
Appendix B – Environmental Investigation



23 September 2011
Project No. WX16667

Dillon Consulting Limited
895 Waverley Street, Suite 200
Winnipeg, Manitoba
R3T 5P4

Attention: Mr. David Krahn

**Re: Environmental Soil Sampling
Transit Garage – Brandon Avenue
Winnipeg, Manitoba**

1.0 INTRODUCTION

As requested, AMEC Environment & Infrastructure, a Division of AMEC Americas Limited (AMEC), completed environmental soil sampling at the above noted site. The investigation included the advancement of hand auger test holes, soil sampling and laboratory analysis. Environmental engineering recommendations were not requested and as such are not included herein.

The environmental work was conducted in conjunction with the Geotechnical Investigation on 8 and 9 September 2011. The results of the Geotechnical Investigation are provided under separate cover.

This report is a summary of the field investigation findings and a comparison of the laboratory analysis to the applicable environmental guidelines. Environmental sampling was deemed necessary because the area was considered to have the potential for impacts resulting from historical activities related to the adjacent rail lines.

2.0 SITE CONDITIONS

The site is located at the west end of Brandon Avenue, near Hethrington Avenue, in Winnipeg, Manitoba. Currently the site is undeveloped, however construction of a Rapid Transit Corridor is occurring adjacent to the site, and as such debris and construction equipment from the construction site are located on various parts of the site. The site is bordered to the east by residential dwellings, and to the west by a currently operating rail yard. The surrounding land use was noted and has been summarized in Table 1.

The site was generally flat lying and partially covered by short grasses at the time of the investigation.

3.0 ENVIRONMENTAL FIELD INVESTIGATION

The Environmental Field Investigation was comprised of twelve hand augered test holes (up to 12), advanced to a maximum depth of 1.5 m adjacent to the geotechnical test holes being advanced with a piling rig. Where soil conditions did not allow the hand auger to penetrate to the desired depth, soil samples for environmental screening were obtained from the solid stem auger of the drill rig (SoilMec SR-30 track-mounted piling rig).

The test holes were located in the footprint of the proposed building and to the north and south of the building. The contaminants of concern were polycyclic aromatic hydrocarbons (PAHs), metals and petroleum hydrocarbons (PHCs) including benzene, toluene, ethylbenzene, xylenes (BTEX) and fractional petroleum hydrocarbons (F1-F4).

As identified in the Geotechnical Report, it should be noted that during drilling of test hole TH07, an abandoned water line was struck at approximately 0.9 m below existing ground surface, causing the test hole to fill with water. Drilling of the hole was ceased and Dillon Consulting was informed. The test hole was moved to avoid the water line and drilling continued. The original test hole was backfilled using 19 mm down crushed gravel.

During the Geotechnical Investigation, soil stratigraphy was classified according to the Modified Unified Soil Classification System (MUSCS) by AMEC's field technician. The stratigraphy has been summarized in the Geotechnical Report.

AMEC's environmental technician conducted field soil vapour testing on the recovered samples. The results of the field soil vapour testing are summarized in Table 2. Each of the samples recovered for possible laboratory analysis during the environmental component of the work consisted of clay fill materials. All samples were sealed in laboratory prepared glass jars for transportation to AMEC's Edmonton Chemistry laboratory.

4.0 LABORATORY ANALYSIS

Select samples were submitted for laboratory analysis of PAHs, PHCs and metals based on field observations, soil type and test hole location. The results are summarized and compared to the applicable guideline criteria in Tables 3 through 5. Given the proposed construction of a Transit Bus Garage, the commercial guidelines were selected from the Canadian Council of Ministers of the Environment (CCME) Environmental Soil Quality Guidelines (ESQG), 2010.

As indicated in the tables the concentrations of copper, lead, and zinc exceeded the applicable guideline criteria at TH01 (at 0.8 m below grade), at TH05 (at 1.5 m below grade) and at TH12 (at 0.6 m below grade). The PAH concentrations exceeded the CCME ESQG for the protection of human health at test holes TH01 (0.8 m) and TH07 (0.6 m). The concentrations of the PHCs parameters BTEX, F1-F4 were less than the applicable guidelines for the analyzed samples.

Results of the laboratory analyses are included in the attached Certificate of Analysis.

6.0 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 the 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 costs. 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 contamination levels can vary between the areas of the investigation.

This report was prepared for the exclusive use of Dillon Consulting Limited and the City of Winnipeg for inclusion in the Rapid Transit Garage request for proposal. This report has been prepared for informational purposes only and the information contained herein should be verified by the successful design build team. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from AMEC will be required. With respect to third parties, AMEC has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The report is based on data and information collected during the environmental soil sampling of the property conducted by AMEC. It is based solely on the conditions of the Site encountered at the time of the Site visit on 8 and 9 September 2011. Except as otherwise maybe specified, AMEC disclaims any obligation to update this report for events taking place, or with respect to information that becomes available to AMEC after the time during which AMEC conducted the environmental soil sampling.

The findings in this report are based, to a large degree, upon information provided by the current owner/occupant. AMEC accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

AMEC makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

This Report is also subject to the further General Conditions contained in Appendix B.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

AMEC trusts the above information satisfies your requirements at this time. We would be pleased to provide any further information that may be needed during design. If you require additional information, please do not hesitate to contact one of the undersigned.

Sincerely,

AMEC ENVIRONMENT AND INFRASTRUCTURE

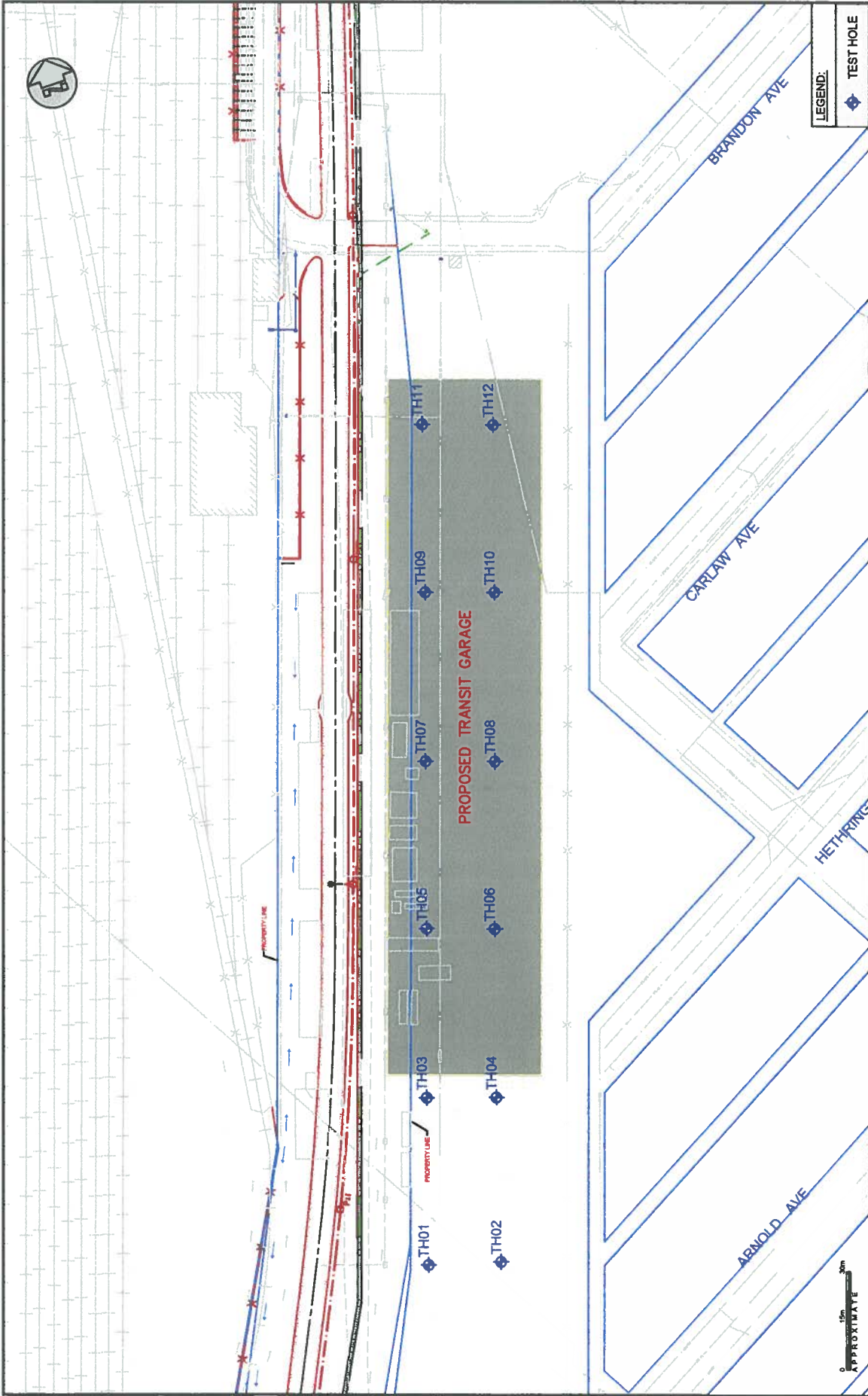
A handwritten signature in black ink, reading "Allyson Desgroseilliers". The signature is written in a cursive, flowing style.

Allyson Desgroseilliers, P.Eng.
Senior Environmental Engineer
Manager, Winnipeg Operations

Reviewed By:

Michael Bertram, P.Eng.
Senior Environmental Engineer

Attachments: Figure 1: Test Hole Location Plan
 Table 1: Surrounding Land Use
 Table 2: Field Observations
 Table 3: Soil Analytical Results - Metals
 Table 4: Soil Analytical Results – Polycyclic Aromatic Hydrocarbons (PAHs)
 Table 5: Soil Analytical Results – Petroleum Hydrocarbons (PHCs)
 Appendix A: Certificate of Analysis
 Appendix B: General Conditions




CLIENT LOGO	CLIENT	DILLON CONSULTING LIMITED		PROJECT	GEOTECHNICAL INVESTIGATION TRANSIT GARAGE - BRANDON AVENUE WINNIPEG, MANITOBA		REV. NO.:	A
	AMEC Earth & Environmental 440 DOVERCOURT DRIVE WINNIPEG, MANITOBA		DWN BY:		MD	TITLE	TEST HOLE LOCATION PLAN	
CHKD BY:			TG	PROJECT NO.:	WX16667			
DATUM:			NAD99	PROJECTION:	UTM Zone 0	DATE:	SEPTEMBER 2011	
SCALE:		AS SHOWN		FIGURE No.		FIGURE 1		

TABLE 1: LAND USE		
Direction	Land Use	Approx. Distance (m)
Site	Vacant land, proposed Transit Bus Garage	---
North	Vacant Land , Brandon Avenue	Adjacent
East	Residential streets	Adjacent
South	Vacant Land	Adjacent
West	Rail line	Adjacent

TABLE 2: FIELD OBSERVATIONS AND SOIL VAPOUR TESTING						
Test Hole	Test Hole Depth (m)	Staining Zone (m)	Soil Vapour Concentrations > 200 ppm _v (m)	Max. Soil Vapour Concentration		
				Level (ppm _v)	Depth (m)	Depth (m)
TH01	0.8	none	none	10	0.8	0.8
TH02	1.5	none	none	<5	1.5	1.5
TH03	1.5	none	none	<5	1.5	1.5
TH04	1.5	none	none	<5	1.5	1.5
TH05	1.5	none	none	<5	1.5	1.5
TH06	1.5	none	none	<5	1.5	1.5
TH07	1.5	none	none	10	0.6	0.6
TH08	1.5	none	none	10	0.6	0.6
TH09	1.5	none	none	<5	0.5, 1.5	0.5, 1.5
TH10	1.5	none	none	<5	1.5	1.5
TH11	0.6	none	none	<5	0.6	0.6
TH12	0.6	none	none	10	0.6	0.6

Notes:

- m - metres
- ppm_v - parts per million total combustible vapour

TABLE 3 : SOIL ANALYTICAL RESULTS - METALS

Parameter	TH01-1 (0.8 m)	TH4-1 (1.5 m)	TH05-1 (1.5 m)	TH08-1 (1.5 m)	TH09-1 (1.5 m)	TH12-1 (0.6 m)	GUIDELINE ¹
Antimony (µg/g)	10.5	<0.5	12.7	<0.5	<0.5	7.9	NG
Aluminum (µg/g)	14100	6760	4390	7520	20800	2590	NG
Arsenic (µg/g)	11	2.6	6.7	4.4	3.3	4.8	12
Barium (µg/g)	836	47	1680	64	140	496	2000
Beryllium (µg/g)	1.1	0.2	0.3	0.3	0.7	0.1	NG
Cadmium (µg/g)	4.9	<0.2	1.7	<0.2	0.3	0.2	22
Calcium (µg/g)	50000	103000	87400	82700	30000	120000	NG
Chromium (µg/g)	15.2	12.2	17.3	12.2	27	7.5	87
Cobalt (µg/g)	9.6	4.2	4.9	6	11.1	3.1	NG
Copper (µg/g)	124	11	107	12.2	21.2	74.8	91
Iron (µg/g)	50000	9850	29400	12700	27800	14800	NG
Lead (µg/g)	539	3.7	2890	5.1	12	494	260
Magnesium (µg/g)	14200	56800	33100	45800	15400	46000	NG
Manganese (µg/g)	456	185	217	445	387	183	NG
Mercury (µg/g)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	50
Molybdenum (µg/g)	1.8	<0.5	1.3	<0.5	0.6	<0.5	NG
Nickel (µg/g)	49	10	17.6	15.4	25.3	7	50
Phosphorus (µg/g)	3220	320	292	398	388	242	NG
Potassium (µg/g)	799	1720	968	1990	4850	1100	NG
Selenium (µg/g)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.9
Sodium (µg/g)	2810	2320	2210	1970	750	2500	NG
Silver (µg/g)	0.2	<0.1	0.1	<0.1	<0.1	0.1	NG
Thallium (µg/g)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1
Tin (µg/g)	60.9	<0.5	12.8	<0.5	<0.5	11.1	NG
Vanadium (µg/g)	14.1	16.8	9.3	19.8	32.1	6.6	130
Uranium (µg/g)	<15.0	<15.0	<15.0	<15.0	<15.0	<15.0	33
Zinc (µg/g)	2960	21.6	1110	27.9	73.9	231	360

Notes:

- < - less than the method detection limit
- NG -- not applicable/no guideline criteria established.
- All results in micrograms per gram (µg/g)
- **BOLD** - exceeds the referenced guideline
- ¹CCME EQG Criteria - most stringent commercial land use criteria for fine grained soils as outlined in the Canadian Council of the Ministers of the Environment (CCME) "Canadian Soil Quality Guidelines for the protection of Environment and Human Health", 2001, revised 2009.
- See laboratory report for detection limits, testing protocols and QA/QC procedures. Analysis was performed by AMEC Laboratory in Edmonton.

TABLE 4 : SOIL ANALYTICAL RESULTS - PAH

Parameter	TH01-1 (0.8 m)	TH02-1 (1.5 m)	TH03-1 (1.5 m)	TH04-1 (1.5 m)	TH05-1 (1.5 m)	TH06-1 (1.5 m)	TH07-1 (0.6 m)	TH08-1 (1.5 m)	TH09-1 (1.5 m)	TH10-1 (1.5 m)	TH11-1 (0.6 m)	TH12-1 (0.6 m)	GUIDELINE ¹
Acenaphthene (µg/g)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NG
Acenaphthylene (µg/g)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NG
Anthracene (µg/g)	0.16	<0.005	<0.005	<0.005	0.19	<0.005	0.22	<0.005	<0.005	<0.005	0.062	0.005	32
Benzo(a)anthracene (µg/g)	0.5	<0.1	<0.1	<0.1	0.4	<0.1	0.5	<0.1	<0.1	<0.1	0.1	<0.1	NG
Benzo(a)pyrene (µg/g)	0.51	<0.05	<0.05	<0.05	0.28	<0.05	0.4	<0.05	<0.05	<0.05	0.11	<0.05	72
Benzo(c)phenanthrene (µg/g)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
Benzo(g,h,i)perylene (µg/g)	0.4	<0.1	<0.1	<0.1	0.2	<0.1	0.3	<0.1	<0.1	<0.1	0.1	<0.1	NG
Chrysene (µg/g)	0.77	<0.05	<0.05	<0.05	0.94	<0.05	1	<0.05	<0.05	<0.05	0.21	<0.05	NG
Dibenzo(a,h)anthracene (µg/g)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
Dibenzo(a,h)pyrene (µg/g)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
Dibenzo(a,i)pyrene (µg/g)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
Dibenzo(a,j)pyrene (µg/g)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
7,12-dimethyl benzanthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NG
Fluoranthene	0.8	<0.04	<0.04	<0.04	0.38	<0.04	0.66	<0.04	<0.04	<0.04	0.33	<0.04	180
Fluorene (µg/g)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NG
Indeno(1,2,3-cd)pyrene (µg/g)	0.3	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	NG
2-Methylnaphthalene (µg/g)	3.1	<0.1	<0.1	<0.1	2.3	<0.1	2.5	<0.1	<0.1	<0.1	0.8	<0.1	NG
Naphthalene (µg/g)	1.5	<0.015	<0.015	<0.015	0.9	<0.015	1.1	<0.015	<0.015	<0.015	0.64	0.035	22
Phenanthrene (µg/g)	1.8	<0.05	<0.05	<0.05	2	<0.05	2.4	<0.05	<0.05	<0.05	0.45	<0.05	NG
Pyrene (µg/g)	0.79	<0.05	<0.05	<0.05	0.5	<0.05	0.73	<0.05	<0.05	<0.05	0.32	<0.05	NG
Benzo(b+h)fluoranthene	0.53	<0.05	<0.05	<0.05	0.46	<0.05	0.53	<0.05	<0.05	<0.05	0.13	<0.05	10
Benzo(k)fluoranthene	0.4	<0.05	<0.05	<0.05	0.18	<0.05	0.29	<0.05	<0.05	<0.05	0.12	<0.05	10
B(a)P TPE	0.7	0.1	0.1	0.1	0.5	0.1	0.7	0.1	0.1	0.1	0.2	0.1	0.6 ²

Notes:

- < - less than the method detection limit
- NG - not applicable/no guideline criteria established.
- All results in micrograms per gram (µg/g)
- **BOLD** - exceeds the referenced guideline
- ¹CCME EQG Criteria - commercial land use criteria for fine grained soils as outlined in the Canadian Council of the Ministers of the Environment (CCME) "Canadian Soil Quality Guidelines for the protection of Environment and Human Health", 2001, updated 2010. These values are for the protection of environmental health.
- B(a)P TPE - Benzo(a) Pyrene Total Potency Equivalents which is the sum of estimated cancer potency relative to B(a)P for all potentially carcinogenic unsubstituted PAHs. The B(a)P TPE is calculated by multiplying the concentration of each PAH in the sample by its B(a)P Potency Equivalence Factor (PEF) and summing the products. NB: where value was less than detection limits, half the MDL was used for the calculation.
- ² Direct Contact SQGDH 10⁶ - the human health-based soil quality guideline for direct contact
- See laboratory report for detection limits, testing protocols and QA/QC procedures.
- Analysis was performed by AMEC Laboratory in Edmonton.

TABLE 5: SOIL ANALYTICAL RESULTS - PHCS

Sample No. (depth m)	Date (dd-mm-yy)	Soil Vapour Concentration (ppm _v)	Benzene (µg/g)	Toluene (µg/g)	Ethylbenzene (µg/g)	Xylenes (µg/g)	F1 (µg/g)	F2 (µg/g)	F3 (µg/g)	F4 (µg/g)
TH01-1 (0.8 m)	8-Sep-11	10	0.031	0.18	0.04	0.33	<5.0	<30	713	513
TH02-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.0	<30	<320	<30
TH03-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.1	<30	<320	<30
TH04-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
TH05-1 (1.5 m)	8-Sep-11	<5	0.014	0.07	0.02	0.15	<5.0	<30	333	141
TH06-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
TH07-1 (0.6 m)	8-Sep-11	10	0.022	0.13	0.03	0.27	<5.0	<30	555	289
TH08-1 (1.5 m)	8-Sep-11	<10	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
TH09-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
TH10-1 (1.5 m)	8-Sep-11	<5	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
TH11-1 (0.6 m)	9-Sep-11	<5	0.023	0.1	0.03	0.2	<5.0	<30	259	139
TH12-1 (0.6 m)	8-Sep-11	10	<0.005	<0.03	<0.01	<0.03	<5.2	<30	<320	<30
CCME Commercial EQG (<1.5m depth)							NG	NG	NG	NG
CCME Commercial CWS PHC – fine grained (<1.5m depth below grade)							320	260	2500	6600

Notes:

- Soil sample headspace vapour concentration measured with a hexane calibrated an Eagle RKI combustible gas meter, set in the no methane response mode.
- ppm - parts per million
- all concentrations in micrograms per gram (µg/g)
- vPH (F1) - volatile petroleum hydrocarbons (C6 – C10); corrected for BTEX concentrations
- EPH (F2) - extractable petroleum hydrocarbons (C10 – C16)
- EPH (F3) - extractable petroleum hydrocarbons (C16 – C34)
- EPH (F4) - extractable petroleum hydrocarbons (C34 – C50)
- < - less than the analytical detection limit
- NG - no guideline
- NA - not analyzed
- **Bold and underline** – concentration exceeds referenced guideline
- CCME EQG Criteria – commercial land use criteria as outlined in the Canadian Council of the Ministers of the Environment (CCME) "Canadian Environmental Quality Guidelines", 1999
- CCME CWS PHC Criteria - commercial land use criteria as outlined in the Canadian Council of the Ministers of the Environment (CCME) "Canada-Wide Standards for Hydrocarbons in Soil", 2001 (revised 2010). Incremental cancer risk for benzene of 10-6.
- See laboratory report for detection limits, testing protocols and QA/QC procedures. Laboratory analysis was performed by AMEC Laboratory.

Environmental Investigation
Rapid Transit Bus Garage
Brandon Avenue
Winnipeg, Manitoba



Appendix A: Certificate of Analysis

5667 - 70 Street
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 Canada T6B 3P6
 Tel: (780) 436-2152
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ANALYTICAL REPORT

AMEC Earth & Environmental
 440 Dovercourt Drive
 Winnipeg, MB R3Y 1N4

Date Received: 2011/09/10
Report Date: 2011/09/19
Date Required: 2011/09/19

**Soil Analysis
 Preliminary Results**

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12702	11-12702-D	11-12703	11-12704	11-12705
					Client ID:	TH01-1 @ 2.5'	TH01-1 @ 2.5'	TH02-1 @ 5'	TH03-1 @ 5'	TH04-1 @ 5'
					Sample Date:	2011-09-08 00:00	Lab Duplicate	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MDL					
AD	2011/09/12	Benzene	µg/g (ppm)	EPA 8260B	0.005	0.031	---	< 0.005	< 0.005	< 0.005
AD	2011/09/12	Toluene	µg/g (ppm)	EPA 8260B	0.03	0.18	---	< 0.03	< 0.03	< 0.03
AD	2011/09/12	Ethylbenzene	µg/g (ppm)	EPA 8260B	0.01	0.04	---	< 0.01	< 0.01	< 0.01
AD	2011/09/12	Total Xylenes	µg/g (ppm)	EPA 8260B	0.03	0.33	---	< 0.03	< 0.03	< 0.03
AD	2011/09/12	Surrogate Recovery	%	---	0.1	92.7	---	76.6	97.6	100
AD	2011/09/12	F1 (C6-C10)	µg/g (ppm)	CCME	5.0	< 5.0	---	< 5.0	< 5.0	< 5.0
PC	2011/09/12	F2 (EPH C10-C16)	µg/g (ppm)	CCME	30	< 30	---	< 30	< 30	< 30
PC	2011/09/12	F3 (EPH C16-C34)	µg/g (ppm)	CCME	30	713	---	< 30	< 30	< 30
PC	2011/09/12	F4 (EPH C34-C50)	µg/g (ppm)	CCME	30	513	---	< 30	< 30	< 30
PC	2011/09/12	Moisture	%	---	0.5	24.3	---	24.6	26.1	17.7
PC	2011/09/12	F1 - BTEX	µg/g (ppm)	CCME	5.00	< 5.00	---	< 5.00	< 5.00	< 5.00

All Analytical results pertain to samples analyzed as received.

CCME (EPH) - Canadian Council of Ministers of the Environment - Method for Canada Wide Standards for Petroleum Hydrocarbon in Soil, Tier 1 Method, Revision 5.0. The method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

Chromatography returned to baseline by C50.

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.

EPH: Extractable Petroleum Hydrocarbon - not corrected for PAH content.

Extraction and analysis limits for holding time were met.

MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
 Manager
 Laboratory Services

Charlene Rollheiser
 Director of QA/QC
 Laboratory Services

This message is confidential. If you are not the intended recipient please notify us by telephone as soon as possible and either return the message or destroy it. If you are not the intended recipient, any use by you of its contents is prohibited.

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ANALYTICAL REPORT

AMEC Earth & Environmental
440 Dovercourt Drive
Winnipeg, MB R3Y 1N4

Date Received: 2011/09/10
Report Date: 2011/09/19
Date Required: 2011/09/19

Soil Analysis
Preliminary Results

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12706	11-12707	11-12708	11-12709	11-12710
					Client ID:	TH05-1 @ 5'	TH06-1 @ 5'	TH07-1 @ 2'	TH08-1 @ 5'	TH09-1 @ 5'
					Sample Date:	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MOL					
AD	2011/09/12	Benzene	µg/g (ppm)	EPA 8260B	0.005	0.014	< 0.005	0.022	< 0.005	< 0.005
AD	2011/09/12	Toluene	µg/g (ppm)	EPA 8260B	0.03	0.07	< 0.03	0.13	< 0.03	< 0.03
AD	2011/09/12	Ethylbenzene	µg/g (ppm)	EPA 8260B	0.01	0.02	< 0.01	0.03	< 0.01	< 0.01
AD	2011/09/12	Total Xylenes	µg/g (ppm)	EPA 8260B	0.03	0.15	< 0.03	0.27	< 0.03	< 0.03
AD	2011/09/12	Surrogate Recovery	%	--	0.1	88.9	103	95.7	100	101
AD	2011/09/12	F1 (C6-C10)	µg/g (ppm)	CCME	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
PC	2011/09/12	F2 (EPH C10-C16)	µg/g (ppm)	CCME	30	< 30	< 30	< 30	< 30	< 30
PC	2011/09/12	F3 (EPH C16-C34)	µg/g (ppm)	CCME	30	333	< 30	555	< 30	< 30
PC	2011/09/12	F4 (EPH C34-C50)	µg/g (ppm)	CCME	30	141	< 30	289	< 30	< 30
PC	2011/09/12	Moisture	%	--	0.5	22.2	17.9	18.7	18.5	24.8
PC	2011/09/12	F1 - BTEX	µg/g (ppm)	CCME	5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00

All Analytical results pertain to samples analyzed as received.

CCME (EPH) - Canadian Council of Ministers of the Environment - Method for Canada Wide Standards for Petroleum Hydrocarbon In Soil, Tier 1 Method, Revision 5.0. The method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

Chromatography returned to baseline by C50.

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.

EPH: Extractable Petroleum Hydrocarbon - not corrected for PAH content.

Extraction and analysis limits for holding time were met.

MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
 Manager
 Laboratory Services

Charlene Rollheiser
 Director of QA/QC
 Laboratory Services

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Soil Analysis
Preliminary Results

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12711	11-12712	11-12713
					Client ID:	TH10-1 @ 5'	TH11-1 @ 2'	TH12-1 @ 2'
					Sample Date:	2011-09-08 00:00	2011-09-09 00:00	2011-09-08 00:00
					MDL			
AD	2011/09/12	Benzene	µg/g (ppm)	EPA 8260B	0.005	< 0.005	0.023	< 0.005
AD	2011/09/12	Toluene	µg/g (ppm)	EPA 8260B	0.03	< 0.03	0.10	< 0.03
AD	2011/09/12	Ethylbenzene	µg/g (ppm)	EPA 8260B	0.01	< 0.01	0.03	< 0.01
AD	2011/09/12	Total Xylenes	µg/g (ppm)	EPA 8260B	0.03	< 0.03	0.20	< 0.03
AD	2011/09/12	Surrogate Recovery	%	-	0.1	99.2	98.7	93.7
AD	2011/09/12	F1 (C6-C10)	µg/g (ppm)	CCME	5.0	< 5.0	< 5.0	< 5.0
PC	2011/09/12	F2 (EPH C10-C16)	µg/g (ppm)	CCME	30	< 30	< 30	< 30
PC	2011/09/12	F3 (EPH C16-C34)	µg/g (ppm)	CCME	30	< 30	259	< 30
PC	2011/09/12	F4 (EPH C34-C50)	µg/g (ppm)	CCME	30	< 30	139	< 30
PC	2011/09/12	Moisture	%	---	0.5	25.2	19.9	3.9
PC	2011/09/12	F1 - BTEX	µg/g (ppm)	CCME	5.00	< 5.00	< 5.00	< 5.00

All Analytical results pertain to samples analyzed as received.

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EPH: Extractable Petroleum Hydrocarbon - not corrected for PAH content.

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Winnipeg, MB R3Y 1N4

Date Received: 2011/09/10
Report Date: 2011/09/19
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Soil Analysis - ICP Metals
Preliminary Results

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12702	11-12702-D	11-12703	11-12704	11-12705
					Client ID:	TH01-1 @ 2.5'	TH01-1 @ 2.5'	TH02-1 @ 5'	TH03-1 @ 5'	TH04-1 @ 5'
					Sample Date:	2011-09-08 00:00	Lab Duplicate	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MDL					
LL	2011/09/15	Antimony	µg/g (ppm)	EPA 3050/6010	0.5	10.5	--	--	--	< 0.5
LL	2011/09/15	Aluminum	µg/g (ppm)	EPA 3050/6010	5	14100	--	--	--	6760
LL	2011/09/15	Arsenic	µg/g (ppm)	EPA 3050/6010	0.5	11.0	--	--	--	2.6
LL	2011/09/15	Barium	µg/g (ppm)	EPA 3050/6010	1	836	--	--	--	47
LL	2011/09/15	Beryllium	µg/g (ppm)	EPA 3050/6010	0.1	1.1	--	--	--	0.2
LL	2011/09/15	Cadmium	µg/g (ppm)	EPA 3050/6010	0.2	4.9	--	--	--	< 0.2
LL	2011/09/15	Calcium	µg/g (ppm)	EPA 3050/6010	5	50000	--	--	--	103000
LL	2011/09/15	Chromium	µg/g (ppm)	EPA 3050/6010	0.5	15.2	--	--	--	12.2
LL	2011/09/15	Cobalt	µg/g (ppm)	EPA 3050/6010	0.5	9.6	--	--	--	4.2
LL	2011/09/15	Copper	µg/g (ppm)	EPA 3050/6010	0.1	124	--	--	--	11.0
LL	2011/09/15	Iron	µg/g (ppm)	EPA 3050/6010	5	50000	--	--	--	9850
LL	2011/09/15	Lead	µg/g (ppm)	EPA 3050/6010	0.5	539	--	--	--	3.7
LL	2011/09/15	Magnesium	µg/g (ppm)	EPA 3050/6010	1	14200	--	--	--	56800
LL	2011/09/15	Manganese	µg/g (ppm)	EPA 3050/6010	0.5	456	--	--	--	185
LL	2011/09/15	Mercury	µg/g (ppm)	EPA 3050/6010	0.2	< 0.2	--	--	--	< 0.2
LL	2011/09/15	Molybdenum	µg/g (ppm)	EPA 3050/6010	0.5	1.8	--	--	--	< 0.5
LL	2011/09/15	Nickel	µg/g (ppm)	EPA 3050/6010	0.5	49.0	--	--	--	10.0
LL	2011/09/15	Phosphorus	µg/g (ppm)	EPA 3050/6010	5	3220	--	--	--	320
LL	2011/09/15	Potassium	µg/g (ppm)	EPA 3050/6010	5	799	--	--	--	1720
LL	2011/09/15	Selenium	µg/g (ppm)	EPA 3050/6010	0.5	< 0.5	--	--	--	< 0.5
LL	2011/09/15	Sodium	µg/g (ppm)	EPA 3050/6010	1	2810	--	--	--	2320
LL	2011/09/15	Silver	µg/g (ppm)	EPA 3050/6010	0.1	0.2	--	--	--	< 0.1
LL	2011/09/15	Thallium	µg/g (ppm)	EPA 3050/6010	0.5	< 0.5	--	--	--	< 0.5
LL	2011/09/15	Tin	µg/g (ppm)	EPA 3050/6010	0.5	60.9	--	--	--	< 0.5
LL	2011/09/15	Vanadium	µg/g (ppm)	EPA 3050/6010	0.2	14.1	--	--	--	16.8
LL	2011/09/15	Uranium	µg/g (ppm)	EPA 3050/6010	15.0	< 15.0	--	--	--	< 15.0
LL	2011/09/15	Zinc	µg/g (ppm)	EPA 3050/6010	0.5	2960	--	--	--	21.6

All Analytical results pertain to samples analyzed as received.

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.

MDL - Method Detection Limit

Report reviewed by:

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 Manager
 Laboratory Services

Charlene Rollheiser
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 440 Dovercourt Drive
 Winnipeg, MB R3Y 1N4

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**Soil Analysis - ICP Metals
 Preliminary Results**

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12706	11-12707	11-12708	11-12709	11-12710
					Client ID:	TH05-1 @ 5'	TH06-1 @ 5'	TH07-1 @ 2'	TH08-1 @ 5'	TH09-1 @ 5'
					Sample Date:	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MDL					
LL	2011/09/15	Antimony	µg/g (ppm)	EPA 3050/6010	0.5	12.7	--	--	< 0.5	< 0.5
LL	2011/09/15	Aluminum	µg/g (ppm)	EPA 3050/6010	5	4390	--	--	7250	20800
LL	2011/09/15	Arsenic	µg/g (ppm)	EPA 3050/6010	0.5	6.7	--	--	4.4	3.3
LL	2011/09/15	Barium	µg/g (ppm)	EPA 3050/6010	1	1680	--	--	64	140
LL	2011/09/15	Beryllium	µg/g (ppm)	EPA 3050/6010	0.1	0.3	--	--	0.3	0.7
LL	2011/09/15	Cadmium	µg/g (ppm)	EPA 3050/6010	0.2	1.7	--	--	< 0.2	0.3
LL	2011/09/15	Calcium	µg/g (ppm)	EPA 3050/6010	5	87400	--	--	82700	30000
LL	2011/09/15	Chromium	µg/g (ppm)	EPA 3050/6010	0.5	17.3	--	--	12.2	27.0
LL	2011/09/15	Cobalt	µg/g (ppm)	EPA 3050/6010	0.5	4.9	--	--	6.0	11.1
LL	2011/09/15	Copper	µg/g (ppm)	EPA 3050/6010	0.1	107	--	--	12.2	21.2
LL	2011/09/15	Iron	µg/g (ppm)	EPA 3050/6010	5	29400	--	--	12700	27800
LL	2011/09/15	Lead	µg/g (ppm)	EPA 3050/6010	0.5	2890	--	--	5.1	12.0
LL	2011/09/15	Magnesium	µg/g (ppm)	EPA 3050/6010	1	33100	--	--	45800	15400
LL	2011/09/15	Manganese	µg/g (ppm)	EPA 3050/6010	0.5	217	--	--	445	387
LL	2011/09/15	Mercury	µg/g (ppm)	EPA 3050/6010	0.2	< 0.2	--	--	< 0.2	< 0.2
LL	2011/09/15	Molybdenum	µg/g (ppm)	EPA 3050/6010	0.5	1.3	--	--	< 0.5	0.6
LL	2011/09/15	Nickel	µg/g (ppm)	EPA 3050/6010	0.5	17.6	--	--	15.4	25.3
LL	2011/09/15	Phosphorus	µg/g (ppm)	EPA 3050/6010	5	292	--	--	398	388
LL	2011/09/15	Potassium	µg/g (ppm)	EPA 3050/6010	5	968	--	--	1990	4850
LL	2011/09/15	Selenium	µg/g (ppm)	EPA 3050/6010	0.5	< 0.5	--	--	< 0.5	< 0.5
LL	2011/09/15	Sodium	µg/g (ppm)	EPA 3050/6010	1	2210	--	--	1970	750
LL	2011/09/15	Silver	µg/g (ppm)	EPA 3050/6010	0.1	0.1	--	--	< 0.1	< 0.1
LL	2011/09/15	Thallium	µg/g (ppm)	EPA 3050/6010	0.5	< 0.5	--	--	< 0.5	< 0.5
LL	2011/09/15	Tin	µg/g (ppm)	EPA 3050/6010	0.5	12.8	--	--	< 0.5	< 0.5
LL	2011/09/15	Vanadium	µg/g (ppm)	EPA 3050/6010	0.2	9.3	--	--	19.8	32.1
LL	2011/09/15	Uranium	µg/g (ppm)	EPA 3050/6010	15.0	< 15.0	--	--	< 15.0	< 15.0
LL	2011/09/15	Zinc	µg/g (ppm)	EPA 3050/6010	0.5	1110	--	--	27.9	73.9

All Analytical results pertain to samples analyzed as received.

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MDL - Method Detection Limit

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Soil Analysis - ICP Metals
Preliminary Results

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12711	11-12712	11-12713
					Client ID:	TH10-1 @ 5'	TH11-1 @ 2'	TH12-1 @ 2'
					Sample Date:	2011-09-08 00:00	2011-09-09 00:00	2011-09-08 00:00
					MDL			
LL	2011/09/15	Antimony	µg/g (ppm)	EPA 3050/6010	0.5	---	---	7.9
LL	2011/09/15	Aluminum	µg/g (ppm)	EPA 3050/6010	5	---	---	2590
LL	2011/09/15	Arsenic	µg/g (ppm)	EPA 3050/6010	0.5	---	---	4.8
LL	2011/09/15	Barium	µg/g (ppm)	EPA 3050/6010	1	---	---	496
LL	2011/09/15	Beryllium	µg/g (ppm)	EPA 3050/6010	0.1	---	---	0.1
LL	2011/09/15	Cadmium	µg/g (ppm)	EPA 3050/6010	0.2	---	---	0.2
LL	2011/09/15	Calcium	µg/g (ppm)	EPA 3050/6010	5	---	---	120000
LL	2011/09/15	Chromium	µg/g (ppm)	EPA 3050/6010	0.5	---	---	7.5
LL	2011/09/15	Cobalt	µg/g (ppm)	EPA 3050/6010	0.5	---	---	3.1
LL	2011/09/15	Copper	µg/g (ppm)	EPA 3050/6010	0.1	---	---	74.8
LL	2011/09/15	Iron	µg/g (ppm)	EPA 3050/6010	5	---	---	14800
LL	2011/09/15	Lead	µg/g (ppm)	EPA 3050/6010	0.5	---	---	494
LL	2011/09/15	Magnesium	µg/g (ppm)	EPA 3050/6010	1	---	---	46000
LL	2011/09/15	Manganese	µg/g (ppm)	EPA 3050/6010	0.5	---	---	183
LL	2011/09/15	Mercury	µg/g (ppm)	EPA 3050/6010	0.2	---	---	< 0.2
LL	2011/09/15	Molybdenum	µg/g (ppm)	EPA 3050/6010	0.5	---	---	< 0.5
LL	2011/09/15	Nickel	µg/g (ppm)	EPA 3050/6010	0.5	---	---	7.0
LL	2011/09/15	Phosphorus	µg/g (ppm)	EPA 3050/6010	5	---	---	242
LL	2011/09/15	Potassium	µg/g (ppm)	EPA 3050/6010	5	---	---	1100
LL	2011/09/15	Selenium	µg/g (ppm)	EPA 3050/6010	0.5	---	---	< 0.5
LL	2011/09/15	Sodium	µg/g (ppm)	EPA 3050/6010	1	---	---	2500
LL	2011/09/15	Silver	µg/g (ppm)	EPA 3050/6010	0.1	---	---	0.1
LL	2011/09/15	Thallium	µg/g (ppm)	EPA 3050/6010	0.5	---	---	< 0.5
LL	2011/09/15	Tin	µg/g (ppm)	EPA 3050/6010	0.5	---	---	11.1
LL	2011/09/15	Vanadium	µg/g (ppm)	EPA 3050/6010	0.2	---	---	6.6
LL	2011/09/15	Uranium	µg/g (ppm)	EPA 3050/6010	15.0	---	---	< 15.0
LL	2011/09/15	Zinc	µg/g (ppm)	EPA 3050/6010	0.5	---	---	231

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Date Received: 2011/09/10
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**Soil Analysis - Polycyclic Aromatic Hydrocarbons
 Preliminary Results**

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12702	11-12702-B	11-12703	11-12704	11-12705
					Client ID:	TH01-1 @ 2.5'	TH01-1 @ 2.5'	TH02-1 @ 5'	TH03-1 @ 5'	TH04-1 @ 5'
					Sample Date:	2011-09-08 00:00	Lab Duplicate	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MDL					
PC	2011/09/12	Aconaphthone	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Aconaphthylene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Anthracene	µg/g (ppm)	EPA 3550/8270C	0.005	* 0.16	* 0.077	< 0.005	< 0.005	< 0.005
PC	2011/09/12	Benzo(a)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	* 0.5	* 0.2	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Benzo(a)pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	* 0.51	* 0.27	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Benzo(c)phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Benzo(g,h,i)perylene	µg/g (ppm)	EPA 3550/8270C	0.1	* 0.4	* 0.2	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Chrysene	µg/g (ppm)	EPA 3550/8270C	0.05	* 0.77	* 0.36	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Dibenz(a,h)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenz(a,h)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenz(a,i)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenz(a,j)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	7,12 Dimethyl benzanthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.04	* 0.80	* 0.39	< 0.04	< 0.04	< 0.04
PC	2011/09/12	Fluorene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Indeno(1,2,3-cd)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	* 0.3	* 0.2	< 0.1	< 0.1	< 0.1
PC	2011/09/12	2-Methylnaphthalene	µg/g (ppm)	EPA 3550/8270C	0.1	* 3.1	* 1.0	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Naphthalene	µg/g (ppm)	EPA 3550/8270C	0.015	* 1.5	* 0.49	< 0.015	< 0.015	< 0.015
PC	2011/09/12	Phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.05	* 1.8	* 0.67	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	* 0.79	* 0.37	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Benzo(b+g)fluoranthene	µg/g (ppm)	EPA 3510/8270C	0.05	* 0.53	* 0.27	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Benzo(k)fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.05	* 0.40	* 0.21	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Surrogate 1 Recovery	%	--	0.1	104	94.2	107	92.2	109
PC	2011/09/12	Surrogate 2 Recovery	%	--	0.1	103	84.6	106	94.8	104

* Note: Laboratory Duplicate results outside QC criteria possibly due to non-homogenous sample. Results have been verified.

All Analytical results pertain to samples analyzed as received.

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.

Extraction and analysis limits for holding time were met.

MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
 Manager
 Laboratory Services

Charlene Rollheiser
 Director of QA/QC
 Laboratory Services

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ANALYTICAL REPORT

AMEC Earth & Environmental
 440 Dovercourt Drive
 Winnipeg, MB R3Y 1N4

Date Received: 2011/09/10
 Report Date: 2011/09/19
 Date Required: 2011/09/19

**Soil Analysis - Polycyclic Aromatic Hydrocarbons
 Preliminary Results**

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12706	11-12707	11-12708	11-12709	11-12710
					Client ID:	TH05-1 @ 5'	TH06-1 @ 5'	TH07-1 @ 2'	TH08-1 @ 5'	TH09-1 @ 5'
					Sample Date:	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00	2011-09-08 00:00
					MDL					
PC	2011/09/12	Acenaphthene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Acenaphthylene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Anthracene	µg/g (ppm)	EPA 3550/8270C	0.005	0.19	< 0.005	0.22	< 0.005	< 0.005
PC	2011/09/12	Benzo(a)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	0.4	< 0.1	0.5	< 0.1	< 0.1
PC	2011/09/12	Benzo(a)pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	0.28	< 0.05	0.40	< 0.05	< 0.05
PC	2011/09/12	Benzo(c)phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Benzo(g,h,i)perylene	µg/g (ppm)	EPA 3550/8270C	0.1	0.2	< 0.1	0.3	< 0.1	< 0.1
PC	2011/09/12	Chrysene	µg/g (ppm)	EPA 3550/8270C	0.05	0.94	< 0.05	1.0	< 0.05	< 0.05
PC	2011/09/12	Dibenzo(a,h)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,h)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,i)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,j)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	7,12 Dimethyl benzanthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.04	0.38	< 0.04	0.66	< 0.04	< 0.04
PC	2011/09/12	Fluorene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Indeno(1,2,3-cd)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	0.1	< 0.1	0.2	< 0.1	< 0.1
PC	2011/09/12	2-Methylnaphthalene	µg/g (ppm)	EPA 3550/8270C	0.1	2.3	< 0.1	2.5	< 0.1	< 0.1
PC	2011/09/12	Naphthalene	µg/g (ppm)	EPA 3550/8270C	0.015	0.90	< 0.015	1.1	< 0.015	< 0.015
PC	2011/09/12	Phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.05	2.0	< 0.05	2.4	< 0.05	< 0.05
PC	2011/09/12	Pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	0.50	< 0.05	0.73	< 0.05	< 0.05
PC	2011/09/12	Benzo(b+g)fluoranthene	µg/g (ppm)	EPA 3510/8270C	0.05	0.46	< 0.05	0.53	< 0.05	< 0.05
PC	2011/09/12	Benzo(k)fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.05	0.18	< 0.05	0.29	< 0.05	< 0.05
PC	2011/09/12	Surrogate 1 Recovery	%	-	0.1	108	111	102	102	100
PC	2011/09/12	Surrogate 2 Recovery	%	-	0.1	96.6	103	100	97.0	102

* Note: Laboratory Duplicate results outside QC criteria possibly due to non-homogenous sample. Results have been verified.
 All Analytical results pertain to samples analyzed as received.
 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.
 Extraction and analysis limits for holding time were met.
 MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
 Manager
 Laboratory Services

Charlene Rollheiser
 Director of QA/QC
 Laboratory Services

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ANALYTICAL REPORT

AMEC Earth & Environmental
 440 Dovercourt Drive
 Winnipeg, MB R3Y 1N4

Date Received: 2011/09/10
Report Date: 2011/09/19
Date Required: 2011/09/19

**Soil Analysis - Polycyclic Aromatic Hydrocarbons
 Preliminary Results**

Attention: Timlick, Karen

Project No. WX16667.600

File No.: EC-61758

Analyst	Date of Analysis (yyyy/mm/d)	Analytical Parameter	Units	Reference Method	Lab #:	11-12711	11-12712	11-12713
					Client ID:	TH10-1 @ 5'	TH11-1 @ 2'	TH12-1 @ 2'
					Sample Date:	2011-09-08 00:00	2011-09-09 00:00	2011-09-08 00:00
					MDL			
PC	2011/09/12	Acenaphthene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Acenaphthylene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	Anthracene	µg/g (ppm)	EPA 3550/8270C	0.005	< 0.005	0.062	0.005
PC	2011/09/12	Benzo(a)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	0.1	< 0.1
PC	2011/09/12	Benzo(a)pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	0.11	< 0.05
PC	2011/09/12	Benzo(c)phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Benzo(g,h,i)perylene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	0.1	< 0.1
PC	2011/09/12	Chrysene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	0.21	< 0.05
PC	2011/09/12	Dibenzo(a,h)anthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,h)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,i)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Dibenzo(a,j)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	7,12 Dimethyl benzanthracene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	Fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.04	< 0.04	0.33	< 0.04
PC	2011/09/12	Fluorene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	< 0.05	< 0.05
PC	2011/09/12	indeno(1,2,3-cd)pyrene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	< 0.1	< 0.1
PC	2011/09/12	2-Methylnaphthalene	µg/g (ppm)	EPA 3550/8270C	0.1	< 0.1	0.8	< 0.1
PC	2011/09/12	Naphthalene	µg/g (ppm)	EPA 3550/8270C	0.015	< 0.015	0.64	0.035
PC	2011/09/12	Phenanthrene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	0.45	< 0.05
PC	2011/09/12	Pyrene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	0.32	< 0.05
PC	2011/09/12	Benzo[b+]fluoranthene	µg/g (ppm)	EPA 3510/8270C	0.05	< 0.05	0.13	< 0.05
PC	2011/09/12	Benzo[k]fluoranthene	µg/g (ppm)	EPA 3550/8270C	0.05	< 0.05	0.12	< 0.05
PC	2011/09/12	Surrogate 1 Recovery	%	--	0.1	97.8	92.3	109
PC	2011/09/12	Surrogate 2 Recovery	%	--	0.1	105	138	103

* Note: Laboratory Duplicate results outside QC criteria possibly due to non-homogenous sample. Results have been verified.

All Analytical results pertain to samples analyzed as received.

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.

Extraction and analysis limits for holding time were met.

MDL - Method Detection Limit

Report reviewed by:

Jesse Dang, B.Sc.
 Manager
 Laboratory Services

Charlene Rollheiser
 Director of QA/QC
 Laboratory Services

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Environmental Investigation
Rapid Transit Bus Garage
Brandon Avenue
Winnipeg, Manitoba



Appendix B: General Conditions

AMEC Environment and Infrastructure, A Division of AMEC Americas Limited
STATEMENT OF GENERAL CONDITIONS - ENVIRONMENTAL SERVICES

1. **STANDARD OF CARE** - In the performance of professional services, AMEC uses that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same or similar localities. No warranty, either express or implied, is made or intended by this Agreement or by furnishing oral or written reports of the findings. AMEC is to be liable only for damage proximately caused by the negligence of AMEC. The CLIENT recognizes that subsurface conditions may vary from those encountered at the location where borings, surveys or explorations are made by AMEC and that the data, interpretations and recommendation of AMEC are based solely on the information available to him. AMEC will not be responsible for the interpretation by others of the information developed.

2. **SITE INFORMATION** - The CLIENT has agreed to make available to AMEC all relevant information and documents under his control regarding past, present and proposed conditions of the site. The information shall include, but not be limited to, plot plans, topographic surveys, hydrologic data and previous soil and geologic data including borings, field or laboratory tests and written reports. The CLIENT shall immediately transmit to AMEC any new information that becomes available or any change in plans. The CLIENT also ensured uninterrupted site access for AMEC throughout performance of this Agreement.

AMEC agrees to include a review of all historical information obtained by the CLIENT or provided by the Client to assist in the investigation of the Site unless and except to the extent that such a review is limited or excluded from the scope of work to be performed by AMEC.

3. **FULL DISCLOSURE** - The CLIENT acknowledges that in order for AMEC to properly advise and assist the CLIENT in respect of the investigation of the Site, AMEC has relied upon full disclosure by the CLIENT of all matters pertinent to an investigation of the Site.

4. **DELAYS AND INTERRUPTIONS** - Should AMEC have been delayed or interrupted by others in the performance of its services or be required to perform additional services as a result of any delay or interruption caused by others, AMEC shall be equitably compensated by the CLIENT for all costs, charges and expenses which it may incur as a result of such delay or interruption and any such additional services to be performed and any and all consequences resulting from such delay or interruption.

5. **USE OF WORK PRODUCT** - AMEC agrees to provide to the CLIENT interim reports outlining the progress of the investigation of the Site on a periodic basis and a final comprehensive report upon the completion of the investigation of the Site.

6. **COMPLETE REPORT** - This document being a part of the Report is of a summary nature and is not intended to stand alone without reference to the instructions given to AMEC by the CLIENT, communications between AMEC and the CLIENT, and to any other reports, writings or documents prepared by AMEC for the CLIENT relative to the specific Site described herein, all of which constitute the Report. Wherever the word "Report" is used herein, it shall refer to any and all of the documents referred to herein.

In order to properly understand the suggestions, recommendations and opinions expressed herein, reference must be made to the whole of the Report. AMEC cannot be responsible for use by any part of portions of the report without reference to the whole report.

7. **LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER**

There is no warranty, expressed or implied, by AMEC that:

- a) The investigation shall uncover all potential contaminants, including asbestos, on the Site; or
- b) The Site will be entirely free of all Targeted Contaminants or other contaminants as a result of any cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential contaminants on the Site.

Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities have been based on commonly accepted practices in environmental consulting practice in this area.

The CLIENT acknowledges that:

- a) The investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;
- b) any assessment regarding the presence of contamination of the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations;
- c) there can be no assurance that isolated pockets of contaminants are not located on the Site;
- d) any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
- e) any assessment is also limited by the scientific possibility of determining the presence of contaminants for which scientific analyses have been conducted; and
- f) the analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation (in the absence of any evidence of potential contamination sources on the Site, which may warrant expanding the analytical parameters).

8. REMEDIATION COST ESTIMATES - Estimates of remediation costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for remediation only represent the cost to clean up known contaminants that have been identified during the course of the investigation. As remediation of a Site is often an iterative exercise, estimated costs for remediation should only be interpreted to cover the first stage of any Site remediation until such time as verification samples indicate that the Site has been fully remediated and AMEC shall therefore not be liable for the accuracy of any estimates of remediation costs provided.

9. CONTROL OF WORK AND JOBSITE SAFETY - AMEC is only responsible for the activities of its employees on the jobsite. The presence of AMEC personnel on the Site shall not be construed in any way to relieve the CLIENT or any contractors on Site from their responsibilities for Site safety. The CLIENT undertakes to inform AMEC of all hazardous conditions, or possible hazardous conditions which are known to him. The CLIENT also recognizes that the activities of AMEC may uncover previously unknown hazardous materials and that such a discovery may result in the necessity to undertake emergency procedures to protect AMEC employees as well as the public at large and the environment in general. The CLIENT also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the CLIENT agrees that notification to such bodies by AMEC will not be a cause of action or dispute.

10. LIMITATION OF RESPONSIBILITY

Limitation of Liability - The CLIENT has agreed that, notwithstanding any other provision negotiated as part of AMEC's contract, the total liability of AMEC, its officers, directors and employees for liabilities, claims, judgments, demands and causes of action arising under or related to this Agreement, whether based in contract or tort, shall be limited to the total compensation actually paid to AMEC for the services hereunder or \$50,000, whichever is less. All claims by the CLIENT shall be deemed relinquished unless filed within one (1) year after substantial completion of the services hereunder.

No Special or Consequential Damages - CLIENT and AMEC agree that to the fullest extent permitted by law that AMEC shall not be responsible for any consequential, incidental or indirect damages.

Indemnification - Because CLIENT owns and/or operates the site where work is being performed, CLIENT has and shall retain all responsibility and liability associated with the environmental conditions at the site. Unless specifically identified elsewhere, CLIENT'S responsibility and liability includes the handling and disposal of any samples or hazardous materials generated on the site as a result of AMEC's performance hereunder. To the fullest extent permitted by law, the CLIENT agrees to defend, indemnify and hold AMEC, its agents, subcontractors, and employees harmless from and against any and all claims, defense costs, including attorney's fees, damages, and other liabilities arising out of or in any way related to CONSULTANT's reports or recommendations concerning this Agreement, AMEC's presence on the project property, or the presence, release, or threatened release of asbestos, hazardous substances, or pollutants on or from the project property; provided that the CLIENT shall not indemnify AMEC against liability for damages to the extent caused by the negligence or intentional misconduct of AMEC, its agents, subcontractors, or employees.