



THE CITY OF WINNIPEG • VILLE DE WINNIPEG

PLANNING, PROPERTY AND DEVELOPMENT DEPARTMENT
SERVICE DE L'URBANISME, DES BIENS ET DE L'AMÉNAGEMENT

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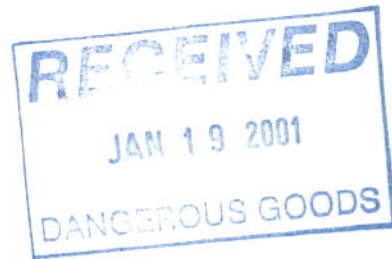
WINNIPEG, MANITOBA
R3C 4K4

In reply please refer to / Référence à rappeler :

R. Senyk
(204) 986-5080
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January 17, 2001

Province of Manitoba
Manitoba Conservation
Environmental Operations Division
123 Main Street - Suite 160
R3C 1A5



ATTENTION: MR. R. WEBBER

Dear Sir:

RE: PHASE II ENVIRONMENTAL SITE ASSESSMENT OF 1385 WHYTE AVENUE
FILE 32/6950 (PLEASE QUOTE WHEN REPLYING)

As per our telephone conversation, I am herein forwarding to you a copy of an environmental site assessment report for the above described property. Would you please review the report and provide us with your comments and if possible a closure letter?

Yours truly,

Robert Senyk

RS/tlc

Encs.

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The City of Winnipeg

Planning, Property and Development Department

Phase II Environmental Site Assessment of 1385, Whyte Ave.



Ecologistics (2000) Limited

January 12, 2001

Mr. Ed Dolhun, P.Eng., M.C.I.P.
Consultant to the Land Enhancement Program
The City of Winnipeg,
Planning, Property and Development Department,
Second floor, 65 Garry Street,
Winnipeg. MB. R3C 4K4

Dear Mr. Dolhun,

RE: PHASE II ESA AT 1385 WHYTE AVENUE.

On behalf of Ecologistics (2000) Limited (formerly FT-Ecologistics Limited) and our sub-contractors AMEC Earth and Environmental Ltd., it is my pleasure to present to The city of Winnipeg our report on Phase II Environmental Site Assessment at 1385 Whyte Avenue..

As you can see, in section 4.2 in this report, our technical staff conclude that the re-development of the Site is severely limited. To verify the lateral extents of impacts and the requirement to complete remedial actions, further delineation of soil and groundwater impacts must be carried out. As suggested in your letter of July 24, 2000 requesting proposals, we are submitting a separate set of recommendations and cost estimates for further delineation.

Thanks,

Yours truly,

Ecologistics (2000) Limited


Jammi Kumar
General Manager

**PHASE II ENVIRONMENTAL SITE ASSESSMENT
1385 WHYTE AVENUE
WINNIPEG, MANITOBA**

Submitted to:

**City of Winnipeg
Planning, Property and Development
Department**

Submitted by:

**FT Ecologistics Limited
230 – 294 William Avenue,
Winnipeg, Manitoba. R3B OR1**

In collaboration with

**AMEC Earth & Environmental Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4**

January 2001

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1.0 INTRODUCTION

The City of Winnipeg-Planning, Property and Development Department contracted the services of FT-Ecologistics to conduct a Phase II Environmental Site Assessment (ESA) of a property located at 1385 Whyte Avenue in Winnipeg, Manitoba. The purpose of the investigation was to determine if subsurface impacts were present at the Site. A Phase I ESA, completed by the consultant on November 2, 2000, identified that a former building and ASTs at the Site formerly contained petroleum products. The Phase I ESA also identified potential off-site sources of hydrocarbon impacts.

1.1 SCOPE OF WORK

The scope of work for the investigation was proposed as follows:

- Drill up to 12 test holes in areas of the Site most likely to be impacted by on and off-site activities, as follows: location of former ASTs at the northwest corner (2 test holes); location of former oil & grease plant and oil storage area (2 test holes); former central AST area (2 test holes); east property line of Site along former Hydro yard (2 test holes); west property line of Site adjacent to former off-site USTs (2 test holes); and at the southeast corner of the Site (2 test holes).
- Install up to three monitoring wells in the test holes located at the northwest corner, along the west property line and at the former oil & grease plant areas of the Site, if hydrocarbon impacts were identified.
- Submit for laboratory analysis, up to two soil samples for Oil & Grease, five soil samples for PHC and BTEX, one soil sample for Lead (leachable), one soil sample for PCB, and one soil sample for Cyanide (free) concentrations.
- Complete monitoring and groundwater sampling of the three monitoring wells.
- Submit up to two water samples for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX) and total lead.
- Submit a report that summarizes the findings of the subsurface investigation.

1.2 SITE DESCRIPTION

The Site is situated at the northeast corner of Vine Street and Whyte Avenue in Winnipeg, Manitoba. At the time of the Site visit, the Site was snow covered, however AMEC noted that the west and southeast portions of the property were surfaced with concrete, the northeast portion contained a concrete dyke and the northeast and central areas contained rubble piles. Large snow piles were also present throughout the northern portion of the Site. The surrounding land consisted of light industrial developments fronting onto Whyte Avenue to the east and west, the CPR Weston Rail Yards to the north, and residential housing to the south, across Whyte Avenue.

The Site was relatively low-lying and the ground surface elevation appeared to be approximately 0.5 m below the adjacent properties.

A plan showing the site layout and adjacent properties is shown in Figure A1, Appendix A. No underground utilities were present at the site.

2.0 ASSESSMENT METHODOLOGY

2.1 TEST HOLE LOCATIONS

Based on the findings of the Phase I ESA, test holes were advanced throughout the majority of the Site in order to determine if historical on and off-Site storage and handling of petroleum products had impacted the Site. A test hole was also advanced at the southeast corner of the Site in order to determine if cyanide impacts, from a suspected off-site source (as indicated by the City of Winnipeg), had impacted the Site. Based on the results of the field screening, monitoring wells were installed at three test hole locations.

On 30 November and 1 December 2000, a total of eleven (11) test holes were drilled at the site, to depths between 4.6 and 6.1 m below grade, at the following locations:

- TH1 (MW): South portion of Site, within the footprint of the former oil & grease plant;
- TH2: Along west property line (south end), adjacent to former off-Site UST;
- TH3: 20 m north of TH1, within former oil storage area;
- TH4 (MW): Along west property line (central), adjacent to former off-Site UST;
- TH5: Central (west side), adjacent to former AST location;
- TH6: Central, within former AST location;
- TH7: Along east property line (central), adjacent to former off-Site Hydro storage yard;
- TH8: Along east property line (15 m north of TH7), adjacent to former off-Site Hydro storage yard;
- TH9: Southwest corner, adjacent to suspected former off-Site cyanide impacts;
- TH10 (MW): Northwest corner (within concrete dyke) at former ASTs location; and
- TH11: Northwest corner, within former rail spur line, directly east of former ASTs location.

The test hole locations are shown in Figure 1 Appendix A and the test hole logs, as recorded at the time of drilling, are included in Appendix B.

2.2 SOIL SAMPLING METHODS

Soil sampling was conducted with the aid of both truck and backhoe mounted drill rigs which were supplied and operated by Maple Leaf Enterprises Limited of Winnipeg, Manitoba. Solid stem augers of 125 mm diameter were used and at regular intervals duplicate soil samples were removed from the auger flights by hand (with clean nitrile gloves) and sealed in clear plastic bags. The Ambient Temperature Headspace (ATH) vapour concentration was determined from one of the bagged soil samples at each sampling interval using a Gastech Tracetestor combustible vapour meter calibrated in the "no methane response mode" with hexane gas. As well, each soil sample was examined for evidence of fill and signs of hydrocarbon contamination such as staining and odours. The second soil sample from select soil intervals was sealed in a glass jar with a Teflon lined lid, supplied by AMEC's Edmonton laboratory, for possible chemical analysis. Headspace in the glass jars were minimized to reduce analyte volatilization before laboratory analysis.

All sample containers were labelled with the project number, date of sampling, name of sampler and sample depth. All jarred samples were immediately placed into an ice packed cooler. The jarred samples were retained in the cooler while in the field and during shipping to AMEC's Edmonton Laboratory. The soil sample that was analyzed for Cyanide was forwarded by AMEC's Edmonton Laboratory to Enviro-test Laboratories in Thunder Bay, Ontario. A chain of FT-Ecologistics Ltd.

Phase II ESA: 1835 Whyte Avenue
The City of Winnipeg.

custody/analytical request form was completed and accompanied the soil samples. Jarred samples that were not analyzed are typically held in cold storage at the laboratory for not less than thirty days and then disposed of.

The test holes were sealed at the top and bottom and within any impacted sections with granular bentonite and backfilled with auger cuttings throughout the remainder of the hole.

2.3 MONITORING WELL INSTALLATION

After the completion of soil sampling activities on 30 November and 1 December 2000, test holes TH1, TH4 and TH10 were completed as monitoring wells in order to monitor subsurface vapour concentrations and establish the groundwater conditions at the Site. The monitor wells were constructed with 50 mm diameter Schedule 40 PVC pipe, 10 slot well screen and 50 mm diameter Schedule 40 solid riser pipe to approximately 0.9m above the ground surface. Silica sand was placed in the annular space between the pipe and test hole to a depth of about 0.3 m above the top of the screen. Granular bentonite seals (1.5m thick) were placed immediately above the silica sand. The remainder of the test hole located between the bentonite seals was backfilled with drill cuttings consisting of high plasticity clay. Above ground steel casings were installed over the wells for protection and padlocked for security. The monitor well construction details are shown on the appropriate test hole logs (Figures B1, B4 and B10).

2.4 LABORATORY ANALYSIS

Based on the findings of the historical review and the field screening completed during the subsurface investigation, five soil samples were submitted for laboratory analysis of PHC and BTEX, two soil samples were submitted for analysis of Oil & Grease, one soil sample was submitted for determination of Lead (leachable) concentrations and one soil sample was submitted for determination of Cyanide (free) concentrations. Also two water samples were submitted for laboratory analysis of BTEX and Lead (total) concentrations. Samples submitted for laboratory analysis and the laboratory methods utilized are summarized in Table 1. The Certificates of Analyses are included in Appendix C.

TABLE 1: LABORATORY ANALYSIS METHODOLOGY			
Sample ID (depth in m)	Media	Analysis Requested	Laboratory Method Used
TH1-3 @ 2.1	Soil	PHC (and BTEX)	Soil BTEX – EPA Reference Method 5021/CCME PHC – EPA Reference Method 3550/CCME Lead – EPA Reference Method 1311/APHA 3120 Oil & Grease – EPA Reference Method 418.1 Cyanide - EPA Reference Method
TH4-3 @ 2.1	Soil	PHC (and BTEX)	
TH5-4 @ 3.0	Soil	Oil & Grease	
TH9-2 @ 1.2	Soil	Cyanide	
TH10-3 @ 1.2	Soil	Oil & Grease	
TH11-2 @ 0.6	Soil	PHC (and BTEX) & Lead	
TH11-4 @ 2.1	Soil	PHC (and BTEX)	
TH11-5 @ 2.4	Soil	PHC (and BTEX)	
TH1	Water	BTEX and Lead	
TH10	Water	BTEX and Lead	Water BTEX – EPA Reference Method 5021/8021B Lead – Reference Method APHA 4500-CN, C & E

2.5 QUALITY ASSURANCE/QUALITY CONTROL

Analytical quality control is provided by the laboratory through analysis in duplicate of a percentage of samples submitted and by the determination of the percentage of surrogate analyte recovery. Duplicated analysis was performed on soil sample TH10-3 and Surrogate analyte recovery analysis was performed on soil samples TH1-3, TH4-3, TH11-2, TH11-4 and TH11-5 and water samples TH1 and TH10. All QA/QC checks were determined to be within an acceptable range. Field quality assurance was provided by adherence to AMEC soil sampling protocols as stated in Section 2.2.

2.6 ASSESSMENT CRITERIA

Manitoba Conservation currently references the environmental assessment criteria as outlined in the following two documents produced by the Canadian Council of Ministers of the Environment (CCME):

- CCME. 1999. Canadian Environmental Quality Guidelines.
- CCME. 2000. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil.

The CCME documents are either directly referenced by federal, provincial and territorial governments as the standard criteria or have provided the basis for the development of other provincial/territorial criteria. The above documents support various legislative acts, such as the Canadian Environmental Protection Act (CEPA, 1985) and the Guideline for Environmental Site Investigations in Manitoba (June, 1998) as published by Manitoba Conservation (formerly Manitoba Environment).

The CCME documents are based on the assessment and consistent management of risks posed to humans, plants, animals and environmental processes from contaminant exposure. The criteria are laid out with a three tiered approach for dealing with contaminated sites with each tier incorporating more detailed Site specific information while maintaining the same environmental and human health protection goals. The first tier consists of the direct adoption of the criteria published in the EQGs and/or CWS-PHCs. The second tier involves the generation of site specific criteria when site conditions exist that significantly modify exposure and risk scenarios which were used to formulate the tier one values. The third tier relies on the use of risk assessment procedures to establish remediation objectives at contaminated sites on a site-specific basis. Tier 2 and 3 Evaluations are to be applied where specific environmental quality

guidelines are not available, or detailed site specific information should be applied, or where human health and/or environmental risks cannot be effectively quantified.

The tier one criteria are derived according to broad use categories (i.e. agricultural, residential/parkland, commercial and industrial for soil) which are further divided into exposure pathways (i.e. soil ingestion, vapour inhalation, protection of potable groundwater, etc.). The generic land use categories are described in detail in the CCME publications.

As the CCME EQGs or CWS-PHCs do not provide guidelines for groundwater with a non-potable use category, AMEC utilizes the non-potable groundwater criteria based on groundwater use criteria (which is subdivided for fine and coarse grained soils) as outlined in the Ministry of Ontario Environment's (MOE) document "*Guideline for Use at Contaminated Sites in Ontario*", June, 1996. Based on conversations with officials at Manitoba Conservation, the MOE Non-Potable Groundwater criteria are acceptable for use at Sites in Manitoba for comparison purposes.

2.6.1 Site Specific

Based on the former on-Site and current off-Site industrial land uses, CCME EQGs and CWS-PHCs for an industrial land use situation have been used as the applicable criteria for BTEX, the fractional PHC components and cyanide parameters for soil. Since the current CCME guidelines do not directly quantify Oil & Grease and lead (leachable), the MC Level III and MC Dangerous Goods Handling and Storage Act parameters were used for the applicable criteria for Oil & Grease and lead (leachable), respectively.

Based on the non-potable groundwater conditions on and off-Site, the MOE Non-Potable Groundwater criteria are applicable for equivalent BTEX and Lead (total) parameters.

3.0 RESULTS

3.1 SOIL

3.1.1 Soil Stratigraphy

The soil stratigraphy as recorded on the test hole (TH) logs (Appendix B) generally consisted of sand and clay fill materials extending to approximately 1.0 m below grade, but as deep as 3.0 m at TH5. Concrete pads ranging in thickness from 100 mm to 225 mm were also present at surface or within the upper 0.5 m of soil in TH3, TH4, TH6, TH8 and TH9. Concrete slabs were also encountered in TH1 at 1.8 m below grade and TH5 at 3.0 m below grade. The fill and/or concrete slabs were followed by alternating layers of silty clay and medium plasticity clay to a depth of up to 3.0 m. The silty clay and medium plasticity clay layers were underlain by a high plasticity clay that extended to the maximum test hole depth of 6.1 m below grade.

3.1.2 Soil Combustible Vapour Levels

The ATH vapour concentrations were determined for each soil sample recovered from the test holes during drilling and are shown on the test hole logs (Appendix B). The soil vapour levels measured and visual indicators (such as staining in the soil) noted during the drilling program are summarized in Table 2.

TABLE 2: SUMMARY OF SOIL COMBUSTIBLE VAPOUR LEVELS					
Location	Test Hole Depth (m)	Hydrocarbon Staining Zone (m)	Elevated Soil Vapour (>150 ppm) Range (m)	Maximum Soil Vapour Level	
				Level (ppm _v)	Depth (m)
TH1	4.6	2.0 to 2.5	None	90	2.1
TH2	6.1	None	None	40	0.6
TH3	4.6	None	None	30	1.2
TH4	4.6	1.5 to 2.2	None	55	0.6 & 2.1
TH5	4.6	1.8 to 3.3	1.2 to 3.3	180	3.0
TH6	4.6	None	None	55	1.2
TH7	4.6	None	None	40	0.6
TH8	4.6	None	None	55	3.7
TH9	3.0	None	None	50	1.2
TH10	6.1	0.05 to 3.0	0 to 3.0	1800	0.6
TH11	4.6	0.05 to 2.4	0 to 2.4	2200	0.6

Notes: ppm_v - parts per million organic vapour

3.1.3 Laboratory Analysis Results

The results of the laboratory analyses conducted on selected soil samples are summarized in Tables 3, 4 and 5. Copies of the Certificates of Analyses are provided in Appendix C.

TABLE 3: SOIL ANALYTICAL RESULTS – HYDROCARBONS								
Location (depth)	Soil Vapour Level (ppm)	Soil Type	Benzene	Toluene	Ethyl-benzene	Xylenes	Lead (leachable)	Oil & Grease
TH1-3 @ 2.1 m	90	Clay (silty)	<0.020	0.65	0.22	1.0		
TH4-3 @ 2.1m	55	Clay (silty)	<0.020	0.095	<0.020	0.15		
TH5-4 @ 3.0 m	180	Clay (fill)						57100
TH10-3 @ 1.2 m	600	Silt						2100
TH11-2 @ 0.6 m	2200	Sand (fill)	10	3.6	63	490	0.015	
TH11-4 @ 2.1 m	1000	Clay (silty)	3.6	0.38	9.4	63		
TH11-5 @ 2.4 m	160	Clay (sandy)t	1.1	0.74	2.4	13		
CCME EQG Industrial			5	14	20	20	NC	NC
MC DGH&T			N/A	N/A	N/A	N/A	5	N/A
MC Level III			N/A	N/A	N/A	N/A	N/A	5000

TABLE 4: SOIL ANALYTICAL RESULTS – PHC

Sample No. (depth)	Soil Vapour Level (ppm _v)	Soil Type	F1-VPH (C ₆ – C ₁₀)	F2-EPH (C ₁₀ -C ₁₆)	F3-EPH (C ₁₆ -C ₃₄)	F4-EPH (C ₃₄ -C ₅₀)
TH1-3 @ 2.1 m	90	Clay (silty)	1.4	190	5200	760
TH4-3 @ 2.1 m	55	Clay (silty)	0.94	47	33	23
TH11-2 @ 0.6 m	2200	Sand (fill)	3000	39000	10000	<10
TH11-4 @ 2.1 m	1000	Clay	600	6700	1300	<10
TH11-5 @ 2.4 m	160	Silt	160	1500	280	<10
CCME CWS-PHC ¹ commercial, coarse grained soil <1.5m depth			330	760	1700	3300
CCME CWS-PHC ¹ commercial, fine grained soil >1.5m depth			1000	3000	5000	10,000

TABLE 5: SOIL ANALYTICAL RESULTS – CYANIDE

Sample No. (depth)	Soil Vapour Level (ppm _v)	Soil Texture	MDL	Cyanide (free)
TH1-3 @ 2.1 m	90	Clay (silty)	0.5	<0.5
CCME EQG <i>Industrial</i>				8.0

Notes

- all concentrations in micrograms per gram (ug/g) = ppm
- MDL method detection limit (ppm)
- NC no criteria
- ppm_v - parts per million total organic vapour
- ¹ - Tier 1 exposure pathway – eco soil contact
- NA – Not applicable
- CCME CWS-PHC – Canadian Council of Ministers of the Environment Canada-Wide Standards for Petroleum Hydrocarbons in Soil (2000) for a commercial site
- Bold and underline indicates parameter exceeds applicable guideline
- CCME EQG – Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines (1999).
- MC Level III – Manitoba Conservation, A Guideline for the Environmental Investigation and Remediation of Petroleum Storage Sites in Manitoba (1993)
- MC DGT & H - Manitoba Conservation, Dangerous Goods Transportation and Handling Act (1987).
- NC No guideline available from CCME EQG (1999)

The laboratory results indicated that the Oil & Grease concentration in soil sample TH5-4 at 3.0 m exceeded the MC Level III criteria. The laboratory results indicated that the benzene, ethylbenzene, xylenes, F1 (C₆ to C₁₀), F2 (>C₁₀ to C₁₆) and F3 (>C₁₆ to C₃₄) fraction concentrations in soil sample TH2-11 at 0.6 m exceeded the CCME EQG and CWS-PHC for an industrial site (coarse grained soil < 1.5 m depth). The laboratory results also indicated that the xylenes and F2 fraction concentrations in soil sample TH11-4 at 2.1 m exceeded the CCME EQG and CWS-PHC for an industrial site (fine grained soil > 1.5 m depth). The laboratory results indicated that hydrocarbon impacts were present in soil sample TH11-5 at 2.4 m below grade, however the concentrations were below the CCME EQG and CWS-PHC for an industrial Site.

3.2 GROUNDWATER

3.2.1 Local Hydrogeology

According to geological maps and local water well records provided by the Water Resources Branch of the Department of Natural Resources, fractured zones in the bedrock comprise the major aquifer in the area. There are no aquifers above the bedrock. Given the substantial clay thickness, the potential for contamination of the aquifer, from on or off-site sources, is considered to be low.

3.2.2 Monitoring Results

The monitor well data from the 7 December 2000 monitoring event is summarized in Table 6.

TABLE 6: MONITOR RESULTS						
Test Hole No.	Test Hole Depth	Ground Elevation (m)	Screened Interval (m)	Monitoring Date: September 20, 2000		
				GW Depth b.g (m)	GW Elevation (m)	Comments
TH1	4.6m	99.64	2.1-3.7	1.46	98.18	No product
TH4	4.6m	99.42	1.5-3.0	0.68	98.74	No product
TH10	6.1m	99.53	2.1-3.7	0.84	98.69	No product

Notes

- ppm_v - parts per million total organic vapour
- b.g - below grade level
- NM - not monitored due to insufficient volume of groundwater
- N/A - not applicable
- GW - groundwater

The groundwater levels varied from depths of 1.46 m (TH1) to 0.67m (TH4) below grade with elevations of 98.18 to 98.74 m below grade. Groundwater flow direction is suspected to be southeast, although it is likely that water levels had not stabilized at the time of the monitoring. No free product was noted at either of the monitoring well locations.

3.2.3 Laboratory Results

The results of the laboratory analyses conducted on the groundwater samples are summarized in Table 7. Copies of the laboratory certificates of analyses are provided in Appendix C.

TABLE 7: GROUNDWATER ANALYTICAL RESULTS					
Monitoring Well No.	Benzene	Toluene	Ethyl-Benzene	Xylenes	Lead
TH1	<0.002	<0.002	<0.002	<0.003	<u>0.469</u>
TH10	0.97	0.049	0.047	1.4	0.004
MOE Non-potable Criteria (fine grained soil)	12.0	37	50	35	0.032

Notes

- all concentrations in milligrams per litre (mg/L)
- MOE Non-potable CCME - Ministry Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines (1999) for a community (drinking) water supply

The laboratory analysis indicated that the groundwater collected from TH1 has been impacted by Lead (total) at concentrations exceeding the MOE Non-Potable Groundwater criteria. The laboratory analysis also indicated that the groundwater collected from TH10 has been impacted by petroleum hydrocarbons but at concentrations significantly less than MOE's Non-Potable Groundwater criteria.

4.0 DISCUSSION AND CONCLUSIONS

4.1 DISCUSSION

The Site investigation consisted of the advancement of eleven test holes at the following locations: two test holes (TH10 & TH11) at a former concrete dyke surrounded AST area located at the northwest corner of the Site; 2 test holes (TH1 & TH3) at a former oil & grease plant and oil storage area located on the southwest portion of the Site; 2 test holes (TH5 & TH6) at a former AST storage area located centrally on the Site; 2 test holes (TH7 & TH8) adjacent to former suspected off-Site hazardous materials storage located along the east property line of the Site; 2 test holes (TH2 & TH4) adjacent to former off-Site USTs located along the west property line of the Site; and as per the City of Winnipeg's request, 1 test hole (TH9) at the southeast corner of the Site. Monitoring wells were installed in TH1, TH4 and TH10.

Elevated ATH vapour concentrations were identified in soil samples from test holes TH5, TH10 & TH11 in depth ranges between ground surface and 3.3 m below grade. Hydrocarbon staining and odours were identified in soil samples from test holes TH1, TH4, TH5, TH10 & TH11 in depth ranges from ground surface to a maximum depth of approximately 3.3 m below grade.

Fill materials (consisting of wood, metals, asphalt shingles and gravel), which extended between 0.3 and 3.0 m below grade were identified in TH5. Also, oil was visible within the soil structure of samples retrieved between 3.0 and 3.3 m below grade in TH5.

The laboratory results for soil samples TH1-3 at 2.1 m, TH5-4 at 3.0 m, TH11-2 at 0.6 m, and TH11-4 at 2.1 m below grade indicated that hydrocarbon impacts above either the CCME EQG, CCME CWS-PHC or MC Level III criteria for an industrial Site were present. Significantly elevated ATH vapour concentrations and hydrocarbon staining and odours, similar to those noted in TH11-2 at 0.6 m and TH11-4 at 2.1 m below grade, were identified at similar depths in TH10. Therefore the upper 2.1 m of soil in the vicinity of TH10 is also suspected of having concentrations of hydrocarbon impacts above the CCME EQG and CWS-PHC for an industrial Site.

The laboratory results for the water sample from TH1 indicated that Lead (total) concentrations exceeded the MOE non-potable water criteria. The laboratory analysis also indicated that the groundwater collected from TH10 had been impacted by petroleum hydrocarbons but at concentrations significantly less than MOE's Non-Potable Groundwater criteria.

4.2 CONCLUSIONS

The Phase II ESA identified hydrocarbon impacts above the CCME EQG and CWS-PHC for an industrial Site and/or MC Level III criteria in the subsurface soil in TH1, TH5, TH10 and TH11 and Lead (total) impacts above the MOE non-potable criteria in the groundwater at TH1.

The impacts identified at the Site are consistent with near surface spills and/or releases. The impacts were present in three separate areas of the Site and were most likely caused by three separate on-Site sources. The first area of impact, which includes TH1, is located at the southwest portion of the Site within the building footprint of the former oil & grease plant and oil storage area. The second area of impact, which includes TH4 and TH5, is located at the central west portion of the Site, within the location of former on-Site ASTs and a single storey building. The third area of impact, which includes TH10 and TH11, is located at the northwest portion of the Site, at the location of former petroleum and oil ASTs.

Significantly elevated hydrocarbon impacts were identified near the property lines at the northwest corner of the Site and therefore impacts may extend off-Site.

Based on AMEC's findings, it is likely that the re-development potential of the Site is severely limited. To verify the lateral extents of impacts and the requirement to complete remedial actions, further delineation of soil and groundwater impacts should be endeavoured. Once the extents of impacts are known, a remedial action plan can be developed. It is recommended that this report be provided to MC for review and comment.

5.0 CLOSURE

The American Society for Testing and Materials Standard of Practice notes that no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property. Performance of a standardized environmental site assessment protocol is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property, given reasonable limits of time and cost. The findings of this investigation are based on the interpretation of data from a limited number of test holes and analytical results pertaining to specific samples. The evaluation and interpretations do not preclude the existence of chemical substances other than those identified herein, or the possibility that contaminate concentrations can vary between the areas of investigation.

This report has been prepared for the exclusive use of the FT Ecologistics and their agents for specific application to the property defined in this report. The environmental assessment was conducted in accordance with generally accepted assessment practices. No other warranty, expressed or implied, is made. The limitations of this report are specified in Appendix E.

We trust that this report meets your present requirements. If you have any questions or if we can be of further assistance, please contact our office.

Respectfully submitted,

FT-Ecologistics Limited



Jammi Kumar

General Manager

6.0 REFERENCES

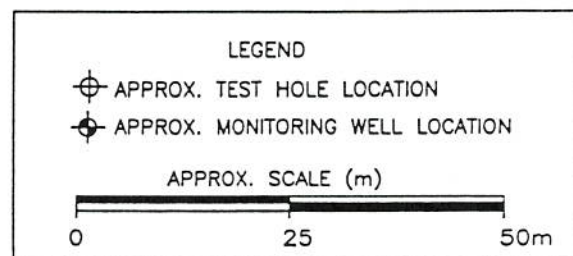
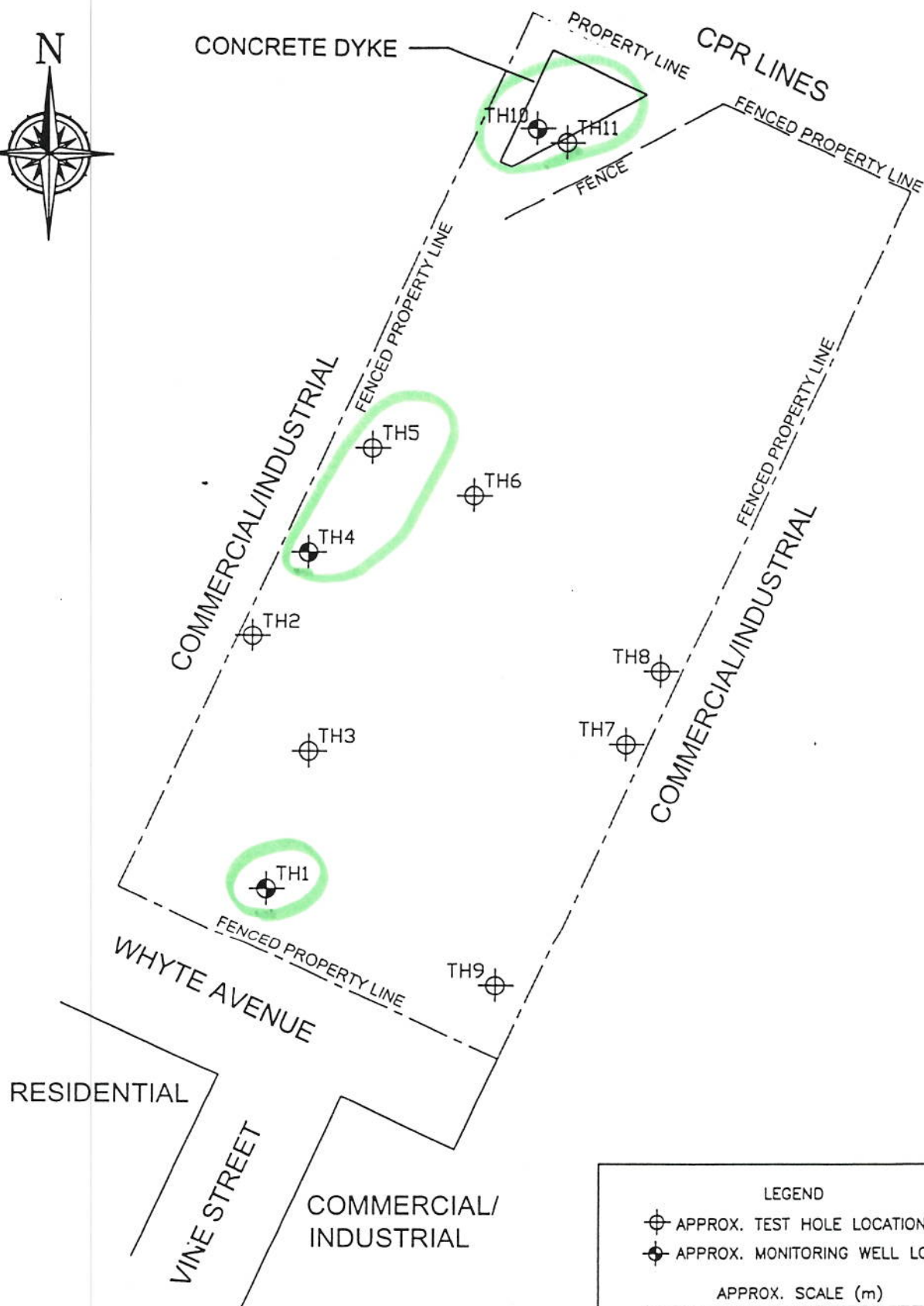
Canadian Council of Ministers of the Environment. 1999. Canadian Environmental Quality Guidelines.

Canadian Council of Ministers of the Environment. 2000. Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil.

Manitoba Environment. 1997. A Guideline for the Environmental Site Investigations in Manitoba. Guideline 98-01.

APPENDIX A

FIGURES



NOTE: DETAILS SHOWN ON THIS FIGURE ARE APPROXIMATE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



Earth & Environmental Limited

TEST HOLE LOCATION PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
CITY OF WINNIPEG
1385 WHITE AVENUE
WINNIPEG, MANITOBA

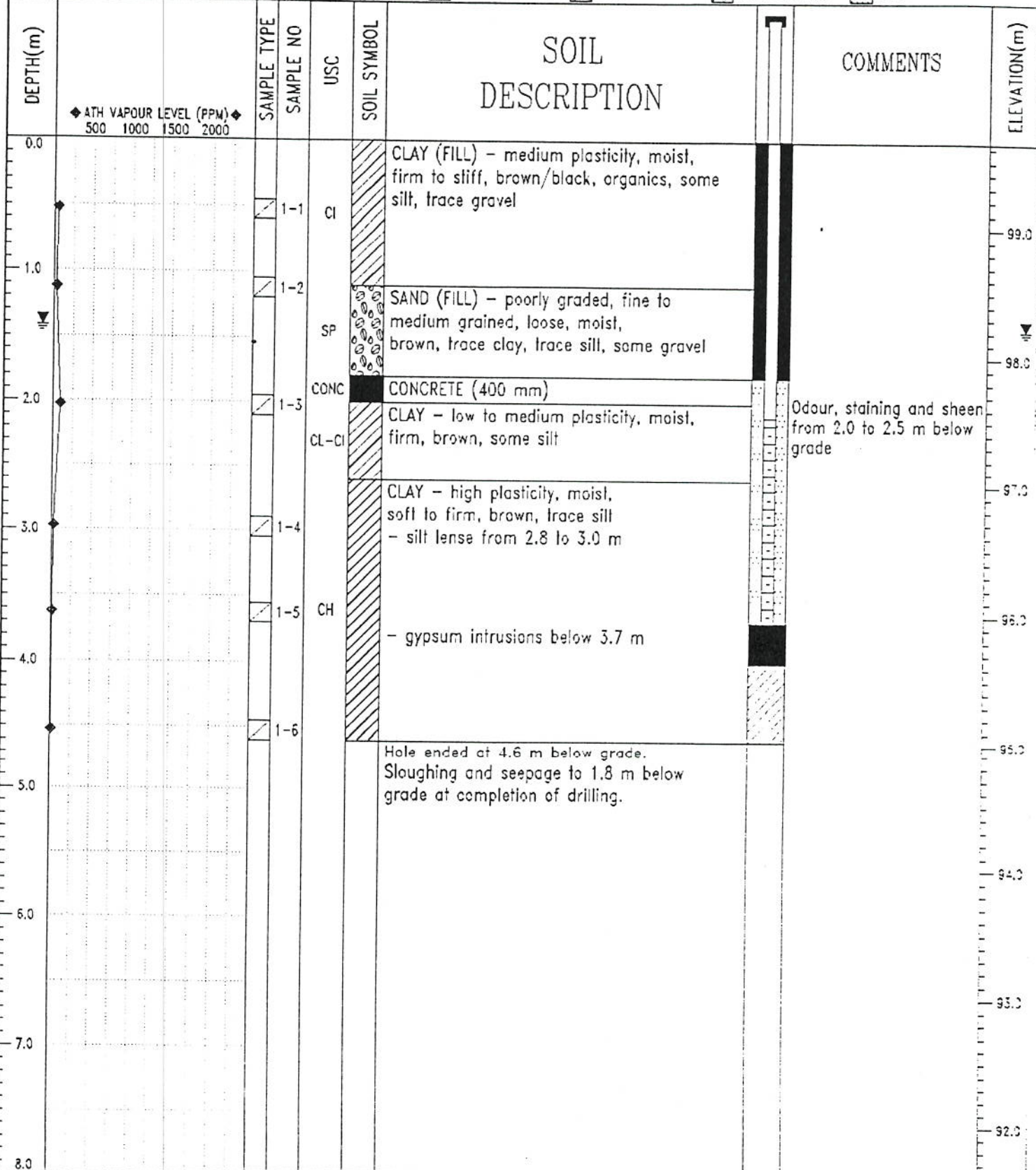
SCALE: SHOWN
DATE: DECEMBER 2000
DRAWN BY: WTH
PROJECT NO: WX-05054

WX-05054

FIGURE 1

APPENDIX B
TEST HOLE LOGS

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH1	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.64 m	
SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ CONT. SAMPLE
					☐ SAND



AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB
REVIEWED BY: HP
Fig. No: B1

COMPLETION DEPTH: 4.6 m
COMPLETE: 11/30/00

Phase II ESA - 1385 Whyte Ave	Contractor: Maple Leaf Drilling	TEST HOLE NO: TH2
City of Winnipeg	Drill Rig: 840	PROJECT NO: WX05054
	Auger: 125 Solid Stem	ELEVATION: 99.6 m

SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPI	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND

DEPTH(m)	ATH VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0						CLAY (FILL) - low plasticity, very moist, soft, brown, organics, some silt, trace gravel, cinders - black, cinders below 0.4 m - wet below 0.4 m			99.0
1.0			2-1	CL					
			2-2	CL		CLAY - low plasticity, moist, soft, light brown, and silt			
2.0			2-3			CLAY - medium to high plasticity, moist, soft to firm, brown, trace silt - silt lense from 2.4 to 2.6 m			98.5
			2-4						97.0
3.0			2-5						
			2-6	CH					96.0
4.0			2-7			- gypsum intrusions below 4.3 m below grade			95.0
5.0									94.0
6.0			2-8						93.0
7.0						Hole ended at 6.1 m below grade Sloughing and seepage to 1.5 m below grade.			92.0
8.0									

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB	COMPLETION DEPTH: 6.1 m
REVIEWED BY: HP	COMPLETE: 11/30/00
Fig. No: B2	Page 1 of 1

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH3	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.63 m	
SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ CONT. SAMPLE
					☐ SAND

DEPTH(m)	ATH VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0				CONC		CONCRETE (400 mm)			
			3-1	CL-CI		SAND (FILL) - poorly graded, fine to medium grained, loose, wet, brown, some gravel			99.0
1.0			3-2	CI		CLAY (FILL) - low to medium plasticity, very moist, firm, black, organics, trace silt, some gravel			
				CL		CLAY - medium plasticity, moist, soft, black and organics			98.0
2.0			3-3			CLAY - low plasticity, moist, soft to firm, light brown and silt			
			3-4			CLAY - high plasticity, moist, soft to firm, brown, trace silt		Odour, staining and sheen from 2.0 to 2.5 m below grade	97.0
3.0			3-5	CH		- silt lense from 2.8 to 3.0 m			
			3-6						96.0
4.0						- gypsum intrusions below 3.7 m			
			3-7						95.0
5.0						Hole ended at 4.6 m below grade. Sloughing and seepage to 1.8 m below grade at completion of drilling.			94.0
6.0									93.0
7.0									92.0
8.0									

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB

REVIEWED BY: HP

Fig. No: B3

COMPLETION DEPTH: 4.6 m

COMPLETE: 11/30/00

Page 1 of 1

Phase II ESA - 1385 Whyte Ave			Contractor: Maple Leaf Drilling			TEST HOLE NO: TH4		
City of Winnipeg			Drill Rig: B40			PROJECT NO: WX05054		
			Auger: 125 Solid Stem			ELEVATION: 99.42 m		
SAMPLE TYPE		☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE	
BACKFILL TYPE		☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND	

DEPTH(m)	SOIL VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0					SP	SAND (FILL) - poorly graded, fine to medium grained, loose, moist, brown, trace clay, trace silt, some gravel		99.0
			4-1		CONC	CONCRETE (150 mm)		
1.0			4-2		CI	CLAY (FILL) - medium plasticity, moist, firm, black, organics, some silt, trace sand		98.0
2.0			4-3		CL-CI	CLAY - low to medium plasticity, moist, firm, brown, some silt	Slight odour, staining (black streaks) and sheen from 1.5 to 2.2 m below grade	97.0
3.0			4-4			CLAY - high plasticity, moist, soft to firm, brown, trace silt - silt lense from 2.7 to 2.9 m		96.0
4.0			4-5		CH			95.0
5.0			4-6			Hole ended at 4.6 m below grade. Sloughing and seepage to 1.5 m below grade at completion of drilling.		94.0
6.0								93.0
7.0								92.0
8.0								

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
		REVIEWED BY: HP	COMPLETE: 11/30/00
		Fig. No: B4	Page 1 of 1

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH5	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.4 m	
SAMPLE TYPE ☒ SHELBY TUBE ☐ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					
BACKFILL TYPE ☒ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0								99.4
					GRAVEL (FILL) - poorly graded, fine to medium grained, loose, moist, brown, trace clay, trace silt, some sand			99.0
		5-1			CLAY (FILL) - low plasticity, wet, soft, black, trace gravel, organics, wood, metal, shingles			98.0
1.0		5-2						98.0
				CL	- mostly wood from 1.5 to 3.3 m below grade		Odour, staining, and sheen from 1.8 to 3.0 m below grade	97.0
2.0		5-3						97.0
							Visible oil from 3.0 to 3.3 m below grade	96.0
3.0		5-4						96.0
				CONC	CONCRETE			96.0
					Hole ended at 3.4 m below grade on suspected concrete slab.			95.0
					Constant sloughing and seepage to 1.2 m below grade during and upon completion of drilling.			94.0
4.0								94.0
5.0								93.0
6.0								92.0
7.0								
8.0								

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB REVIEWED BY: HP Fig. No: B5	COMPLETION DEPTH: 4.6 m COMPLETE: 11/30/00 Page 1 of 1
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Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH6	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.45 m	
SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ CONT. SAMPLE
					☐ SAND

DEPTH(m)	ATH VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0				CONC		CONCRETE (125 mm)			
				CONC		GRAVEL (FILL) - poorly graded, fine to medium grained, loose, moist, brown			99.0
			6-1	CL-CI		CONCRETE (100 mm)			
1.0				CL		CLAY (FILL) - low to medium plasticity, moist, soft, brown, organics, some silt, trace gravel			
			6-2	CL		CLAY - low plasticity, moist, soft, light brown, and silt			98.0
				CI		CLAY - medium plasticity, moist, stiff, brown, trace silt			
2.0				CL		CLAY - low plasticity, moist, soft, light brown, and silt			97.0
			6-3	CL		CLAY - high plasticity, moist, soft to firm, brown, trace silt			
3.0				CH					96.0
			6-4	CH					
4.0				CH					95.0
			6-5	CH					
5.0						Hole ended at 4.6 m below grade No sloughing or seepage.			94.0
			6-6						93.0
6.0									92.0
7.0									
8.0									

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Winnipeg, Manitoba

LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
REVIEWED BY: HP	COMPLETE: 11/30/00
Fig. No: B6	Page 1 of 1

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH7	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.5 m	
SAMPLE TYPE	☒ SHELBY TUBE	☒ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ SAND

DEPTH(m)	ATH VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0					SP	SAND (FILL) - poorly graded, fine to medium grained, loose, moist, brown, and gravel			99.5
0.5		☒	7-1		CL-CI	CLAY (FILL) - low to medium plasticity, moist, firm, black, organics, trace silt, some gravel			
1.0		☒	7-2		CI	CLAY - medium plasticity, moist, soft, black and organics			
1.5						CLAY - low plasticity, moist, soft to firm, light brown and silt			98.5
2.0		☒	7-3		CL				97.5
3.0		☒	7-4			CLAY - high plasticity, moist, soft to firm, brown, trace silt			96.5
3.5		☒	7-5		CH				
4.0						- grey/brown below 4.1 m			95.5
4.5		☒	7-6						94.5
5.0						Hole ended at 4.6 m below grade. No sloughing or seepage.			93.5
6.0									92.5
7.0									
8.0									

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
REVIEWED BY: HP	COMPLETE: 11/30/00
Fig. No: B7	Page 1 of 1

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH8	
City of Winnipeg		Drill Rig: B40		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.55 m	
SAMPLE TYPE	☒ SHELBY TUBE	☒ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
				☐ CONT. SAMPLE	☐ SAND

DEPTH(m)	ATH VAPOUR LEVEL (PPM) 500 1000 1500 2000	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0					CONC	CONCRETE (100 mm)			
0.5			8-1	CL-CI		CLAY (FILL) - low to medium plasticity, moist, firm, black, organics, trace silt, some gravel			99.0
1.0			8-2	CL		CLAY - low plasticity, moist, soft to firm, light brown and silt			
1.5				CI		CLAY - medium plasticity, moist, firm to stiff, brown			98.0
2.0			8-3	CL		CLAY - low plasticity, moist, soft to firm, light brown and silt			
3.0			8-4						97.0
3.5									
4.0			8-5	CH		CLAY - high plasticity, moist, soft to firm, brown, trace silt			96.0
4.5									
5.0			8-6			- grey/brown below 4.3 m			95.0
5.5									
6.0									94.0
7.0									93.0
8.0									92.0
						Hole ended at 4.6 m below grade. No sloughing or seepage.			

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DS
REVIEWED BY: HP
Fig. No: B8

COMPLETION DEPTH: 4.6 m
COMPLETE: 11/30/00

Phase II ESA - 1385 Whyte Ave	Contractor: Maple Leaf Drilling	TEST HOLE NO: TH9
City of Winnipeg	Drill Rig: B40	PROJECT NO: WX05054
	Auger: 125 Solid Stem	ELEVATION: 99.7 m

SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND

DEPTH(m)		SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
	◆ ATH VAPOUR LEVEL (PPM) ◆ 500 1000 1500 2000								
0.0				SP	0.0%	SAND (FILL) - poorly graded, fine to medium grained, loose, moist, brown, and gravel			
			9-1	CONC		CONCRETE (225 mm)			
1.0			9-2	CL		CLAY (FILL) - low plasticity, moist, firm, brown - gravelly from 0.4 to 0.6 m - organics from 0.7 to 0.9 m			99.0
2.0			9-3	CH		CLAY - low plasticity, moist, soft to firm, light brown and silt CLAY - high plasticity, moist, firm, brown, trace silt - grey, stiff below 1.8 m below grade			98.0
3.0			9-4			Hole ended at 3.0 m below grade. No sloughing or seepage.			97.0
4.0									96.0
5.0									95.0
6.0									94.0
7.0									93.0
8.0									92.0

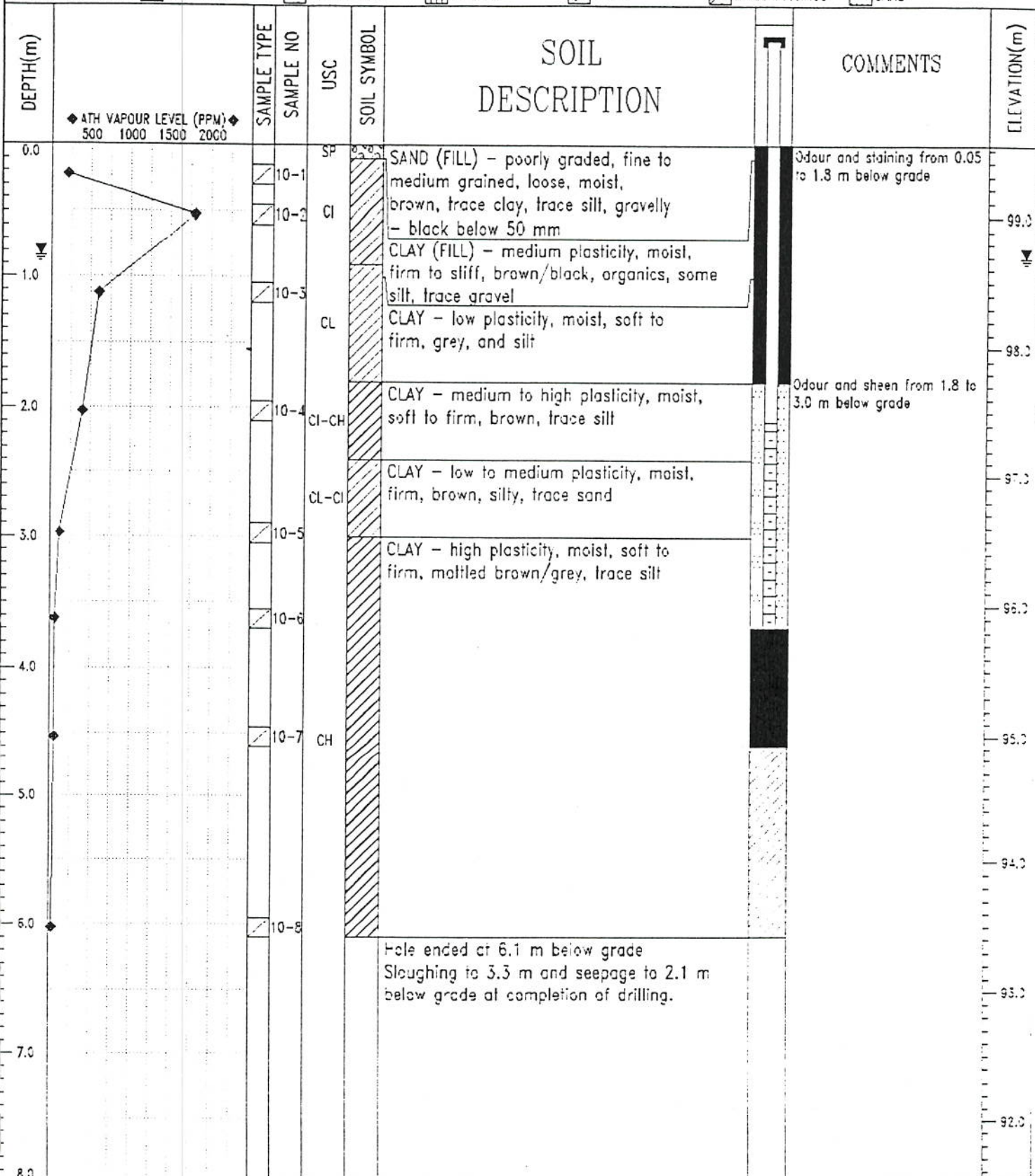
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Winnipeg, Manitoba

LOGGED BY: DB
REVIEWED BY: HP
Fig. No: B9

COMPLETION DEPTH: 3 m
COMPLETE: 11/30/00

Page 1 of 1

Phase II ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH10	
City of Winnipeg		Drill Rig: VL 60		PROJECT NO: WX05054	
		Auger: 125 Solid Stem		ELEVATION: 99.53 m	
SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ CONT. SAMPLE
					☐ SAND



AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB
REVIEWED BY: HP
Fig. No: B10

COMPLETION DEPTH: 6.1 m
COMPLETE: 12/01/00

Page 1 of 1

Phase II ESA - 1385 Whyte Ave	Contractor: Maple Leaf Drilling	TEST HOLE NO: TH11
City of Winnipeg	Drill Rig: VL 60	PROJECT NO: WX05054
	Auger: 125 Solid Stem	ELEVATION: 99.5 m

SAMPLE TYPE	☒ SHELBY TUBE	☐ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☒ DRILL CUTTINGS	☐ SAND

DEPTH(m)		SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	INSTRUMENTATION DATA	COMMENTS	ELEVATION(m)
0.0	◆ ATH VAPOUR LEVEL (PPM) ◆ 500 1000 1500 2000								
0.0		☒	11-1	SP		SAND (FILL) - poorly graded, fine to medium grained, loose, moist, brown, trace clay, trace silt, gravelly - black below 50 mm		Odour and staining from 0.05 to 3.0 m below grade	99.0
0.5		☒	11-2						
1.0		☒	11-3	CI		CLAY (FILL) - medium plasticity, wet, firm to stiff, brown/black, organics, some silt, trace gravel			
1.5		☒	11-4	CL		CLAY - low plasticity, moist, firm, grey, and silt			98.0
2.0		☒	11-5	CL-CI		CLAY - low to medium plasticity, moist, firm, brown - silty, trace sand from 2.1 to 2.4 m			
2.5		☒	11-6						
3.0		☒	11-7	CH		CLAY - medium to high plasticity, moist, soft to firm, mottled brown/grey, trace silt			97.0
3.5		☒	11-8						96.0
4.0									95.0
4.5									94.0
5.0									93.0
5.5									92.0
6.0									
6.5									
7.0									
7.5									
8.0									
						Hole ended at 4.6 m below grade Sloughing to 4.0 and seepage to 3.0 m below grade at completion of drilling.			

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB
REVIEWED BY: HP
Fig. No: B11

COMPLETION DEPTH: 4.6 m
COMPLETE: 12/01/00

Page 1 of 1

APPENDIX C

CERTIFICATES OF ANALYSIS

AMEC Earth & Environmental Analytical Chemistry Laboratory

Date Required: Dec 20/00

Attn AMEC Earth & Enviro.

Attn Byrnski, David

Date Dec 6/00

SOIL ANALYSIS

PRELIMINARY RESULTS

9

File# 40475

Project# WX05054

Date Sampled: Nov 30-Dec 1/00

Date Sampled: Nov 30-Dec 1/00									
Analysis (dry wt)	Reference Method	Lab. No.	19937	19940	19941	19942	19944		
			Sample ID,	1-3 @ 7"	4-3 @ 7"	11-4 @ 7"	11-2 @ 2'	11-5 @ 8'	
Trifluorobenzene Recovery (%)			90	81	89	112	83		
MOL			ug/g (ppm) dry weight						
ST	6/12/2000	Benzene	EPA 502.1VCCME	0.020	<0.020	<0.020	3.6	10	1.1
ST	6/12/2000	Toluene	EPA 502.1VCCME	0.090	0.65	0.095	0.38	3.6	0.74
ST	6/12/2000	Ethylbenzene	EPA 502.1VCCME	0.020	0.22	<0.020	9.4	63	2.4
ST	6/12/2000	Xylenes	EPA 502.1VCCME	0.090	1.0	0.15	63	490	13
ST	6/12/2000	F1 - VPH (C ₆ C ₁₀)	EPA 502.1VCCME	1.5	1.4	0.94	600	3000	160
ST	6/12/2000	F2 - EPH (C ₁₀ C ₁₈)	EPA 3550CCME	10	190	47	6700	39000	1500
ST	6/12/2000	F3 - EPH (C ₁₆ C ₂₄)	EPA 3650CCME	10	5200	33	1300	10000	280
ST	6/12/2000	F4 - EPH (C ₂₄ C ₅₀)	EPA 3560CCME	10	760	23	<10	<10	<10
ST	6/12/2000	Moisture	%	30.9	29.1	19.7	22.8	21.0	

EPA: U.S. Environmental Protection Agency, 1987. Test Methods of Evaluation of Solid Waste and Ed through Update III.
Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
VPH - Volatile Petroleum Hydrocarbons

EPA: U.S. Environmental Protection Agency, 1987, Test Methods of Evaluation of Solid Waste 3rd Ed through Update III.
Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

VPH - Volatile Petroleum Hydrocarbons (TVH with BTX extracted)

EPH: Extractable Petroleum Hydrocarbons - not corrected for PAH content

CCME - Canadian Council of Ministers of the Environment - Method for Canada Wide

Standards for Petroleum Hydrocarbons in Soil - Tit Method, Rev 0/00

Report reviewed by

James A. LeBlanc, B.Sc.

QA/QC Manager

Laboratory Services

Brenda Chomin

Manager

Laboratory Services

AMEC Earth & Environmental
Analytical Chemistry Laboratory

Date Required: Dec 20/00

SOIL
PRELIMINARY RESULTS

Attn: AMEC Earth & Enviro.

Attn: Bynski, David

Date Dec 6/00

File# 40475a

Project# WX05054

Date Sampled: Nov 30-Dec 1/00

Analyst	Date of Analysis	ANALYTICAL PARAMETERS	Units	Method	MDL	19939	19943	19943
						5-4 @ 10'	10-3 @ 4'	duplicate 10-3 @ 4'
AD	12-Dec	Oil & Grease (infrared)	ug/g (ppm)	EPA 418.1*	8	57100	2100	2130

(L: Method Detection Limit

Keague: Manual on Soil Sampling and Methods of Analyses. Can. Soc. Soil Sci. Ottawa.

PA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III.

ce Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

modified method

Report reviewed by:

James A. LeBlanc, B.Sc.

QA/QC Manager

Laboratory Services



Brenda Chomin

Manager

Laboratory Services

AMEC Earth & Environmental
Analytical Chemistry Laboratory

Date Required: Dec 20/01

ICP METALS-LEACHATE
PRELIMINARY RESULTS

9

Attn: AMEC Earth & Enviro.
Attn: Bynski, David
Date Dec

File# 40475b
Project# WX05054
Date Sampled: Nov 30-D

Analyst	Date of Analysis	Parameters	Units	APHA Reference Method	MDL	19942
						11-2 @ 2'
ME	12/11/2000	Lead	mg/L (ppm)	EPA1311/APHA3120	0.001	0.015

Report reviewed by:

James A. LeBlanc, B.Sc.
QA/QC Manager
Laboratory Services



Brenda Chomin
Manager
Laboratory Services

T012172 CONT...
PAGE 2

THUNDER BAY ANALYTICAL CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	DL/SRI	UNITS	EXTRACTED	ANALYZED	BY
T012172-01	9-2 @ 4 FT							
Collected: 11/30/00		Cyanide, Free	<0.5	0.5	mg/kg dwt	12/13/00	12/14/00	MRR
N.D. - NOT DETECTED, LESS THAN THE DETECTION LIMIT <DL - LESS THAN THE DETECTION LIMIT <W - LESS THAN THE SMALLEST REPORTING INCREMENT (SRI); NO INSTRUMENT RESPONSE THIS IS THE FINAL PAGE OF THE REPORT NOT INCLUDING APPENDICES								

Appendix A Test Methodologies

Cyanide, Free

Prep: Extracted into distilled water. Distillation with strong acid for
determination of total CN
Method: Automated continuous flow colorimetry
Ref: APHA 4500-CN C and E.

THIS IS THE LAST PAGE OF THE METHODOLOGY APPENDIX.

AMEC Earth & Environmental Analytical Chemistry Laboratory

Date Required: Dec 15/00

WATERS

PRELIMINARY RESULTS

8

Attn AMEC Earth & Enviro.

Attn Bynski, David

Date Dec 8/00

File# 40498

Project# WX05054

Date Sampled: Dec 7/00

Analyte	Date of Analysis (d/m/y)	Parameter	EPA Reference Method	Lab. No.		mg/L (ppm)	
				Sample I.D.	TH10	TH1	TH1
ST	8/12/2000	Benzene	5021/8021B	MDL	0.97	<0.002	<0.002
ST	8/12/2000	Toluene	5021/8021B		0.002	0.049	<0.002
ST	8/12/2000	Ethylbenzene	5021/8021B		0.002	0.047	<0.002
ST	8/12/2000	Xylenes	5021/8021B		0.003	1.4	<0.003
ME	11/12/2000	Lead	EPA 238		0.001	0.004	0.469

MDL: Method Detection Limit

TVH - Total Volatile Hydrocarbons (Purgeable)

TSI - Total Semi-volatile Hydrocarbons (Extractable)

THI - Total Petroleum Hydrocarbons (Sum of TVH + TSI)

EPA: U.S. Environmental Protection Agency, 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III, Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Report reviewed by:

James A. LeBlanc, B.Sc.
QA/QC Manager
Laboratory ServicesBrenda Chornlin
Manager
Laboratory Services

APPENDIX D
LIMITATIONS

STATEMENT OF LIMITATIONS

1. The work performed in this report was carried out in accordance with the standard terms of conditions made part of this contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in our contract.
2. The report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.
3. The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site which were unavailable for direct observation, reasonably beyond the control of FT-Ecologistics Limited/AMEC Earth & Environmental Limited.
4. The objective of this report was to assess the environmental conditions at the site, within the context of our contract and existing environmental regulations within the applicable jurisdiction. Evaluating compliance of past or future owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.
5. Our observations relating to the condition of environmental media at the site are described in this report. It should be noted that other compounds or materials other than those described could be present in the site environment.
6. The conclusions of this report are based in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the site in locations not specifically investigated. Should such an event occur, FT-Ecologistics Limited must be notified in order that we may determine if modifications to our conclusions and recommendations presented herein, are necessary.