0.45	1.80
	Minimum	0.14	0.11	0.12	0.13	0.96	0.58	0.36	0.83	0.55	0.45	0.29	0.20	0.11
	Maximum	0.46	2.12	2.54	3.49	6.30	7.15	6.37	4.17	4.90	7.42	5.47	0.92	7.42
	10th Percentile	0.23	0.17	0.14	0.46	3.24	2.64	1.16	1.07	1.04	1.40	0.55	0.35	-
	25th Percentile	0.25	0.19	0.16	0.78	3.58	3.31	1.75	1.29	1.43	1.82	0.60	0.37	-
	75th Percentile	0.34	0.26	0.57	2.17	4.45	5.15	4.15	2.30	2.34	3.20	0.95	0.55	-
	90th Percentile	0.38	0.32	1.38	2.67	5.06	5.82	4.66	3.61	2.79	4.02	1.70	0.60	-
901-IN	Average	0.03	0.02	0.03	0.06	0.13	0.15	0.12	0.07	0.07	0.09	0.05	0.03	0.07
	Minimum	0.02	0.02	0.02	0.02	0.06	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02
	Maximum	0.04	0.06	0.08	0.12	0.21	0.23	0.23	0.17	0.18	0.19	0.15	0.06	0.23
	10th Percentile	0.02	0.02	0.02	0.02	0.10	0.10	0.05	0.04	0.04	0.06	0.04	0.03	-
	25th Percentile	0.02	0.02	0.02	0.03	0.12	0.13	0.07	0.05	0.05	0.07	0.04	0.03	-
	75th Percentile	0.03	0.02	0.03	0.08	0.15	0.18	0.17	0.09	0.08	0.11	0.05	0.04	-
	90th Percentile	0.03	0.03	0.04	0.10	0.17	0.20	0.19	0.14	0.10	0.13	0.06	0.04	-
901-OUT	Average	0.03	0.03	0.05	0.15	0.43	0.41	0.23	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.02	0.02	0.02	0.02	0.08	0.03	0.03	0.04	0.04	0.03	0.02	0.02	0.02
	Maximum	0.05	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.08	0.72
	10th Percentile	0.02	0.02	0.02	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.03	0.02	0.02	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.03	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.04	0.03	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.04	0.03	0.05	0.15	0.38	0.45	0.36	0.24	0.22	0.28	0.11	0.06	0.20
	Minimum	0.02	0.01	0.01	0.01	0.13	0.06	0.05	0.09	0.07	0.07	0.04	0.03	0.01
	Maximum	0.06	0.18	0.26	0.33	0.59	0.72	0.65	0.52	0.56	0.71	0.54	0.10	0.72
	10th Percentile	0.03	0.02	0.01	0.04	0.29	0.33	0.13	0.13	0.13	0.16	0.07	0.04	-
	25th Percentile	0.03	0.02	0.02	0.07	0.34	0.40	0.21	0.15	0.17	0.21	0.07	0.05	-
	75th Percentile	0.04	0.03	0.06	0.21	0.44	0.52	0.51	0.29	0.27	0.34	0.10	0.07	-
	90th Percentile	0.05	0.03	0.13	0.27	0.48	0.57	0.55	0.46	0.31	0.41	0.17	0.07	-
ILLIANCE R	Average	1.05	0.82	1.22	8.86	23.17	20.66	13.04	4.90	6.01	8.78	2.65	1.56	7.73
	Minimum	0.89	0.66	0.84	7.44	20.11	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.66
	Maximum	1.21	2.67	3.27	10.81	25.45	23.62	16.44	7.13	9.01	13.64	7.10	2.03	25.45
	10th Percentile	0.98	0.73	0.87	7.77	22.39	19.11	11.23	4.04	5.14	7.61	2.18	1.45	-
	25th Percentile	1.00	0.74	0.89	8.09	22.73	19.78	11.82	4.26	5.53	8.04	2.23	1.48	-
	75th Percentile	1.09	0.81	1.30	9.49	23.61	21.62	14.22	5.27	6.44	9.42	2.58	1.65	-
	90th Percentile	1.13	0.87	2.11	9.99	24.22	22.29	14.73	6.58	6.89	10.24	3.33	1.71	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A7 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold CONSULTING

TABLE A8

AVANTI KITSAULT MINE LTD
KITSAULT PROJECT

POST CLOSURE MONTHLY SURFACE WATER FLOWS

02/11/2011 11:16

Node	Post Closure	January	February	March	April	May	June	July	August	September	October	November	December	Annual
LCK-H1	Average	0.19	0.17	0.29	0.92	2.90	3.48	2.83	1.83	1.68	1.76	0.57	0.26	1.41
	Minimum	0.12	0.10	0.11	0.09	1.12	0.63	0.31	0.90	0.41	0.27	0.20	0.15	0.09
	Maximum	0.26	1.09	1.43	2.35	4.70	5.62	5.13	3.79	3.93	4.36	3.05	0.47	5.62
	10th Percentile	0.16	0.13	0.12	0.26	2.17	2.26	1.29	1.14	0.99	1.06	0.32	0.21	-
	25th Percentile	0.17	0.13	0.12	0.39	2.55	2.98	1.72	1.34	1.27	1.20	0.35	0.23	-
	75th Percentile	0.20	0.16	0.34	1.32	3.33	4.02	3.99	2.06	2.00	2.31	0.55	0.30	-
	90th Percentile	0.22	0.20	0.72	1.78	3.74	4.44	4.46	3.12	2.38	2.87	0.92	0.33	-
LCK-H2	Average	0.33	0.38	0.75	1.91	4.29	4.40	3.29	2.13	2.17	2.83	1.15	0.47	2.01
	Minimum	0.19	0.17	0.16	0.23	1.28	0.72	0.38	1.02	0.57	0.39	0.30	0.24	0.16
	Maximum	0.72	3.09	2.77	3.95	6.52	7.98	6.79	4.47	5.30	8.13	5.43	1.78	8.13
	10th Percentile	0.27	0.22	0.21	0.89	3.41	2.62	1.46	1.30	1.21	1.52	0.50	0.33	-
	25th Percentile	0.29	0.23	0.28	1.21	3.85	3.49	1.92	1.57	1.51	1.93	0.56	0.37	-
	75th Percentile	0.36	0.32	1.03	2.52	4.85	5.37	4.62	2.39	2.63	3.63	1.50	0.50	-
	90th Percentile	0.41	0.68	1.59	2.93	5.23	5.91	5.43	3.72	3.27	4.62	1.88	0.64	-
CCK-H1	Average	0.03	0.02	0.04	0.16	0.45	0.43	0.24	0.12	0.14	0.24	0.09	0.04	0.17
	Minimum	0.01	0.01	0.01	0.01	0.09	0.03	0.02	0.04	0.04	0.04	0.02	0.02	0.01
	Maximum	0.04	0.17	0.25	0.38	0.74	0.77	0.68	0.36	0.44	0.73	0.55	0.07	0.77
	10th Percentile	0.02	0.01	0.01	0.03	0.35	0.19	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.02	0.01	0.01	0.07	0.41	0.29	0.09	0.06	0.08	0.17	0.05	0.03	-
	75th Percentile	0.03	0.02	0.04	0.23	0.51	0.58	0.36	0.14	0.19	0.31	0.07	0.05	-
	90th Percentile	0.03	0.02	0.12	0.29	0.59	0.65	0.43	0.29	0.22	0.38	0.15	0.06	-
CCK- H1.5	Average	0.07	0.06	0.10	0.32	0.87	0.91	0.61	0.36	0.37	0.54	0.21	0.10	0.38
	Minimum	0.04	0.03	0.03	0.03	0.22	0.10	0.08	0.13	0.11	0.10	0.07	0.05	0.03
	Maximum	0.12	0.37	0.53	0.74	1.38	1.50	1.38	0.89	1.03	1.51	1.14	0.19	1.51
	10th Percentile	0.06	0.04	0.04	0.07	0.67	0.55	0.19	0.20	0.19	0.30	0.12	0.08	-
	25th Percentile	0.06	0.05	0.04	0.14	0.79	0.72	0.32	0.22	0.26	0.40	0.13	0.09	-
	75th Percentile	0.08	0.06	0.10	0.46	0.96	1.11	0.90	0.46	0.47	0.67	0.19	0.12	-
	90th Percentile	0.09	0.07	0.27	0.59	1.11	1.26	1.00	0.78	0.54	0.82	0.34	0.14	-
CCK-H2	Average	0.23	0.19	0.33	1.09	3.22	3.57	2.65	1.75	1.66	2.02	0.76	0.35	1.49
	Minimum	0.13	0.09	0.08	0.08	0.88	0.53	0.33	0.77	0.46	0.41	0.26	0.18	0.08
	Maximum	0.37	1.30	1.86	2.67	5.20	5.82	5.32	3.69	4.13	5.51	4.13	0.62	5.82
	10th Percentile	0.19	0.14	0.10	0.21	2.41	2.36	1.07	1.01	0.96	1.16	0.45	0.28	-
	25th Percentile	0.20	0.14	0.11	0.46	2.88	2.85	1.64	1.20	1.28	1.44	0.48	0.29	-
	75th Percentile	0.27	0.20	0.34	1.59	3.56	4.18	3.69	2.08	2.03	2.58	0.65	0.43	-
	90th Percentile	0.30	0.22	0.93	2.12	4.15	4.78	4.11	3.20	2.39	3.20	1.23	0.48	-
CCK-H3	Average	0.30	0.27	0.49	1.54	4.02	4.19	2.97	1.93	1.90	2.56	1.02	0.45	1.80
	Minimum	0.14	0.11	0.12	0.13	0.96	0.58	0.36	0.83	0.55	0.45	0.29	0.20	0.11
	Maximum	0.46	2.12	2.54	3.49	6.30	7.15	6.37	4.17	4.90	7.42	5.47	0.92	7.42
	10th Percentile	0.23	0.17	0.14	0.46	3.24	2.64	1.16	1.07	1.04	1.40	0.55	0.35	-
	25th Percentile	0.25	0.19	0.16	0.78	3.58	3.31	1.75	1.29	1.43	1.82	0.60	0.37	-
	75th Percentile	0.34	0.26	0.57	2.17	4.45	5.15	4.15	2.30	2.34	3.20	0.95	0.55	-
	90th Percentile	0.38	0.32	1.38	2.67	5.06	5.82	4.66	3.61	2.79	4.02	1.70	0.60	-
901-IN	Average	0.03	0.02	0.03	0.06	0.13	0.15	0.12	0.07	0.07	0.09	0.05	0.03	0.07
	Minimum	0.02	0.02	0.02	0.02	0.06	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02
	Maximum	0.04	0.06	0.08	0.12	0.21	0.23	0.23	0.17	0.18	0.19	0.15	0.06	0.23
	10th Percentile	0.02	0.02	0.02	0.02	0.10	0.10	0.05	0.04	0.04	0.06	0.04	0.03	-
	25th Percentile	0.02	0.02	0.02	0.03	0.12	0.13	0.07	0.05	0.05	0.07	0.04	0.03	-
	75th Percentile	0.03	0.02	0.03	0.08	0.15	0.18	0.17	0.09	0.08	0.11	0.05	0.04	-
	90th Percentile	0.03	0.03	0.04	0.10	0.17	0.20	0.19	0.14	0.10	0.13	0.06	0.04	-
901-OUT	Average	0.03	0.03	0.05	0.15	0.43	0.41	0.23	0.11	0.13	0.23	0.09	0.04	0.16
	Minimum	0.02	0.02	0.02	0.02	0.08	0.03	0.03	0.04	0.04	0.03	0.02	0.02	0.02
	Maximum	0.05	0.17	0.24	0.36	0.70	0.72	0.65	0.34	0.41	0.70	0.52	0.08	0.72
	10th Percentile	0.02	0.02	0.02	0.03	0.33	0.18	0.05	0.05	0.05	0.12	0.05	0.03	-
	25th Percentile	0.03	0.02	0.02	0.06	0.39	0.27	0.09	0.06	0.07	0.16	0.05	0.03	-
	75th Percentile	0.03	0.03	0.04	0.22	0.49	0.55	0.33	0.13	0.18	0.30	0.07	0.05	-
	90th Percentile	0.04	0.03	0.12	0.27	0.56	0.62	0.41	0.28	0.21	0.36	0.15	0.05	-
493- OUT	Average	0.04	0.03	0.05	0.15	0.38	0.45	0.36	0.24	0.22	0.28	0.11	0.06	0.20
	Minimum	0.02	0.01	0.01	0.01	0.13	0.06	0.05	0.09	0.07	0.07	0.04	0.03	0.01
	Maximum	0.06	0.18	0.26	0.33	0.59	0.72	0.65	0.52	0.56	0.71	0.54	0.10	0.72
	10th Percentile	0.03	0.02	0.01	0.04	0.29	0.33	0.13	0.13	0.13	0.16	0.07	0.04	-
	25th Percentile	0.03	0.02	0.02	0.07	0.34	0.40	0.21	0.15	0.17	0.21	0.07	0.05	-
	75th Percentile	0.04	0.03	0.06	0.21	0.44	0.52	0.51	0.29	0.27	0.34	0.10	0.07	-
	90th Percentile	0.05	0.03	0.13	0.27	0.48	0.57	0.55	0.46	0.31	0.41	0.17	0.07	-
ILLIANCE R	Average	1.05	0.82	1.22	8.86	23.17	20.66	13.04	4.90	6.01	8.78	2.65	1.56	7.73
	Minimum	0.89	0.66	0.84	7.44	20.11	17.05	10.43	3.79	4.65	6.67	1.92	1.31	0.66
	Maximum	1.21	2.67	3.27	10.81	25.45	23.62	16.44	7.13	9.01	13.64	7.10	2.03	25.45
	10th Percentile	0.98	0.73	0.87	7.77	22.39	19.11	11.23	4.04	5.14	7.61	2.18	1.45	-
	25th Percentile	1.00	0.74	0.89	8.09	22.73	19.78	11.82	4.26	5.53	8.04	2.23	1.48	-
	75th Percentile	1.09	0.81	1.30	9.49	23.61	21.62	14.22	5.27	6.44	9.42	2.58	1.65	-
	90th Percentile	1.13	0.87	2.11	9.99	24.22	22.29	14.73	6.58	6.89	10.24	3.33	1.71	-

M:\1\01\00343\09\A\Data\Task 500 (EA)\Surface Water Hydrology\Surface Water Flow Reductions\[Watershed_Flow Reduction_20111101.xlsx]Table A8 Appendix A

NOTES:

1. FLOWS ARE IN M^3/S
2. ALL FLOW VALUES ARE FROM THE KP WATERSHED MODEL, WHICH SIMULATES FLOW DATA FROM 1940 TO 2010.
3. THE ANNUAL MINIMUM AND MAXIMUM VALUES REPRESENT THE MINIMUM AND MAXIMUM CONDITION IN ANY MONTH FOR THE ENTIRE PERIOD OF RECORD FROM 1940 TO 2010.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
1	01NOV'11	ISSUED WITH LETTER VA11-00964	ER	JGC	KJB

Knight Piésold
CONSULTING

APPENDIX B

AMEC FIGURE – INTERIM LOCATOR POINT MAP 1, STREAM AFFECTED BY FOOTPRINT

(Page B-1)

472000 474000 476000 478000

6146000 6144000 6142000

CLARY CREEK

ALICE ARM ROAD

CLARY LAKE

N

Legend

- Interim Locator Point
- Cascade
- Falls
- Road
- Transmission line
- Stream & Lake not on Footprint
- Stream & Lake on Footprint
- Diversion Ditch
- Access Road
- Process Plant
- Open Pit
- Ore Stockpile
- East Waste Rock Management Facility
- Clary Lake Freshwater Intake
- Tailings Beach
- TMF Supernatant Pond

KEY MAP

Scale:1:22,000

0 0.5 1

Kilometers

Reference

1. Base Data
Geobase 1:20,000 (TRIM)
Land and Resource Data Warehouse 1:20,000 (TRIM)
Image: Orthophoto 40cm
2. Project Infrastructure
Supplied by AMEC and Knight Piesold on March 2011
3. Fish Barriers
Data collected by amec on June 2010

CLIENT: Avanti Kitsault Mine Ltd.

PROJECT: Kitsault Mine Project

Interim Locator Point Map 1
Stream Affected by Footprint

DATE:	ANALYST:	
January 2011	MY	
JOB No: VE51988	QA/QC: BH	PDF FILE: 10-50-044_stream_ILP_1.pdf
GIS FILE: 10-50-044.mxd		
PROJECTION: UTM Zone 9	DATUM: NAD83	

Y:\GIS\Projects\VE\VE51988_KitsaultMapping\10_fisheries-aquatics\Baseline\10-50-044.mxd