PHASE II ENVIRONMENTAL SITE ASSESSMENT
1545 AND 1545A MERIVALE ROAD
OTTAWA, ONTARIO

Submitted to:
Chase Estates Limited
195 Colonnade Road South
Ottawa, Ontario
K2E 7K3

Submitted by:
AMEC Earth & Environmental
a division of AMEC Americas Limited
300 – 210 Colonnade Road South
Ottawa, Ontario
K2E 7L5

April 8, 2004

TZ4107501

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EXECUTIVE SUMMARY

AMEC Earth & Environmental ("AMEC") was retained by Chase Estates Limited to conduct a Phase II Environmental Site Assessment (ESA) of the commercial property located at 1545 and 1545A Merivale Road, in Ottawa, Ontario (the "Site").

A Phase I ESA completed at the Site by AMEC in March 2004 revealed evidence of potential environmental concerns associated with the following findings:

- AMEC observed a suspected fill pipe located adjacent to the exterior south elevation of Malabar (1545A Merivale) that suggests the presence of a potential underground storage tank (UST) on Site. The Site representative was unaware as to the purpose/source of the suspected fill pipe;

- an Ultramar retail fuel outlet is located adjacent to the north Site perimeter. According to the Site representative, the USTs at the Ultramar were replaced in approximately 1998/99. However, it is unknown as to whether or not there were petroleum hydrocarbon impacts to the soil and/or groundwater in the vicinity of the USTs at the time or removal/replacement; and

- a Shell retail fuel outlet is located approximately 50 m west and is inferred to be hydraulically upgradient to the Site.

To address the above noted potential environmental concerns, AMEC recommended the following:

- a geophysical survey should be completed at the Site to confirm/deny the presence of a UST associated with the suspected fill pipe. If found to be present, the UST should be removed in accordance with the relevant standards. Should the geophysical survey results indicate that no UST is present at the Site, a Phase II ESA should be completed at the Site to address potential soil and/or groundwater contamination as a result of a former on-Site UST; and

- a Phase II ESA should be completed at the Site to address potential soil and/or groundwater contamination as a result of the current Ultramar and Shell retail fuel outlets located immediately north and west of the Site, respectively.

A camera scope was completed by USL-1 Underground Service Locators ("USL-1") to address the concern of the suspected fill pipe located adjacent to the exterior south elevation of Malabar (1545A Merivale). Based on USL-1's camera scope, an out-of-use UST was confirmed to be present however the former use of the UST could not be determined. USL-1 also completed a geophysical survey in the vicinity of the former UST to determine its orientation, however the results were inconclusive.

In addition, a total of four boreholes (MW-1, MW-2, MW-3, and MW-4) were advanced at strategic locations in order to assess potential environmental concerns identified by AMEC's Phase I ESA. All of the boreholes were instrumented as groundwater monitoring wells. The borehole and monitoring well locations were chosen to intersect potential subsurface soil and groundwater plumes and to establish the Site-specific geological and hydrogeological characteristics beneath the Site.

In general, the subsurface conditions at the Site consist of asphalt overlying sand and sandy clay fill, successively underlain by sand and clay till followed by sand to the termination depth of each borehole.

No olfactory or visual evidence of petroleum hydrocarbon impacts were observed during the advancement of the boreholes and collection of the soil samples. COV concentration headspace measurements recorded in the soil samples collected at the Site ranged from non-detectable (ND) to 10 parts per million (ppm) by volume. No visible liquid petroleum hydrocarbon product (LPH) was observed in either the soil or groundwater samples obtained from the Site. No measurable accumulations of floating LPH were detected in any of the monitoring wells installed at the Site.

Representative soil and groundwater samples collected during the investigation were submitted for laboratory analysis of suspect parameters of concern. Paracel Laboratories Ltd. in Ottawa, Ontario, conducted all laboratory chemical analyses.

The criteria for the selection of soil samples for laboratory analysis were based on the worse case results of the sample field screening and visual/olfactory observations. A total of four soil samples, including one soil sample from each borehole location, were submitted for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), and total petroleum hydrocarbons (TPH) in the gas/diesel and heavy oil ranges.

Groundwater samples collected from the monitoring wells during the April 2, 2004 sampling event were also submitted for analysis of BTEX, TPH (gas/diesel) and TPH (heavy oil).

Concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted soil samples satisfy the applicable MOE Guideline Table B soil quality assessment criteria.

Concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted groundwater samples satisfy the applicable MOE Guideline Table B groundwater quality assessment criteria. However, detected levels of gasoline related parameters were detected in the groundwater sample collected from MW-1.

Based on the results of AMEC's Phase II ESA soil and groundwater sampling and analytical programs, the Site is deemed to be in compliance with the applicable soil and groundwater criteria set forth in the MOE *Guideline for Use at Contaminated Sites in Ontario.* As such, no

additional investigations are warranted or recommended at this time with respect to the off-Site retail fuel outlets.

However, given that USL-1 confirmed the presence of UST, the former use should be determined. The City of Ottawa's Health Unit should be contacted in order to confirm if the out-of-use UST is associated with a former septic system. Based on the findings of the City of Ottawa's Health Unit search the following remediation activities should be completed at the Site:

- In the event that the out-of-use UST is confirmed to be associated with a former septic system, the UST should be removed according to standards set forth by the City of Ottawa (i.e. emptied of all contents and decommissioned in-place by filling with sand). In addition, any biowaste within the vicinity of a tile field should be removed and disposed of according to non-hazardous biowaste procedures; or

- In the event that the out-of-use UST is confirmed to have been used for the storage of heating oil the UST should be removed as per appropriate provincial (i.e., TSSA) regulations.

This Executive Summary provides a brief overview of the Phase II ESA findings. It is intended to be read in conjunction with the complete report as it does not identify detailed issues discussed within the body of the report.

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1.0 INTRODUCTION

AMEC Earth & Environmental ("AMEC") was retained by Chase Estates Limited to conduct a Phase II Environmental Site Assessment (ESA) of the commercial property located at 1545 and 1545A Merivale Road, in Ottawa, Ontario (the "Site").

1.1 Site Description

The Site is located on the east side of Merivale Road, approximately 60 m south of the intersection of Merivale Road and Capilano Drive, Ontario (refer to Figure 1). The Site lies in a typical municipal urban setting in an area of mixed residential, commercial and institutional land uses.

The Site is an irregular-shaped property, approximately 0.9 hectares (2.3 acres) in area and is occupied by two single-storey commercial buildings (the "Site buildings"). The Site buildings consist of a single-tenant restaurant at 1545 Merivale and a multi-tenant commercial/retail at 1545A Merivale. The Site buildings are inferred to have been originally constructed in approximately the 1960s with an addition added to the east elevation of 1545 Merivale in approximately the 1990s. 1545 Merivale has an approximate footprint and total building area of 307 m^2 (3,300 ft^2). 1545A Merivale, comprised of both Malabar and the Convention Centre, possesses a footprint and total building area of approximately 1,020 m^2 (11,000 ft^2). The Site building covers approximately 14% of the total Site area.

1545 Merivale is owned by Chase Estates Limited and is occupied by a Cora's restaurant while 1545A Merivale is owned by Mr. Morris Kimmel and is occupied by Malabar costume sales and rentals, and the Convention Centre. Based on a review of available historical information sources (i.e., city directories and aerial photographs), the Site was developed for its current use in approximately the 1960s. Prior to development the Site appeared to be agricultural in nature.

1.2 Objective and Scope of Work

A Phase I ESA completed at the Site by AMEC in March 2004 revealed evidence of potential environmental concerns associated with the following findings:

- AMEC observed a suspected fill pipe located adjacent to the exterior south elevation of Malabar (1545A Merivale) that suggests the presence of a potential underground storage tank (UST) on Site. The Site representative was unaware as to the purpose/source of the suspected fill pipe;

- an Ultramar retail fuel outlet is located adjacent to the north Site perimeter. According to the Site representative, the USTs at the Ultramar were replaced in approximately 1998/99. However, it is unknown as to whether or not there were petroleum hydrocarbon impacts to the soil and/or groundwater in the vicinity of the USTs at the time or removal/replacement; and

- a Shell retail fuel outlet is located approximately 50 m west and is inferred to be hydraulically upgradient to the Site.

To address the above noted potential environmental concerns, AMEC recommended the following:

- a geophysical survey should be completed at the Site to confirm/deny the presence of a UST associated with the suspected fill pipe. If found to be present, the UST should be removed in accordance with the relevant standards. Should the geophysical survey results indicate that no UST is present at the Site, a Phase II ESA should be completed at the Site to address potential soil and/or groundwater contamination as a result of a former on-Site UST; and

- a Phase II ESA should be completed at the Site to address potential soil and/or groundwater contamination as a result of the current Ultramar and Shell retail fuel outlets located immediately north and west of the Site, respectively.

The camera scope, geophysical survey and Phase II ESA was conducted in accordance with AMEC's Workplan and Cost Estimate, dated March 17, 2004.

2.0 WORK PROGRAM AND METHODOLOGY

Details of the investigation activities are provided in the following sections.

2.1 Field Preparation

2.1.1 Subsurface Utility Locates

The locations of all buried and overhead services were obtained prior to the initiation of any of the subsurface investigations. USL-1 of Ottawa, Ontario, was retained to undertake the subsurface utility locates.

2.2 Subsurface Investigations and Soil Sampling

2.2.1 Camera Scope and Geophysical Survey

A camera scope was completed by USL-1 Underground Service Locators ("USL-1") to address the concern of the suspected fill pipe located adjacent to the exterior south elevation of Malabar (1545A Merivale). Based on USL-1's camera scope, an out-of-use UST was confirmed to be present however the former use of the UST could not be determined. USL-1 also completed a geophysical survey in the vicinity of the former UST to determine its orientation, however the results were inconclusive.

2.2.2 Borehole Drilling and Soil Sampling

A total of four boreholes (MW-1, MW-2, MW-3, and MW-4) were advanced at strategic locations in order to assess potential environmental concerns identified by AMEC's Phase I ESA. All of the boreholes were instrumented as groundwater monitoring wells. The borehole and monitoring well locations were chosen to intersect potential subsurface soil and groundwater plumes and to establish the Site-specific geological and hydrogeological characteristics beneath the Site. The borehole and monitoring well locations are shown in Figure 1.

The borehole investigations were completed on March 29, 2004 by Marathon Drilling Co. Ltd. of Ottawa, Ontario, under the supervision of AMEC personnel. The boreholes were advanced to a maximum depth of approximately 5.33 m below surface grade using a truck-mounted CME drilling rig. All boreholes were advanced using standard 200 mm diameter hollow stem augers. Sixty centimetre soil samples were collected using standard split spoon sampling techniques at regular intervals throughout borehole advancement within the overburden. Details of the borehole drilling and soil sampling are provided in the Stratigraphic and Instrumentation Logs in Appendix A.

2.2.3 Sample Logging and Handling

The soil samples retrieved during the field investigations were examined, classified, and logged according to soil type, moisture content, colour, consistency, and presence/absence of visual and/or olfactory indicators of negative impact. Soil samples were split into duplicate fractions upon recovery at the surface. The primary sample fractions were placed in 200 mL sample jars with Teflon-lined lids and subsequently stored in coolers at 4°C for future potential laboratory analysis. The duplicate sample fractions were placed in "Ziploc" sample bags and stored at ambient temperature for subsequent field vapour screening purposes.

2.2.4 Sample Screening

All soil samples were screened in the field for gross evidence of negative environmental impact including staining and odours. Soil sample headspace screening was also performed to facilitate sample selections for laboratory analysis and to provide an assessment of the vertical contaminant distributions at each borehole location. The duplicate soil sample fractions were screened for combustible organic vapour (COV) concentrations using the sample headspace method. COV concentrations were measured using an Eagle™ multi-gas detector calibrated to a known standard and operated in methane elimination mode.

2.3 Monitoring Well Constructions

All of the boreholes were instrumented as groundwater monitoring wells upon completion. The monitoring wells were constructed using 50 mm diameter, schedule 40, flush-joint threaded PVC monitoring well supplies. All monitoring wells were completed with a 3.0 m length of #10 mill slotted intake screen. The tops of the intake screens were then extended to the

ground surface using solid riser pipe. A silica sand filter pack was placed between the intake screen and the wall of the borehole. The filter pack was extended approximately 0.3 m above the top of the well screen. A bentonite seal was placed above the sand pack. The monitoring wells were finished at the surface with flushmount steel casing set in an asphalt surface seal. Details of the monitoring well constructions are included in the Stratigraphic and Instrumentation Logs in Appendix A.

2.4 Groundwater Monitoring and Sampling

Groundwater monitoring wells installed by AMEC at the Site were instrumented with dedicated Waterra™ tubing and foot valves to facilitate well development, purging and sampling requirements. Following installation, each monitoring well was developed by purging approximately five well volumes to remove any residual sediment and/or drill cuttings introduced during the borehole drilling and well installation process.

Groundwater monitoring including gauging of the static water table elevations and visual assessment of liquid petroleum hydrocarbon (LPH) was conducted on April 2, 2004 and included all on-Site monitoring wells. Measurements of groundwater depth were made using a Heron Instruments water level indicator and reduced to static elevations based on the monitoring well survey data.

Groundwater sampling was also performed on April 2, 2004. Prior to sampling all monitoring wells were purged a minimum of three well volumes to ensure the samples to be representative of true formation waters. The purging and sampling activities were carried out using the dedicated Waterra™ tubing. Groundwater samples were transferred directly into laboratory supplied, preservative filled sample containers. Samples were placed in a cooler and stored at 4°C until delivered to the analytical laboratory.

2.5 Laboratory Analyses

Representative soil and groundwater samples collected during the investigation were submitted for laboratory analysis of suspect parameters of concern. Paracel Laboratories Ltd. ("Paracel") in Ottawa, Ontario, conducted all laboratory chemical analyses. Paracel is certified and accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL).

The criteria for the selection of soil samples for laboratory analysis were based on the worse case results of the sample field screening and visual/olfactory observations. A total of four soil samples, including one soil sample from each borehole location, were submitted for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), and total petroleum hydrocarbons (TPH) in the gas/diesel and heavy oil ranges.

Groundwater samples collected from the monitoring wells during the April 2, 2004 sampling event were also submitted for analysis of BTEX, TPH (gas/diesel) and TPH (heavy oil).

3.0 RESULTS OF THE FIELD INVESTIGATIONS

3.1 Site Geology

The subsurface conditions encountered at the Site are described in the Stratigraphic and Instrumentation Logs provided in Appendix A. In general, the subsurface conditions at the Site consist of asphalt overlying sand and sandy clay fill, successively underlain by sand and clay till followed by sand to the termination depth of each borehole.

3.2 Field Measurements

3.2.1 Staining and Odours

No olfactory or visual evidence of petroleum hydrocarbon impacts were observed during the advancement of the boreholes and collection of the soil samples.

3.2.2 Combustible Organic Vapour Concentrations

COV concentration headspace measurements recorded in the soil samples collected at the Site ranged from non-detectable (ND) to 10 parts per million (ppm) by volume. There are no regulatory criteria for combustible soil vapours; however, they are often used as a practicable field-screening tool to identify "worst-case" petroleum hydrocarbon impacted soils for subsequent laboratory analyses.

The COV concentrations headspace measurements are summarized in the Stratigraphic and Instrumentation Logs in Appendix A.

3.2.3 Liquid Petroleum Hydrocarbons

No visible liquid petroleum hydrocarbon product (LPH) was observed in either the soil or groundwater samples obtained from the Site. No measurable accumulations of floating LPH were detected in any of the monitoring wells installed at the Site.

4.0 DATA INTERPRETATION AND ASSESSMENT

4.1 Regulatory Framework

The framework for the assessment, remediation, and management of contaminated sites in Ontario is established within the MOE *Guideline for Use at Contaminated Sites in Ontario* ("MOE Guideline"). This document provides advice and information to property owners and consultants to use when assessing the environmental condition of a property, when determining whether or not restoration is required, and in determining the kind of restoration needed to allow continued use or re-use of the Site. The guideline provides three approaches, which may be used for site restoration. These include:

- **Background Approach:** the restoration of the site to the naturally occurring background concentrations;

- **Generic Approach:** the restoration of the site to generically derived soil and groundwater criteria which are protective of human health and of the natural environment; and

- **Site Specific Risk Assessment Approach (SSRA):** the restoration of the site to soil and groundwater criteria derived for a specific site which are protective of human health and of the natural environment but may be less stringent than the generic criteria.

The generic approach involves the application of soil and groundwater quality criteria, which have been developed to provide protection against potential adverse effects to human health, ecological health, and the natural environment. The guideline provides four sets of generic criteria for 117 parameters, including petroleum hydrocarbons. These criteria have been developed using a risk-based approach. The application of the appropriate criteria is dependent upon several site-specific conditions including: 1) the existing/proposed land use; 2) the existing/potential groundwater use; 3) soil depth; and 4) soil texture.

In many instances, despite the final restoration approach adopted, the generic criteria developed by the MOE serve as the necessary benchmarks for evaluating the need for additional investigations and/or the implementation of a risk management or remedial strategy at the Site.

There are, however, certain conditions exist which restrict the use of the generic criteria at potentially sensitive sites as outlined in Section 6.1 of the 1997 Guideline. One such condition is the presence of less than 2 metres of overburden and soil overlying the bedrock in the contaminated areas of the site, or in the contaminant plume area hydraulically downgradient of the source of contamination. If the Site is considered potentially sensitive, the Generic criteria may not be applicable and the background criteria presented in Table F of the 1997 Guideline may apply.

Based on the existing and proposed future commercial/industrial land use and the current non-potable groundwater use situation, the MOE Guideline ***Table B non-potable commercial/industrial*** criteria was selected as the appropriate soil and groundwater quality assessment criteria. As the principle near surface water table resides in the surficial overburden deposits, the criteria established for coarse textured soils were adopted for the Site.

4.2 Soil Sample Analyses

Concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted soil samples satisfy the applicable MOE Guideline Table B soil quality assessment criteria.

The results of the soil sample analyses, and their respective MOE Guideline assessment criteria, are summarized in Table 1. Copies of the laboratory certificates of analysis are presented in Appendix B.

4.3 Groundwater Sample Analyses

Concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted groundwater samples satisfy the applicable MOE Guideline Table B groundwater quality assessment criteria. However, detected levels of gasoline related parameters were detected in the groundwater sample collected from MW-1.

The results of the groundwater sample analyses, and their respective MOE Guideline assessment criteria, are summarized in Table 2. Copies of the laboratory certificates of analysis are presented in Appendix B.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the soil and groundwater sampling and laboratory analytical programs, AMEC offers the following conclusions and recommendations regarding the environmental Site condition:

- a camera scope was completed by USL-1 Underground Service Locators ("USL-1") to address the concern of the suspected fill pipe located adjacent to the exterior south elevation of Malabar (1545A Merivale). Based on USL-1's camera scope, an out-of-use UST was confirmed to be present however the former use of the UST could not be determined. USL-1 also completed a geophysical survey in the vicinity of the former UST to determine its orientation, however the results were inconclusive;

- a total of four boreholes (MW-1, MW-2, MW-3, and MW-4) were advanced at strategic locations in order to assess potential environmental concerns identified by AMEC's Phase I ESA. All of the boreholes were instrumented as groundwater monitoring wells;

- the subsurface conditions at the Site consist of asphalt overlying sand and sandy clay fill, successively underlain by sand and clay till followed by sand to the termination depth of each borehole;

- no olfactory or visual evidence of petroleum hydrocarbon impacts were observed during the advancement of the boreholes and collection of the soil samples;

- COV concentration headspace measurements recorded in the soil samples collected at the Site ranged from non-detectable (ND) to 10 parts per million (ppm) by volume;

- no visible liquid petroleum hydrocarbon product (LPH) was observed in either the soil or groundwater samples obtained from the Site. No measurable accumulations of floating LPH were detected in any of the monitoring wells installed at the Site;

- concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted soil samples satisfy the applicable MOE Guideline Table B soil quality assessment criteria; and

- Concentrations of BTEX and TPH in the gas/diesel and heavy oil ranges in all of the submitted groundwater samples satisfy the applicable MOE Guideline Table B groundwater quality assessment criteria. However, detected levels of gasoline related parameters were detected in the groundwater sample collected from MW-1.

Based on the results of AMEC's Phase II ESA soil and groundwater sampling and analytical programs, the Site is deemed to be in compliance with the applicable soil and groundwater criteria set forth in the MOE *Guideline for Use at Contaminated Sites in Ontario.* As such, no additional investigations are warranted or recommended at this time with respect to the off-Site retail fuel outlets.

However, given that USL-1 confirmed the presence of UST, the former use should be determined. The City of Ottawa's Health Unit should be contacted in order to confirm if the out-of-use UST is associated with a former septic system. Based on the findings of the City of Ottawa's Health Unit search the following remediation activities should be completed at the Site:

- In the event that the out-of-use UST is confirmed to be associated with a former septic system, the UST should be removed according to standards set forth by the City of Ottawa (i.e. emptied of all contents and decommissioned in-place by filling with sand). In addition, any biowaste within the vicinity of a tile field should be removed and disposed of according to non-hazardous biowaste procedures; or

- In the event that the out-of-use UST is confirmed to have been used for the storage of heating oil the UST should be removed as per appropriate provincial (i.e., TSSA) regulations.

6.0 CLOSURE

The Canadian Standards Association notes that no Phase II ESA can wholly eliminate uncertainty regarding the recognition of all potential environmental concerns associated with a given property. Performance of a standardized Phase II ESA protocol is intended to reduce, but not eliminate this uncertainty, providing a reasonable professional opinion with respect to the potential site environmental liabilities, given the time, scope and cost limitations of a conventional Phase II ESA.

AMEC has prepared this report for the exclusive use of Chase Estates Limited and HSBC for specific application to this Site. The environmental investigation was conducted in accordance with the verbal and written requests from Chase Estates Limited and generally accepted environmental assessment practices, restricting the investigations to the assessment of the specifically identified environmental liabilities associated with the Site. No other warranty, expressed or implied, is made. The limitations of this report are specified in Appendix C.

We trust the above information is satisfactory. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

AMEC Earth & Environmental

Jennifer Luxton, B.A.
Project Manager

Scott Mather, P.Eng.
Senior Project Manager

for Larry Backman, B.Sc.S.
Vice President

Table 1 - Summary of Soil Analyses for Petroleum Hydrocarbons
Phase II Environmental Site Assessment
1545 and 1545A Merivale Road, Ottawa, Ontario

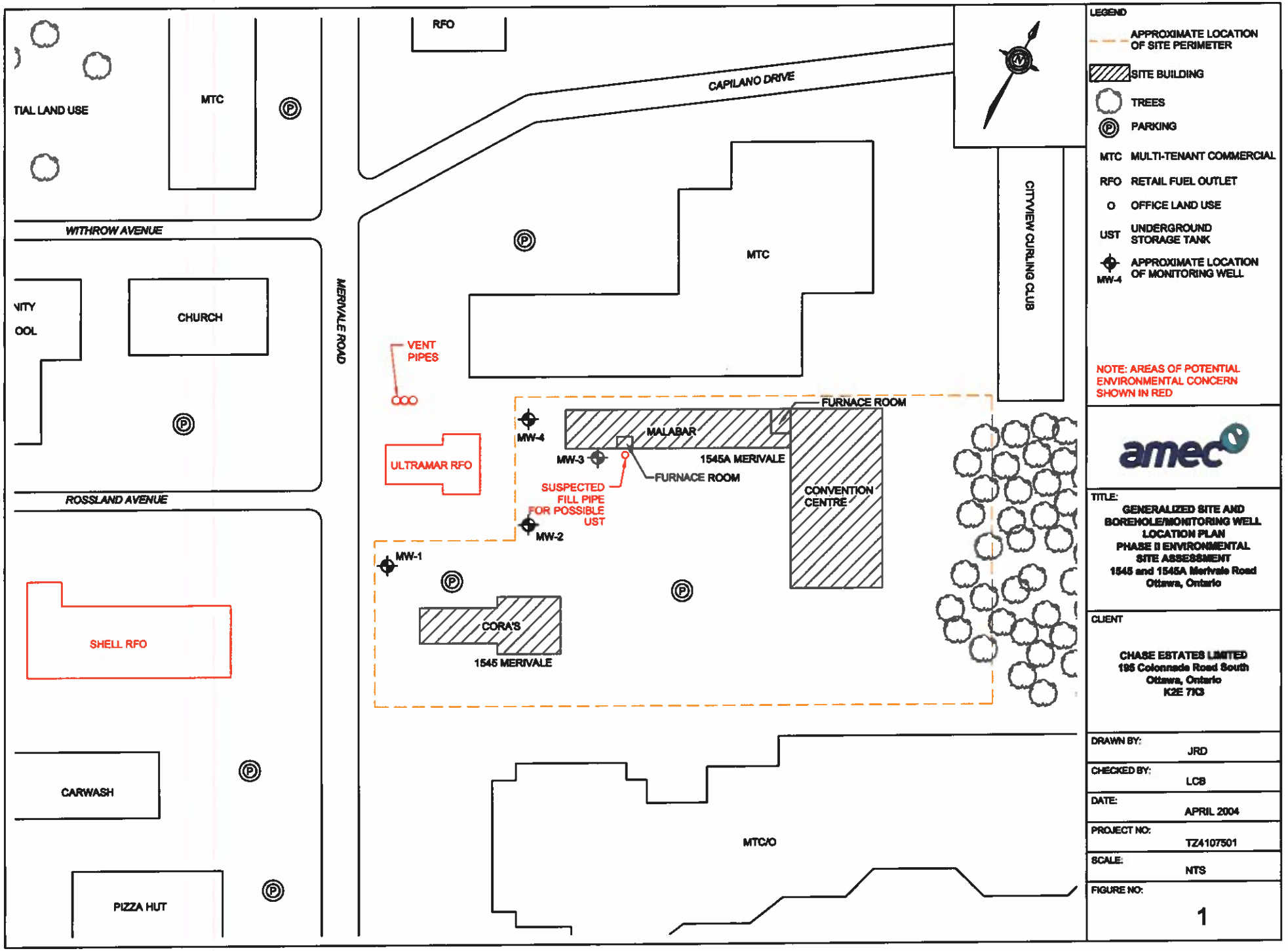
Parameters	Analytical Results - µg/g (Sample Location / Sample No.)				MOE Guidelines Full Depth Clean-Up Non-Potable Groundwater Use Conditions
	MW-1 SS-7 29/03/2004	MW-2 SS-6 29/03/2004	MW-3 SS-3 29/03/2004	MW-4 SS-3 29/03/2004	(Table B) Industrial/Commercial Coarse Grained Soil
Benzene	<0.05	<0.05	<0.05	<0.05	5.3
Toluene	<0.1	<0.1	<0.1	<0.1	34
Ethylbenzene	<0.05	<0.05	<0.05	<0.05	290
o-Xylenes	<0.05	<0.05	<0.05	<0.05	-
m,p-Xylenes	<0.1	<0.1	<0.1	<0.1	-
Total Xylenes	<0.15	<0.15	<0.15	<0.15	34
TPH (gas)	<20	<20	<20	<20	-
TPH (diesel)	<10	<10	760	<10	-
TPH (gas/diesel)	<30	<30	760	<30	1,000
TPH (heavy oils)	<50	<50	<50	<50	5,000

Notes: All Units in micrograms per gram (µg/g).
BOLD = concentration exceeds MOE Guideline criteria.
MOE Guidelines = Guideline for Use at Contaminated Sites in Ontario, Ontario Ministry of the Environment and Energy, February 1997.
TPH = Total Petroleum Hydrocarbons

Table 2 - Summary Groundwater Analyses for Petroleum Hydrocarbons
Phase II Environmental Site Assessment
1545 and 1545A Merivale Road, Ottawa, Ontario

Parameters	Analytical Results - µg/L (Sample Location / Sample No.)				MOE Guidelines Full Depth Clean-Up Non-Potable Groundwater Use Conditions
	MW-1 04/02/2004	MW-2 04/02/2004	MW-3 04/02/2004	MW-4 04/02/2004	(Table B) Coarse Grained Soils
Benzene	80	<0.5	<0.5	<0.5	1,900
Toluene	10	<0.5	<0.5	<0.5	5,900
Ethylbenzene	340	<0.5	<0.5	<0.5	28,000
o-Xylenes	250	<0.5	<0.5	<0.5	-
m,p-Xylenes	200	<1.0	<1.0	<1.0	-
Total Xylenes	450	<1.5	<1.5	<1.5	5,600
TPH (gas)	8,000	<200	<200	<200	-
TPH (diesel)	1,700	<100	200	<100	-
TPH (gas/diesel)	9,700	<300	<400	<300	-
TPH (heavy oils)	<500	<500	<500	500	-

Notes: All Units in micrograms per litre (µg/L).
MOE Guidelines = Guideline for Use at Contaminated Sites in Ontario, Ontario Ministry of the Environment and Energy, February 1997.
TPH = Total Petroleum Hydrocarbons


RFO
CAPILANO DRIVE
TIAL LAND USE
MTC
WITHROW AVENUE
MERIVALE ROAD
VITY
OOL
CHURCH
MTC
CITYVIEW CURLING CLUB
VENT PIPES
MW-4
FURNACE ROOM
MALABAR
1545A MERIVALE
MW-3
FURNACE ROOM
ULTRAMAR RFO
SUSPECTED FILL PIPE FOR POSSIBLE UST
CONVENTION CENTRE
MW-2
MW-1
CORA'S
1545 MERIVALE
ROSSLAND AVENUE
SHELL RFO
CARWASH
PIZZA HUT
MTC/O
LEGEND
APPROXIMATE LOCATION OF SITE PERIMETER
SITE BUILDING
TREES
PARKING
MTC MULTI-TENANT COMMERCIAL
RFO RETAIL FUEL OUTLET
O OFFICE LAND USE
UST UNDERGROUND STORAGE TANK
MW-4 APPROXIMATE LOCATION OF MONITORING WELL
NOTE: AREAS OF POTENTIAL ENVIRONMENTAL CONCERN SHOWN IN RED
amec
TITLE:
GENERALIZED SITE AND BOREHOLE/MONITORING WELL LOCATION PLAN
PHASE II ENVIRONMENTAL SITE ASSESSMENT
1545 and 1545A Merivale Road
Ottawa, Ontario
CLIENT
CHASE ESTATES LIMITED
195 Colonnade Road South
Ottawa, Ontario
K2E 7K3
DRAWN BY: JRD
CHECKED BY: LCB
DATE: APRIL 2004
PROJECT NO: TZ4107501
SCALE: NTS
FIGURE NO: 1

APPENDIX A

STRATIGRAPHIC AND INSTRUMENTATION LOGS

Stratigraphic and Instrumentation Log: MW-1

Project No: TZ4107501
Location: 1545 & 1545A Merivale Rd.
Logged By: RDC/KS
Drill Date: March 29, 2004
Hole Size: 200 mm

Project Name: Phase II ESA
Client: Chase Estates Ltd.
Entered By: JRD
Drill Method: Hollow Stem Auger
Drilled By: Marathon Drilling Co. Ltd.

amec
300-210 Colonnade Road
Nepean, Ontario
K2E 7L5

Depth (ft / m)	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Vapour Data (PPM: 250 / 750 / 1250; %LEL: 20 / 40 / 60 / 80)	Monitoring Well Details	Remarks
0 / 0		Ground Surface	98.89								
0		**ASPHALT**	0.00								
1		**FILL** Brown, medium grained sand, dry		GS	1				1		
2			98.13								
3 / 1		**FILL** Grey-black, clay, some sand, moist	0.76	SS	2		50	25	1		
5			97.27								
6 / 2		**TILL** Grey, clay, dense, moist	1.63	SS	3		12	91.6	1		
7			96.61								
8		**TILL** Grey, clay, pockets of fine to coarse grained sand, some gravel, moist	2.29	SS	4		21	83	1		
9 / 3				SS	5		47	66	1		
12 / 4				SS	6		50	75	1		
15			94.32								
15		**SAND** Grey, some gravel and clay, wet	4.57	SS	7		50	83	10		
17 / 5			93.56								
18		End of Borehole - Inferred Bedrock	5.33								
20 / 6											

Elevation: 98.894
Easting:
Northing:

Casing Elevation: 98.834
Well Casing Size: 50 mm
Vapour Unit: Eagle

Datum:
Checked by: SM
Sheet: 1 of 1

Stratigraphic and Instrumentation Log: MW-2

Project No: TZ4107501
Location: 1545 & 1545A Merivale Rd.
Logged By: RDC/KS
Drill Date: March 29, 2004
Hole Size: 200 mm

Project Name: Phase II ESA
Client: Chase Estates Ltd.
Entered By: JRD
Drill Method: Hollow Stem Auger
Drilled By: Marathon Drilling Co. Ltd.

amec
300-210 Colonnade Road
Nepean, Ontario
K2E 7L5

Depth (ft / m)	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Vapour Data (PPM 250 / 750 / 1250; %LEL 20 / 40 / 60 / 80)	Monitoring Well Details	Remarks
0 / 0		Ground Surface	98.66								
0 / 0		**ASPHALT**	0.00								
1 /		**FILL** Brown-grey, sand, some clay and gravel, dry		GS	1						
3 / 1				SS	2		17				
6 / 2				SS	3		12				
8 /				SS	4		50				
10 / 3			95.61								
11 /		**TILL** Light brown, sandy, some gravel and rock pieces, very dense, moist to damp	3.05	SS	5		50	33	5		
12 /			94.84								
13 / 4		**TILL** Grey, some rock pieces, crumbly, very dense, dry to damp	3.81	SS	6		50	20	10		
15 /			94.08								
		End of Borehole - Inferred Bedrock	4.57	SS	7		50	8			
16 / 5											
18 /											
19 / 6											
20 /											

Elevation: 98.655
Easting:
Northing:

Casing Elevation: 98.533
Well Casing Size: 50 mm
Vapour Unit: Eagle

Datum:
Checked by: SM
Sheet: 1 of 1

Stratigraphic and Instrumentation Log: MW-3

Project No: TZ4107501
Location: 1545 & 1545A Merivale Rd.
Logged By: RDC/KS
Drill Date: March 29, 2004
Hole Size: 200 mm

Project Name: Phase II ESA
Client: Chase Estates Ltd.
Entered By: JRD
Drill Method: Hollow Stem Auger
Drilled By: Marathon Drilling Co. Ltd.

amec
300-210 Colonnade Road
Nepean, Ontario
K2E 7L5

Depth (ft / m)	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Vapour Data (PPM: 250 / 750 / 1250; %LEL: 20 / 40 / 60 / 80)	Monitoring Well Details	Remarks
0 / 0		Ground Surface	98.64								
		ASPHALT	0.00								
1		**FILL** Brown, sand, granular, moist		GS	1						
2			97.88								
3 / 1		**CLAYEY SAND** Light brown, some rock pieces, firm, moist	0.76	SS	2		7	33			
4			97.12								
5		**TILL** Light brown, sandy, trace clay, gravel, rocks and pebbles, moist, slight odour	1.52	SS	3		21	83	5		
6 / 2			96.36								
7		**TILL** Light brown, sandy, trace clay, gravel, rocks and pebbles, moist with wet sand lenses throughout	2.29	SS	4		47	75			
8											
9											
10 / 3			95.59								
		ROCK FRAGMENTS Fractured	95.02 3.12	SS	5		50	8			
11		End of Borehole - Inferred Bedrock									
12											
13 / 4											
14											
15											
16 / 5											
17											
18											
19											
20 / 6											

Elevation: 98.642
Easting:
Northing:

Casing Elevation: 98.517
Well Casing Size: 50 mm
Vapour Unit: Eagle

Datum:
Checked by: SM
Sheet: 1 of 1

Stratigraphic and Instrumentation Log: MW-4

Project No: TZ4107501
Location: 1545 & 1545A Merivale Rd.
Logged By: RDC/KS
Drill Date: March 29, 2004
Hole Size: 200 mm

Project Name: Phase II ESA
Client: Chase Estates Ltd.
Entered By: JRD
Drill Method: Hollow Stem Auger
Drilled By: Marathon Drilling Co. Ltd.

amec
300-210 Colonnade Road
Nepean, Ontario
K2E 7L5

Depth (ft / m)	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Vapour Data (PPM: 250 / 750 / 1250; %LEL: 20 / 40 / 60 / 80)	Monitoring Well Details	Remarks
0 / 0		Ground Surface	98.79								
		ASPHALT	0.00 / 98.67								
		GRAVEL	0.12								
1		**FILL** Brown, clayey sand, soft, moist		GS	1						
2			98.03								
3 / 1		**SANDY CLAY** Light brown, some pebbles, soft, moist to wet	0.76	SS	2		6	100			
5			97.27								
6 / 2		**TILL** Light brown, sandy, compact, moist to wet	1.52	SS	3		15	42			
7			96.50								
8		**TILL** Light brown, sandy, some rock fragments, compact, moist to wet	2.29	SS	4		34	46			
10 / 3											
11				SS	5		50	20			
		End of Borehole - Inferred Bedrock	95.31 / 3.48								
12											
13 / 4											
14											
15											
16 / 5											
17											
18											
19											
20 / 6											

Elevation: 98.791
Easting:
Northing:

Casing Elevation: 98.710
Well Casing Size: 50 mm
Vapour Unit: Eagle

Datum:
Checked by: SM
Sheet: 1 of 1

APPENDIX B

LABORATORY CERTIFICATES OF ANALYSIS

PARACEL Laboratories Ltd.
Environmental &
Indoor Air Quality

300-2319 St. Laurent Blvd.
Ottawa ON K1G 4J8
Phone: (613) 731-9577
Fax: (613) 731-9064
Toll Free: 800-7491947
email: paracel@paracellabs.com

Order #: J0773

Certificate of Analysis

AMEC Earth and Environmental Ltd.

210 Colonnade Road South, Unit 300
Nepean, ON K2E 7L5
Attn: Mr. Scott Mather

Phone: (613)-727-0658
Fax: (613)-727-9465

Client PO: **TZ4107501**
Project: **Malabar**
Custody #: **17358**

Report Date: 06-Apr-2004
Order Date: 01-Apr-2004

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
J0773.1	MW-1 SS-7
J0773.2	MW-2 SS-6
J0773.3	MW-3 SS-3
J0773.4	MW-4 SS-3

Approved By: _____ Dale Robertson, B.Sc.
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description
BTEX, TPH (gasoline)	EPA 8260, MOE 3398 - P&T GC-MS/FID
TPH (diesel)	Based on E3398/EPA3546 - GC-FID
TPH (heavy oils)	Based on MOE E3398/EPA3546 - gravimetric

n/a: not applicable
MDL: Method Detection Limit
Soil results calculated on a dry weight basis.

Certificate of Analysis

Report Date: 06-Apr-2004
Order Date: 01-Apr-2004

Client: **AMEC Earth and Environmental Ltd.**

Client PO: **TZ4107501** Project: **Malabar**

Matrix: Soil
Sample Date: 29/03/2004

Parameter	MDL/Units	MW-1 SS-7 J0773.1	MW-2 SS-6 J0773.2	MW-3 SS-3 J0773.3
Benzene	0.05 ug/g	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.05 ug/g	< 0.05	< 0.05	< 0.05
Toluene	0.1 ug/g	< 0.1	< 0.1	< 0.1
m/p-Xylene	0.05 ug/g	< 0.05	< 0.05	< 0.05
o-Xylene	0.05 ug/g	< 0.05	< 0.05	< 0.05
Toluene-d8	surrogate	113%	117%	113%
TPH (gasoline)	20 ug/g	< 20	< 20	< 20
TPH (diesel)	10 ug/g	< 10	< 10	760
TPH (heavy oil)	50 ug/g	< 50	< 50	< 50

Matrix: Soil
Sample Date: 29/03/2004

Parameter	MDL/Units	MW-4 SS-3 J0773.4
Benzene	0.05 ug/g	< 0.05
Ethylbenzene	0.05 ug/g	< 0.05
Toluene	0.1 ug/g	< 0.1
m/p-Xylene	0.05 ug/g	< 0.05
o-Xylene	0.05 ug/g	< 0.05
Toluene-d8	surrogate	117%
TPH (gasoline)	20 ug/g	< 20
TPH (diesel)	10 ug/g	< 10
TPH (heavy oil)	50 ug/g	< 50

Certificate of Analysis

Report Date: 06-Apr-2004
Order Date: 01-Apr-2004

Client: **AMEC Earth and Environmental Ltd.**

Client PO: **TZ4107501** Project: **Malabar**

QA/QC Results

	Blank	Spike (QC Limits)	Duplicate	
Benzene	< 0.05 ug/g	93% (61 - 134%)	< 0.05	< 0.05
Ethylbenzene	< 0.05 ug/g	84% (66 - 128%)	< 0.05	< 0.05
Toluene	< 0.1 ug/g	87% (66 - 133%)	< 0.1	< 0.1
m/p-Xylene	< 0.05 ug/g	87% (65 - 132%)	< 0.05	< 0.05
o-Xylene	< 0.05 ug/g	91% (66 - 134%)	< 0.05	< 0.05
TPH (gasoline)	< 20 ug/g	88% (50 - 150%)	< 20	< 20
TPH (diesel)	< 10 ug/g	99% (50 - 150%)	< 10	< 10
TPH (heavy oil)	< 50 ug/g	99% (65 - 135%)	< 50	< 50

PARACEL Laboratories Ltd.
Environmental & Indoor Air Quality

300-2319 St. Laurent Blvd.
Ottawa ON K1G 4J8
Phone: (613) 731-9577
Fax: (613) 731-9064
Toll Free: 800-7491947
email: paracel@paracellabs.com

Order #: J0814

Certificate of Analysis

AMEC Earth and Environmental Ltd.

210 Colonnade Road South, Unit 300
Nepean, ON K2E 7L5
Attn: Mr. Scott Mather

Phone: (613)-727-0658
Fax: (613)-727-9465

Client PO: **TZ4107501**
Project: **Malabar**
Custody #: **18876**

Report Date: 08-Apr-2004
Order Date: 05-Apr-2004

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
J0814.1	MW-1
J0814.2	MW-2
J0814.3	MW-3
J0814.4	MW-4

Approved By: _____ Dale Robertson, B.Sc.
Laboratory Director

Certificate of Analysis

Report Date: 08-Apr-2004
Order Date: 05-Apr-2004

Client: **AMEC Earth and Environmental Ltd.**

Client PO: **TZ4107501** Project: **Malabar**

Analysis Summary Table

Analysis	Method Reference/Description
BTEX, TPH (gasoline)	EPA 624/MOE E3421 - P&T GC-MS/FID
TPH (diesel)	E3420 - GC-FID
TPH (heavy oils)	Based on EPA 413 - gravimetric

n/a: not applicable
MDL: Method Detection Limit

Certificate of Analysis

Client: **AMEC Earth and Environmental Ltd.**

Client PO: **TZ4107501** Project: **Malabar**

Report Date: 08-Apr-2004
Order Date: 05-Apr-2004

Matrix: Water
Sample Date: 02/04/2004

Parameter	MDL/Units	MW-1 J0814.1	MW-2 J0814.2	MW-3 J0814.3
Benzene	0.0005 mg/L	0.08	< 0.0005	< 0.0005
Ethylbenzene	0.0005 mg/L	0.34	< 0.0005	< 0.0005
Toluene	0.0005 mg/L	0.01	< 0.0005	< 0.0005
m/p-Xylene	0.001 mg/L	0.20	< 0.001	< 0.001
o-Xylene	0.0005 mg/L	0.25	< 0.0005	< 0.0005
Toluene-d8	surrogate	106%	103%	102%
TPH (gasoline)	0.2 mg/L	8	< 0.2	< 0.2
TPH (diesel)	0.1 mg/L	1.7	< 0.1	0.2
TPH (heavy oil)	0.5 mg/L	< 0.5	< 0.5	< 0.5

Matrix: Water
Sample Date: 02/04/2004

Parameter	MDL/Units	MW-4 J0814.4
Benzene	0.0005 mg/L	< 0.0005
Ethylbenzene	0.0005 mg/L	< 0.0005
Toluene	0.0005 mg/L	< 0.0005
m/p-Xylene	0.001 mg/L	< 0.001
o-Xylene	0.0005 mg/L	< 0.0005
Toluene-d8	surrogate	105%
TPH (gasoline)	0.2 mg/L	< 0.2
TPH (diesel)	0.1 mg/L	< 0.1
TPH (heavy oil)	0.5 mg/L	0.5

Certificate of Analysis

Report Date: 08-Apr-2004
Order Date: 05-Apr-2004

Client: **AMEC Earth and Environmental Ltd.**

Client PO: **TZ4107501** Project: **Malabar**

QA/QC Results

	Blank	Spike (QC Limits)	Duplicate	
Benzene	< 0.0005 mg/L	94% (50 - 150%)	< 0.0005	< 0.0005
Ethylbenzene	< 0.0005 mg/L	71% (50 - 150%)	0.0010	0.0010
Toluene	< 0.0005 mg/L	100% (50 - 150%)	0.0015	0.0015
m/p-Xylene	< 0.001 mg/L	91% (50 - 150%)	0.002	0.002
o-Xylene	< 0.0005 mg/L	84% (50 - 150%)	0.0030	0.0030
TPH (gasoline)	< 0.2 mg/L	93% (50 - 150%)	< 0.2	< 0.2
TPH (diesel)	< 0.1 mg/L	99% (50 - 150%)		
TPH (heavy oil)	< 0.5 mg/L	95% (64 - 132%)		

APPENDIX C

LIMITATIONS

Limitations

1. The work performed in this report was carried out in accordance with the Standard Terms and Conditions made part of our 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 observations, reasonably beyond the control of AMEC Earth & Environmental.

4. The objective of this report was to assess the environmental conditions at the site, given the context of our contract, with respect to existing environmental regulations within the applicable jurisdiction. Compliance of past owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

5. The Site history performed herein relies on information supplied by others, such as local, provincial and federal agencies as well as Site personnel. No attempt has been made to independently verify the accuracy of such information, unless specifically noted in our report.

6. Our observations relating to potential contaminant materials in the environment at the Site are described in this report. Where testing was performed, it was executed in accordance with our contract for these services. It should be noted that other compounds or materials not tested for may be present in the Site environment.

7. 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, AMEC Earth & Environmental must be notified in order that we may determine if modifications to our conclusions are necessary.

8. The utilization of AMEC Earth & Environmental's services during the implementation of any remedial measures will allow AMEC Earth & Environmental to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered.

9. 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 such third parties. AMEC Earth & Environmental accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.