Fish and Fish Habitat Investigation for the Direct-Shipping Ore Project, New Millennium Capital Corp.

Prepared for
Groupe Hémisphères

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Executive Summary

Select fish and fish habitat within two mine sites (DSO2 & DSO3) of the proposed New Millennium Direct Shipping Ore Project (DSOP) were surveyed, classified and quantified under the federal Department of Fisheries and Oceans' quantification guidelines in order to characterize fish habitat within the proposed mine sites and to determine the potential HADD (habitat alteration, disruption or destruction) from proposed construction, operation and processing activities associated with the Project. This field investigation is follow-up from a preliminary reconnaissance survey in July 2008. The assessment and classification of habitat included five field-sampled waterbodies and twelve field-sampled stream sections within the Project footprint. Each waterbody was surveyed for fish species presence and subsequent habitat quantification as per Bradbury et al. (2001). Streams previously surveyed for habitat in July 2008 were sampled for fish species presence using index electrofishing. Table E1 provides a brief summary of the surveyed waterbodies and stream sections which contained fish.

All stream sections sampled within the proposed DSO2 footprint contained fish, primarily brook trout (*Salvelinus fontinalis*). Stream DSO2-01 yielded the most fish in site DSO2 with 30 brook trout. Within the proposed DSO3 footprint, three of the eight sites contained fish. Stream DS03-15 had the most brook trout captured (20). No fish were caught in streams DSO3-03, DSO3-06 and DSO3-14. Streams DSO3-10 and DSO3-11, which flowed during the July survey, were dried up on the September trip and could not be sampled. Two streams yielded species other than brook trout, DSO2-04 (burbot) (*Lota lota*) and DSO3-13 (lake chub) (*Couesius plumbeus*).

Of the five ponds and lakes sampled, two contained fish (brook trout): Star Lake and Timmins 1. Sampling for fish presence consisted of gill netting, the use of baited minnow traps and, in one case, index electrofishing in a very shallow pond (Triangle Pond, DSO3-05).

Star Lake is located within the proposed DSO2 mine site footprint. This pond contains brook trout and has a maximum depth of 1.5 m. The substrate composition of Star Lake consisted of mostly fines (sand and silt) with some rubble, cobble and gravel around the inflow and outflow. Total Habitat Equivalent Units have been calculated for brook trout at 0.1 ha.

Timmins 1 is located in the proposed DSO3 mine site footprint. This pond is the remains of previous mining operations, a pit now filled with water from spring freshet, runoff and precipitation in unknown proportions. Timmins 1 contains brook trout and has a total area of 23.78 ha, with the deepest location in the pond measuring 75 m. The substrate composition is comprised of rubble, gravel, sand and silt. Total Habitat Equivalent Units have been calculated for brook trout at 5.8 ha.

Table E.1. Summary of fish habitat quantification, DSO Project.

Site	Species Present	Total Area/Units	Total Area/Units by Habitat Type
Proposed Mining Site DSO2			
STREAMS			
DSO2-01	Brook trout	-	Riffle/Run
DSO2-02	Brook trout	-	Riffle/Run
DSO2-03	Brook trout	-	Riffle/Run
DSO2-04	Brook trout Burbot	-	Riffle/Run
LAKE			
Star Lake	Brook trout	10.1 ha	Littoral 10.1 ha
Proposed Mining Site DSO3			
STREAMS			
DSO3-03	-	-	Steady
DSO3-06	-	-	Steady
DSO3-08	Brook trout	-	Run / Riffle
DSO3-10	-	-	Dry (contained water in July)
DSO3-11	-	-	Dry (contained water in July)
DSO3-13	Brook trout Lake chub	-	Run / Riffle / Steady / Pool
DSO3-14	-	-	Steady
DSO3-15	Brook trout	-	Riffle
LAKE			
DSO-7 (Inukshuk Lake) (Upstream control)	-		Littoral 4.5 ha
DSO3-5 (Triangle Pond) (Downstream impact)	-		Littoral 0.2 ha
Timmins 1 Pit	Brook trout	23.8 ha	Littoral 2.5 ha Profundal 21.3 ha
Timmins 2 Pit	-		-

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1.0 INTRODUCTION

New Millennium Capital Corp. is exploring options for the location of mines northwest of the community of Schefferville, Quebec. There are currently two sites generally located just west of the community. The two proposed sites are named DSO2 and DSO3. To gather more information on the potential fish habitat in the area, a baseline survey of streams and waterbodies was carried out within the two options as required under schedule 2 of the Metal Mining Effluent Regulations (MMER) pursuant to subsections 36(5) (a) to (e) of the *Fisheries Act*.

2.0 OBJECTIVES

The aquatic survey provides New Millennium Capital Corp. with support for ongoing feasibility studies as well as information on the freshwater fish and fish habitat within the potential mining location options. It also addresses information requirements related to habitat characterization suitable for quantification in the context of DFO HADD requirements, as well as aquatic habitat characterization in compliance with general EA guidelines. The specific work scopes were as follows:

1. Collect baseline water quality parameters within selected watercourses and waterbodies;
2. Identify fish species present and, where possible, make population estimates in existing streams within both options;
3. Determine baseline habitat classification of streams and quantification of ponds to determine possible fish habitat within both options.

3.0 STUDY TEAM

The study team for the field project was a group that has extensive experience conducting fisheries surveys and habitat classification. Key team members are outlined below. Members of the study team have been involved in and have conducted fish and fish habitat studies during past projects.

Mr. Eugene M. Lee, M.Sc. is Project Manager and Senior Environmental/Aquatic Biologist with AMEC Earth and Environmental Ltd., St. John's. He has 22 years of experience as a consulting biologist and 15 years of experience in environmental site assessments in Canada and the United States. Mr. Lee was the project manager for this work scope.

Mr. James McCarthy, M.Sc. is a Senior Biologist with the St. John's office who has over sixteen years of experience in fisheries research and environmental assessment. Mr. McCarthy has acted as senior biologist and assessor for numerous projects throughout Newfoundland and Labrador and North America. Mr. McCarthy acted as senior technical biologist and co-project manager for this work scope.

Mr. Derm Kenny, NRT is an Environmental Technician with over ten years of experience in the environmental field involving baseline data collection directly related to the scope of work for this project. Mr. Kenny has a strong background in marine and freshwater studies, and conducted field data collection, data analysis, and interpretation for this project.

Ms. Suzanne Gouveia, B.Env. Studies (Honours) is an Environmental Biologist with the St. John's office. Ms. Gouveia has over seven years of experience in field sampling and environmental studies pertaining to fish and fish habitat studies. She has been involved in various baseline and environmental monitoring projects throughout Newfoundland and Labrador, Ontario and Washington State, USA. Ms. Gouveia conducted data analysis and interpretation and co-authored the project report.

Ms. Maureen Cameron-MacMillan, M.Sc. is an Intermediate Biologist with the Sydney, Nova Scotia, office. She has over four years of experience in fish habitat investigations and environmental assessments. Ms. Cameron-MacMillan has worked as a field biologist on fish habitat assessment projects throughout Atlantic Canada and acted as field team leader and field data manager for this project.

Mr. Aaron Wood, B.Sc. (Environmental Science) is an Environmental Scientist with the Dartmouth, Nova Scotia, office. Mr. Wood has 4 years of experience in Environmental Monitoring and Wildlife Inventories. He is experienced in data collection and report writing. He has a strong academic and field background in wildlife biology, marine and freshwater biology, ecology, and species at risk as well as experience in conservation. Mr. Wood acted as a field team member for this project.

Mr. Cassidy Pottle, NRT is an Environmental Technician with the Goose Bay office and has four years of experience in the collection of soil, water, sediment and fish samples for a variety of projects including contaminated site investigations and environmental effects monitoring. Mr. Pottle is experienced with working in remote locations throughout Labrador. Mr. Pottle's role on this project was field technician.

Mr. David McGinnis, CET is an Environmental Technologist with the Dartmouth, Nova Scotia, office who has five years of experience in various environmental fields. Mr. McGinnis has acted as field technologist for numerous projects throughout Nova Scotia and Newfoundland and Labrador. Mr. McGinnis acted as field technologist for this project.

4.0 QUALITY ASSURANCE

Standard Operating Procedures (SOPs) developed by AMEC Earth & Environmental for conducting studies were implemented during the current program. These included:

- Water, Sediment, Fish and Macro-invertebrate Sampling
- Electrofishing
- Bathymetry
- Fyke Net and Gill Net Use
- Stream Surveys
- Pond Surveys
- Field Data Management and Transfer

SOPs serve as established plans and procedures for conducting a series of tasks, ensuring that the work is completed to an acceptable standard and in a prescribed manner. The SOPs used by AMEC are on file. SOPs were reviewed in the field by all team members to ensure consistency of sample collection. In addition, a part of each team's Job-Safety Assessment (JSA) was a list of contact numbers for senior biologists and a call-in procedure to ensure that each day's data collection was consistent and accurate. This was referred to if any confusion arose in the field.

In addition to SOPs, QA/QC forms were completed and tracked for all data transfer from field to digital form and any aspect of the project where data validation was deemed necessary. These forms are an integral part of AMEC's QA/QC for data entry.

5.0 HEALTH AND SAFETY

Safety, health and environment (SHE) is an important part of every participant's overall job performance. Although AMEC has made great efforts in reducing the accident and injury rate, the goal is to have zero accidents and injuries. Obtaining this goal requires developing and maintaining an effective safety, health and environment management system and a safety culture among all employees. Managers continue to make safety their number one priority by promoting programs that are effective in identifying and reducing hazards in the workplace, providing ongoing training and making safety the primary consideration in all operations. As part of this program, field operations require job health and safety assessments (JSA) to be completed prior to remote activities. JSA documents are working documents that are brought to the work site and reviewed by all participants. Any outstanding issues are identified, documented and addressed as they arise. JSA reports are kept on file upon completion of the program.

6.0 DATA COLLECTION

The field data manager (Cameron-MacMillan) was responsible for ensuring that SOPs were followed during the collection of data and also for the daily transcription of field data onto data forms for subsequent computer data entry. For data requiring laboratory analysis, chain of custody forms were completed including documentation of preservation and storage methods. At least weekly, all data transcribed to data forms was reviewed by the data manager and cross-referenced with field note books. Any discrepancies were noted on field data forms and a review of procedure was conducted.

6.1. Technical Reporting

Technical quality assurance extending from field data collection to data review and reporting was provided by field supervisors and senior scientists. Their role included reviewing the data entered for computer analysis and all subsequent reports for accuracy. A Data Validation, QA/QC Form was completed each time data was transferred (e.g., from field data forms to digital spreadsheets). These forms suggest QA procedures and, when filled out, outline what QA reviews and corrective actions, if required, were completed on the data.

6.2. Nomenclature

The naming of streams, ponds and landmarks was provided by the client and utilized for consistency and referencing purposes. Each pond and stream has been labeled by a unique identification number or name as identified on the 1:50,000 topographic maps. Ponds and streams labeled and sampled in past programs retained their label designation to allow direct comparison of results. All names are provided in the appropriate sections of the report.

6.3. Geo-referencing

All sample locations were geo-referenced using handheld Global Positioning Systems (GPS). The position of each set was recorded on an internal SD chip and also recorded in field notebooks. All field positions were gathered using WGS84 datum unless sample locations from previous reports were used. In these circumstances, the original datum was used and is clearly shown. Where greater accuracy was required (i.e. during bathymetric surveys), Differential Global Positioning Systems (DGPS) were used. These systems used one of two methods to correct for position accuracy: integration of Canadian Coast Guard differential correction data or integration of OMNIstar differential correction data. Tests on both systems prior to deployment indicated accuracies of 1 m or less.

7.0 SAMPLING PROGRAM

The stream sampling program for this project followed the stream sampling Standard Methods Guide for Freshwater Fish and Fish Habitat Surveys in Newfoundland and Labrador: Rivers and Streams (Sooley et al. 1998 and McCarthy et al. 2007). Similarly, Standard Methods Guide for the Classification/Quantification of Lacustrine Habitat in Newfoundland and Labrador (Bradbury et al. 2001) was followed for all sampled ponds.

The work comprised a set of clearly defined tasks, which were carried out in accordance with the scope of work provided in the Request for Proposal. Sample locations are provided in Table 7.1, with a map of the general location provided in Figure 1. The existing 1:50,000 scale mapping doesn't provide the detailed stream locations in and around the project site. Air photos taken in 1973 from the Department of Natural Resources and Wildlife of Quebec as well as aerial photography completed in Sept and Oct 2008 were used to provide more accurate delineation of habitat (Figures 2 and 3).

Table 7.1. Summary of sample sites, type of sampling and coordinates of DSO Project.

Sample Site ID	WGS 84 UTM		Sampling type
	N	E	
Proposed Mining Site DSO2			
DSO2-01	6079173	631981	Stream survey Index Electrofishing
DSO2-02	6079486	631340	Stream survey Index Electrofishing
DSO2-03	6079913	631512	Stream survey Index Electrofishing Sediment and Invertebrate samples
DSO2-04	6079693	630843	Stream survey Index Electrofishing
Star Lake	6079724	631689	Fish Presence, Bathymetry and Habitat Quantification
Proposed Mining Site DSO3			
DSO3-03	6083555	624887	Stream survey Index Electrofishing
Triangle Pond DSO3-05	6084610	623300	Fish Presence and Bathymetry
DSO3-06	6084138	624393	Stream survey Index Electrofishing
Inukshuk Lake DSO3-07	6086016	623471	Fish Presence and Bathymetry
DSO3-08	6088875	620814	Stream survey Index Electrofishing
DSO3-10	6088278	622497	Stream survey
DSO3-11	6086401	621667	Stream survey
DSO3-13	6084944	620381	Stream survey Index Electrofishing
DSO3-14	6086422	620277	Stream survey Index Electrofishing
DSO3-15	6083929	622501	Stream survey Index Electrofishing
Timmins 1 Pit	6083939	622599	Fish Presence, Bathymetry and Habitat Quantification
Timmins 2 Pit	6084494	622589	Fish Presence

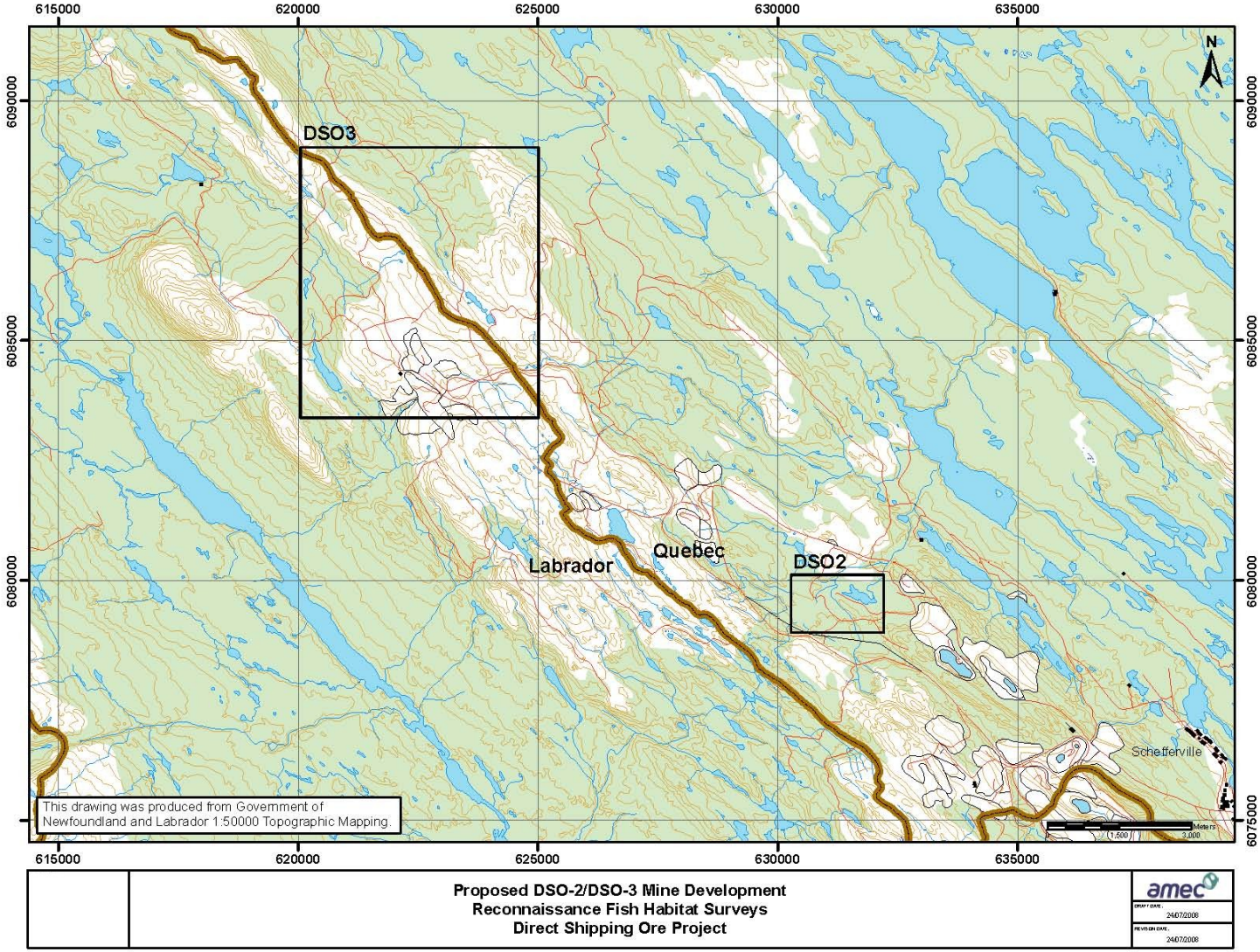

Figure 7.1. An overview of DSO2 and DSO3 locations.

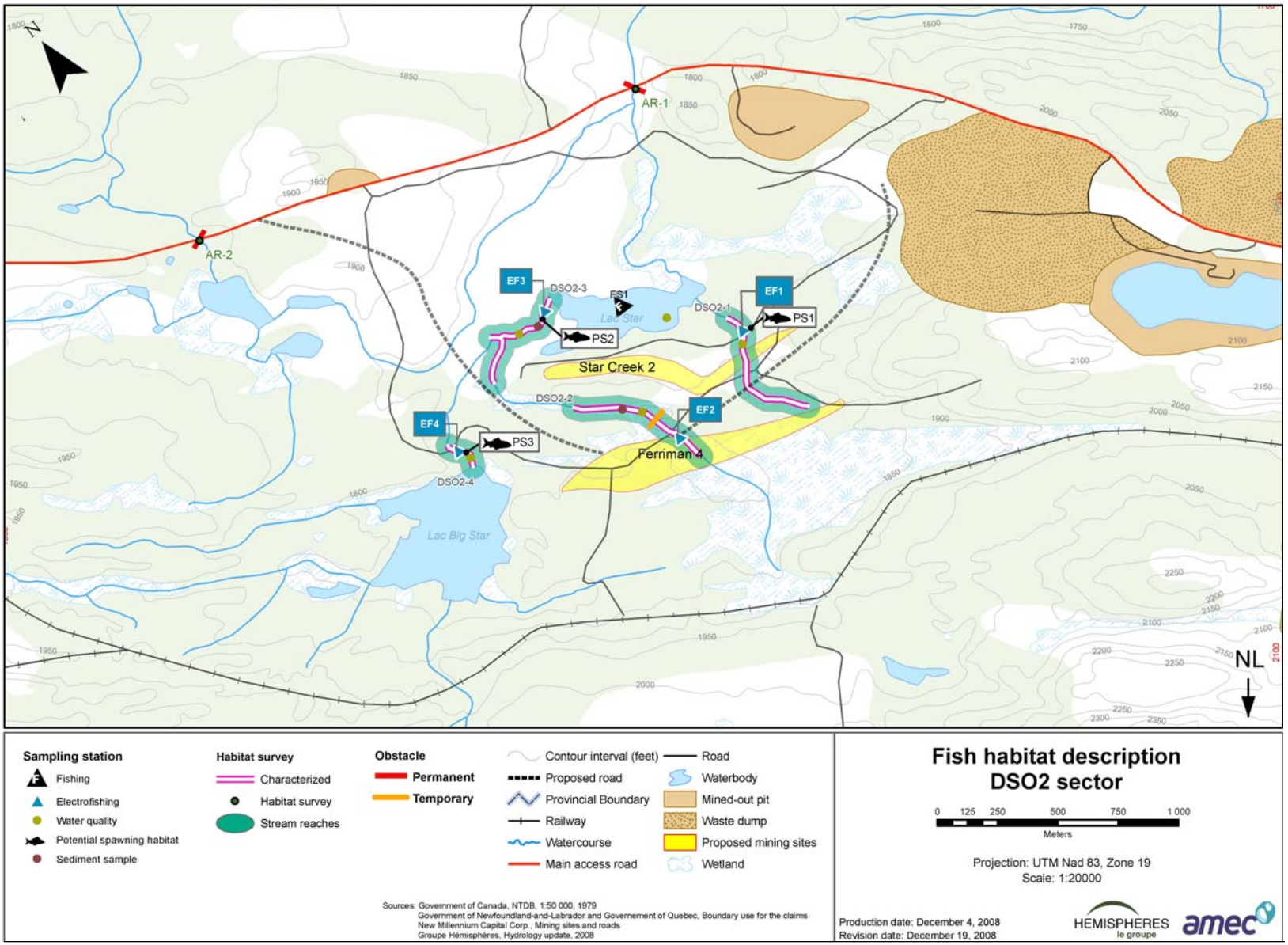

Figure 7.2. DSO2 stream and waterbody sites.

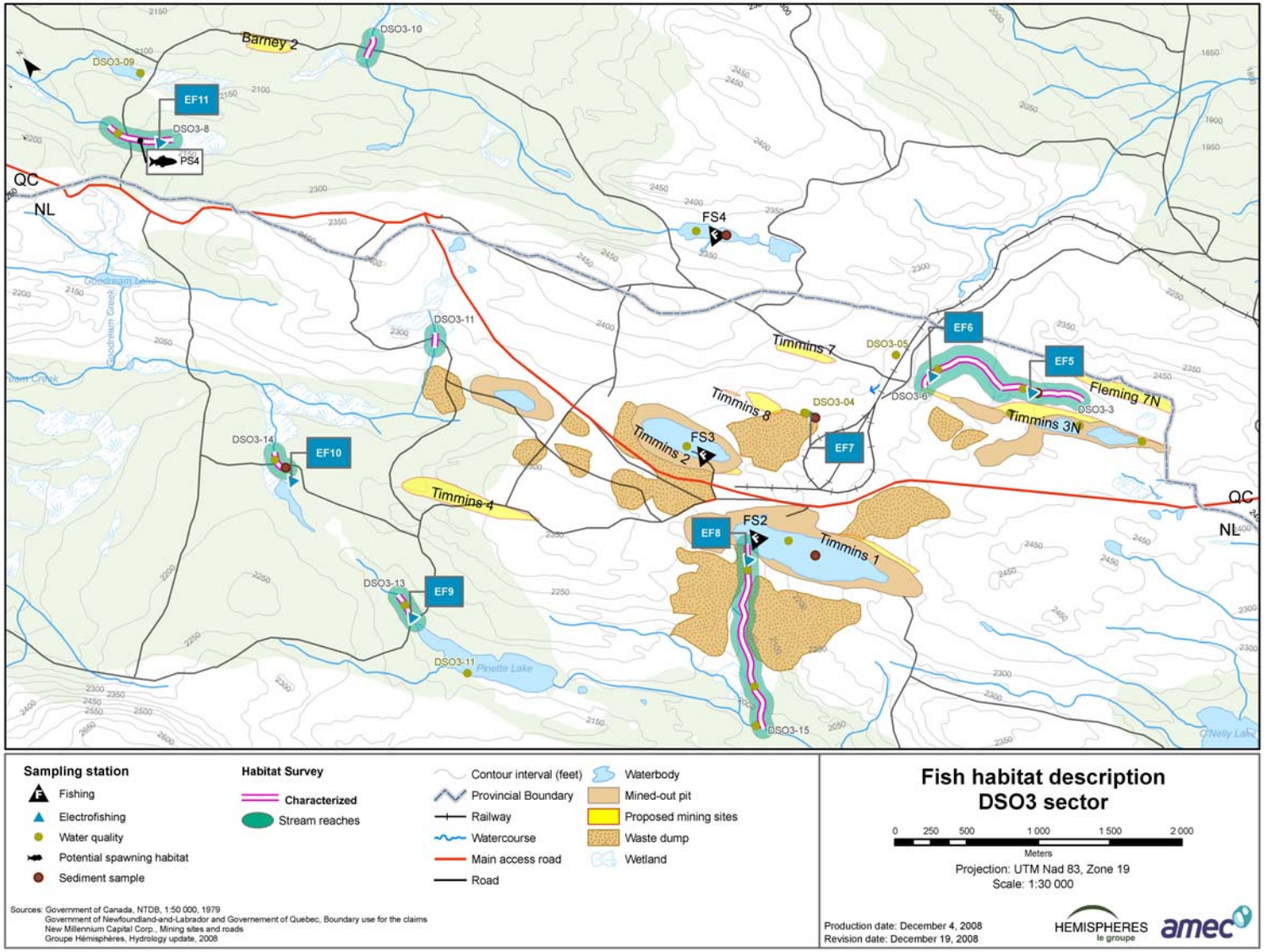

Figure 7.3.DSO3 stream and waterbody site.

8.0 METHODS

Preliminary field reconnaissance of streams near and within each proposed mine site (DSO2 and DSO3) took place July 17-19, 2008. Each stream site was accessed by vehicle and/or on foot and surveyed using standard stream measurement techniques as described in Sooley et al (1998) and Scruton et al. (1992) as well as AMEC Standard Operating Procedures. The preliminary reconnaissance identified areas that had potential as fish habitat. Sampling for fish presence was not included in the work scope for the reconnaissance survey.

The current study was initiated to determine fish presence and the quantity of lacustrine fish habitat in ponds containing fish populations. Streams determined in July to be potential fish habitat were sampled for fish presence from September 9 to 15, 2008. Surveying of selected ponds was also conducted.

8.1. Lacustrine Habitat Classification/Quantification

As per DFO guidelines, fish species presence is used to classify and quantify the fish habitat present in each pond. Sampling in each pond consisted of a depth profile of water quality parameters, Secchi depth determination, fish presence determination, and bathymetry using an integrated GPS and sonar mapping system. The field crew also conducted a shoreline survey of each pond for nearshore substrate classification.

8.1.1. Fish Presence

Baited minnow traps and gillnets were used to determine fish species presence in each of the ponds. Baited minnow traps were set along the littoral zone of the ponds to determine small-bodied fish presence. Monofilament gillnet gangs comprising a total of six panels of 12.7 mm, 25.4 mm, 38.1 mm, 76.2 mm, 101.6 mm, 127 mm mesh sizes were set throughout each pond. The nets and traps where set throughout the day and overnight to allow for fish movement throughout the pond and adequate time for the nets/traps to fish. Nets were generally set perpendicular to the shore.

Electrofishing was conducted in one sample pond (DSO3-05) as an alternative sampling means, because the water was too shallow to permit the use of nets or traps. The crew covered the entire area of the shallow pond. The total shocking time was recorded and later calculated to determine catch-per-unit-effort (CPUE). All captured fish were processed in the same way as those captured by electrofishing in streams.

8.1.2. Water Clarity

Water clarity, measured at the deepest location of the pond, was determined using a Secchi disc during the July site visit. The disc was lowered in the water column using a calibrated line on the shaded side of the boat. The depth when the disc disappeared from sight as it descended was recorded, as well as the depth when it re-appeared as it ascended. The average of the two was calculated and recorded as the littoral depth (depth of water which is penetrated by light).

8.1.3. Sediment Sampling

Sediment samples were collected from four open waterbodies and three stream locations with a Petit Ponar grab (model 1725-F10). The Petit Ponar was equipped with 500µm top screens, which assisted in reducing the loss of sediment on the surface substrates prior to recovery of the grab. The grab was brought to the surface and the appropriate amount extracted from the sampler using stainless steel instruments.

8.1.4. Bathymetric Profile

As part of lacustrine habitat quantification, a bathymetric profile of all identified ponds was completed using sonar equipment. The unit used to map the bathymetric profiles was linked to a GPS and external sonar; this allowed the correlation of pond depths and locations (differential GPS capable) with a set of digital maps. The unit collects a position and water depth every second. An aluminum boat was used with the digital sonar to appropriately traverse the pond habitat. The data was mapped upon completion of the surveys using existing mapping of the study area (1: 50,000) and contour mapping software. The pond boundary was extracted from existing digital base maps of the area provided by the Province of Newfoundland and Labrador and was used as the boundary for all contour modeling. Bathymetric plots were generated using the 3Dfield software package, which plots the data using simple linear equations with grid intervals of 1 m. All completed bathymetric contours were then exported to ARCGIS™ for analysis.

8.1.5. Habitat Quantification

In all ponds where fish were present, the number of hectares of productive lacustrine fish habitat was quantified. All fish species caught during sampling were considered to be using that habitat for part or all of their life-cycle. The approach used for the quantification of lacustrine habitat followed the Standard Methods Guide for the Classification/Quantification of Lacustrine Habitat in Newfoundland and Labrador (Bradbury et al. 2001). The approach involved the completion of both littoral and non-littoral habitat mapping and sampling for species presence and habitat utilization.

Secchi disc depth was used to discriminate between littoral and non-littoral habitat. Once determined, the crew conducted a habitat survey within the littoral zone recording the substrate composition, littoral depth and vegetation. This data was used to calculate the habitat suitability indices (HSI) of individual fish species at various life stages specific to the waterbody. Once habitat suitabilities are determined, habitat equivalent units (HEU's) are calculated for each fish species present.

8.2. Riverine Habitat Classification

All stream reaches were sampled on the ground and were identified and delineated with a series of habitat measurements completed within each stream reach (see Scruton et al. 1992 and Sooley et al. 1998). Habitat measurements included water velocity, water depth, substrate composition and quality, slope, vegetation (presence/absence), stream wetted width, channel width and general bank condition. Measurements of water depth and mean water column velocity were conducted at intervals of 1/3,1/2 and 2/3 of the stream wetted width. Water depth was recorded using a meter-stick, and mean water velocity was measured using a velocity meter (Global flow Probe model FP101) or equivalent field method as outlined in Sooley et al. (1998). The substrate composition of each reach was also recorded as the percentage of each substrate size classification. Based on these measurements, each reach was classified into various habitat types. Two habitat classification systems were used: the Beak (1980) and a new classification system soon to be implemented by DFO (McCarthy et al. 2007).

Riverine habitat classification was completed as part of the July site visit and is presented in Appendix A. Relevant results have been presented in this report where fish species were present.

8.2.1. Electrofishing

Index electrofishing surveys were completed at 12 sites throughout the study streams and at one standing body of shallow water to determine fish species presence. All sites were index electrofished for a minimum of 300 seconds (shocking time). Electrofishing was conducted in the same locations as the stream survey conducted in July.

Electrofishing procedures followed AMEC's Standard Operating Procedures (SOP's) for stream electrofishing as well as Scruton and Gibson (1995).

Electrofishing is the least selective method of fish sampling within a river system (Lagler 1978). A sampling site is selected based on the habitat type (e.g., riffle, run, pool) and the distance of the site allowing the crew to sample one discrete habitat type within a minimum of 300 seconds of electrofishing effort. The site must not be disturbed prior to sampling (e.g., walking through the selected site before sampling) as it is not enclosed with barrier nets. The site is sampled by a backpack-operated electrofisher and one or two dip-netters on either side of the electrofisher operator. The crew starts at the downstream end of the site and fishes moving upstream covering the entire width of the stream; moving up in a discontinuous fashion (turning on and off the power through the

trigger on the anode) so as to not 'push' or herd fish continually upstream (Scruton and Gibson 1995). Each fish captured was placed in a bucket of stream water until the entire reach was completed. All observed missed fish were recorded for monitoring of fishing efficiency of the field crew. All captured fish were anaesthetized with a 10:1 mixture of ethanol alcohol and clove oil, identified to the species level, weighed, measured, a sub-set of scale samples taken (for purposes of age interpretation), and where possible sexed using external colouration. The fish were then released downstream of the sampling station.

8.2.2. Benthic Invertebrates

Benthic macroinvertebrates are known to be good indicators of habitat health (Reise and Wohlenberg 1993) and are typically included in long-term Environmental Effects Monitoring (EEM) Programs.

Benthic sampling was conducted during the September field sampling period. Samples were collected from four open waterbodies and three stream locations using either a Mini-Surber sampler or a Petit Ponar grab (model 1725-F10). Three separate samples were collected from each site.

The Mini-Surber has a sampling area of 0.023 m^2 and 500 μm mesh net for collection. Substrate within the square frame was cleaned thoroughly with a small, soft bristle brush. Samples were then stored in a glass sample jar preserved with 95% ethanol alcohol for later processing and identification.

The Ponar was used to collect samples from the ponds. The unit has a 232 cm^2 collection area (0.0024 m^3 volume) and is equipped with 500 μm top screens to reduce the loss of macroinvertebrates residing on the surface substrates prior to recovery of the grab. Each sample was field cleaned and stored in bottles with preservative (95% ethanol).

Each sample had all organisms identified to the lowest possible level (typically to Family) and enumerated. Due to the relatively low numbers of organisms, no splitting of the samples was conducted. Baseline diversity was assessed using standard methods with calculations of richness (total number of families), Shannon-Weiner Diversity Indices (H), Simpson's Diversity Index and an estimate of Species Evenness (D).

Invertebrate Diversity Estimates

The mathematics of *information theory* is used to make calculations about groups of organisms and their *first-order diversity*, H_1, and divergence from equiprobability, D_1. For example, if there are n possible categories in a data set and their proportions are $p_i,.....,p_n$, then the measure of diversity, for this system is defined to be:

$$H_i = \sum_{i=1}^{n} p_i \log_2 p_i$$

Since $\log_2 0$ is not defined, if $p_i = 0$ the conventional adoption is the expression $p_i \log_2 p_i = 0$. In a data set with n categories, $H_{1max}(n)$ is the maximum possible value of H_1.
The divergence from equiprobability is defined to be:

$$D_1 = H_{max} - H_1 = \log_2 n - H_1$$

A low D_1 value means H_1 is close to H_{1max}, that is, the system is nearly in a state of equiprobability; there is a high degree of diversity present. Conversely, a high D_1 value means that H_1 is small relative to H_{1max}, that is, the system has diverged substantially from equiprobability and is not very diverse. For example, for an H_1 of 1.5 and an H_{1max} of 2.0, the D_1 value would be 0.5. In this case 0.5 is a substantial divergence, since it represents 25% of H_{1max}.

9.0 WATER QUALITY

Water quality sampling was conducted at the locations listed in Table 9.1. Parameters analyzed were in accordance with the Metal Mining Effluent Regulations (MMER), with the exceptions of Radium 226 and Total Cyanide, which were not required by the client. All samples were analyzed by a CAEAL certified laboratory. Standard field duplicates of 10% of all samples were collected and sent to the laboratory for QA/QC. In addition, the laboratory results also identify all in-laboratory QA/QC measures (blanks and calibrations) as part of standard reporting (see Appendix C).

In addition to the collection of water samples, an in-situ physical analysis of the water quality in the study area was carried out concurrently with the stream surveys in July and the fish habitat surveys in September. Depth profiles of water quality parameters were recorded in-situ at each sample location. A Hydrolab Mini-Sonde probe was used to gather a profile of water temperature, pH, conductivity and dissolved oxygen at one-meter intervals (or at half-meter intervals if the pond was shallow) between the surface and bottom. Water quality parameters included temperature, pH, conductivity, dissolved oxygen, conductivity and turbidity. Data were collected with a hand-held water quality meter (YSI model 600 QS), a turbidity meter (La Motte model 2020e) and a Secchi disk. In some locations, a pocket pH meter and a conductivity meter (Hanna brand) were used. This information was collected during the July site visit.

Table 9.1. Summary of sampling sites in July and September, 2008.

Site I.D.	July Survey	September Survey
DSO2-01	17/07/2008	11/09/2008
DSO2-02	17/07/2008	11/09/2008
DSO2-03	17/07/2008	11/09/2008
DSO2-04	17/072008	11/09/2008
Star Lake	20/07/2012	11/09/2008
DSO3-02	17/07/2008	Not surveyed[1]
DSO3-03	17/07/2008	11/09/2008
DSO3-04	18/07/08	Not surveyed[1]
DSO3-05 Triangle Pond	20/07/2008	13/09/2008
DSO3-06	18/07/2008	10/09/2008
DSO3/-07 Inukshuk Lake	18/07/2008	13/09/2008
DSO3-08	18/07/2008	10/09/2008
DSO3-09	18/07/2008	Not surveyed[1]
DSO3-10	19/07/2008	Not surveyed[2]
DSO3-11	18/07/2008	Not surveyed[2]
DSO3-13	19/07/2008	10/09/2008
DSO3-14	19/07/2008	10/09/2008
DSO3-15	19/07/2008	12/09/2008
Timmins 1	19/07/2008	12/09/2008
Timmins 2	19/07/2008	11/09/2008

Notes:
1: July's survey determined that site contained no fish habitat
2 : July's survey quantified the site as fish habitat but was dried up in September

10.0 RESULTS

10.1. Lacustrine Habitat Classification/Quantification

Table 10.1 presents the CPUE of all fished waterbodies. Due to the shallow depth of site DSO3-05 (Triangle Pond), this site was sampled by electrofishing instead of netting. The entire pond was index electrofished but did not yield any fish. Only Timmins 1 and Star Lake were considered fish habitat, as only these had fish present. The habitat quantification and calculation of Habitat Equivalent Units for both Timmins 1 and Star Lake are provided below.

Table 10.1. CPUE of fishing effort, all ponds.

CPUE Gill Nets						
Site	**Date (set)**	**Set Time**	**Date (lift)**	**Check Time**	**Total Catch**	**CPUE(catch/hr)**
Inukshuk Lake	13/09/2008	15:30	14/09/2008	9:00	0	0.00
Timmins 1	12/09/2008	9:45	12/09/2008	11:40	6	3.13
Timmins 2	12/09/2008	15:40	13/09/2008	10:44	0	0.00
Star Lake	12/09/2008	11:00	12/09/2008	14:45	2	0.35
CPUE Minnow Traps						
Site	**Date (set)**	**Set Time**	**Date (lift)**	**Check Time**	**Total Catch**	**CPUE(catch/hr)**
Inukshuk Lake	13/09/2008	15:30	14/09/08	9:00	0	0.00
Star Lake	12/09/2008	11:00	12/09/2008	13:00	1	0.50
Star Lake	12/09/2008	13:00	12/09/2008	14:45	0	0.00
Timmins 1	12/09/2008	9:45	12/09/2008	11:35	0	0.00
Timmins 2	12/09/2008	15:40	13/09/2008	10:44	0	0.00
Index Electrofishing CPUE						
Site ID	**Date**	**Effort (seconds)**			**Total Catch**	**CPUE (catch / 300 sec)**
Triangle Pond DSO3-05	13/09/2008	300			0.00	0.00

10.1.1. DSO3-05 (Triangle Pond)

This pond contained no fish and is hence not considered fish habitat. The site consisted of a 0.2 ha (all littoral) water body located east of Timmins 2. It was sampled as a downstream impact monitoring site for water quality and fish presence. This pond was very shallow (all less than one metre deep) and contained a substrate composition of mostly silt and sand. There was no evidence of an inflow/outflow, and geologists stated that this water body is the result of rain runoff and spring freshet. See Photo B-56, Appendix B.

10.1.2. DSO3-07 (Inukshuk Lake)

This site also contained no fish and hence is not considered fish habitat. It is a 4.48 ha shallow lake (all littoral) with emergent vegetation. Inukshuk Lake contains a rocky bottom with an overall substrate composition of boulders and rubble, with lesser amounts of cobble, gravel and silt. This site may be considered as a control or reference site for water quality should development proceed. See Photo B-57, Appendix B. Figure 10.1 presents the bathymetric profile of Inukshuk Lake.

10.1.3. Timmins 2

Timmins 2 is an exhausted pit now filled with water, a result of rain, runoff and the spring freshet. It is located within the DSO3 proposed mine site. No inflow or outflow was observed. Gillnets and minnow traps were set but did not yield any fish; therefore no other surveys were conducted or samples collected (see Photo B-59, Appendix B).

10.1.4. Timmins 1

Brook trout were present in this former pit. Timmins 1 is an exhausted pit now filled with water, a result of rain, runoff and the spring freshet. Timmins 1 has a total area of 23.78 ha, with the deepest location measuring 75 m. The substrate composition consisted of rubble, gravel, sand and silt. It is located within the DSO3 proposed mine site. Water from this pond was found to be running through a gravel berm into stream DSO3-15 on the western shore (see Photo B-58, Appendix B). Figure 10.2 presents the bathymetric profile of Timmins 1.

Habitat Quantification

A DFO-generated spreadsheet was used for habitat quantification; the spreadsheet was used in conjunction with the habitat and species data collected in the field. Table 10.2 presents an overview of the habitat information used to determine habitat areas. Table 10.3 shows the habitat suitabilities of each habitat type for the species present (i.e., brook trout). The habitat suitabilities range from 0.00 (not suitable) to 1.00 (very high suitability). DFO spreadsheet calculations were used to determine final habitat equivalent units of each habitat type present (Table 10.4). Total HEUs (Table 10.4) have been calculated for brook trout at 5.8 ha and broken down as follows:

- 1.5 ha of Littoral Medium, no vegetation;
- 0.7 ha Littoral Fine, no vegetation;
- 3.6 ha Non-littoral Fine habitat.

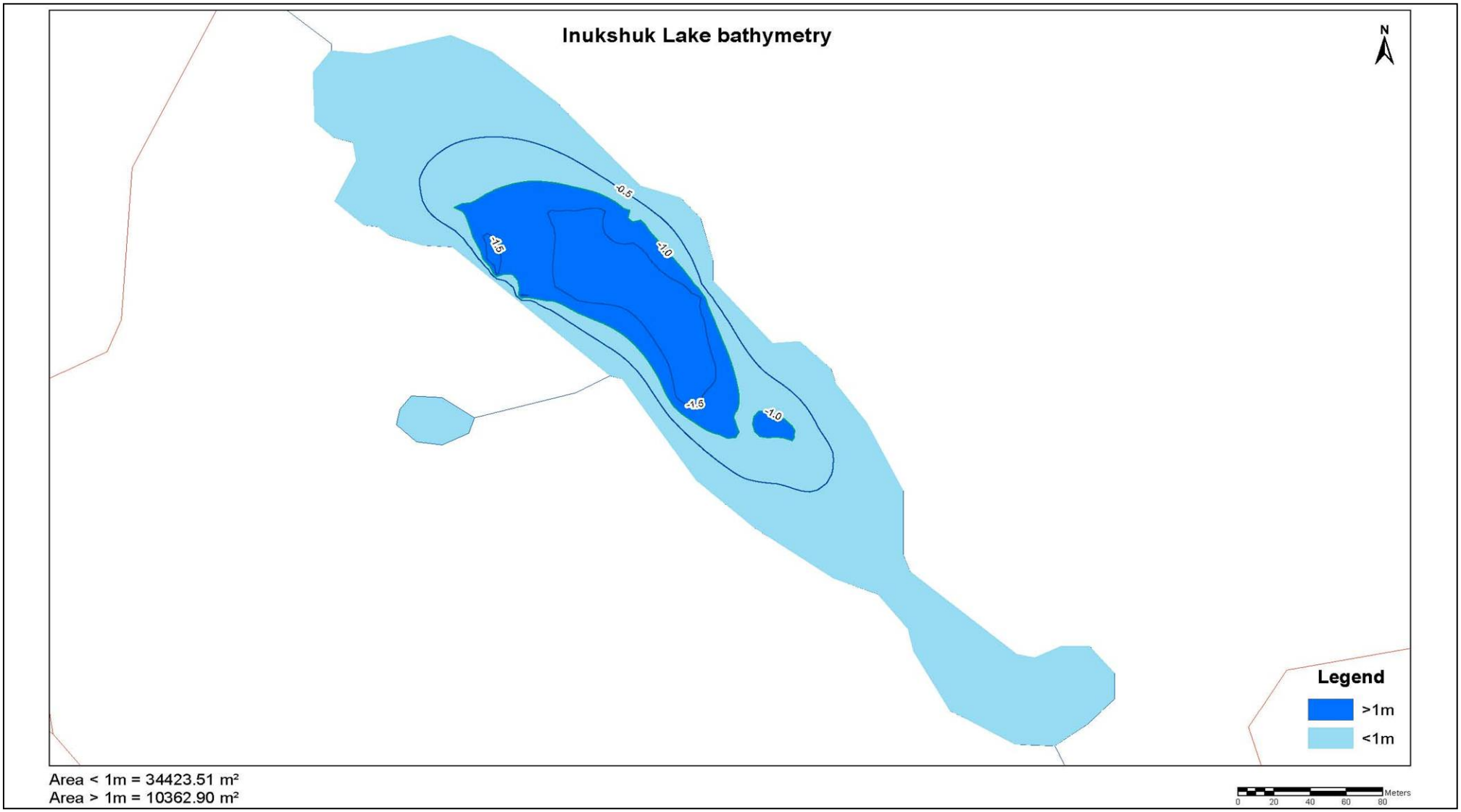

Figure 10.1. Bathymetric profile of Inukshuk Lake, September, 2008.

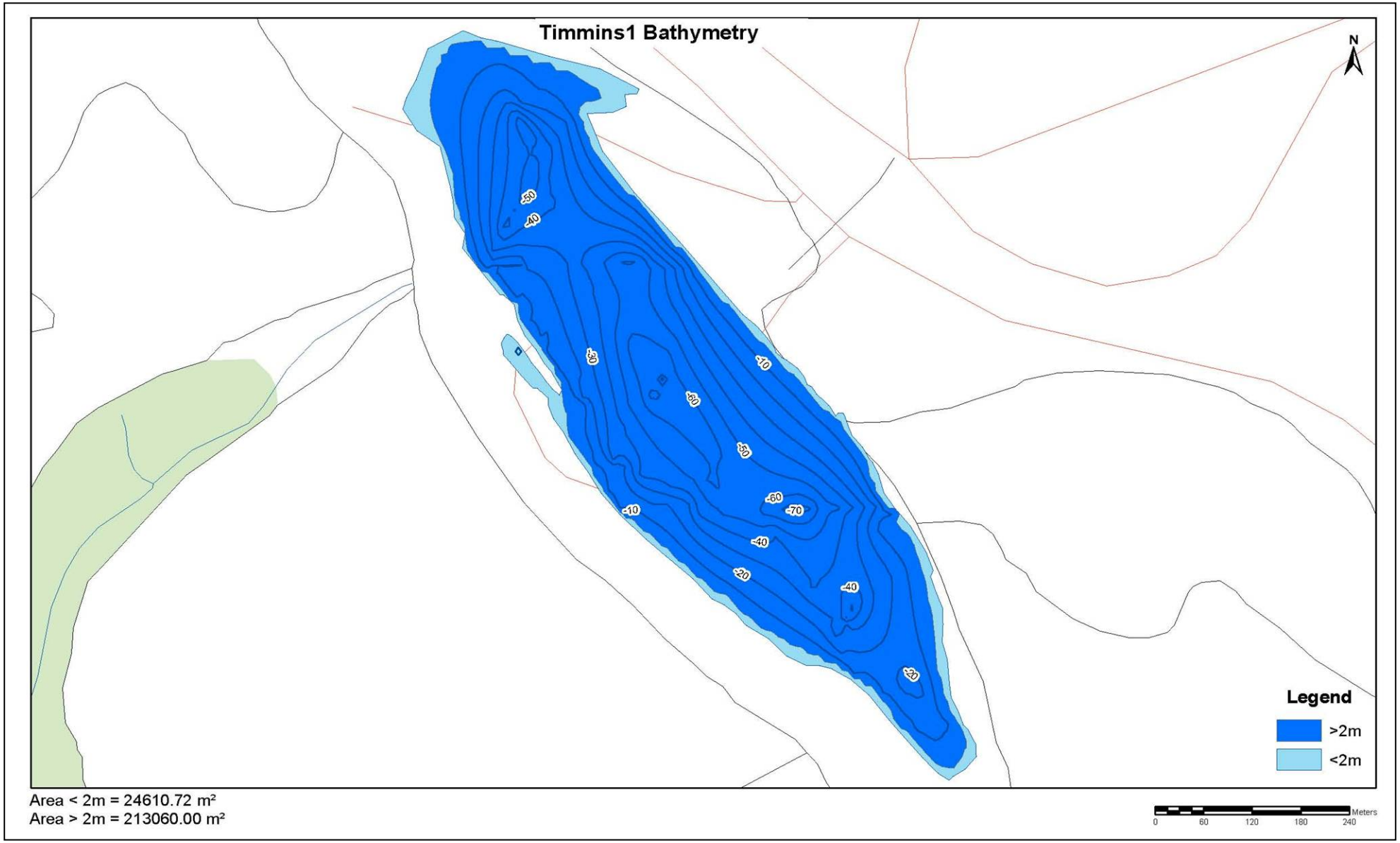

Figure 10.2. Bathymetric profile of Timmins 1, September, 2008.

Table 10.2. Summary of Timmins 1 habitat values used to calculate aerial extents

Enter Lake name:	Timmins 1

Part 1 Entering Lake depth(s):

IF Lake Depth is less than or equal to 10 m:

Path 1		OR	Path 2	
A Enter Depth of Littoral Zone:	0		A-1 Enter mean depth of Non-Littoral Zone:	17
B Enter Mean Depth of Lake:	0		B-1 Enter depth of Benthic Zone:	75

Path 2 (Continued…)

IF Lake Depth is greater than 10 m:

Mean depth of Non-Littoral Zone:		*(Reduced Value)*
Depth of the Benthic Zone:		*(Reduced Value)*
Benthic Pelagic ratio:		

Part 2 Enter the values for the estimated bottom surface area:

Littoral Zone (No vegetation):

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	5,537.41	Sand:	5,537.41
	Boulder:	0.00	Cobble:	0.00	Silt:	4,306.88
			Gravel:	9,229.02	Muck:	0.00
					Clay:	0.00
	SubTotals:	0		14,766		9,844

Littoral Zone (Vegetation)

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00
			Gravel:	0.00	Muck:	0.00
					Clay:	0.00
	SubTotals:	0		0		0

Non-Littoral Zone

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00
			Gravel:	0.00	Muck:	213,060.00
					Clay:	0.00
	SubTotals:	0		0		213,060

Part 3 Summary Table for Bottom Surface Area Totals:

Habitat Types	Bottom Surface area (m^2)
Littoral Coarse/No vegetation	0
Littoral Medium/No vegetation	14,766
Littoral Fine/No vegetation	9,844
subtotal Littoral/No vegetation	**24,611**
Littoral Coarse/Vegetation	0
Littoral Medium/Vegetation	0
Littoral Fine/Vegetation	0
Subtotal Littoral/Vegetation	**0**
Subtotal Littoral	**24,611**
Non-littoral Coarse/Pelagic	0
Non-littoral Medium/Pelagic	0
Non-littoral Fine/Pelagic	213,060
Subtotal nonlittoral	**213,060**
Total Available Habitat	**237,671**

Table 10.3. Habitat suitabilities for species present (brook trout) within Timmins 1.

Species	Life Stage	Littoral Zone						Non-Littoral Zone		
		Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic
Brook Trout (freshwater resident)	Spawning	NA	0.84	0.76	NA	NA	NA	NA	NA	0.17
	YOY	NA	1.00	0.00	NA	NA	NA	NA	NA	0.00
	Juvenile	NA	1.00	0.00	NA	NA	NA	NA	NA	0.00
	Adult	NA	0.50	0.67	NA	NA	NA	NA	NA	0.00

YOY – Young of the Year

Table 10.4. Habitat equivalent units for species present (brook trout) within Timmins 1 measured in m^2.

Species	Littoral Zone						Non-Littoral Zone			
	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic	Total Available Habitat
Brook Trout (freshwater resident)	0	14766	7482	0	0	0	0	0	36220	58468.4

10.1.5. Star Lake

This lake is located within the DSO2 proposed mine site. It has a total area of 10.1 ha, with the deepest point measuring 1.5 m. The substrate composition is comprised of fines, with gravel cobble and rubble located at the mouth of the inflow and outflow. Schools of large (approximately 200 mm in length) brook trout were observed near the outflow of the lake during the September field sampling. See Photo B-60, Appendix B. Figure 10.3 presents the bathymetric profile of Star Lake.

Habitat Quantification

A DFO-generated spreadsheet was used for habitat quantification; the spreadsheet was used in conjunction with the habitat and species data collected in the field. Table 10.5 presents an overview of the habitat information used to determine habitat areas. Table 10.6 shows the habitat suitabilities of each habitat type for the species present (i.e., brook trout). DFO spreadsheet calculations were used to determine final habitat equivalent units of each habitat type present (Table 10.7). Total HEUs (Table 10.7) have been calculated for brook trout at 0.055 ha and broken down as follows:

- 0.055 ha Littoral Fine, vegetation.

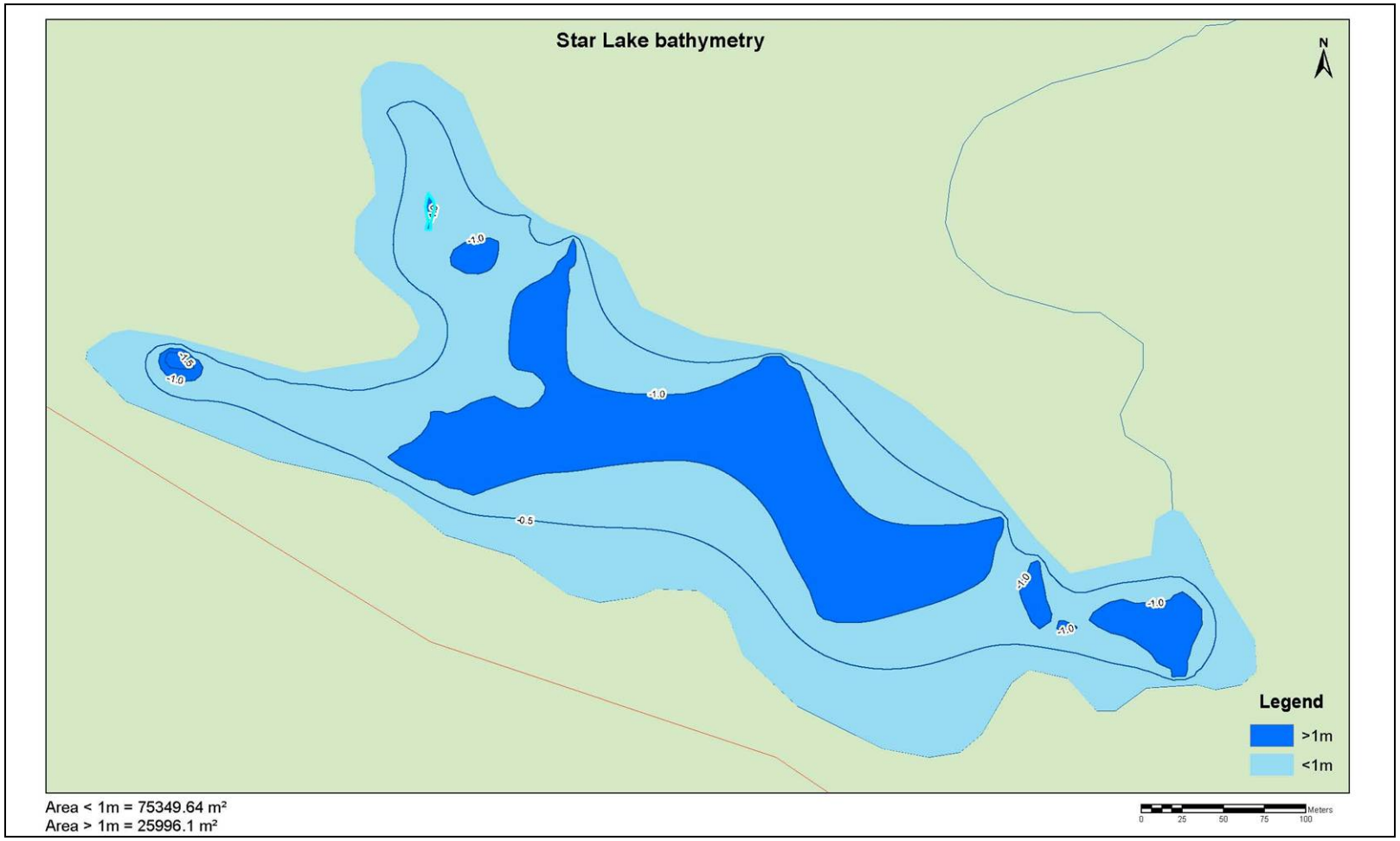

Figure 10.3. Bathymetric profile of Star Lake, September, 2008.

Table 10.5. Summary of Star Lake habitat values used to calculate aerial extents.

Step 1 **Note:** Only enter the values in the cells shaded blue, the subtotals, totals and ratios will be calculated autor

Enter Lake name: Star Lake

Part 1 Entering Lake depth(s):

IF Lake Depth is less than or equal to 10 m: Path 1		OR	IF Lake Depth is greater than 10 m: Path 2	
A Enter Depth of Littoral Zone:	1		A-1 Enter mean depth of Non-Littoral Zone:	0
B Enter Mean Depth of Lake:	1		B-1 Enter depth of Benthic Zone:	0

Path 2 (Continued…)

IF Lake Depth is greater than 10 m:

Mean depth of Non-Littoral Zone:		*(Reduced Value)*
Depth of the Benthic Zone:		*(Reduced Value)*
Benthic Pelagic ratio:		

Part 2 Enter the values for the estimated bottom surface area:

Littoral Zone (No vegetation):

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	3,013.99	Sand:	30,139.86
	Boulder:	0.00	Cobble:	3,767.48	Silt:	30,139.86
			Gravel:	7,534.96	Muck:	0.00
					Clay:	0.00
	SubTotals:	0		14,316		60,280

Littoral Zone (Vegetation)

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00
			Gravel:	0.00	Muck:	753.50
					Clay:	0.00
	SubTotals:	0		0		754

Non-Littoral Zone

Substrate:	Coarse	m^2	Medium	m^2	Fine	m^2
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00
			Gravel:	0.00	Muck:	25,996.10
					Clay:	0.00
	SubTotals:	0		0		25,996

Part 3 Summary Table for Bottom Surface Area Totals:

Habitat Types	Bottom Surface area (m^2)
Littoral Coarse/No vegetation	0
Littoral Medium/No vegetation	14,316
Littoral Fine/No vegetation	60,280
subtotal Littoral/No vegetation	**74,596**
Littoral Coarse/Vegetation	0
Littoral Medium/Vegetation	0
Littoral Fine/Vegetation	754
Subtotal Littoral/Vegetation	**754**
Subtotal Littoral	**75,350**
Non-littoral Coarse/Pelagic	0
Non-littoral Medium/Pelagic	0
Non-littoral Fine/Pelagic	25,996
Subtotal nonlittoral	**25,996**
Total Available Habitat	**101,346**

Table 10.6. Habitat suitabilities for species present (brook trout) within Star Lake.

		Littoral Zone						Non-Littoral Zone		
Species	Life Stage	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic
Brook Trout (freshwater resident)	Spawning	0.00	0.84	0.71	0.00	0.84	0.71	0.00	0.42	0.30
	YOY	0.50	1.00	0.00	0.50	1.00	0.00	0.50	1.00	0.00
	Juvenile	0.50	1.00	0.00	0.50	1.00	0.00	0.50	1.00	0.07
	Adult	0.00	0.67	0.34	0.00	0.67	0.39	0.00	0.50	0.33

Table 10.7. Habitat equivalent units for species present (brook trout) within Star Lake measured in m^2

	Littoral Zone						Non-Littoral Zone			
Species	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic	Total Available Habitat
Brook Trout (freshwater resident)	0	14316	43401	0	0	543	0	0	8839	67099.4

10.2. Riverine Habitat Classification

All streams that were surveyed and sampled are located within one of the two mining areas or adjacent to it with the likelihood of being affected by the proposed changes to the site. A summary of habitat information and classifications from July's survey is presented in Table 10.8. A more detailed summary can be found in Appendix A.

Table 10.8. A summary of habitat characteristics found during July survey

Survey ID	Predominant Habitat Type	Notes on Fish Habitat Potential
DSO2-01	Riffle / Run: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO2-02	Riffle / Run: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO2-03	Run / Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO2-04	Run / Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-02	Run / Riffle	No Potential Fish Habitat Present
DSO3-03	Steady: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-04	Standing rain water: no inflow or outflow	No Potential Fish Habitat Present
DSO3-05	Standing rain water: no inflow or outflow	No Potential Fish Habitat Present
DSO3-06	Steady: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-08	Run / Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-09	No stream habitat present	No Potential Fish Habitat Present
DSO3-10	Run / Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-11	Run / Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-13	Run / Riffle/Steady/Pool: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-14	Steady: All habitat parameters appear suitable	Potential Fish Habitat Present
DSO3-15	Riffle: All habitat parameters appear suitable	Potential Fish Habitat Present

10.2.1. Electrofishing

Table 10.9 summarizes each stream sampled for fish presence in September. An estimate of the catch per unit effort (CPUE) was calculated for all electrofished sites that yielded fish (Table 10.10). Stream DSO2-01 produced the highest CPUE while site DSO2-02 and DSO3-08 were the lowest. Streams DSO3-13 and DSO2-04 were the only two sites to capture a species other than brook trout (lake chub and burbot respectively).

Table 10.9. DSO2 and DSO3 habitat type and fish presence summary.

Survey ID	Predominant Habitat Type		Fish Presence
	New Classification	Beak	
DSO2-01	Riffle / Run	II (rearing, limited spawning)	30 Brook trout
DSO2-02	Riffle / Run	IV (shelter and feeding)	2 Brook trout
DSO2-03	Riffle / Run	I (spawning and rearing)	21 Brook trout
DSO2-04	Riffle / Run	II (rearing, limited spawning)	14 Brook trout and 1 Burbot
DSO3-03	Steady	IV (shelter and feeding)	No fish
DSO3-06	Steady	IV (shelter and feeding)	No fish
DSO3-08	Run / Riffle	IV (shelter and feeding)	2 Brook trout
DSO3-10	Dry		No fish; Channel was dry
DSO3-11	Dry		No fish; Channel was dry
DSO3-13	Run / Riffle/Steady/Pool	IV (shelter and feeding	3 Lake chub 1 Brook trout
DSO3-14	Steady	IV (shelter and feeding	No fish
DSO3-15	Riffle	II (rearing, limited spawning)	20 Brook trout

Table 10.10. Standardized Index electrofishing CPUE of all sites that yielded fish.

Index Electrofishing CPUE				
Site ID	Species	Total Catch	Time (sec)	Catch/300sec
DSO2				
DSO2-01	Brook trout	30	309	29.1
DSO2-02	Brook trout	2	305	2.0
DSO2-03	Brook trout	21	300	21.0
DSO2-04	Brook trout	14	309	13.6
	Burbot	1		1.0
DSO3				
DSO3-08	Brook trout	2	300	2.0
DSO3-13	Brook trout	1	306	1.0
	Lake chub	3		2.9
DSO3-15	Brook trout	20	300	20.0

DSO2-01

Stream DSO2-01 yielded a catch of 30 brook trout within an area dominated by instream cover and small pools. The fish ranged from young-of-the-year to 170 mm in length. This stream is confirmed as fish habitat due to the presence of fish there.

Approximately 370 m of stream was surveyed with most of the habitat being classified as riffle/run. The average stream wet width was 1.45 m. Mean water depth was 0.54 m with an average velocity of 0.17 m/s. Substrate consisted predominantly of cobble and rubble with sand and gravel intermixed. One pool was identified and measured at 3 m long by 6 m wide, had an average depth of 0.55 m and an average flow of 0.06 m/s. The pool contained substrate dominated by medium and fine substrate types. See Photos B-1 to B-3, Appendix B.

DSO2-02

Stream DSO2-02 yielded a catch of two brook trout within a narrow channel leading to open wetland. The fish ranged in length from 70 mm to 100 mm. The site consisted of partial instream cover. This stream is confirmed as fish habitat due to the presence of fish there.

Approximately 500 m of stream was surveyed, the majority of which was classified as run/riffle habitat. The average stream wet width was 0.9 m. Mean water depth was 0.39 m with an average velocity of 0.10 m/s. Substrate consisted of mostly muck and sand and partially medium-sized substrate such as cobble. One pool was identified and measured at 2.8 m long and 6 m wide, had an average depth of 0.54 m with no measurable velocity. The pool consisted of medium and fine sized substrate. The stream disappears into a fen at one point but emerges again approximately 100m away. This fen could be considered a temporary barrier during low flows. . See Photos B-4 to B-7 in Appendix B.

DSO2-03

Stream DSO2-03 yielded 21 brook trout ranging from 40 mm to 100 mm in length. Plenty of instream cover was present and a large deep pool at the mouth of the stream to Star Lake. This stream is confirmed as fish habitat due to the presence of fish there. Sediment samples were collected at this site.

Approximately 300 m of stream was surveyed and classified as predominantly run/riffle habitat. The average stream wet width was 3.12 m. Mean water depth was 0.28 m with an average velocity of 0.37 m/s. The majority of substrate consisted of sand and gravel, supplemented by medium-sized substrate such as cobble and rubble. One pool that was identified at the inflow of Star Lake measured 5.0 m long and 8.0 m wide. The pool had an average depth of 1.0 m. Velocity could not be measured due to the pool's depth. The majority of substrate consisted of medium-sized rocks with fines settled along the sides of the pool. See Photos B-8 and B-9 in Appendix B.

DSO2-04

Stream DSO2-04 yielded 14 brook trout ranging from 80 mm to 250 mm in length and one burbot at 180 mm in length. The majority of brook trout caught were larger in size. The site was difficult to sample due to fast flowing water impairing visibility. This stream is confirmed as fish habitat due to the presence of fish there.

Approximately 120 m of stream was surveyed, the majority of which was classified as run/riffle habitat. The average stream wet width was 5.1 m. Mean water depth was 0.39 m with an average velocity of 0.34 m/s. Substrate consisted of medium-sized substrate with fines intermixed. See Photos B-10 and B-11, Appendix B.

DSO3-03

During July's survey this site was considered potential fish habitat but at the time of sampling the channel was dry in places, with very little cover. Electrofishing was conducted but did not yield any fish. Sediment samples were collected at this site as scheduled in the Work Task Order. This stream is not considered fish habitat.

DSO3-06

During July's survey this site was considered potential fish habitat but at the time of sampling the channel was dry in places, with very little cover. Electrofishing was conducted but did not yield any fish. This stream is not considered fish habitat.

DSO3-08

Stream DSO3-08 yielded a catch of two brook trout 120 mm and 240 mm in length respectively. The sample site consisted of ample overhang cover from vegetation along the banks of the stream. This stream is confirmed as fish habitat due to the presence of fish there.

Approximately 60 m of stream was surveyed and classified as run/riffle habitat. The average stream wet width was 1.38 m. Mean water depth was 0.11 m with an average velocity of 0.19 m/s. Substrate consisted predominantly of medium and fines with coarse substrate intermixed. See Photos B-28 and B-29, Appendix B.

DSO3-10

During July's survey this site was considered potential fish habitat but at the time of sampling, this stream was dry and is therefore not considered fish habitat.

DSO3-11

During July's survey this site was considered potential fish habitat but at the time of sampling, this stream was dry and is therefore not considered fish habitat.

DSO3-13

Stream DSO3-13 yielded three lake chub ranging from 40 mm to 80 mm in length and one brook trout 60 mm in length. A suitable sample site was found near the mouth of Lake Pinette as the upstream portion of this stream was dry in parts. This stream is confirmed as fish habitat due to the presence of fish there.

Approximately 150 m of stream was surveyed and classified as a combination of run/riffle, steady and pool habitats. The average stream wet width of the run/riffle habitat was 0.43 m with a mean water depth of 0.15 m and an average velocity of 0.52 m/s. Substrate consisted of a majority of medium substrate intermixed with coarse, fines and organics. The average stream wet width of the identified steady habitat was 2.2 m with a mean water depth of 0.26 m and an average velocity of 0.0 m/s. The average stream wet width of the identified pool habitat was 2.2 m with a mean water depth of 0.45 m and an average velocity of 0.04 m/s. Substrate in the steady and pool habitat consisted mostly of medium substrate intermixed with coarse, fines and organics. See Photos B-38 to B-41, Appendix B.

DSO3-14

During July's survey this site was considered potential fish habitat but did not yield any fish during sampling. Sediment samples were collected at this site as scheduled in the Work Task Order. This stream is not considered fish habitat.

DSO3-15

Stream DSO3-15 yielded 20 brook trout ranging from 45 mm to 150 mm in length. The site consisted of some moderately deep pools with overhanging vegetation providing cover for fish. The uppermost portions (outflow of Timmins 1) had little or no overhanging vegetation due to the large tailing piles on each side of the stream. This stream is confirmed as fish habitat due to the presence of fish there.

The outflow of Timmins 1 was surveyed between the pit and its confluence with the outflow of Lake Pinette (1.5 km). The stream was predominantly riffle habitat with an average stream wet width of 2.84 m. Mean water depth was 0.11 m with an average velocity of 0.21 m/s. Substrate consisted mostly of medium substrate intermixed with fine and coarse substrate. At the outflow from the pit, there were two steadies (6 m x 20 m and 15 m x 100 m). One small pool was also identified while surveying the stream. Its dimensions were 3.79 m x 3 m with an average depth of 0.32 m and an average velocity of 0.06 m/s. The substrate was classified as medium with coarse and fine substrates intermixed. See Photos B-49 to B-54, Appendix B.

10.2.2. Macroinvertebrates

Samples were collected from selected sites as outlined within the Work Task Order and identified to Family and Order. Table 10.11 presents a summary of species Richness, Evenness and Shannon-Weiner diversity indices from each pond sampled. Table 10.11 presents the macroinvertebrate results from each location and Table 10.12 presents the macroinvertebrates identified.

Table 10.11. Summary of species Richness (S), Shannon-Weiner (H) and Evenness (E) diversity indices for macroinvertebrates.

Sample ID	Aquatic Habitat Type	Number of Species (Richness - S)	Number of Individuals (n)	Shannon-Weiner (H)	H_{max}	Evenness (E) %	Simpson's Diversity Index
DSO2							
DSO2-03	Stream	9	24	1.921	3.2	60.0%	1.533
DSO2-03	Stream	8	28	1.810	3.3	54.9%	1.350
DSO2-03	Stream	9	30	1.867	3.4	54.9%	1.381
DSO3							
DSO3-03	Stream	0	0	-	0	-	-
DSO3-03	Stream	1	1	-	0	-	-
DSO3-03	Stream	1	1	-	0	-	-
DSO3-07	Stream	6	78	0.841	4.4	19.1%	1.069
DSO3-07	Stream	8	30	1.504	3.4	44.2%	1.318
DSO3-07	Stream	5	25	1.015	3.2	31.7%	1.111
DSO3-14	Stream	4	45	0.392	3.8	10.3%	1.073
DSO3-14	Stream	6	76	0.568	4.3	13.2%	1.071
DSO3-14	Stream	2	10	0.325	2.3	14.1%	1.125
Star	Lake	1	1	-	0	-	-
Star	Lake	1	1	-	0	-	-
Timmins 1	Pond	1	3	-	0	-	1
Timmins 1	Pond	1	2	-	0	-	1

Table 10.12. Macroinvertebrates identified, September 2008.

Macroinvertebrate Identification		Sample Location					
		DSO2-03			DSO3-03		
Order	Family	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Ephemeroptera	Ephemerellidae	4	6	10			
	Unknown		1				
Tricoptera	Polycentropodidae		2	1			
	Lepidostomatidae	3					
	Glossosomatidae		2	1			
Diptera	Stratiomyidae	1					
	Chironomidae		2	3		1	
	Tipulidae	1		2			
Plecoptera	Chloroperlidae	3	10	7			
	Unknown	1		1			
Mollusca	bivalvia	8	3	3			
Crustacea	Amphipoda	1					
Oligochaetae	Unknown	2	2	2			
Homoptera	delphacidae						1

Macroinvertebrate Identification		Sample Location					
		DSO3-07			DSO3-14		
Order	Family	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Ephemeroptera	Ephemerellidae			1			
	Unknown	2					
Tricoptera	Leptoceridae	1					
	Phryganeidae		1				
	Limnephilidae		1				
Diptera	Chironomidae	61	15	17	41	66	9
	Chaoboridae	5		4	1	5	
	Unknown					1	
Hemiptera	Corixidae		4	2			
Mollusca	bivalvia	6	6	1	2	2	1
Crustacea	Cladocera		1				
Coleoptera	Chrysomelidae				1		
	Dytiscidae		1			1	
Odonata	Libellulidae					1	
Arhynchobdellida	Erpodbellidae	3	1				

Macroinvertebrate Identification		Sample Location					
		Star Lake			Timmins 1		
Order	Family	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Diptera	Chironomidae	1					
	Tipulidae				3		
Mollusca	Gastrapoda		1				
Coleoptera	Elmidae					2	

10.3. In-situ Water Quality and Laboratory Results

An *In-situ* physical analysis of the water quality in pond sample sites was carried out. Water quality parameters included temperature, pH, conductivity, dissolved oxygen conductivity and transparency. A summary of these results from July and September is presented in Table 10.13. Surface water samples were also collected and sent to AMEC's Mississauga Laboratory for analysis. Samples were analyzed for general chemistry and metals, plus hydrides, in compliance with the MMER. The laboratory results can be found in Appendix C.

Laboratory results were analyzed for exceedance of the Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the Protection of Aquatic Life (2007). Aluminum was in exceedance at sites DSO3-03, DSO3-05, DSO3-06, DSO3-07, DSO3-13 and DSO3-14. Cadmium was in exceedance at sites DSO3-03, DSO3-05, DSO3-06, DSO3-07, DSO3-08, DSO3-13, DSO3-14, DSO3-15, DSO2-01, DSO2-02 and DSO2-03, DSO2-04, Star Lake, Timmins1, and Timmins 2. Copper was in exceedance at sites DSO3-06, DSO3-07, DSO3-14, and DSO3-15. Iron was in exceedance at sites DSO3-05, DSO3-06, DSO3-08, DSO3-13, DSO3-14 and DSO2-02. Lead was in exceedance at site DSO3-15. Mercury was in exceedance at site DSO3-06. Selenium was in exceedance at site DSO3-15. A summary of these results can be found in Table 10.14.

In the sediment results arsenic was in exceedance of ISQG guideline at sites DSO2-03 and DSO3-05. Cadmium was in exceedance of ISQG guideline at sites DSO2-03, DSO3-03, DSO3-05 and Timmins 1. None of the sites exceeded PEL levels. A summary of the results can be found in Table 10.15.

Table 10.13. Summary of water quality measurements at all sampled sites in July and September.

Site ID	July Sampling						September Sampling				
	Date	Temperature	Conductivity	pH	NTU	DO	Date	Temperature	Conductivity	pH	DO
DSO2-01	17/07/2008	-	-	-	0.49	-	11/09/2008	6.1	118	7.1	-
DSO2-02	17/07/2008	-	-	-	-	-	11/09/2008	8.8	54	6.36	-
DS02-03	17/07/2008	13.3	70	7.5	1.02	10.0	11/09/2008	9.3	58	6.63	-
DSO2-04	17/07/2008	14.7	70	7.5	1.02	10.0	11/09/2008	8.9	59	6.81	-
Star Lake	20/07/2008	14.3	72	7	0.34	11.5					
DSO3-03	17/07/2008	14.5	5	6.0	0.37	8.3	11/09/2008	10.9	0	4.81	-
DSO3-05 Triangle Pond	20/07/2008	14.1	7	5.7	210.00[2]	10.4	13/09/2008	10.6	0	5.21	-
DSO3-06	18/07/2008	13.8	6	6.2	0.27	9.9	10/09/2008	8.7	19	6.4	-
DSO3-07 Inukshuk Lake	18/07/2008	15.5	5	6.1	0.66	10.2	13/09/2008	12.5	0	5.73	-
DSO3-08	18/07/2008	14.8	22	6.0	0.52	9.6	10/09/2008	10.7	19	7.68	-
DSO3-10	19/07/2008	13.4	5	4.9	0.16	8.4	-	-	-	-	-
DSO3-11	18/07/2008	15.7	4	5.6	0.47	10.0	-	-	-	-	-
DSO3-13	19/07/2008	16.7	6	4.7	0.62	6.9	10/09/2008	8.8	-	-	-
DSO3-14	19/07/2008	14.1	16	7.2	13.10	-	10/09/2008	9.3	1	5.67	-
DSO3-15	19/07/2008	13.8	2	5.8	0.23	-	12/09/2008	9.7	11	7.78	-
Timmins 1	19/07/2008	8.8	21	6.5	4.89	12.1	12/09/2008	12.1	10	6.18	-
Timmins 2	19/07/2008	7.8	25	6.6	11.10	12.5	11/09/2008	11.7	13	6.33	-

[1] = Temperature in Degrees Celsius

[2] = Tailings pile was along one side of DSO3-05. This would cause heavy siltation during heavy rain events. This may have caused the high reading.

NTU = Nephelometric Turbidity Units. A measure of water turbidity.

DO = Dissolved Oxygen mg/L

Conductivity = µS/cm

Table 10.14. Summary of laboratory results of metals plus hydrides of water samples collected in September.

Lab Number Sample ID Date Collected			S2008-12951 DS03-06 10-Sep-08	S2008-12952 DS03-08 10-Sep-08	S2008-12953 DS03-13 10-Sep-08	S2008-12954 DS03-14 10-Sep-08	S2008-12955 DS02-01 11-Sep-08	S2008-12956 DS02-02 11-Sep-08	S2008-12957 DS02-03 11-Sep-08	CCME Guidelines
Parameters	**Unit**	**MDL**								
Aluminum	(µg/L)	1	36	32	118	57	10	17	8	5-100
Antimony	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	-
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	-
Barium	(µg/L)	0.5	7.9	2.2	3.3	1.6	1.2	3.7	0.9	-
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	(µg/L)	20	<20	<20	<20	<20	<20	<20	<20	-
Cadmium	(µg/L)	0.015	0.127	0.105	0.129	0.129	0.081	0.096	0.100	0.017
Calcium	(µg/L)	500	1500	1990	569	685	17400	7620	7800	-
Chromium	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	-
Cobalt	(µg/L)	1	1	<1	<1	<1	<1	<1	<1	-
Copper	(µg/L)	1	5	<1	1	4	<1	<1	1	2-4
Iron	(µg/L)	1	1570	826	1080	1640	66	2160	64	300
Lead	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	1-7
Magnesium	(µg/L)	20	693	2290	291	195	10400	4530	5400	-
Manganese	(µg/L)	1	135	53	104	64	6	111	6	-
Mercury	(µg/L)	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.026
Molybdenum	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	-
Nickel	(µg/L)	1	2	<1	<1	<1	<1	<1	<1	25-150
Phosphorus	(µg/L)	2	5	5	<2	14	7	7	8	-
Potassium	(µg/L)	20	67	331	56	20	187	210	337	-
Rubidium	(µg/L)	5	<5	<5	<5	<5	<5	<5	<5	-
Selenium	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	1
Silicon	(µg/L)	2	3450	1720	4280	405	1890	2570	2620	-
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sodium	(µg/L)	500	1490	373	820	<500	<500	517	598	-
Strontium	(µg/L)	1	11	4	4	2	8	7	7	-
Sulphur	(µg/L)	2	205	1290	136	59	496	228	835	-
Tellerium	(µg/L)	5	<5	<5	<5	<5	<5	<5	<5	-
Thallium	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	1
Tin	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	-
Titanium	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	-
Uranium	(µg/L)	1	<1	<1	<1	<1	2	2	2	-
Vanadium	(µg/L)	5	<5	<5	<5	<5	<5	<5	<5	-
Zinc	(µg/L)	1	13	4	6	8	4	3	4	30

MDL: Method Detection Limit
CCME: Canadian Council of the Ministers of Environment
- : Value not established
Shaded area exceeds CCME Guidelines

Aluminum Guidelines: 5µg/L at a pH < 6.5
100µg/L at pH ≥6.5

Copper Guidelines: 2µg/L at [$CaCO_3$] = 0-120mg/L
3µg/L at [$CaCO_3$] = 120-180mg/L
4µg/L at [$CaCO_3$] >180mg/L

Lead Guidelines: 1µg/L at [$CaCO_3$] = 0-60mg/L
2µg/L at [$CaCO_3$] = 60-120mg/L
4µg/L at [$CaCO_3$] = 120-180mg/L
7µg/L at [$CaCO_3$] >180mg/L

Nickel Guidelines: 25µg/L at [$CaCO_3$] = 0-60mg/L
65µg/L at [$CaCO_3$] = 60-120mg/L
110µg/L at [$CaCO_3$] = 120-180mg/L
150µg/L at [$CaCO_3$] >180mg/L

Table 10.14. (cont') Summary of laboratory results of metals plus hydrides of water samples collected in September.

Lab Number Sample ID Date Collected			S2008-12958 DS02-04 11-Sep-08	S2008-12959 Star 1 11-Sep-08	S2008-13074 Timmins 1 12-Sep-08	S2008-13075 Timmins 2 12-Sep-08	S2008-13076 DS03-15 12-Sep-08	S2008-13077 DS03-07 13-Sep-08	S2008-13078 DS03-03 13-Sep-08	S2008-13079 DS03-05 13-Sep-08	CCME Guidelines
Parameters	**Unit**	**MDL**									
Aluminum	(µg/L)	1	5	8	10	14	358	34	45	177	5-100
Antimony	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	-
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	-
Barium	(µg/L)	0.5	1.0	0.8	3.5	1.2	3.2	0.7	0.9	2.1	-
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Boron	(µg/L)	20	<20	<20	<20	<20	<20	<20	<20	<20	-
Cadmium	(µg/L)	0.015	0.101	0.055	0.097	0.111	0.152	0.033	0.098	0.129	0.017
Calcium	(µg/L)	500	7910	8210	1070	1300	1100	<500	<500	<500	-
Chromium	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	-
Cobalt	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	-
Copper	(µg/L)	1	<1	<1	2	<1	9	3	1	1	2-4
Iron	(µg/L)	1	203	103	23	36	22	90	86	419	300
Lead	(µg/L)	1	<1	<1	<1	<1	2	<1	<1	1	1-7
Magnesium	(µg/L)	20	5540	5580	769	900	810	256	140	78	-
Manganese	(µg/L)	1	4	4	2	3	2	4	8	12	-
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.026
Molybdenum	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	-
Nickel	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	25-150
Phosphorus	(µg/L)	2	7	9	<2	<2	13	4	8	14	-
Potassium	(µg/L)	20	344	333	259	151	277	62	362	116	-
Rubidium	(µg/L)	5	<5	<5	<5	<1	<5	<5	<5	<5	-
Selenium	(µg/L)	1	<1	<1	<1	<1	2	<1	<1	<1	1
Silicon	(µg/L)	2	2630	2590	1330	2070	1650	1180	1750	241	-
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sodium	(µg/L)	500	582	612	<500	710	<500	<500	715	<500	-
Strontium	(µg/L)	1	6	6	3	4	3	1	2	<1	-
Sulphur	(µg/L)	2	868	767	448	362	486	197	213	148	-
Tellerium	(µg/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	-
Thallium	(µg/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	1
Tin	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	-
Titanium	(µg/L)	2	<2	<2	<2	<2	<2	<2	<2	4	-
Uranium	(µg/L)	1	2	2	<1	<1	<1	<1	<1	<1	-
Vanadium	(µg/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	-
Zinc	(µg/L)	1	4	3	5	3	8	5	4	4	30

MDL: Method Detection Limit
CCME: Canadian Council of the Ministers of Environment
- : Value not established
Shaded area exceeds CCME Guidelines

Aluminum Guidelines: 5µg/L at a pH < 6.5
100µg/L at pH ≥6.5

Copper Guidelines: 2µg/L at $[CaCO_3]$ = 0-120mg/L
3µg/L at $[CaCO_3]$ = 120-180mg/L
4µg/L at $[CaCO_3]$ >180mg/L

Lead Guidelines: 1µg/L at $[CaCO_3]$ = 0-60mg/L
2µg/L at $[CaCO_3]$ = 60-120mg/L
4µg/L at $[CaCO_3]$ = 120-180mg/L
7µg/L at $[CaCO_3]$ >180mg/L

Nickel Guidelines: 25µg/L at $[CaCO_3]$ = 0-60mg/L
65µg/L at $[CaCO_3]$ = 60-120mg/L
110µg/L at $[CaCO_3]$ = 120-180mg/L
150µg/L at $[CaCO_3]$ >180mg/L

Table 10.15. Summary of laboratory results of metals plus hydrides of sediment samples collected in September.

Lab Number			S2008-13081	S2008-13082	S2008-13083	S2008-13084	S2008-13085	S2008-13086	S2008-13087	CCME Guideline	
Sample ID			DS03-14	Star 1	DS02-03	Timmins 1	DS03-05	DS03-07	DS03-03		
Date Collected			10-Sep-08	11-Sep-08	11-Sep-08	12-Sep-08	13-Sep-08	13-Sep-08	13-Sep-08		
Parameters	**Unit**	**MDL**								**ISQG**	**PEL**
Aluminum	(µg/g)	5	7290	3150	4420	1510	7430	6110	6230	-	-
Antimony	(µg/g)	0.5	0.7	0.6	1.4	1.3	1.7	1.2	0.5	-	-
Arsenic	(µg/g)	0.5	5.3	4.4	10.2	3.0	9.2	2.9	3.9	5.9	17.0
Barium	(µg/g)	0.5	24.8	6.2	24.2	70.4	14.6	13.9	10.6	-	-
Beryllium	(µg/g)	0.2	0.2	0.3	0.4	0.3	0.3	0.4	0.3	-	-
Bismuth	(µg/g)	0.2	<0.2	<0.2	0.7	0.7	1.0	<0.2	<0.2	-	-
Boron	(µg/g)	1	13	8	37	42	33	19	38	-	-
Cadmium	(µg/g)	0.5	<0.5	<0.5	0.9	0.8	0.8	0.5	0.7	0.6	3.5
Calcium	(µg/g)	25	291	1750	2680	119	116	266	174	-	-
Chromium	(µg/g)	1	11	9	12	4	17	13	9	37.3	90.0
Cobalt	(µg/g)	1	1	2	7	19	5	5	1	-	-
Copper	(µg/g)	1	9	4	5	12	11	10	10	35.7	197.0
Iron	(µg/g)	5	16600	7620	40600	45000	38400	23000	16400	-	-
Lead	(µg/g)	5	9	<5	12	13	13	12	6	35.0	91.3
Magnesium	(µg/g)	10	1100	1030	2250	486	2030	2550	1150	-	-
Manganese	(µg/g)	1	71	70	1420	2800	228	136	36	-	-
Mercury	(µg/g)	0.01	0.10	0.04	0.03	0.16	0.06	0.04	0.05	0.17	0.49
Molybdenum	(µg/g)	2	<2	<2	<2	<2	<2	<2	<2	-	-
Nickel	(µg/g)	5	6	<5	9	5	10	14	6	-	-
Phosphorus	(µg/g)	5	739	781	565	116	310	427	397	-	-
Potassium	(µg/g)	10	860	562	457	173	380	436	390	-	-
Rubidium	(µg/g)	2	9	6	6	3	6	5	6	-	-
Selenium	(µg/g)	0.1	0.3	0.8	0.3	<0.1	0.1	<0.1	0.1	-	-
Silicon	(µg/g)	5	7	8	19	26	11	55	8	-	-
Silver	(µg/g)	0.25	0.36	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	-
Sodium	(µg/g)	25	168	131	141	104	139	131	107	-	-
Strontium	(µg/g)	2	2	<2	3	<2	<2	<2	<2	-	-
Sulphur	(µg/g)	5	1690	4690	458	23	114	292	1370	-	-
Tellerium	(µg/g)	2	<2	<2	5	5	5	3	3	-	-
Thallium	(µg/g)	0.5	<0.5	<0.5	<0.5	2.3	<0.5	<0.5	<0.5	-	-
Tin	(µg/g)	2	<2	<2	<2	<2	<2	<2	<2	-	-
Titanium	(µg/g)	2	97	37	91	68	59	54	36	-	-
Uranium	(µg/g)	0.5	22.7	10.4	55.1	65.3	59.5	34.5	24.2	-	-
Vanadium	(µg/g)	5	16	<5	11	<5	13	10	8	-	-
Zinc	(µg/g)	2	23	36	45	17	29	48	17	123.0	315.0

MDL: Method Detection Limit
CCME: Canadian Council of the Ministers of Environment
- : Value not established

ISQG: Interim Freshwater Sediment Quality Guidelines
PEL: Probable Effects Level
Shaded area exceeds CCME Guidelines

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Glossary

CPUE - Catch Per Unit Effort: The number of fish caught per unit of time or area and is often used as an estimate of relative fish abundance.

DSOP - Direct Shipping Ore Project.

Freshet - A flood resulting from heavy rain or a spring thaw.

HADD - Harmful Alteration, Disruption or Destruction of fish habitat, which reduces its capacity to support one or more life processes of fish.

ISQG – Interim Freshwater Sediment Quality Guidelines

Habitat Suitability Indices - The amount of habitat deemed viable for the life process of fish at different stages of life.

Lacustrine - Of or relating to lakes.

Littoral - The shallow, near shore region of a water body where adequate light can penetrate to the bottom to allow for the growth of rooted aquatic plants.

Non-littoral - The deeper region of a water body in which light does not penetrate to the bottom, resulting in the absence of aquatic plants.

PEL – Probable Effects Level. The concentration of a chemical in which adverse biological effects are expected to occur frequently.

Total Habitat Equivalent Units - A quantity (m^2 or ha) of a particular habitat type that offers equivalent utilization by a species (or life-cycle stage) to that of a standardized “preferred” habitat type.

YOY - Young of Year refers to the life stage of a fish during first year of life.

Appendix A
Summary of July 2008 Reconnaissance and Raw Data

DSO2-01

Approximately 370 m of stream was surveyed with most of the habitat being classified as riffle/run. The average stream wet width was 1.45m. Mean water depth was 0.54m with an average velocity of 0.17m/s. Substrate consisted predominantly of cobble and rubble with sand and gravel intermixed. One pool was identified and measured at 3m long by 6 m wide, had an average depth of 0.55m and an average flow of 0.06. The pool contained substrate dominated by medium and fine substrate-types. See Photos B-1 to B-3, Appendix B.

DSO2-02

Approximately 500m of stream was surveyed and classified as comprising a majority of run/riffle habitat. The average stream wet width was 0.9 m. Mean water depth was 0.39m with an average velocity of 0.10m/s. Substrate consisted of medium and fine substrates. One pool was identified and measured at 2.8m long and 6m wide, had an average depth of 0.54 m with no measurable velocity. The pool contained substrate consisting of medium and fine substrate. The pool consisted of medium and fine sized substrate. The stream disappears into a fen at one point but emerges again approximately 100m away. This fen could be considered a temporary barrier during low flows. See Photos B-4 to B-7 in Appendix B.

DSO2-03

Approximately 300m of stream was surveyed and classified as predominantly run/riffle habitat. The average stream wet width was 3.12 m. Mean water depth was 0.28m with an average velocity of 0.37m/s. Substrate consisted of medium and fine substrates. One pool that was identified at the inflow to Lac Star and measured at 5.0m long by 8.0m wide, had an average depth of 1.0 m. Velocity could not be measured due to the pools depth. The pool contained substrate consisting of a majority of medium substrates with fines settled along the sides of the pool. See Photos B-8 and B-9 in Appendix B.

DSO2-04

Approximately 120m of stream was surveyed and classified as comprising a majority of run/riffle habitat. The average stream wet width was 5.1m. Mean water depth was 0.39 m with an average velocity of 0.34m/s. Substrate consisted of medium substrate with fines intermixed. See Photos B-10 and B-11, Appendix B.

DSO3-01

This site is Timmins Pit 3N. No habitat survey of the pit was conducted due to its depth and size; however water quality samples were collected and measured. See Photo B-12, Appendix B.

DSO3-02

Approximately 200m of stream was surveyed and classified as predominantly run/riffle habitat. This stream flows between three existing mine pits (Timmins 3A, 3B, and 3C) with the stream terminating at pit 3C. The average stream wet width was 1.5m. Mean water depth was 0.1m with an average velocity of 0.24m/s. Substrate consisted mostly of medium substrate with fines intermixed. See Photos B-13 and B-14, Appendix B.

DSO3-03

Approximately 320m of stream was surveyed and classified as comprising a majority of steady with a portion of run/riffle habitat. The average stream wet width of the steadies was 2.3m with a mean depth of 0.27m and an average velocity of 0.01m/s. Substrate consisted primarily of organics. The average stream wet width of the run/riffle habitat was 0.58m with a mean water depth of 0.12m and an average velocity of 0.25m/s. Substrate in this habitat type consisted primarily of organics with medium and fine substrates intermixed. See Photos B-15 and B-16, Appendix B.

DSO3-04

This site consisted of a small body of water located just west of Timmins Pit 1 near the former railway track. The perimeter of the water body was surveyed and no inflows/outflows were located. Geologists working for New Millennium stated that this water body is a result of rain runoff and the spring freshet. See Photos B-17 and B-18, Appendix B.

DSO3-05

This site also consisted of a small water body located just to the east of DSO3-04. This water body was also surveyed around its entire perimeter with no evidence of an inflow/outflow identified. Geologists again stated that this water body is a result of rain runoff and spring freshet. See Photos B-19 and B-20, Appendix B.

DSO3-06

Approximately 500m of stream was surveyed and classified as steady habitat. The average stream wet width was 1.18m. Mean water depth was 0.15 m with an average velocity of 0.02m/s. Substrate consisted primarily of organics with medium and fines intermixed. See Photos B-22 to B25, Appendix B.

DSO3-07

This site consisted of a lake (Inukshuk Lake). No stream surveys were conducted; however water quality samples were collected and measured. This site may be considered as a control or reference site for water quality should development proceed. See Photos B-26 and B-27, Appendix B.

DSO3-08

Approximately 60m of stream was surveyed and classified as run/riffle habitat. The average stream wet width was 1.38m. Mean water depth was 0.11 m with an average velocity of 0.19m/s. Substrate consisted predominantly of medium and fines with coarse substrate intermixed. An access road is proposed to cross this stream. See Photos B-28 and B-29, Appendix B.

DSO3-09

This site has an existing road crossing between a bog and a lake; however no inflow or outflow were identified connecting the two bodies of water therefore no stream surveys were conducted. See Photos B-30 and B-31, Appendix B.

DSO3-10

Approximately 60m of stream was surveyed and classified as predominately run/riffle habitat. The average stream wet width was 3.37m. Mean water depth was 0.11m with an average velocity of 0.15m/s. Substrate consisted mostly of medium substrate intermixed with coarse and fines. An access road is proposed to cross this stream. See Photos B-32 to B-34, Appendix B.

DSO3-11

Approximately 60m of stream was surveyed and classified as predominately run/riffle habitat. The average stream wet width was 1.1m. Mean water depth was 0.20m with an average velocity of 0.06m/s. Substrate consisted predominately of medium substrate intermixed with coarse, fines and organics. An access road is proposed to cross this stream. See Photos B-35 and B-36, Appendix B.

DSO3-12

This site consisted of a lake (Lake Pinette). No stream surveys were conducted; however water quality samples were collected and measurements taken. See Photo B-37, Appendix B.

DSO3-13

Approximately 150m of stream was surveyed and classified as a combination of run/riffle, steady, and pool habitats. The average stream wet width of the run/riffle habitat was 0.43m with a mean water depth of 0.15m and an average velocity of 0.52m/s. Substrate consisted of a majority of medium substrate intermixed with coarse, fines and organics. The average stream wet width of the identified steady habitat was 2.2m with a mean water depth of 0.26m and an average velocity of 0.0m/s. The average stream wet width of the identified pool habitat was 2.2m with a mean water depth of 0.45m and an

average velocity of 0.04m/s. Substrate in the steady and pool habitat consisted mostly of medium substrate intermixed with coarse, fines and organics. See Photos B-38 to B-41, Appendix B.

DSO3-14

Approximately 60m of stream was surveyed and was classified as steady habitat. The average stream wet width was 0.84m. Mean water depth was 0.22m with an average velocity of 0.13m/s. Substrate consisted predominately of organics intermixed with fine and medium substrate. See Photos B-42 to B-44, Appendix B.

DSO3-15

The outflow of Timmins Pit 1 was surveyed between the pit and where it joins the outflow of Lake Pinette (1.5km). The stream was predominately riffle habitat with an average stream wet width of 2.84m. Mean water depth was 0.11m with an average velocity of 0.21m/s. Substrate consisted mostly of medium substrate intermixed with fine and coarse substrate. At the outflow from the pit, there were two steadies (6m x 20m and 15m x100m). One small pool was also identified while surveying the stream. Its dimensions were 3.79m x 3m with an average depth of 0.32m and an average velocity of 0.06m/s. The substrate was classified as medium with coarse and fine substrates intermixed. See Photos B-49 to B-54, Appendix B

River: DSO2-1

Transect #	Reach Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	Run/riffle	1.1		1.4	0.37	0.42	0.39		0.39	0.22	0.15	
2	pool	6			0.53	0.55	0.58		0.00	0.17	0	
3	Run/riffle	1.8		2.2	0.71	0.73	0.64		0.14	0.13	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
	35		15	30	10	10			**5.00**		10	10	50	50	10	40	
	45		15	30	10						20	40					Pool 3m x 6m
		40	25	20	10	5											

River: DSO2-2

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	Run/riffle	0.9		1.2	0.41	0.26	0.17		0.11	0.00	0.00	
2	Run/riffle	0.77		0.89	0.33	0.21	0.28		0.18	0.11	0.00	
3	Run/riffle	1.3		1.6	0.25	0.25	0.25		0.00	0.05	0.05	
4	Run/riffle	0.76		0.8	0.37	0.40	0.40		0.00	0.13	0.11	
5	small pool	6		6.2	0.56	0.56	0.50		0.00	0.00	0.00	
6	Run/riffle	0.55		0.9	0.18	0.20	0.23		0.30	0.30	0.20	

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
	100								**2.00**		10	10	40	40	70	0	
	100										10	10	35	35	60	0	
		25	5	40	10	20							45	45	10	30	Stream dissappears into bog
																	Stream begins again
		60	20	10	10						10	5	40	40	60	0	small pool 2.8 x 6m
		30	10	40	10		10		1		20	30	30	30	30	0	

River: DSO2-3

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	Pool	5.0		7.0	1.00	1.00	1.00					
2	Riffle/Run	2.1		2.8	0.37	0.49	0.58		0.17	0.66	0.47	
3	Riffle/Run	4.1		4.8	0.38	0.50	0.49		0.62	0.89	0.18	
4	Riffle/Run	4.9		5.1	0.47	0.55	0.40		0.09	0.56	0.05	
5	Riffle/Run	2.3		2.9	0.24	0.38	0.31		0.85	0.18	0.48	
6	Riffle/Run	2.2		3.1	0.27	0.21	0.20		0.10	0.11	0.07	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse											
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
	35		50	5	10												Pool too large to walk in. Depths estimated. 1 Brook Trout seen
		30	60	10	5	5					30	30	40	5	0	5	
		50	35	10	5								30	30	5	10	1 Brook trout 10cm observed. Another 6 to 8 @ 8cm
		30	25	30	15				1		20	30	40	40	0	75	
		10	5	25	20	30					20	25	30	35	0	45	Stream braids off into 3 different streams. Followed stream in centre
		20	30	10	10	30					35	20	40	40	10	70	

River: DSO2-4

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	Riffle/Run	4.2		4.8	0.42	0.53	0.48		0.27	0.43	0.3	
2	Riffle/Run	6			0.33	0.38	0.18		0.84	0.18	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse											
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
									1.00								2 Brook trout about 14 cm observed
		10	15	30	30	15					15	25	20	25	5	50	

River: DSO3-2

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	Riffle/Run	1.3		1.6	0.02	0.05	0.02		0.17	0.45	0.12	
2	Riffle/Run	1.7		1.9	0.40	0.05	0.03		0.32	0.36	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
		25	30	30	10	5		0.38/8									Stream runs into open pit (old mine)
		40	15	20	20	5					0	0	0	0	20	0	rocks covered in green algae

River: DSO3-03

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity
					1/3	1/2	2/3		1/3	1/2	2/3	
1	Steady	4.0		4.6	0.11	0.07	0.28		0.00	0.00	0	
2	Steady	1.5		2.6	0.41	0.48	0.25		0.00	0	0	
3	Steady	1.3		1.8	0.25	0.31	0.25		0.07	0	0	
4	Riffle/Run	0.58		0.8	0.10	0.14	0.13		0.26	0.49	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
100																	
95			2	1	1	1					5	5	50	50	70	0	mostly overland flow, no distinct streambed
100																	
80		5	10	5							5	15	50	50	20	0	

River: DSO3-06

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity
					1/3	1/2	2/3		1/3	1/2	2/3	
1	steady	0.66			0.10	0.21	0.12		0.00	0.00	0	
2	steady	0.69			0.23	0.24	0.23		0.00	0	0	
3	steady	0.51			0.10	0.10	0.07		0.15	0.19	0	
4	steady	3.00			0.07	0.12	0.13		0.00	0	0	
5	steady	0.88			0.10	0.16	0.08		0.00	0.1	0	
6	steady	1.35			0.26	0.26	0.17		0.00	0	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
100																	
40		20	15	15	10						5	15	10	15	5	0	
75		10	5	5	5			0.65/10					5	5	5	0	
35		15	10	10	10								10	5	5	1	some overland flow, meets small pond
50		10	10	20	10								20	15	5	0	

River: DSO3-08

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity
					1/3	1/2	2/3		1/3	1/2	2/3	
1	riffle/run	1.20		1.8	0.12	0.09	0.13		0.11	0.22	0.11	
2	riffle/run	2.30		2.9	0.05	0.04	0.04		0.40	0.25	0.24	
3	riffle/run	0.63		0.92	0.15	0.16	0.17		0.00	0.23	0.19	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse											
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
	30	24	5	20	10	11					7	5	20	15	15	5	
	25	10	20	30	10	5					5	7	20	15	5	10	

River: DSO3-09

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	riffle/run	2.20		2.8	0.11	0.10	0.11		0.41	0.13	0.13	
2	riffle/run	4.20		6.1	0.14	0.13	0.09		0.24	0.09	0	
3	pool	10.00		10	0.10	0.66	0.64		0.00	0.02	0	
4	riffle/run	3.70		4.8	0.09	0.06	0.15		0.14	0	0.22	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
		10	15	50	20	5					5	10	35	30	5	10	
	20	30	30	20													Pool 10m x 3m
5		2	13	45	20	15					5	10	30	35	5	15	

River: DSO3-10

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	steady	1.28		1.6	0.15	0.41	0.22		0.00	0.00	0	
2	steady	0.98		1.22	0.15	0.17	0.12		0.22	0.13	0.01	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
5		9	15	30	30	11			6.5		15	10	20	35	5	5	

River: DSO3-13

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	steady	2.20		2.9	0.27	0.28	0.23		0.00	0.00	0	
2	pool	3.80		4.25	0.29	0.49	0.57		0.00	0.11	0	
3	riffle/run	0.43		0.58	0.14		0.15		0.51		0.53	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse											
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
																	stream disappears in sedge and goes underground after 10 m, reappears 20 m up
40		5	15	25	10	5					10	15	40	35	55	0	
30		10	15	30	10	5					7	15	40	35	40	5	

River: DSO3-14

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity
					1/3	1/2	2/3		1/3	1/2	2/3	
1	Steady	1.10		1.6	0.21	0.24	0.12		0.05	0.23	0	
2	Steady	0.62		0.87	0.15	0.15	0.14		0.27	0.21	0.11	
3	Steady	0.80		0.96	0.37	0.35	0.25		0.11	0.18	0	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
75		5	5	10	5				1.8		7	5	35	35	30	1	stream meets road, outflows from a small steady
75		10	5	5	5						15	10	40	40	25	0	

River: DSO3-15

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth 1/3	Depth 1/2	Depth 2/3	Average Depth	Velocity (m/s) 1/3	Velocity (m/s) 1/2	Velocity (m/s) 2/3	Average Velocity
1	riffle/run	3.70		3.9	0.24	0.05	0.05		0.25	0.34	0	
2	riffle/run	2.86		3.4	0.06	0.12	0.05		0.20	0.35	0	
3	riffle/run	2.50		3.2	0.11	0.19	0.07		0.07	0.28	0.15	
4	riffle/run	3.40		4.6	0.10	0.20	0.15		0.45	0.34	0.13	
5	pool	3.79		4	0.31	0.41	0.23		0.00	0.18	0	
6	riffle/run	3.80		4.9	0.25	0.23	0.17		0.13	0.12	0.12	
7	steady	15.00										
8	riffle/run	2.37		15	0.06	0.05	0.12		0.33	0	0.62	
9	riffle/run	1.80		2.3	0.04	0.03	0.06		0.37	0.16	0.29	
10	steady	6.00										
11	riffle/run	2.30		3.4	0.05	0.06	0.08		0.10	0.2	0.09	

Stream Habitat Survey Sheet

Substrate Compostion (%)								Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
Organics	Fine		Medium			Coarse					L	R	L	R			
Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock										
																	1 Brook Trout about 15cm
		5	20	20	20	35		0.17/7			5	10	35	35	5	5	2 unidentified fish approximately 15 cm each
		5	20	15	30	30		0.43/8			5	5	40	40	0	10	leaving wooded area, tailing mounds on both sides of river
	2	10	13	25	10	40		0.61/8			30	7	35	25	5	5	2 Brook Trout seen between 10 and 15 cm
		5	15	15	15	55		0.44/9			15	2	25	35	5	0	small pool 3.79m x 3m, heavy bank erosion on both sides
	10	10	15	15	25	25					0	0	15	10	0	0	Tailings on both side of stream. Water has red tint
																	steady 15 m wide x 100m long. 1 Fish breached
		10	40	15	10	15	10				0	0	0	0	0	0	
																	Steady 6m long x 20m wide. Small waterfall (89 cm high) dumps into steady
		10	40	15	10	15	10				0	0	0	0	0	0	

Appendix B
Habitat Photos

Photo B-1. DSO2-01 looking upstream (pool)

Photo B-2. DSO2-01 substrate (pool)

Photo B-3. DSO2-01 upstream (riffle)

Photo B-4. DSO2-02 upstream

Photo B-5. DSO2-02 downstream

Photo B-6. DSO2-02 upstream

Photo B-7. DSO2-02 downstream

Photo B-8. DSO2-03 pool upstream

Photo B-9. DSO2-03 pool downstream

Photo B-10. DSO2-04 upstream

Photo B-11. DSO2-04 downstream

Photo B-12. Timmins 3N looking SE

Photo B-13. DSO3-2, Stream flowing into pit 3A

Photo B-14. DSO3-2, Stream flowing into pit 3A

Photo B-15. DSO3-3 upstream flowing from bog

Photo B-16. DSO3-3 downstream flowing into bog

Photo B-17. Dry streambed along side of DSO3-4

Photo B-18. Dry streambed along side of DSO3-4 (Stagnant body of water)

Photo B-19. Dry streambed along side of DSO3-5 (Stagnant body of water)

Photo B-20. Dry streambed along side of DSO3-5 (Stagnant body of water)

Photo B-21. DSO3-5 (Stagnant body of water) with no inflow

Photo B-22. DSO3-6 downstream view, stream is completely covered by sedge

Photo B-23. DSO3-6 upstream view, stream is completely covered by sedge

Photo B-24. DSO3-6 upstream view, stream outflow from a bog steady

Photo B-25. DSO3-6 downstream view, stream outflow from a bog steady

Photo B-26. DSO3-7 Lake Inukshuk

Photo B-27. DSO3-7 Lake Inukshuk outflow

Photo B-28. DSO3-8 downstream view (proposed road crossing)

Photo B-29. DSO3-8 upstream view (proposed road crossing)

Photo B-30. DSO3-9 road crosses wetland

Photo B-31. DSO3-9 road crosses by waterbody (no stream connection to wetland)

Photo B-32. DSO3-10 view of pool upstream of potential road crossing

Photo B-33. DSO3-10 view of pool inflow, upstream of potential road crossing

Photo B-34. DSO3-10 view of riffle, upstream of potential road crossing

Photo B-35. DSO3-11 upstream view of riffle (potential road crossing)

Photo B-36. DSO3-11 downstream view of riffle (potential road crossing)

Photo B-37. DSO3-12 Pinette Lake

Photo B-38. DSO3-13, upstream view of inflow to Pinette Lake

Photo B-39. DSO3-13, downstream view of inflow to Pinette Lake

Photo B-40. DSO3-13, upstream view of outflow from steady

Photo B-41. DSO3-13, downstream view of outflow from steady

Photo B-42. DSO3-14, upstream view of potential road crossing

Photo B-43. DSO3-14, downstream view of potential road crossing

Photo B-44. DSO3-14, view of potential road crossing

Photo B-45. Timmins 1 Ditch, downstream view from road which runs to Timmins 1

Photo B-46. Timmins 1 Ditch, upstream view from road which runs to Timmins 1 (could not find culvert inflow on other side of road)

Photo B-47. Timmins 1 Ditch, downstream view with Timmins 1 in background

Photo B-48. Timmins 1 Ditch, upstream view (a lot of debris such as wood and rubber conveyor belts in ditch)

Photo B-49. DSO3-15 upstream view of riffle

Photo B-50. DSO3-15 upstream view (inflow from Pinette Lake on left)

Photo B-51. DSO3-15 upstream view

Photo B-52. DSO3-15 downstream view

Photo B-53. DSO3-15 upstream view of inflow from Timmins 1

Photo B-54. DSO3-15 downstream view of steady (tailing piles on left and right causing heavy siltation)

Photo B-55. DSO3-1 5 downstream view of steady (tailing piles on left and right causing heavy siltation)

Photo B-56. DSO3-05. Triangle Pond

Photo B-57 DSO3-07. Inukshuk Lake

Photo B-58 Timmins 1.

Photo B-59 Timmins 2

Photo B-60 Inflow to Star Lake

Appendix C
Laboratory Results

Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 01, 2008 September 17, 2008
		Page:	1 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			S2008-12950	S2008-12950	S2008-12951	S2008-12951	S2008-12952	S2008-12952
Sample ID			DS03-DUP	DS03-DUP	DS03-06	DS03-06	DS03-08	DS03-08
Date Collected			10-Sep-08	10-Sep-08	10-Sep-08	10-Sep-08	10-Sep-08	10-Sep-08
Parameters	**Unit**	**MDL**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**
Aluminum	(µg/L)	1	33	11	36	7	32	18
Antimony	(µg/L)	1	<1	<1	<1	<1	<1	<1
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1	<1
Barium	(µg/L)	0.5	4.5	3.2	7.9	2.8	2.2	1.6
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	(µg/L)	20	<20	<20	<20	<20	<20	<20
Cadmium	(µg/L)	0.015	0.109	0.028	0.127	0.029	0.105	0.043
Calcium	(µg/L)	500	1350	1290	1500	1180	1990	1310
Chromium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Cobalt	(µg/L)	1	<1	<1	1	<1	<1	<1
Copper	(µg/L)	1	1	<1	5	<1	<1	<1
Iron	(µg/L)	1	1070	20	1570	79	826	292
Lead	(µg/L)	1	<1	<1	<1	<1	<1	<1
Magnesium	(µg/L)	20	697	475	693	483	2290	1470
Manganese	(µg/L)	1	136	88	135	72	53	24
Mercury	(µg/L)	0.02	0.06	<0.02	0.04	<0.02	<0.02	<0.02
Molybdenum	(µg/L)	2	<2	<2	<2	<2	<2	<2
Nickel	(µg/L)	1	1	<1	2	<1	<1	<1
Phosphorus	(µg/L)	2	2	<2	5	<2	5	<2
Potassium	(µg/L)	20	58	39	67	43	331	213
Rubidium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Selenium	(µg/L)	1	1	<1	<1	<1	<1	<1
Silicon	(µg/L)	2	3470	2370	3450	2420	1720	1120
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	(µg/L)	500	1480	1010	1490	1040	373	243
Strontium	(µg/L)	1	11	8	11	7	4	3
Sulphur	(µg/L)	2	210	128	205	113	1290	871
Tellerium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Thallium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Tin	(µg/L)	2	<2	<2	<2	<2	<2	<2
Titanium	(µg/L)	2	<2	<2	<2	<2	<2	<2
Uranium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Vanadium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Zinc	(µg/L)	1	4	3	13	2	4	2

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 01, 2008 September 17, 2008
		Page:	2 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			**S2008-12953**	**S2008-12953**	**S2008-12954**	**S2008-12954**	**S2008-12954**	**S2008-12955**
Sample ID			**DS03-13**	**DS03-13**	**DS03-14**	**DS03-14**	**DS03-14**	**DS02-01**
Date Collected			**10-Sep-08**	**10-Sep-08**	**10-Sep-08**	**10-Sep-08**	**10-Sep-08**	**11-Sep-08**
Parameters	**Unit**	**MDL**	**(Total)**	**(Dissolved)**	**(Total)**	**(Total) (Replicate)**	**(Dissolved)**	**(Total)**
Aluminum	(µg/L)	1	118	4	57	NR	25	10
Antimony	(µg/L)	1	<1	<1	<1	NR	<1	<1
Arsenic	(µg/L)	1	<1	<1	<1	NR	<1	<1
Barium	(µg/L)	0.5	3.3	2.5	1.6	NR	1.6	1.2
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	NR	<0.5	<0.5
Boron	(µg/L)	20	<20	<20	<20	NR	<20	<20
Cadmium	(µg/L)	0.015	0.129	0.025	0.129	NR	0.021	0.081
Calcium	(µg/L)	500	569	<500	685	NR	<500	17400
Chromium	(µg/L)	1	<1	<1	<1	NR	<1	<1
Cobalt	(µg/L)	1	<1	<1	<1	NR	<1	<1
Copper	(µg/L)	1	1	<1	4	NR	<1	<1
Iron	(µg/L)	1	1080	16	1640	NR	36	66
Lead	(µg/L)	1	<1	<1	<1	NR	<1	<1
Magnesium	(µg/L)	20	291	192	195	NR	136	10400
Manganese	(µg/L)	1	104	76	64	NR	48	6
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	NR	<0.02	<0.02
Molybdenum	(µg/L)	2	<2	<2	<2	NR	<2	<2
Nickel	(µg/L)	1	<1	<1	<1	NR	<1	<1
Phosphorus	(µg/L)	2	<2	<2	14	NR	<2	7
Potassium	(µg/L)	20	56	31	20	NR	<20	187
Rubidium	(µg/L)	5	<5	<5	<5	NR	<5	<5
Selenium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Silicon	(µg/L)	2	4280	1280	405	NR	442	1890
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	NR	<0.1	<0.1
Sodium	(µg/L)	500	820	535	<500	NR	<500	<500
Strontium	(µg/L)	1	4	3	2	NR	4	8
Sulphur	(µg/L)	2	136	103	59	NR	127	496
Tellerium	(µg/L)	5	<5	<5	<5	NR	<5	<5
Thallium	(µg/L)	1	<1	<1	<1	NR	1	<1
Tin	(µg/L)	2	<2	<2	<2	NR	<2	<2
Titanium	(µg/L)	2	<2	<2	<2	NR	<2	<2
Uranium	(µg/L)	1	<1	<1	<1	NR	<1	2
Vanadium	(µg/L)	5	<5	<5	<5	NR	<5	<5
Zinc	(µg/L)	1	6	2	8	NR	3	4

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 01, 2008 September 17, 2008
		Page:	3 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			S2008-12955	S2008-12955	S2008-12956	S2008-12956	S2008-12957	S2008-12957
Sample ID			DS02-01	DS02-01	DS02-02	DS02-02	DS02-03	DS02-03
Date Collected			11-Sep-08	11-Sep-08	11-Sep-08	11-Sep-08	11-Sep-08	11-Sep-08
Parameters	**Unit**	**MDL**	**(Total) (Replicate)**	**(Dissolved)**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**
Aluminum	(µg/L)	1	NR	5	17	13	8	3
Antimony	(µg/L)	1	NR	<1	<1	<1	<1	<1
Arsenic	(µg/L)	1	NR	<1	<1	<1	<1	<1
Barium	(µg/L)	0.5	NR	0.9	3.7	2.4	0.9	0.7
Beryllium	(µg/L)	0.1	NR	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	(µg/L)	0.5	NR	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	(µg/L)	20	NR	<20	<20	<20	<20	<20
Cadmium	(µg/L)	0.015	NR	0.025	0.096	0.041	0.100	0.025
Calcium	(µg/L)	500	NR	11300	7620	4960	7800	5830
Chromium	(µg/L)	1	NR	<1	<1	<1	<1	<1
Cobalt	(µg/L)	1	NR	<1	<1	<1	<1	<1
Copper	(µg/L)	1	NR	<1	<1	<1	1	<1
Iron	(µg/L)	1	NR	34	2160	317	64	10
Lead	(µg/L)	1	NR	<1	<1	<1	<1	<1
Magnesium	(µg/L)	20	NR	6800	4530	2950	5400	4060
Manganese	(µg/L)	1	NR	2	111	64	6	<1
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	(µg/L)	2	NR	<2	<2	<2	<2	<2
Nickel	(µg/L)	1	NR	<1	<1	<1	<1	<1
Phosphorus	(µg/L)	2	NR	3	7	2	8	3
Potassium	(µg/L)	20	NR	116	210	132	337	253
Rubidium	(µg/L)	5	NR	<5	<5	<5	<5	<5
Selenium	(µg/L)	1	NR	<1	<1	<1	<1	<1
Silicon	(µg/L)	2	NR	1240	2570	1670	2620	1970
Silver	(µg/L)	0.1	NR	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	(µg/L)	500	NR	<500	517	<500	598	<500
Strontium	(µg/L)	1	NR	7	7	5	7	5
Sulphur	(µg/L)	2	NR	405	228	168	835	625
Tellerium	(µg/L)	5	NR	<5	<5	<5	<5	<5
Thallium	(µg/L)	1	NR	<1	<1	<1	<1	<1
Tin	(µg/L)	2	NR	<2	<2	<2	<2	<2
Titanium	(µg/L)	2	NR	<2	<2	<2	<2	<2
Uranium	(µg/L)	1	NR	<1	2	1	2	<1
Vanadium	(µg/L)	5	NR	<5	<5	<5	<5	<5
Zinc	(µg/L)	1	NR	<1	3	<1	4	3

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 01, 2008 September 17, 2008
		Page:	4 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number **Sample ID** **Date Collected**			**S2008-12958** **DS02-04** **11-Sep-08**	**S2008-12958** **DS02-04** **11-Sep-08**	**S2008-12959** **Star 1** **11-Sep-08**	**S2008-12959** **Star 1** **11-Sep-08**	**S2008-12959** **Star 1** **11-Sep-08**
Parameters	**Unit**	**MDL**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**	**(Dissolved) (Replicate)**
Aluminum	(µg/L)	1	5	3	8	3	NR
Antimony	(µg/L)	1	<1	<1	<1	<1	<1
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1
Barium	(µg/L)	0.5	1.0	0.7	0.8	0.6	NR
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	NR
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	NR
Boron	(µg/L)	20	<20	<20	<20	<20	NR
Cadmium	(µg/L)	0.015	0.101	0.017	0.055	0.049	NR
Calcium	(µg/L)	500	7910	5300	8210	5520	NR
Chromium	(µg/L)	1	<1	<1	<1	<1	NR
Cobalt	(µg/L)	1	<1	<1	<1	<1	NR
Copper	(µg/L)	1	<1	<1	<1	<1	NR
Iron	(µg/L)	1	203	9	103	29	NR
Lead	(µg/L)	1	<1	<1	<1	<1	NR
Magnesium	(µg/L)	20	5540	3720	5580	3760	NR
Manganese	(µg/L)	1	4	<1	4	<1	NR
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	<0.02	NR
Molybdenum	(µg/L)	2	<2	<2	<2	<2	NR
Nickel	(µg/L)	1	<1	<1	<1	<1	NR
Phosphorus	(µg/L)	2	7	4	9	6	NR
Potassium	(µg/L)	20	344	229	333	222	NR
Rubidium	(µg/L)	5	<5	<5	<5	<5	NR
Selenium	(µg/L)	1	<1	<1	<1	<1	NR
Silicon	(µg/L)	2	2630	1770	2590	1730	NR
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	NR
Sodium	(µg/L)	500	582	<500	612	<500	NR
Strontium	(µg/L)	1	6	5	6	5	NR
Sulphur	(µg/L)	2	868	582	767	525	NR
Tellerium	(µg/L)	5	<5	<5	<5	<5	NR
Thallium	(µg/L)	1	<1	<1	<1	<1	NR
Tin	(µg/L)	2	<2	<2	<2	<2	NR
Titanium	(µg/L)	2	<2	<2	<2	<2	NR
Uranium	(µg/L)	1	2	<1	2	<1	NR
Vanadium	(µg/L)	5	<5	<5	<5	<5	NR
Zinc	(µg/L)	1	4	<1	3	<1	NR

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Project Name: DSOP West Labrador / East Quebec

Project Number: TF 8165902

Contact: Eugene Lee

Report Date: October 01, 2008
Received Date: September 17, 2008

Sample Type: Water

Lab Ref.: F2008-1832

Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

			Lab Blank	Q.C. Standards Actual	Q.C. Standards Expected	Date of Analysis
Parameters	**Unit**	**MDL**				
Aluminum	(µg/L)	1	<1	1030	1000	26-Sep-08
Antimony	(µg/L)	1	<1	3	3	22-Sep-08
Arsenic	(µg/L)	1	<1	3	3	24-Sep-08
Barium	(µg/L)	0.5	<0.5	504	500	26-Sep-08
Beryllium	(µg/L)	0.1	<0.1	496	500	26-Sep-08
Bismuth	(µg/L)	0.5	<0.5	1000	1000	26-Sep-08
Boron	(µg/L)	20	<20	908	1000	26-Sep-08
Cadmium	(µg/L)	0.015	<0.015	504	500	26-Sep-08
Calcium	(µg/L)	500	<500	9820	10000	26-Sep-08
Chromium	(µg/L)	1	<1	505	500	26-Sep-08
Cobalt	(µg/L)	1	<1	512	500	26-Sep-08
Copper	(µg/L)	1	<1	1010	1000	26-Sep-08
Iron	(µg/L)	1	<1	1020	1000	26-Sep-08
Lead	(µg/L)	1	<1	1010	1000	26-Sep-08
Magnesium	(µg/L)	20	<20	4070	4000	26-Sep-08
Manganese	(µg/L)	1	<1	519	500	26-Sep-08
Mercury	(µg/L)	0.02	<0.02	0.2	0.2	19-Sep-08
Molybdenum	(µg/L)	2	<2	1010	1000	26-Sep-08
Nickel	(µg/L)	1	<1	1030	1000	26-Sep-08
Phosphorus	(µg/L)	2	<2	2010	2000	26-Sep-08
Potassium	(µg/L)	20	<20	18800	20000	26-Sep-08
Rubidium	(µg/L)	5	<5	100	100	26-Sep-08
Selenium	(µg/L)	1	<1	3	3	23/26-Sep-08
Silicon	(µg/L)	2	<2	882	1000	26-Sep-08
Silver	(µg/L)	0.1	<0.1	992	1000	26-Sep-08
Sodium	(µg/L)	500	<500	20800	20000	26-Sep-08
Strontium	(µg/L)	1	<1	1030	1000	26-Sep-08
Sulphur	(µg/L)	2	<2	2010	2000	26-Sep-08
Tellerium	(µg/L)	5	<5	92	100	26-Sep-08
Thallium	(µg/L)	1	<1	1010	1000	26-Sep-08
Tin	(µg/L)	2	<2	1060	1000	26-Sep-08
Titanium	(µg/L)	2	<2	1000	1000	26-Sep-08
Uranium	(µg/L)	1	<1	97	100	26-Sep-08
Vanadium	(µg/L)	5	<5	503	500	26-Sep-08
Zinc	(µg/L)	1	<1	513	500	26-Sep-08

Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 01, 2008 September 17, 2008
		Page:	6 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

			Method References
Parameters	**Unit**	**MDL**	
Aluminum	(µg/L)	1	APHA 3120, 3030 E
Antimony	(µg/L)	1	APHA 3114 C, VGA
Arsenic	(µg/L)	1	APHA 3114 C, VGA
Barium	(µg/L)	0.5	APHA 3120, 3030 E
Beryllium	(µg/L)	0.1	APHA 3120, 3030 E
Bismuth	(µg/L)	0.5	APHA 3120, 3030 E
Boron	(µg/L)	20	APHA 3120, 3030 E
Cadmium	(µg/L)	0.015	APHA 3120, 3030 E
Calcium	(µg/L)	500	APHA 3120, 3030 E
Chromium	(µg/L)	1	APHA 3120, 3030 E
Cobalt	(µg/L)	1	APHA 3120, 3030 E
Copper	(µg/L)	1	APHA 3120, 3030 E
Iron	(µg/L)	1	APHA 3120, 3030 E
Lead	(µg/L)	1	APHA 3120, 3030 E
Magnesium	(µg/L)	20	APHA 3120, 3030 E
Manganese	(µg/L)	1	APHA 3120, 3030 E
Mercury	(µg/L)	0.02	APHA 3112B, VGA
Molybdenum	(µg/L)	2	APHA 3120, 3030 E
Nickel	(µg/L)	1	APHA 3120, 3030 E
Phosphorus	(µg/L)	2	APHA 3120, 3030 E
Potassium	(µg/L)	20	APHA 3120, 3030 E
Rubidium	(µg/L)	5	APHA 3120, 3030 E
Selenium	(µg/L)	1	APHA 3114 C, VGA
Silicon	(µg/L)	2	APHA 3120, 3030 E
Silver	(µg/L)	0.1	APHA 3120, 3030 E
Sodium	(µg/L)	500	APHA 3120, 3030 E
Strontium	(µg/L)	1	APHA 3120, 3030 E
Sulphur	(µg/L)	2	APHA 3120, 3030 E
Tellerium	(µg/L)	5	APHA 3120, 3030 E
Thallium	(µg/L)	1	APHA 3120, 3030 E
Tin	(µg/L)	2	APHA 3120, 3030 E
Titanium	(µg/L)	2	APHA 3120, 3030 E
Uranium	(µg/L)	1	APHA 3120, 3030 E
Vanadium	(µg/L)	5	APHA 3120, 3030 E
Zinc	(µg/L)	1	APHA 3120, 3030 E

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Cynthia Ridge, C. Chem
Q.A./Q.C. Officer

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Suman Punani
CHEMIST

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager

~ GENERAL COMMENTS ~

MDL	Method Detection Limit
RDL	Reporting Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate
	Result in (brackets) represents Lab Replicate.
	Results relate only to the items tested.

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 01, 2008 September 17, 2008 1 of 6
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Cations

Lab Number			**S2008-12950**	**S2008-12950**	**S2008-12951**	**S2008-12952**	**S2008-12953**
Sample ID			**DS03-DUP**	**DS03-DUP**	**DS03-06**	**DS03-08**	**DS03-13**
Date Collected			**10-Sep-08**	**10-Sep-08**	**10-Sep-08**	**10-Sep-08**	**10-Sep-08**
Parameters	**Unit**	**MDL**		**(Replicate)**			
Ammonia as N	(µg/L)	10	<10	NR	<10	10	<10
Bicabornate	(µg/L)	6000	10200	NR	9540	11900	4440
Carbonate	(µg/L)	3000	<3000	NR	<3000	<3000	<3000
Chloride	(µg/L)	100	<100	<100	<100	<100	108
Colour	(TCU)	5	<5	NR	10	26	<5
Conductivity	(µS/cm)	5	21	NR	19	31	10
Dissolved Inorganic Carbon	(µg/L)	500	3850	NR	3740	2790	2190
Dissolved Organic Carbon	(µg/L)	500	1850	NR	1490	3080	995
Hardness as CaCO3	(µg/L)	300	6250	NR	6600	14400	2620
Nitrate as N	(µg/L)	50	132	124	<50	<50	<50
Nitrite as N	(µg/L)	15	<15	<15	<15	<15	<15
Nitrate + Nitrite	(µg/L)	65	<147	<139	<65	<65	<65
pH	-	-	6.12	NR	6.08	6.90	5.98
Reactive Silica	(µg/L)	10.7	7420	NR	7380	3680	4280
Sulphate	(µg/L)	100	521	527	532	3830	383
Total Alkalinity (CaCO3)	(µg/L)	5000	8350	NR	7820	9790	3640
Total Dissolved Solids (Theo)	(µg/L)	10000	13500	NR	12300	20100	<10000
Total Inorganic Carbon	(µg/L)	500	4240	NR	3880	2820	2240
Total Organic Carbon	(µg/L)	500	1900	1910	1670	3110	1040
Total Suspended Solids	(ug/L)	2000	2000	NR	2000	11000	3000
Turbidity	(NTU)	0.1	1.3	NR	1.3	3.2	2.0
Cations							
Calcium	(µg/L)	500	1350	NR	1500	1990	569
Magnesium	(µg/L)	20	697	NR	693	2290	291
Potassium	(µg/L)	20	58	NR	67	331	56
Sodium	(µg/L)	500	1480	NR	1490	<500	820

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 01, 2008 September 17, 2008 2 of 6
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Cations

Lab Number Sample ID Date Collected			S2008-12953 DS03-13 10-Sep-08	S2008-12954 DS03-14 10-Sep-08	S2008-12955 DS02-01 11-Sep-08	S2008-12955 DS02-01 11-Sep-08	S2008-12956 DS02-02 11-Sep-08
Parameters	**Unit**	**MDL**	**(Replicate)**			**(Replicate)**	
Ammonia as N	(µg/L)	10	NR	<10	<10	NR	<10
Bicabornate	(µg/L)	6000	NR	1700	103000	NR	46900
Carbonate	(µg/L)	3000	NR	<3000	<3000	NR	<3000
Chloride	(µg/L)	100	NR	<100	146	NR	155
Colour	(TCU)	5	NR	<5	<5	NR	20
Conductivity	(µS/cm)	5	NR	6	156	NR	72
Dissolved Inorganic Carbon	(µg/L)	500	2130	2120	20200	NR	9580
Dissolved Organic Carbon	(µg/L)	500	NR	3890	873	820	2260
Hardness as CaCO3	(µg/L)	300	NR	2510	86300	NR	37700
Nitrate as N	(µg/L)	50	NR	<50	<50	NR	<50
Nitrite as N	(µg/L)	15	NR	<15	<15	NR	<15
Nitrate + Nitrite	(µg/L)	65	NR	<65	<65	NR	<65
pH	-	-	NR	5.40	7.79	NR	7.03
Reactive Silica	(µg/L)	10.7	NR	866	4040	NR	5500
Sulphate	(µg/L)	100	NR	<100	1840	NR	648
Total Alkalinity (CaCO3)	(µg/L)	5000	NR	1390	84800	NR	38500
Total Dissolved Solids (Theo)	(µg/L)	10000	NR	<10000	10200	NR	46700
Total Inorganic Carbon	(µg/L)	500	NR	2590	20800	NR	10000
Total Organic Carbon	(µg/L)	500	NR	4420	1270	NR	2630
Total Suspended Solids	(ug/L)	2000	NR	5000	<2000	NR	3000
Turbidity	(NTU)	0.1	NR	1.6	0.1	NR	5.3
Cations							
Calcium	(µg/L)	500	NR	685	17400	NR	7620
Magnesium	(µg/L)	20	NR	195	10400	NR	4530
Potassium	(µg/L)	20	NR	20	187	NR	210
Sodium	(µg/L)	500	NR	<500	<500	NR	517

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 01, 2008 September 17, 2008 3 of 6
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Cations

Lab Number Sample ID Date Collected			S2008-12957 DS02-03 11-Sep-08	S2008-12958 DS02-04 11-Sep-08	S2008-12958 DS02-04 11-Sep-08	S2008-12959 Star 1 11-Sep-08	S2008-12959 Star 1 11-Sep-08
Parameters	**Unit**	**MDL**			**(Replicate)**		**(Replicate)**
Ammonia as N	(µg/L)	10	<10	10	NR	<10	NR
Bicabornate	(µg/L)	6000	50100	50200	NR	51500	NR
Carbonate	(µg/L)	3000	<3000	<3000	NR	<3000	NR
Chloride	(µg/L)	100	302	294	NR	311	NR
Colour	(TCU)	5	<5	<5	NR	<5	<5
Conductivity	(µS/cm)	5	81	82	NR	83	NR
Dissolved Inorganic Carbon	(µg/L)	500	9590	9730	NR	10100	NR
Dissolved Organic Carbon	(µg/L)	500	675	659	NR	612	NR
Hardness as CaCO3	(µg/L)	300	41700	42600	NR	43500	NR
Nitrate as N	(µg/L)	50	<50	<50	NR	<50	NR
Nitrite as N	(µg/L)	15	<15	<15	NR	<15	NR
Nitrate + Nitrite	(µg/L)	65	<65	<65	NR	<65	NR
pH	-	-	7.60	7.62	NR	7.55	NR
Reactive Silica	(µg/L)	10.7	5600	5630	NR	5540	NR
Sulphate	(µg/L)	100	2540	2620	NR	2390	NR
Total Alkalinity (CaCO3)	(µg/L)	5000	41100	41100	NR	42200	NR
Total Dissolved Solids (Theo)	(µg/L)	10000	52900	53400	NR	54200	NR
Total Inorganic Carbon	(µg/L)	500	9860	9930	9930	10400	NR
Total Organic Carbon	(µg/L)	500	960	1080	NR	911	NR
Total Suspended Solids	(ug/L)	2000	<2000	<2000	NR	2000	2000
Turbidity	(NTU)	0.1	0.3	0.5	0.4	0.4	NR
Cations							
Calcium	(µg/L)	500	7800	7910	NR	8210	NR
Magnesium	(µg/L)	20	5400	5540	NR	5580	NR
Potassium	(µg/L)	20	337	344	NR	333	NR
Sodium	(µg/L)	500	598	582	NR	612	NR

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 01, 2008 September 17, 2008 4 of 6
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Cations

			Lab Blank	Q.C. Standard Actual	Q.C. Standard Expected	Date of Analysis
Parameters	**Unit**	**MDL**				
Ammonia	(µg/L)	10	<10	395	400	19-Sep-08
Bicabornate	(µg/L)	6000	<6000	-	-	19-Sep-08
Carbonate	(µg/L)	3000	<3000	-	-	19-Sep-08
Chloride	(µg/L)	100	<100	4090	4200	20-Sep-08
Colour	(TCU)	5	<5	31	32.5	23-Sep-08
Conductivity	(µS/cm)	5	<5	107	100	19-Sep-08
Dissolved Inorganic Carbon	(µg/L)	500	<500	-	-	29-Sep-08
Dissolved Organic Carbon	(µg/L)	500	<500	15400	15000	23-Sep-08
Hardness as CaCO3	(µg/L)	300	<300	-	-	26-Sep-08
Nitrate as N	(µg/L)	50	<50	4130	4000	20-Sep-08
Nitrite as N	(µg/L)	15	<15	505	500	20-Sep-08
Nitrate + Nitrite	(µg/L)	65	<65	-	-	20-Sep-08
pH	-	-	6.68	5.99	6.00	19-Sep-08
Reactive Silica	(µg/L)	10.7	<10.7	882	1000	26-Sep-08
Sulphate	(µg/L)	100	<100	23900	24000	20-Sep-08
Total Alkalinity (CaCO3)	(µg/L)	5000	<5000	100	1000000	19-Sep-08
Total Dissolved Solids (Theo)	(µg/L)	10000	<10000	69000	65000	19-Sep-08
Total Inorganic Carbon	(µg/L)	500	<500	-	-	29-Sep-08
Total Organic Carbon	(µg/L)	500	<500	-	15000	23-Sep-08
Total Suspended Solids	(ug/L)	2000	<2000	97000	10000	22-Sep-08
Turbidity	(NTU)	0.1	<0.1	9.84	10.0	25-Sep-08
Cations						
Calcium	(µg/L)	500	<500	9820	10000	26-Sep-08
Magnesium	(µg/L)	20	<20	4070	4000	26-Sep-08
Potassium	(µg/L)	20	<20	18800	20000	26-Sep-08
Sodium	(µg/L)	500	<500	20800	20000	26-Sep-08

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Client:	AMEC Earth and Environmental, a division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 01, 2008 September 17, 2008 5 of 6
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1832
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Cations

			Method References
Parameters	**Unit**	**MDL**	
Ammonia as N	(ug/L)	10	US EPA 1688, Skalar 155-318
Bicabornate	(µg/L)	6000	APHA 2320
Carbonate	(µg/L)	3000	APHA 2320
Chloride	(ug/L)	100	APHA 4110 C
Colour	(TCU)	5	APHA 2120 B
Conductivity	(µS/cm)	5	APHA 2510
Dissolved Organic Carbon	(µg/L)	500	APHA 5310
Hardness as CaCO3	(ug/L)	300	Calculated
Nitrate as N	(ug/L)	50	APHA 4110 C
Nitrite as N	(ug/L)	15	APHA 4110 C
Nitrate + Nitrite	(ug/L)	65	Calculated
pH	-	-	APHA 4500 H^+
Reactive Silica	(µg/L)	10.7	APHA 3120, 3030 E
Sulphate	(ug/L)	100	APHA 4110 C
Total Alkalinity (CaCO3)	(ug/L)	5000	APHA 2320
Total Dissolved Solids (Theo)	(ug/L)	10000	APHA 2510
Total Organic Carbon	(ug/L)	500	APHA 5310
Total Suspended Solids	(ug/L)	2000	APHA 2540 D
Turbidity	(NTU)	0.1	APHA 2130 B
Cations			
Calcium	(ug/L)	500	APHA 3120, 3030 E
Magnesium	(ug/L)	20	APHA 3120, 3030 E
Potassium	(ug/L)	20	APHA 3120, 3030 E
Sodium	(ug/L)	500	APHA 3120, 3030 E

<Original signed by>

Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager

ASSOCIATION OF PROFESSIONAL CHEMISTS OF ONTARIO
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~ GENERAL COMMENTS ~

MDL	Method Detection Limit
RDL	Reporting Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate
	Result in (brackets) represents Lab Replicate
	Results relate to only to the items tested.

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Request for Analysis

The Work specified herein shall be performed in accordance with the terms and conditions on the reverse of this document; or, as may be applicable, in accordance with the terms and conditions of the Blanket Purchase Order Number _____

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LQ# _____ AUTHORIZED SIGNATURE: _____ DATE: _____ TIME: _____

DATE REQUIRED: _____ RECEIVED AT LAB BY: _____ DATE: _____ TIME: _____

LOGGED AT LAB BY: SS. DATE: Sept 17/08 TIME: 1:00

(A) ARE THESE WATER SAMPLES FROM SOURCES IN ONTARIO - YES / (NO)
(B) ARE THESE SAMPLES POTABLE or FOR HUMAN CONSUMPTION - YES / (NO)
IF YES TO (A) and (B). CONTACT THE LAB BEFORE SHIPPING.

FILE #: 1832 BOX #: 41/42/39

Temperature: 20.6/20.2 Sample Condition

PROJECT # / P.O # TF8165902

CONTACT Eugene Lee

PROJECT NAME DSOP West Labrador/East Quebec

COMPANY NAME AMEC E&E

MAILING ADDRESS 133 Crosbie Rd. St. John's, NL A1B 4A5

TELEPHONE NUMBER 709-722-7023

FAX NUMBER 709-722-7353

TURNAROUND BUSINESS DAY
☑ NORMAL (5-7) ☐ RUSH (3) ☐ SUPER (24Hrs)

Regulatory Requirements:
☐ Brownfields 153/04
☐ Table ___ **separate request for Analysis**
☐ PWQO **Form required for Ontario**
☑ CCME **Drinking water samples**
☐ ODWS ☐ Other
☐ TCLP ☐ uncertainty reported on C of A

note: unless stated otherwise, all water samples will be treated as non-potable and will not be subject to ODWS regulation requirements

LAB USE ONLY	SAMPLE ID	DATE	TYPE	AMOUNT COLLECTED	PRESERVATIVES	LAB FILTRATION REQUIRED	ANALYSIS REQUESTED: Gen Chem	Total metals	Dissolved metals	TSS	TOC				LEVEL OF CONTAMINATION (H, L, U)
					in total metals only	Dissolved metals									
S2008-12950	DS03-DUP	10Sept08	Surface Water	1-1L 2-250mL 1-500mL 1-100mL	✓	✓	✓	✓	✓	✓	✓				
S2008-12951	DS03-06				✓	✓	✓	✓	✓	✓	✓				
S2008-12952	DS03-08				✓	✓	✓	✓	✓	✓	✓				
S2008-12953	DS03-13				✓	✓	✓	✓	✓	✓	✓				
S2008-12954	DS03-14	10Sept08			✓	✓	✓	✓	✓	✓	✓				
S2008-12955	DS02-01	11Sept08			✓	✓	✓	✓	✓	✓	✓				
S2008-12956	DS02-02				✓	✓	✓	✓	✓	✓	✓				
S2008-12957	DS02-03				✓	✓	✓	✓	✓	✓	✓				
S2008-12958	DS02-04				✓	✓	✓	✓	✓	✓	✓				
S2008-12959	Star1	11Sept08	surface Water	1-1L 2-250mL 1-500mL 1-100mL	✓	✓	✓	✓	✓	✓	✓				
S2008-12960	Lab Blank No Sample.														

COMMENTS: Sent by 15Sept 2008@13:00.

Revision 2006 -2

Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 07, 2008 September 18, 2008 1 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

Lab Number			**S2008-13072**	**S2008-13072**	**S2008-13073**	**S2008-13074**	**S2008-13075**
Sample ID			**Trip Blank**	**Trip Blank**	**DS03-Dup2**	**Timmins 1**	**Timmins 2**
Date Collected			**04-Sep-08**	**04-Sep-08**	**12-Sep-08**	**12-Sep-08**	**12-Sep-08**
Parameters	**Unit**	**MDL**		**(Replicate)**			
Ammonia as N	(ug/L)	10	<1	NR	<10	<10	<10
Bicarbonate	(ug/L)	6000	<6000	NR	<6000	8920	7480
Carbonate	(ug/L)	3000	<3000	NR	<3000	<3000	<3000
Chloride	(ug/L)	100	<100	<100	<100	331	1230
Colour	(TCU)	5	<5	NR	<5	<5	<5
Conductivity	(uS/cm)	5	7	NR	<5	22	28
Dissolved Inorganic Carbon	(ug/L)	500	<500	NR	<500	2010	1530
Dissolved Organic Carbon	(ug/L)	500	<500	NR	<500	2300	1790
Nitrate as N	(ug/L)	50	<50	<50	<50	156	924
Nitrite as N	(ug/L)	15	<15	<15	<15	<15	<15
Nitrate + Nitrite	(ug/L)	65	<65	<65	<65	<171	<939
pH	-	-	7.35	NR	6.10	6.97	6.96
Reactive Silica	(ug/L)	10.7	1300	NR	1490	2850	4430
Sulphate	(ug/L)	100	<100	<100	<100	1540	1210
Total Alkalinity (CaCO3)	(ug/L)	5000	<5000	NR	<5000	7310	6130
Total Dissolved Solids (Theo)	(ug/L)	10000	<10000	NR	<10000	14000	18300
Total Hardness ($CaCO_3$)	(ug/L)	300	<300	NR	<300	5840	6950
Total Inorganic Carbon	(ug/L)	500	<500	NR	<500	2040	1580
Total Organic Carbon	(ug/L)	500	<500	NR	<500	2570	1900
Total Suspended Solids	(ug/L)	2000	<2000	NR	<2000	<2000	<2000
Turbidity	(NTU)	0.1	0.1	NR	<0.1	1.2	3.4
Cations							
Calcium	(µg/L)	500	<500	NR	<500	1070	1300
Magnesium	(µg/L)	20	<20	NR	<20	769	900
Potassium	(µg/L)	20	<20	NR	<20	259	151
Sodium	(µg/L)	500	<500	NR	<500	<500	710

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 07, 2008 September 18, 2008 2 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

Lab Number			**S2008-13076**	**S2008-13076**	**S2008-13077**	**S2008-13077**	**S2008-13078**
Sample ID			**DS03-15**	**DS03-15**	**DS03-07**	**DS03-07**	**DS03-03**
Date Collected			**12-Sep-08**	**12-Sep-08**	**13-Sep-08**	**13-Sep-08**	**13-Sep-08**
Parameters	**Unit**	**MDL**		**(Replicate)**		**(Replicate)**	
Ammonia as N	(ug/L)	10	<10	NR	24	30	38
Bicarbonate	(ug/L)	6000	8930	NR	<6000	NR	<6000
Carbonate	(ug/L)	3000	<3000	NR	<3000	NR	<3000
Chloride	(ug/L)	100	342	NR	<100	NR	142
Colour	(TCU)	5	<5	NR	31	NR	<5
Conductivity	(uS/cm)	5	22	NR	7	NR	10
Dissolved Inorganic Carbon	(ug/L)	500	2080	NR	847	NR	1120
Dissolved Organic Carbon	(ug/L)	500	1840	NR	3190	NR	6350
Fluoride	(ug/L)	100	<100	NR	<100	NR	<100
Nitrate as N	(ug/L)	50	208	NR	<50	NR	<50
Nitrite as N	(ug/L)	15	<15	NR	<15	NR	<15
Nitrate + Nitrite	(ug/L)	65	<223	NR	<65	NR	<65
pH			6.81	NR	6.40	NR	6.02
Reactive Silica	(ug/L)	10.7	3530	NR	2530	NR	3750
Sulphate	(ug/L)	100	1560	NR	547	NR	586
Total Alkalinity (CaCO3)	(ug/L)	5000	7320	NR	<5000	NR	<5000
Total Dissolved Solids (Theo)	(ug/L)	10000	14600	NR	<10000	NR	<10000
Total Hardness ($CaCO_3$)	(ug/L)	300	6080	NR	1990	NR	1180
Total Inorganic Carbon	(ug/L)	500	2190	2140	879	NR	1150
Total Organic Carbon	(ug/L)	500	2270	NR	3560	3440	6740
Total Suspended Solids	(ug/L)	2000	<2000	NR	<2000	NR	<2000
Turbidity	(NTU)	0.1	4.2	NR	1.2	NR	1.2
Cations							
Calcium	(µg/L)	500	1100	NR	<500	NR	<500
Magnesium	(µg/L)	20	810	NR	256	NR	140
Potassium	(µg/L)	20	277	NR	62	NR	362
Sodium	(µg/L)	500	<500	NR	<500	NR	715

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

Lab Number			**S2008-13079**	**S2008-13079**
Sample ID			**DS03-05**	**DS03-05**
Date Collected			**13-Sep-08**	**13-Sep-08**
Parameters	**Unit**	**MDL**		**(Replicate)**
Ammonia as N	(ug/L)	10	44	NR
Bicarbonate	(ug/L)	6000	<6000	NR
Carbonate	(ug/L)	3000	<3000	NR
Chloride	(ug/L)	100	<100	NR
Colour	(TCU)	5	<5	<5
Conductivity	(uS/cm)	5	<5	NR
Dissolved Inorganic Carbon	(ug/L)	500	<500	NR
Dissolved Organic Carbon	(ug/L)	500	2600	NR
Fluoride	(ug/L)	100	<100	NR
Nitrate as N	(ug/L)	50	<50	NR
Nitrite as N	(ug/L)	15	<15	NR
Nitrate + Nitrite	(ug/L)	65	<65	NR
pH	-	-	5.71	NR
Reactive Silica	(ug/L)	10.7	514	NR
Sulphate	(ug/L)	100	334	NR
Total Alkalinity (CaCO3)	(ug/L)	5000	<5000	NR
Total Dissolved Solids (Theo)	(ug/L)	10000	<10000	NR
Total Hardness ($CaCO_3$)	(ug/L)	300	704	NR
Total Inorganic Carbon	(ug/L)	500	520	NR
Total Organic Carbon	(ug/L)	500	3610	NR
Total Suspended Solids	(ug/L)	2000	13000	13000
Turbidity	(NTU)	0.1	33.3	34.1
Cations				
Calcium	(µg/L)	500	<500	NR
Magnesium	(µg/L)	20	78	NR
Potassium	(µg/L)	20	116	NR
Sodium	(µg/L)	500	123	NR

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

			Lab Blank	Q.C. Standard Actual	Q.C. Standard Expected	Date of Analysis
Parameters	**Unit**	**MDL**				
Ammonia as N	(ug/L)	10	<10	402	400	23-Sep / 06-Oct-08
Bicarbonate	(ug/L)	6000	<6000	-	-	23-Sep-08
Carbonate	(ug/L)	3000	<3000	-	-	23-Sep-08
Chloride	(ug/L)	100	<100	4100	4200	22-Sep-08
Colour	(TCU)	5	<5	31	32.5	23-Sep-08
Conductivity	(uS/cm)	5	<5	105	100	23-Sep-08
Dissolved Inorganic Carbon	(ug/L)	500	<500	-	-	29/30-Sep-08
Dissolved Organic Carbon	(ug/L)	500	<500	15400	15000	23/26-Sep-08
Fluoride	(ug/L)	100	<100	1850	1800	22-Sep-08
Nitrate as N	(ug/L)	50	<50	4160	4200	22-Sep-08
Nitrite as N	(ug/L)	15	<15	500	500	22-Sep-08
Nitrate + Nitrite	(ug/L)	65	<65	-	-	22-Sep-08
pH			6.81	5.99	6.00	23-Sep-08
Reactive Silica	(ug/L)	10.7	<10.7	915	1000	29-Sep-08
Sulphate	(ug/L)	100	<100	23800	24000	22-Sep-08
Total Alkalinity (CaCO3)	(ug/L)	5000	<5000	101000	100000	23-Sep-08
Total Dissolved Solids (Theo)	(ug/L)	10000	<10000	68100	65000	23-Sep-08
Total Hardness ($CaCO_3$)	(ug/L)	300	<300	-	-	29-Sep-08
Total Inorganic Carbon	(ug/L)	500	<500	-	-	29/30-Sep-08
Total Organic Carbon	(ug/L)	500	<500	15400	15000	23/26-Sep-08
Total Suspended Solids	(ug/L)	2000	<2000	97000	100000	22-Sep-08
Turbidity	(NTU)	0.1	<0.1	9.84	10.0	25-Sep-08
Cations						
Calcium	(µg/L)	500	<500	9500	10000	29-Sep-08
Magnesium	(µg/L)	20	<20	3750	4000	29-Sep-08
Potassium	(µg/L)	20	<20	18000	20000	29-Sep-08
Sodium	(µg/L)	500	<500	21000	20000	29-Sep-08

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry + Sodium

			Method References
General Chemistry	**Unit**	**MDL**	
Ammonia as N	(ug/L)	10	US EPA 1688, Skalar 155-318
Bicarbonate	(ug/L)	6000	APHA 2320
Carbonate	(ug/L)	3000	APHA 2320
Chloride	(ug/L)	100	APHA 4110 C
Colour	(TCU)	5	APHA 2120 B
Conductivity	(uS/cm)	5	APHA 2510
Dissolved Inorganic Carbon	(ug/L)	500	APHA 5310 C
Dissolved Organic Carbon	(ug/L)	500	APHA 5310 C
Fluoride	(ug/L)	100	APHA 4110 C
Nitrate as N	(ug/L)	50	APHA 4110 C
Nitrite as N	(ug/L)	15	APHA 4110 C
Nitrate + Nitrite	(ug/L)	65	Calculated
pH			APHA 4500 H^+
Reactive Silica	(ug/L)	10.7	APHA 3120, 3030 E
Sulphate	(ug/L)	100	APHA 4110 C
Total Alkalinity (CaCO3)	(ug/L)	5000	APHA 2320
Total Dissolved Solids (Theo)	(ug/L)	10000	APHA 2510
Total Hardness ($CaCO_3$)	(ug/L)	300	Calculated
Total Inorganic Carbon	(ug/L)	500	APHA 5310 C
Total Organic Carbon	(ug/L)	500	APHA 5310 C
Total Suspended Solids	(ug/L)	2000	APHA 2540 D
Turbidity	(NTU)	0.1	APHA 2130 B
Cations			
Calcium	(µg/L)	500	APHA 3120, 3030 E
Magnesium	(µg/L)	20	APHA 3120, 3030 E
Potassium	(µg/L)	20	APHA 3120, 3030 E
Sodium	(µg/L)	500	APHA 3120, 3030 E

<Original signed by>

Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Suman Punani
CHEMIST

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~ GENERAL COMMENTS ~

MDL	Method Detection Limit
RDL	Reporting Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate
	Result in (brackets) represents Lab Replicate.
	Results relate only to the items tested.

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			S2008-13072	S2008-13072	S2008-13073	S2008-13073	S2008-13074	S2008-13074
Sample ID			Trip Blank	Trip Blank	DS03-Dup2	DS03-Dup2	Timmins 1	Timmins 1
Date Collected			04-Sep-08	04-Sep-08	12-Sep-08	12-Sep-08	12-Sep-08	12-Sep-08
Parameters	**Unit**	**MDL**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**
Aluminum	(µg/L)	1	<1	<1	13	5	10	8
Antimony	(µg/L)	1	<1	<1	<1	<1	<1	<1
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1	<1
Barium	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	3.5	2.4
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	(µg/L)	20	<20	<20	<20	<20	<20	<20
Cadmium	(µg/L)	0.015	<0.015	<0.015	0.054	<0.015	0.097	<0.015
Calcium	(µg/L)	500	<500	<500	<500	<500	1070	709
Chromium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Cobalt	(µg/L)	1	<1	<1	<1	<1	<1	<1
Copper	(µg/L)	1	1	<1	1	<1	2	<1
Iron	(µg/L)	1	<1	<1	31	16	23	18
Lead	(µg/L)	1	<1	<1	2	<1	<1	<1
Magnesium	(µg/L)	20	<20	<20	<20	<20	769	517
Manganese	(µg/L)	1	<1	<1	<1	<1	2	<1
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	(µg/L)	2	<2	<2	<2	<2	<2	<2
Nickel	(µg/L)	1	<1	<1	<1	<1	<1	<1
Phosphorus	(µg/L)	2	<2	<2	<2	<2	<2	<2
Potassium	(µg/L)	20	<20	<20	<20	<20	259	163
Rubidium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Selenium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Silicon	(µg/L)	2	607	576	694	626	1330	1220
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	(µg/L)	500	<500	<500	<500	<500	<500	<500
Strontium	(µg/L)	1	<1	<1	<1	<1	3	2
Sulphur	(µg/L)	2	3	4	<2	<2	448	305
Tellerium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Thallium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Tin	(µg/L)	2	<2	<2	<2	<2	<2	<2
Titanium	(µg/L)	2	<2	<2	<2	<2	<2	<2
Uranium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Vanadium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Zinc	(µg/L)	1	2	2	3	1	5	2

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			S2008-13075	S2008-13075	S2008-13075	S2008-13076	S2008-13076	S2008-13076
Sample ID			Timmins 2	Timmins 2	Timmins 2	DS03-15	DS03-15	DS03-15
Date Collected			12-Sep-08	12-Sep-08	12-Sep-08	12-Sep-08	12-Sep-08	12-Sep-08
Parameters	**Unit**	**MDL**	(Total)	(Total) (Replicate)	(Dissolved)	(Total)	(Total) (Replicate)	(Dissolved)
Aluminum	(µg/L)	1	14	NR	2	358	NR	146
Antimony	(µg/L)	1	<1	<1	<1	<1	NR	<1
Arsenic	(µg/L)	1	<1	<1	<1	<1	NR	<1
Barium	(µg/L)	0.5	1.2	NR	0.7	3.2	NR	2.1
Beryllium	(µg/L)	0.1	<0.1	NR	<0.1	<0.1	NR	<0.1
Bismuth	(µg/L)	0.5	<0.5	NR	<0.5	<0.5	NR	<0.5
Boron	(µg/L)	20	<20	NR	<20	<20	NR	<20
Cadmium	(µg/L)	0.015	0.111	NR	0.098	0.152	NR	<0.015
Calcium	(µg/L)	500	1300	NR	910	1100	NR	839
Chromium	(µg/L)	1	<1	NR	<1	<1	NR	<1
Cobalt	(µg/L)	1	<1	NR	<1	<1	NR	<1
Copper	(µg/L)	1	<1	NR	<1	9	NR	<1
Iron	(µg/L)	1	36	NR	12	22	NR	14
Lead	(µg/L)	1	<1	NR	<1	2	NR	<1
Magnesium	(µg/L)	20	900	NR	589	810	NR	579
Manganese	(µg/L)	1	3	NR	2	2	NR	1
Mercury	(µg/L)	0.02	<0.02	NR	<0.02	<0.02	<0.02	<0.02
Molybdenum	(µg/L)	2	<2	NR	<2	<2	NR	<2
Nickel	(µg/L)	1	<1	NR	<1	<1	NR	<1
Phosphorus	(µg/L)	2	<2	NR	<2	13	NR	<2
Potassium	(µg/L)	20	151	NR	99	277	NR	184
Rubidium	(µg/L)	5	<1	NR	<5	<5	NR	<1
Selenium	(µg/L)	1	<1	<1	<1	2	NR	1
Silicon	(µg/L)	2	2070	NR	1930	1650	NR	1490
Silver	(µg/L)	0.1	<0.1	NR	<0.1	<0.1	NR	<0.1
Sodium	(µg/L)	500	710	NR	<500	<500	NR	<500
Strontium	(µg/L)	1	4	NR	3	3	NR	2
Sulphur	(µg/L)	2	362	NR	245	486	NR	340
Tellerium	(µg/L)	5	<5	NR	<5	<5	NR	<5
Thallium	(µg/L)	1	<1	NR	<1	<1	NR	<1
Tin	(µg/L)	2	<2	NR	<2	<2	NR	<2
Titanium	(µg/L)	2	<2	NR	<2	<2	NR	<2
Uranium	(µg/L)	1	<1	NR	<1	<1	NR	<1
Vanadium	(µg/L)	5	<5	NR	<5	<5	NR	<5
Zinc	(µg/L)	1	3	NR	2	8	NR	2

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			S2008-13077	S2008-13077	S2008-13078	S2008-13078	S2008-13079	S2008-13079
Sample ID			DS03-07	DS03-07	DS03-03	DS03-03	DS03-05	DS03-05
Date Collected			13-Sep-08	13-Sep-08	13-Sep-08	13-Sep-08	13-Sep-08	13-Sep-08
Parameters	**Unit**	**MDL**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**	**(Total)**	**(Dissolved)**
Aluminum	(µg/L)	1	34	14	45	37	177	30
Antimony	(µg/L)	1	<1	<1	<1	<1	<1	<1
Arsenic	(µg/L)	1	<1	<1	<1	<1	<1	<1
Barium	(µg/L)	0.5	0.7	<0.5	0.9	0.7	2.1	0.9
Beryllium	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	(µg/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Boron	(µg/L)	20	<20	<20	<20	<20	<20	<20
Cadmium	(µg/L)	0.015	0.033	<0.015	0.098	<0.015	0.129	0.085
Calcium	(µg/L)	500	<500	<500	<500	<500	<500	<500
Chromium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Cobalt	(µg/L)	1	<1	<1	<1	<1	<1	<1
Copper	(µg/L)	1	3	<1	1	1	1	<1
Iron	(µg/L)	1	90	56	86	46	419	9
Lead	(µg/L)	1	<1	<1	<1	<1	1	<1
Magnesium	(µg/L)	20	256	180	140	115	78	38
Manganese	(µg/L)	1	4	2	8	5	12	4
Mercury	(µg/L)	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	(µg/L)	2	<2	<2	<2	<2	<2	<2
Nickel	(µg/L)	1	<1	<1	<1	<1	<1	<1
Phosphorus	(µg/L)	2	4	<2	8	<2	14	<2
Potassium	(µg/L)	20	62	33	362	285	116	39
Rubidium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Selenium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Silicon	(µg/L)	2	1180	1080	1750	1730	241	41
Silver	(µg/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sodium	(µg/L)	500	<500	<500	715	553	<500	<500
Strontium	(µg/L)	1	1	<1	2	1	<1	<1
Sulphur	(µg/L)	2	197	137	213	167	148	72
Tellerium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Thallium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Tin	(µg/L)	2	<2	<2	<2	<2	<2	<2
Titanium	(µg/L)	2	<2	<2	<2	<2	4	<2
Uranium	(µg/L)	1	<1	<1	<1	<1	<1	<1
Vanadium	(µg/L)	5	<5	<5	<5	<5	<5	<5
Zinc	(µg/L)	1	5	<1	4	2	4	1

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 07, 2008 September 18, 2008 4 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

Lab Number			**S2008-13079**
Sample ID			**DS03-05**
Date Collected			**13-Sep-08**
Parameters	**Unit**	**MDL**	**(Dissolved) (Replicate)**
Aluminum	(µg/L)	1	NR
Antimony	(µg/L)	1	NR
Arsenic	(µg/L)	1	<1
Barium	(µg/L)	0.5	NR
Beryllium	(µg/L)	0.1	NR
Bismuth	(µg/L)	0.5	NR
Boron	(µg/L)	20	NR
Cadmium	(µg/L)	0.015	NR
Calcium	(µg/L)	500	NR
Chromium	(µg/L)	1	NR
Cobalt	(µg/L)	1	NR
Copper	(µg/L)	1	NR
Iron	(µg/L)	1	NR
Lead	(µg/L)	1	NR
Magnesium	(µg/L)	20	NR
Manganese	(µg/L)	1	NR
Mercury	(µg/L)	0.02	NR
Molybdenum	(µg/L)	2	NR
Nickel	(µg/L)	1	NR
Phosphorus	(µg/L)	2	NR
Potassium	(µg/L)	20	NR
Rubidium	(µg/L)	5	NR
Selenium	(µg/L)	1	<1
Silicon	(µg/L)	2	NR
Silver	(µg/L)	0.1	NR
Sodium	(µg/L)	500	NR
Strontium	(µg/L)	1	NR
Sulphur	(µg/L)	2	NR
Tellerium	(µg/L)	5	NR
Thallium	(µg/L)	1	NR
Tin	(µg/L)	2	NR
Titanium	(µg/L)	2	NR
Uranium	(µg/L)	1	NR
Vanadium	(µg/L)	5	NR
Zinc	(µg/L)	1	NR

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

			Lab Blank	Q.C. Standards Actual	Q.C. Standards Expected	Date of Analysis
Parameters	**Unit**	**MDL**				
Aluminum	(µg/L)	1	<1	1040	1000	29-Sep-08
Antimony	(µg/L)	1	<1	3	3	25/26-Sep-08
Arsenic	(µg/L)	1	<1	3	3	25-Sep-08
Barium	(µg/L)	0.5	<0.5	451	500	29-Sep-08
Beryllium	(µg/L)	0.1	<0.1	494	500	29-Sep-08
Bismuth	(µg/L)	0.5	<0.5	960	1000	29-Sep-08
Boron	(µg/L)	20	<20	986	1000	29-Sep-08
Cadmium	(µg/L)	0.015	<0.015	493	500	29-Sep-08
Calcium	(µg/L)	500	<500	9500	10000	29-Sep-08
Chromium	(µg/L)	1	<1	481	500	29-Sep-08
Cobalt	(µg/L)	1	<1	482	500	29-Sep-08
Copper	(µg/L)	1	<1	985	1000	29-Sep-08
Iron	(µg/L)	1	<1	966	1000	29-Sep-08
Lead	(µg/L)	1	<1	946	1000	29-Sep-08
Magnesium	(µg/L)	20	<20	3750	4000	29-Sep-08
Manganese	(µg/L)	1	<1	479	500	29-Sep-08
Mercury	(µg/L)	0.02	<0.02	0.2	0.2	23-Sep-08
Molybdenum	(µg/L)	2	<2	947	1000	29-Sep-08
Nickel	(µg/L)	1	<1	970	1000	29-Sep-08
Phosphorus	(µg/L)	2	<2	2000	2000	29-Sep-08
Potassium	(µg/L)	20	<20	18000	20000	29-Sep-08
Rubidium	(µg/L)	5	<5	106	100	29-Sep-08
Selenium	(µg/L)	1	<1	3	3	24-Sep-08
Silicon	(µg/L)	2	<2	915	1000	29-Sep-08
Silver	(µg/L)	0.1	<0.1	929	1000	29-Sep-08
Sodium	(µg/L)	500	<500	21000	20000	29-Sep-08
Strontium	(µg/L)	1	<1	918	1000	29-Sep-08
Sulphur	(µg/L)	2	<2	2010	2000	29-Sep-08
Tellerium	(µg/L)	5	<5	84	100	29-Sep-08
Thallium	(µg/L)	1	<1	994	1000	29-Sep-08
Tin	(µg/L)	2	<2	993	1000	29-Sep-08
Titanium	(µg/L)	2	<2	945	1000	29-Sep-08
Uranium	(µg/L)	1	<1	95	100	29-Sep-08
Vanadium	(µg/L)	5	<5	482	500	29-Sep-08
Zinc	(µg/L)	1	<1	493	500	29-Sep-08

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 07, 2008 September 18, 2008
		Page:	6 of 7
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Water
Project Number:	TF 8165902	Lab Ref.:	F2008-1848
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals+Hydrides

			Method References
Parameters	**Unit**	**MDL**	
Aluminum	(µg/L)	1	APHA 3120, 3030 E
Antimony	(µg/L)	1	APHA 3114 C, VGA
Arsenic	(µg/L)	1	APHA 3114 C, VGA
Barium	(µg/L)	0.5	APHA 3120, 3030 E
Beryllium	(µg/L)	0.1	APHA 3120, 3030 E
Bismuth	(µg/L)	0.5	APHA 3120, 3030 E
Boron	(µg/L)	20	APHA 3120, 3030 E
Cadmium	(µg/L)	0.015	APHA 3120, 3030 E
Calcium	(µg/L)	500	APHA 3120, 3030 E
Chromium	(µg/L)	1	APHA 3120, 3030 E
Cobalt	(µg/L)	1	APHA 3120, 3030 E
Copper	(µg/L)	1	APHA 3120, 3030 E
Iron	(µg/L)	1	APHA 3120, 3030 E
Lead	(µg/L)	1	APHA 3120, 3030 E
Magnesium	(µg/L)	20	APHA 3120, 3030 E
Manganese	(µg/L)	1	APHA 3120, 3030 E
Mercury	(µg/L)	0.02	APHA 3112B, VGA
Molybdenum	(µg/L)	2	APHA 3120, 3030 E
Nickel	(µg/L)	1	APHA 3120, 3030 E
Phosphorus	(µg/L)	2	APHA 3120, 3030 E
Potassium	(µg/L)	20	APHA 3120, 3030 E
Rubidium	(µg/L)	5	APHA 3120, 3030 E
Selenium	(µg/L)	1	APHA 3114 C, VGA
Silicon	(µg/L)	2	APHA 3120, 3030 E
Silver	(µg/L)	0.1	APHA 3120, 3030 E
Sodium	(µg/L)	500	APHA 3120, 3030 E
Strontium	(µg/L)	1	APHA 3120, 3030 E
Sulphur	(µg/L)	2	APHA 3120, 3030 E
Tellerium	(µg/L)	5	APHA 3120, 3030 E
Thallium	(µg/L)	1	APHA 3120, 3030 E
Tin	(µg/L)	2	APHA 3120, 3030 E
Titanium	(µg/L)	2	APHA 3120, 3030 E
Uranium	(µg/L)	1	APHA 3120, 3030 E
Vanadium	(µg/L)	5	APHA 3120, 3030 E
Zinc	(µg/L)	1	APHA 3120, 3030 E

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Suman Punani
CHEMIST

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/bpj

<Original signed by>

Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager

~ GENERAL COMMENTS ~

MDL	Method Detection Limit .
RDL	Reporting Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate
	Result in (brackets) represents Lab Replicate.
	Results relate only to the items tested.

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Request for Analysis

The Work specified herein shall be performed in accordance with the terms and conditions on the reverse of this document; or, as may be applicable, in accordance with the terms and conditions of the Blanket Purchase Order Number_____

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LQ#_____ AUTHORIZED SIGNATURE:_____ DATE:_____ TIME:_____

DATE REQUIRED:_____ RECEIVED AT LAB BY:_____ DATE:_____ TIME:_____

(A) ARE THESE WATER SAMPLES FROM SOURCES IN ONTARIO - YES / (NO.)
(B) ARE THESE SAMPLES POTABLE or FOR HUMAN CONSUMPTION - YES / (NO.)
IF YES TO (A) and (B). CONTACT THE LAB BEFORE SHIPPING.

LOGGED AT LAB BY: SS DATE: Sept 18/08 TIME: 2:45
FILE #: 1848 BOX #: 44/45/38
17.2/20.0 Temperature Sample Condition

PROJECT # / P.O # TF 8165902
CONTACT Eugene Lee
PROJECT NAME D50p West Labrador/East Quebec
COMPANY NAME AMEC E&E
MAILING ADDRESS 133 Crosbie Rd. St. John's, NL A1B 4A5
TELEPHONE NUMBER 709-722-7023
FAX NUMBER 709-722-7353

TURNAROUND BUSINESS DAY
☒ NORMAL (5-7) ☐ RUSH (3) ☐ SUPER (24Hrs)

Regulatory Requirements:
☐ Brownfields 153/04
☐ Table ___ **separate request for Analysis**
☐ PWQO **Form required for Ontario**
☒ CCME FWAL **Drinking water samples**
☐ ODWS ☐ Other
☐ TCLP ☐ uncertainty reported on C of A

note: unless stated otherwise, all water samples will be treated as non-potable and will not be subject to ODWS regulation requirements

LAB USE ONLY	SAMPLE ID	DATE	TYPE	AMOUNT COLLECTED	PRESERVATIVES in Total Metals only	LAB FILTRATION REQUIRED for Dissolved Metals	Gen Chem	Total Metals	Dissolved Metals	TSS	TOC				LEVEL OF CONTAMINATION (H, L, U)
					ANALYSIS REQUESTED										
S2008-13072	Trip Blank	4 Sept 08	Surface Water	1-1L 2-250mL 1-500mL 1-100mL	✓	✓	✓	✓	✓	✓	✓				
S2008-13073	D503-Dup2	12 Sept 08			✓	✓	✓	✓	✓	✓	✓				
S2008-13074	Timmins 1	↓			✓	✓	✓	✓	✓	✓	✓				
S2008-13075	Timmins 2	↓			✓	✓	✓	✓	✓	✓	✓				
S2008-13076	D503-15	12 Sept 08			✓	✓	✓	✓	✓	✓	✓				-
S2008-13077	D503-07	13 Sept 08			✓	✓	✓	✓	✓	✓	✓				
S2008-13078	D503-03	↓	↓	↓	✓	✓	✓	✓	✓	✓	✓				
S2008-13079	D503-05	13 Sept 08	Surface Water	1-1L 2-250mL 1-500mL 1-100mL	✓	✓	✓	✓	✓	✓	✓				
S2008-13080	Lab Blank No Sample														

COMMENTS: Sent by 13 Sept 2008 at 12:00

Revision 2006 -2

Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date: Page:	October 06, 2008 September 18, 2008 1 of 3
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

Lab Number			S2008-13081	S2008-13082	S2008-13083	S2008-13084	S2008-13085
Sample ID			DS03-14	Star 1	DS02-03	Timmins 1	DS03-05
Date Collected			10-Sep-08	11-Sep-08	11-Sep-08	12-Sep-08	13-Sep-08
Parameters	**Unit**	**MDL**					
Ammonia as N	(ug/g)	10	62	179	24	<10	<10
Chloride	(ug/g)	1	8	4	4	2	<1
Conductivity	(uS/cm)	10	110	445	185	21	18
Nitrate as N	(ug/g)	1	<1	<1	<1	<1	<1
Nitrite as N	(ug/g)	1	<1	<1	<1	<1	<1
pH	-	-	4.2	5.9	6.6	6.5	4.5
Sulphate	(ug/g)	1	69	140	10	1	3

Lab Number			S2008-13086	S2008-13086	S2008-13087	S2008-13087
Sample ID			DS03-07	DS03-07	DS03-03	DS03-03
Date Collected			13-Sep-08	13-Sep-08	13-Sep-08	13-Sep-08
Parameters	**Unit**	**MDL**		**(Replicate)**		**(Replicate)**
Ammonia as N	(ug/g)	10	<10	<10	29	NR
Chloride	(ug/g)	1	2	NR	5	NR
Conductivity	(uS/cm)	10	49	NR	67	68
Nitrate as N	(ug/g)	1	<1	NR	<1	NR
Nitrite as N	(ug/g)	1	<1	NR	<1	NR
pH	-	-	4.7	NR	4.3	NR
Sulphate	(ug/g)	1	17	NR	44	NR

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Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

General Chemistry

			Lab Blank (µg/g)	Q.C. Standard Actual (mg/L)	Q.C. Standard Expected (mg/L)	Date of Analysis
Parameters	**Unit**	**MDL**				
Ammonia as N	(ug/g)	10	<10	0.43	0.40	26-Sep-08
Chloride	(ug/g)	1	<1	4.1	4.2	22-Sep-08
Conductivity	(uS/cm)	10	<10	104	100	24-Sep-08
Nitrate as N	(ug/g)	1	<1	4.2	4.2	22-Sep-08
Nitrite as N	(ug/g)	1	<1	0.5	0.5	22-Sep-08
pH	-	-	6.5	6.0	6.0	24-Sep-08
Sulphate	(ug/g)	1	<1	23.8	24.0	22-Sep-08

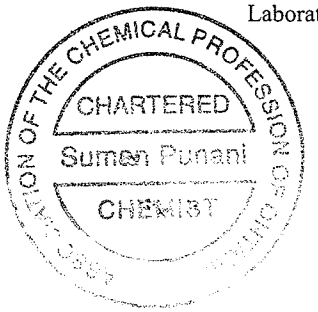
			Method References
General Chemistry	**Unit**	**MDL**	
Ammonia as N	(ug/g)	10	Water Ext., Skalar Method 155-318
Chloride	(ug/g)	100	MOE 3013, APHA 4110 C
Conductivity	(uS/cm)	5	MOE 3137
Nitrate as N	(ug/g)	50	MOE 3013, APHA 4110 C
Nitrite as N	(ug/g)	15	MOE 3013, APHA 4110 C
pH	-	-	MOE 9045
Sulphate	(ug/g)	100	MOE 3013, APHA 4110 C

<Original signed by>

Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager



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MDL	Method Detection Limit
RDL	Reporting Detection Limit
ANR	Analysis not required
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	Results relate only to the items tested.

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		Page:	1 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals + Hydrides

Lab Number			**S2008-13081**	**S2008-13082**	**S2008-13083**	**S2008-13084**	**S2008-13085**
Sample ID			**DS03-14**	**Star 1**	**DS02-03**	**Timmins 1**	**DS03-05**
Date Collected			**10-Sep-08**	**11-Sep-08**	**11-Sep-08**	**12-Sep-08**	**13-Sep-08**
Parameters	**Unit**	**MDL**					
Aluminum	(µg/g)	5	7290	3150	4420	1510	7430
Antimony	(µg/g)	0.5	0.7	0.6	1.4	1.3	1.7
Arsenic	(µg/g)	0.5	5.3	4.4	10.2	3.0	9.2
Barium	(µg/g)	0.5	24.8	6.2	24.2	70.4	14.6
Beryllium	(µg/g)	0.2	0.2	0.3	0.4	0.3	0.3
Bismuth	(µg/g)	0.2	<0.2	<0.2	0.7	0.7	1.0
Boron	(µg/g)	1	13	8	37	42	33
Cadmium	(µg/g)	0.5	<0.5	<0.5	0.9	0.8	0.8
Calcium	(µg/g)	25	291	1750	2680	119	116
Chromium	(µg/g)	1	11	9	12	4	17
Cobalt	(µg/g)	1	1	2	7	19	5
Copper	(µg/g)	1	9	4	5	12	11
Iron	(µg/g)	5	16600	7620	40600	45000	38400
Lead	(µg/g)	5	9	<5	12	13	13
Magnesium	(µg/g)	10	1100	1030	2250	486	2030
Manganese	(µg/g)	1	71	70	1420	2800	228
Mercury	(µg/g)	0.01	0.10	0.04	0.03	0.16	0.06
Molybdenum	(µg/g)	2	<2	<2	<2	<2	<2
Nickel	(µg/g)	5	6	<5	9	5	10
Phosphorous	(µg/g)	5	739	781	565	116	310
Potassium	(µg/g)	10	860	562	457	173	380
Rubidium	(µg/g)	2	9	6	6	3	6
Selenium	(µg/g)	0.1	0.3	0.8	0.3	<0.1	0.1
Silicon	(µg/g)	5	7	8	19	26	11
Silver	(µg/g)	0.25	0.36	<0.25	<0.25	<0.25	<0.25
Sodium	(µg/g)	25	168	131	141	104	139
Strontium	(µg/g)	2	2	<2	3	<2	<2
Sulphur	(µg/g)	5	1690	4690	458	23	114
Tellerium	(µg/g)	2	<2	<2	5	5	5
Thallium	(µg/g)	0.5	<0.5	<0.5	<0.5	2.3	<0.5
Tin	(µg/g)	2	<2	<2	<2	<2	<2
Titanium	(µg/g)	2	97	37	91	68	59
Uranium	(µg/g)	0.5	22.7	10.4	55.1	65.3	59.5
Vanadium	(µg/g)	5	16	<5	11	<5	13
Zinc	(µg/g)	2	23	36	45	17	29

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 06, 2008 September 18, 2008
		Page:	2 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals + Hydrides

Lab Number			**S2008-13086**	**S2008-13086**	**S2008-13087**
Sample ID			**DS03-07**	**DS03-07**	**DS03-03**
Date Collected			**13-Sep-08**	**13-Sep-08**	**13-Sep-08**
Parameters	**Unit**	**MDL**		**(Replicate)**	
Aluminum	(µg/g)	5	6110	5950	6230
Antimony	(µg/g)	0.5	1.2	1.0	0.5
Arsenic	(µg/g)	0.5	2.9	3.3	3.9
Barium	(µg/g)	0.5	13.9	12.9	10.6
Beryllium	(µg/g)	0.2	0.4	0.4	0.3
Bismuth	(µg/g)	0.2	<0.2	<0.2	<0.2
Boron	(µg/g)	1	19	15	38
Cadmium	(µg/g)	0.5	0.5	0.5	0.7
Calcium	(µg/g)	25	266	250	174
Chromium	(µg/g)	1	13	12	9
Cobalt	(µg/g)	1	5	5	1
Copper	(µg/g)	1	10	10	10
Iron	(µg/g)	5	23000	22300	16400
Lead	(µg/g)	5	12	11	6
Magnesium	(µg/g)	10	2550	2430	1150
Manganese	(µg/g)	1	136	129	36
Mercury	(µg/g)	0.01	0.04	0.04	0.05
Molybdenum	(µg/g)	2	<2	<2	<2
Nickel	(µg/g)	5	14	13	6
Phosphorous	(µg/g)	5	427	417	397
Potassium	(µg/g)	10	436	409	390
Rubidium	(µg/g)	2	5	5	6
Selenium	(µg/g)	0.1	<0.1	<0.1	0.1
Silicon	(µg/g)	5	55	49	8
Silver	(µg/g)	0.25	<0.25	<0.25	<0.25
Sodium	(µg/g)	25	131	118	107
Strontium	(µg/g)	2	<2	<2	<2
Sulphur	(µg/g)	5	292	283	1370
Tellerium	(µg/g)	2	3	2	3
Thallium	(µg/g)	0.5	<0.5	<0.5	<0.5
Tin	(µg/g)	2	<2	<2	<2
Titanium	(µg/g)	2	54	51	36
Uranium	(µg/g)	0.5	34.5	33.0	24.2
Vanadium	(µg/g)	5	10	10	8
Zinc	(µg/g)	2	48	47	17

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 06, 2008 September 18, 2008
		Page:	3 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals + Hydrides

			Lab Blank (µg/g)	Q.C. Standards Actual (mg/L)	Q.C. Standards Expected (mg/L)	Date of Analysis
Parameters	**Unit**	**MDL**				
Aluminum	(µg/g)	5	<5	1.04	1.00	29-Sep-08
Antimony	(µg/g)	0.5	<0.5	1.04	1.00	29-Sep-08
Arsenic	(µg/g)	0.5	<0.5	0.89	1.00	29-Sep-08
Barium	(µg/g)	0.5	<0.5	0.45	0.50	29-Sep-08
Beryllium	(µg/g)	0.2	<0.2	0.49	0.50	29-Sep-08
Bismuth	(µg/g)	0.2	<0.2	0.96	1.00	29-Sep-08
Boron	(µg/g)	1	<1	0.99	1.00	29-Sep-08
Cadmium	(µg/g)	0.5	<0.5	0.49	0.50	29-Sep-08
Calcium	(µg/g)	25	<25	9.50	10.0	29-Sep-08
Chromium	(µg/g)	1	<1	0.48	0.50	29-Sep-08
Cobalt	(µg/g)	1	<1	0.48	0.50	29-Sep-08
Copper	(µg/g)	1	<1	0.99	1.00	29-Sep-08
Iron	(µg/g)	5	<5	0.97	1.00	29-Sep-08
Lead	(µg/g)	5	<5	0.95	1.00	29-Sep-08
Magnesium	(µg/g)	10	<10	3.75	4.00	29-Sep-08
Manganese	(µg/g)	1	<1	0.48	0.50	29-Sep-08
Mercury	(µg/g)	0.01	<0.01	0.002	0.002	24-Sep-08
Molybdenum	(µg/g)	2	<2	0.95	1.00	29-Sep-08
Nickel	(µg/g)	5	<5	0.97	1.00	29-Sep-08
Phosphorous	(µg/g)	5	<5	2.00	2.00	29-Sep-08
Potassium	(µg/g)	10	<10	18.0	20.0	29-Sep-08
Rubidium	(µg/g)	2	<2	0.11	0.10	29-Sep-08
Selenium	(µg/g)	0.1	<0.1	0.003	0.003	24-Sep-08
Silicon	(µg/g)	5	<5	0.91	1.00	29-Sep-08
Silver	(µg/g)	0.25	<0.25	0.93	1.00	29-Sep-08
Sodium	(µg/g)	25	<25	21.0	20.0	29-Sep-08
Strontium	(µg/g)	2	<2	0.92	1.00	29-Sep-08
Sulphur	(µg/g)	5	<5	2.01	2.00	29-Sep-08
Tellerium	(µg/g)	2	<2	0.08	0.10	29-Sep-08
Thallium	(µg/g)	0.5	<0.5	0.99	1.00	29-Sep-08
Tin	(µg/g)	2	<2	0.99	1.00	29-Sep-08
Titanium	(µg/g)	2	<2	0.94	1.00	29-Sep-08
Uranium	(µg/g)	0.5	<0.5	0.09	0.10	29-Sep-08
Vanadium	(µg/g)	5	<5	0.48	0.50	29-Sep-08
Zinc	(µg/g)	2	<2	0.49	0.50	29-Sep-08

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Client:	AMEC Earth and Environmental, A Division of AMEC Americas Limited 133 Crosbie Road, Suite 202, P.O. Box 13216 St. John's, Newfoundland A1B 4A5	Report Date: Received Date:	October 06, 2008 September 18, 2008
		Page:	4 of 5
Project Name:	DSOP West Labrador / East Quebec	Sample Type:	Sediment
Project Number:	TF 8165902	Lab Ref.:	F2008-1849
Contact:	Eugene Lee		Final

CERTIFICATE OF ANALYSIS

ICP Metals + Hydrides

			Method References
Parameters	**Unit**	**MDL**	
Aluminum	(µg/g)	5	SW 846, 3050, 6010 C
Antimony	(µg/g)	0.5	SW 846, 3050, 6010 C
Arsenic	(µg/g)	0.5	SW 846, 3050, 6010 C
Barium	(µg/g)	0.5	SW 846, 3050, 6010 C
Beryllium	(µg/g)	0.2	SW 846, 3050, 6010 C
Bismuth	(µg/g)	0.2	SW 846, 3050, 6010 C
Boron	(µg/g)	1	SW 846, 3050, 6010 C
Cadmium	(µg/g)	0.5	SW 846, 3050, 6010 C
Calcium	(µg/g)	25	SW 846, 3050, 6010 C
Chromium	(µg/g)	1	SW 846, 3050, 6010 C
Cobalt	(µg/g)	1	SW 846, 3050, 6010 C
Copper	(µg/g)	1	SW 846, 3050, 6010 C
Iron	(µg/g)	5	SW 846, 3050, 6010 C
Lead	(µg/g)	5	SW 846, 3050, 6010 C
Magnesium	(µg/g)	10	SW 846, 3050, 6010 C
Manganese	(µg/g)	1	SW 846, 3050, 6010 C
Mercury	(µg/g)	0.01	SW 846, 7741, 1994
Molybdenum	(µg/g)	2	SW 846, 3050, 6010 C
Nickel	(µg/g)	5	SW 846, 3050, 6010 C
Phosphorous	(µg/g)	5	SW 846, 3050, 6010 C
Potassium	(µg/g)	10	SW 846, 3050, 6010 C
Rubidium	(µg/g)	2	SW 846, 3050, 6010 C
Selenium	(µg/g)	0.1	SW 846, 3050, 7061
Silicon	(µg/g)	5	SW 846, 3050, 6010 C
Silver	(µg/g)	0.25	SW 846, 3050, 6010 C
Sodium	(µg/g)	25	SW 846, 3050, 6010 C
Strontium	(µg/g)	2	SW 846, 3050, 6010 C
Sulphur	(µg/g)	5	SW 846, 3050, 6010 C
Tellerium	(µg/g)	2	SW 846, 3050, 6010 C
Thallium	(µg/g)	0.5	SW 846, 3050, 6010 C
Tin	(µg/g)	2	SW 846, 3050, 6010 C
Titanium	(µg/g)	2	SW 846, 3050, 6010 C
Uranium	(µg/g)	0.5	SW 846, 3050, 6010 C
Vanadium	(µg/g)	5	SW 846, 3050, 6010 C
Zinc	(µg/g)	2	SW 846, 3050, 6010 C

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CHARTERED
Suman Punani
CHEMIST

<Original signed by>

Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

<Original signed by>

Suman Punani, C. Chem.
Laboratory Manager

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~ GENERAL COMMENTS ~

MDL	Method Detection Limit
RDL	Reporting Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate
	Result in (brackets) represents Lab Replicate.
	Results relate only to the items tested.

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Request for Analysis

The Work specified herein shall be performed in accordance with the terms and conditions on the reverse of this document; or, as may be applicable, in accordance with the terms and conditions of the Blanket Purchase Order Number_____

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LQ#_____ AUTHORIZED SIGNATURE:_____ DATE:_____ TIME:_____

DATE REQUIRED:_____ RECEIVED AT LAB BY:_____ DATE:_____ TIME:_____

LOGGED AT LAB BY: SS DATE: Sept 18 TIME: 2:45

FILE #: 18499 BOX #: 67

(A) ARE THESE WATER SAMPLES FROM SOURCES IN ONTARIO - YES / (NO)
(B) ARE THESE SAMPLES POTABLE or FOR HUMAN CONSUMPTION - YES / (NO)
IF YES TO (A) and (B). CONTACT THE LAB BEFORE SHIPPING.

Temperature 18.8/19.7. Sample Condition

PROJECT # / P.O #	CONTACT
TF8165902	Eugene Lee

PROJECT NAME: DSOP West Labrador / East Quebec

COMPANY NAME: AMEC E&E

MAILING ADDRESS: 133 Crosbie Rd. St John's, NL A1B 4A5

TELEPHONE NUMBER	FAX NUMBER
709-722-7023	709-722-7353

TURNAROUND BUSINESS DAY
☐ NORMAL (5-7) ☐ RUSH (3) ☐ SUPER (24Hrs)

Regulatory Requirements:
- ☐ Brownfields 153/04
- ☐ Table ___ **separate request for Analysis**
- ☐ PWQO **Form required for Ontario**
- ☑ CCME **Drinking water samples**
- ☐ ODWS ☐ Other
- ☐ TCLP ☐ uncertainty reported on C of A

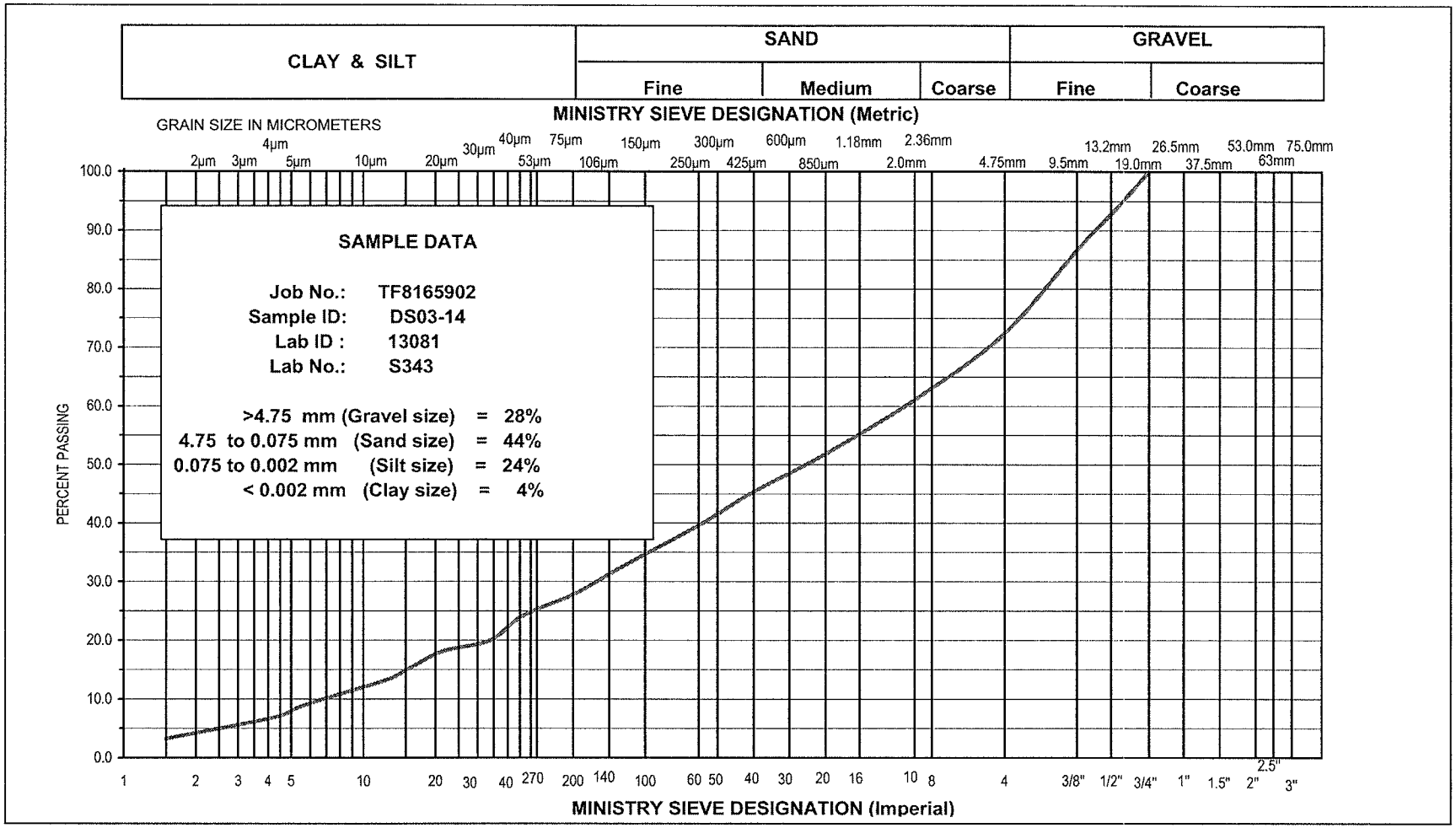
note: unless stated otherwise, all water samples will be treated as non-potable and will not be subject to ODWS regulation requirements

LAB USE ONLY	SAMPLE ID	DATE	TYPE	AMOUNT COLLECTED	PRESERVATIVES	LAB FILTRATION REQUIRED	ANALYSIS REQUESTED: GenChem	Metals	TOC	Grain Size					LEVEL OF CONTAMINATION (H, L, U)
S2008-13081	DS03-14	10 Sept 08	Sediment	3-250mL 1-60mL			✓	✓	✓	✓					
S2008-13082	DS02-02	11 Sept 08		3-250mL 1-60mL			✓	✓	✓	✓					
S2008-13083	DS02-03	11 Sept 08		2-250mL 1-60mL			✓	✓	✓	✓*					
S2008-13084	Timmins 1	12 Sept 08		3-250mL 1-60mL			✓	✓	✓	✓					
S2008-13085	DS03-05	13 Sept 08		3-250mL 1-60mL			✓	✓	✓	✓					
S2008-13086	DS03-07	↓	↓	3-250mL			✓	✓	✓+	✓					
S2008-13087	DS03-03	13 Sept 08	Sediment	3-250mL 1-60mL			✓	✓	✓	✓					
~~S2008-13088~~	Star 1	~~11 Sept 08~~					~~✓~~	~~✓~~	~~✓~~	~~✓~~					
S2008-13089	Lab Blank No Sample.														

COMMENTS: Please try to analyse Grain Size in DS02-03 & TOC in DS03-07 using sample from other jars if possible.
Sampled & sent by 15 Sept 2008 at 12:00pm

Revision 2006 -2

UNIFIED SOIL CLASSIFICATION SYSTEM



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GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe
	Project:- DSOP-Field Program-New Millenium
SILTY GRAVELLY SAND with organics trace clay	Location:- Newfoundland
	Lab No. :- S343 — Date :- 01 Oct 2008

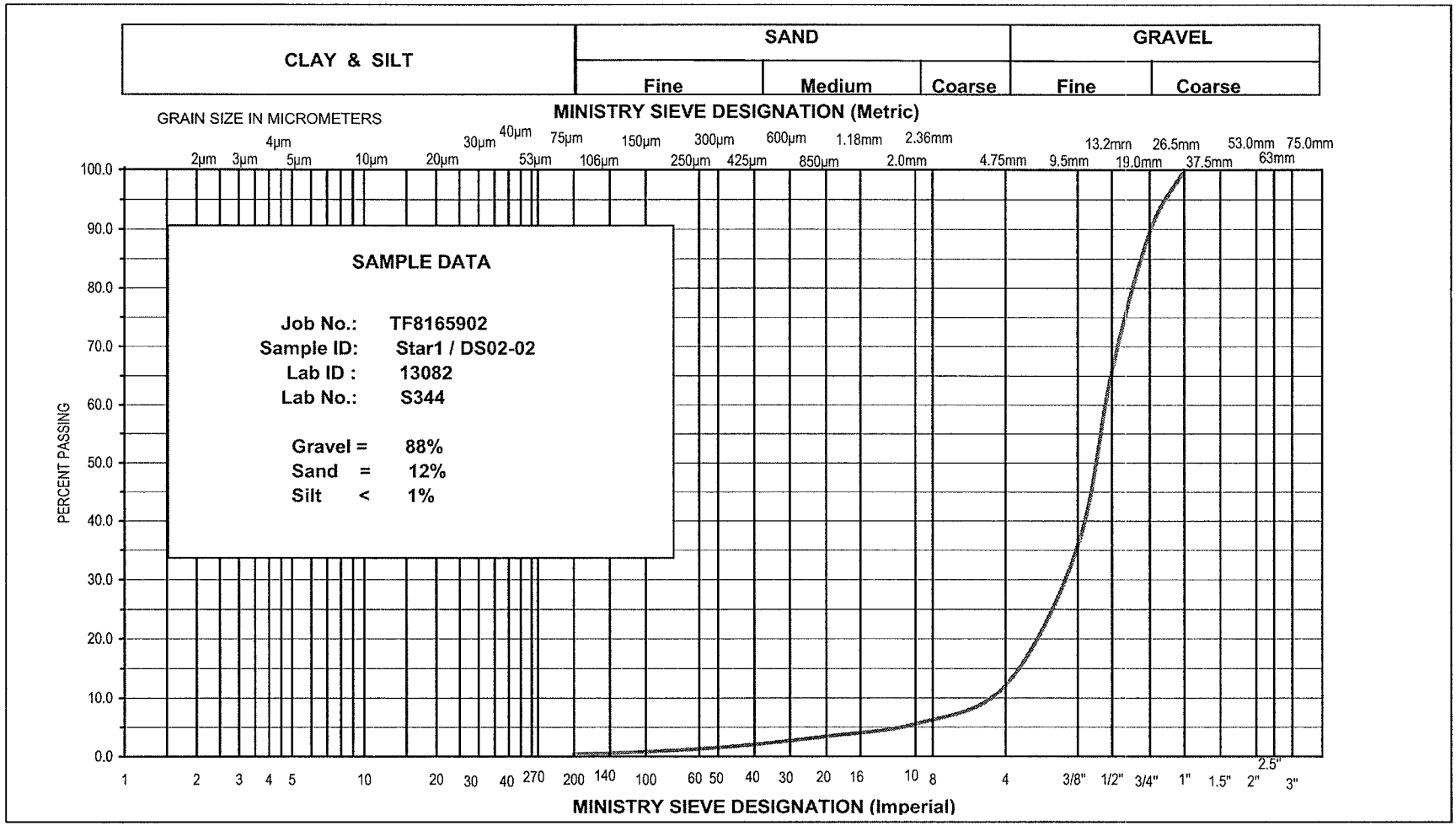
Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ/WA
Sample ID :-	DS03-14	**Lab ID # :-**	13081
Lab No. :-	S343	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
19.00	0.00	100.0
13.20	11.80	92.8
9.50	21.87	86.7
4.75	45.20	72.4
2.00	63.81	61.1
0.85		51.8
0.425		45.3
0.250		39.6
0.150		34.6
0.106		31.3
0.075		27.8
0.0463		24.1
0.0335		19.9
0.0214		18.1
0.0154		15.1
0.0127		13.3
0.0090		11.5
0.0064		9.7
0.0053		8.5
0.0046		7.2
0.0034		6.0
0.0015		3.3

Total Wt (g)	164.98	
Wt used for Hydrometer (g)		
50.54		
Pass 2mm Retained 0.075mm		
0.850	7.65	0.849
0.425	13.02	0.742
0.250	17.79	0.648
0.150	21.87	0.567
0.106	24.66	0.512
0.075	27.57	0.454
Pan	28.30	

UNIFIED SOIL CLASSIFICATION SYSTEM



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GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe
	Project:- DSOP-Field Program-New Millenium
GRAVEL	Location:- Newfoundland
some sand, trace silt and organics	Lab No. :- S344 / Date :- 01 Oct 2008

Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ
Sample ID # :-	Star1/DS02-02	**Lab ID:-**	13082
Lab No. :-	S344	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
26.50	0.00	100.0
19.00	23.43	89.6
13.20	76.49	65.9
9.50	144.04	35.8
4.75	197.11	12.1
2.00	211.79	5.6
0.85		3.5
0.425		2.1
0.250		1.3
0.150		0.8
0.106		0.6
0.075		0.4

Total Wt (g)	224.35	
Sieve size		
	12.36 g	
	wt. retained	%passing
0.85	4.7	61.7
0.425	7.8	37.1
0.250	9.5	23.4
0.150	10.5	14.8
0.106	11.1	10.0
0.075	11.5	6.9
Pan	11.6	6.1

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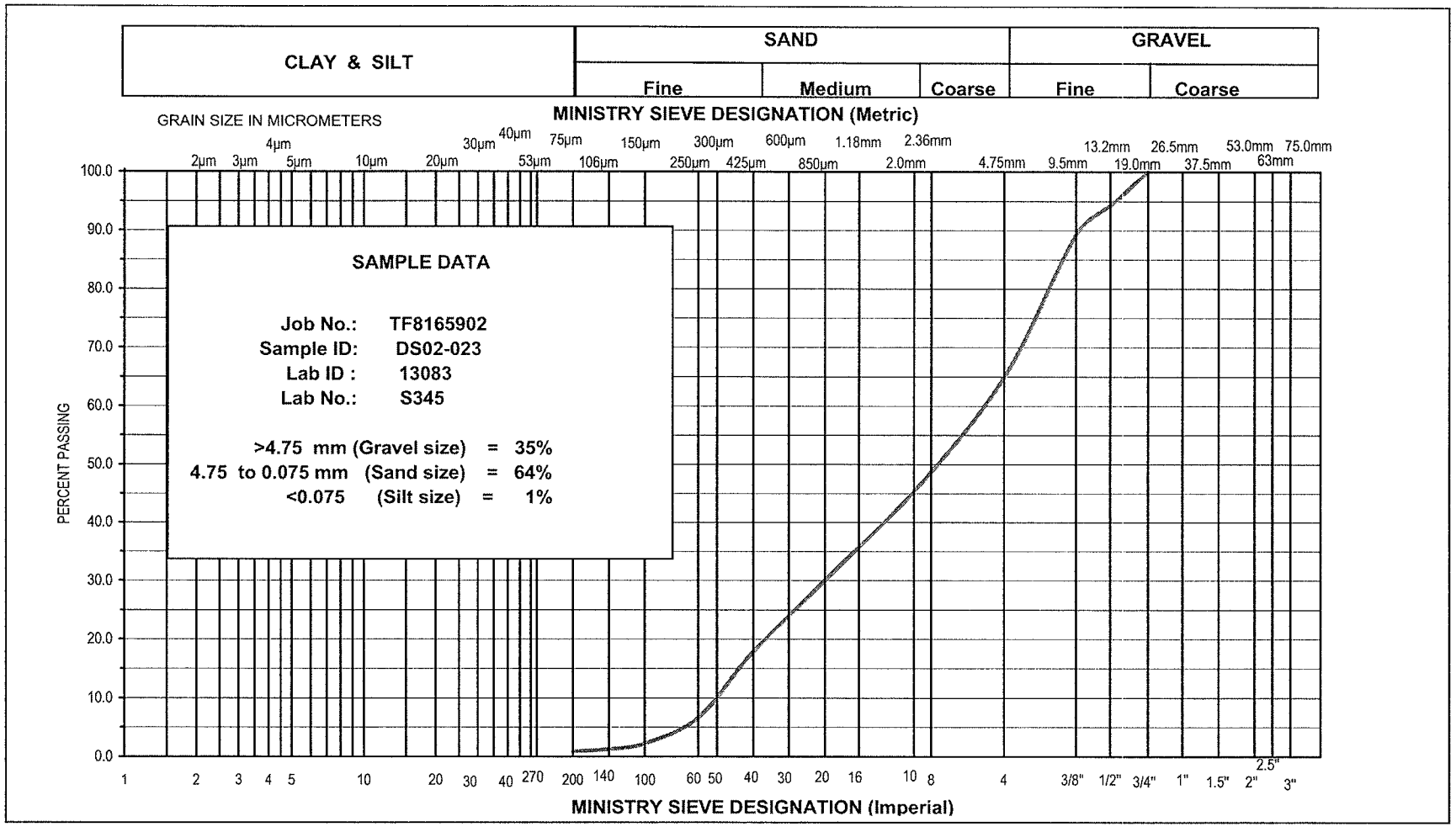

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GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe
	Project:- DSOP-Field Program-New Millenium
GRAVELLY SAND with organics trace silt	Location:- Newfoundland
	Lab No. :- S345 — Date :- 01 Oct 2008

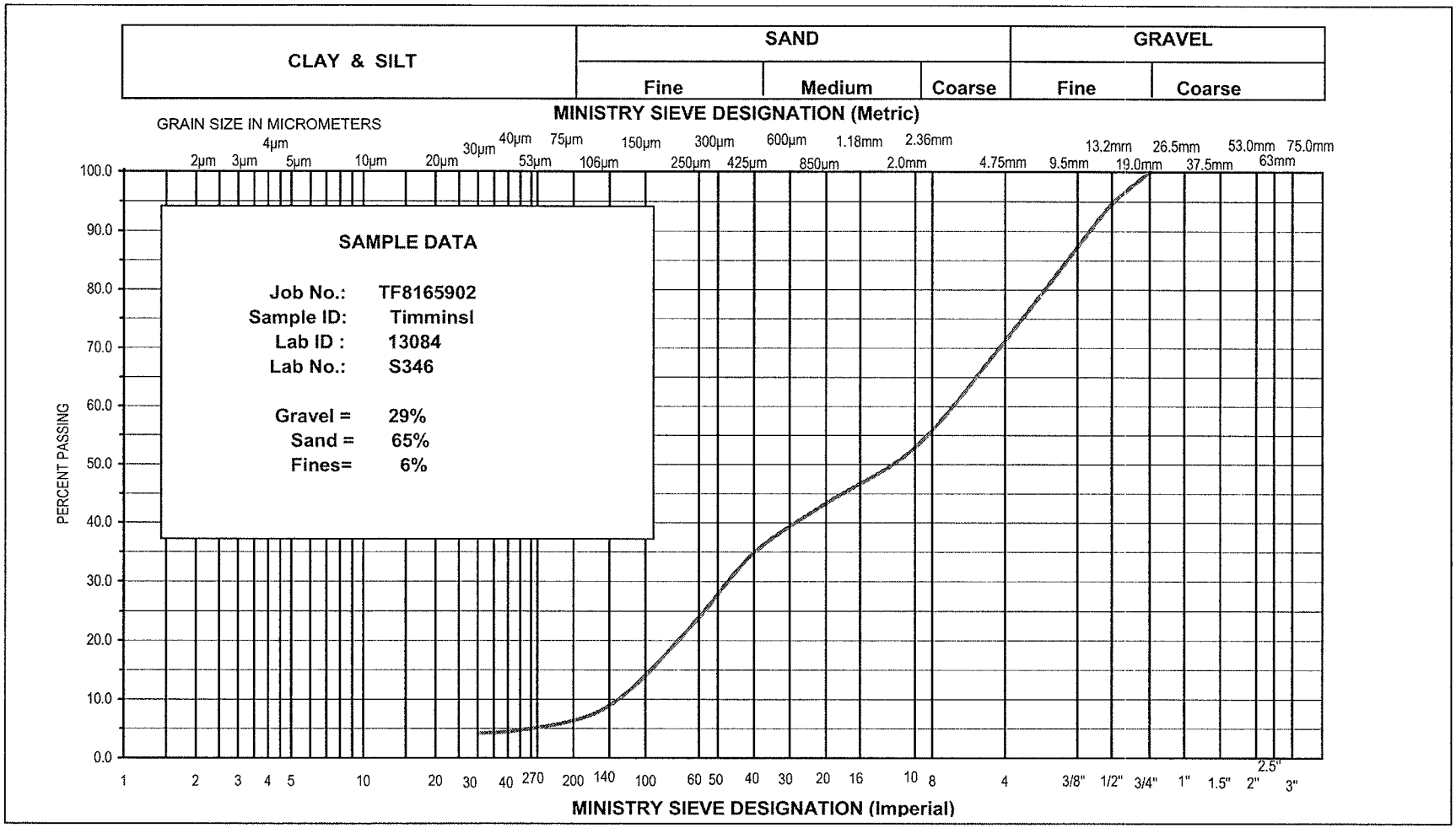
Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ
Sample ID # :-	DS02-03	**Lab ID:-**	13083
Lab No. :-	S345	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
19	0.00	100.0
13.2	18.37	94.2
9.5	34.02	89.3
4.75	111.58	64.9
2.00	173.72	45.4
0.85		30.1
0.425		17.9
0.250		6.6
0.150		2.2
0.106		1.3
0.075		0.9

Total Wt (g)		317.94
Sieve size (mm)	**62.93** g	
	wt. retained	%passing
0.85	21.2	66.3
0.425	38.2	39.4
0.250	53.8	14.6
0.150	59.8	4.9
0.106	61.2	2.8
0.075	61.7	2.0
Pan	61.8	

UNIFIED SOIL CLASSIFICATION SYSTEM



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GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe
	Project:- DSOP-Field Program-New Millenium
GRAVELLY SAND	Location:- Newfoundland
trace clay and silt	Lab No. :- S346 / Date :- 01 Oct 2008

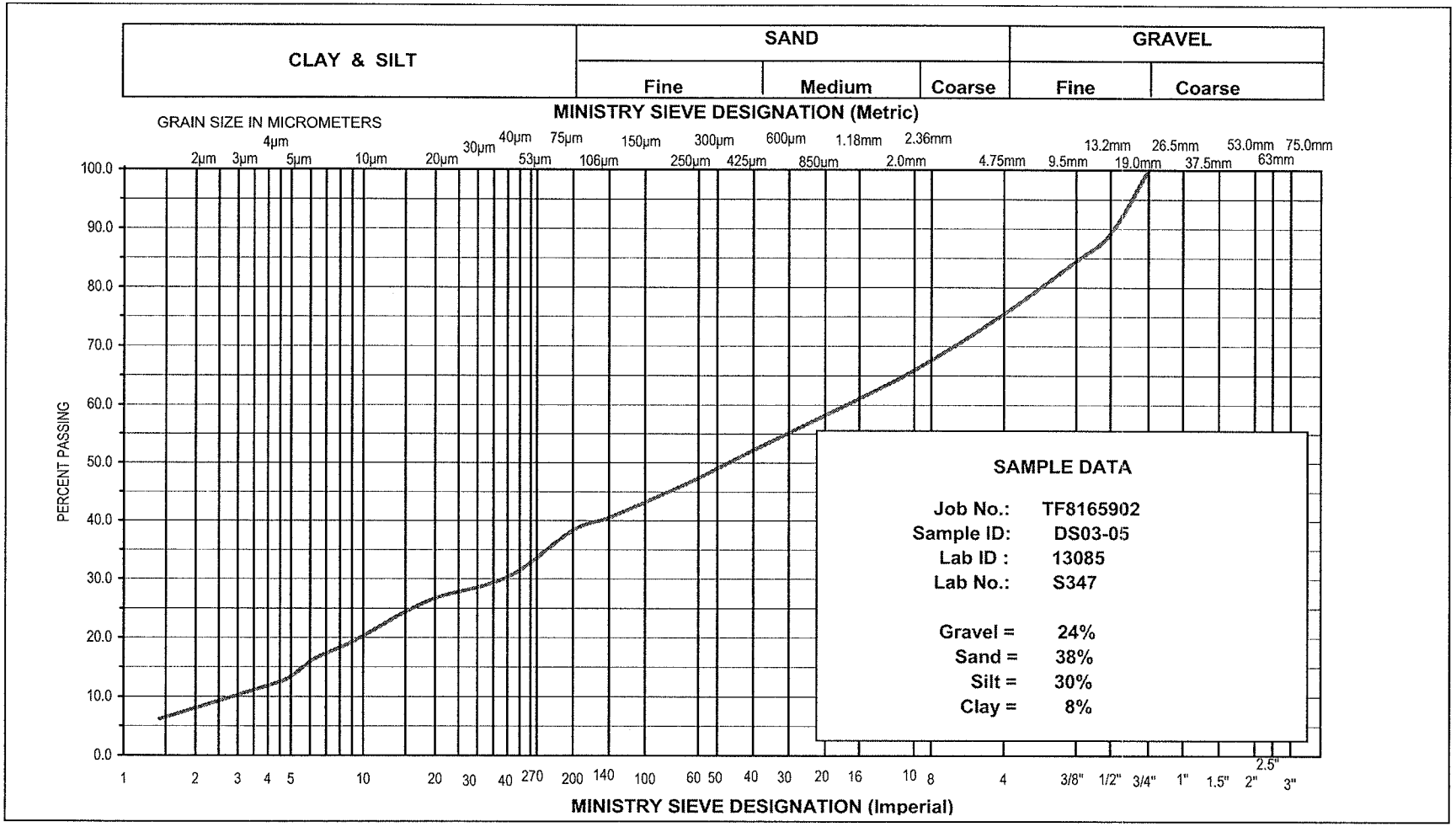
Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ/WA
Sample ID :-	Timminsl	**Lab ID # :-**	13084
Lab No. :-	S346	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
19.00	0.00	100.0
13.20	25.16	94.6
9.50	58.69	87.3
4.75	133.15	71.3
2.00	218.19	52.9
0.85		43.4
0.425		34.9
0.250		23.9
0.150		14.1
0.106		8.9
0.075		6.3
0.0431		4.6
0.0306		4.2

Total Wt (g)	464.29	
Wt used for Hydrometer (g)		
50.57		
Pass 2mm Retained 0.075mm		
0.850	9.15	0.819
0.425	17.25	0.659
0.250	27.74	0.451
0.150	37.13	0.266
0.106	42.03	0.169
0.075	44.52	0.120

UNIFIED SOIL CLASSIFICATION SYSTEM



AMEC Earth & Environmental,
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104 Crockford Blvd., Scarborough, Ontario
Canada, M1R 3C3
Tel +1 (416) 751 6565, Fax +1 (416) 751 7592
www.amec.com

GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe	
	Project:- DSOP-Field Program-New Millenium	
GRAVELLY SILTY SAND trace clay	Location:- Newfoundland	
	Lab No. :- S347	Date :- 01 Oct 2008

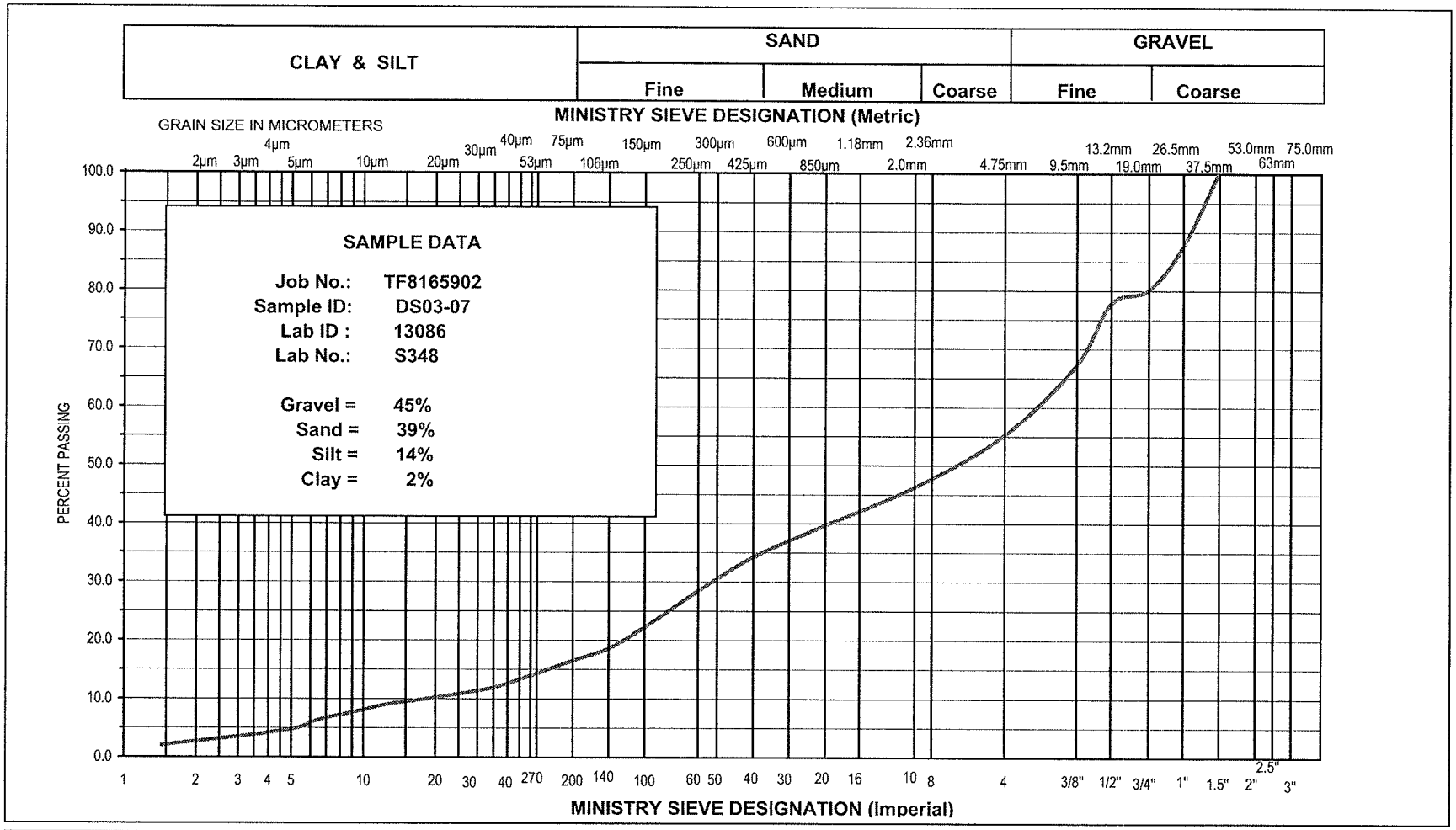
Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ/WA
Sample ID :-	DS03-05	**Lab ID # :-**	13085
Lab No. :-	S347	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
19.00	0.00	100.0
13.20	40.21	89.2
9.50	57.66	84.5
4.75	91.25	75.5
2.00	126.82	65.9
0.85		58.2
0.425		52.2
0.250		47.3
0.150		43.2
0.106		40.5
0.075		38.3
0.0452		31.5
0.0324		28.9
0.0207		26.9
0.0148		24.3
0.0122		22.3
0.0088		19.0
0.0063		16.4
0.0052		13.8
0.0045		12.5
0.0031		10.5
0.0014		6.2

Total Wt (g)	374.15	
Wt used for Hydrometer (g)		
50.04		
Pass 2mm Retained 0.075mm		
0.850	5.85	0.883
0.425	10.44	0.791
0.250	14.11	0.718
0.150	17.28	0.655
0.106	19.32	0.614
0.075	20.95	0.581

UNIFIED SOIL CLASSIFICATION SYSTEM



AMEC Earth & Environmental, A division of AMEC Americas Limited 104 Crockford Blvd., Scarborough, Ontario Canada, M1R 3C3 Tel +1 (416) 751 6565, Fax +1 (416) 751 7592 www.amec.com	GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe
		Project:- DSOP-Field Program-New Millenium
	GRAVEL AND SAND some silt, trace clay	Location:- Newfoundland
		Lab No. :- S347 / Date :- 01 Oct 2008

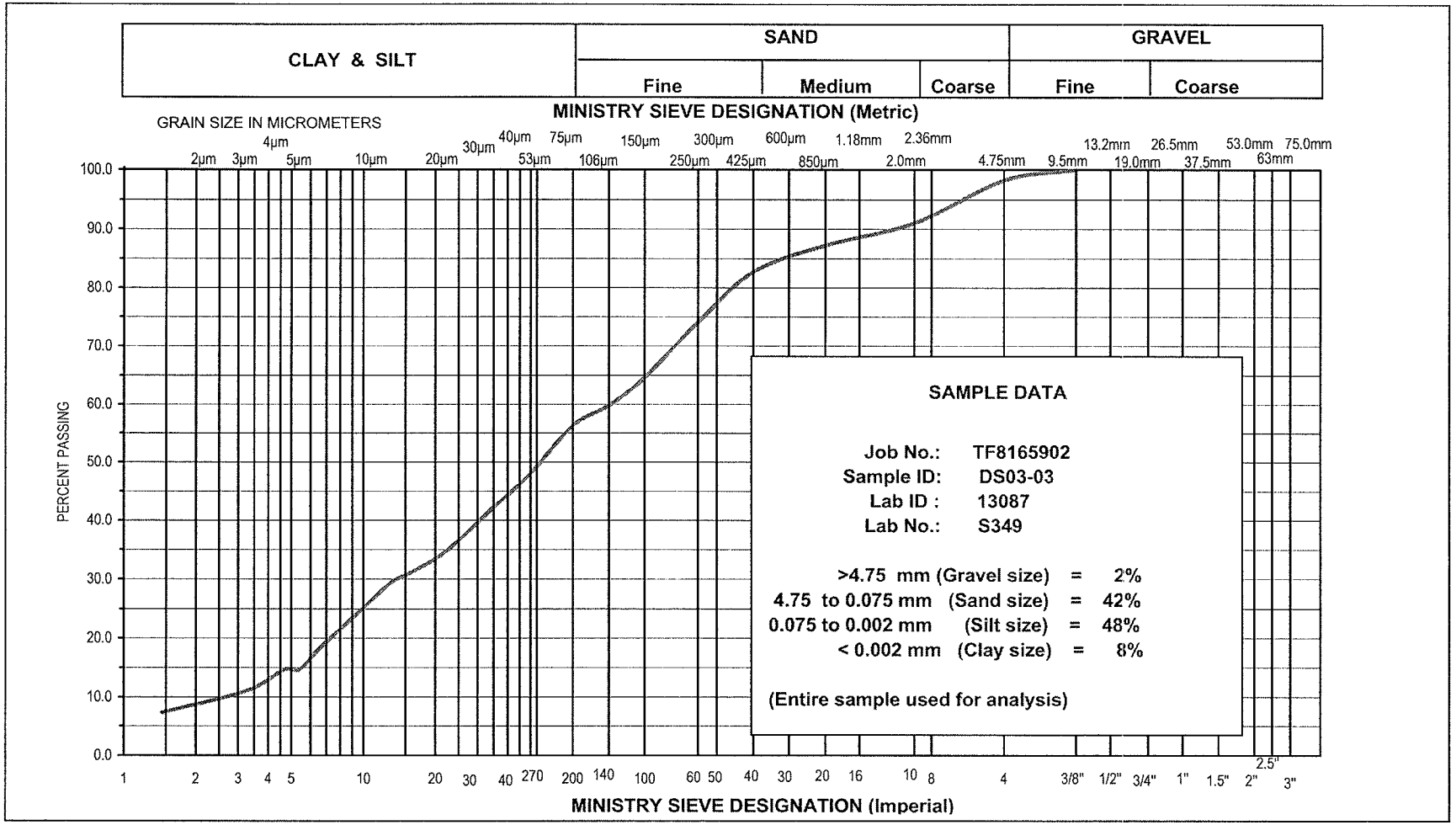
Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ/WA
Sample ID :-	DS03-07	**Lab ID # :-**	13086
Lab No. :-	S347	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
37.00	0.00	100.0
26.50	50.94	87.7
19.00	82.58	80.1
13.20	92.05	77.8
9.50	135.56	67.3
4.75	185.83	55.2
2.00	223.07	46.3
0.85		39.8
0.425		34.2
0.250		28.4
0.150		22.2
0.106		18.6
0.075		16.5
0.0480		13.7
0.0344		11.8
0.0219		10.5
0.0156		9.6
0.0128		9.1
0.0091		7.7
0.0065		6.4
0.0054		5.0
0.0046		4.6
0.0032		3.6
0.0014		2.0

Total Wt (g)	416.64	
Wt used for Hydrometer (g)		
50.62		
Pass 2mm Retained 0.075mm		
0.850	7.11	0.860
0.425	13.17	0.740
0.250	19.52	0.614
0.150	26.33	0.480
0.106	30.28	0.402
0.075	32.57	0.357

UNIFIED SOIL CLASSIFICATION SYSTEM



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GRAIN SIZE DISTRIBUTION	Client :- Hemispheres le Groupe	
	Project:- DSOP-Field Program-New Millenium	
SILT AND SAND with organics trace clay and gravel	Location:- Newfoundland	
	Lab No. :- S349	Date :- 01 Oct 2008

Grain Size Analysis

Project:-	DSOP-Field Program-New Millenium	**Location:-**	Newfoundland
Client :-	Hemispheres le Groupe	**Date :-**	1-Oct-08
Job# :-	TF8165902	**Tested By :-**	TQ/WA
Sample ID :-	DS03-03	**Lab ID # :-**	13087
Lab No. :-	S349	**Checked By :-**	SB

Sieve size (mm)	Cumm. Wt. Retained (g)	%passing
9.50	0.00	100.0
4.75	0.73	98.2
2.00	3.70	91.0
0.85		87.2
0.425		82.7
0.250		74.1
0.150		64.6
0.106		59.8
0.075		56.3
0.0486		47.6
0.0347		42.1
0.0222		34.7
0.0158		31.1
0.0129		29.3
0.0092		23.8
0.0066		18.3
0.0054		14.6
0.0047		14.6
0.0032		11.0
0.0014		7.3

Total Wt (g)	42.70	
Wt used for Hydrometer (g)		
25.59		
Pass 2mm Retained 0.075mm		
0.850	1.06	0.959
0.425	2.33	0.909
0.250	4.77	0.814
0.150	7.43	0.710
0.106	8.79	0.657
0.075	9.77	0.618

Your C.O.C. #: 00557581

Attention: Suman Punani
AMEC Earth & Environmental Ltd
160 Traders Blvd E
Suite 110
Mississauga, ON
L4Z 3K7

Report Date: 2008/10/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A8C0878
Received: 2008/10/16, 11:31

Sample Matrix: Soil
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Total Organic Carbon in Soil	12	N/A	2008/10/21	CAM SOP-00468	LECO Combustion

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

EMA GITEJ,
Email: ema.gitej@maxxamanalytics.com
Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

AMEC Earth & Environmental Ltd

Maxxam Job #: A8C0878
Report Date: 2008/10/21

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AU2860		AU2861		AU2862		
Sampling Date		2008/09/09		2008/09/11		2008/09/11		
COC Number		00557581		00557581		00557581		
	Units	**13081 DS03-14**	**QC Batch**	**13082 STAR1/DS02-02**	**QC Batch**	**13083 DS02-03**	**RDL**	**QC Batch**
Inorganics								
Total Organic Carbon	mg/kg	180000	1647355	11000	1647691	40000	500	1647355

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AU2863	AU2864	AU2865	AU2866		
Sampling Date		2008/09/12	2008/09/13	2008/09/13	2008/09/13		
COC Number		00557581	00557581	00557581	00557581		
	Units	**13084 TIMMINS 1**	**13085 DS03-05**	**13086 DS03-07**	**13087 DS03-03**	**RDL**	**QC Batch**
Inorganics							
Total Organic Carbon	mg/kg	710	12000	19000	97000	500	1647355

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AU2867	AU2868	AU2869	AU2870	AU2871		
Sampling Date		2008/10/01	2008/10/02	2008/10/02	2008/10/03	2008/09/29		
COC Number		00557581	00557581	00557581	00557581	00557581		
	Units	**14647 BH36 SS2**	**14648 BH25 SS3**	**14649 DUP3**	**14650 BH32 SS3**	**14651 BH13 SS2**	**RDL**	**QC Batch**
Inorganics								
Total Organic Carbon	mg/kg	9200	5700	12000	1700	9200	500	1647691

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AMEC Earth & Environmental Ltd

Maxxam Job #: A8C0878
Report Date: 2008/10/21

Package 1	7.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AMEC Earth & Environmental Ltd
Attention: Suman Punani
Client Project #:
P.O. #:
Project name:

Quality Assurance Report

Maxxam Job Number: MA8C0878

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1647355	OK	QC STANDARD	Total Organic Carbon	2008/10/21		94	%	80 - 120
		Method Blank	Total Organic Carbon	2008/10/21	ND, RDL=0.05		mg/kg	
		RPD	Total Organic Carbon	2008/10/21	11.2		%	50
1647691	OK	QC STANDARD	Total Organic Carbon	2008/10/21		91	%	N/A
		Method Blank	Total Organic Carbon	2008/10/21	ND, RDL=0.05		mg/kg	
		RPD	Total Organic Carbon	2008/10/21	10.3		%	50

ND = Not detected
N/A = Not Applicable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard

Validation Signature Page

Maxxam Job #: A8C0878

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

<Original signed by>

BRAD NEWMAN, Scientific Specialist

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

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