MINTO MINE

FLOW MONITORING PLAN

Water Use License QZ96-006

Date:

August 11, 2006

Prepared by:

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1.0 INTRODUCTION

Minto Explorations Ltd. (MintoEx) has retained Access Consulting Group (ACG) to assist MintoEx in preparing a flow monitoring plan in accordance with Section 68 of Water Use License QZ96-006:

> "*Prior to the initial filling of the water storage pond, the Licensee shall submit to the Board a plan for the monitoring of flows in lower Minto Creek.*"

This plan represents a review of issues related to the design, implementation and operation of an adaptive flow monitoring regime for lower Minto Creek. This plan will be implemented prior to the initial filling of the water storage pond, with the following conditions prescribed in the Water Use License, Sections 69 and 70:

- "*Lower Minto Creek shall include triggers and action plans to ensure that there are no impacts to fish as a result of the filling of the water storage pond and shall include a description of the information that will be reported to the Board as well as a schedule for reporting of that information.*" and
- "*The Licensee shall implement the Flow Monitoring Plan – Lower Minto Creek within six months of submitting that plan to the Board*."

Additionally, *"Section 9 – Hydrology"* of the Water Use Application stipulates that pre-determined locations be selected and monitored for baseline data prior to implementing the Flow Monitoring Plan, to obtain detailed stream flow records for Minto Creek at two locations. This is required to confirm that adequate water will be available for the operation. The hydrology monitoring installations are located at stations W1 and W3. Data Logger assemblies and staff gauges are used at both stations. See Figure 1 for a map of site water quality and flow monitoring stations, and Section 3.0 of this plan for station W1 and W3 descriptions.

This plan presents historical baseline flow data from W1 and W3 and analyzes the relationship between the two. This data and these calculations will provide target discharge levels that managers will be required to meet throughout the life of the mine in order to achieve the performance objectives as set out in the above licensing conditions.

An adaptive management practice will be applied to these performance objectives with a focus on proceeding responsibly to ensure that fisheries in lower Minto Creek are not impacted. This plan provides a clear and common approach to continually compare management actions against

performance objectives to determine the adequacy of this plan compared with current site conditions.

The plan also discusses:

- Station locations and descriptions;
- Methods and mechanisms for recording, measuring, and maintaining flow data;
- Schedule for monitoring plan implementation and activities;
- Adaptive Management approach complete with triggers and management actions; and
- Description of the process for notifying MintoEx and the Yukon Water Board of any variances that may occur during the application of this plan.

The full range of activities scheduled for the Minto site in the near future can be partitioned into two distinct phases:

- **Phase I – Site Development:** encompasses the development of both the mine site and camp infrastructure, including pit development, road, campsite and main water dam construction; and
- **Phase II – Mining Operations:** includes ore removal and mill processing and tailings production and disposal in the tailings facility.

This plan will address the monitoring of flows during Phase I – Site Development. Once the site development phase has been finalized and Phase II begins, this plan will be amended as required to account for operational changes. An updated plan will be re-submitted prior to the commencement of Phase II activities.

2.0 MINE SITE LOCATION AND DESCRIPTION

The Minto project is located approximately 240 km northwest of Whitehorse, Yukon Territory, on the west side of the Yukon River. The mine site lies within the upper reaches of the Minto Creek watershed, a tributary of the Yukon River.

Minto Creek has a mainstem length of 11 km, with an average width of 2 m and flows northeast into the Yukon River (see Figure 1). Streamflows in Minto Creek are generally characterized by peak flows in the spring during freshet and low flows in the summer. Minto Creek freezes and glaciates in the winter and has been observed to be entirely dry in the lower reaches in the mid-late summer. Sizeable flood events may also occur in the summer as a result of significant precipitation events. The water license application contains further information on regional and site-specific hydrology.

2.1 MINE SITE FLOW CHARACTERISTICS

Effluents from mine site locations can reach the final discharge points through a variety of means, such as natural watercourses, ditches, pipes, culverts, and/or pumping and pipeline systems. Effluent discharge rates can also be augmented through non-point sources such as rainfall, snowmelt waters, aquifers, or springs.

On July 6, 2006, MintoEx provided a letter to Environment Canada outlining station W3 as the final discharge point for the Minto mine under the Metal Mining Effluent Regulations. For the purposes of this plan, the interface between the upper reaches of Minto Creek and the lower reaches of Minto Creek is defined at site W3 based on the following conditions:

- Minto Creek runs through the mine property and is being diverted for operations at the mine site;
- Water used during mine operations will ultimately flow into the main water dam;
- The main water dam is on upper Minto Creek, upstream of the final point of discharge; and
- There will be spilling and seepage (expected) over and under the dam, with a stilling basin with a possible re-circulation seepage pond downstream of the stilling basin.

Therefore, the starting point for managing flows in lower Minto Creek at W1 is to measure flows below all water management and treatment facilities. This would represent the final effluent discharge point from all sources to the receiving waters of upper Minto Creek at W3. All water that flows either directly or indirectly through the water retention pond and down to W3 is considered a part of upper Minto Creek and all flows below that are considered lower Minto Creek. The following are explanations of the two reaches.

2.1.1 Upper Minto Creek

The upper reaches of Minto Creek are delineated by the height of land that follows the upper contours of the Minto Creek watershed. All flows from this area include point source flows from Minto mines effluent and tributaries, as well as non-point source flows from run-off. These flows will ultimately drain from the main water dam and to the location W3 (located approximately 200 m downstream of the toe of the Minto Main Water Dam) as indicated in Figure 1.

2.1.2 Lower Minto Creek

Lower Minto Creek will be defined as the area below site W3 to the lower Minto Creek location W1, and out to the Yukon River confluence.

There are three tributary streams that contribute flow to lower Minto Creek and these are, Tributary W6 (north slope), Tributary W7 (south slope) and three unnamed tributaries (two on the south slope, one on the north). These tributaries contribute flows to lower Minto Creek at W1 *downstream* of the Minto mine project.

Historic and recent flow monitoring in lower Minto Creek indicates that the creek is “losing stream” during certain periods of the year. Flows in upper Minto Creek have been measured at W3 with no flows reported in lower Minto Creek (W1). Recent hydrological surveys on Minto Creek have been conducted to document and locate local stream flow conditions in the creek. These surveys have determined that flows in Minto Creek are visible to a canyon (fish barrier – see Figure 1) at which point water flows to subsurface gravels in lower Minto Creek at a point where the creek reaches the Yukon River Valley. This location (lower Minto Creek at canyon) provides an opportunity to observe and verify flows from the upper creek to the lower reaches of Minto Creek.

N

Yukon River

W5

W4

W2

W1

Access Road

Minto Creek

W6

W7

W3

Main Dump

Open Pit

Camp

Future Main Water Dam

H1

W8

W9

Proposed Location of
Thickened Tailings Deposit

Overburden
Dump

Airstrip

W10

Minto Mine Flow Monitoring Plan

SHERWOOD COPPER CORP.

Legend

- Monitoring Station
- Decommissioned Hydrometric Station
- Fish Barrier (Canyon)
- Access Road
- Contour
- Water Course
- Intermittent Water Course
- Proposed Areas of Construction

Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 105I/11

Figure 1

Minto Mine Monitoring Station Locations

Scale:

0 250 500 1,000 1,500 m

ACCESS CONSULTING GROUP

Drawn by: HD | Checked by: SK

Date: July 2006

Our File: D:\Project\AllProjects\Minto\gis\mxd\FlowMonitorPlan\July06\Fig1_SampleStnLoc.mxd

3.0 MONITORING STATION LOCATIONS AND DESCRIPTIONS

In planning the flow measurement system, a site selection process was undertaken to determine the most effective and accessible location to act as the performance objective points. The following items were considered:

- seasonal nature of the effluent discharge;
- location of historical flow data collected on Minto Creek;
- ability to control upstream water levels and flows to control lower Minto Creek flows;
- accessibility for monitoring vehicles and personnel;
- accessibility of equipment for operation and maintenance by personnel;
- power supply to the site;
- existing soil conditions and their effects on stability;
- fisheries resources in Minto Creek; and
- proximity to the main water dam and conveyance of effluent from the main water dam to the flow measurement system.

Based on these items, station W1 was chosen to represent flows in lower Minto Creek and station W3 was chosen to represent flows in upper Minto Creek. The following sections briefly describe the two sites, with locations shown on Figure 1:

3.1 STATION W1

Station HW2 was located in lower Minto Creek immediately upstream of the access road crossing of Minto Creek. A staff gauge and data logger assembly was in operation at this site from 1994 - 1996. In 2005 the data logger site was moved upstream approx 300 m to station W1. There are no surface water inputs between Stations W1 and former station HW2, and therefore current and historical data for these two sites are considered directly comparable. The combined flow dataset will be referred to henceforth as W1 data. The water license application refers to fisheries studies that identified this reach as having seasonal fish use.

3.2 STATION W3

Station W3 is located 200m below the final decant point of the main water dam. The station location is described as downstream of the proposed dam but upstream of tributary stream confluences for W6 and W7. A data logger and staff gauge were installed in W3 in July 1995 and were operational through 1995 and 1996. A 90° V-notch weir was installed in July 2006, in preparation for the requirements of the Metal Mining Effluent Regulations (MMER**)** monitoring regime and for this plan. Appendix I provides the engineering design for the W3 90^{o} V-notch weir and computation tables for flow calculations based on height of water moving through the weir (H). Fisheries studies included in the water license application concluded that there is no fish use in this reach of Minto Creek above the canyon fish barrier, approximately 8 km below W3 and 1.5 km above W1.

4.0 HISTORICAL DISCHARGE DATA

This section evaluates and analyzes recent flow data collected by ACG in combination with historical flow data collected by Hallam Knight Piesold Ltd. and by John Gibson at stations W1 and W3 over a 16-year period, as required by Section 69 of the Water Use License. Collectively, this data forms the basis for understanding the streamflow relationship between W1 and W3. This relationship can then be used to establish operational discharge targets that will achieve the plan's performance objectives, and to establish triggers and mitigative measures as per the adaptive management approach of this plan. Sections 4.1 to 4.3 provide the parties responsible for historical flow data acquisition.

4.1 ACCESS CONSULTING GROUP

Access Consulting Group (ACG) has been the onsite environmental monitor since April 4, 2006, as outlined in the "*Phase I Water Treatment Contingency Plan*" submitted to the Yukon Water Board on March 17, 2006. ACG's role as onsite environmental monitor consists mainly of water quality sampling and measuring volumetric flow rates at established monitoring sites (including W1 and W3) on Minto Creek (see Figure 1). The results of the monitoring program have provided recent discharge data during periods of high flow - during spring freshet or high precipitation events - and during periods of seasonal low flow.

4.2 HALLAM KNIGHT PIESOLD

Hallam Knight Piesold (HKP) investigated stream flows beginning in September 1993, to quantify all surface flow potentially affected by project development. The program consisted of installing three staff gauges and an automatic water level recorder at station H1 (now decommissioned.) Water levels were recorded for a period of 1 year. Additionally, regional stream flow records from areas nearby were combined with site specific data in order to expand the baseline data (see HKP Minto Creek Streamflow Data from the Water Use License Application). Historical records from these stations were used in combination with site specific data to determine hydrological specifics for the project area.

4.3 JOHN GIBSON ENVIRONMENTAL CONSULTING

John Gibson collected discharge and stage data at Stations W1 and W3 periodically from September 29, 1993 to March 11, 2006. He also collected water quality and periodic rainfall and snow survey data during this period.

4.4 FLOW DATA REVIEW

Table 1 is a subset of flow data from the above noted sources where there are concurrent discharge measurements for stations W1 and W3. This table presents discharge targets for station W3, based on mean monthly flow rates at W3 and W1 and the project performance objectives. Section 5.0 outlines the methodology used to convert the performance objectives to operational target discharges using the historical flow data.

This historical data set shows that flows within Minto Creek generally increase between stations W3 and W1, as expected between lower and higher order stream reaches. This relationship differs seasonally, and during the winter months Minto Creek is heavily glaciated with streambed ice persisting until June.

During the mid-late summer months, during lower flows, upper Minto Creek at station W3 has occasionally returned higher flows than recorded in the lower reaches, as measured at W1. Previous studies by HKP suggested that the "loss" of water may be due to infiltration of flows into the local groundwater system downstream of W3 and upstream of W1. This "losing stream" scenario is under investigation to determine and document the fate of the flow upstream of the W1 station. A recent preliminary investigation (July 30, 2006) of the steep canyon section of the stream (approximately parallel to km 8.5 of the access road, see Figure 1) returned the following discharges:

- Station W3, Minto Creek upstream of the canyon – 0.088 m^3/s; and
- Station W1, downstream of the canyon – 0.013 m^3/s

These measurements confirmed that there is significant flow loss to subsurface gravels in the vicinity of the canyon on Minto Creek. Further hydrological evaluations will be undertaken to assess the impact of this scenario on water use/management objectives and target discharges set forth in this plan. As a component of the adaptive management plan during low flow conditions in Lower Minto Creek, the canyon location will be measured for flow and if required, a stream staff gauge station will be established.

Table 1. Minto Creek discharge measurements from stations W1 and W3 from 1993 - 2006, with monthly mean discharges (MMD) and W3 target discharges.

Month	Date	Discharge at W1 (m3/s)	Discharge at W3 (m3/s)	MMD at W1 (m3/s)	25% of MMD at W1 (m3/s)	MMD at W3 (m3/s)	W3 Target Discharge for 25% Reduction of W1 Discharge: MMD at W3 minus 25% of MMD at W1 (m3/s)
April	8-Apr-06	0.010	0.004	0.234	0.058	0.022	-0.036
	10-Apr-06	0.010	0.005				
	12-Apr-06	0.021	0.003				
	14-Apr-06	0.026	0.003				
	22-Apr-06	0.069					
	23-Apr-06	0.117	0.028				
	24-Apr-06	0.554	0.005				
	25-Apr-06	0.421	0.067				
	26-Apr-06	0.243	0.065				
	28-Apr-06	0.531					
	29-Apr-06	0.393					
	30-Apr-06	0.412					
May	15-May-94	0.312	0.101	0.384	0.096	0.139	0.043
	5-May-95	0.027					
	20-May-96	0.031	0.013				
	17-May-97	1.447	0.554				
	2-May-98	0.161					
	2-May-00	1.004					
	11-May-01	0.467	0.160				
	27-May-05	0.097	0.046				
	1-May-06	0.136					
	2-May-06	0.260	0.026				
	5-May-06	0.997	0.396				
	6-May-06	0.773	0.330				
	7-May-06		0.249				
	8-May-06	0.505	0.307				
	12-May-06	0.520	0.250				
	13-May-06	0.390	0.166				
	15-May-06	0.450	0.170				
	16-May-06		0.153				
	17-May-06	0.290	0.097				
	18-May-06	0.250	0.115				
	19-May-06		0.071				
	20-May-06	0.235					
	21-May-06	0.230	0.072				
	22-May-06	0.187	0.067				
	23-May-06	0.150	0.054				
	24-May-06		0.055				
	25-May-06	0.092	0.035				
	26-May-06		0.026				
	28-May-06		0.073				
	29-May-06	0.195	0.057				
	30-May-06		0.055				
	31-May-06		0.045				
June	4-Jun-94	0.061	0.028	0.058	0.014	0.028	0.014
	5-Jun-94	0.061	0.028				
	6-Jun-94	0.053					
	15-Jun-95	0.001	0.004				
	14-Jun-96	0.024					
	30-Jun-05	0.012	0.008				
	1-Jun-06	0.218	0.062				
	2-Jun-06		0.108				
	15-Jun-06	0.080	0.048				
	22-Jun-06		0.008				
	23-Jun-06	0.008	0.007				
	24-Jun-06		0.007				
	25-Jun-06		0.002				

Table 1. Minto Creek discharge measurements from stations W1 and W3 from 1993 - 2006, with monthly mean discharges (MMD) and W3 target discharges.

Month	Date	Discharge at W1 (m3/s)	Discharge at W3 (m3/s)	MMD at W1 (m3/s)	25% of MMD at W1 (m3/s)	MMD at W3 (m3/s)	W3 Target Discharge for 25% Reduction of W1 Discharge: MMD at W3 minus 25% of MMD at W1 (m3/s)
July	7-Jul-94	0.095	0.039	0.139	0.035	0.019	-0.015
	25-Jul-95	0.091	0.017				
	16-Jul-96	0.324	0.087				
	29-Jul-04	0.118	0.026				
	28-Jul-05	0.011	0.014				
	28-Jul-05	0.059					
	29-Jul-05	0.115					
	30-Jul-05	0.219					
	31-Jul-05	0.255					
	31-Jul-05	0.219					
	7-Jul-06	0.021	0.003				
	19-Jul-06						
	20-Jul-06		0.004				
	21-Jul-06		0.002				
	22-Jul-06		0.002				
	23-Jul-06						
	24-Jul-06						
	26-Jul-06		0.000				
August	12-Aug-94	0.007	0.011	0.195	0.049	0.015	-0.033
	20-Aug-97	0.265					
	9-Aug-98	0.003	0.006				
	26-Aug-99	0.033	0.006				
	24-Aug-03	0.129	0.037				
	1-Aug-05	0.241					
	2-Aug-05	0.291					
	3-Aug-05	0.230					
	4-Aug-05	0.128					
	5-Aug-05	0.152					
	5-Aug-05	0.219					
	6-Aug-05	0.334					
	7-Aug-05	0.410					
	8-Aug-05	0.495					
	9-Aug-05	0.513					
	10-Aug-05	0.442					
	10-Aug-05	0.334					
	11-Aug-05	0.348					
	12-Aug-05	0.392					
	13-Aug-05	0.320					
	14-Aug-05	0.255					
	15-Aug-05	0.169					
	15-Aug-05	0.108					
	16-Aug-05	0.135					
	17-Aug-05	0.103					
	18-Aug-05	0.056					
	19-Aug-05	0.189					
	20-Aug-05	0.152					
	20-Aug-05	0.108					
	21-Aug-05	0.082					
	22-Aug-05	0.189					
	23-Aug-05	0.178					
	24-Aug-05	0.082					
	25-Aug-05	0.070					
	25-Aug-05	0.073					
	26-Aug-05	0.108					
	27-Aug-05	0.255					
	28-Aug-05	0.279					
	29-Aug-05	0.073					
	30-Aug-05	0.059					
	30-Aug-05	0.078					
	31-Aug-05	0.230					
	29-Aug-05	0.061	0.017				

Table 1. Minto Creek discharge measurements from stations W1 and W3 from 1993 - 2006, with monthly mean discharges (MMD) and W3 target discharges.

Month	Date	Discharge at W1 (m3/s)	Discharge at W3 (m3/s)	MMD at W1 (m3/s)	25% of MMD at W1 (m3/s)	MMD at W3 (m3/s)	W3 Target Discharge for 25% Reduction of W1 Discharge: MMD at W3 minus 25% of MMD at W1 (m3/s)
September	29-Sep-93	0.069	0.028	0.209	0.052	0.025	-0.027
	26-Sep-94	0.073	0.028				
	20-Sep-95	0.133	0.027				
	9-Sep-96	0.146	0.021				
	1-Sep-05	0.320					
	2-Sep-05	0.304					
	3-Sep-05	0.304					
	4-Sep-05	0.199					
	4-Sep-05	0.160					
	5-Sep-05	0.135					
	6-Sep-05	0.082					
	7-Sep-05	0.086					
	8-Sep-05	0.209					
	9-Sep-05	0.531					
	9-Sep-05	0.267					
	10-Sep-05	0.230					
	11-Sep-05	0.320					
	12-Sep-05	0.169					
	13-Sep-05	0.096					
	14-Sep-05	0.586					
	14-Sep-05	0.609					
	15-Sep-05	0.291					
	16-Sep-05	0.209					
	17-Sep-05	0.103					
	18-Sep-05	0.057					
	19-Sep-05	0.061					
	19-Sep-05	0.108					
	20-Sep-05	0.362					
	21-Sep-05	0.531					
	22-Sep-05	0.442					
	23-Sep-05	0.189					
	24-Sep-05	0.091					
	24-Sep-05	0.091					
	25-Sep-05	0.189					
	26-Sep-05	0.291					
	27-Sep-05	0.169					
	28-Sep-05	0.109					
	29-Sep-05	0.092					
	29-Sep-05	0.068					
	30-Sep-05	0.065					
	7-Sep-05	0.094					
	28-Sep-05	0.118	0.022				
October	25-Oct-95		0.008	0.134	0.034	0.014	-0.020
	1-Oct-05	0.067					
	2-Oct-05	0.189					
	3-Oct-05	0.320					
	4-Oct-05	0.320					
	4-Oct-05	0.189					
	5-Oct-05	0.056					
	6-Oct-05	0.058					
	7-Oct-05	0.086					
	8-Oct-05	0.178					
	9-Oct-05	0.103					
	9-Oct-05	0.078					
	10-Oct-05	0.060					
	11-Oct-05	0.059					
	12-Oct-05	0.078					
	13-Oct-05	0.062					
	14-Oct-05	0.255					
	14-Oct-05	0.291					
	15-Oct-05	0.115					
	16-Oct-05	0.067					
	15-Oct-05	0.053	0.020				

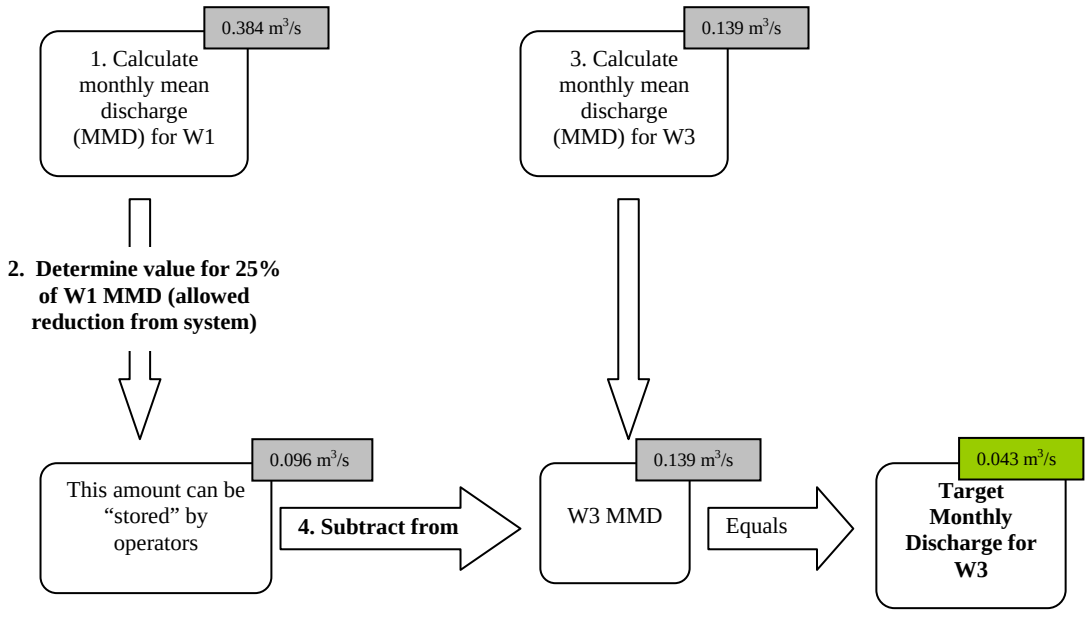
5.0 PERFORMANCE OBJECTIVES AND TARGET DISCHARGES

The performance objectives for this plan are twofold, and are taken directly from the water license application:

- Water use/management activities on the site will not impact fish resources in lower Minto Creek; and
- Flows in lower Minto Creek (as measured at station W1) will not be reduced by more than 30% of monthly historic mean flows. This objective is based on the environmental assessment that was completed for the project and presented in the water use license application.

In order to achieve these objectives, this plan has proposed monthly target discharges (Table 1) that if maintained at site W3, should ensure that flows are not reduced by more than 25% of mean monthly historic flows at W1. These target discharges will act as triggers for progressive management action if the prescribed flows are not being achieved. The 5% contingency buffer (30% - 25%) will provide room for adaptive management responses to verify measurements, confirm flows at both locations, make water use/management decisions, and to achieve the performance objectives. The following methodology was utilized to develop target discharges for each month for the station W3, using the historic discharge measurements (example values provided):

Figure 2 Methodology for Development of Monthly Target Discharges for Site W3
(note: discharge values are rounded to three decimal places)



6.0 MANAGEMENT TOOLS

Section 4.0 presented a review and analysis of flow data between stations W1 and W3 and Section 5.0 outlined the methodology for establishing target discharges to meet performance objectives. This section will outline the monitoring and management tools available for site managers to ensure that the objectives are being met. The adaptive management model will be employed, using specific triggers and actions to provide a progressive plan to achieve the required minimum flows in lower Minto Creek as conditions change.

6.1 MONITORING INSTRUMENTS

Successful adaptive management of flows in Minto Creek rely on reliable and accurate instruments and devices, a comprehensive regular monitoring program, and an effective internal and external reporting regimen. Monitoring flows at W3 is achieved using an installation of the following:

- Primary Device – a 90º V-notch weir (see Appendix I); and
- Secondary Device – a Heron Instruments Dipper-log™ pressure-transducing data logger for collection of continuous water stage/discharge record, installed upstream of weir in stilling well with attached survey controlled staff gauge.

Monitoring at station W1 will be conducted using a developed rating curve for the existing staff gauge. A data-logger secondary device will also provide an available continuous flow record for this site.

6.1.1 Primary Device - W3

The primary device used to measure volumetric flow rates at W3 is a custom-built 90º V-notch sharp-crested weir (see Appendix I for weir and weir plate design.) The weir was designed and constructed to meet 2005 ASTM Standard *D5242-92 – Standard Test Method for Open-Channel Flow Measurement of Water and Thin-Plate Weirs*. Operation and installation of the weir is in accordance with Environment Canada's Guidance Document for Flow Measurement of Metal Mining Effluents (EPS2/MM/4 – April, 2001). The purpose of the weir is to collect and calm creek waters behind an obstruction built across Minto Creek. The stilled water is decanted through a specifically shaped notch within the weir. Water level-discharge relationships can then be applied to this specific shape in order to calculate an instantaneous volumetric flow rate.

6.1.2 Secondary Device

The Secondary Device used to measure the head of water in the weir notch (W3) or in creek (W1) is a Heron Instruments Dipper-log™ pressure-transducing data logger. This instrument is used in conjunction with the primary device to provide a continuous head record, and by conversion to the weir formula, a continuous discharge record for station W3 and W1.

In order to be effective, the logger will be placed upstream at least 3 times the maximum expected head on the weir, or above the drawdown influence of the weir notch.

Stream discharge rating curves for both locations will be maintained, reviewed and updated as required to ensure accuracy of staff gauge/discharge relationships.

6.1.3 Maintenance Activities

Inspection and maintenance activity requirements for the plan have been taken from the "*Guidance Document for Flow Measurement of Metal Mining Effluents, Environment Canada"*. These requirements address the following:

- Gradual deterioration due to wear and tear, signal drift, build-up of debris, and organic build-up; and
- Sudden failure from acts of nature, inundation, component failure and human error.

Flow measurement systems will be clearly identified with signage, and all inspections and maintenance activities will be logged in a bound log book located at W3. Inspection of the primary measuring device will include but not be limited to the following:

- Check for sedimentation, debris build-up, algae growth and scum build-up;
- Check for ice accumulation that would affect flow measurement accuracy;
- Check for signs of cracking or separation from the weir mould and weir plate;
- Check for signs of differential settling of the installation mould;
- Check for evidence of leakages at the sides of, and under the weir;
- Check for corrosion of the device and installation equipment; and
- Check for failure of any device components.

Inspection of the secondary measuring device at W3 and W1 will include but not be limited to the following:

- Check the water level (head) measurement to ensure conformance with reported readings;
- Check for any growth or material that may be restrictive to the operation of the device;
- Check for signs of damage or wear to the installation system and the device;
- Check for corrosion of the device and installation of the equipment; and
- Check for failure of any device components.

An inspection checklist for the flow measurement system will be prepared and used as the basis for recording inspections and maintenance activities.

6.2 MONITORING SCHEDULE AND ADAPTIVE MANAGEMENT PLAN

Adherence to a regular monitoring program is essential for the effective management of flows in Minto Creek. By measuring and reviewing flow data collection on a regular basis, management actions can be dynamic, thereby allowing mine managers to adapt flow measurement systems appropriate to a specific situation. The goal of this performance-based method is to provide reasonable flexibility in the actions taken to manage flows in lower Minto Creek.

The following is the site monitoring schedule for flow management:

- *Weekly* staff gauge and weir measurements at station W3. Site managers will compare staff gauge readings at site W3 with an established table to determine if target discharges for the given month are being achieved;
- *Weekly* confirmation of staff gauge/instantaneous measurements at W1 for comparison with performance objectives; and
- *Monthly* datalogger stage record downloads and conversion to discharge record.

Should weekly monitoring at both sites confirm that target discharges and performance objectives are being achieved, no management actions will be taken, and monitoring will continue as required by MMER and the water use license QZ96-006.

Should flow readings at W3 indicate that target discharges are not being met, a sequence of management actions and/or modifications to the monitoring program will be initiated, as outlined below:

- Flow measurements will be verified using a calibrated flow meter at W3 and W1, and will be compared with W3 weir calculations to check for error in initial measurements;

- Flow measurement conducted on a daily basis at W3 and W1 and compared to W3 weir calculations to verify/control flow releases;
- Flows in Minto Creek upstream of the canyon will be investigated for comparison with W1 flows (low flow periods);
- Flow rates will be increased over the dam spillway to increase flow at W3;
- Water use will be minimized at the mine/camp, and a mine site water conservation program will be initiated;
- Flow measurements will continue to be collected *daily* until performance objectives are met;
- Installation of new ground water wells will be considered to augment freshwater usage;
- Fisheries monitoring initiatives for lower Minto Creek will be implemented to assess potential impacts of lowered flows resulting from failing to meet performance objectives; and,
- Habitat compensation measures could be developed with SFN if long term adequate flows are not available.

Monitoring initiatives will be increased after the implementation of any of these management actions, with the relative success of these measures feeding back into the ongoing plan for water management on site. This adaptive management will ensure that shortcomings are addressed by increasingly aggressive measures, and that successful mitigative measures are incorporated into future management options and programs.

Should monitoring indicate that target discharges are being achieved at W3, but there is:

- **less** than a 25% reduction in monthly mean flow as measured at W1, operators will retain the option of storing more water (discharging less water at W3).
- **more** than a 25% reduction in monthly mean flow as measured at W1, operators will implement the above adaptive management plan and/or supplement flows at W3 from the water storage dam or other sources (i.e. ground water wells).

These conditions will be accompanied by weekly discharge measurements at both W3 and W1 to confirm that performance objectives are still being met.

7.0 REPORTING AND NOTIFICATION REQUIREMENTS

Reporting and notification is required for both to the Yukon Water Board and Environment Canada inspectors, as specified in the Water Use License and the MMER respectively. The information required consists of the following:

- The name of the mine site and the final discharge point to which the report applies;
- The date, time and duration of all measurements used to generate the report;
- General conditions at the final discharge point over the reporting period (e.g., weather conditions, ongoing maintenance activities, equipment modifications, changes in normal mine or mill operating conditions such as temporary shutdowns or changes to minor process operations);
- All relevant flow measurement data;
- Tabular summary of W3, W1 and flow reduction performance;
- Identification of data discrepancies due to maintenance activities or technical problems; and
- An authorization signature.

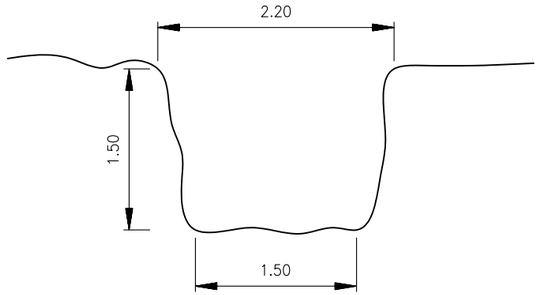
These reports will be included in the monthly reports submitted for MMER protocols to Environment Canada, and also in the monthly reporting that MintoEx has been submitting to the Yukon Water Board. Data will be summarized in the Annual Report and retained in both electronic format and hard copy.

MINTO MINE

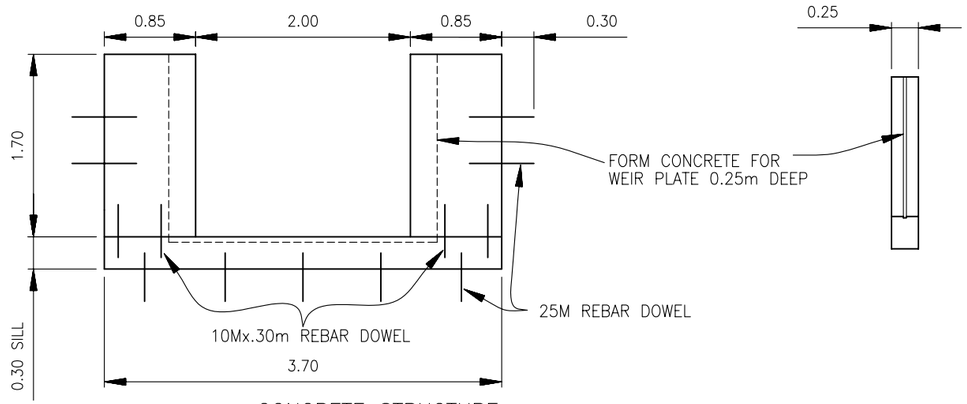
Flow Monitoring Plan

APPENDIX I

W3 WEIR ENGINEERING DESIGN



EXISTING CHANNEL CROSS SECTION



CONCRETE STRUCTURE

NOTE: POUR SILL AND INSERT
FORM AND POUR SIDES IN PLACE

CONCRETE VOLUME
1). CONCRETE SILL
0.3m H
0.25m W
3.7m L
0.28 CUBIC METRES CONCRETE

2). CONCRETE SIDES (TWO REQUIRED)
1.7m H
0.25m W
0.85m L
2x.36=0.72 CUBIC METRES CONCRETE

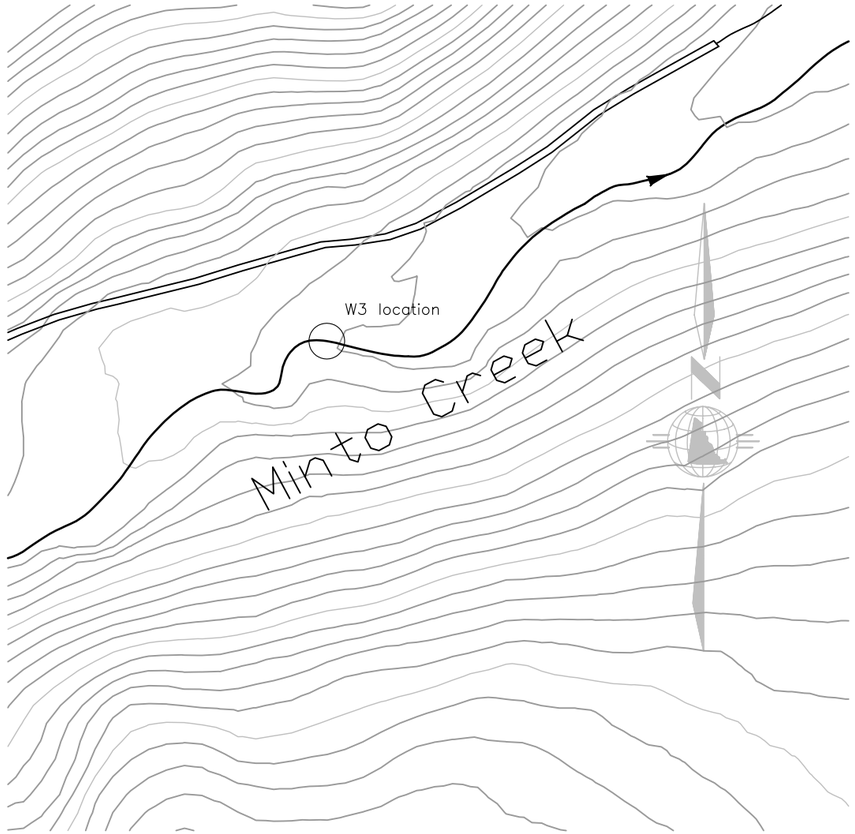
TOTAL 1.0 CUBIC METRES CONCRETE.

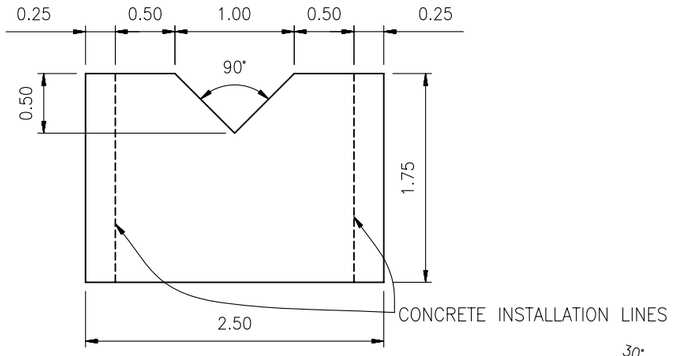
REBAR
1). 10M REBAR CROSS HATCH IN CONCRETE (TYP.)

2). 10M REBAR DOWELS x 300mm LONG IN SILL @ 150mm
BURY FOR TIE TO CONCRETE SIDES (POURED IN PLACE)

3). 25m REBAR DOWELS PLACED IN SILL AND SIDE.
PLACE WITH MINIMUM 300 BURY IN NATIVE GROUND (TYP)

CONCRETE
1). CONCRETE TO BE 25MPa





METAL WEIR PLATE

NOTE: 60° BEVEL ON DOWN STREAM
SIDE OF WEIR PLATE

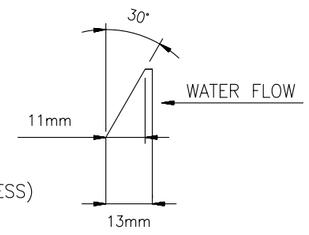


PLATE
1). 2.5m x 1.75m PLATE (13mm MINIMUM THICKNESS)

REFERENCE DRAWINGS

NOTES:

LOCATION: N6945787.622
E386978.528
Z683.0

REVISIONS & ISSUES

NO.	DATE	DESCRIPTION	BY
00	10/07/06	ISSUED FOR REVIEW	EWN
00	19/06/06	ISSUED FOR COMMENT	EWN
00	19/06/06	ISSUED FOR REVIEW	PJK

DESIGN
DRAWN EWN
CHECKED
SCALE:
HOR. NTS
VER. NTS

Yukon Engineering Services

SHERWOOD COPPER CORP.
SWC:TSX-V

MINTO CREEK
FLOW MEASUREMENT
WEIR W-3

DETAILS

SHEET 1 OF 1
Consultant Drawing No.: WEIR3
Client Drawing No.: –
REV. 1

MINTO MINE

Flow Monitoring Plan

APPENDIX II

90^0 V-NOTCH WEIR DISCHARGE CALCULATION TABLE

Formulas: $l/s = 1380\ H^{2.5}$

$m^3/hr = 4969\ H^{2.5}$

Where: H = head in meters

Head (meters)	l/s	m^3/hr	Head (meters)	l/s	m^3/hr
0.005			0.255	45.31	163.2
0.010			0.260	47.57	171.3
0.015			0.265	49.89	179.6
0.020			0.270	52.27	188.2
0.025			0.275	54.73	197.1
0.030			0.280	57.25	206.1
0.035			0.285	59.84	215.5
0.040			0.290	62.50	225.0
0.045			0.295	65.23	234.9
0.050			0.300	68.03	244.9
0.055			0.305	70.90	255.3
0.060	1.217	4.382	0.310	73.84	265.9
0.065	1.486	5.352	0.315	76.85	276.7
0.070	1.789	6.442	0.320	79.94	287.8
0.075	2.126	7.655	0.325	83.10	299.2
0.080	2.498	8.995	0.330	86.33	310.9
0.085	2.907	10.47	0.335	89.64	322.8
0.090	3.353	12.07	0.340	93.02	334.9
0.095	3.839	13.82	0.345	96.48	347.4
0.100	4.364	15.71	0.350	100.0	360.1
0.105	4.930	17.75	0.355	103.6	373.1
0.110	5.538	19.94	0.360	107.3	386.4
0.115	6.189	22.29	0.365	111.1	399.9
0.120	6.884	24.79	0.370	114.9	413.8
0.125	7.623	27.45	0.375	118.8	427.9
0.130	8.409	30.28	0.380	122.8	442.3
0.135	9.241	33.27	0.385	126.9	457.0
0.140	10.12	36.44	0.390	131.1	472.0
0.145	11.05	39.78	0.395	135.3	487.3
0.150	12.03	43.30	0.400	139.6	502.8
0.155	13.05	47.00	0.405	144.1	518.7
0.160	14.13	50.88	0.410	148.5	534.8
0.165	15.26	54.95	0.415	153.1	551.3
0.170	16.44	59.21	0.420	157.8	568.1
0.175	17.68	63.66	0.425	162.5	585.1
0.180	18.97	68.30	0.430	167.3	602.5
0.185	20.31	73.15	0.435	172.2	620.1
0.190	21.72	78.19	0.440	177.2	638.1
0.195	23.17	83.44	0.445	182.3	656.4
0.200	24.69	88.89	0.450	187.5	675.0
0.205	26.26	94.55	0.455	192.7	693.9
0.210	27.89	100.4	0.460	198.0	713.1
0.215	29.58	106.5	0.465	203.5	732.7
0.220	31.33	112.8	0.470	209.0	752.5
0.225	33.14	119.3	0.475	214.6	772.7
0.230	35.01	126.1	0.480	220.3	793.2
0.235	36.94	133.0	0.485	226.1	814.0
0.240	38.94	140.2	0.490	231.9	835.1
0.245	41.00	147.6	0.495	237.9	856.6
0.250	43.13	155.3	0.500	244.0	878.4