Direct Shipping Ore Project Phase I
Reconnaissance of Potentially Affected Fish Habitat
Western Labrador and Eastern Quebec

Submitted To:

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1.0 INTRODUCTION

On 30 April, 2008, New Millennium Capital Corp. ("NML") submitted to the Canadian Environmental Assessment Agency ("CEAA") the Project Description for its Direct-Shipping Ore Project ("DSOP").

A meeting to discuss the DSOP and the Project Description was held in St. John's on 12 May, 2008, with representatives of the Government of Newfoundland and Labrador and of the Government of Canada.

On 12 June, 2008, the CEAAg issued the comments on the Project Description of the concerned federal departments and agencies. The Department of Fisheries and Oceans ("DFO") requested more information on the potential impacts of the DSOP on fish and fish habitat in Newfoundland and Labrador and Quebec, so that it could make a determination as to its role under the *Canadian Environmental Assessment Act*.

On 16 July, 2008, NML mandated Hémisphères Le Groupe of Montreal and AMEC Earth & Environmental of St. John's to conduct a reconnaissance to make a preliminary determination of the potential impacts of the DSOP on fish and fish habitat.

The present report describes the results of that reconnaissance.

2.0 OBJECTIVES

The specific work scope was to record general habitat characteristics of streams within project areas identified as DSO2 and DSO3 (see Figures A-1 to A-3, Appendix A).

3.0 METHODS

Streams within and near each proposed mine site (DSO2 and DSO3) were surveyed between July 17 and 19, 2008. Each stream site was accessed by vehicle and/or walking 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. Figure 3.1 and Table 3.1 present each survey location. It should be noted that some sites listed were sampled for water quality only (i.e. ponds and standing water) at this stage and were visited by the Habitat Team Members for preliminary characterization of the presence/absence of fish habitat.

Each location was surveyed on foot and general habitat descriptions recorded of each surveyed stream. Detailed habitat measurements were also recorded to further describe and delineate the habitat types present. Parameters measured at each location were water velocity, water depth, substrate composition and quality, slope, vegetation (presence/absence), stream wetted width, channel width and general bank condition. Sampling for fish presence was not included in the work scope for this reconnaissance survey.

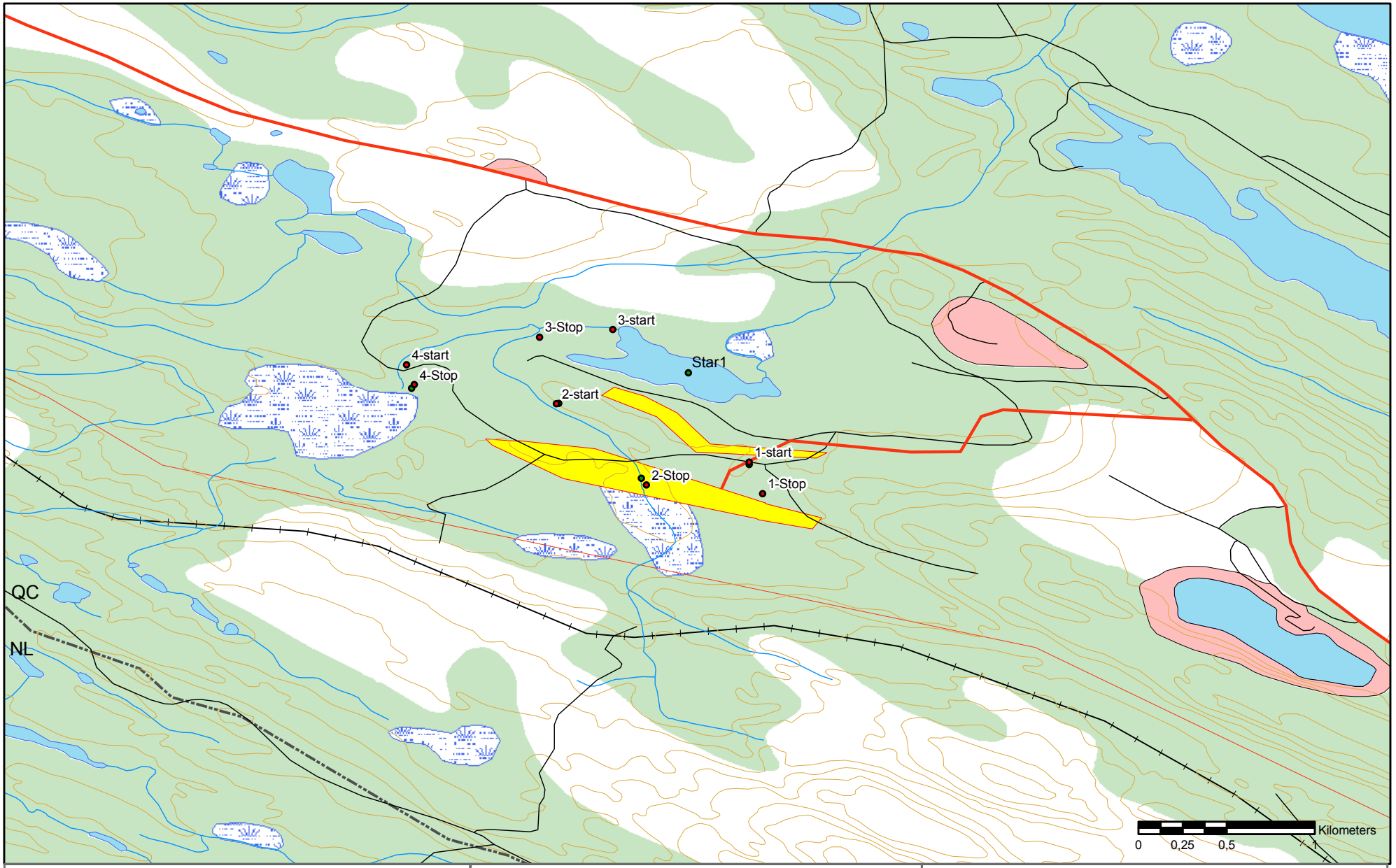
Distances were measured with a 30m tape reel and a laser range finder. Water velocities and depths were recorded along transects and at random survey points using a Global flow Probe model FP101 (0.01m/s) and a metre stick. A Lowrance GPS was used to locate streams and record their positions.

Water quality sampling was also conducted at each survey location. In-situ physical analysis of the water quality in the study area was carried out concurrent with fish habitat surveys. A total of 22 sampling points were completed which included established sites as well as sites added once in the field. Water quality parameters included temperature, pH, conductivity, dissolved oxygen conductivity and turbidity. Lake sites were also surveyed for transparency and maximum depth. Data were collected with a hand-held water quality meter (YSI model 600 QS), a turbidimeter (La Motte model 2020e) and a Secchi disk. In some locations, a pocket pH meter and a conductivity meter (Hanna brand) were used.

Table 3.1 Summary of stream habitat survey locations. Survey coordinates are UTM, WGS84.

Survey ID	Coordinates				Notes
	Start		Stop		
	Northing	Easting	Northing	Easting	
DSO2-01	6079173	631981	6078996	632030	
DSO2-02	6079486	631340	6079033	631648	
DSO2-03	6079913	631512	6079863	631274	
DSO2-04	6079693	630843	6079581	630871	
DSO3-01[1]	6083606	624514	- -	- -	Start of Timmins 3N pit
DSO3-02	6083606	624514	6082882	625156	
DSO3-03	6083747	624664	6083555	624887	
DSO3-04	6084256	622834	- -	- -	Dry stream bed
DSO3-05[1]	6084610	623300	- -	- -	Standing water
DSO3-06	6084138	624393	6083806	624660	
DSO3-07[1]	6086016	623471	- -	- -	Inukshuk Lake
DSO3-08	6088875	620814	6089065	621228	
DSO3-09	6089065	621228	- -	- -	No flow
DSO3-10	6088278	622497	6088298	622554	
DSO3-11	6086401	621667	6086176	621645	
DSO3-12[1]	6034384	620338	- -	- -	Lake Pinette
DSO3-13	6084944	620381	6085088	620376	
DSO3-14	6086422	620277	6086344	620286	
DSO3-15	6082846	621745	6083929	622501	

[1] These sites were sampled for water quality only.



Legend

- Stream habitat survey
- Physico-chemical survey
- Roads proposed
- Roads
- Railroad
- Transmission lines
- Provincial boundaries
- DSO Potential sites
- Existing mining zones
- Wetlands

Proposed DSO-2 Mine Development
Reconnaissance Fish Habitat Surveys

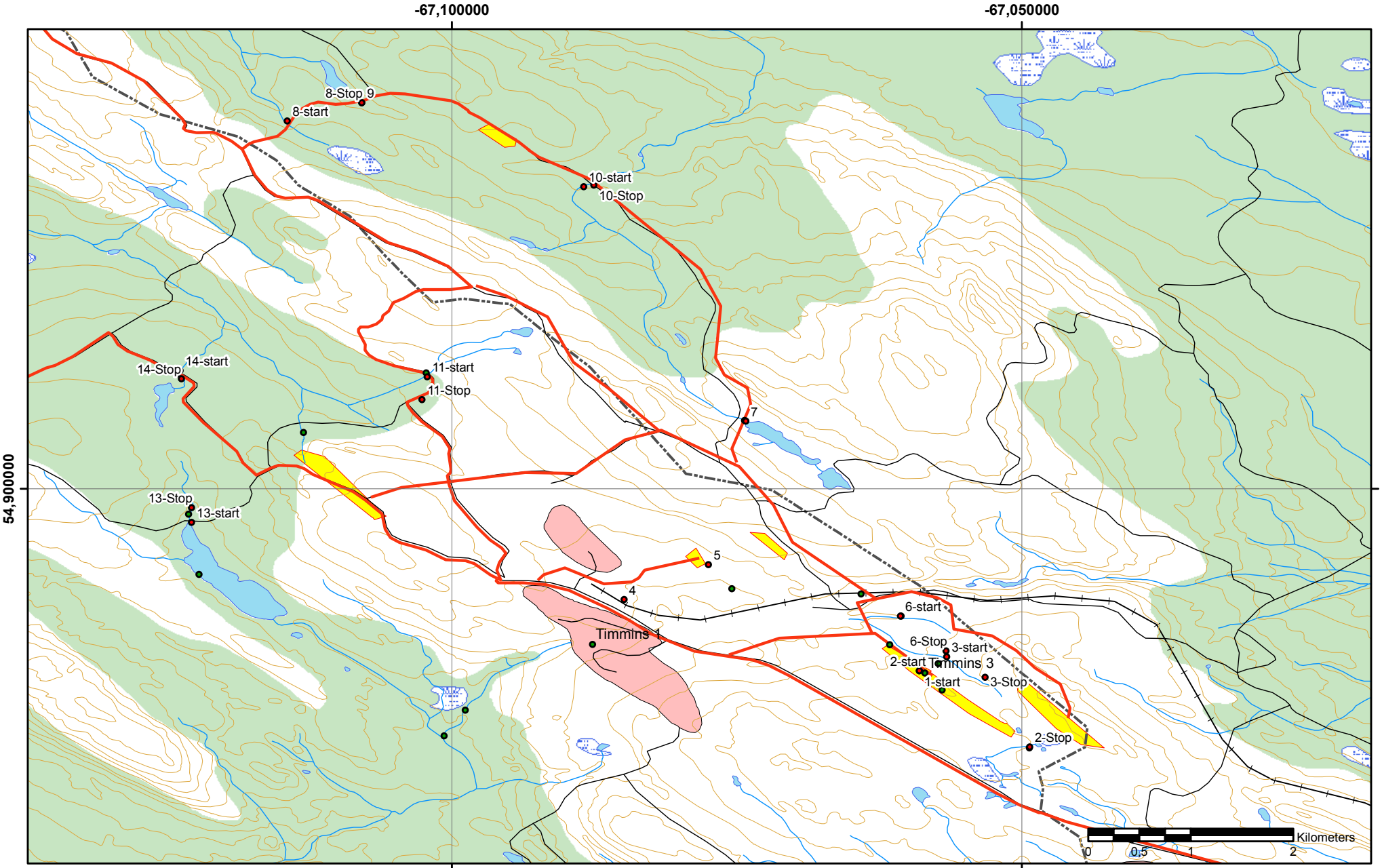
Western Labrador and Eastern Quebec

Production date: August 6, 2008
Revision date: August 6, 2008
Scale: 1:30 000
Projection: Long./lat. Nad 83

HEMISPHERES le groupe

amec

Sources:
Government of Canada, 1979, BNDT, 1:50 000
Government of Quebec, 2000, MRN, 1:250 000
Groupe Hémisphères, 2008, Hydrology update



Legend

- Stream habitat survey
- Physico-chemical survey
- Roads proposed
- Roads
- Railroad
- Transmission lines
- Provincial boundaries
- DSO Potential sites
- Existing mining zones
- Wetlands

Proposed DSO-3 Mine Development
Reconnaissance Fish Habitat Surveys

Western Labrador and Eastern Quebec

Production date: August 6, 2008
Revision date: August 6, 2008
Scale: 1:50 000
Projection: Long./lat. Nad 83

HEMISPHERES le groupe

amec

Sources:
Government of Canada, 1979, BNDT, 1:50 000
Government of Quebec, 2000, MRN, 1:250 000
Groupe Hémisphères, 2008, Hydrology update

4.0 RESULTS

The following results provide a summary of the habitat types at each stream survey site. Appendix B contains photos of each site. Detailed habitat measurements are provided in Appendix C. Summary water quality results are provided in Appendix D. It should also be noted that water quality parameters measured at each survey location (i.e. water temperature, pH, dissolved oxygen) would not limit any site as potential fish habitat.

4.1 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.

4.2 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. See Photos B-4 to B-7 in Appendix B.

4.3 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.

4.4 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.

4.5 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.

4.6 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.

4.7 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.

4.8 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.

4.9 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.

4.10 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.

4.11 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.

4.12 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.

4.13 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.

4.14 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.

4.15 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.

4.16 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.

4.17 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.

4.18 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.

4.19 DSO3-15

The outflow of Timmins Pit 2 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.

5.0 Summary

As a summary, Table 5.1 presents the general habitat type at each survey location as well as a preliminary determination as to whether each location has the potential to be fish habitat. This preliminary determination is considered cautionary and is based solely on the physical characteristics and observations while at each site as no sampling for fish presence was conducted. It is also unknown at this time whether any of the streams are intermittent as a result of low flows in mid-summer and/or mid-winter.

Table 5.1 Summary of stream habitat survey locations. Survey coordinates are UTM, WGS84.

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: All habitat parameters appear suitable	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

6.0 REFERENCES

Scruton, D.A., T.C. Anderson, C.E. Bourgeois, and J.P. O'Brien. 1992. Small stream surveys for public sponsored habitat improvement and enhancement projects. Can. Manuscr. Rep. Fish. Aquat. Sci. No. 2163: v + 49pp.

Sooley, D.R.E., E.A. Luiker and M.A. Barnes. 1998. Standard Methods Guide for Freshwater Fish and Fish Habitat Surveys in Newfoundland and Labrador: Rivers and Streams. Fisheries and Oceans, St. John's, NF. iii + 50pp.

Appendix A
Proposed Mine Site Locations
(DSO2 & DSO3)

630,000 632,000 634,000

6,082,000 6,080,000 6,078,000 6,076,000

Lac Ridge

Lac Star

Star Creek 2

Ferriman 4

KILOMETRES / KILOMÈTRES
0 0.4 0.8

1:20,000

UTM19N NAD83

DSO Property Map
Proposed 2008 Drilling Sites

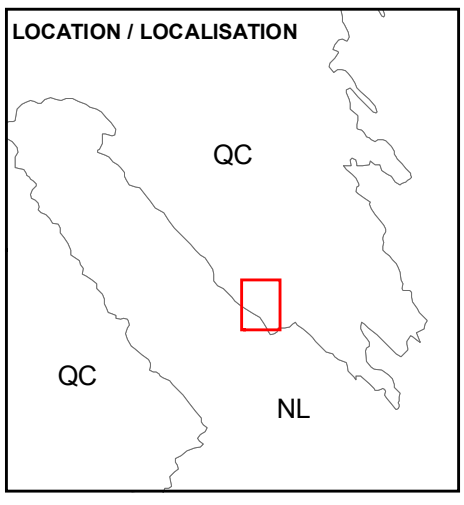
GIS-0040-00 2008-MAY-08 S.D.

CONFIDENTIAL
CONFIDENTIEL

LEGEND / LÉGENDE

- Existing Access Roads (IOC maps)
- Proposed DSO Drilling Sites 2008
- DSO deposit / Gisement "DSO" (APPROX.)

LOCATION / LOCALISATION



620,000 622,000 624,000

6,090,000 6,088,000 6,086,000 6,084,000

Barney 1
Barney 2
Goodream Lake
Goodream Creek
Howse
Timmins 4
Timmins 8
Timmins 8
Timmins 7
Timmins 3N
Elross 2
Pinette Lake

KILOMETRES / KILOMÈTRES
0 0.4 0.8

1:20,000

UTM19N NAD83

DSO Property Map
Proposed 2008 Drilling Sites

GIS-0040-00 2008-MAY-08 S.D.

CONFIDENTIAL
CONFIDENTIEL

LEGEND / LÉGENDE

- Existing Access Roads (IOC maps)
- Proposed DSO Drilling Sites 2008
- DSO deposit / Gisement "DSO" (APPROX.)

LOCATION / LOCALISATION

QC
QC
NL

624,000
626,000
6,086,000
6,084,000
6,082,000
6,080,000

Timmins 8
Timmins 8
Timmins 7
Timmins 3N
Fleming 7N
Fleming 7S
Timmins 3S
O'Nelly Lake
Lac de l' Hématite

KILOMETRES / KILOMÈTRES
0 0.4 0.8

1:20,000

UTM19N NAD83

DSO Property Map
Proposed 2008 Drilling Sites

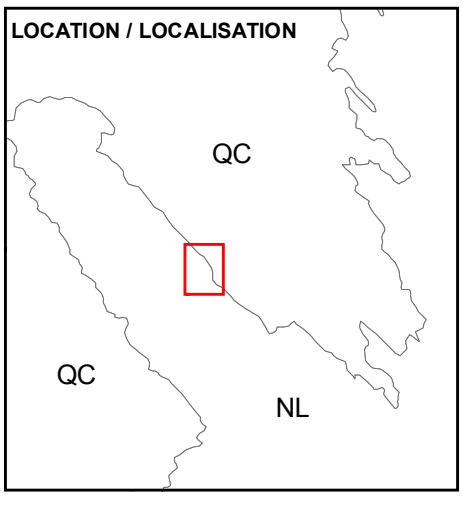
GIS-0040-00 2008-MAY-08 S.D.

CONFIDENTIAL
CONFIDENTIEL

LEGEND / LÉGENDE

- Existing Access Roads (IOC maps)
- Proposed DSO Drilling Sites 2008
- DSO deposit / Gisement "DSO" (APPROX.)

LOCATION / LOCALISATION



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)

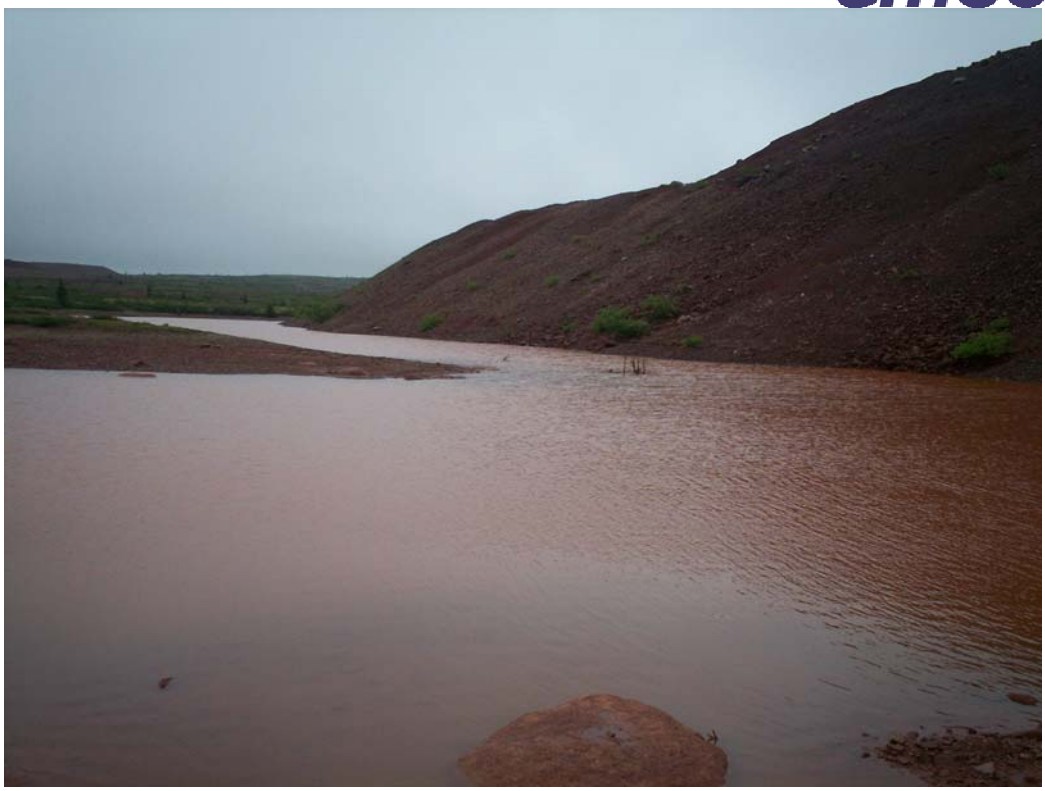


Photo B-21. DSO3-5 (Stagnant body of water) with no inflow

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)

Appendix C
Stream Survey Tables

(Included as a digital file attached to report)

River: DSO2-1

Stream Habitat Survey Sheet

Transect #	Reach #	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	Substrate Compostion (%) Organics	Fine		Medium			Coarse			Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank L	0-50% Undercut Bank R	0-50% Overhanging Veg. L	0-50% Overhanging Veg. R	0-100% Instream	0-100% Canopy	Comments
														Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock											
1	1	Run/riffle	1.1		1.4	0.37	0.42	0.39		0.39	0.22	0.15			35		15	30	10	10			**5.00**		10	10	50	50	10	40	
2	1	pool	6			0.53	0.55	0.58		0.00	0.17	0			45		15	30	10						20	40					Pool 3m x 6m
3	1	Run/riffle	1.8		2.2	0.71	0.73	0.64		0.14	0.13	0				40	25	20	10	5											

River: DSO2-2

Stream Habitat Survey Sheet

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	Substrate Compostion (%) Organics	Fine		Medium			Coarse		Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
1	Run/riffle	0.9		1.2	0.41	0.26	0.17		0.11	0.00	0.00			100								**2.00**		10	10	40	40	70	0	
2	Run/riffle	0.77		0.89	0.33	0.21	0.28		0.18	0.11	0.00			100										10	10	35	35	60	0	
3	Run/riffle	1.3		1.6	0.25	0.25	0.25		0.00	0.05	0.05				25	5	40	10	20							45	45	10	30	Stream dissappears into bog
4	Run/riffle	0.76		0.8	0.37	0.40	0.40		0.00	0.13	0.11																			Stream begins again
5	small pool	6		6.2	0.56	0.56	0.50		0.00	0.00	0.00				60	20	10	10						10	5	40	40	60	0	small pool 2.8 x 6m
6	Run/riffle	0.55		0.9	0.18	0.20	0.23		0.30	0.30	0.20				30	10	40	10		10			1	20	30	30	30	30	0	

River: DSO2-3

Stream Habitat Survey Sheet

Transect	Type	Width	Av Width	Channel Width	Depth			Average Depth	Velocity (m/s)			Average Velocity	Substrate Compostion (%)								Reach Gradient	Reach Gradient	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse										
#		(m)		(m)									Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock	(m/m)	(degrees)		L	R	L	R			
1	Pool	5.0		7.0	1.00	1.00	1.00							35		50	5	10											Pool too large to walk in. Depths estimated. 1 Brook Trout seen
2	Riffle/Run	2.1		2.8	0.37	0.49	0.58		0.17	0.66	0.47				30	60	10	5	5					30	30	40	5	0	5	
3	Riffle/Run	4.1		4.8	0.38	0.50	0.49		0.62	0.89	0.18				50	35	10	5								30	30	5	10	1 Brook trout 10cm observed. Another 6 to 8 @ 8cm
4	Riffle/Run	4.9		5.1	0.47	0.55	0.40		0.09	0.56	0.05				30	25	30	15				1		20	30	40	40	0	75	
5	Riffle/Run	2.3		2.9	0.24	0.38	0.31		0.85	0.18	0.48				10	5	25	20	30					20	25	30	35	0	45	Stream braids off into 3 different streams. Followed stream in centre
6	Riffle/Run	2.2		3.1	0.27	0.21	0.20		0.10	0.11	0.07				20	30	10	10	30					35	20	40	40	10	70	

River: DSO2-4

Stream Habitat Survey Sheet

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	Substrate Compostion (%) Organics (Detritus)	Fine (Fines)	Fine (Sand)	Medium (Gravel)	Medium (Cobble)	Coarse (Rubble)	Coarse (Boulder)	Coarse (Bedrock)	Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank L	0-50% Undercut Bank R	0-50% Overhanging Veg. L	0-50% Overhanging Veg. R	0-100% Instream	0-100% Canopy	Comments
1	Riffle/Run	4.2		4.8	0.42	0.53	0.48		0.27	0.43	0.3											**1.00**								2 Brook trout about 14 cm observed
2	Riffle/Run	6			0.33	0.38	0.18		0.84	0.18	0				10	15	30	30	15					15	25	20	25	5	50	

River: DSO2-3

Stream Habitat Survey Sheet

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	Substrate Compostion (%) Organics (Detritus)	Fine (Fines)	Fine (Sand)	Medium (Gravel)	Medium (Cobble)	Coarse (Rubble)	Coarse (Boulder)	Coarse (Bedrock)	Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank L	0-50% Undercut Bank R	0-50% Overhanging Veg. L	0-50% Overhanging Veg. R	0-100% Instream	0-100% Canopy	Comments
1	Riffle/Run	1.3		1.6	0.02	0.05	0.02		0.17	0.45	0.12				25	30	30	10	5		0.38/8									Stream runs into open pit (old mine)
2	Riffle/Run	1.7		1.9	0.40	0.05	0.03		0.32	0.36	0				40	15	20	20	5					0	0	0	0	20	0	rocks covered in green algae

River: DSO3-03

Stream Habitat Survey Sheet

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity	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
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse					L	R	L	R			
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock									
1	Steady	4.0		4.6	0.11	0.07	0.28		0.00	0.00	0		100																
2	Steady	1.5		2.6	0.41	0.48	0.25		0.00	0	0		95			2	1	1	1					5	5	50	50	70	0	mostly overland flow, no distinct streambed
3	Steady	1.3		1.8	0.25	0.31	0.25		0.07	0	0		100																
4	Riffle/Run	0.58		0.8	0.10	0.14	0.13		0.26	0.49	0		80		5	10	5							5	15	50	50	20	0	

River: DSO3-06

Stream Habitat Survey Sheet

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity	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
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse					L	R	L	R			
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock									
1	steady	0.66			0.10	0.21	0.12		0.00	0.00	0		100																
2	steady	0.69			0.23	0.24	0.23		0.00	0	0		40		20	15	15	10						5	15	10	15	5	0	
3	steady	0.51			0.10	0.10	0.07		0.15	0.19	0		75		10	5	5	5			0.65/10					5	5	5	0	
4	steady	3.00			0.07	0.12	0.13		0.00	0	0		35		15	10	10	10								10	5	5	1	some overland flow, meets small pond
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		50		10	10	20	10								20	15	5	0	

River: DSO3-08

Stream Habitat Survey Sheet

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity	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
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse										
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
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			30	24	5	20	10	11					7	5	20	15	15	5	
3	riffle/run	0.63		0.92	0.15	0.16	0.17		0.00	0.23	0.19			25	10	20	30	10	5					5	7	20	15	5	10	

River: DSO3-09

Stream Habitat Survey Sheet

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity	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
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse										
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
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				10	15	50	20	5					5	10	35	30	5	10	
3	pool	10.00		10	0.10	0.66	0.64		0.00	0.02	0			20	30	30	20													Pool 10m x 3m
4	riffle/run	3.70		4.8	0.09	0.06	0.15		0.14	0	0.22		5		2	13	45	20	15					5	10	30	35	5	15	

River: DSO3-10

Stream Habitat Survey Sheet

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

River: DSO3-13

Stream Habitat Survey Sheet

Transect #	Type	Width (m)	Av Width	Channel Width (m)	Depth			Average Depth	Velocity (m/s)			Average Velocity	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
					1/3	1/2	2/3		1/3	1/2	2/3		Organics	Fine		Medium			Coarse					L	R	L	R			
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock									
1	steady	2.20		2.9	0.27	0.28	0.23		0.00	0.00	0																		stream disappears in sedge and goes underground after 10 m, reappears 20 m up
2	pool	3.80		4.25	0.29	0.49	0.57		0.00	0.11	0		40		5	15	25	10	5					10	15	40	35	55	0	
3	riffle/run	0.43		0.58	0.14		0.15		0.51		0.53		30		10	15	30	10	5					7	15	40	35	40	5	
4																														
5																														
6																														

River: DSO3-14

Stream Habitat Survey Sheet

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	Substrate Compostion (%) Organics	Fine		Medium			Coarse		Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank		0-50% Overhanging Veg.		0-100% Instream	0-100% Canopy	Comments
													Detritus	Fines	Sand	Gravel	Cobble	Rubble	Boulder	Bedrock				L	R	L	R			
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		75		5	5	10	5				1.8		7	5	35	35	30	1	stream meets road, outflows from a small steady
3	Steady	0.80		0.96	0.37	0.35	0.25		0.11	0.18	0		75		10	5	5	5						15	10	40	40	25	0	
			0.8					**0.22**				**0.13**											**0.00**							

River: DSO3-15

Stream Habitat Survey Sheet

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	Substrate Compostion (%) Organics: Detritus	Fine: Fines	Fine: Sand	Medium: Gravel	Medium: Cobble	Medium: Rubble	Coarse: Boulder	Coarse: Bedrock	Reach Gradient (m/m)	Reach Gradient (degrees)	Average Gradient	0-50% Undercut Bank L	0-50% Undercut Bank R	0-50% Overhanging Veg. L	0-50% Overhanging Veg. R	0-100% Instream	0-100% Canopy	Comments
1	riffle/run	3.70		3.9	0.24	0.05	0.05		0.25	0.34	0																			1 Brook Trout about 15cm
2	riffle/run	2.86		3.4	0.06	0.12	0.05		0.20	0.35	0				5	20	20	20	35		0.17/7			5	10	35	35	5	5	2 unidentified fish approximately 15 cm each
3	riffle/run	2.50		3.2	0.11	0.19	0.07		0.07	0.28	0.15				5	20	15	30	30		0.43/8			5	5	40	40	0	10	leaving wooded area, tailing mounds on both sides of river
4	riffle/run	3.40		4.6	0.10	0.20	0.15		0.45	0.34	0.13			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	pool	3.79		4	0.31	0.41	0.23		0.00	0.18	0				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
6	riffle/run	3.80		4.9	0.25	0.23	0.17		0.13	0.12	0.12			10	10	15	15	25	25					0	0	15	10	0	0	Tailings on both side of stream. Water has red tint
7	steady	15.00																												steady 15 m wide x 100m long. 1 Fish breached
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	40	15	10	15	10				0	0	0	0	0	0	
10	steady	6.00																												Steady 6m long x 20m wide. Small waterfall (89 cm high) dumps into steady
11	riffle/run	2.30		3.4	0.05	0.06	0.08		0.10	0.2	0.09				10	40	15	10	15	10				0	0	0	0	0	0	

APPENDIX D
Summary Water Quality Results

Projet : Proposed DSO Mine Development
Object : Summary Water Quality
Tech. : Daniel Néron et David Savoie
Apparatus : multiparameters YSI 600 QS, Conductivimeter and pHmeter pocketsize Hanna, turbidimeter LaMotte 2020e

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le groupe

Location									Physical Chemistry							
Site	Point	Water-body	Inter-ference*	Name	Latitude (nad83)	Longitude (nad83)	Day	Hrs	Depth (m)	Temp. (ºC)	Cond. (µmhos /cm)	pH	DO (mg/L)	NTU	Secchi (m)	Comment
DSO2	01	stream	yes		54.84213	-66.94469	2008-07-17	09:05	0.0					0.49		South inflow of lake Star1
DSO2	02	stream	yes		54.84143	-66.95020	2008-07-17	10:00								
DSO2	03	stream	yes		54.84525	-66.95440	2008-07-17	11:34	0.0	13.3	70	7.5	10.0	1.02		West inflow of lake Star1
DSO2	04	stream	possible		54.84603	-66.96191	2008-01-17	13:50	0.0	14.7	72	7.8	10.8	0.40		Discharge of a shallow lake
DSO2	05	lake	yes	Star1	54.84680	-66.94780	2008-07-19	16:00	0.0	14.1	71	6.9	11.6	0.34	> 0.9	
DSO2	05	lake	yes	Star1					0.8	14.4	73	7.0	11.3			10 cm over bottom
DSO3	01	pit	yes	Timmins3a	54.88627	-67.06156	2008-07-17	16:55	0.0	16.7	7	7.7	9.4	45.70		Pink water color, no outflow
DSO3	01	pit	yes	Timmins3b	54.88231	-67.05698	2008-07-17	17:30	0.0	14.8	6	6.9	10.4	3.93		Pink-brown water color
DSO3	01	pit	yes	Timmins3c	54.88039	-67.05344	2008-07-17	17:50	0.0	14.4	8	6.0	10.3	3.48		Pink-brown water color, no inflow
DSO3	02	stream	yes		54.87721	-67.04931	2008-07-17	18:05	0.0							Spring
DSO3	03	stream	yes		54.88461	-67.05732	2008-07-17	18:40	0.0	14.5	5	6.0	8.3	0.37		
DSO3	04	pond	yes	demi-lune**	54.89178	-67.07575	2008-07-20	10:20	0.0	14.8	3	5.4	9.9	36.50	0.50	No outflow
DSO3	04	pond	yes	demi-lune**					1.0	14.7	3	4.9	9.8			
DSO3	05	pond	yes	triangle**	54.89111	-67.06419	2008-07-20	10:50	0.0	14.1	7	5.7	10.4	210.00	0.15	No outflow
DSO3	05	pond	yes	triangle**					0.8							
DSO3	06	stream	yes		54.88879	-67.06058	2008-07-18	10:40	0.0	13.8	6	6.2	9.9	0.27		Series of step-fens
DSO3	07	lake	no	inukshuk**	54.90594	-67.07431	2008-07-18	12:50	0.0	15.5	5	6.1	10.2	0.66		Reference lake
DSO3	08	stream	possible		54.91013	-67.10223	2008-07-18	15:30	0.0	14.8	22	6.0	9.6	0.52		
DSO3	09	lake	possible	de la neige**	54.93502	-67.10789	2008-07-20	08:20	0.0	16.2	6	6.3	9.4		> 2.1	
DSO3	09	lake	possible	de la neige**					1.0	16.1	6	6.3	9.4			
DSO3	09	lake	possible	de la neige**					2.0	15.9	6	6.4	5.9			10 cm over bottom
DSO3	10	stream	no		54.90490	-67.11299	2008-07-18	16:10	0.0	13.4	5	4.9	8.4	0.16		Reference stream
DSO3	11	lake	possible	Pinette	54.89243	-67.12216	2008-07-18	16:30	0.0	15.7	4	5.6	10.0	0.47		
DSO3	12	stream	possible		54.89772	-67.12306	2008-07-18	17:00	0.0	12.4	7	5.5	9.6	0.21		Inflow of lake Pinette
DSO3	13	stream	no		54.91002	-67.12408	2008-07-18	17:50	0.0	16.7	6	4.7	6.9	0.62		Reference stream
DSO3	14	stream	no	Timmins1 outflow	54.88094	-67.09896	2008-07-19	14:40	0.0	14.1	16	7.2		13.10		
DSO3	15	stream	possible	Pinette	54.87818	-67.10191	2008-07-19	14:00	0.0	13.8	2	5.8		0.23		
DSO3	T1	pit	no	Timmins1	54.88629	-67.08764	2008-07-19	10:25	0.0	12.9	22	6.3	11.0	4.89	1.20	Pink-brown water color
DSO3	T1	pit	no	Timmins1					1.0	12.8	21	6.3	10.9			Inflow from snow melt
DSO3	T1	pit	no	Timmins1					2.0	12.6	21	6.2	11.0			Outflow named DSO3-14
DSO3	T1	pit	no	Timmins1					3.0	12.2	21	6.4	11.3			
DSO3	T1	pit	no	Timmins1					4.0	10.5	21	6.5	11.4			
DSO3	T1	pit	no	Timmins1					5.0	10.2	21	6.6	11.5			
DSO3	T1	pit	no	Timmins1					6.0	10.0	21	6.6	11.5			
DSO3	T1	pit	no	Timmins1					7.0	9.5	21	6.6	11.6			
DSO3	T1	pit	no	Timmins1					8.0	9.2	21	6.6	11.7			
DSO3	T1	pit	no	Timmins1					9.0	8.2	21	6.6	12.0			
DSO3	T1	pit	no	Timmins1					10.0	6.5	21	6.6	12.8			
DSO3	T1	pit	no	Timmins1					12.0	5.6	21	6.6	13.2			
DSO3	T1	pit	no	Timmins1					14.0	5.3	21	6.7	13.3			
DSO3	T1	pit	no	Timmins1					16.0	5.1	21	6.6	13.3			
DSO3	T1	pit	no	Timmins1					18.0	4.9	21	6.6	13.3			
DSO3	T1	pit	no	Timmins1					20.0	4.9	21	6.6	13.2			
DSO3	T1	pit	no	Timmins1					21.1							Bottom and maximum depth
DSO3	T2	pit	yes	Timmins2	54.89355	-67.08722	2008-07-19	11:35	0.0	14.4	26	6.5	10.3	11.1	0.90	Pink-brown water color,

Projet : Proposed DSO Mine Development
Object : Summary Water Quality
Tech. : Daniel Néron et David Savoie
Apparatus : multiparameters YSI 600 QS, Conductivimeter and pHmeter pocketsize Hanna, turbidimeter LaMotte 2020e

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Location									Physical Chemistry							
Site	Point	Water-body	Inter-ference*	Name	Latitude (nad83)	Longitude (nad83)	Day	Hrs	Depth (m)	Temp. (ºC)	Cond. (µmhos /cm)	pH	DO (mg/L)	NTU	Secchi (m)	Comment
DSO3	T2	pit	yes	Timmins2					1.0	14.2	26	6.5	10.3			no outflow and no inflow
DSO3	T2	pit	yes	Timmins2					2.0	13.5	26	6.6	10.4			
DSO3	T2	pit	yes	Timmins2					3.0	11.9	23	6.6	10.9			
DSO3	T2	pit	yes	Timmins2					4.0	11.3	26	6.6	11.0			
DSO3	T2	pit	yes	Timmins2					5.0	9.9	26	6.6	11.8			
DSO3	T2	pit	yes	Timmins2					6.0	8.5	24	6.7	12.1			
DSO3	T2	pit	yes	Timmins2					7.0	7.1	24	6.6	12.8			
DSO3	T2	pit	yes	Timmins2					8.0	6.5	24	6.6	13.0			
DSO3	T2	pit	yes	Timmins2					9.0	6.1	24	6.6	13.2			
DSO3	T2	pit	yes	Timmins2					10.0	5.9	24	6.6	13.2			
DSO3	T2	pit	yes	Timmins2					12.0	5.5	24	6.5	13.4			
DSO3	T2	pit	yes	Timmins2					14.0	5.2	24	6.5	13.5			
DSO3	T2	pit	yes	Timmins2					16.0	4.8	24	6.5	13.6			
DSO3	T2	pit	yes	Timmins2					18.0	4.6	24	6.5	13.6			
DSO3	T2	pit	yes	Timmins2					20.0	4.5	24	6.5	13.7			
DSO3	T2	pit	yes	Timmins2					22.0	4.4	24	6.5	13.7			
DSO3	T2	pit	yes	Timmins2					26.0	4.5	24	6.5	13.6			
DSO3	T2	pit	yes	Timmins2					29.0	4.6	24	6.5	13.5			Bottom not reached

* Water quality potentially affected by the proposed mining operations

Lake Star1

Timmins3a Pit

Pond Demi-Lune

Pond Triangle

Lake de la neige

Lake Pinette

Timmins1 Pit

Timmins2 Pit