

Village of Teslin

ISSUED FOR USE

2009 GROUNDWATER AND SURFACE WATER MONITORING AND
PRELIMINARY HYDROGEOLOGICAL ASSESSMENT
SOLID WASTE DISPOSAL FACILITY
TESLIN, YUKON

W23101303

December 2009

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EXECUTIVE SUMMARY

At the request of the Village of Teslin, EBA Engineering Consultants Ltd. completed groundwater and surface monitoring and a preliminary hydrogeological assessment at the Teslin solid waste disposal site. Currently, the water sampling network includes three monitoring wells and Teslin Lake. The monitoring wells were installed in November 2008 but no groundwater sampling was conducted prior to the fall 2009 monitoring event.

The following conclusions are made based on the findings of the fall 2009 preliminary hydrogeological assessment:

- Three monitoring wells MW01, MW02 and MW03 were installed in November 2008 in areas south of the main current solid waste disposal site to establish a groundwater monitoring network at the Site. All monitoring wells were completed in bedrock with a slotted section at the well bottom to allow groundwater entry. The well screens of MW02 and MW03 straddle the overburden-bedrock interface;
- No monitoring or sampling of the wells was previously completed prior to the fall 2009 field program;
- Groundwater elevations as of November 13, 2009 show that the flow of groundwater within the aquifer generally follows the local topography and the surface water flow regime. Preliminary conceptual hydrogeology indicates that the groundwater flow direction is westerly towards Teslin Lake, under a horizontal hydraulic gradient of 0.04 m/m. However, additional groundwater elevation data are necessary to identify potential seasonal changes and confirm the conceptual hydrogeological model;
- Analysis of the rising head hydraulic response test results show that the geometric mean of the hydraulic conductivity of the bedrock is about 3×10^{-7} m/s;
- Waters from the three monitoring wells and Teslin Lake can all be characterized as calcium-magnesium-bicarbonate type waters; however, the magnesium concentrations in MW02 and MW03 are higher than that in MW01 and in the Lake;
- Concentrations of all dissolved metal parameters analyzed in the monitoring wells were below the Yukon Contaminated Site Regulations for protection of freshwater aquatic life (CSR-AW);
- Dissolved aluminum and dissolved iron in MW01 exceeded the Yukon Contaminated Sites Regulations standards for drinking water protection (CSR-DW);
- Dissolved iron, dissolved magnesium and dissolved manganese in MW02 exceeded the CSR-DW standards;
- Metal parameters that were analyzed for MW03 were below the CSR-DW standards;
- The Teslin Lake water quality was compared to the CSR standards and the Canadian Council of Ministers of the Environment (CCME) guidelines for freshwater aquatic life. All parameters analyzed met the applicable CSR and CCME standards/guidelines;

- Extractable petroleum hydrocarbon concentrations in all monitoring wells and Teslin Lake were below the analytical detection limit of 0.1 mg/L (100 ug/L), except for the 0.1 mg/L EPHw₁₉₋₃₂ concentration detected in MW01 and MW02. Currently, there are no guidelines established for heavy extractable petroleum hydrocarbons;
- The nitrate nitrogen and nitrite nitrogen concentrations in the monitoring wells were all less than the detection limit of 0.01 mg/L and well below the standards/guidelines. Nitrate and nitrite in Teslin Lake was 0.06 and 0.02 mg/L, respectively. However, the results may not be precise as the analysis was performed after the recommended holding time;
- The bacteriological samples from all monitoring wells showed negative results for total coliform and *E.coli* whereas the sample from Teslin Lake indicated total coliform presence; and,
- There are insufficient water quality data to indicate any adverse effect on groundwater or surface water quality by the site operation.

Based on our recent field observation and the water quality data analysis, we recommend the following:

- A groundwater monitoring program should be conducted on a semi-annual basis to include a monitoring event during spring freshet when the most significant groundwater recharge occurs;
- A seasonal creek was reported to be present in the northern part of the site (near the site operator office), and the water flows westerly towards the ditch along the old Alaska Highway. The creek becomes dry during the fall/winter months. Given the close proximity to the potential sources of contaminants at the Site, this creek should be included in the water quality monitoring network;
- Teslin Lake can be excluded from the monitoring program because of the great distance (at least 1 km) from the Site;
- At least two additional monitoring wells should be installed at the Site and be surveyed to confirm groundwater flow direction and to establish a better water quality monitoring network. The location of these new monitoring wells should be consulted with a hydrogeologist prior to site preparation and well installation;
- Future monitoring for extractable hydrocarbons should be completed as LEPHw to compare directly with CSR standards (rather than EPHw as indicated in the current permit); and,
- Due to the observed presence of hydrocarbons at low concentrations in groundwater samples obtained from MW01 and MW02, it is recommended that screening for additional organic parameters of concern be completed. These should include benzene, toluene, ethylbenzene and xylene (BTEX), as well as polycyclic aromatic hydrocarbons (PAHs). Decisions on whether this additional analytical should be continued should be based on the results of the next sampling event.

EXECUTIVE SUMMARY	i
1.0 INTRODUCTION.....	1
2.0 SCOPE OF WORK	1
3.0 AUTHORIZATION	1
4.0 SITE CHARACTERISTICS	2
4.1 Location of Study Area	2
4.2 Climate	2
4.3 Surficial Geology and Hydrogeology	2
5.0 FIELD INVESTIGATIONS.....	3
5.1 Groundwater Level Monitoring.....	3
5.2 Rising Head Hydraulic Response Tests.....	3
5.3 Groundwater And Surface Water Sampling	3
5.3.1 Groundwater Sampling	4
5.3.1 Surface Water Sampling.....	4
5.4 Well Survey.....	4
6.0 RESULTS	5
6.1 Groundwater Elevations, Flow Direction and Gradient	5
6.2 Rising Head Test Results	5
6.3 Estimated Average Linear Groundwater Velocity	6
6.4 Groundwater Quality Assessment Criteria	6
6.4.1 Groundwater Quality.....	7
6.4.2 Surface Water Quality.....	7
7.0 CONCLUSIONS.....	8
8.0 RECOMMENDATIONS.....	9
9.0 LIMITATIONS OF REPORT	10
10.0 CLOSURE.....	11
REFERENCES	12

TABLES

Table 1 Groundwater Elevations and Monitoring Well Details

Table 2 Estimated Hydraulic Conductivity Values

Table 3 Analytical Results – Teslin Landfill Monitoring Wells and Teslin Lake

FIGURES

Figure 1 Site Plan Showing Monitoring Well Locations, Inferred Groundwater Flow Direction and Cross-Section Transect

Figure 2 Cross-Section A-A'

Figure 3 Piper Diagram

APPENDICES

Appendix A Monitoring Well Logs

Appendix B Rising Head Hydraulic Response Test Data and Analysis

Appendix C Laboratory Analytical Reports

Appendix D Environmental Report - General Conditions

1.0 INTRODUCTION

At the request of the Village of Teslin, EBA Engineering Consultants Ltd. (EBA) completed a groundwater and surface water monitoring and sampling program at the Teslin solid waste disposal site (the “Site”) in accordance with the Solid Waste Disposal Facility Permit (Permit No: 80-004). The existing site has been in operation since early 1980’s.

Three monitoring wells (herein referred to as MW01, MW02 and MW03) were installed at the Site in November 2008 under the direction of EBA to establish a groundwater monitoring network. All wells were completed in fractured bedrock, each with a machine-slotted 51 mm polyvinyl chloride (PVC) standpipe inserted from the borehole bottom to various depths depending on target depth intervals; unslotted PVC pipe was used for the remainder of the well to the ground surface. The well screens of MW02 and MW03 straddle the bedrock-overburden interface. Each monitoring well was secured with a steel protective casing.

Locations of the monitoring wells were selected based on aerial photography. Figure 1 is a site plan showing the monitoring well locations. Logs of the wells are included in Appendix A, with a summary of well completion details presented in Table 1.

2.0 SCOPE OF WORK

The scope of work of the 2009 study was as follows:

- Groundwater monitoring and rising head hydraulic response testing to determine groundwater flow direction, hydraulic gradient, estimated hydraulic conductivities, and groundwater flow velocity;
- Water sampling and analysis in compliance with the requirements for groundwater and surface water monitoring outlined in the Solid Waste Disposal Facility Permit No. 80-004;
- Comparison of groundwater quality data with applicable guidelines;
- Development of a preliminary conceptual hydrogeological model;
- Identification of potential data gaps which may require installation of additional monitoring well(s); and,
- Preparation of this report as a preliminary hydrogeological assessment for the Site.

3.0 AUTHORIZATION

EBA received on November 13, 2009 verbal authorization from Village of Teslin to proceed with the work outlined in EBA’s proposal dated November 12, 2009. Services

Agreements were signed by Mr. Mike Drake, CAO of Village of Teslin, and EBA on November 23, 2009.

4.0 SITE CHARACTERISTICS

4.1 LOCATION OF STUDY AREA

The Teslin solid waste disposal facility site is located on Lot 1076, Quad 105C/02, approximately 3 km east of the Village core at Mile 802 (Km 1291) Alaska Highway at a latitude of 60° 9' 8" N and longitude of 132° 40' 55" W. The Site is on the slope of a ridge near the confluence of the Nisutlin Bay and the Teslin Lake.

4.2 CLIMATE

The average annual precipitation in Teslin is 344.3 mm, with most of the precipitation falling as snow between October and March. The average annual temperature is -1.5°C with an average monthly high in July of 14°C, and the coldest month generally being January with an average temperature of -19.2°C (Environment Canada, Teslin Airport 1971 to 2000).

4.3 SURFICIAL GEOLOGY AND HYDROGEOLOGY

The southern Yukon has undergone several episodes of glaciation, the most recent being the McConnell glaciation. Hence, the surficial materials in the study area are primarily of glacial origin.

The area is underlain by till with a silty to sandy matrix with thickness of up to 30 m (Geological Survey of Canada (GSC) Map 1891A, 1997). Review of the monitoring well logs shows that the hydrogeological conditions may vary quite dramatically from site to site, as at least 7 m of till was encountered at MW02 and MW03 but the till layer was absent at MW01. The subsurface geology encountered during the drilling of the monitoring wells is described below:

- Organic root materials, approximately 0.2 m thick;
- SAND, silty, trace fine to medium grained gravel; between 0.8 and 2.3 m thick;
- SAND (till), silty and gravelly; absent at MW01 but approximately 10.3 m thick at MW02;
- Bedrock; sand and bedrock interface from 1.0 m-bgs at MW01 to 12.2 m-bgs at MW02. The bedrock is mapped as greywacke and lesser siltstone and shale (GCS Map 1125A, 1963).

Discontinuous permafrost is present in the Teslin area.

Cross-section A-A', shown as Figure 2, illustrates the interpreted conceptual hydrogeology model in the study area.

5.0 FIELD INVESTIGATIONS

5.1 GROUNDWATER LEVEL MONITORING

Depth to groundwater and depth to bottom in each monitoring well were measured on November 13, 2009 using a Heron water level sounder. These field measurements are provided in Table 1.

5.2 RISING HEAD HYDRAULIC RESPONSE TESTS

Rising head tests were completed on each monitoring well to estimate the hydraulic conductivity of the aquifer at the well location. The rising head test was performed by quickly removing one bailer of water (approximately one litre in volume) from the well using a 2-inch (508 mm) diameter dedicated polyethylene bailer. The recovery response in the well was then monitored closely using the water level sounder until the water level had recovered to at least 80% of its static water level. More than 90% of recovery was observed in MW01 and MW03 before the end of the manual observation period. In addition to the manual data, a Solinst Levelogger® was deployed in the well to automatically record the water level data at one-minute intervals at MW03 and at one-second intervals at MW02.

A Levelogger was also installed in MW01 during the rising head test; however, the logger was damaged and the data could not be downloaded from the MW01 logger for analysis.

5.3 GROUNDWATER AND SURFACE WATER SAMPLING

Groundwater and surface water sampling was completed on November 15, 2009 by EBA personnel in accordance with EBA's protocols for sampling, storing, and transporting water samples.

The fall 2009 monitoring program included chemical and bacteriological analyses of groundwater from all three monitoring wells and also from Teslin Lake.

In accordance with the requirements of the Solid Waste Disposal Facility Permit No. 80-004 and EBA's proposal, the wells were sampled and tested for the following parameters:

- pH;
- Electrical conductivity;
- Hardness and total alkalinity;
- Total suspended solids and total dissolved solids;
- Dissolved organic carbon (DOC);
- Ammonia, nitrite, nitrate, and phosphorous (total); and,
- Dissolved sulphate, chloride, sodium, calcium, magnesium, and potassium.

- ICP dissolved metals;
- Total extractable hydrocarbons (EPH_{w10-19} and EPH_{w19-32}); and,
- Total coliforms and *E.Coli*;

In addition to the dissolved metals analysis, total metals samples were also collected for analysis.

Samples for ammonia nitrogen analysis were preserved in the field with sulphuric acid and samples for dissolved metals analysis were field filtered using new, clean 0.45 µm filters and preserved with nitric acid. Total metal samples were also preserved with nitric acid.

Bacteriological samples were collected using the sterile bottles provided by the lab.

The chemical samples were shipped on ice to Exova Canada Inc. (Exova) in Surrey, B.C. Exova is a certified laboratory by the Canadian Association for Laboratory Accreditation. The bacteriological samples were delivered to Environmental Health and Social Services in Whitehorse, YT within the 24-hour recommended holding time.

5.3.1 Groundwater Sampling

Prior to water sample collection, the wells were purged until practically dry (at MW02) or until a minimum of three standing well volumes of water had been removed (at MW01 and MW03). Purging was conducted using dedicated polyethylene bailers.

During groundwater purging at MW01 and MW03, pH, temperature and electrical conductivity and turbidity were measured and recorded for every well volume. Field parameters showed that the three consecutive measurements of pH, total dissolved solids and electrical conductivity were within five percent of each other.

Field parameters were also measured at MW02 after one well volume of water was purged from the well; however, because the well was purged dry after one well volume, only one set of field parameters was collected. Groundwater in MW02 was allowed to recover for approximately one hour before groundwater sampling.

5.3.1 Surface Water Sampling

Surface water samples were collected as grab samples at the shore of the Teslin Lake at 60° 9' 30.11" N and longitude of 132° 42' 31.66" W, at an elevation of 689 ± 5 m above sea level (based on data collected from a handheld GPS). The location was selected based on the regional topography of the area. The sampling point was assumed to be downgradient of the Site.

5.4 WELL SURVEY

Yukon Engineering Services (YES) surveyed the elevations of the grade, the top of the protective steel casing and the top of the PVC casing at each location on

December 10, 2009. Elevations were surveyed relative to a geodetic benchmark at the Site. Elevations relative to mean sea level are provided in Table 1.

6.0 RESULTS

6.1 GROUNDWATER ELEVATIONS, FLOW DIRECTION AND GRADIENT

Groundwater was encountered in each monitoring well during the fall 2009 monitoring and sampling program. EBA used the November 13, 2009 groundwater depth data and well survey elevation information to calculate the groundwater elevation at each monitoring well. The water level measurements and estimated groundwater elevations as of November 13, 2009 are presented in Table 1.

The groundwater elevations and the interpreted groundwater flow direction are presented in Figure 1. As shown, the flow direction is westerly towards the Teslin Lake under a horizontal hydraulic gradient of approximately 0.04 m/m.

6.2 RISING HEAD TEST RESULTS

EBA analyzed the five rising head test results (one for MW01, two for MW02 and two for MW03) using methods identified in National Standards Council of Canada *Determination of Permeability* by the Lefranc Method (CAN/BNQ, 1988).

The hydraulic conductivity testing results and the plots are attached in Appendix B.

The Lefranc method uses two different analytical methods:

- Lefranc estimate #1 is derived using the slope of the best-fit line through the test measurements when the natural logarithm of the ratio of the static water level and the water level in the well are plotted as a function of the time elapsed since the beginning of the test.
- Lefranc estimate #2 is derived using the slope of the best-fit line through the test measurements when the natural logarithm of the ratio of the static water level and the water level in the well are plotted as a function of the time elapsed since the beginning of the test taking into account error estimates in the estimated piezometric level. If a piezometric level error estimate is identified during the analysis, the estimate of hydraulic conductivity yielded by this method will be superior to that yielded by the Lefranc estimate #1.

The estimated hydraulic conductivities for each well using the Lefranc estimate methods are presented in Table 2.

As shown, the estimated hydraulic conductivity ranged from 4.35×10^{-5} to 8.94×10^{-8} m/s, with a geometric mean of 3×10^{-7} m/s.

6.3 ESTIMATED AVERAGE LINEAR GROUNDWATER VELOCITY

As described above, the geometric mean hydraulic conductivity of the aquifer tested is 3.4×10^{-7} m/s and the observed hydraulic gradient across the property was 0.04 m/m towards Teslin Lake. Average linear groundwater velocity is calculated using the following equation:

$$D_{ToT} = (k i) / n$$

Where: D_{ToT} : is groundwater travel time in metres per year (m/year);
 K : is hydraulic conductivity in metres per year (m/year);
 i : is horizontal hydraulic gradient in metres/metres (m/m); and,
 n : is porosity (no unit).

This results an estimated average groundwater velocity of approximately 4 m per year, assuming a typical porosity of the bedrock of 0.1. However, the groundwater may travel much faster through permeable bedrock fractures.

6.4 GROUNDWATER QUALITY ASSESSMENT CRITERIA

The potential, environmentally sensitive receptors for contaminants leaving the Site include freshwater aquatic receptors and drinking water receptors due to the proximity of Teslin Lake and drinking water wells at the lake shore that are potentially downgradient of the Site. As such, EBA has compared the groundwater and surface water quality results with the Yukon Contaminated Sites Regulations (CSR) standards for freshwater aquatic life (AW) and drinking water (DW) (amended in 2002) and compared the surface water results with the Canadian Council of Ministers of the Environment (CCME) guidelines for freshwater aquatic life (November 2008).

Table 3 summarizes the laboratory analytical results and compares the results with the applicable guidelines. Total metals results are usually compared to guidelines and standards for drinking water quality. However, due to the high turbidity of the groundwater samples, which was likely a result of a coarse well screen or insufficiently developed well, EBA believes that the total metals concentrations for the monitoring wells are not representative for the local groundwater. Dissolved metals concentrations were therefore used for comparison with CSR standards. Total and dissolved metal results of the Teslin Lake water were compared with the applicable CSR standards and CCME guidelines.

Copies of the laboratory reports are included in Appendix C.

6.4.1 Groundwater Quality

Based on the fall 2009 analytical results, the groundwater quality evaluation can be summarized as follows:

- Table 3 and Figure 3 (tri-linear plot) indicate that water chemistries from all three monitoring wells are similar (calcium-magnesium-bicarbonate type);
- Dissolved aluminum and dissolved iron in MW01 exceeded the CSR-DW standards;
- Dissolved iron, dissolved magnesium and dissolved manganese in MW02 exceeded the CSR-DW standards;
- Dissolved metal parameters that were analyzed for MW03 were all below the applicable CSR standards;
- The sulphate concentrations measured in all monitoring wells were below the CSR-AW and CSR-DW standards; however, the sulphate concentration of 181 mg/L in MW02 is considerably higher than that in the other two monitoring wells (19 mg/L in MW01 and 43.2 mg/L in MW03). The sulphate concentration in the sample collected at Teslin Lake was also lower, at 9.02 mg/L;
- The laboratory stated that the nitrate nitrogen and nitrite nitrogen analysis was performed after the recommended holding time of 3 days, which may result in unreliable data because nitrate and nitrite tend to convert back and forth over time. The nitrate nitrogen and nitrite nitrogen concentrations in the monitoring wells were all less the detection limit of 0.01 mg/L and well below the standards/guidelines;
- Extractable petroleum hydrocarbons EPHw10-19 in all monitoring wells were below the analytical detection limit of 0.1 mg/L (100 ug/L). EPHw19-32 concentration of 0.1 mg/L was detected in MW01 and MW02 but the EPHw19-32 concentration in MW03 was less than the detection limit of 0.1 mg/L. Currently, there are no guidelines within the CSR or the CCME for extractable petroleum hydrocarbons; and,
- The bacteriological samples from all monitoring wells were negative on both the total coliform and *E.Coli* results.

6.4.2 Surface Water Quality

Based on the fall 2009 analytical results, EBA observed the following:

- The water chemistry of Teslin Lake is distinctively different from the groundwater chemistry in that the total dissolved solids and the total alkalinity concentrations of the Teslin Lake water were much lower. Teslin Lake water is also softer and has a lower electrical conductance value;

- Although the water chemistries are different, the Teslin Lake water, based on the tri-linear plot (Figure 3), can also be characterized as a calcium-magnesium-bicarbonate type water;
- The Teslin Lake water quality meets the CCME guidelines for freshwater aquatic life for all chemical parameters analyzed;
- The extractable petroleum hydrocarbon concentrations (EPHw₁₀₋₁₉ and EPHw₁₉₋₃₂) of the Teslin Lake water were below the analytical detection limit of 0.1 mg/L; and,
- The bacteriological sample from the Teslin Lake was positive for total coliform bacteria but was negative for *E.Coli*.

7.0 CONCLUSIONS

The field work for the fall 2009 groundwater and surface monitoring and sampling program at the Teslin solid waste disposal site, was completed between November 13 and 15, 2009. Currently, the water sampling network includes three monitoring wells and Teslin Lake.

The following conclusions are made based on the findings of the fall 2009 preliminary hydrogeological assessment:

- Three monitoring wells MW01, MW02 and MW03 were installed in November 2008 in areas south of the main current solid waste disposal site to establish a groundwater monitoring network at the Site. All monitoring wells were completed in bedrock with a slotted section at the well bottom to allow groundwater entry;
- Monitoring wells MW01 and MW02 appear to be cross-gradient of the Site whereas MW03 may be downgradient; however, additional groundwater elevation data are necessary to identify potential seasonal changes and confirm the conceptual hydrogeological model;
- No monitoring or sampling were previously conducted at the wells prior to the fall 2009 field program;
- Groundwater elevations as of November 13, 2009 show that the flow of groundwater within the aquifer generally follows the local topography and the surface water flow regime. Preliminary conceptual hydrogeology indicates that the groundwater flow direction is inferred to be westerly towards Teslin Lake, under a horizontal hydraulic gradient of 0.04.m/m;
- Analysis of the rising head hydraulic response test results show that the geometric mean of the hydraulic conductivity of the bedrock is about 3×10^{-7} m/s;
- Waters from the three monitoring wells and Teslin Lake can all be characterized as calcium-magnesium-bicarbonate type waters; however, the magnesium concentrations in MW02 and MW03 are higher than that in MW01 and in the Lake;

- Concentrations of all the dissolved metal parameters analyzed in the monitoring wells were below the CSR-AW standards;
- Dissolved aluminum and dissolved iron in MW01 exceeded the CSR-DW standards;
- Dissolved iron, dissolved magnesium and dissolved manganese in MW02 exceeded the CSR-DW standards;
- Metal parameters that were analyzed for MW03 were below the CSR-DW standards;
- The Teslin Lake water quality met the applicable CSR and CCME standards/guidelines for all chemical parameters analyzed;
- Extractable petroleum hydrocarbon concentrations in all monitoring wells and Teslin Lake were below the analytical detection limit of 0.1 mg/L except for the 0.1 mg/L EPHw₁₉₋₃₂ concentrations detected in MW01 and MW02. Currently, there are no guidelines established for EPHw₁₉₋₃₂ (or for HEPHw);
- The nitrate nitrogen and nitrite nitrogen concentrations in the monitoring wells were all less the detection limit of 0.01 mg/L and well below the standards/guidelines. Nitrate and nitrite in Teslin Lake was 0.06 and 0.02 mg/L, respectively. However, the results may not be precise as the analysis was performed after the recommended holding time;
- The bacteriological samples from all monitoring wells showed negative results on the total coliform and *E.coli* whereas the sample from Teslin Lake indicate total coliform presence; and,
- There are insufficient water quality data to indicate any adverse effect on groundwater or surface water quality by the site operation.

8.0 RECOMMENDATIONS

The following recommendations are made based on the findings of the fall 2009 preliminary hydrogeological assessment:

- Future monitoring programs (semi-annual as per permit) should be completed during the spring freshet when the most significant groundwater recharge occurs.
- EBA did not observe any water course within the Site at the time of the fall 2009 field program. However, it is reported that there is an ephemeral creek present in the northern part of the site (near the site operator office), and the water flows northwesterly towards the ditch along the old Alaska Highway. The approximate location of the creek is shown on Figure 1. The creek becomes dry during the fall/winter months (per. comm. Mr. Rob Anderson, Village of Teslin). This creek should be included in the water quality monitoring network.
- It is our opinion that semi-annual sampling on Teslin Lake water is not necessary, given the lake is at least 2 km from the Site.

- At least two additional monitoring wells should be installed and surveyed to confirm groundwater flow direction and to provide a better water quality monitoring network. The rationale for installing two additional monitoring wells is provided below:
 1. MW01 can be considered as a cross-gradient well within the groundwater quality monitoring network. However, due to its distance (at least 100 m to the actual landfill area, this well may not provide reliable data on background groundwater quality in vicinity of the Site. Therefore, we recommend that one additional well be drilled in the open area east and upgradient of the Site, not too far from the seasonal creek.
 2. Construction waste, contaminated soils and waste steel, which are considered to be the major potential sources of contaminants at this Site, have been disposed in the southwestern part of the Site. One additional well should be drilled in the west side of the main landfill area to serve as a downgradient well to monitor potential groundwater quality changes, assuming groundwater flows westerly.
- The location of these new monitoring wells should be consulted with a hydrogeologist prior to site preparation and well installation;
- Future monitoring for extractable hydrocarbons should be completed as LEPHw to compare directly with CSR standards (rather than EPHw as indicated in the current permit); and,
- Due to the observed presence of hydrocarbons at low concentrations in groundwater samples obtained from MW01 and MW02, it is recommended that screening for additional organic parameters of concern be completed. These should include benzene, toluene, ethylbenzene and xylene (BTEX), as well as polycyclic aromatic hydrocarbons (PAHs). Decisions on whether this additional analytical should be continued should be based on the results of the next sampling event.

9.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the Village of Teslin and its agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the Village of Teslin, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Environmental Report - General Conditions provided in Appendix D of this report.

10.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Sincerely,
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REFERENCES

- EBA Engineering Consultants Ltd. Monitoring Well Installation – Solid Waste Disposal Site, Teslin, YT. January 2009.
- Environment Canada – Climate Normal Data – website.
- Canadian Council of Ministers of the Environment. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Last updated December 2007.
- Geological Survey of Canada. Mulligan, R., Geology, Teslin, Yukon Territory. Map 1125A. 1963.
- Geological Survey of Canada. Morrison, S.R. and Klassen, R.W., Surficial Geology, Teslin, Yukon Territory. Map 1891A. 1997.
- Yukon Environment. Solid Waste Disposal Facility Permit No. 80-004.
- Yukon Territory. Environment Act Contaminated Sites Regulation. O.I.C. 2002/171. Schedule 3 – Generic Numerical Water Standards for Protection of Freshwater Aquatic Life and Drinking Water.



TABLES



TABLE 1: GROUNDWATER ELEVATIONS AND MONITORING WELL DETAILS

Monitoring Well ID	Ground Surface Elevation ¹	Top of Protective Steel Casing Elevation ¹	Top of Piezometer Elevation ¹	Screen Interval ²			Lithology ²			Lithologic Description ²	Depth to Bottom ³	Depth to Water ³	November 13, 2009 Groundwater Elevation ⁴
				(m-bgs)			Depth (m-bgs)						
	(m-asl)	(m-asl)	(m-asl)	From		To	From		To		(m btoc)	(m btoc)	(m-asl)
MW01	806.99	807.72	807.58	4.20	-	10.5	0.00	-	0.20	ORGANICS, root materials	10.68	4.726	802.85
							0.20	-	1.00	SAND & GRAVEL, trace clay			
							1.00	-	10.5	BEDROCK.			
MW02	797.50	798.41	797.94	9.1	-	15.5	0.00	-	0.20	ORGANICS, root materials	14.79	5.750	792.19
							0.20	-	1.90	SAND, silty, trace gravel			
							1.90	-	12.2	SAND (TILL), gravelly, silty			
							12.2	-	15.5	BEDROCK.			
MW03	789.37	789.91	789.78	10.10	-	16.2	0.00	-	0.20	ORGANICS, root materials	16.26	0.802	788.98
							0.20	-	2.50	SAND, silty, trace gravel			
							2.50	-	9.60	SAND (TILL), silty, gravelly			
							9.60	-	16.2	BEDROCK.			

Notes:

1. Elevations were surveyed by Yukon Engineering Services on December 10, 2009. The elevations of the monitoring wells were relative to a geodetic benchmark at the Teslin Solid Waste Disposal Facility Site. "m-asl" indicates metres above sea level.
2. Screen intervals and subsurface conditions were obtained from the EBA Teslin Landfill monitoring well installation report (January, 2009).
"m-bgs" indicates metre below ground surface.
3. Depth to bottom and depth to water data were measured on November 13, 2009 by Carol Ma of EBA. "m btoc" indicates metres below top of piezometer.
4. Groundwater elevation at each monitoring well was calculated by subtracting "Depth to Water" by "Top of Piezometer Elevation."

TABLE 2: ESTIMATED HYDRAULIC CONDUCTIVITY VALUES

Monitoring Well ID	Lefranc Estimate #1 (m/s)		Lefranc Estimate #2 (m/s)		Hydrogeological Unit	Geomean Hydraulic Conductivity (m/s)
	manual data	logger data	manual data	logger data		
MW01	4.35E-05	N/A	1.39E-07	N/A	Bedrock.	3.40E-07
MW02	2.07E-07	2.72E-08	8.27E-08	8.94E-08	Till/Bedrock.	
MW03	5.25E-07	2.15E-07	3.77E-07	1.94E-06	Till/Bedrock.	

Notes:

1. N/A indicates logger data not available to analyze due to logger malfunction.
2. Rising head hydraulic response test data and plots are included in Appendix C.

TABLE 3: ANALYTICAL RESULTS - TESLIN LANDFILL MONITORING WELLS AND TESLIN LAKE

Sample ID	MW01	MW02	MW03	Teslin Lake	Applicable Standards		
Source	Groundwater	Groundwater	Groundwater	Surface Water	YT CSR-AW ^A	YT CSR-DW ^B	Canadian Council of Ministers of the Environment (CCME) Guidelines for Freshwater Aquatic Life ^C
Location	cross-gradient	cross-gradient	downgradient	downgradient			
Date Sampled	15-Nov-09	15-Nov-09	15-Nov-09	15-Nov-09			
Time Sampled	12:10	12:25	11:35	13:30			
Exova Lot ID	713641-1	713641-2	713641-3	713641-4			
Physical Tests							
Temperature (in field)	7.3	3.4	5.8	4.4	NS	NS	NG
Total Dissolved Solids (in lab)	278	687	319	92	NS	NS	NG
Total Dissolved Solids (in field)	287	752	354	116	NS	NS	NG
Hardness CaCO3	244	575	290	78	NS	NS	NG
pH (in lab)	7.53	8.06	8.06	7.86	NS	NS	6.5 - 9.0 ^C
pH (in field)	7.41	8.18	7.99	8.31	NS	NS	6.5 - 9.0 ^C
Conductivity (in lab)	445	1050	545	158	NS	NS	NG
Conductivity (in field)	410	1089	541	166	NS	NS	NG
Turbidity (in lab)	480	62	3.7	0.7	NS	NS	NG
Turbidity (in field)	too turbid	too turbid	5.11	26.6	NS	NS	NG
Total Suspended Solids	3390	216000	8	<2	NS	NS	see note C
Dissolved Organic Carbon	7.5	3.9	3.2	3.7	NS	NS	NG
Anions							
Alkalinity-Total	224	457	254	72	NS	NS	NG
Alkalinity-Bicarbonate	270	560	310	90	NS	NS	NG
Alkalinity-Carbonate	<6	<6	<6	<6	NS	NS	NG
Alkalinity-Hydroxide	<5	<5	<5	<5	NS	NS	NG
Chloride, Cl	0.37	0.7	0.73	0.33	1500	250	NG
Fluoride, F	0.19	0.35	0.34	0.14	2.0 - 3.0	1.5	NG
Sulphate, SO4	19	181	43.2	9.02	1000	500	NG
Nutrients							
Ammonia Nitrogen, NH3-N	<0.01	0.58	0.18	0.09	1.3 - 18.4	NS	0.82 (see note C)
Nitrate Nitrogen, NO3-N	<0.01	<0.01	<0.01	0.06	400	10	NG
Nitrite Nitrogen, NO2-N	<0.01	<0.01	<0.01	0.02	0.2 - 2.0	3.2	0.06
Total Phosphorous, P	0.08	0.03	0.01	0.01	NS	NS	NG
Total Metals							
Antimony, T-Sb	<0.001	0.006	<0.0002	<0.0002	NA	NA	NG
Arsenic, T-As	0.0063	0.284	0.0074	0.0007	NA	NA	0.05
Barium, T-Ba	2.78	5.93	0.072	0.034	NA	NA	NG
Beryllium, T-Be	0.0042	0.0052	<0.00004	<0.00004	NA	NA	NG
Bismuth, T-Bi	<0.005	<0.005	<0.001	<0.001	NA	NA	NG
Boron, T-B	<0.02	0.052	0.016	<0.005	NA	NA	NG
Cadmium, T-Cd	0.00112	0.00836	0.00002	<0.00001	NA	NA	0.00027
Chromium, T-Cr	0.0772	0.327	0.007	<0.0004	NA	NA	0.002 - 0.02
Cobalt, T-Co	0.111	0.176	0.00022	0.00005	NA	NA	NG
Copper, T-Cu	0.38	1.06	<0.001	<0.001	NA	NA	0.002
Iron, T-Fe	225.5	332.5	0.88	0.299	NA	NA	0.3
Lead, T-Pb	0.027	0.0812	0.0003	0.0002	NA	NA	0.002
Lithium, T-Li	0.072	0.097	0.001	0.002	NA	NA	NG
Manganese, T-Mn	3.92	15.1	0.043	0.015	NA	NA	NG
Mercury T-Hg	0.06	0.02	<0.01	<0.01	NA	NA	0.0001
Molybdenum, T-Mo	0.0082	0.0719	0.0115	0.0008	NA	NA	NG
Nickel, T-Ni	0.059	0.926	0.002	0.001	NA	NA	0.065
Selenium, T-Se	<0.003	0.0518	<0.0006	<0.0006	NA	NA	0.001
Silver, T-Ag	0.00068	0.00656	<0.00001	<0.00001	NA	NA	0.0001
Strontium, T-Sr	1.07	1.76	0.488	0.081	NA	NA	NG
Sulfur, T-S	11	172	15.7	3.4	NA	NA	NG
Thallium, T-Tl	0.00064	0.00264	<0.00001	<0.00001	NA	NA	NG
Tin, T-Sn	0.002	0.003	0.0009	<0.0001	NA	NA	NG
Titanium, T-Ti	13.4	6.01	<0.001	<0.0010	NA	NA	NG
Uranium, T-U	<0.002	0.017	0.0032	0.0007	NA	NA	NG
Vanadium, T-V	0.784	0.543	0.0007	0.0002	NA	NA	NG
Zinc, T-Zn	0.46	1.66	0.009	0.011	NA	NA	0.03
Zirconium, T-Zr	0.003	0.011	0.0005	0.0003	NA	NA	NG

TABLE 3: ANALYTICAL RESULTS - TESLIN LANDFILL MONITORING WELLS AND TESLIN LAKE

Sample ID	MW01	MW02	MW03	Teslin Lake	Applicable Standards		
Source	Groundwater	Groundwater	Groundwater	Surface Water			
Location	cross-gradient	cross-gradient	downgradient	downgradient	YT CSR-AW ^A	YT CSR-DW ^B	Canadian Council of Ministers of the Environment (CCME) Guidelines for Freshwater Aquatic Life ^C
Date Sampled	15-Nov-09	15-Nov-09	15-Nov-09	15-Nov-09			
Time Sampled	12:10	12:25	11:35	13:30			
Exova Lot ID	713641-1	713641-2	713641-3	713641-4			
Dissolved Metals							
Aluminum, D-Al	1.06 ^B	0.098	<0.005	0.011	5	0.2	0.1
Antimony, D-Sb	0.0006	0.0038	0.0005	0.0006	0.2	0.006	NG
Arsenic, D-As	0.0004	0.0086	0.0080	0.0006	0.05	0.025	0.05
Barium, D-Ba	0.084	0.032	0.068	0.034	10	1	NG
Beryllium, D-Be	0.00005	<0.00004	<0.00004	<0.00004	0.053	NS	NG
Bismuth, D-Bi	<0.001	<0.001	<0.001	<0.001	NS	NS	NG
Boron, D-B	<0.004	0.054	0.018	<0.004	50	5	NG
Cadmium, D-Cd	0.00004	0.00005	0.00004	0.00003	0.0001 - 0.0006	0.005	0.00027
Calcium, D-Ca	82.5	54.8	39.2	21.9	NS	NS	NG
Chromium, D-Cr	0.0012	0.0017	0.0012	<0.0004	0.01	0.05	0.002 - 0.02
Cobalt, D-Co	0.00093	0.00031	0.00008	0.00008	0.009	NS	NG
Copper, D-Cu	0.006	<0.001	0.002	0.001	0.02 - 0.09	1	0.002
Iron, D-Fe	1.32 ^B	0.72 ^B	0.22	0.03	NS	0.3	0.3
Lead, D-Pb	0.001	0.0004	0.0009	0.0014	0.04 - 0.16	0.01	0.002
Lithium, D-Li	0.003	0.006	<0.001	<0.001	NS	NS	NG
Magnesium, D-Mg	9.2	106 ^B	46.6	5.7	NS	100	NG
Manganese, D-Mn	0.0248	0.101 ^B	0.0343	0.0054	NS	0.05	NG
Molybdenum, D-Mo	0.0044	0.0364	0.0114	0.0008	10	0.25	NG
Nickel, D-Ni	0.002	0.007	0.002	0.001	0.25 - 1.5	NS	0.065
Phosphorous, D-P	0.08	0.03	0.01	0.01	NS	NS	NG
Potassium, D-K	5.1	4.1	2.3	0.3	NS	NS	NG
Selenium, D-Se	<0.0006	<0.0006	<0.0006	<0.0006	0.01	0.01	0.001
Silicon, D-Si	7.84	5.82	5.99	3.5	NS	NS	NG
Silver, D-Ag	<0.00001	<0.00001	<0.00001	<0.00001	0.0005 - 0.015	NS	0.0001
Sodium, D-Na	6.1	49.6	18.6	2.2	NS	200	NG
Strontium, D-Sr	0.194	0.470	0.484	0.077	NS	NS	NG
Sulfur, D-S	7.6	59.4	15.5	3.1	NS	NS	NG
Thallium, D-Tl	0.00001	<0.00001	<0.00001	<0.00001	0.003	NS	NG
Tellurium, D-Te	<0.0001	<0.0001	<0.0001	<0.0001	NS	NS	NG
Thorium, D-Th	<0.0004	<0.0004	<0.0004	<0.0004	NS	NS	NG
Tin, D-Sn	0.0005	0.0003	0.0001	<0.0001	NS	NS	NG
Titanium, D-Ti	0.068	<0.01	<0.01	<0.01	1	NS	NG
Uranium, D-U	<0.0004	0.0016	0.0031	0.0007	3	0.1	NG
Vanadium, D-V	0.0056	0.0011	0.0003	0.0003	NS	NS	NG
Zinc, D-Zn	0.009	0.003	0.006	0.003	0.15 - 2.4	5	0.03
Zirconium, D-Zr	0.0005	0.0003	<0.0001	<0.0001	NS	NS	NG
Extractable Petroleum Hydrocarbons							
EPHw10-19	<0.1	<0.1	<0.1	<0.1	5	5	NG
EPHw19-32	0.1	0.1	<0.1	<0.1	NS	NS	NG
Bacteriological Tests							
Total Coliforms	absent	absent	absent	present	NS	NS	NG
E. Coli	absent	absent	absent	absent	NS	NS	NG

Notes:

- A) Yukon Territory (YT) Environmental Act Contaminated Sites Regulation (CSR) (OIC 2002/171) Schedule 3 (Generic Numerical Water Standards) for Protection of Freshwater Aquatic Life (AW).
- Where range of values is shown, the standard is dependent on pH, hardness or chloride concentration.
- B) YT CSR Schedule 3 (Generic Numerical Water Standards) for Protection of Drinking Water (DW).
- C) Canadian Council of Ministers of the Environment (CCME) guidelines for freshwater aquatic life (November 2008).
- Guideline for total suspended solids (TSS) - less than 10 mg/L if the background TTS is less than or equal to 100 mg/L or less than 10% increase of the background TSS.
 - Guideline for ammonia nitrogen depends on pH and temperature of the water sample.

Results are in milligrams per litre except for temperature (°C), pH, turbidity (NTU) and bacteriological analytical result (CFU/100 mL).

< indicates "less than the detection limit indicated".

NS indicates "No Standard". NG indicates "No Guideline".

NA indicates not applicable. Total metals and dissolved metals results of the Teslin Lake water were compared to CCME guidelines for freshwater aquatic life.

Bold ^{A, B, or C}

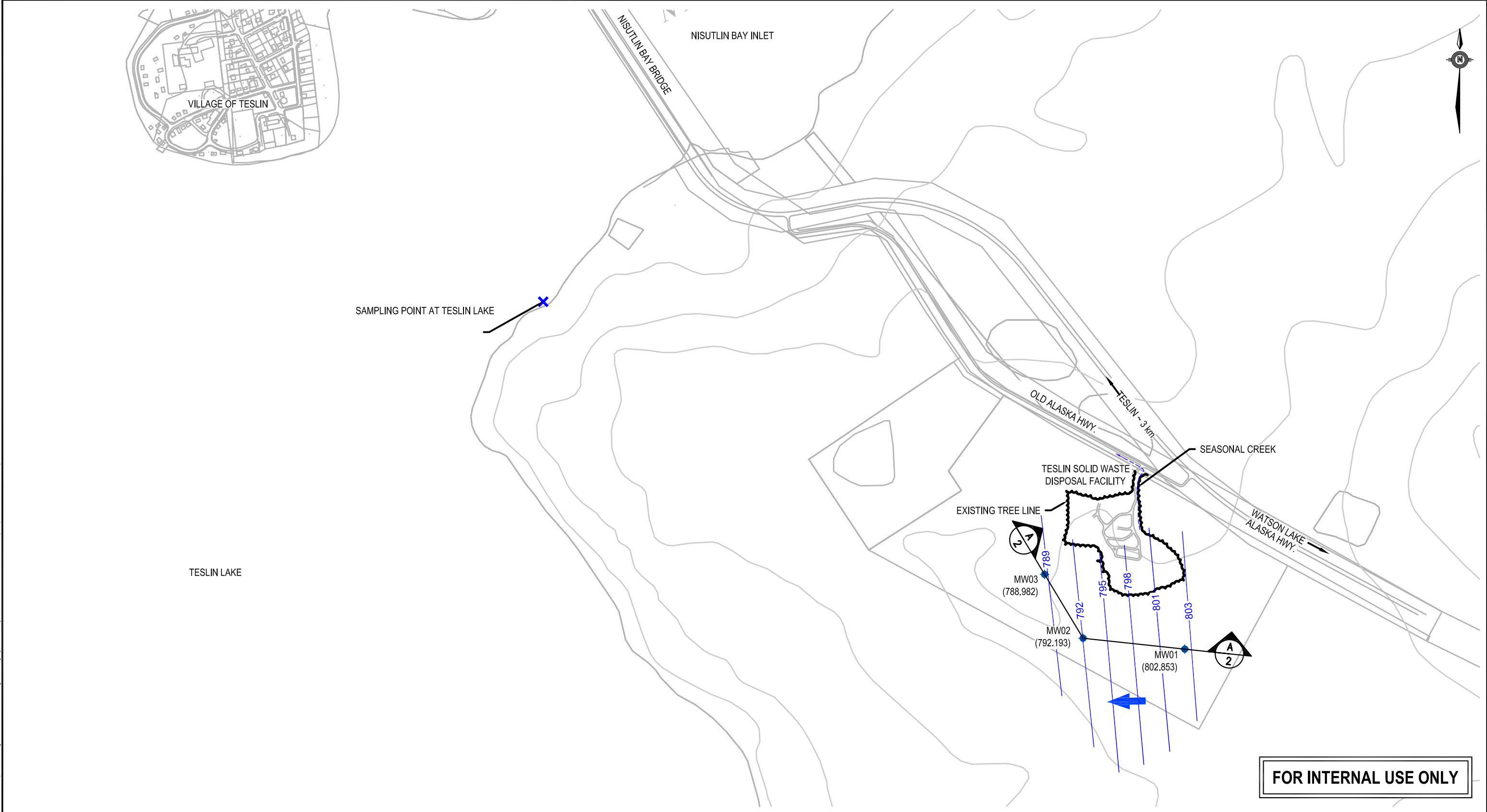
indicates concentration exceeding the applicable standards.



FIGURES



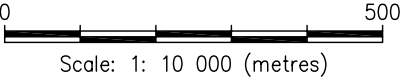
Q:\WhitehorseData\0201 drawings\Teslin\W23101303 Teslin Dump Monitoring Wells\W23101303 Figures.dwg [FIGURE 1] December 21, 2009 - 3:09:07 pm (BY: KEN TOMCZYK)



FOR INTERNAL USE ONLY

LEGEND

- MONITORING WELL LOCATION W/ GROUNDWATER ELEV. AS OF NOVEMBER 13, 2009.
- ✕ TESLIN LAKE WATER SAMPLING LOCATION
- ➡ INFERRED GROUNDWATER FLOW DIRECTION
- 795 GROUNDWATER EQUIPOTENTIAL CONTOUR



CLIENT

Village of Teslin

EBA Engineering
Consultants Ltd.



2009 GROUNDWATER MONITORING PROGRAM
SOLID WASTE DISPOSAL FACILITY, TESLIN, YT

SITE PLAN SHOWING MONITORING WELL LOCATIONS,
GROUNDWATER ELEVATIONS, INFERRED GROUNDWATER
FLOW DIRECTION, AND CROSS-SECTION TRANSECT

PROJECT NO.
W23101303

OFFICE
WHSE

DWN
KJT

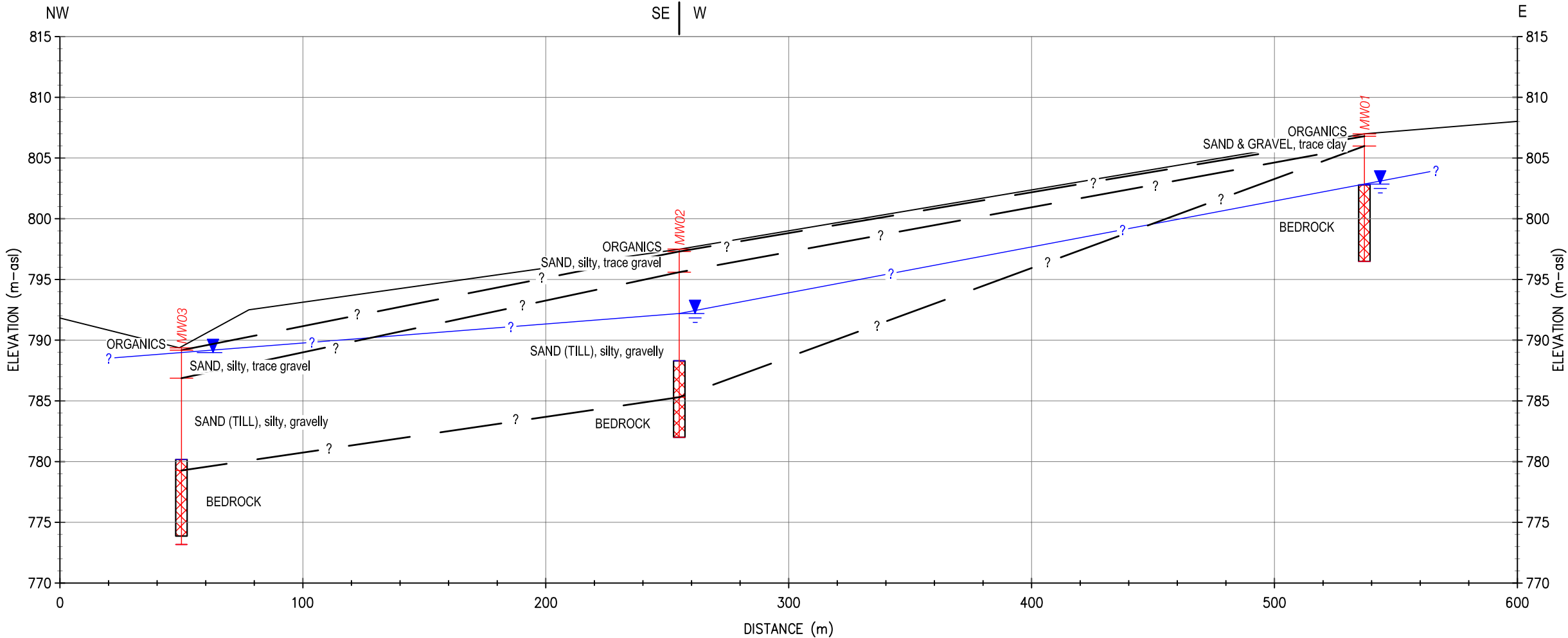
CKD
CM

REV
0

DATE
December 16, 2009

Figure 1

Q:\Whitehorse\Data\0201 drawings\Teslin\W23101303_Teslin Dump Monitoring Wells\W23101303_Figures.dwg [FIGURE 2] December 21, 2009 - 9:24:32 am (BY: KEN TOMCZYK)



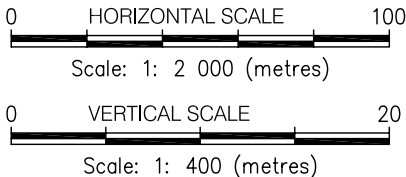
A
1 SECTION A
SCALE H 1:2,000 V 1:400

- Notes:
- 1. Soil descriptions were interpreted by EBA staff in November, 2008 during monitoring well installation.
 - 2. Information has been interpolated between well locations and conditions may vary between sites.
 - 3. Well elevations were surveyed by Yukon Engineering Services on December 10, 2009.
 - 4. m-asl indicates metres above sea level.

FOR INTERNAL USE ONLY

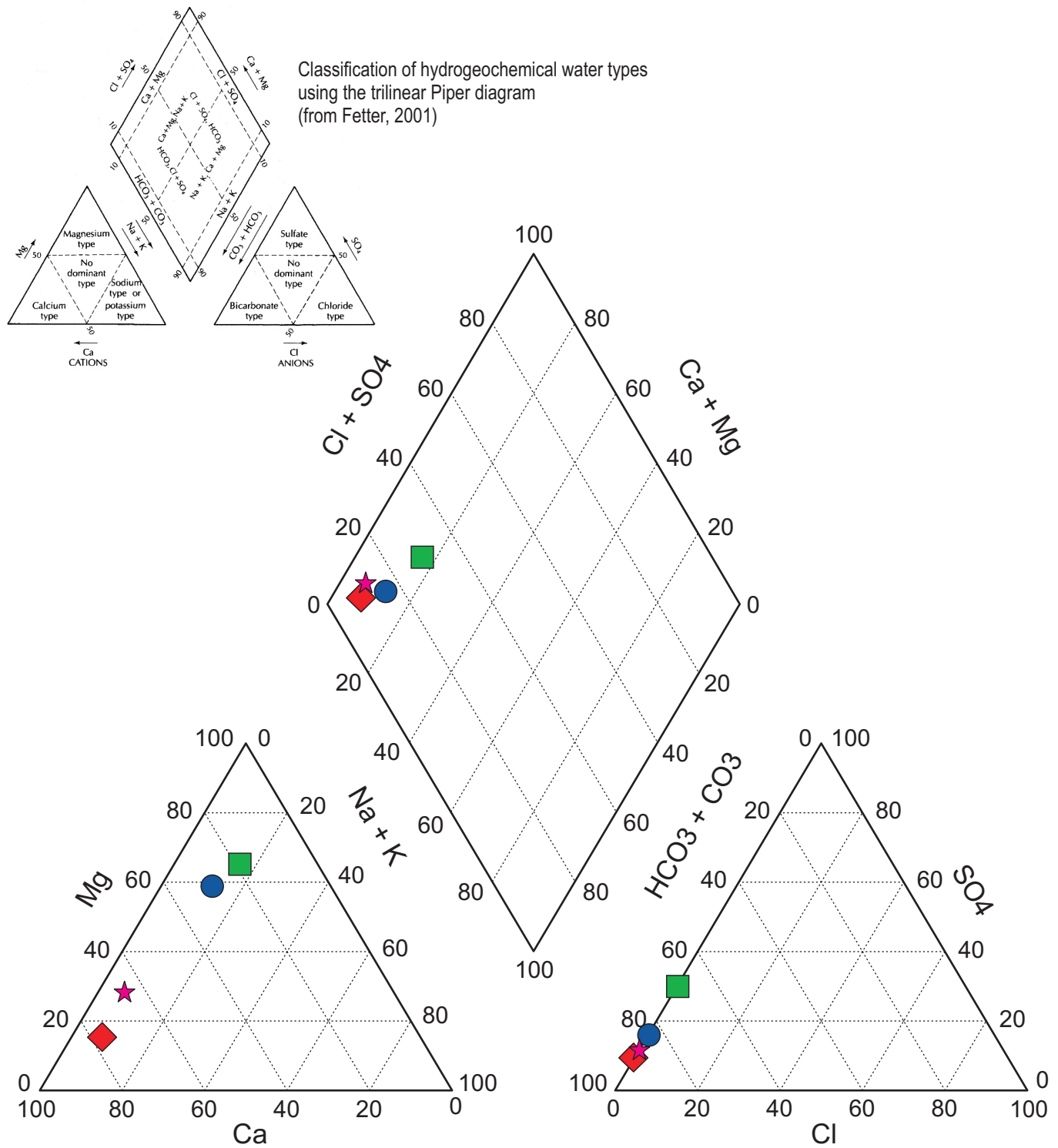
LEGEND

- Static Water Level
- Screen Interval



CLIENT		2009 GROUNDWATER MONITORING PROGRAM SOLID WASTE DISPOSAL FACILITY, TESLIN, YT				
Village of Teslin		CROSS-SECTION A				
EBA Engineering Consultants Ltd. 	PROJECT NO. W23101303	DWN KJT	CKD CM	REV 0	Figure 2	
	OFFICE WHSE	DATE December 16, 2009				

Classification of hydrogeochemical water types using the trilinear Piper diagram (from Fetter, 2001)



LEGEND

- ◆ MW01
- MW02
- MW03
- ★ Teslin Lake

CLIENT

Village of Teslin

EBA Engineering
Consultants Ltd.



2009 GROUNDWATER MONITORING PROGRAM
SOLID WASTE DISPOSAL FACILITY, TESLIN, YT

Piper Diagram

PROJECT NO.
W23101303

OFFICE
EBA-WHSE

DWN
SK

CKD
CM

REV
1

DATE
December 2009

Figure 3



APPENDIX A

APPENDIX A MONITORING WELL LOGS



Groundwater Monitoring Wells		CLIENT: Village of Teslin		PROJECT NO. - BOREHOLE NO.			
Solid Waste Facility		DRILL: Prospector Air Rotary		W23101303 Monitoring Well: MW01			
Teslin, YT							
SAMPLE TYPE DISTURBED NO RECOVERY SPT A-CASING SHELBY TUBE CORE							
BACKFILL TYPE BENTONITE PEA GRAVEL SLOUGH GROUT DRILL CUTTINGS SAND							
Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	MOISTURE CONTENT	STANDARD PENETRATION (N)		Slotted Piezometer	Depth (ft)
				PLASTIC M.C. LIQUID			
0	ORGANIC ROOT MATERIAL						0
	SAND AND GRAVEL - trace clay						
1	BEDROCK @ 1.0 m						5
2							10
3							15
4							20
5	- water encountered @ 4.9 m						25
6							30
7							35
8							40
9							45
10							50
11	END OF WELL @ 10.5 m						55
12							56
13							
14							
15							
16							
17							

EBA Engineering Consultants Ltd.
 GEOTECHNICAL W23101303.GPJ EBA.GDT 09/12/17

LOGGED BY: RC

REVIEWED BY: JRT

DRAWING NO:

COMPLETION DEPTH: 10.5m

COMPLETE: 11/22/2008

Page 1 of 1

Groundwater Monitoring Wells		CLIENT: Village of Teslin		PROJECT NO. - BOREHOLE NO.	
Solid Waste Facility		DRILL: Prospector Air Rotary		W23101303 Monitoring Well: MW02	
Teslin, YT					
SAMPLE TYPE DISTURBED NO RECOVERY SPT A-CASING SHELBY TUBE CORE					
BACKFILL TYPE BENTONITE PEA GRAVEL SLOUGH GROUT DRILL CUTTINGS SAND					
Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT	STANDARD PENETRATION (N)
					UNCONFINED (kPa) POCKET PEN. (kPa)
					PLASTIC M.C. LIQUID 20 40 60 80
0	ORGANIC ROOT MATERIAL				
1	SAND - silty, trace gravel, well graded sand, fine to medium grained gravel - becomes gravelly around 0.2 m, trace silt below		1		
2	SAND (TILL) - gravelly, silty				
3			2		
4					
5					
6					
7					
8					
9					
10					
11			3		
12	- water encountered @ 12.2 m (?) BEDROCK @ 12.2 m				
13					
14					
15	END OF WELL @ 15.5 m				
16	NOTE: Water originally encountered at 16.8 m, drilled to 30 m, then backfilled to 15.5 m				
17					

Groundwater Monitoring Wells		CLIENT: Village of Teslin		PROJECT NO. - BOREHOLE NO.	
Solid Waste Facility		DRILL: Prospector Air Rotary		W23101303 Monitoring Well: MW03	
Teslin, YT					
SAMPLE TYPE DISTURBED NO RECOVERY SPT		 A-CASING SHELBY TUBE CORE			
BACKFILL TYPE BENTONITE PEA GRAVEL SLOUGH		 GROUT DRILL CUTTINGS SAND			

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT	<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> PLASTIC M.C. LIQUID <div style="border-top: 1px solid black; width: 100%; position: relative;"> 20 40 60 80 </div> </div> <div> STANDARD PENETRATION (N) <div style="border-top: 1px solid black; width: 100%; position: relative;"> 20 40 60 80 </div> </div> </div> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> ◆ UNCONFINED (kPa) ◆ 50 100 150 200 </div> <div> ▲ POCKET PEN. (kPa) ▲ 100 200 300 400 </div> </div>	Slotted Piezometer <div style="border: 1px solid black; width: 100%; height: 100%; position: relative;"> <div style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> </div>	Depth (ft)
0	ORGANIC ROOT MATERIAL SAND - silty, trace gravel		1				0
1							5
2							10
3	SAND (TILL) - silty, gravelly						15
4							20
5							25
6							30
7			2				35
8							40
9							45
10	BEDROCK @ 9.6 m						50
11							55
12							60
13	- water encountered @ 12.8 m						65
14							70
15							75
16	END OF WELL @ 16.2 m						80
17							85

EBA Engineering Consultants Ltd.
 GEOTECHNICAL W23101303.GPJ EBA.GDT 09/12/17

LOGGED BY: RC	COMPLETION DEPTH: 16.2m
REVIEWED BY: JRT	COMPLETE: 11/21/2008
DRAWING NO:	Page 1 of 1



APPENDIX B

APPENDIX B RISING HEAD HYDRAULIC RESPONSE TEST DATA AND ANALYSIS



Solid Waste Disposal Facility - Teslin, YT

Project No: W23101303

Site - Piezometer No. MW03

Monitoring Zone

From: 4.20 m **Length:** 630 cm

To: 10.50 m

Piezometer diameter (pipe): 5.08 cm

Borehole diameter (drilled): 15.2 cm

Static level (m): 0.802 0.802 0.802

Elapsed Time (sec)	Elapsed Time (min)	DTW (m)	DTP (m)	POT. (m)	Potential Column (cm)	Increment (min)	Increment (sec)	Delta t (min)	delta h (cm)	h avg (cm)	dh/dt (cm/min)	H real (cm)	ln(Hr/Hi)
0	0.000	1.302	1.302	1.302	50.00								
12	0.200	1.293	1.293	1.293	49.10	0.20	12	0.4	-0.90	49.55	2.25	45.55	-2.62
30	0.500	1.229	1.229	1.229	42.70	0.30	18	0.6	-6.40	45.90	10.7	41.90	-2.70
47	0.783	1.208	1.208	1.208	40.60	0.28	17	0.6	-2.10	41.65	3.71	37.65	-2.81
60	1.000	1.185	1.185	1.185	38.30	0.22	13	0.4	-2.30	39.45	5.31	35.45	-2.87
80	1.333	1.164	1.164	1.164	36.20	0.33	20	0.7	-2.10	37.25	3.15	33.25	-2.94
92	1.533	1.148	1.148	1.148	34.60	0.20	12	0.4	-1.60	35.40	4.00	31.40	-2.99
118	1.967	1.131	1.131	1.131	32.90	0.43	26	0.9	-1.70	33.75	1.96	29.75	-3.05
131	2.183	1.111	1.111	1.111	30.90	0.22	13	0.4	-2.00	31.90	4.62	27.90	-3.11
156	2.600	1.094	1.094	1.094	29.20	0.42	25	0.8	-1.70	30.05	2.04	26.05	-3.18
195	3.250	1.064	1.064	1.064	26.20	0.65	39	1.3	-3.00	27.70	2.31	23.70	-3.27
221	3.683	1.048	1.048	1.048	24.60	0.43	26	0.9	-1.60	25.40	1.85	21.40	-3.38
250	4.167	1.034	1.034	1.034	23.20	0.48	29	1.0	-1.40	23.90	1.45	19.90	-3.45
264	4.400	1.028	1.028	1.028	22.60	0.23	14	0.5	-0.60	22.90	1.29	18.90	-3.50
285	4.750	1.011	1.011	1.011	20.90	0.35	21	0.7	-1.70	21.75	2.43	17.75	-3.56
311	5.183	1.006	1.006	1.006	20.40	0.43	26	0.9	-0.50	20.65	0.58	16.65	-3.63
341	5.683	0.991	0.991	0.991	18.90	0.50	30	1.0	-1.50	19.65	1.50	15.65	-3.69
408	6.800	0.971	0.971	0.971	16.90	1.12	67	2.2	-2.00	17.90	0.90	13.90	-3.81
433	7.217	0.960	0.930	0.936	13.40	0.42	25	0.8	-3.50	15.15	4.20	11.15	-4.03
485	8.083	0.949	0.949	0.949	14.70	0.87	52	1.7	1.30	14.05	-0.75	10.05	-4.13
528	8.800	0.938	0.938	0.938	13.60	0.72	43	1.4	-1.10	14.15	0.77	10.15	-4.12
567	9.450	0.93	0.93	0.930	12.80	0.65	39	1.3	-0.80	13.20	0.62	9.200	-4.22
634	10.57	0.921	0.921	0.921	11.90	1.12	67	2.2	-0.90	12.35	0.40	8.350	-4.32
674	11.23	0.915	0.915	0.915	11.30	0.67	40	1.3	-0.60	11.60	0.45	7.600	-4.41
743	12.38	0.904	0.904	0.904	10.20	1.15	69	2.3	-1.10	10.75	0.48	6.750	-4.53
802	13.37	0.896	0.896	0.896	9.400	0.98	59	2.0	-0.80	9.800	0.41	5.800	-4.68
829	13.82	0.893	0.893	0.893	9.100	0.45	27	0.9	-0.30	9.250	0.33	5.250	-4.78
855	14.25	0.894	0.894	0.894	9.200	0.43	26	0.9	0.10	9.150	-0.12	5.150	-4.80
944	15.73	0.884	0.884	0.884	8.200	1.48	89	3.0	-1.00	8.700	0.34	4.700	-4.89
1195	19.92	0.870	0.870	0.870	6.800	4.18	251	8.4	-1.40	7.500	0.17	3.500	-5.19
1379	22.98	0.862	0.862	0.862	6.000	3.07	184	6.1	-0.80	6.400	0.13	2.400	-5.56
1702	28.37	0.852	0.852	0.852	5.000	5.38	323	10.8	-1.00	5.500	0.09	1.500	-6.03
2322	38.70	0.842	0.842	0.842	4.000	10.33	620	20.7	-1.00	4.500	0.05	0.500	-7.13

First Hydr. Cond. Asst:
(see graph hvsdhdt)

slope (p) = 7.18 cm/(cm/min)
S = 20.27 cm²
C = 896.06 cm
K = 5.25E-07 m/s

Elapsed Time (sec)	Elapsed Time (min)	DTW (m)	DTP (m)	POT. (m)	Potentio. Column (cm)	Increment (min)	Increment (sec)	Delta t (min)	delta h (cm)	h avg (cm)	dh/dt (cm/min)	H real (cm)	ln(Hr/Hi)
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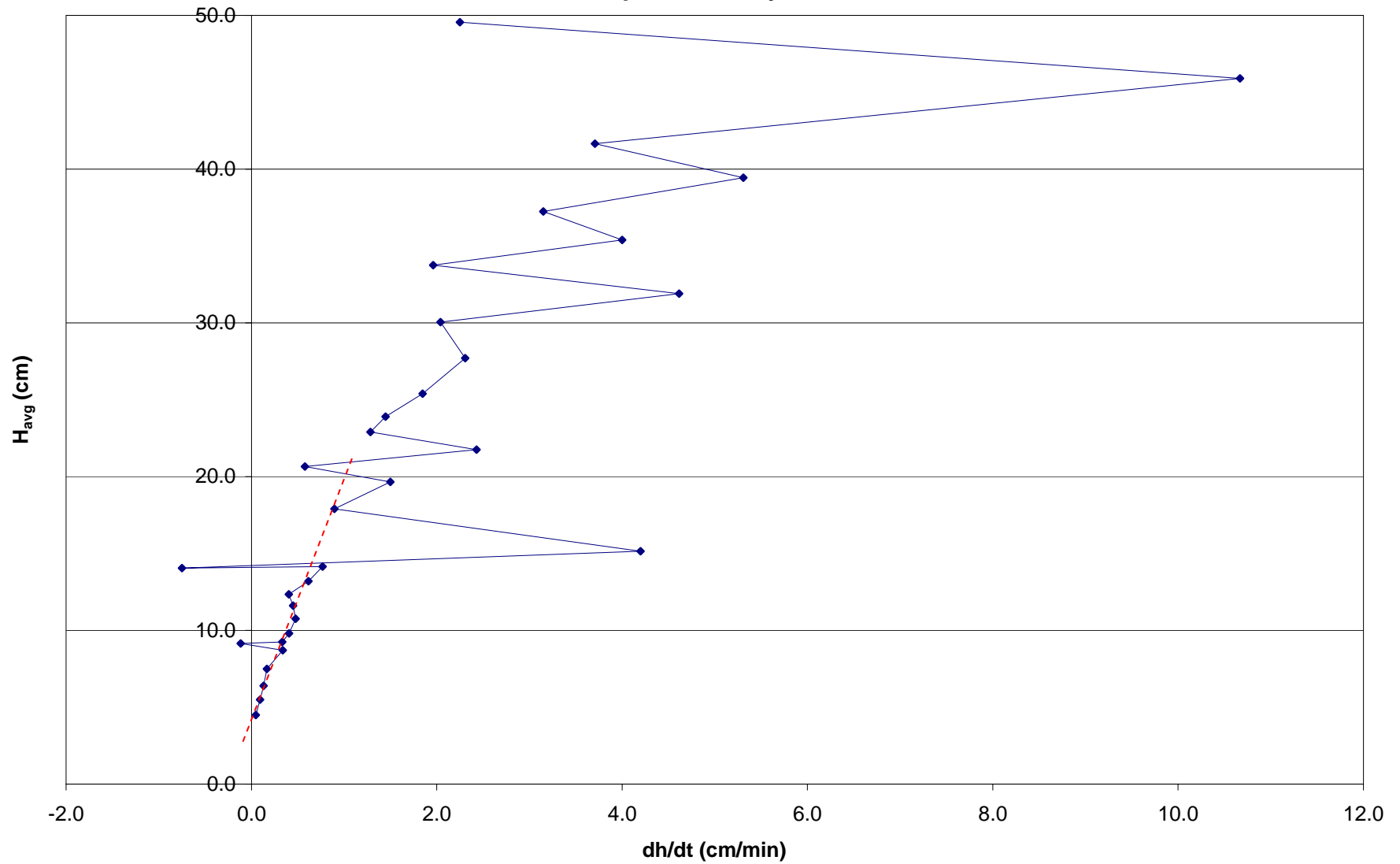
Assuming a piezometric error of H0 =

4.0 cm

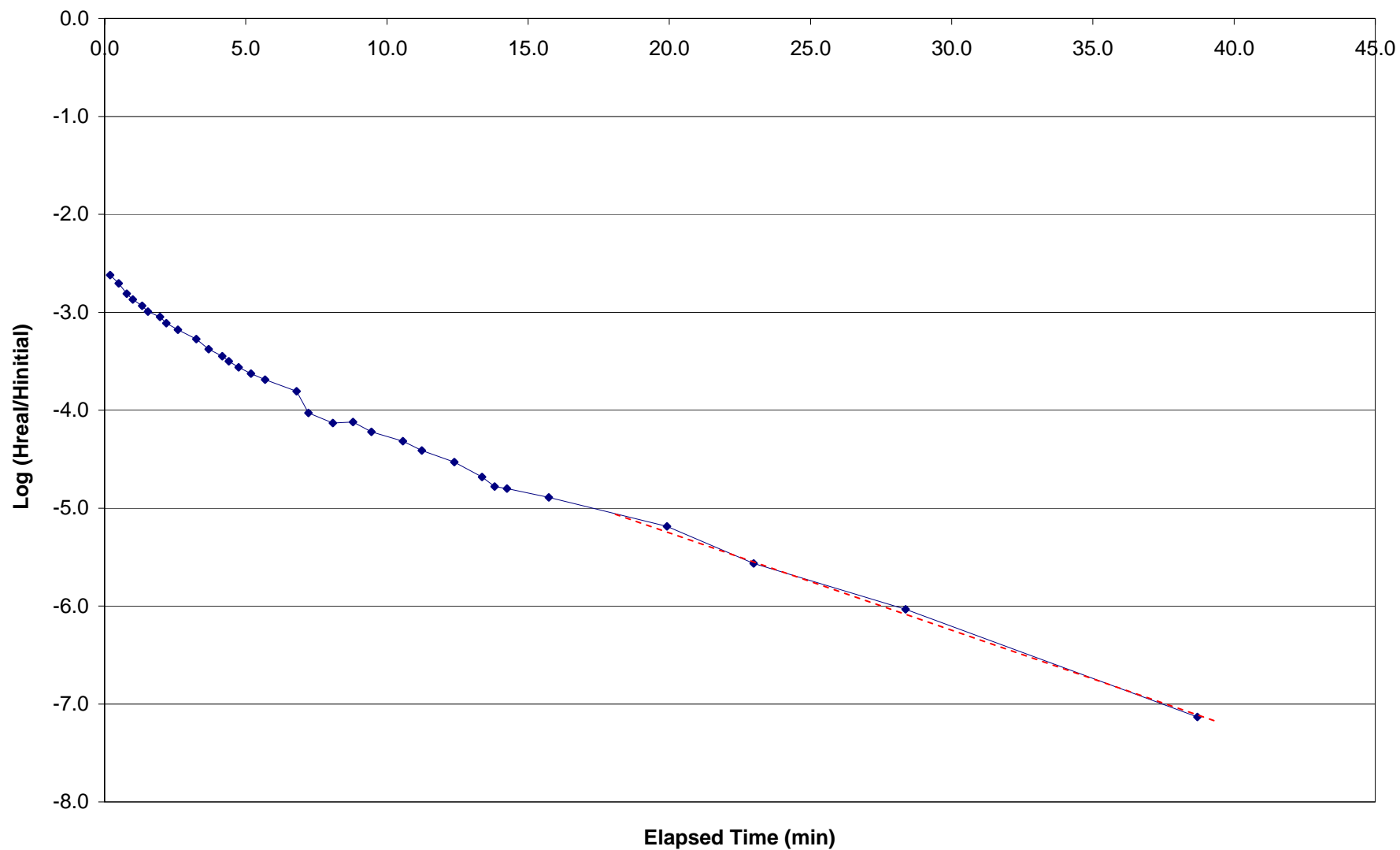
Second Hydr. Cond. Asst.:
(see graph lnhr/hi)

slope (p) = 0.10 cm/(cm/min)
S = 20.27 cm²
C = 896.06 cm
K = 3.77E-07 m/s

Rising Head Permeability Test - MW03
Solid Waste Disposal Facility, Teslin, YT



Rising Head Permeability Test - MW03
Solid Waste Disposal Facility, Teslin, YT



Solid Waste Disposal Facility - Teslin, YT

Project No: W23101303

Site - Piezometer No. MW02

Monitoring Zone

From: 9.10 m **Length:** 640 cm

To: 15.50 m

Piezometer diameter (pipe): 5.08 cm

Borehole diameter (drilled): 15.2 cm

Static level (m): 5.750 5.750 5.750

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potentio. Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
0	0.00	6.312	6.312	6.312	56.20								
1	0.02	6.304	6.304	6.304	55.40	0.02	1.0	0.0	-0.80	55.80	24.00	8.65	-4.23
2	0.03	6.295	6.295	6.295	54.50	0.02	1.0	0.0	-0.90	54.95	27.00	7.80	-4.33
3	0.05	6.297	6.297	6.297	54.70	0.02	1.0	0.0	0.20	54.60	-6.00	7.45	-4.38
4	0.07	6.300	6.300	6.300	55.00	0.02	1.0	0.0	0.30	54.85	-9.00	7.70	-4.34
5	0.08	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.60	54.70	18.00	7.55	-4.36
6	0.10	6.299	6.299	6.299	54.90	0.02	1.0	0.0	0.50	54.65	-15.00	7.50	-4.37
7	0.12	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.50	54.65	15.00	7.50	-4.37
8	0.13	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.20	54.50	-6.00	7.35	-4.39
9	0.15	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
10	0.17	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
11	0.18	6.295	6.295	6.295	54.50	0.02	1.0	0.0	-0.10	54.55	3.00	7.40	-4.38
12	0.20	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.10	54.55	-3.00	7.40	-4.38
13	0.22	6.289	6.289	6.289	53.90	0.02	1.0	0.0	-0.70	54.25	21.00	7.10	-4.42
14	0.23	6.286	6.286	6.286	53.60	0.02	1.0	0.0	-0.30	53.75	9.00	6.60	-4.50
15	0.25	6.288	6.288	6.288	53.80	0.02	1.0	0.0	0.20	53.70	-6.00	6.55	-4.51
16	0.27	6.290	6.290	6.290	54.00	0.02	1.0	0.0	0.20	53.90	-6.00	6.75	-4.48
17	0.28	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.50	54.25	-15.00	7.10	-4.42
18	0.30	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.00	54.50	0.00	7.35	-4.39
19	0.32	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.10	54.55	-3.00	7.40	-4.38
20	0.33	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
21	0.35	6.295	6.295	6.295	54.50	0.02	1.0	0.0	-0.10	54.55	3.00	7.40	-4.38
22	0.37	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.10	54.55	-3.00	7.40	-4.38
23	0.38	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
24	0.40	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
25	0.42	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
26	0.43	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
27	0.45	6.297	6.297	6.297	54.70	0.02	1.0	0.0	0.10	54.65	-3.00	7.50	-4.37
28	0.47	6.296	6.296	6.296	54.60	0.02	1.0	0.0	-0.10	54.65	3.00	7.50	-4.37
29	0.48	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
30	0.50	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
31	0.52	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.60	54.30	18.00	7.15	-4.42
32	0.53	6.297	6.297	6.297	54.70	0.02	1.0	0.0	0.70	54.35	-21.00	7.20	-4.41
33	0.55	6.296	6.296	6.296	54.60	0.02	1.0	0.0	-0.10	54.65	3.00	7.50	-4.37
34	0.57	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.00	54.60	0.00	7.45	-4.38
35	0.58	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.40	54.40	12.00	7.25	-4.40

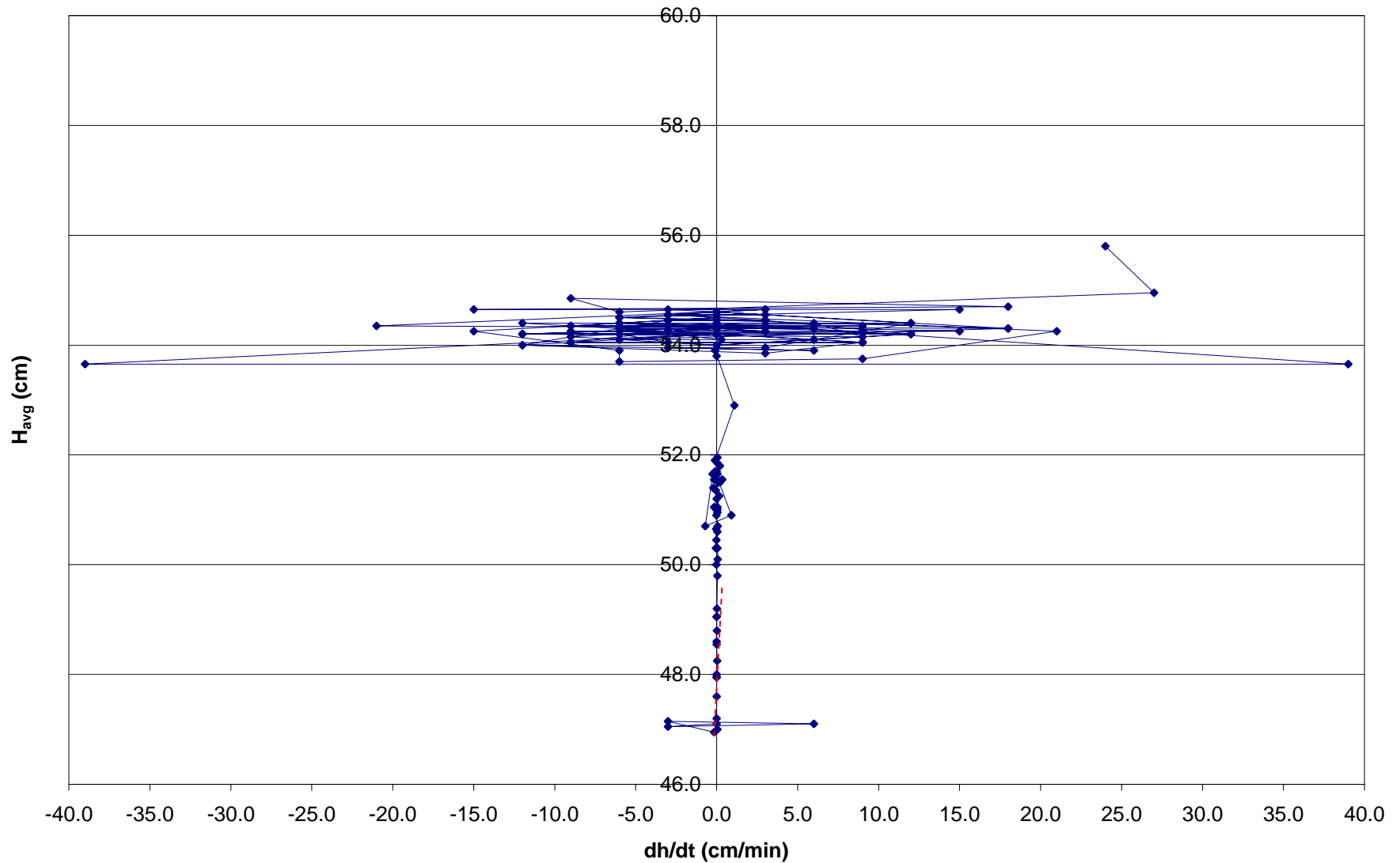
Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potential Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
36	0.60	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.30	54.35	-9.00	7.20	-4.41
37	0.62	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.30	54.35	9.00	7.20	-4.41
38	0.63	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.30	54.35	-9.00	7.20	-4.41
39	0.65	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.00	54.50	0.00	7.35	-4.39
40	0.67	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.10	54.45	3.00	7.30	-4.40
41	0.68	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.10	54.45	-3.00	7.30	-4.40
42	0.70	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.10	54.45	3.00	7.30	-4.40
43	0.72	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.20	54.50	-6.00	7.35	-4.39
44	0.73	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.60	54.30	18.00	7.15	-4.42
45	0.75	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.20	54.10	-6.00	6.95	-4.45
46	0.77	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
47	0.78	6.296	6.296	6.296	54.60	0.02	1.0	0.0	0.40	54.40	-12.00	7.25	-4.40
48	0.80	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.40	54.40	12.00	7.25	-4.40
49	0.82	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.20	54.10	6.00	6.95	-4.45
50	0.83	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.20	54.10	-6.00	6.95	-4.45
51	0.85	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.20	54.30	-6.00	7.15	-4.42
52	0.87	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.10	54.45	-3.00	7.30	-4.40
53	0.88	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.10	54.45	3.00	7.30	-4.40
54	0.90	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.10	54.45	-3.00	7.30	-4.40
55	0.92	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.10	54.45	3.00	7.30	-4.40
56	0.93	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.10	54.45	-3.00	7.30	-4.40
57	0.95	6.294	6.294	6.294	54.40	0.02	1.0	0.0	-0.10	54.45	3.00	7.30	-4.40
58	0.97	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.40	54.20	12.00	7.05	-4.43
59	0.98	6.290	6.290	6.290	54.00	0.02	1.0	0.0	0.00	54.00	0.00	6.85	-4.46
60	1.00	6.291	6.291	6.291	54.10	0.02	1.0	0.0	0.10	54.05	-3.00	6.90	-4.45
61	1.02	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.20	54.20	-6.00	7.05	-4.43
62	1.03	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.00	54.30	0.00	7.15	-4.42
63	1.05	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.20	54.40	-6.00	7.25	-4.40
64	1.07	6.293	6.293	6.293	54.30	0.02	1.0	0.0	-0.20	54.40	6.00	7.25	-4.40
65	1.08	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.30	54.15	9.00	7.00	-4.44
66	1.10	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.40	54.20	-12.00	7.05	-4.43
67	1.12	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.40	54.20	12.00	7.05	-4.43
68	1.13	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.40	54.20	-12.00	7.05	-4.43
69	1.15	6.293	6.293	6.293	54.30	0.02	1.0	0.0	-0.10	54.35	3.00	7.20	-4.41
70	1.17	6.295	6.295	6.295	54.50	0.02	1.0	0.0	0.20	54.40	-6.00	7.25	-4.40
71	1.18	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.50	54.25	15.00	7.10	-4.42
72	1.20	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.40	54.20	-12.00	7.05	-4.43
73	1.22	6.293	6.293	6.293	54.30	0.02	1.0	0.0	-0.10	54.35	3.00	7.20	-4.41
74	1.23	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.00	54.30	0.00	7.15	-4.42
75	1.25	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.00	54.30	0.00	7.15	-4.42
76	1.27	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.10	54.35	-3.00	7.20	-4.41
77	1.28	6.291	6.291	6.291	54.10	0.02	1.0	0.0	-0.30	54.25	9.00	7.10	-4.42
78	1.30	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.30	54.25	-9.00	7.10	-4.42
79	1.32	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.40	54.20	12.00	7.05	-4.43
80	1.33	6.290	6.290	6.290	54.00	0.02	1.0	0.0	0.00	54.00	0.00	6.85	-4.46
81	1.35	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.30	54.15	-9.00	7.00	-4.44
82	1.37	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.00	54.30	0.00	7.15	-4.42

Elapsed Time (sec)	Elapsed Time (min)	DTW (m)	DTP (m)	POT. (m)	Potential Column (cm)	Increment (min)	Increment (sec)	Delta t (min)	delta h (cm)	h avg (cm)	dh/dt (cm/min)	H real (cm)	ln(Hr/Hi)
83	1.38	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.10	54.25	3.00	7.10	-4.42
84	1.40	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
85	1.42	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
86	1.43	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
87	1.45	6.289	6.289	6.289	53.90	0.02	1.0	0.0	-0.30	54.05	9.00	6.90	-4.45
88	1.47	6.288	6.288	6.288	53.80	0.02	1.0	0.0	-0.10	53.85	3.00	6.70	-4.48
89	1.48	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.40	54.00	-12.00	6.85	-4.46
90	1.50	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.20	54.30	-6.00	7.15	-4.42
91	1.52	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.00	54.40	0.00	7.25	-4.40
92	1.53	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.00	54.40	0.00	7.25	-4.40
93	1.55	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.20	54.30	6.00	7.15	-4.42
94	1.57	6.290	6.290	6.290	54.00	0.02	1.0	0.0	-0.20	54.10	6.00	6.95	-4.45
95	1.58	6.289	6.289	6.289	53.90	0.02	1.0	0.0	-0.10	53.95	3.00	6.80	-4.47
96	1.60	6.290	6.290	6.290	54.00	0.02	1.0	0.0	0.10	53.95	-3.00	6.80	-4.47
97	1.62	6.288	6.288	6.288	53.80	0.02	1.0	0.0	-0.20	53.90	6.00	6.75	-4.48
98	1.63	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.40	54.00	-12.00	6.85	-4.46
99	1.65	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
100	1.67	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
101	1.68	6.289	6.289	6.289	53.90	0.02	1.0	0.0	-0.30	54.05	9.00	6.90	-4.45
102	1.70	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.30	54.05	-9.00	6.90	-4.45
103	1.72	6.289	6.289	6.289	53.90	0.02	1.0	0.0	-0.30	54.05	9.00	6.90	-4.45
104	1.73	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.30	54.05	-9.00	6.90	-4.45
105	1.75	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.10	54.25	-3.00	7.10	-4.42
106	1.77	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.10	54.35	-3.00	7.20	-4.41
107	1.78	6.293	6.293	6.293	54.30	0.02	1.0	0.0	-0.10	54.35	3.00	7.20	-4.41
108	1.80	6.280	6.280	6.280	53.00	0.02	1.0	0.0	-1.30	53.65	39.00	6.50	-4.51
109	1.82	6.293	6.293	6.293	54.30	0.02	1.0	0.0	1.30	53.65	-39.00	6.50	-4.51
110	1.83	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.10	54.25	3.00	7.10	-4.42
111	1.85	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
112	1.87	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
113	1.88	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
114	1.90	6.292	6.292	6.292	54.20	0.02	1.0	0.0	0.00	54.20	0.00	7.05	-4.43
115	1.92	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.10	54.25	-3.00	7.10	-4.42
116	1.93	6.293	6.293	6.293	54.30	0.02	1.0	0.0	0.00	54.30	0.00	7.15	-4.42
117	1.95	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.10	54.25	3.00	7.10	-4.42
118	1.97	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.20	54.30	-6.00	7.15	-4.42
119	1.98	6.292	6.292	6.292	54.20	0.02	1.0	0.0	-0.20	54.30	6.00	7.15	-4.42
120	2.00	6.294	6.294	6.294	54.40	0.02	1.0	0.0	0.20	54.30	-6.00	7.15	-4.42
180	3.00	6.288	6.288	6.288	53.80	1.00	60.0	2.0	-0.60	54.10	0.30	6.95	-4.45
240	4.00	6.288	6.288	6.288	53.80	1.00	60.0	2.0	0.00	53.80	0.00	6.65	-4.49
300	5.00	6.290	6.290	6.290	54.00	1.00	60.0	2.0	0.20	53.90	-0.10	6.75	-4.48
360	6.00	6.268	6.268	6.268	51.80	1.00	60.0	2.0	-2.20	52.90	1.10	5.75	-4.64
420	7.00	6.270	6.270	6.270	52.00	1.00	60.0	2.0	0.20	51.90	-0.10	4.75	-4.83
480	8.00	6.269	6.269	6.269	51.90	1.00	60.0	2.0	-0.10	51.95	0.05	4.80	-4.82
540	9.00	6.268	6.268	6.268	51.80	1.00	60.0	2.0	-0.10	51.85	0.05	4.70	-4.84
600	10.00	6.270	6.270	6.270	52.00	1.00	60.0	2.0	0.20	51.90	-0.10	4.75	-4.83

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potential Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
660	11.00	6.266	6.266	6.266	51.60	1.00	60.0	2.0	-0.40	51.80	0.20	4.65	-4.85
720	12.00	6.267	6.267	6.267	51.70	1.00	60.0	2.0	0.10	51.65	-0.05	4.50	-4.88
780	13.00	6.266	6.266	6.266	51.60	1.00	60.0	2.0	-0.10	51.65	0.05	4.50	-4.88
840	14.00	6.268	6.268	6.268	51.80	1.00	60.0	2.0	0.20	51.70	-0.10	4.55	-4.87
900	15.00	6.250	6.250	6.250	50.00	1.00	60.0	2.0	-1.80	50.90	0.90	3.75	-5.06
960	16.00	6.264	6.264	6.264	51.40	1.00	60.0	2.0	1.40	50.70	-0.70	3.55	-5.12
1020	17.00	6.269	6.269	6.269	51.90	1.00	60.0	2.0	0.50	51.65	-0.25	4.50	-4.88
1080	18.00	6.262	6.262	6.262	51.20	1.00	60.0	2.0	-0.70	51.55	0.35	4.40	-4.90
1140	19.00	6.266	6.266	6.266	51.60	1.00	60.0	2.0	0.40	51.40	-0.20	4.25	-4.94
1200	20.00	6.264	6.264	6.264	51.40	1.00	60.0	2.0	-0.20	51.50	0.10	4.35	-4.91
1260	21.00	6.267	6.267	6.267	51.70	1.00	60.0	2.0	0.30	51.55	-0.15	4.40	-4.90
1320	22.00	6.267	6.267	6.267	51.70	1.00	60.0	2.0	0.00	51.70	0.00	4.55	-4.87
1380	23.00	6.263	6.263	6.263	51.30	1.00	60.0	2.0	-0.40	51.50	0.20	4.35	-4.91
1440	24.00	6.264	6.264	6.264	51.40	1.00	60.0	2.0	0.10	51.35	-0.05	4.20	-4.95
1500	25.00	6.261	6.261	6.261	51.10	1.00	60.0	2.0	-0.30	51.25	0.15	4.10	-4.97
1560	26.00	6.260	6.260	6.260	51.00	1.00	60.0	2.0	-0.10	51.05	0.05	3.90	-5.02
1620	27.00	6.260	6.260	6.260	51.00	1.00	60.0	2.0	0.00	51.00	0.00	3.85	-5.04
1680	28.00	6.260	6.260	6.260	51.00	1.00	60.0	2.0	0.00	51.00	0.00	3.85	-5.04
1740	29.00	6.259	6.259	6.259	50.90	1.00	60.0	2.0	-0.10	50.95	0.05	3.80	-5.05
1800	30.00	6.262	6.262	6.262	51.20	1.00	60.0	2.0	0.30	51.05	-0.15	3.90	-5.02
2100	35.00	6.262	6.262	6.262	51.20	5.00	300.0	10.0	0.00	51.20	0.00	4.05	-4.99
2400	40.00	6.258	6.258	6.258	50.80	5.00	300.0	10.0	-0.40	51.00	0.04	3.85	-5.04
2700	45.00	6.260	6.260	6.260	51.00	5.00	300.0	10.0	0.20	50.90	-0.02	3.75	-5.06
3000	50.00	6.254	6.254	6.254	50.40	5.00	300.0	10.0	-0.60	50.70	0.06	3.55	-5.12
3300	55.00	6.255	6.255	6.255	50.50	5.00	300.0	10.0	0.10	50.45	-0.01	3.30	-5.19
3600	60.00	6.251	6.251	6.251	50.10	5.00	300.0	10.0	-0.40	50.30	0.04	3.15	-5.24
3900	65.00	6.255	6.255	6.255	50.50	5.00	300.0	10.0	0.40	50.30	-0.04	3.15	-5.24
4200	70.00	6.258	6.258	6.258	50.80	5.00	300.0	10.0	0.30	50.65	-0.03	3.50	-5.13
4500	75.00	6.254	6.254	6.254	50.40	5.00	300.0	10.0	-0.40	50.60	0.04	3.45	-5.15
4800	80.00	6.248	6.248	6.248	49.80	5.00	300.0	10.0	-0.60	50.10	0.06	2.95	-5.30
5400	90.00	6.252	6.252	6.252	50.20	10.00	600.0	20.0	0.40	50.00	-0.02	2.85	-5.34
6000	100.00	6.244	6.244	6.244	49.40	10.00	600.0	20.0	-0.80	49.80	0.04	2.65	-5.41
6600	110.00	6.240	6.240	6.240	49.00	10.00	600.0	20.0	-0.40	49.20	0.02	2.05	-5.67
7200	120.00	6.241	6.241	6.241	49.10	10.00	600.0	20.0	0.10	49.05	-0.01	1.90	-5.74
7800	130.00	6.240	6.240	6.240	49.00	10.00	600.0	20.0	-0.10	49.05	0.01	1.90	-5.74
8400	140.00	6.236	6.236	6.236	48.60	10.00	600.0	20.0	-0.40	48.80	0.02	1.65	-5.88
9000	150.00	6.236	6.236	6.236	48.60	10.00	600.0	20.0	0.00	48.60	0.00	1.45	-6.01
9600	160.00	6.235	6.235	6.235	48.50	10.00	600.0	20.0	-0.10	48.55	0.01	1.40	-6.05
10200	170.00	6.230	6.230	6.230	48.00	10.00	600.0	20.0	-0.50	48.25	0.02	1.10	-6.29
10800	180.00	6.230	6.230	6.230	48.00	10.00	600.0	20.0	0.00	48.00	0.00	0.85	-6.55
11400	190.00	6.229	6.229	6.229	47.90	10.00	600.0	20.0	-0.10	47.95	0.01	0.80	-6.61
12000	200.00	6.230	6.230	6.230	48.00	10.00	600.0	20.0	0.10	47.95	-0.01	0.80	-6.61
15600	260.00	6.222	6.222	6.222	47.20	60.00	3600.0	120.0	-0.80	47.60	0.01	0.45	-7.18

Elapsed Time (sec)	Elapsed Time (min)	DTW (m)	DTP (m)	POT. (m)	Potential Column (cm)	Increment (min)	Increment (sec)	Delta t (min)	delta h (cm)	h avg (cm)	dh/dt (cm/min)	H real (cm)	ln(Hr/Hi)
19200	320.00	6.222	6.222	6.222	47.20	60.00	3600.0	120.0	0.00	47.20	0.00	0.05	-9.38
19500	325.00	6.218	6.218	6.218	46.80	5.00	300.0	10.0	-0.40	47.00	0.04	-0.15	#NUM!
19560	326.00	6.221	6.221	6.221	47.10	1.00	60.0	2.0	0.30	46.95	-0.15	-0.20	#NUM!
19561	326.02	6.222	6.222	6.222	47.20	0.02	1.0	0.0	0.10	47.15	-3.00	0.00	#NUM!
19562	326.03	6.220	6.220	6.220	47.00	0.02	1.0	0.0	-0.20	47.10	6.00	-0.05	#NUM!
19563	326.05	6.221	6.221	6.221	47.10	0.02	1.0	0.0	0.10	47.05	-3.00	-0.10	#NUM!
19564	326.07	6.221	6.221	6.221	47.10	0.02	1.0	0.0	0.00	47.10	0.00	-0.05	#NUM!
First Hydr. Cond. Asst: (see graph hvstdhdt)												slope (p) =	137.0 cm/(cm/min)
												S =	20.27 cm ²
												C =	907.05 cm
												K =	2.72E-08 m/s
Assuming a piezometric error of H0 =												47.15 cm	
Second Hydr. Cond. Asst.: (see graph lnhr/hi)												slope (p) =	0.0240 cm/(cm/min)
												S =	20.27 cm ²
												C =	907.05 cm
												K =	8.94E-08 m/s

Rising Head Permeability Test (Logger Data) - MW02
Solid Waste Disposal Facility, Teslin, YT



Rising Head Permeability Test - MW02
Solid Waste Disposal Facility, Teslin, YT



Solid Waste Disposal Facility - Teslin, YT

Project No: W23101303

Site - Piezometer No. MW02

Monitoring Zone

From: 9.10 m **Length:** 640 cm

To: 15.50 m

Piezometer diameter (pipe): 5.08 cm

Borehole diameter (drilled): 15.2 cm

Static level (m): 5.750 5.750 5.750

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potential Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
0	0.000	6.250	6.250	6.250	50.00								
23	0.383	6.215	6.215	6.215	46.50	0.38	23	0.767	-3.50	48.25	4.57	4.45	-4.90
41	0.683	6.215	6.215	6.215	46.50	0.30	18	0.600	0.00	46.50	0.00	2.70	-5.40
73	1.217	6.214	6.214	6.214	46.40	0.53	32	1.067	-0.10	46.45	0.09	2.65	-5.42
105	1.750	6.214	6.214	6.214	46.40	0.53	32	1.067	0.00	46.40	0.00	2.60	-5.44
153	2.550	6.213	6.213	6.213	46.30	0.80	48	1.600	-0.10	46.35	0.06	2.55	-5.45
185	3.083	6.210	6.210	6.210	46.00	0.53	32	1.067	-0.30	46.15	0.28	2.35	-5.54
214	3.567	6.207	6.207	6.207	45.70	0.48	29	0.967	-0.30	45.85	0.31	2.05	-5.67
255	4.250	6.205	6.205	6.205	45.50	0.68	41	1.367	-0.20	45.60	0.15	1.80	-5.80
288	4.800	6.205	6.205	6.205	45.50	0.55	33	1.100	0.00	45.50	0.00	1.70	-5.86
353	5.883	6.205	6.205	6.205	45.50	1.08	65	2.167	0.00	45.50	0.00	1.70	-5.86
402	6.700	6.205	6.205	6.205	45.50	0.82	49	1.633	0.00	45.50	0.00	1.70	-5.86
457	7.617	6.205	6.205	6.205	45.50	0.92	55	1.833	0.00	45.50	0.00	1.70	-5.86
574	9.567	6.205	6.205	6.205	45.50	1.95	117	3.900	0.00	45.50	0.00	1.70	-5.86
650	10.83	6.205	6.205	6.205	45.50	1.27	76	2.533	0.00	45.50	0.00	1.70	-5.86
879	14.65	6.200	6.200	6.200	45.00	3.82	229	7.633	-0.50	45.25	0.07	1.45	-6.02
1119	18.65	6.200	6.200	6.200	45.00	4.00	240	8.000	0.00	45.00	0.00	1.20	-6.21
1390	23.17	6.200	6.200	6.200	45.00	4.52	271	9.033	0.00	45.00	0.00	1.20	-6.21
5811	96.85	6.165	6.165	6.165	41.50	73.68	4421	147.4	-3.50	43.25	0.02	-0.55	#NUM!

First Hydr. Cond. Asst:
(see graph hvshdht)

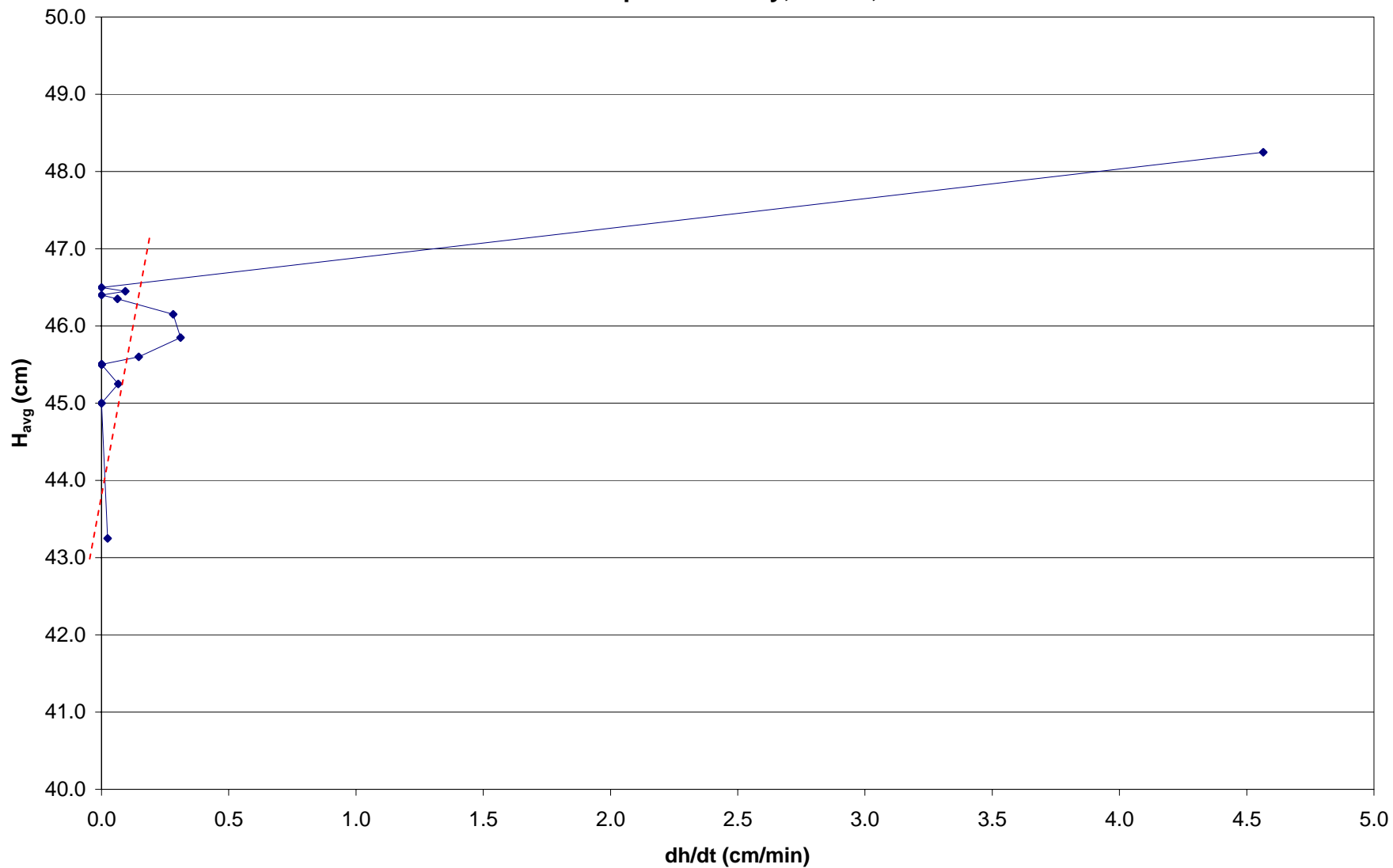
slope (p) = 18.00 :m/(cm/min)
S = 20.27 cm2
C = 907.05 cm
K = 2.07E-07 m/s

Assuming a piezometric error of H0 =

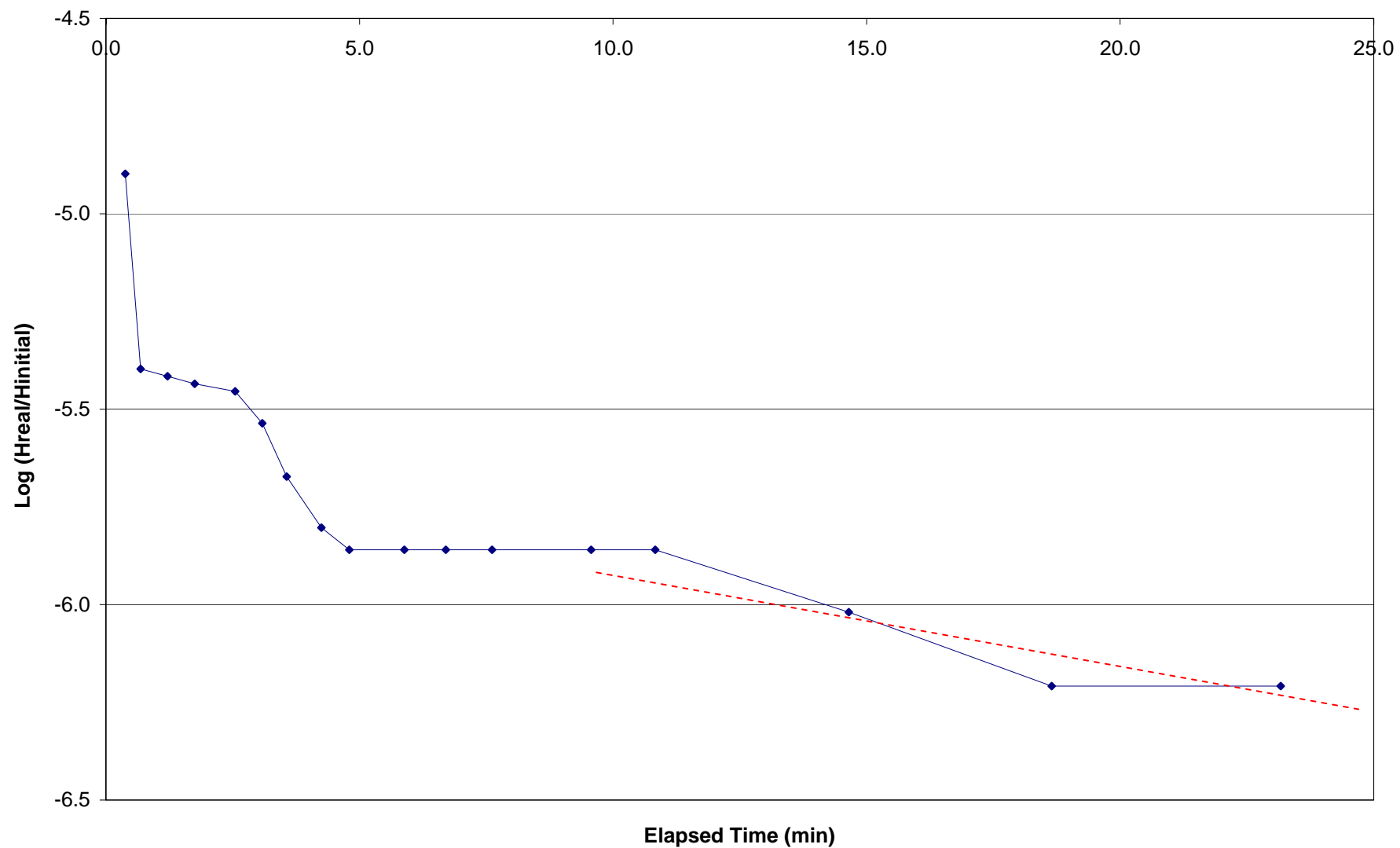
43.8 cm
Second Hydr. Cond. Asst.:
(see graph lnhr/hi)

slope (p) = 0.0222 :m/(cm/min)
S = 20.27 cm2
C = 907.05 cm
K = 8.27E-08 m/s

Rising Head Permeability Test - MW02
Solid Waste Disposal Facility, Teslin, YT



Rising Head Permeability Test - MW02
Solid Waste Disposal Facility, Teslin, YT



Solid Waste Disposal Facility - Teslin, YT

Project No: W23101303

Site - Piezometer No. MW01

Monitoring Zone

From: 10.1 m **Length:** 610 cm

To: 16.2 m

Piezometer diameter (pipe): 5.08 cm

Borehole diameter (drilled): 15.2 cm

Static level (m): 4.726 4.726 4.726

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potential Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
0	0.000	5.226	5.226	5.226	50.00								
19	0.317	4.778	4.778	4.778	5.200	0.32	19	0.6	-44.80	27.60	70.74	27.30	-3.11
33	0.550	4.751	4.751	4.751	2.500	0.23	14	0.5	-2.700	3.850	5.786	3.55	-5.15
49	0.817	4.737	4.737	4.737	1.100	0.27	16	0.5	-1.400	1.800	2.625	1.50	-6.01
68	1.133	4.735	4.735	4.735	0.900	0.32	19	0.6	-0.200	1.000	0.316	0.70	-6.77
90	1.500	4.735	4.735	4.735	0.900	0.37	22	0.7	0.000	0.900	0.000	0.60	-6.92
109	1.817	4.735	4.735	4.735	0.900	0.32	19	0.6	0.000	0.900	0.000	0.60	-6.92
154	2.567	4.735	4.735	4.735	0.900	0.75	45	1.5	0.000	0.900	0.000	0.60	-6.92
194	3.233	4.735	4.735	4.735	0.900	0.67	40	1.3	0.000	0.900	0.000	0.60	-6.92
215	3.583	4.735	4.735	4.735	0.900	0.35	21	0.7	0.000	0.900	0.000	0.60	-6.92
255	4.250	4.735	4.735	4.735	0.900	0.67	40	1.3	0.000	0.900	0.000	0.60	-6.92
295	4.917	4.735	4.735	4.735	0.900	0.67	40	1.3	0.000	0.900	0.000	0.60	-6.92
336	5.600	4.735	4.735	4.735	0.900	0.68	41	1.4	0.000	0.900	0.000	0.60	-6.92
411	6.850	4.734	4.734	4.734	0.800	1.25	75	2.5	-0.100	0.850	0.040	0.55	-7.01
436	7.267	4.734	4.734	4.734	0.800	0.42	25	0.8	0.000	0.800	0.000	0.50	-7.11
494	8.233	4.734	4.734	4.734	0.800	0.97	58	1.9	0.000	0.800	0.000	0.50	-7.11
529	8.817	4.733	4.733	4.733	0.700	0.58	35	1.2	-0.100	0.750	0.086	0.45	-7.21
570	9.500	4.732	4.732	4.732	0.600	0.68	41	1.4	-0.100	0.650	0.073	0.35	-7.46
638	10.63	4.732	4.732	4.732	0.600	1.13	68	2.3	0.000	0.600	0.000	0.30	-7.62
704	11.73	4.732	4.732	4.732	0.600	1.10	66	2.2	0.000	0.600	0.000	0.30	-7.62
799	13.32	4.732	4.732	4.732	0.600	1.58	95	3.2	0.000	0.600	0.000	0.30	-7.62

First Hydr. Cond. Asst:
(see graph hvsdhdt)

slope (p) = 0.09 :m/(cm/min)
S = 20.27 cm2
C = 874.00 cm
K = 4.35E-05 m/s

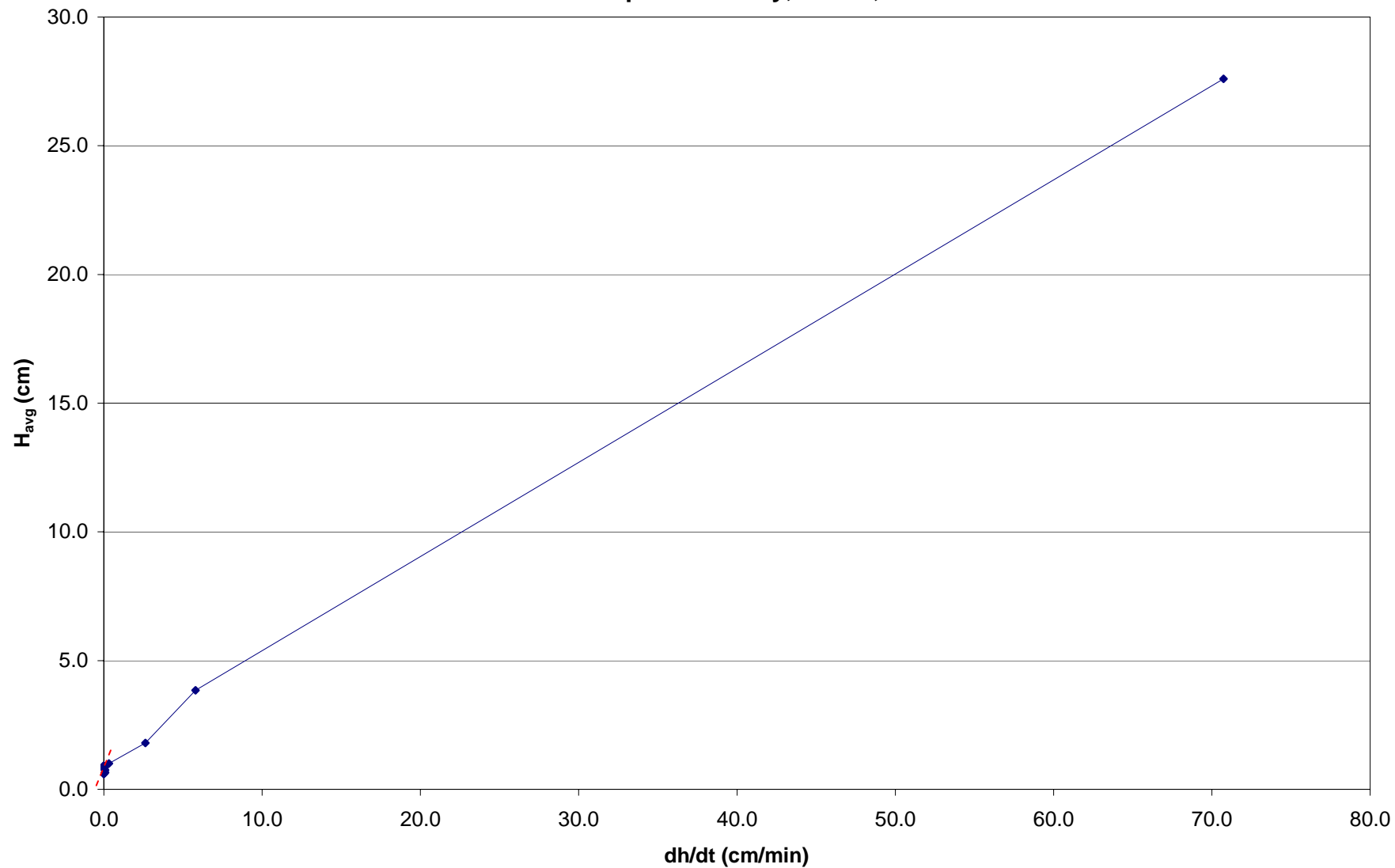
Assuming a piezometric error of H0 =

0.3 cm

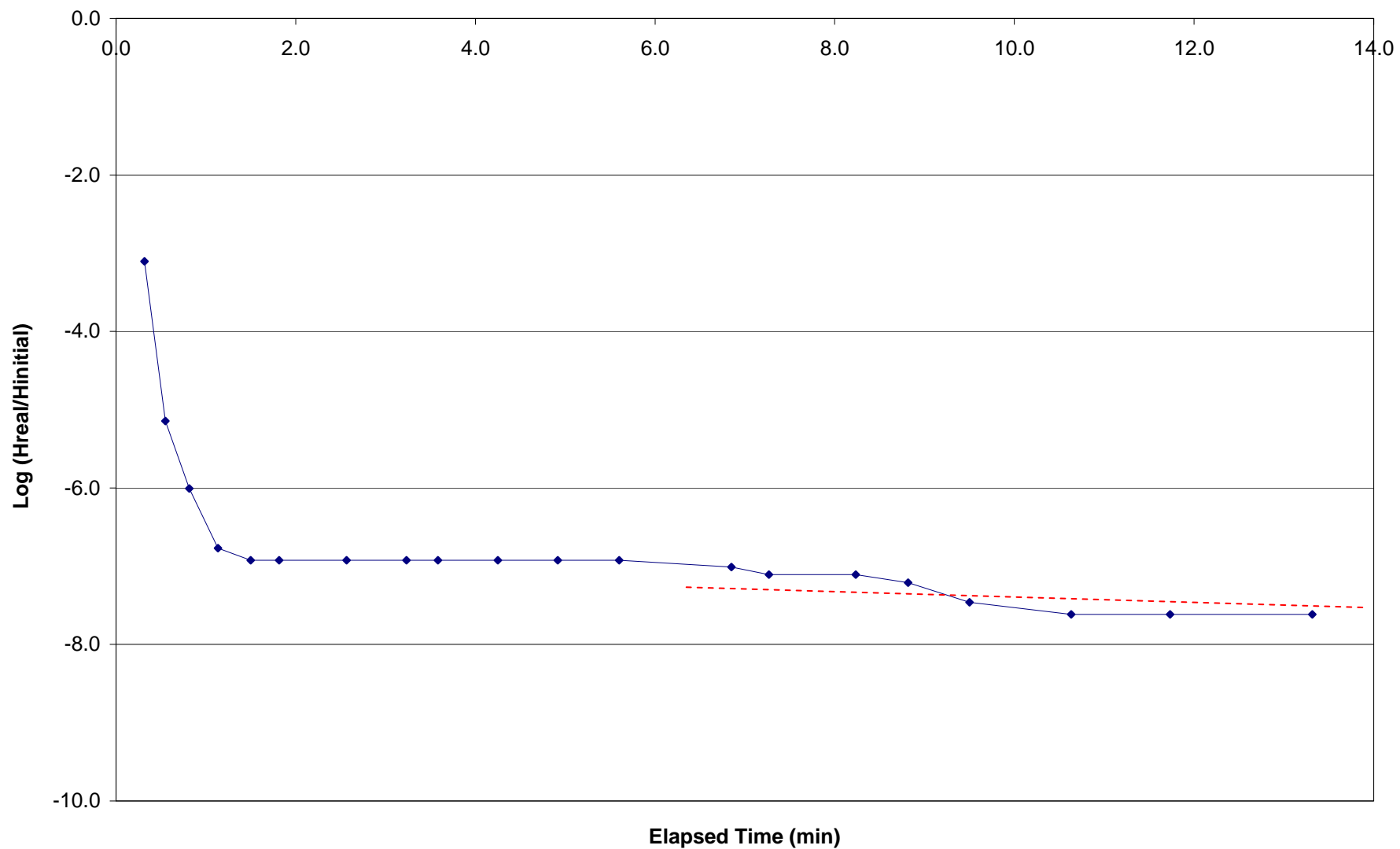
Second Hydr. Cond. Asst:
(see graph lnhr/hi)

slope (p) = 0.036 :m/(cm/min)
S = 20.27 cm2
C = 874.00 cm
K = 1.39E-07 m/s

Rising Head Permeability Test - MW01
Solid Waste Disposal Facility, Teslin, YT



Rising Head Permeability Test - MW01
Solid Waste Disposal Facility, Teslin, YT



Solid Waste Disposal Facility - Teslin, YT

Project No: W23101303

Site - Piezometer No. MW03

Monitoring Zone

From: 4.20 m **Length:** 630 cm

To: 10.50 m

Piezometer diameter (pipe): 5.08 cm

Borehole diameter (drilled): 15.2 cm

Static level (m): 0.802 0.802 0.802

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potentio. Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
0	0.00	1.302	1.302	1.302	50.00								
60	1.00	1.244	1.244	1.244	44.20	1.00	60	2.0	-5.80	47.10	2.90	41.30	-2.72
120	2.00	1.165	1.165	1.165	36.30	1.00	60	2.0	-7.90	40.25	3.95	34.45	-2.90
180	3.00	1.117	1.117	1.117	31.50	1.00	60	2.0	-4.80	33.90	2.40	28.10	-3.10
240	4.00	1.075	1.075	1.075	27.30	1.00	60	2.0	-4.20	29.40	2.10	23.60	-3.28
300	5.00	1.044	1.044	1.044	24.20	1.00	60	2.0	-3.10	25.75	1.55	19.95	-3.44
360	6.00	1.018	1.018	1.018	21.60	1.00	60	2.0	-2.60	22.90	1.30	17.10	-3.60
420	7.00	0.996	0.996	0.996	19.40	1.00	60	2.0	-2.20	20.50	1.10	14.70	-3.75
480	8.00	0.978	0.978	0.978	17.60	1.00	60	2.0	-1.80	18.50	0.90	12.70	-3.89
540	9.00	0.965	0.965	0.965	16.30	1.00	60	2.0	-1.30	16.95	0.65	11.15	-4.03
600	10.0	0.951	0.951	0.951	14.90	1.00	60	2.0	-1.40	15.60	0.70	9.800	-4.15
660	11.0	0.941	0.941	0.941	13.90	1.00	60	2.0	-1.00	14.40	0.50	8.600	-4.28
720	12.0	0.932	0.932	0.932	13.00	1.00	60	2.0	-0.90	13.45	0.45	7.650	-4.40
780	13.0	0.924	0.924	0.924	12.20	1.00	60	2.0	-0.80	12.60	0.40	6.800	-4.52
840	14.0	0.917	0.917	0.917	11.50	1.00	60	2.0	-0.70	11.85	0.35	6.050	-4.64
900	15.0	0.908	0.908	0.908	10.60	1.00	60	2.0	-0.90	11.05	0.45	5.250	-4.78
960	16.0	0.901	0.901	0.901	9.900	1.00	60	2.0	-0.70	10.25	0.35	4.450	-4.94
1020	17.0	0.897	0.897	0.897	9.500	1.00	60	2.0	-0.40	9.700	0.20	3.900	-5.08
1080	18.0	0.895	0.895	0.895	9.300	1.00	60	2.0	-0.20	9.400	0.10	3.600	-5.16
1140	19.0	0.889	0.889	0.889	8.700	1.00	60	2.0	-0.60	9.000	0.30	3.200	-5.27
1200	20.0	0.889	0.889	0.889	8.700	1.00	60	2.0	0.00	8.700	0.00	2.900	-5.37
1260	21.0	0.882	0.882	0.882	8.000	1.00	60	2.0	-0.70	8.350	0.35	2.550	-5.50
1320	22.0	0.881	0.881	0.881	7.900	1.00	60	2.0	-0.10	7.950	0.05	2.150	-5.67
1380	23.0	0.879	0.879	0.879	7.700	1.00	60	2.0	-0.20	7.800	0.10	2.000	-5.74
1440	24.0	0.877	0.877	0.877	7.500	1.00	60	2.0	-0.20	7.600	0.10	1.800	-5.85
1500	25.0	0.878	0.878	0.878	7.600	1.00	60	2.0	0.10	7.550	-0.05	1.750	-5.88
1560	26.0	0.873	0.873	0.873	7.100	1.00	60	2.0	-0.50	7.350	0.25	1.550	-6.00
1620	27.0	0.870	0.870	0.870	6.800	1.00	60	2.0	-0.30	6.950	0.15	1.150	-6.30
1680	28.0	0.867	0.867	0.867	6.500	1.00	60	2.0	-0.30	6.650	0.15	0.850	-6.60
1740	29.0	0.867	0.867	0.867	6.500	1.00	60	2.0	0.00	6.500	0.00	0.700	-6.79
1800	30.0	0.867	0.867	0.867	6.500	1.00	60	2.0	0.00	6.500	0.00	0.700	-6.79
1860	31.0	0.868	0.868	0.868	6.600	1.00	60	2.0	0.10	6.550	-0.05	0.750	-6.72
1920	32.0	0.868	0.868	0.868	6.600	1.00	60	2.0	0.00	6.600	0.00	0.800	-6.66
1980	33.0	0.865	0.865	0.865	6.300	1.00	60	2.0	-0.30	6.450	0.15	0.650	-6.87
2040	34.0	0.864	0.864	0.864	6.200	1.00	60	2.0	-0.10	6.250	0.05	0.450	-7.23
2100	35.0	0.862	0.862	0.862	6.000	1.00	60	2.0	-0.20	6.100	0.10	0.300	-7.64
2160	36.0	0.859	0.859	0.859	5.700	1.00	60	2.0	-0.30	5.850	0.15	0.050	-9.43
2220	37.0	0.861	0.861	0.861	5.900	1.00	60	2.0	0.20	5.800	-0.10	0.000	#NUM!
2280	38.0	0.863	0.863	0.863	6.100	1.00	60	2.0	0.20	6.000	-0.10	0.200	-8.05

Elapsed Time	Elapsed Time	DTW	DTP	POT.	Potentio. Column	Increment	Increment	Delta t	delta h	h avg	dh/dt	H real	ln(Hr/Hi)
(sec)	(min)	(m)	(m)	(m)	(cm)	(min)	(sec)	(min)	(cm)	(cm)	(cm/min)	(cm)	
2340	39.0	0.859	0.859	0.859	5.700	1.00	60	2.0	-0.40	5.900	0.20	0.100	-8.74

First Hydr. Cond. Asst:
(sec graph hvsdhdt)

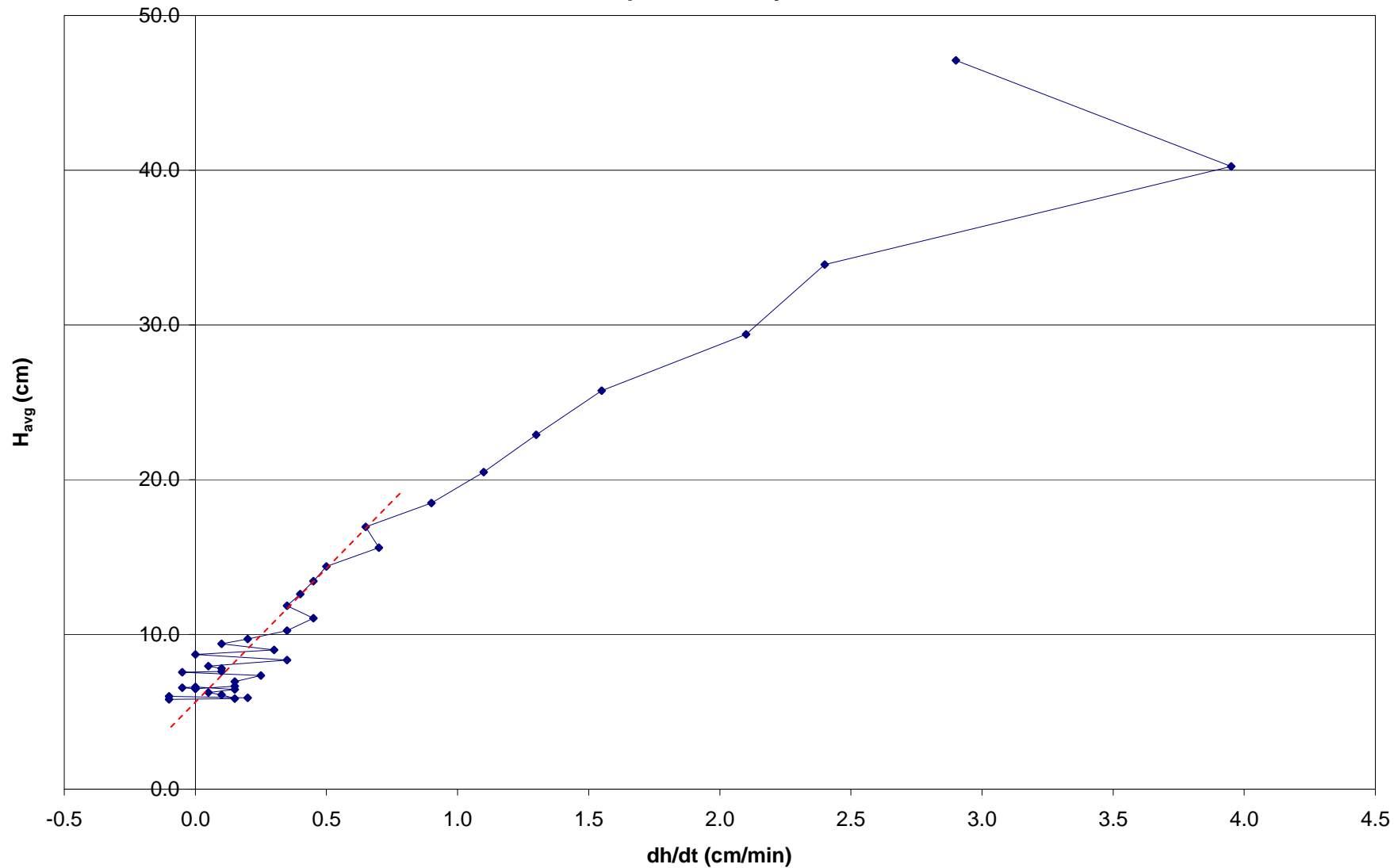
slope (p) = 17.50 :m/(cm/min)
S = 20.27 cm2
C = 896.06 cm
K = 2.15E-07 m/s

Assuming a piezometric error of H0 =

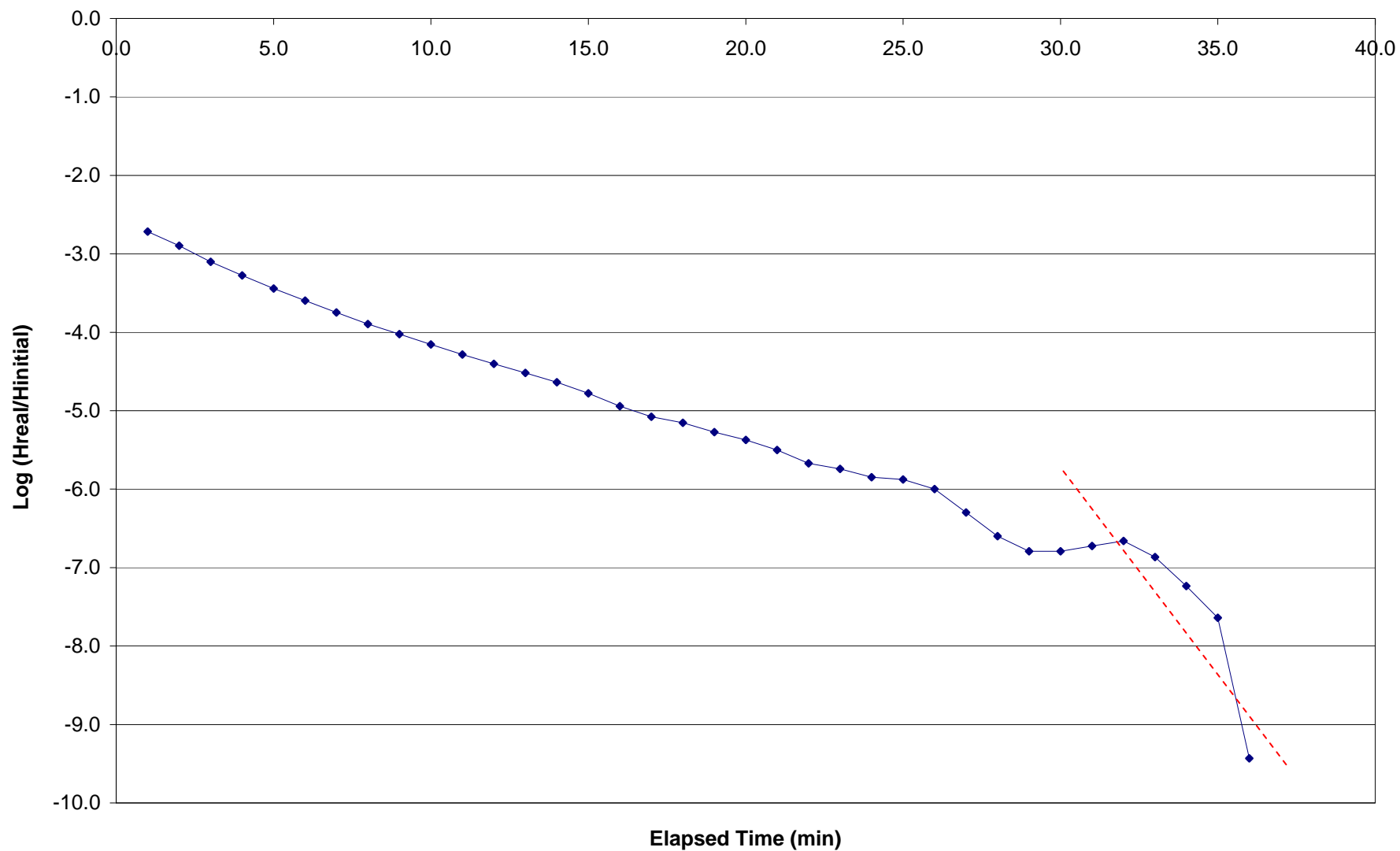
5.8 cm
Second Hydr. Cond. Asst.:
(sec graph lnhr/hi)

slope (p) = 0.51 :m/(cm/min)
S = 20.27 cm2
C = 896.06 cm
K = 1.94E-06 m/s

Rising Head Permeability Test (Logger Data) - MW03
Solid Waste Disposal Facility, Teslin, YT



Rising Head Permeability Test (Logger Data) - MW03
Solid Waste Disposal Facility, Teslin, YT





APPENDIX C

APPENDIX C LABORATORY ANALYTICAL REPORTS



Report Transmission Cover Page

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	713641
Report To:	EBA Engineering Consulting Lt	ID:	W23101303	Control Number:	A137210
	Unit 6, 151 Industrial Road	Name:	Teslin Landfill Sampling	Date Received:	Nov 17, 2009
	Whitehorse, YT, Canada	Location:	Teslin, YT	Date Reported:	Nov 24, 2009
	Y1A 2V3	LSD:		Report Number:	1277759
Attn:	Carol Ma	P.O.:			
Sampled By:	Carol Ma	Acct code:			
Company:	EBA				

Contact & Affiliation	Address	Delivery Commitments
Carol Ma EBA Engineering - Edmonton	Unit 6, 151 Industrial Road Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-3068 Fax: (867) 668-4349 Email: cma@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports
Kim Greenman EBA Engineering - Edmonton	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: kgreenman@eba.ca	On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report

Notes To Clients:

- Due to presence of high suspended solids Turbidity could not be reported on sample 713641-1.
- Samples 1-4 were analyzed for NO2/NO3 by IEC after holding time had expired.

Sample Custody

Bill To: EBA Engineering Consulting Lt	Project:	Lot ID: 713641
Report To: EBA Engineering Consulting Lt	ID: W23101303	Control Number: A137210
Unit 6, 151 Industrial Road	Name: Teslin Landfill Sampling	Date Received: Nov 17, 2009
Whitehorse, YT, Canada	Location: Teslin, YT	Date Reported: Nov 24, 2009
Y1A 2V3	LSD:	Report Number: 1277759
Attn: Carol Ma	P.O.:	
Sampled By: Carol Ma	Acct code:	
Company: EBA		

Sample Disposal Date: February 22, 2010

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	\$ 2.50 per sample
Storage for an additional 60 days	\$ 5.00 per sample
Storage for an additional 90 days	\$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

☐ Greyhound

☐ DHL

☐ Purolator

☐ Other (specify) _____

Name _____

Company _____

Address _____

Phone _____

Fax _____

Signature _____

Analytical Report

Bill To: EBA Engineering Consulting Lt	Project:	Lot ID: 713641
Report To: EBA Engineering Consulting Lt	ID: W23101303	Control Number: A137210
Unit 6, 151 Industrial Road	Name: Teslin Landfill Sampling	Date Received: Nov 17, 2009
Whitehorse, YT, Canada	Location: Teslin, YT	Date Reported: Nov 24, 2009
Y1A 2V3	LSD:	Report Number: 1277759
Attn: Carol Ma	P.O.:	
Sampled By: Carol Ma	Acct code:	
Company: EBA		

		Reference Number	713641-1	713641-2	713641-3	
		Sample Date	Nov 15, 2009	Nov 15, 2009	Nov 15, 2009	
		Sample Time	12:10	12:25	11:35	
		Sample Location				
		Sample Description	MW01-Teslin Landfill	MW02-Teslin Landfill	MW03-Teslin Landfill	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Dissolved Nonpurgeable	mg/L	7.5	3.9	3.2	0.5
Ammonia - N		mg/L	<0.01	0.58	0.18	
Metals Dissolved						
Titanium	Dissolved	mg/L	0.068	<0.01	<0.01	0.01
Aluminum	Dissolved	mg/L	1.060	0.098	<0.005	0.005
Antimony	Dissolved	mg/L	0.0006	0.0038	0.0005	0.0002
Arsenic	Dissolved	mg/L	0.0004	0.0086	0.0080	0.0002
Barium	Dissolved	mg/L	0.084	0.032	0.068	0.001
Beryllium	Dissolved	mg/L	0.00005	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	0.054	0.018	0.004
Cadmium	Dissolved	mg/L	0.00004	0.00005	0.00004	0.00001
Chromium	Dissolved	mg/L	0.0012	0.0017	0.0012	0.0004
Cobalt	Dissolved	mg/L	0.00093	0.00031	0.00008	0.00002
Copper	Dissolved	mg/L	0.006	<0.001	0.002	0.001
Iron	Dissolved	mg/L	1.32	0.72	0.22	0.01
Lead	Dissolved	mg/L	0.0010	0.0004	0.0009	0.0001
Lithium	Dissolved	mg/L	0.003	0.006	<0.001	0.001
Manganese	Dissolved	mg/L	0.0248	0.1010	0.0343	0.0002
Molybdenum	Dissolved	mg/L	0.0044	0.0364	0.0114	0.0001
Nickel	Dissolved	mg/L	0.002	0.007	0.002	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Dissolved	mg/L	0.194	0.470	0.484	0.001
Sulfur	Dissolved	mg/L	7.6	59.4	15.5	0.2
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	0.0005	0.0003	0.0001	0.0001
Uranium	Dissolved	mg/L	<0.0004	0.0016	0.0031	0.0004
Vanadium	Dissolved	mg/L	0.0056	0.0011	0.0003	0.0001
Zinc	Dissolved	mg/L	0.009	0.003	0.006	0.001
Zirconium	Dissolved	mg/L	0.0005	0.0003	<0.0001	0.0001
Metals Total						
Mercury	Total	ug/L	0.06	0.02	<0.01	0.01
Antimony	Total	mg/L	<0.001	0.0060	<0.0002	0.0002

Analytical Report

Bill To: EBA Engineering Consulting Lt	Project:	Lot ID: 713641
Report To: EBA Engineering Consulting Lt	ID: W23101303	Control Number: A137210
Unit 6, 151 Industrial Road	Name: Teslin Landfill Sampling	Date Received: Nov 17, 2009
Whitehorse, YT, Canada	Location: Teslin, YT	Date Reported: Nov 24, 2009
Y1A 2V3	LSD:	Report Number: 1277759
Attn: Carol Ma	P.O.:	
Sampled By: Carol Ma	Acct code:	
Company: EBA		

		Reference Number	713641-1	713641-2	713641-3	
		Sample Date	Nov 15, 2009	Nov 15, 2009	Nov 15, 2009	
		Sample Time	12:10	12:25	11:35	
		Sample Location				
		Sample Description	MW01-Teslin Landfill	MW02-Teslin Landfill	MW03-Teslin Landfill	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Arsenic	Total	mg/L	0.0063	0.284	0.0074	0.0002
Barium	Total	mg/L	2.78	5.93	0.072	0.001
Beryllium	Total	mg/L	0.0042	0.00522	<0.00004	0.00004
Bismuth	Total	mg/L	<0.005	<0.005	<0.001	0.001
Boron	Total	mg/L	<0.02	0.052	0.016	0.004
Cadmium	Total	mg/L	0.00112	0.00836	0.00002	0.00001
Chromium	Total	mg/L	0.0772	0.327	0.0007	0.0004
Cobalt	Total	mg/L	0.111	0.176	0.00022	0.00002
Copper	Total	mg/L	0.38	1.06	<0.001	0.001
Iron	Total	mg/L	244	331	0.56	0.01
Iron	Total	mg/L	207	334	1.20	0.01
Lead	Total	mg/L	0.027	0.0812	0.0003	0.0001
Lithium	Total	mg/L	0.072	0.097	0.001	0.001
Manganese	Total	mg/L	4.03	15.4	0.0439	0.0002
Manganese	Total	mg/L	3.80	14.8	0.043	0.005
Molybdenum	Total	mg/L	0.0082	0.0719	0.0115	0.0001
Nickel	Total	mg/L	0.059	0.926	0.002	0.001
Phosphorus	Total	mg/L	6.46	5.16	0.080	0.01
Selenium	Total	mg/L	<0.003	0.0518	<0.0006	0.0006
Silver	Total	mg/L	0.00068	0.00656	<0.00001	0.00001
Strontium	Total	mg/L	1.07	1.76	0.488	0.001
Sulfur	Total	mg/L	11	172	15.7	0.1
Thallium	Total	mg/L	0.00064	0.00264	<0.00001	0.00001
Tin	Total	mg/L	0.002	0.003	0.0009	0.0001
Uranium	Total	mg/L	<0.002	0.017	0.0032	0.0004
Vanadium	Total	mg/L	0.784	0.543	0.0007	0.0001
Zinc	Total	mg/L	0.46	1.66	0.009	0.001
Zirconium	Total	mg/L	0.003	0.011	0.0005	0.0001
Titanium	Total	mg/L	13.4	6.01	<0.001	0.001
Physical and Aggregate Properties						
Turbidity		NTU	480	62	3.7	0.1
Solids	Total Suspended	mg/L	3390	216000	8	1
Routine Water						
pH	@ 25 °C		7.53	8.06	8.06	
Electrical Conductivity		µS/cm at 25 C	445	1050	545	1
Calcium	Dissolved	mg/L	82.5	54.8	39.2	0.1

Analytical Report

Bill To: EBA Engineering Consulting Lt	Project:	Lot ID: 713641
Report To: EBA Engineering Consulting Lt	ID: W23101303	Control Number: A137210
Unit 6, 151 Industrial Road	Name: Teslin Landfill Sampling	Date Received: Nov 17, 2009
Whitehorse, YT, Canada	Location: Teslin, YT	Date Reported: Nov 24, 2009
Y1A 2V3	LSD:	Report Number: 1277759
Attn: Carol Ma	P.O.:	
Sampled By: Carol Ma	Acct code:	
Company: EBA		

		Reference Number	713641-1	713641-2	713641-3	
		Sample Date	Nov 15, 2009	Nov 15, 2009	Nov 15, 2009	
		Sample Time	12:10	12:25	11:35	
		Sample Location				
		Sample Description	MW01-Teslin Landfill	MW02-Teslin Landfill	MW03-Teslin Landfill	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued						
Magnesium	Dissolved	mg/L	9.2	106	46.6	0.1
Phosphorus	Dissolved	mg/L	0.08	0.03	0.01	0.01
Potassium	Dissolved	mg/L	5.1	4.1	2.3	0.1
Silicon	Dissolved	mg/L	7.84	5.82	5.99	0.05
Sodium	Dissolved	mg/L	6.1	49.6	18.6	0.1
Bicarbonate		mg/L	270	560	310	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO ₃	mg/L	224	457	254	5
Chloride	Dissolved	mg/L	0.37	0.7	0.73	0.02
Fluoride	Dissolved	mg/L	0.19	0.35	0.34	0.01
Nitrate - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO ₄)	Dissolved	mg/L	19.0	181	43.2	0.05
Hardness	as CaCO ₃	mg/L	244	575	290	5
Total Dissolved Solids	Calculated	mg/L	278	687	319	1
Extractable Petroleum Hydrocarbons - Water						
EPHw10-19		ug/L	<100	<100	<100	100
EPHw19-32		ug/L	100	100	<100	100

Analytical Report

Bill To: EBA Engineering Consulting Lt Project:
Report To: EBA Engineering Consulting Lt ID: W23101303
Unit 6, 151 Industrial Road Name: Teslin Landfill Sampling
Whitehorse, YT, Canada Location: Teslin, YT
Y1A 2V3 LSD:
Attn: Carol Ma P.O.:
Sampled By: Carol Ma Acct code:
Company: EBA

Lot ID: **713641**
Control Number: A137210
Date Received: Nov 17, 2009
Date Reported: Nov 24, 2009
Report Number: 1277759

Reference Number 713641-4
Sample Date Nov 15, 2009
Sample Time 13:30
Sample Location
Sample Description Teslin Lake
Matrix Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Dissolved Nonpurgeable	mg/L	3.7			0.5
Ammonia - N		mg/L	0.09			
Metals Dissolved						
Titanium	Dissolved	mg/L	<0.01			0.01
Aluminum	Dissolved	mg/L	0.011			0.005
Antimony	Dissolved	mg/L	0.0006			0.0002
Arsenic	Dissolved	mg/L	0.0006			0.0002
Barium	Dissolved	mg/L	0.034			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	<0.004			0.004
Cadmium	Dissolved	mg/L	0.00003			0.00001
Chromium	Dissolved	mg/L	<0.0004			0.0004
Cobalt	Dissolved	mg/L	0.00008			0.00002
Copper	Dissolved	mg/L	0.001			0.001
Iron	Dissolved	mg/L	0.03			0.01
Lead	Dissolved	mg/L	0.0014			0.0001
Lithium	Dissolved	mg/L	<0.001			0.001
Manganese	Dissolved	mg/L	0.0054			0.0002
Molybdenum	Dissolved	mg/L	0.0008			0.0001
Nickel	Dissolved	mg/L	0.001			0.001
Selenium	Dissolved	mg/L	<0.0006			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Strontium	Dissolved	mg/L	0.077			0.001
Sulfur	Dissolved	mg/L	3.1			0.2
Tellurium	Dissolved	mg/L	<0.0001			0.0001
Thallium	Dissolved	mg/L	<0.00001			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0007			0.0004
Vanadium	Dissolved	mg/L	0.0003			0.0001
Zinc	Dissolved	mg/L	0.003			0.001
Zirconium	Dissolved	mg/L	<0.0001			0.0001
Metals Total						
Mercury	Total	ug/L	<0.01			0.01
Antimony	Total	mg/L	<0.0002			0.0002

Analytical Report

Bill To: EBA Engineering Consulting Lt Project:
Report To: EBA Engineering Consulting Lt ID: W23101303
Unit 6, 151 Industrial Road Name: Teslin Landfill Sampling
Whitehorse, YT, Canada Location: Teslin, YT
Y1A 2V3 LSD:
Attn: Carol Ma P.O.:
Sampled By: Carol Ma Acct code:
Company: EBA

Lot ID: **713641**
Control Number: A137210
Date Received: Nov 17, 2009
Date Reported: Nov 24, 2009
Report Number: 1277759

Reference Number 713641-4
Sample Date Nov 15, 2009
Sample Time 13:30
Sample Location
Sample Description Teslin Lake
Matrix Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Arsenic	Total	mg/L	0.0007			0.0002
Barium	Total	mg/L	0.034			0.001
Beryllium	Total	mg/L	<0.00004			0.00004
Bismuth	Total	mg/L	<0.001			0.001
Boron	Total	mg/L	<0.005			0.004
Cadmium	Total	mg/L	<0.00001			0.00001
Chromium	Total	mg/L	<0.0004			0.0004
Cobalt	Total	mg/L	0.00005			0.00002
Copper	Total	mg/L	<0.001			0.001
Iron	Total	mg/L	0.08			0.01
Iron	Total	mg/L	0.518			0.01
Lead	Total	mg/L	0.0002			0.0001
Lithium	Total	mg/L	0.002			0.001
Manganese	Total	mg/L	0.0096			0.0002
Manganese	Total	mg/L	0.015			0.005
Molybdenum	Total	mg/L	0.0008			0.0001
Nickel	Total	mg/L	0.001			0.001
Phosphorus	Total	mg/L	0.045			0.01
Selenium	Total	mg/L	<0.0006			0.0006
Silver	Total	mg/L	<0.00001			0.00001
Strontium	Total	mg/L	0.081			0.001
Sulfur	Total	mg/L	3.4			0.1
Thallium	Total	mg/L	<0.00001			0.00001
Tin	Total	mg/L	<0.0001			0.0001
Uranium	Total	mg/L	0.0007			0.0004
Vanadium	Total	mg/L	0.0002			0.0001
Zinc	Total	mg/L	0.011			0.001
Zirconium	Total	mg/L	0.0003			0.0001
Titanium	Total	mg/L	<0.0010			0.001
Physical and Aggregate Properties						
Turbidity		NTU	0.7			0.1
Solids	Total Suspended	mg/L	<2			1
Routine Water						
pH	@ 25 °C		7.86			
Electrical Conductivity		µS/cm at 25 C	158			1
Calcium	Dissolved	mg/L	21.9			0.1

Analytical Report

Bill To: EBA Engineering Consulting Lt
Report To: EBA Engineering Consulting Lt
Unit 6, 151 Industrial Road
Whitehorse, YT, Canada
Y1A 2V3
Attn: Carol Ma
Sampled By: Carol Ma
Company: EBA

Project:
ID: W23101303
Name: Teslin Landfill Sampling
Location: Teslin, YT
LSD:
P.O.:
Acct code:

Lot ID: **713641**
Control Number: A137210
Date Received: Nov 17, 2009
Date Reported: Nov 24, 2009
Report Number: 1277759

Reference Number 713641-4
Sample Date Nov 15, 2009
Sample Time 13:30
Sample Location
Sample Description Teslin Lake
Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Magnesium	Dissolved	mg/L	5.7		0.1
Phosphorus	Dissolved	mg/L	0.01		0.01
Potassium	Dissolved	mg/L	0.3		0.1
Silicon	Dissolved	mg/L	3.50		0.05
Sodium	Dissolved	mg/L	2.2		0.1
Bicarbonate		mg/L	90		5
Carbonate		mg/L	<6		6
Hydroxide		mg/L	<5		5
T-Alkalinity	as CaCO ₃	mg/L	72		5
Chloride	Dissolved	mg/L	0.33		0.02
Fluoride	Dissolved	mg/L	0.14		0.01
Nitrate - N	Dissolved	mg/L	0.06		0.01
Nitrite - N	Dissolved	mg/L	0.02		0.01
Sulfate (SO ₄)	Dissolved	mg/L	9.02		0.05
Hardness	as CaCO ₃	mg/L	78		5
Total Dissolved Solids	Calculated	mg/L	92		1
Extractable Petroleum Hydrocarbons - Water					
EPHw10-19		ug/L	<100		100
EPHw19-32		ug/L	<100		100

Approved by: 
Andrew Garrard, BSc
General Manager

Methodology and Notes

Bill To: EBA Engineering Consulting Lt	Project:	Lot ID: 713641
Report To: EBA Engineering Consulting Lt	ID: W23101303	Control Number: A137210
Unit 6, 151 Industrial Road	Name: Teslin Landfill Sampling	Date Received: Nov 17, 2009
Whitehorse, YT, Canada	Location: Teslin, YT	Date Reported: Nov 24, 2009
Y1A 2V3	LSD:	Report Number: 1277759
Attn: Carol Ma	P.O.:	
Sampled By: Carol Ma	Acct code:	
Company: EBA		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	* Conductivity, 2510	17-Nov-09	Exova Surrey
Alk, pH, EC, Turb in water	APHA	* Electrometric Method, 4500-H+ B	17-Nov-09	Exova Surrey
Alk, pH, EC, Turb in water	APHA	* Nephelometric Method, 2130 B	17-Nov-09	Exova Surrey
Alk, pH, EC, Turb in water	APHA	* Titration Method, 2320 B	17-Nov-09	Exova Surrey
Ammonia-N in Water	APHA	* Titrametric, 4500-NH3 C	18-Nov-09	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	19-Nov-09	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	23-Nov-09	Exova Surrey
Carbon Organic (Dissolved) in water (DOC)	APHA	High-Temperature Combustion Method, 5310 B	19-Nov-09	Exova Edmonton
EPH - Water	BCELM	* Extractable Petroleum Hydrocarbons (EPH) in Water by GC/FID, EPH Water	18-Nov-09	Exova Surrey
Mercury Low Level (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	18-Nov-09	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	* Metals & Trace Elements by ICP-AES, 6010B	18-Nov-09	Exova Surrey
Metals SemiTrace (Total) in Water	US EPA	* Metals & Trace Elements by ICP-AES, 6010B	18-Nov-09	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	18-Nov-09	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	18-Nov-09	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	* Metals & Trace Elements by ICP-AES, 6010B	18-Nov-09	Exova Surrey
Trace Metals (Total) in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	18-Nov-09	Exova Surrey

* Laboratory method(s) based on reference method

References

APHA	Standard Methods for the Examination of Water and Wastewater
B.C.M.O.E	B.C. Ministry of Environment
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Methodology and Notes

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	713641
Report To:	EBA Engineering Consulting Lt	ID:	W23101303	Control Number:	A137210
	Unit 6, 151 Industrial Road	Name:	Teslin Landfill Sampling	Date Received:	Nov 17, 2009
	Whitehorse, YT, Canada	Location:	Teslin, YT	Date Reported:	Nov 24, 2009
	Y1A 2V3	LSD:		Report Number:	1277759
Attn:	Carol Ma	P.O.:			
Sampled By:	Carol Ma	Acct code:			
Company:	EBA				

Comments:

- Due to presence of high suspended solids Turbidity could not be reported on sample 713641-1.
- Samples 1-4 were analyzed for NO2/NO3 by IEC after holding time had expired.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Bill To: EBA Engineering - Edmonton
 Report To: EBA Engineering - Edmonton

Unit 6, 151 Industrial Road
 Whitehorse, YT, Canada
 Y1A 2V3

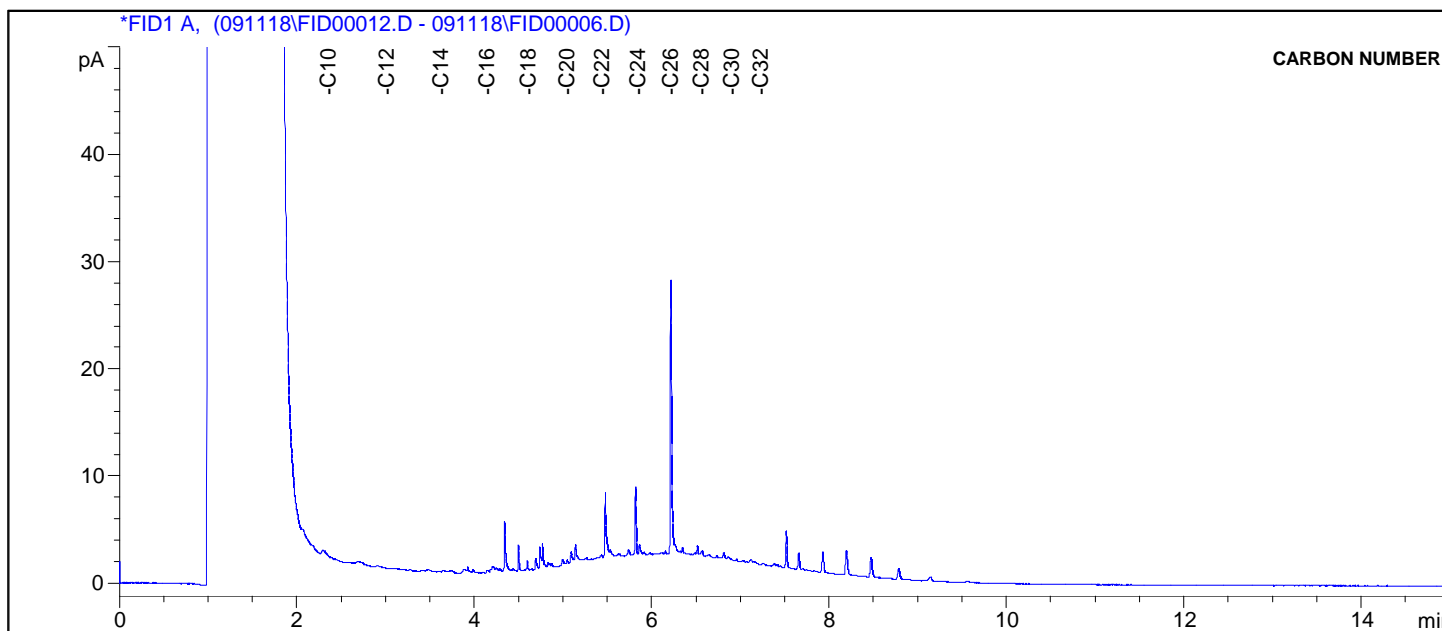
Attn: Carol Ma
 Sampled by: Carol Ma
 Company: EBA

Project ID: W23101303
 Name: Teslin Landfill Sampling
 Location: Teslin, YT
 LSD:
 P.O.:

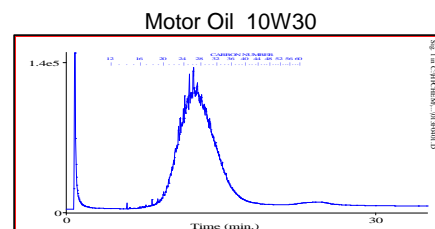
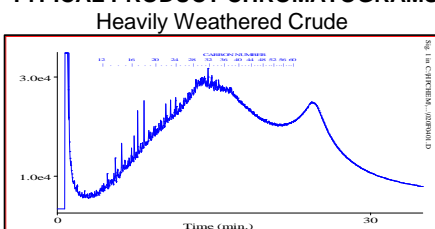
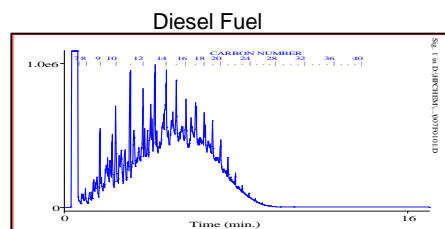
Lot ID: **713641**
 Control Number: A137210
 Date Received: Nov 17, 2009
 Date Reported: Nov 19, 2009
 Report Number: 1277759

NWL Number: 713641-1
 Sample Date: Nov 15, 2009

Sample Description: MW01-Teslin Landfill



TYPICAL PRODUCT CHROMATOGRAMS



Product Carbon Number Ranges

Gasoline C4-C12
 Varsol C8-C12

Kerosene C7-C16
 Diesel C8-C22

Lubricating Oils C20-C40
 Crude Oils C3-C60+

Bill To: EBA Engineering - Edmonton
 Report To: EBA Engineering - Edmonton

Unit 6, 151 Industrial Road
 Whitehorse, YT, Canada
 Y1A 2V3

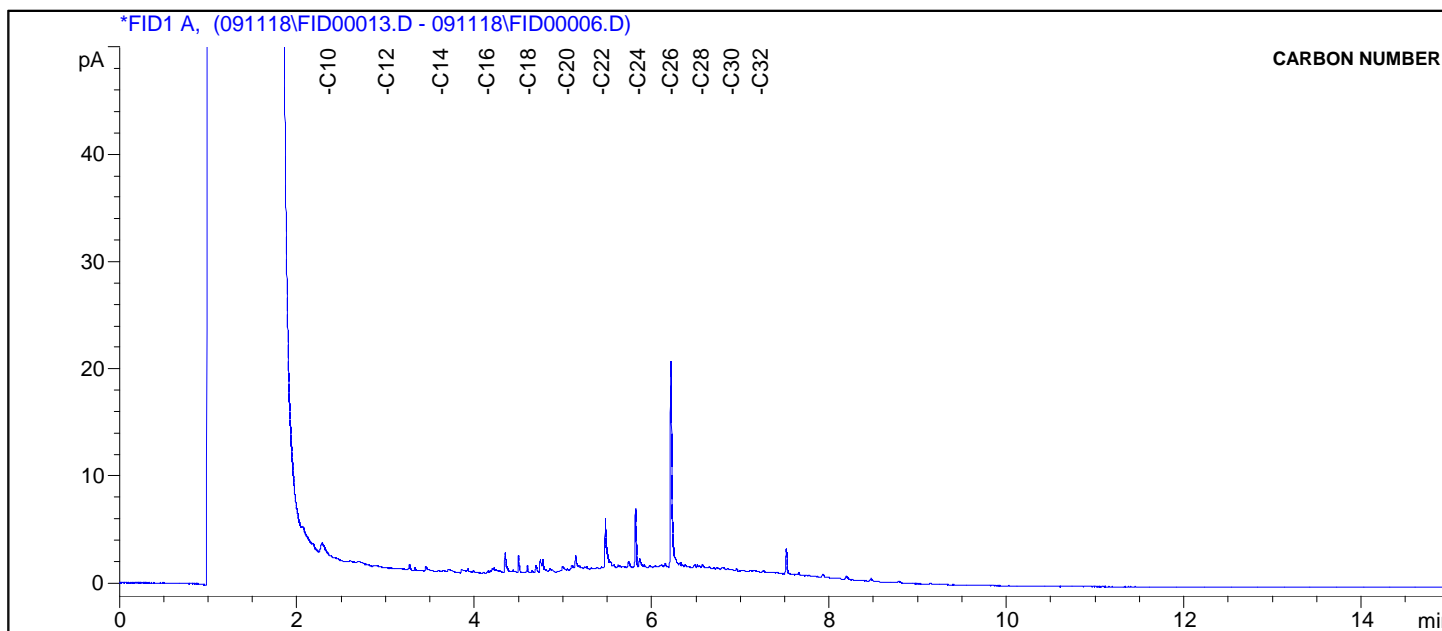
Attn: Carol Ma
 Sampled by: Carol Ma
 Company: EBA

Project ID: W23101303
 Name: Teslin Landfill Sampling
 Location: Teslin, YT
 LSD:
 P.O.:

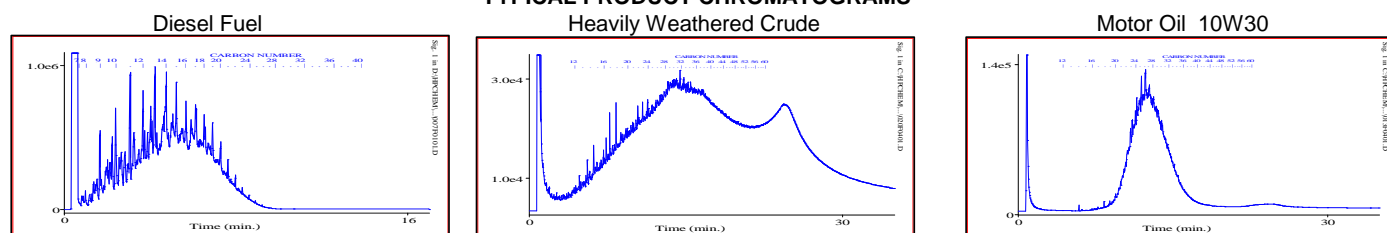
Lot ID: **713641**
 Control Number: A137210
 Date Received: Nov 17, 2009
 Date Reported: Nov 19, 2009
 Report Number: 1277759

NWL Number: 713641-2
 Sample Date: Nov 15, 2009

Sample Description: MW02-Teslin Landfill



TYPICAL PRODUCT CHROMATOGRAMS



Product Carbon Number Ranges

Gasoline C4-C12
 Varsol C8-C12

Kerosene C7-C16
 Diesel C8-C22

Lubricating Oils C20-C40
 Crude Oils C3-C60+

Bill To: EBA Engineering - Edmonton
 Report To: EBA Engineering - Edmonton

Unit 6, 151 Industrial Road
 Whitehorse, YT, Canada
 Y1A 2V3

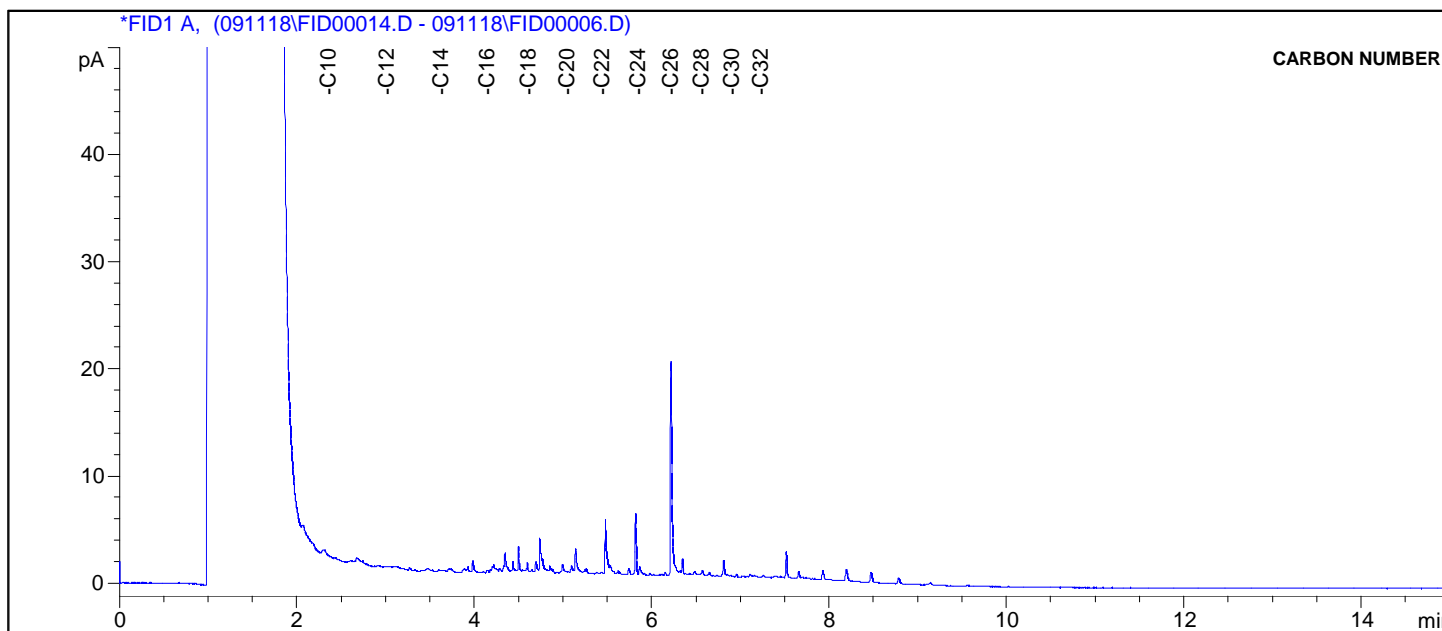
Attn: Carol Ma
 Sampled by: Carol Ma
 Company: EBA

Project ID: W23101303
 Name: Teslin Landfill Sampling
 Location: Teslin, YT
 LSD:
 P.O.:

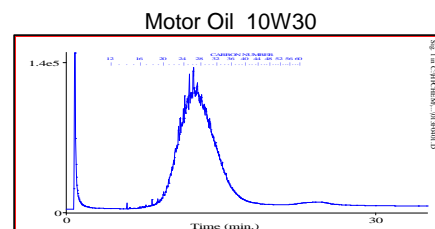
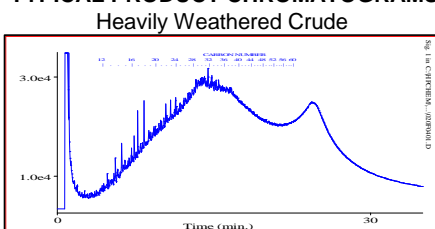
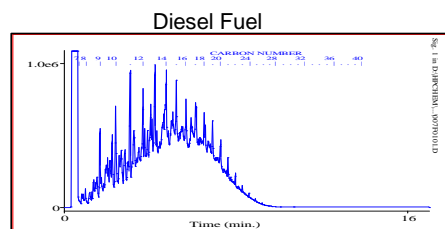
Lot ID: **713641**
 Control Number: A137210
 Date Received: Nov 17, 2009
 Date Reported: Nov 19, 2009
 Report Number: 1277759

NWL Number: 713641-3
 Sample Date: Nov 15, 2009

Sample Description: MW03-Teslin Landfill



TYPICAL PRODUCT CHROMATOGRAMS



Product Carbon Number Ranges

Gasoline C4-C12
 Varsol C8-C12

Kerosene C7-C16
 Diesel C8-C22

Lubricating Oils C20-C40
 Crude Oils C3-C60+

Bill To: EBA Engineering - Edmonton
 Report To: EBA Engineering - Edmonton

Unit 6, 151 Industrial Road
 Whitehorse, YT, Canada
 Y1A 2V3

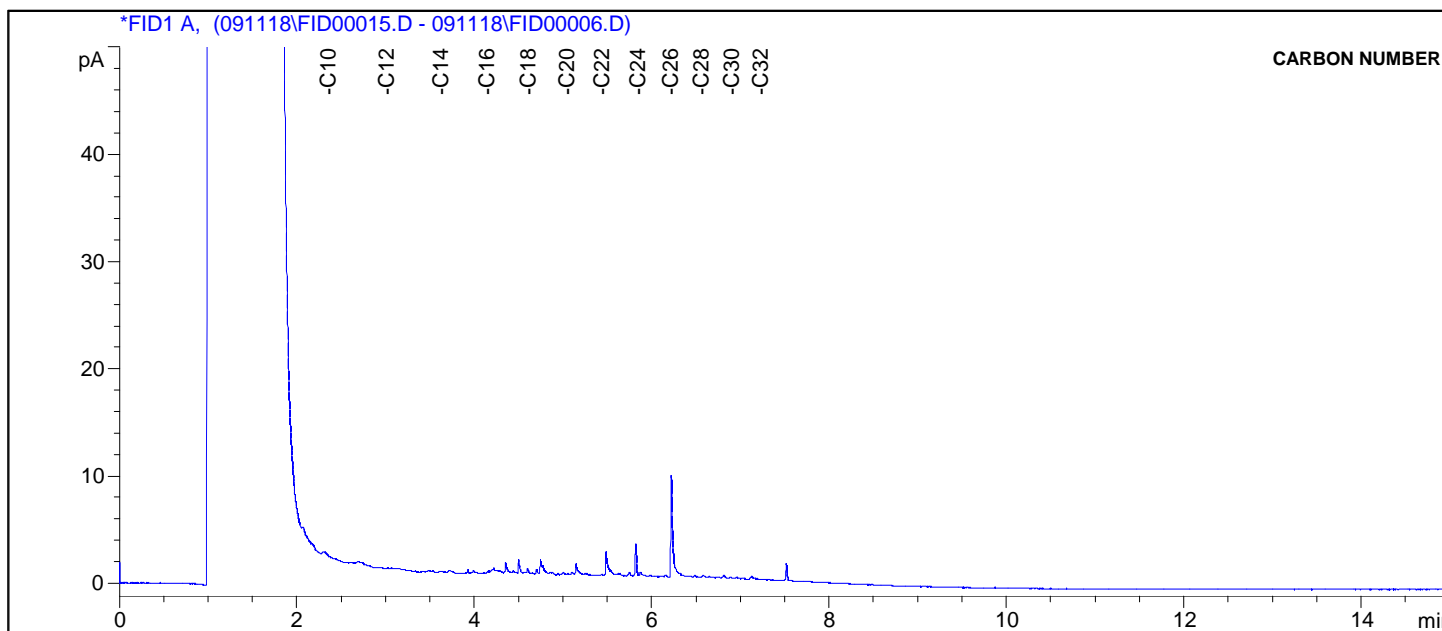
Attn: Carol Ma
 Sampled by: Carol Ma
 Company: EBA

Project ID: W23101303
 Name: Teslin Landfill Sampling
 Location: Teslin, YT
 LSD:
 P.O.:

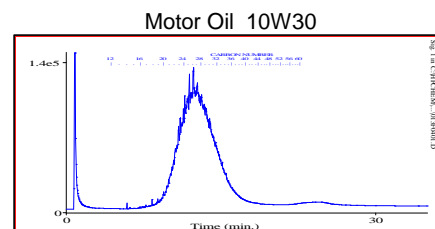
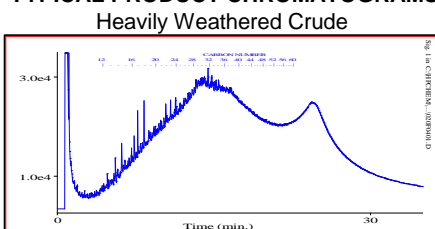
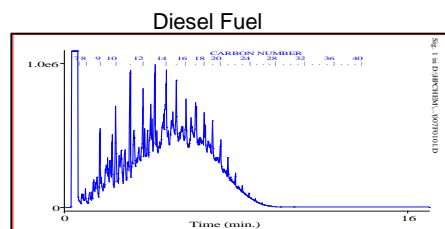
Lot ID: **713641**
 Control Number: A137210
 Date Received: Nov 17, 2009
 Date Reported: Nov 19, 2009
 Report Number: 1277759

NWL Number: 713641-4
 Sample Date: Nov 15, 2009

Sample Description: Teslin Lake



TYPICAL PRODUCT CHROMATOGRAMS



Product Carbon Number Ranges

Gasoline C4-C12
 Varsol C8-C12

Kerosene C7-C16
 Diesel C8-C22

Lubricating Oils C20-C40
 Crude Oils C3-C60+



Control Number A137210

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Exova location and proper sampling protocol

www.exova.com

Billing Address:		Copy of Report:	Copy of Report To:	Copy of invoice:
Company: EBA Engineering Consultants		<input type="checkbox"/>	Company:	Send invoice to this
Address: #6 151 Industrial Road		QA/QC Report <input type="checkbox"/>	Address:	address for approval <input type="checkbox"/>
Whitehorse Yukon Y1A 2V3				
Attention: Carol Ma		Report Result:	Report Result:	
Phone: 867-668-2071 x224		e-mail <input checked="" type="checkbox"/>	e-mail <input type="checkbox"/>	
Fax: 668-4349		Results Online <input type="checkbox"/>	Results Online <input type="checkbox"/>	
Cell: 668-4349		Fax <input type="checkbox"/>	Fax <input type="checkbox"/>	
e-mail: cma@eba.ca		Mail <input checked="" type="checkbox"/>	Mail <input type="checkbox"/>	

Information to be included on Report and Invoice

Project ID: **W23101303**
Project Name: **Teslin Landfill Sampling**
Project Location: **Teslin, YT**
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.
If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)

Sampled by: **Carol Ma**
Company: **EBA** Signature: **Carol Ma**

I authorize Exova to proceed with the work indicated on this form:

Date: **11/15/09** Initial: **CM**

Received by: **Carol Ma** **NOV 17 2009**

Waybill #: _____

Company: _____

Special Instructions / Comments

Ammonia + total phosphates are preserved w/ sulphuric acid
total metals are preserved w/ nitric acid
dissolved metals are field filtered +

Please indicate which regulations you are required to meet:

☒ **MW02 - original amber glasses for DO & T & E were**

☒ Health Canada Drinking Water Quality
☐ Alberta Tier 1
Other: _____

Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Enter tests above (✓ relevant samples below)									
						↓	TW 36	Dissolved Organic Carbon	Total Extractable Hydrocarbons	ICP Dissolved Metals	Total Suspended Solids	Ammonia	Total phosphate		
MW01 - Teslin Landfill			11/15/09 11:30 AM	H2O	pump	7	X	X	X	X	X	X	X		
MW02 - Teslin Landfill			11/15/09 12:35 PM	H2O	pump	5	X	X	X	X	X	X	X		
MW03 - Teslin Landfill			11/15/09 11:35 AM	H2O	pump	7	X	X	X	X	X	X	X		
Teslin Lake			11/15/09 1:30 PM	H2O	grab	7	X	X	X	X	X	X	X		

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

Page ____ of ____



Health and Social Services
Santé et des Affaires sociales
Environmental Health Services
Service d'hygiène du milieu

#2 Hospital Road, Whitehorse, Yukon Y1A 3H8
phone: (867) 667-8391 fax: (867) 667-8322
Toll free: 1-800-661-0408 ext.8391

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER
ANALYSE BACTÉRIOLOGIQUE DE L'EAU POTABLE

2, chemin Hospital, Whitehorse (Yukon) Y1A 3H8
Tél.: (867) 667-8391 Téléc.: (867) 667-8322
Sans frais au Yukon 1-800-661-0408, poste 8391

Contact Information • Coordonnées de la personne-ressource

Contact Person Carol Ma Phone 667-668-2071
Personne-ressource Carol Ma Téléphone 667-668-2071
Mailing address #6151 Industrial Road Fax 668-4349
Adresse postale Whitehorse Yukon Postal code Y1A 2V3

First Nation, Municipal or Business Name
Nom de la première nation, de la municipalité ou de l'entreprise
Agent EBA Engineering Consultants Ltd Fax 668-4349
Agent EBA Engineering Consultants Ltd Télécopieur 668-4349

Sampling Location • Lieu de la prise d'échantillon

Municipal Address Teslin Landfill Subdivision
Adresse municipale Teslin Landfill Lotissement
Legal Description Lot Quad Plan no.
Designation officielle Terrain Quadrilatère Plan n°
Other information (e.g., Location, Business / Building Name)
Autres renseignements (par ex.: emplacement, nom de l'entreprise, nom de l'édifice)

Sample Collection / Échantillonnage

Sample Collected By Carol Ma Date 09/11/15 Time 11:35 am
Échantillon prélevé par Carol Ma Date 09/11/15 YY/MM/DD • AA/MM/JJ
Sampling Site (e.g., kitchen tap) MW03
Point d'échantillonnage (par ex.: robinet de cuisine) MW03
Is this a Resample from a Previous Test? ☐ Yes ☒ No Previous Sample Number
Est-ce un deuxième échantillon d'un test antérieur? ☐ Oui ☒ Non Numéro de l'échantillon précédent

Sample Supply / Source d'approvisionnement

☐ Public Supply ☐ Bulk Water Distributor ☐ Business ☐ Private Residence
Municipal - par canalisation Municipal - par camion Privé - entreprise Privé - résidence

Sample Source / Provenance de l'échantillon

☐ Dug Well ☐ Driven Well ☒ Drilled Well Depth of Well
Puits creusé Puits tubulaire Puits foré à la sondeuse Profondeur du puits
☐ Water Holding Tank ☐ Other (explain) not a drinking water supply
Eau livrée Autre (précisez)

Water Treatment / Traitement de l'eau

Is the Water Chlorinated? ☐ Yes ☒ No Free Available Chlorine p.p.m.
L'eau contient-elle du chlore? ☐ Oui ☒ Non Chlore libre disponible mg/L
Other Treatment Systems (e.g., UV, softener, filter)
Autre dispositif de traitement (par ex.: désinfection aux rayons ultraviolets, adoucisseur d'eau, filtre d'eau)

For Laboratory Use Only / À l'usage du laboratoire seulement

Receipt of Sample Date 09/11/16 Time 1000 By 2
Réception de l'échantillon Date 09/11/16 YY/MM/DD • AA/MM/JJ Heure 1000 pm Par 2
Condition of Sample ☒ Satisfactory ☐ Unsatisfactory (explain)
État de l'échantillon ☒ Satisfaisant ☐ Non satisfaisant (précisez)
Incubation Date 09/11/16 Time 035 am By 2 Incubator 1
Date 09/11/16 YY/MM/DD • AA/MM/JJ Heure 035 am Par 2
Analysis Completed Date 09/11/17 Time 035 am By 2
Analyse terminée Date 09/11/17 YY/MM/DD • AA/MM/JJ Heure 035 am Par 2

Results (See Reverse Side for Interpretation)
Résultats (Voir au verso l'interprétation des résultats)

Total Coliforms/Coliformes totaux <input type="checkbox"/> Present / Présence <input checked="" type="checkbox"/> Absent / Absence	E. coli/E. coli <input type="checkbox"/> Present / Présence <input checked="" type="checkbox"/> Absent / Absence
---	---

Comments / Commentaires

- ☐ Results Satisfactory for Bacteriological Quality
Résultats satisfaisants à l'égard de la qualité bactériologique
☐ Immediately Resample
Rééchantillonnage immédiat
☐ Investigate and Take Appropriate Corrective Actions
Faire enquête et appliquer les mesures correctives nécessaires
☐ Boil Water Before Consumption
Traiter l'eau avant de la consommer

STANDARD METHOD 9223B
COLLETT PRESENCE/ABSENCE
PER MANUFACTURER SPEC

Report Authorized By LT Position LT Date 09/11/17
Report Authorized By LT YY/MM/DD • AA/MM/JJ

YG(4649)NC3 Rev.03/2005

Sample Number
Numéro de l'échantillon: 33950



Health and Social Services
Santé et des Affaires sociales
Environmental Health Services
Service d'hygiène du milieu

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER
ANALYSE BACTÉRIOLOGIQUE DE L'EAU POTABLE

#2 Hospital Road, Whitehorse, Yukon Y1A 3H8
phone: (867) 667-8391 fax: (867) 667-8322
Toll free: 1-800-661-0408 ext.8391

2, chemin Hospital, Whitehorse (Yukon) Y1A 3H8
Tél.: (867) 667-8391 Téléc.: (867) 667-8322
Sans frais au Yukon 1-800-661-0408, poste 8391

Contact Information • Coordonnées de la personne-ressource

Contact Person Carol Ma Phone 867-668-2671
Personne-ressource Carol Ma Téléphone 867-668-2671
Mailing address #6 151 Industrial Road Fax X224
Adresse postale Whitehorse YT Télécopieur 668-4349
Postal code Y1A 2V3 Code postal Y1A 2V3

First Nation, Municipal or Business Name
Nom de la première nation, de la municipalité ou de l'entreprise

Agent EBA Engineering Consultants Ltd Fax 668-4349
Agent EBA Engineering Consultants Ltd Télécopieur 668-4349

Sampling Location • Lieu de la prise d'échantillon

Municipal Address Teslin Landfill Subdivision
Adresse municipale Teslin Landfill Lotissement
Legal Description Lot Quad Plan no.
Designation officielle Terrain Quadrilatère Plan n°
Other Information (e.g., Location, Business / Building Name)
Autres renseignements (par ex.: emplacement, nom de l'entreprise, nom de l'édifice)

Sample Collection / Échantillonnage

Sample Collected By Carol Ma Date 09/11/15 Time 12:10 am
Échantillon prélevé par Carol Ma Date 09/11/15 Heure 12:10 am
Sampling Site (e.g., kitchen tap) MW01
Point d'échantillonnage (par ex.: robinet de cuisine) MW01
Is this a Resample from a Previous Test? ☐ Yes ☒ No Previous Sample Number
Est-ce un deuxième échantillon d'un test antérieur? ☐ Oui ☒ Non Numéro de l'échantillon précédent

Sample Supply / Source d'approvisionnement

☐ Public Supply ☐ Bulk Water Distributor ☐ Business ☐ Private Residence
Municipal - par canalisation Municipal - par camion Privé - entreprise Privé - résidence

Sample Source / Provenance de l'échantillon

☐ Dug Well ☐ Driven Well ☒ Drilled Well Depth of Well
Puits creusé Puits tubulaire Puits foré à la sondeuse Profondeur du puits
☐ Water Holding Tank ☐ Other (explain) not a drinking water supply
Eau livrée Autre (précisez)

Water Treatment / Traitement de l'eau

Is the Water Chlorinated? ☐ Yes ☒ No Free Available Chlorine 0.00 p.p.m.
L'eau contient-elle du chlore? ☐ Oui ☒ Non Chlore libre disponible 0.00 mg/L
Other Treatment Systems (e.g., UV, softener, filter)
Autre dispositif de traitement (par ex.: désinfection aux rayons ultraviolets, adoucisseur d'eau, filtre d'eau)

For Laboratory Use Only / À l'usage du laboratoire seulement

Receipt of Sample 09/11/16 Time 00:00 pm By 2
Réception de l'échantillon Date 09/11/16 Heure 00:00 pm Par 2
YY/MM/DD • AA/MM/JJ
Condition of Sample ☒ Satisfactory ☐ Unsatisfactory (explain)
État de l'échantillon ☒ Satisfaisant ☐ Non satisfaisant (précisez)
Incubation 09/11/16 Time 22:50 am By 2 Incubator 1
Incubation Date 09/11/16 Heure 22:50 am Par 2 Incubateur 1
YY/MM/DD • AA/MM/JJ
Analysis Completed 09/11/17 Time 3:05 am By 2
Analyse terminée Date 09/11/17 Heure 3:05 am Par 2
YY/MM/DD • AA/MM/JJ

Results (See Reverse Side for Interpretation)
Résultats (Voir au verso l'interprétation des résultats)

Total Coliforms/Coliformes totaux

☐ Present / Présence ☒ Absent / Absence

E. coli/E. coli

☐ Present / Présence ☒ Absent / Absence

Comments / Commentaires

- ☐ Results Satisfactory for Bacteriological Quality
Résultats satisfaisants à l'égard de la qualité bactériologique
☐ Immediately Resample
Rééchantillonnage immédiat
☐ Investigate and Take Appropriate Corrective Actions
Faire enquête et appliquer les mesures correctives nécessaires
☐ Boil Water Before Consumption
Traiter l'eau avant de la consommer

STANDARD METHOD 9223B

COLILERT PRESENCE/ABSENCE

PER MANUFACTURER SPEC

Report Authorized By L. L. L. Position LRT Date 09/11/17
Rapport autorisé par L. L. L. Position LRT Date 09/11/17
YY/MM/DD • AA/MM/JJ

YQ(4649)NC3 Rev.03/2005

Sample Number
Numéro de l'échantillon: 33947



Health and Social Services
Santé et des Affaires sociales
Environmental Health Services
Service d'hygiène du milieu

#2 Hospital Road, Whitehorse, Yukon Y1A 3H8
phone : (867) 667-8391 fax : (867) 667-8322
Toll free: 1-800-661-0408 ext.8391

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER
ANALYSE BACTÉRIOLOGIQUE DE L'EAU POTABLE

2, chemin Hospital, Whitehorse (Yukon) Y1A 3H8
Tél. : (867) 667-8391 Téléc. : (867) 667-8322
Sans frais au Yukon 1-800-661-0408, poste 8391

Contact Information • Coordonnées de la personne-ressource

Contact Person
Personne-ressource Carol Ma Phone 668-2071 x224
Mailing address
Adresse postale #6 151 Industrial Road Fax 668-4349
Whitehorse YT Postal code Y1A 2N5

First Nation, Municipal or Business Name
Nom de la première nation, de la municipalité ou de l'entreprise

Agent
Agent EBA Engineering Consultants Ltd. Fax 668-4349

Sampling Location • Lieu de la prise d'échantillon

Municipal Address
Adresse municipale Teslin Landfill Subdivision
Legal Description Lot Quad Lotissement
Designation officielle Terrain Plan no.
Other Information (e.g., Location, Business / Building Name) Plan n°
Autres renseignements (par ex. : emplacement, nom de l'entreprise, nom de l'édifice)

Sample Collection / Échantillonnage

Sample Collected By
Échantillon prélevé par Carol Ma Date 09/11/15 Time 12:35 am
Sampling Site (e.g., Kitchen tap)
Point d'échantillonnage (par ex. : robinet de cuisine) MW22
Is this a Resample from a Previous Test?
Est-ce un deuxième échantillon d'un test antérieur? ☐ Yes ☒ No Previous Sample Number
Numéro de l'échantillon précédent

Sample Supply / Source d'approvisionnement

☐ Public Supply ☐ Bulk Water Distributor ☐ Business ☐ Private Residence
Municipal - par canalisation Municipal - par camion Privé - entreprise Privé - résidence

Sample Source / Provenance de l'échantillon

☐ Dug Well ☐ Driven Well ☒ Drilled Well Depth of Well
Puits creusé Puits tubulaire Puits foré à la sondeuse Profondeur du puits
☐ Water Holding Tank ☐ Other (explain)
Eau livrée Autre (précisez)

Water Treatment / Traitement de l'eau

Is the Water Chlorinated?
L'eau contient-elle du chlore? ☐ Yes ☒ No Free Available Chlorine p.p.m.
Chlore libre disponible mg/L
Other Treatment Systems (e.g., UV, softener, filter)
Autre dispositif de traitement (par ex. : désinfection aux rayons ultraviolets, adoucisseur d'eau, filtre d'eau)

For Laboratory Use Only / À l'usage du laboratoire seulement

Receipt of Sample
Réception de l'échantillon Date 09/11/16 Time 1:00 pm By PA
Condition of Sample
État de l'échantillon ☒ Satisfactory ☐ Unsatisfactory (explain)
Satisfaisant Non satisfaisant (précisez)
Incubation Date 09/11/16 Time 3:35 pm By PA Incubator 1
Analysis Completed
Analyse terminée Date 09/11/17 Time 3:35 pm By PA

Results (See Reverse Side for Interpretation)
Résultats (Voir au verso l'interprétation des résultats)

Total Coliforms/Coliformes totaux

☐ Present / Présence ☒ Absent / Absence

E. coli/E. coli

☐ Present / Présence ☒ Absent / Absence

Comments / Commentaires

- ☐ Results Satisfactory for Bacteriological Quality
Résultats satisfaisants à l'égard de la qualité bactériologique
☐ Immediately Resample
Rééchantillonnage immédiat
☐ Investigate and Take Appropriate Corrective Actions
Faire enquête et appliquer les mesures correctives nécessaires
☐ Boil Water Before Consumption
Traiter l'eau avant de la consommer

STANDARD METHOD 9223B

COLILERT PRESENCE/ABSENCE

PER MANUFACTURER SPEC

By
Par

Report Authorized By RLT Position RLT Date 09/11/17
Report Authorized By RLT Position RLT Date 09/11/17

YG(4649)NC3 Rev.03/2005

Sample Number
Numéro de l'échantillon : 33948



Health and Social Services
Santé et des Affaires sociales
Environmental Health Services
Service d'hygiène du milieu

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER
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Contact Information • Coordonnées de la personne-ressource

Contact Person / Personne-ressource: Carol Ma Phone / Téléphone: 668-2071 x224
Mailing address / Adresse postale: #6151 Industrial Road Fax / Télécopieur: 668-4349
Whitehorse YT Postal code / Code postal: Y1A 2V5

First Nation, Municipal or Business Name

Nom de la première nation, de la municipalité ou de l'entreprise

Agent

Agent: EBA Engineering Consultants

Fax

Télécopieur: 668-4349

Sampling Location • Lieu de la prise d'échantillon

Municipal Address

Adresse municipale: Teslin Landfill

Subdivision

Lotissement

Legal Description / Lot

Quadrant

Plan no.

Désignation officielle Terrain

Quadrilatère

Plan n°

Other information (e.g., Location, Business / Building Name)

Autres renseignements (par ex.: emplacement, nom de l'entreprise, nom de l'édifice)

Sample Collection / Échantillonnage

Sample Collected By

Échantillon prélevé par: Carol Ma

Date

Date: 09/11/15

Time

Heure: 1:35 am

Sampling Site (e.g., kitchen tap)

Point d'échantillonnage (par ex.: robinet de cuisine): Teslin Lake

Is this a Resample from a Previous Test?

Est-ce un deuxième échantillon d'un test antérieur?

☐ Yes

☐ Oui

☒ No

☒ Non

Previous Sample Number

Numéro de l'échantillon précédent

Sample Supply / Source d'approvisionnement

☐ Public Supply

Municipal - par canalisation

☐ Bulk Water Distributor

Municipal - par camion

☐ Business

Privé - entreprise

☐ Private Residence

Privé - résidence

Sample Source / Provenance de l'échantillon

☐ Dug Well

Puits creusé

☐ Driven Well

Puits tubulaire

☐ Drilled Well

Puits foré à la sondeuse

Depth of Well

Profondeur du puits

☐ Water Holding Tank

Eau livrée

☒ Other (explain)

Autre (précisez): Teslin Lake

Water Treatment / Traitement de l'eau

Is the Water Chlorinated?

L'eau contient-elle du chlore?

☐ Yes

☐ Oui

☒ No

☒ Non

Free Available Chlorine

Chlore libre disponible

p.p.m.

mg/L

Other Treatment Systems (e.g., UV, softener, filter)

Autre dispositif de traitement (par ex.: désinfection aux rayons ultraviolets, adoucisseur d'eau, filtre d'eau)

For Laboratory Use Only / À l'usage du laboratoire seulement

Receipt of Sample

Réception de l'échantillon

Date

Date: 09/11/16

Time

Heure: 1:00 pm

By

Par: 2

Condition of Sample

État de l'échantillon

☒ Satisfactory

Satisfaisant

☐ Unsatisfactory (explain)

Non satisfaisant (précisez)

Incubation

Incubation

Date

Date: 09/11/16

Time

Heure: 3:35 am

By

Par: 2

Incubator

Incubation: 1

Analysis Completed

Analyse terminée

Date

Date: 09/11/17

Time

Heure: 3:35 am

By

Par: 1

Results (See Reverse Side for Interpretation)

Résultats (Voir au verso l'interprétation des résultats)

Total Coliforms/Coliformes totaux

☒ Present / Présence

☐ Absent / Absence

E. coli/E. coli

☐ Present / Présence

☒ Absent / Absence

Comments / Commentaires

☐ Results Satisfactory for Bacteriological Quality

Résultats satisfaisants à l'égard de la qualité bactériologique

☐ Immediately Resample

Reéchantillonnage immédiat

☐ Investigate and Take Appropriate Corrective Actions

Faire enquête et appliquer les mesures correctives nécessaires

☐ Boil Water Before Consumption

Traiter l'eau avant de la consommer

STANDARD METHOD 9223B

COLILERT PRESENCE/ABSENCE

PER MANUFACTURER SPEC

By

Par

Report Authorized By

Report Autorisé par

[Signature]

Position

Position: [Signature]

Date

Date: 09/11/17

Sample Number

Numéro de l'échantillon: 33949



APPENDIX D

APPENDIX D ENVIRONMENTAL REPORT – GENERAL CONDITIONS



ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

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In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.