

**Butter Pot Provincial Park  
Newfoundland and Labrador  
Sub-Surface Assessment**

113088 • Report • November 2011

Prepared for:  
**Newfoundland and  
Labrador Parks and  
Natural Areas Division**

Prepared by:



**CBCL LIMITED**  
Consulting Engineers

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## CHAPTER 1 **INTRODUCTION**

At the request of Ms. Jackie Hussey of Newfoundland and Labrador Parks and Natural Areas Division, CBCL Limited conducted a Sub-Surface Soil Assessment at the area containing the workshop and generator shed located at Butter Pot Provincial Park, Newfoundland, herein referred to as the "Site". The purpose of the Sub-Surface Assessment was to evaluate the extent and severity of petroleum hydrocarbon impacts in at the site in association with a reported historical spill events.

## CHAPTER 2 **SITE INFORMATION**

### **2.1 Property**

The Site is located at Butter Pot Provincial Park located on the Avalon Peninsula of Newfoundland. For this assessment, test pitting activities were restricted to the immediate area of the workshop and generator station. The property is owned by the Provincial Government of Newfoundland and Labrador and is managed by the Parks and Natural Areas Division.

On-site structures consist of a generator shed, workshop, warm-up building. Landscaped areas and an asphalted driveway surround the residence, Drawing No. 2 - Site Plan is provided in Appendix A.

#### **2.1.1 Adjoining Properties**

Surrounding land use to the area in the immediate vicinity of the generator shed is summarized in Table 3.

**Table 1: Adjoining Properties Current Land Use**

<i>Direction</i>	<i>Current Land Use</i>
North	Undeveloped Property
East	Undeveloped Property
South	Park office and Undeveloped Property
West	Groomer shed and Undeveloped Property

#### **2.1.2 Water Supply/Groundwater Usage**

Potable water for the Site and surrounding properties is supplied by one drilled well and one artesian well located at the Park. Based on this information the site is classified as potable.

#### **2.1.3 Topography and Drainage**

Based on an available topographic map and the observed site topography, regional surface drainage appears to be to the north. Storm water is anticipated to drain by infiltration and/or overland flow. The general ground surface slope of the property is towards the north.

#### **2.1.4 Contaminated Site Management**

In November 2003, the NBENV released Version 2 of the Guideline for the Management of Contaminated Sites. The 2003 guideline was updated based on technical guidance contained in the

Atlantic Risk Based Corrective Action (RBCA) User Guidance Version 2.0 for Petroleum Impacted Sites in Atlantic Canada, issued in October 2003 and updated in March 2007 (Guidance Document).

Atlantic RBCA is a scientific tool for determining site-specific remedial levels for soil and groundwater at petroleum impacted sites for the protection of human health. Atlantic RBCA is a tiered approach where increasing site-specific detail can be used to derive remedial criteria that are progressively more specific to the site and less reliant on generic assumptions. The tiers are as follows:

- Tier I Risk-Based Screening Levels (RBSLs) are contained in "RBSL Look Up" tables that were derived using the Atlantic RBCA software (version 2.1) and conservative default assumptions regarding the site and potential exposure pathways. The RBSLs are meant to be applicable to most sites, and are considered to be a conservative approach;
- Tier II Pathway Specific Screening Levels (PSSLs) are contained in "PSSL Look Up" tables that were derived using the Atlantic RBCA software (version 2.1) and conservative default site conditions; however, they may be used on sites where some of the exposure pathways are not complete (e.g. inhalation of indoor air is possible, but soil ingestion is not);
- Tier II Site Specific Target Levels (SSTLs) are derived using Atlantic RBCA software (version 2.1) with an increasing amount of site-specific information in place of generic, default information on site conditions and potential exposure pathways; and
- Tier III remedial criteria are derived using a large amount of site-specific data and methodologies that replace or supplement the Atlantic RBCA software.

If site concentrations exceed the Tier I Risk Based Screening Levels (RBSLs), the site may be remediated to the Tier I RBSLs, or a Tier II/III assessment may be completed to determine more appropriate clean-up criteria. A Tier II/III assessment may include comparison of site concentrations to the Tier II Pathway-Specific Screening Level (PSSL) tables or development of Site-Specific Target Levels (SSTLs).

#### **2.1.5 Soil and Groundwater Screening Levels**

Users of the Tier I RBSL and Tier II PSSL tables are required to ensure that their site conditions are compatible with the default site conditions used to generate the screening criteria. If significant differences exist, the site should be evaluated using a site-specific risk assessment approach.

A Site Assessment & Tier I/II Table Checklist for the Site is presented in Appendix B. Based on the identified Site conditions, the Tier I RBSLs are applicable to the Site. The criteria for a commercial receptor, potable groundwater, coarse-grained soil (most conservative), and diesel/#2 oil type have been selected for use at this Site for the following reasons:

- The land-use of the subject property is commercial ;
- The subject property and adjacent properties are serviced by a potable drilled well and artesian well system;
- The known source of the contamination is diesel/#2 oil type; and
- The soil type encountered during the assessment work generally consists of a granular fill underlain by silty sand (glacial till) with some gravel.

## CHAPTER 3 **SUBSURFACE INVESTIGATION**

CBCL personnel were on site in September, 2011 to provide environmental consultation services during a sub-surface soil assessment which was conducted to determine the current extent of historical petroleum hydrocarbon impacts.

### **3.1 Methodology**

A subsurface soil assessment was conducted at the site on September 15, 2011. A total of twelve (12) test pits (TP-1 to TP-12) were excavated in the vicinity of the generator shed and workshop. Test pit locations are shown on Figure 1 (Appendix A). The test pits were excavated by Wally Clarkes Excavating using a track mounted excavator. The test pits were advanced to depths of up to 1.95 metres below ground surface (mbgs).

### **3.2 Results**

#### **3.2.1 Stratigraphy**

The stratigraphy observed during the sub-surface assessment generally consisted of a surficial gravel fill underlain by a silty sand with some gravel (glacial till). Apparent bedrock was encountered at depths ranging from xx to xx mbgs. The test pits were terminated at depths ranging from 0.5 to 1.95 mbgs based upon bedrock refusal. Groundwater was not encountered during test pitting activities.

#### **3.2.2 Liquid Phase Petroleum Hydrocarbons**

Phase-separated liquid petroleum product was not observed during the excavation and sampling of the test pits.

#### **3.2.3 Subsurface Vapour Concentrations**

Measured organic vapour concentrations in the soil samples collected from the test pits ranged from 0 parts per million volume (ppm v) to 420 ppm v. The measured concentrations are provided in Table 1 (Appendix B).

#### **3.2.4 Laboratory Analytical Results**

Two (2) selected soil samples from each test pit were submitted to Maxxam Analytics for BTEX and modified TPH analysis. Soil analytical results are presented in Table 1 (Appendix B). Laboratory certificates are also attached in Appendix B.

## CHAPTER 4 **RESULTS**

### **4.1 Soil Analytical Results**

As indicated in Table 1, concentration of TEX were above the applicable Tier I RBSLs in samples TP3-02 and TP4-02 while concentrations of ethylbenzene were above the applicable Tier I RBSL in samples TP4-03 and TP6-02. Modified TPH concentrations were above the referenced Tier I RBSLs in 4 of the 24 soil samples (TP3-02, TP4-02, TP4-03 and TP5-01). The highest concentration was from TP4-02 (0.30-0.80m) with a modified TPH concentration of 54,000 mg/kg.



## CHAPTER 5 **ECOLOGICAL RECEPTORS**

In accordance with the NLENV requirements, the Ecological Receptor Screening Checklist has been completed and is presented in Appendix C. Based on the completion of the checklist, further action is required for ecological receptors at this time.

## CHAPTER 6 **SUMMARY OF FINDINGS**

Based on the above noted data, CBCL Limited offers the following summary of findings:

- Phase-separated liquid petroleum product was not observed in the test pits during excavation activities.
- Groundwater was not encountered during test pitting activities. As a result, a groundwater investigation is required to determine if hydrocarbon impacts have reached the underlying groundwater.
- Concentrations of TEX were above the applicable Tier I RBSLs in samples TP3-02 and TP4-02.
- Concentrations of ethylbenzene were above the applicable Tier I RBSL in samples TP4-03 and TP6-02.
- Modified TPH concentrations were above the referenced Tier I RBSLs in 4 of the 24 soil samples (TP3-02, TP4-02, TP4-03 and TP5-01). The highest concentration was from TP4-02 (0.30-0.80m) with a modified TPH concentration of 54,000 mg/kg.



## CHAPTER 7 **RECOMMENDATIONS**

The Limited Sub-Surface Assessment completed by CBCL Limited in September 15, 2011 indicates that petroleum hydrocarbon impacts remain in the immediate vicinity of the generator shed. While petroleum hydrocarbon impacts have been delineated to the north and east of the generator shed, they have not been fully delineated to the south and west. Due to the shallow underlying bedrock in the vicinity of the generator shed, there exists the potential for groundwater contamination at the site. Based on the findings of the Limited Sub-Surface Assessment, additional assessment work is required. CBCL Limited therefore recommends the following Phase II Environmental Site Assessment activities to further assess and delineate the identified petroleum hydrocarbons impacts to the south and west and to assess potential impacts to groundwater:

- Drill four (4) monitoring wells on the subject property, one monitoring to the north side of the generator shed, one directly adjacent the generator shed on the south side and two monitoring wells southwest and southeast of the generator shed to further assess and delineate petroleum impacts in groundwater and to determine if identified petroleum hydrocarbon impacts have impacted the groundwater;
- Conduct additional borehole activities to the southeast and southwest of the generator shed to delineate the identified hydrocarbon impacts vertically and horizontally;
- Once groundwater quality is obtained and soil delineation is complete the determination can be made for a recommendation of either remediation or risk assessment.
- Collect a sample of potable water for laboratory analysis.

## CHAPTER 8 **CLOSURE**

The area that was assessed during the site investigation was restricted to the portion of the property outlined in Drawing 2 and 3, Appendix A. The conclusions presented in this report are related to observations recorded on September 15, 2011 and represent our professional opinion, in light of the terms of reference, scope of work, and any limiting conditions noted herein.

The environmental consulting services were performed in accordance with generally accepted professional standards. This report and the information contained herein are not to be construed as legal advice, or as a guarantee or warranty regarding the potential liability associated with site environmental conditions or impacts.

Any use that a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. CBCL Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this report.

CBCL Limited hereby releases this report to Newfoundland and Labrador Parks and Natural Areas Division and Mrs. Jackie Hussey. This information may be distributed by the Parks and Natural Areas Division and Mrs. Jackie Hussey without the express written consent of CBCL Limited. All information contained or provided to a third party is subject to the limitations as described above.

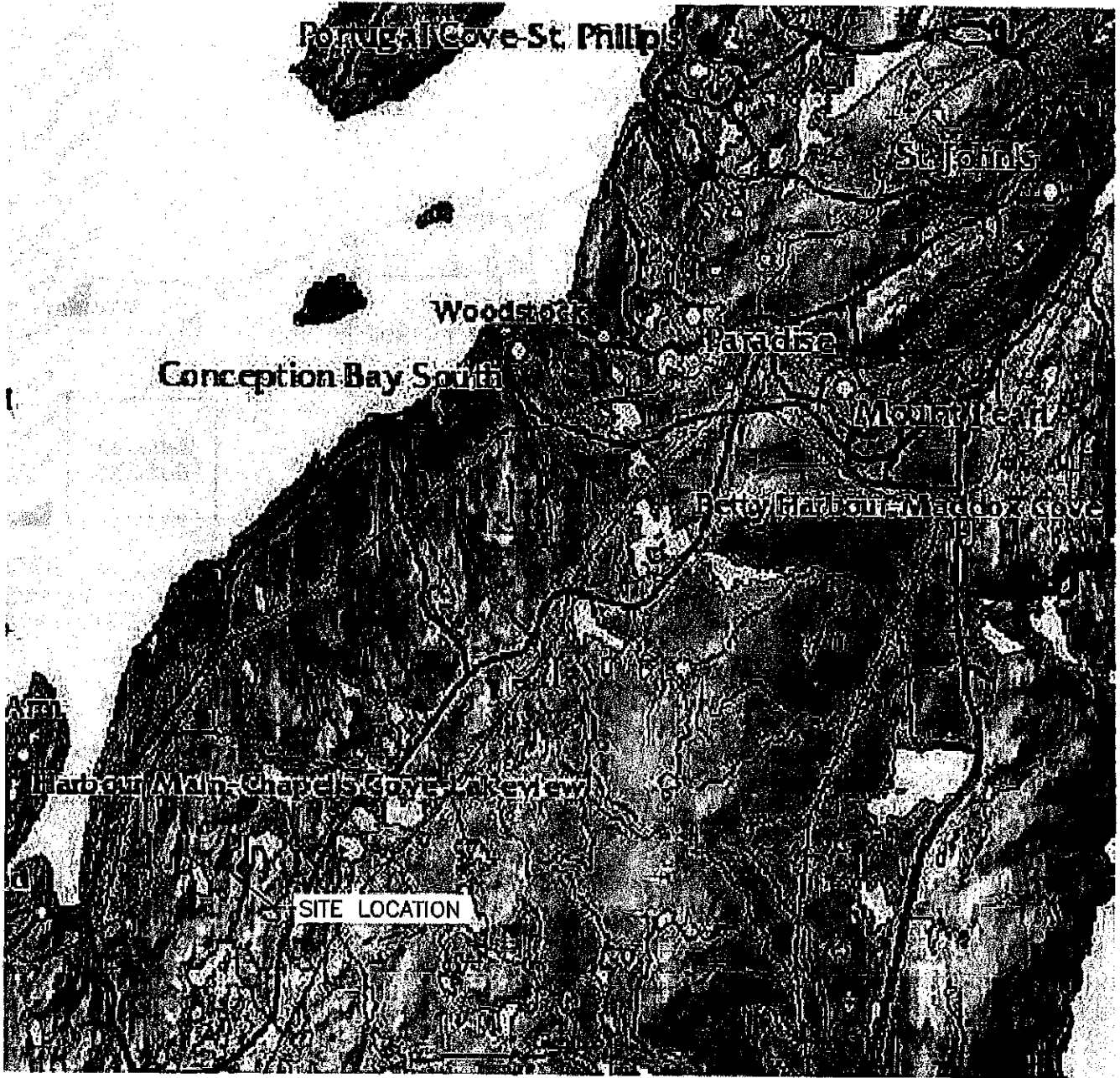
If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

APPENDIX A


# Drawings

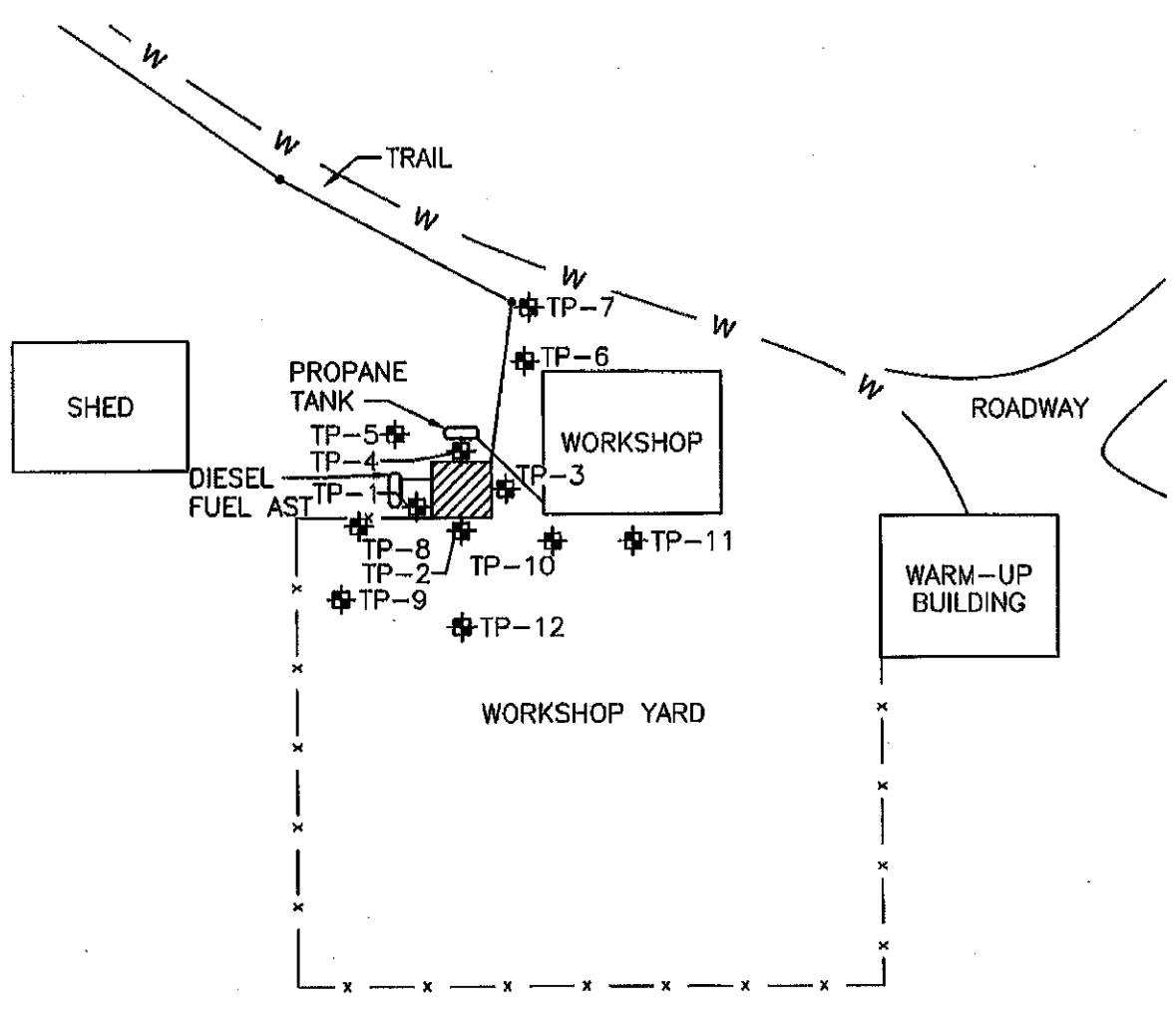


NORTH







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Date	Scale	Designed	Drawn	Checked	Approved	Project
2011/11/07	N.T.S.					113088.00
 <b>CBCL LIMITED</b> Consulting Engineers ISO 9001 CERTIFIED	BUTTER POND PARK NL PARKS AND NATURAL AREAS DIVISION				Figure	
	SITE LOCATION PLAN				<b>1</b>	




**LEGEND:**

-  TEST PIT LOCATION
-  WATER LINE LOCATION
-  FENCE LINE
-  GENERATOR SHED

DRAWING NAME: L:\113088.00 BUTTER POND\FIGURE.DWG LAYOUT NAME: FIGURE2 PLOT DATE: November-07-11 4:36:17 PM CAD OPERATOR: BCROOKS

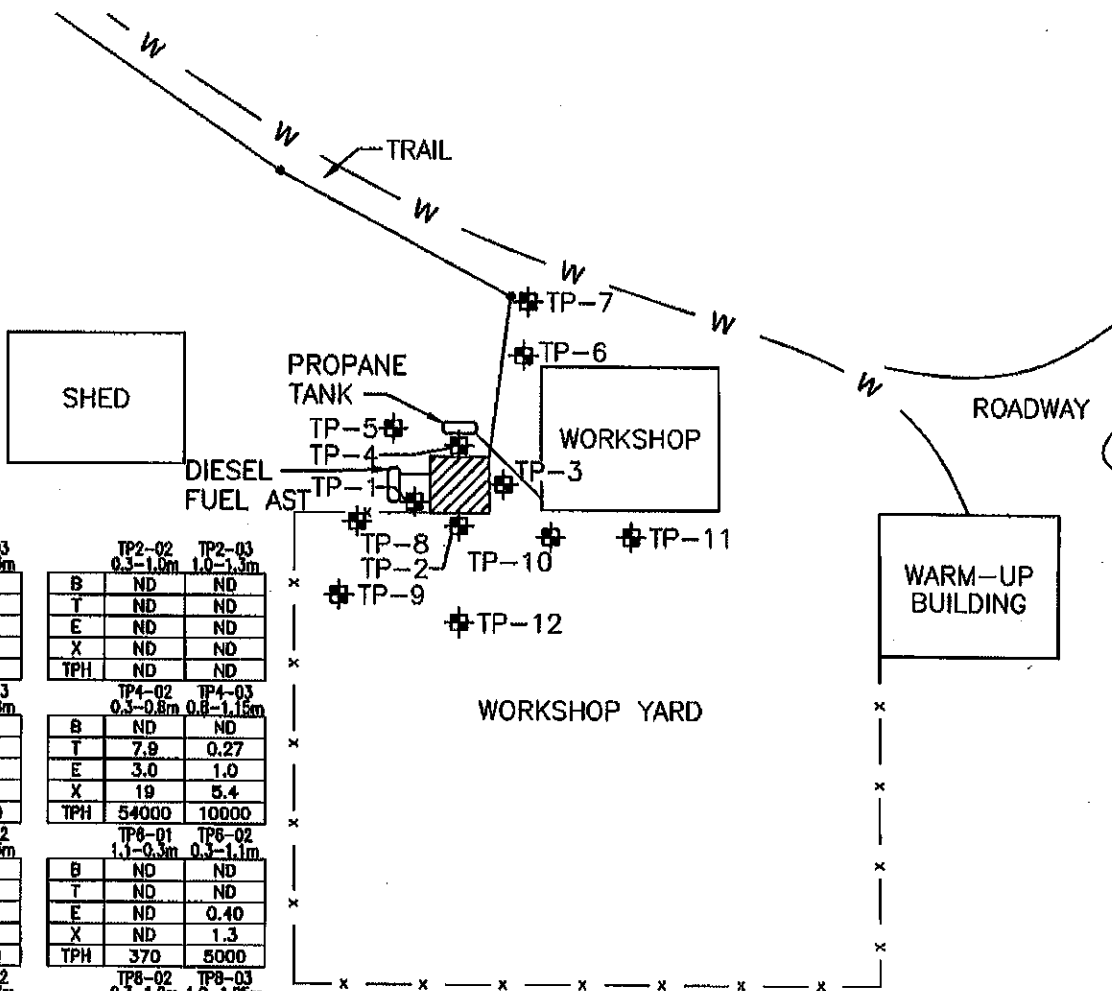
Date	Scale	Designed	Drawn	Checked	Approved	Project
2011/10/03	N.T.S.					113088.00

 <b>CBCL LIMITED</b> Consulting Engineers <small>ISO 9001 CERTIFIED</small>	BUTTER POND PARK NL PARKS AND NATURAL AREAS DIVISION	Figure <h1 style="text-align: center;">2</h1>
	<h2 style="text-align: center;">SITE PLAN WITH TEST PIT LOCATIONS</h2>	





NORTH



	TP1-02 0.3-1.0m	TP1-03 1.0-1.3m
B	ND	ND
T	ND	ND
E	ND	ND
X	0.28	ND
TPH	5200	360

	TP2-02 0.3-1.0m	TP2-03 1.0-1.3m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	ND	ND

	TP3-02 0.3-1.0m	TP3-03 1.0-1.8m
B	ND	ND
T	1.0	ND
E	1.4	ND
X	12	0.13
TPH	43000	4200

	TP4-02 0.3-0.8m	TP4-03 0.8-1.15m
B	ND	ND
T	7.9	0.27
E	3.0	1.0
X	19	5.4
TPH	54000	10000

	TP5-01 0.0-0.3m	TP5-02 0.3-0.9m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	10000	1200

	TP6-01 1.1-0.3m	TP6-02 0.3-1.1m
B	ND	ND
T	ND	ND
E	ND	0.40
X	ND	1.3
TPH	370	5000

	TP7-01 0.0-0.3m	TP7-02 0.3-0.7m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	840	600

	TP8-02 0.3-1.0m	TP8-03 1.0-1.95m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	ND	ND

	TP9-01 0.0-0.3m	TP9-02 0.3-0.9m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	ND	ND

	TP10-02 0.3-1.0m	TP10-03 1.0-1.95m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	200	41

	TP11-01 0.0-0.3m	TP11-02 0.3-1.05m
B	ND	ND
T	ND	ND
E	ND	ND
X	ND	ND
TPH	ND	ND

	TP12-02 0.3-1.0m	TP12-02 LAB-DUP	TP12-03 1.0-1.95m
B	ND	ND	ND
T	ND	ND	ND
E	ND	ND	ND
X	ND	ND	ND
TPH	ND	ND	ND

**LEGEND:**

- TEST PIT LOCATION
- WATER LINE LOCATION
- FENCE LINE
- GENERATOR SHED

DRAWING NAME: L:\113088.00 BUTTER POND\FIGURE.DWG LAYOUT NAME: FIGURES PLOT DATE: November-07-11 4:36:03 PM CAD OPERATOR: BCROOKS

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2011/10/03	N.T.S.					113088.00

<b>CBCL LIMITED</b> Consulting Engineers ISO 9001 CERTIFIED	BUTTER POND PARK NL PARKS AND NATURAL AREAS DIVISION	Figure <h1 style="text-align: center;">3</h1>
	<b>SITE PLAN WITH TEST PIT LOCATIONS AND SOIL ANALYTICAL DATA</b>	

APPENDIX B

# Site Assessment and Tier I/II Table Checklist

### SITE ASSESSMENT & TIER III TABLE CHECKLIST

Site Location:	Butter Pot Park, Newfoundland and Labrador
Site Professional:	Colin LeFrense, M.Sc.
Date:	September 15, 2011

Method Used	
Tier I RBSL	✓
Tier II PSSL	
Tier II SSSL	

Minimum Site Assessment Requirements		
Issue	Yes or No*	Comment
PID, owner, location identified	Yes	
Current and future land use identified	Yes	Commercial
Review of underground services as conduits	Yes	
Historical review completed	No	Historical spill events
Local groundwater use identified	Yes	Potable
Adjacent land uses and receptors identified	Yes	
Ecological screening completed	Yes	
Soil and groundwater samples from all potential source areas obtained	Yes	Groundwater not encountered, soil samples collected
Soil and groundwater impacts delineated to Tier I criteria for potential receptor (adjacent property receptor may be lower Tier I criteria)	No	Soil not completely delineated, groundwater not encountered
Groundwater flow direction and gradient established	No	Groundwater not encountered
Combination of surface and sub-surface soil samples analyzed	No	Samples selected based on field observations and headspace readings
Free-phase product observations made in soil and groundwater	Yes	None observed
Low lab detection level for benzene in soil if potable water area	Yes	
Grain size and organic carbon analysis completed on soil	No	
TPH fractionation done on soil and water if calculating Tier II SSSL	N/A	
Accurate site plan prepared	Yes	
Receptor building characteristics obtained (storeys, floor condition, Ceiling height, etc.)	Yes	
Defaults and Mandatory Criteria		
Issue	Yes or No*	Comment
Confirmed no surface staining	No	Surface staining present around generator shed
Confirmed no free-phase product in soil or water	Yes	No free-phase product observed following remedial activities. Groundwater not encountered.
Confirmed no odours or explosive conditions in buildings or infrastructure	Yes	
Confirmed no objectionable taste or odour in potable water supplies	No	Not sampled
Confirmed that correct TPH type selected in RBSL or PSSL Table	Yes	
Confirmed that correct soil type selected in RBSL or PSSL Table	Yes	Most conservative used
Confirmed that depth to groundwater approximately 3.0 metres	No	Groundwater was not encountered
Confirmed that impacted soil thickness is less than 3.0 metres	Yes	
Confirmed that default foundation crack fraction is appropriate	N/A	
Confirmed that default foundation thickness is appropriate	N/A	
Confirmed that two floors exist if using a residential scenario	N/A	
Confirmed that no foundation walls are hydrocarbon impacted above RBSL or PSSL Table soil criteria	No	Concentrations on southern wall exceed the applicable RBSLs
Confirmed that RBSL or PSSL Table criteria is correct for adjacent property receptors (i.e. use residential at property line if adjacent property is residential)	N/A	

\* If no, indicate in comment section if and where in report the issue is addressed.  
Consult the Minimum Requirements and Reference Guidelines for Environmental Assessments of Petroleum Impacted Sites in Atlantic Canada and the Atlantic PIRI Tier I RBSL and Tier II PSSL Tables for additional requirements

APPENDIX C

# Ecological Screening Checklist



**REFERENCE GUIDELINES TIER ONE CHECKLIST**

**FOR**

**ECOLOGICAL RECEPTOR ASSESSMENT**

**IN ATLANTIC CANADA**

***ATLANTIC PARTNERS IN RBCA IMPLEMENTATION***

***June 2003***

## **PURPOSE**

This document provides guidance for conducting a TIER 1 screening Ecological Risk Assessment (ERA) at a simple site impacted with hydrocarbons. This is a qualitative evaluation designed to determine whether or not additional data is required to quantify risks to ecological receptors through a tiered Ecological Risk Assessment.

This protocol is to be used in conjunction with the TIER 1 or TIER 2 Human Health Risk Assessment, RBCA tool kit, for Atlantic Canada.

The components of this assessment consist of a check list format to identify the potential receptors at risk and the presence of exposure pathways.

These practices are consistent with the recommended tiered approach from the National Contaminated Sites Remediation Program (NCSRP) as published by Environment Canada.

The following guidelines are intended to be the minimum requirements for a preliminary assessment. They should in no way be construed as limiting, if your professional judgement determines that additional or different evaluation is required for a particular site.

## **INTRODUCTION**

The components of this evaluation are divided in two steps. Step 1 identifies presence of ecological receptors on or adjacent to the site, within a suggested distance of about 150 meters. This distance is subject to professional judgement.

Step 2 determines the potential for the ecological receptors to be exposed to release hydrocarbons. Risks to ecological receptors essentially require presence of receptors, potential pathways and presence of toxicity. Further ERA activities should not be required if one of these conditions is missing.

**1) ECOLOGICAL HABITAT**  
**(within 150 meters of the site)**

**YES/NO**

- Wetland habitats such as marshes, swamps, tidal flats, beaches No
- Aquatic habitats such as rivers, lakes or streams Yes
- Forested habitats (50 acres or more) Yes
- Grassland habitats No
- Provincial/National parks or ecological reserve Yes
- Rare, threatened or endangered species populations No
- Other critical or sensitive habitat for wildlife, migratory species No

If the answer is "NO" to ALL questions, then no species of concern are identified.

There is no further action required.

If the answer to any one question is YES, then proceed to the next step.



**2) EXPOSURE ASSESSMENT**

**YES/NO**

- Can dissolved hydrocarbons in groundwater reach any receptor habitat identified above now or in the future?  

Yes  
\_\_\_\_\_
- Can LNAPL (Light Non Aqueous Phase Liquids) reach receptor habitat identified above?  

Yes  
\_\_\_\_\_
- Can hydrocarbons reach receptor habitat identified above via surface runoffs?  

Yes  
\_\_\_\_\_

**If the site is under building or pavement, skip the next two questions.**

- Is there a potential for direct absorption of contaminants through skin?  

N/A  
\_\_\_\_\_
- Is there a potential for oral consumption of contaminated soils, water, plants?  

N/A  
\_\_\_\_\_
- Have hydrocarbons, associated by the site being investigated, been known to be present in any of the soils, sediments, surface water of the receptor habitats identified above at concentrations greater than CCME ecologically-based guidelines?  

Yes  
\_\_\_\_\_

If the answer to any questions above is YES, then further assessment is required.

Additional data should be gathered to enhance the knowledge of the site-specific situation such as; fate and transport of contaminants, description of the receptor of concerns, preliminary toxicity estimates and mitigation options. (Tiered ERA)

The results of this screening assessment should be documented in writing in the Atlantic RBCA report. It should detail answers to the questions above and provide documentation or rationale for the answers provided.

**References:**

- 1) ASTM, RBCA Draft Provisional Standard (RBCA II), Appendix x5 qualitative ecological exposure assessment, ASTM publication, 1997
- 2) BRITISH COLUMBIA Ministry of Environment, Lands and Parks, 1998. Guidance and Checklist for Tier 1 Ecological Risk Assessment of Contaminated Sites in British Columbia. Landis et al.. January 1998.
- 3) ENVIRONMENT CANADA, 1994. A Framework for Ecological Risk Assessment at Contaminated Sites in Canada: Review and Recommendations. Scientific series No 199, C. Gaudet, EVS Environment Consultants, ESSA Environmental and Social Systems Analysts, Ottawa Ont. 1994

APPENDIX D

# Laboratory Analytical Results and Certificates

TABLE D1  
SOIL ANALYTICAL RESULTS  
BTEX and MODIFIED TPH  
(mg/kg or ppm)

Sample Location	Sample Date (D/M/Y)	Sample Depth/Interval (mbsgs)	Vapour Readings (ppm v)	Benzene	Toluene	Ethyl Benzene	Xylenes	Total Petroleum Hydrocarbons				Resemblance
								C <sub>6</sub> -C <sub>10</sub>	C <sub>10</sub> -C <sub>21</sub>	C <sub>21</sub> -C <sub>32</sub>	Modified TPH <sup>1</sup>	
TP1-02	15-09-11	0.3 - 1.0	43	<0.03	<0.03	<0.03	0.26	250	3800	1100	5200	Fuel oil fraction
TP1-03	15-09-11	1.0 - 1.3	13	<0.03	<0.03	<0.03	<0.05	7	260	86	360	Weathered fuel oil fraction. Lube oil fraction.
TP2-02	15-09-11	0.3 - 1.0	17	<0.03	<0.03	<0.03	<0.05	<3	59	24	83	Weathered fuel oil fraction. Lube oil fraction.
TP2-03	15-09-11	1.0 - 1.45	6	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
TP3-02	15-09-11	0.3 - 1.0	346	<0.03	150	14	12	570	38000	3800	79000	Fuel oil fraction
TP3-03	15-09-11	1.0 - 1.8	54	<0.03	<0.03	<0.03	0.13	160	3600	480	4200	Fuel oil fraction
TP4-02	15-09-11	0.3 - 0.8	420	<0.03	79	50	19	490	48000	5400	54000	Fuel oil fraction
TP4-03	15-09-11	0.8 - 1.15	216	<0.03	0.27	150	5.4	630	8900	940	10000	Fuel oil fraction
TP5-01	15-09-11	0 - 0.3	145	<0.03	<0.03	<0.03	<0.05	<3	7400	3100	10000	One product in fuel/lube oil range.
TP5-02	15-09-11	0.3 - 0.5	36	<0.03	<0.03	<0.03	<0.05	20	1020	190	1200	Fuel oil fraction
TP6-01	15-09-11	0 - 0.3	24	<0.03	<0.03	<0.03	<0.05	<3	307	68	370	Weathered fuel oil fraction
TP6-02	15-09-11	0.3 - 1.10	47	<0.03	<0.03	0.4	1.3	330	4300	400	5000	Fuel oil fraction
TP7-01	15-09-11	0 - 0.3	8	<0.03	<0.03	<0.03	<0.05	<3	640	210	840	One product in the fuel/lube oil range.
TP7-02	15-09-11	0.3 - 0.7	16	<0.03	<0.03	<0.03	<0.05	<3	480	110	600	One product in the fuel/lube oil range.
TP8-02	15-09-11	0.3 - 1.0	8	<0.03	<0.03	<0.03	<0.05	<3	<10	18	<20	No resemblance to petroleum products in the lube oil range.
TP8-03	15-09-11	1.0 - 1.85	3	<0.03	<0.03	<0.03	<0.05	5	12	<10	<20	Weathered fuel oil fraction
TP9-01	15-09-11	0 - 0.3	4	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
TP9-02	15-09-11	0.3 - 1.0	1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-

TP10-02	15-09-11	0.3 - 1.0	13	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	115	89	200	Weathered fuel oil fraction. No resemblance to petroleum products in the lube oil range.
TP10-03	15-09-11	1.0 - 1.55	11	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	41	<10	41	Weathered fuel oil fraction
TP11-01	15-09-11	0 - 0.3	4	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
TP11-02	15-09-11	0.3 - 1.05	7	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
TP12-02	15-09-11	0.3 - 1.0	5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
TP12-03	15-09-11	1.0 - 1.95	3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<20	-
RDLs				0.03	0.03	0.03	0.03	0.03	0.05	3	10	10	20	
Tier I RBSLs <sup>2</sup>				0.03	0.38	0.08	0.08	11		-	-	-	7400	

Notes:

- 1 The "Modified TPH" values noted in this table do not include BTEX compounds.
  - 2 Atlantic PIRI Tier I risk-based screening levels (RBSLs) for a commercial receptor, potable groundwater, coarse-grained soil with diesel/# 2 Oil product type, September, 2003.
- "-" Not applicable

<sup>3</sup> Indicates TPH/BTEX above receptor guidelines  
RDL Reportable Detection Limit. The RDLs are also indicated on the attached laboratory certificates.

Your Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK  
 Your C.O.C. #: 06731

**Attention: Colin LeFrense**  
 CBCL Limited  
 187 Kenmount Rd  
 St. John's, NL  
 A1B 3P9

**Report Date: 2011/09/23**

## CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B1E2745**  
**Received: 2011/09/16, 13:10**

Sample Matrix: Soil  
 # Samples Received: 24

Analyses	Quantity	Date		Laboratory Method	Method Reference
		Extracted	Analyzed		
TEH in Soil (PIRI) Ⓟ	9	2011/09/19	2011/09/20	ATL SOP-00197 R2	Based on Atl. PIRI
TEH in Soil (PIRI) Ⓟ	2	2011/09/19	2011/09/23	ATL SOP-00197 R2	Based on Atl. PIRI
TEH in Soil (PIRI) Ⓟ	12	2011/09/20	2011/09/21	ATL SOP-00197 R2	Based on Atl. PIRI
TEH in Soil (PIRI) Ⓟ	1	2011/09/20	2011/09/22	ATL SOP-00197 R2	Based on Atl. PIRI
Moisture	11	N/A	2011/09/19	ATL SOP-00196 R3	MOE Handbook 1983
Moisture	12	N/A	2011/09/20	ATL SOP-00196 R3	MOE Handbook 1983
Moisture	1	N/A	2011/09/21	ATL SOP-00196 R3	MOE Handbook 1983
VPH in Soil (PIRI) Ⓟ	11	2011/09/19	2011/09/19	ATL SOP 00199 R3	Based on Atl. PIRI
VPH in Soil (PIRI) Ⓟ	12	2011/09/20	2011/09/20	ATL SOP 00199 R3	Based on Atl. PIRI
VPH in Soil (PIRI) Ⓟ	1	2011/09/20	2011/09/21	ATL SOP 00199 R3	Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	9	2011/09/16	2011/09/20		Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	12	2011/09/16	2011/09/21		Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	1	2011/09/16	2011/09/22		Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	2	2011/09/16	2011/09/23		Based on Atl. PIRI

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Reported on a dry weight basis.

### Encryption Key



Paula Chaplin  
 23 Sep 2011 14:26:50 -02:30

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

**ROB WHELAN, Project Manager**  
 Email: RWhelan@maxxam.ca  
 Phone# (709) 754-0203

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

 CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3497	KX3500	KX3501	KX3502		
Sampling Date		2011/09/15	2011/09/15	2011/09/15	2011/09/15		
COC Number		06731	06731	06731	06731		
	Unite	TP1-02 (0.30-1.0M)	TP1-03 (1.0-1.3M)	TP2-02 (0.30-1.0M)	TP2-03 (1.0M-1.45M)	RDL	QC Batch
<b>Inorganics</b>							
Moisture	%	18	12	9	10	1	2618222
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2618440
Toluene	mg/kg	ND	ND	ND	ND	0.03	2618440
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.03	2618440
Xylene (Total)	mg/kg	0.26	ND	ND	ND	0.05	2618440
C6 - C10 (less BTEX)	mg/kg	250	7	ND	ND	3	2618440
>C10-C16 Hydrocarbons	mg/kg	2200	140	27	ND	10	2618441
>C16-C21 Hydrocarbons	mg/kg	1600	120	32	ND	10	2618441
>C21-<C32 Hydrocarbons	mg/kg	1100	86	24	ND	15	2618441
Modified TPH (Tier1)	mg/kg	5200	360	83	ND	20	2616261
Reached Baseline at C32	mg/kg	Yes	No	No	Yes	N/A	2618441
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (2)	SEECOMMENT (2)		N/A	2618441
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%	111	99	97	96		2618441
n-Dotriacontane - Extractable	%	116	110	109	112		2618441
Isobutylbenzene - Volatile	%	135	99	112	94		2618440
ND = Not detected RDL = Reportable Detection Limit QC Batch = Quality Control Batch ( 1 ) Fuel oil fraction. Lube oil range. ( 2 ) Weathered fuel oil fraction. Lube oil range.							

Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

 CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3503	KX3504	KX3505	KX3506		
Sampling Date		2011/09/15	2011/09/15	2011/09/15	2011/09/15		
COC Number		06731	06731	06731	06731		
	Units	TP3-02 (0.30-1.0M)	TP3-03 (1.0-1.8M)	TP4-02 (0.30-0.80M)	TP4-03 (0.8M-1.15M)	RDL	QC Batch

<b>Inorganics</b>							
Moisture	%	41	14	53	20	1	2618222
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2618440
Toluene	mg/kg	1.0	ND	7.9	0.27	0.03	2618440
Ethylbenzene	mg/kg	1.4	ND	3.0	1.0	0.03	2618440
Xylene (Total)	mg/kg	12	0.13	19	5.4	0.05	2618440
C6 - C10 (less BTEX)	mg/kg	570	160	490	630	3	2618440
>C10-C16 Hydrocarbons	mg/kg	24000	2000	29000	5300	10	2618441
>C16-C21 Hydrocarbons	mg/kg	14000	1600	19000	3600	10	2618441
>C21-<C32 Hydrocarbons	mg/kg	3600	480	5400	940	15	2618441
Modified TPH (Tier1)	mg/kg	43000	4200	54000	10000	20	2618261
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	N/A	2618441
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (1)	SEECOMMENT (1)	SEECOMMENT (1)	N/A	2618441
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%	155 (2)	115	115	126		2618441
n-Dotriacontane - Extractable	%	112 (3)	116	111	111		2618441
Isobutylbenzene - Volatile	%	112	123	52 (4)	133		2618440

ND = Not detected

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) Fuel oil fraction.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Isobutylbenzene/n-Dotriacontane recovery(ies) not within acceptance limits due to matrix/co-extractive interference.

(4) Isobutylbenzene recovery not within acceptance limits; moisture exceeds 50%.



Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

 CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3507	KX3508	KX3509		
Sampling Date		2011/09/15	2011/09/15	2011/09/15		
COC Number		06731	06731	06731		
	Units	TP5-01 (0-0.30M)	TP5-02 (0.3-0.5M)	TP6-01 (0-0.30M)	RDL	QC Batch

<b>Inorganics</b>						
Moisture	%	80	18	11	1	2618222
<b>Petroleum Hydrocarbons</b>						
Benzene	mg/kg	ND	ND	ND	0.03	2618440
Toluene	mg/kg	ND	ND	ND	0.03	2618440
Ethylbenzene	mg/kg	ND	ND	ND	0.03	2618440
Xylene (Total)	mg/kg	ND	ND	ND	0.05	2618440
C6 - C10 (less BTEX)	mg/kg	ND	20	ND	3	2618440
>C10-C16 Hydrocarbons	mg/kg	1700	480	97	10	2618441
>C16-C21 Hydrocarbons	mg/kg	5700	540	210	10	2618441
>C21-<C32 Hydrocarbons	mg/kg	3100	190	68	15	2618441
Modified TPH (Tier1)	mg/kg	10000	1200	370	20	2618261
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	N/A	2618441
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (2)	SEECOMMENT (3)	N/A	2618441
<b>Surrogate Recovery (%)</b>						
Isobutylbenzene - Extractable	%	104	109	98		2618441
n-Dotriacontane - Extractable	%	120	114	111		2618441
Isobutylbenzene - Volatile	%	48 (4)	92	91		2618440

ND = Not detected

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) One product in fuel/tube oil range.

(2) Fuel oil fraction.

(3) Weathered fuel oil fraction.

(4) Isobutylbenzene recovery not within acceptance limits; moisture exceeds 50%.



Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3510	KX3511	KX3512	KX3513		
Sampling Date		2011/09/15	2011/09/15	2011/09/15	2011/09/15		
COC Number		06731	06731	06731	06731		
	Units	TP6-02 (0.30-1.10M)	TP7-01 (0-0.30M)	TP7-02 (0.30-0.70M)	TP8-02 (0.30-1.0M)	RDL	QC Batch

<b>Inorganics</b>							
Moisture	%	12	22	13	13	1	2619664
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2620078
Toluene	mg/kg	ND	ND	ND	ND	0.03	2620078
Ethylbenzene	mg/kg	0.40	ND	ND	ND	0.03	2620078
Xylene (Total)	mg/kg	1.3	ND	ND	ND	0.05	2620078
C6 - C10 (less BTEX)	mg/kg	330	ND	ND	ND	3	2620078
>C10-C16 Hydrocarbons	mg/kg	2600	150	110	ND	10	2620080
>C16-C21 Hydrocarbons	mg/kg	1700	490	370	ND	10	2620080
>C21-<C32 Hydrocarbons	mg/kg	400	210	110	18	15	2620080
Modified TPH (Tier1)	mg/kg	5000	840	600	ND	20	2618261
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	No	N/A	2620080
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)	SEECOMMENT (2)	SEECOMMENT (2)	SEECOMMENT (3)	N/A	2620080
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%	129	102	100	100		2620080
n-Dotriacontane - Extractable	%	110	114	110	108		2620080
Isobutylbenzene - Volatile	%	107	102	112	105		2620078

ND = Not detected  
 RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 (1) Fuel oil fraction.  
 (2) One product in fuel/lube oil range.  
 (3) No resemblance to petroleum products in lube oil range.

Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

 CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3514	KX3515	KX3516	KX3517		
Sampling Date		2011/09/15	2011/09/15	2011/09/15	2011/09/15		
COC Number		08731	08731	08731	08731		
	Units	TP8-03 (1.0-1.85M)	TP9-01 (0-0.30M)	TP9-02 (0.3-0.9M)	TP10-02 (0.3-1.0M)	RDL	QC Batch

Inorganics								
Moisture	%	12	2	27	25	1	2619684	
Petroleum Hydrocarbons								
Benzene	mg/kg	ND	ND	ND	ND	0.03	2620078	
Toluene	mg/kg	ND	ND	ND	ND	0.03	2620078	
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.03	2620078	
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.05	2620078	
C6 - C10 (less BTEX)	mg/kg	5	ND	ND	ND	3	2620078	
>C10-C16 Hydrocarbons	mg/kg	12	ND	ND	39	10	2620080	
>C16-C21 Hydrocarbons	mg/kg	ND	ND	ND	76	10	2620080	
>C21-<C32 Hydrocarbons	mg/kg	ND	ND	ND	89	15	2620080	
Modified TPH (Tier1)	mg/kg	ND	ND	ND	200	20	2616261	
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	No	N/A	2620080	
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)			SEECOMMENT (2)		N/A	2620080
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	102	100	100	102		2620080	
n-Dotriacontane - Extractable	%	109	105	110	118		2620080	
Isobutylbenzene - Volatile	%	116	94	111	103		2620078	

ND = Not detected  
 RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 (1) Weathered fuel oil fraction.  
 (2) Weathered fuel oil fraction. No resemblance to petroleum products in lube oil range.

Maxxam Job #: B1E2745  
Report Date: 2011/09/23

CBCL Limited  
Client Project #: 113088.00  
Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

### ATLANTIC MUST IN SOIL (SOIL)

Maxxam ID		KX3518	KX3519	KX3520	KX3521		
Sampling Date		2011/09/15	2011/09/15	2011/09/15	2011/09/15		
COC Number		06731	06731	06731	06731		
	Units	TP10-03 (1.0-1.55M)	TP11-01 (0-0.30M)	TP11-02 (0.30-1.05M)	TP12-02 (0.30-1.0M)	RDL	QC Batch

Inorganics							
Moisture	%	9	2	10	3	1	2619864
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2620078
Toluene	mg/kg	ND	ND	ND	ND	0.03	2620078
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.03	2620078
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.05	2620078
C8 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	3	2620078
>C10-C16 Hydrocarbons	mg/kg	17	ND	ND	ND	10	2620080
>C16-C21 Hydrocarbons	mg/kg	24	ND	ND	ND	10	2620080
>C21-<C32 Hydrocarbons	mg/kg	ND	ND	ND	ND	15	2620080
Modified TPH (Tier1)	mg/kg	41	ND	ND	ND	20	2616261
Reached Baseline at C32	mg/kg	Yes	Yes	Yes	Yes	N/A	2620080
Hydrocarbon Resemblance	mg/kg	SEECOMMENT (1)				N/A	2620080
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%	102	105	102	95		2620080
n-Dotriacontane - Extractable	%	111	111	112	103		2620080
Isobutylbenzene - Volatile	%	111	107	95	102		2620078

ND = Not detected  
RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
(1) Weathered fuel oil fraction.

Maxxam Job #: B1E2745  
 Report Date: 2011/09/23

 CBCL Limited  
 Client Project #: 113088.00  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**ATLANTIC MUST IN SOIL (SOIL)**

Maxxam ID		KX3521		KX3522		
Sampling Date		2011/09/15		2011/09/15		
COC Number		06731		06731		
	Units	TP12-02 (0.30-1.0M) Lab-Dup	QC Batch	TP12-03 (1.0-1.95M)	RDL	QC Batch

<b>Inorganics</b>						
Moisture	%	3	2619664	10	1	2621153
<b>Petroleum Hydrocarbons</b>						
Benzene	mg/kg	ND	2620078	ND	0.03	2621504
Toluene	mg/kg	ND	2620078	ND	0.03	2621504
Ethylbenzene	mg/kg	ND	2620078	ND	0.03	2621504
Xylene (Total)	mg/kg	ND	2620078	ND	0.05	2621504
C0 - C10 (less BTEX)	mg/kg	NU	2620078	ND	3	2621504
>C10-C16 Hydrocarbons	mg/kg	ND	2620080	ND	10	2621505
>C16-C21 Hydrocarbons	mg/kg	ND	2620080	ND	10	2621505
>C21-<C32 Hydrocarbons	mg/kg	ND	2620080	ND	15	2621505
Modified TPH (Tier1)	mg/kg		2616261	ND	20	2616261
Reached Baseline at C32	mg/kg	Yes	2620080	Yes	N/A	2621505
<b>Surrogate Recovery (%)</b>						
Isobutylbenzene - Extractable	%	95	2620080	105		2621505
n-Dotriacontane - Extractable	%	102	2620080	102		2621505
Isobutylbenzene - Volatile	%	106	2620078	95		2621504

 ND = Not detected  
 RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch



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Maxxam Job #: B1E2745  
Report Date: 2011/09/23

CBCL Limited  
Client Project #: 113088.00  
Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**GENERAL COMMENTS**

**Results relate only to the items tested.**

CBCL Limited  
 Attention: Colin LeFrense  
 Client Project #: 113088.00  
 P.O. #:  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

**Quality Assurance Report**

Maxam Job Number: ZB1E2745

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2618222 JHW	RPD	Moisture	2011/09/19	11.8		%	25
2618440 SPN	Spiked Blank	Isobutylbenzene - Volatile	2011/09/19		102	%	60 - 140
		Benzene	2011/09/19		92	%	60 - 140
		Toluene	2011/09/19		93	%	60 - 140
		Ethylbenzene	2011/09/19		93	%	60 - 140
		Xylene (Total)	2011/09/19		95	%	60 - 140
	Method Blank	Isobutylbenzene - Volatile	2011/09/19		107	%	60 - 140
		Benzene	2011/09/19	ND, RDL=0.03		mg/kg	
		Toluene	2011/09/19	ND, RDL=0.03		mg/kg	
		Ethylbenzene	2011/09/19	ND, RDL=0.03		mg/kg	
		Xylene (Total)	2011/09/19	ND, RDL=0.05		mg/kg	
		C6 - C10 (less BTEX)	2011/09/19	ND, RDL=3		mg/kg	
	RPD	Benzene	2011/09/19	NC		%	50
		Toluene	2011/09/19	NC		%	50
		Ethylbenzene	2011/09/19	NC		%	50
		Xylene (Total)	2011/09/19	NC		%	50
		C6 - C10 (less BTEX)	2011/09/19	NC		%	50
2618441 SPI	Matrix Spike	Isobutylbenzene - Extractable	2011/09/20		93	%	30 - 130
		n-Dotriacontane - Extractable	2011/09/20		109	%	30 - 130
		>C10-C16 Hydrocarbons	2011/09/20		86	%	30 - 130
		>C16-C21 Hydrocarbons	2011/09/20		108	%	30 - 130
		>C21-<C32 Hydrocarbons	2011/09/20		91	%	30 - 130
	Spiked Blank	Isobutylbenzene - Extractable	2011/09/20		95	%	30 - 130
		n-Dotriacontane - Extractable	2011/09/20		110	%	30 - 130
		>C10-C16 Hydrocarbons	2011/09/20		85	%	30 - 130
		>C16-C21 Hydrocarbons	2011/09/20		106	%	30 - 130
		>C21-<C32 Hydrocarbons	2011/09/20		101	%	30 - 130
	Method Blank	Isobutylbenzene - Extractable	2011/09/20		98	%	30 - 130
		n-Dotriacontane - Extractable	2011/09/20		104	%	30 - 130
		>C10-C16 Hydrocarbons	2011/09/20	ND, RDL=10		mg/kg	
		>C16-C21 Hydrocarbons	2011/09/20	ND, RDL=10		mg/kg	
		>C21-<C32 Hydrocarbons	2011/09/20	ND, RDL=15		mg/kg	
	RPD	>C10-C16 Hydrocarbons	2011/09/20	NC		%	50
		>C16-C21 Hydrocarbons	2011/09/20	NC		%	50
		>C21-<C32 Hydrocarbons	2011/09/20	NC		%	50
2619664 JHW	RPD [KX3521-01]	Moisture	2011/09/20	NC		%	25
2620078 SPN	Spiked Blank	Isobutylbenzene - Volatile	2011/09/20		96	%	60 - 140
		Benzene	2011/09/20		83	%	60 - 140
		Toluene	2011/09/20		82	%	60 - 140
		Ethylbenzene	2011/09/20		84	%	60 - 140
		Xylene (Total)	2011/09/20		84	%	60 - 140
	Method Blank	Isobutylbenzene - Volatile	2011/09/20		92	%	60 - 140
		Benzene	2011/09/20	ND, RDL=0.03		mg/kg	
		Toluene	2011/09/20	ND, RDL=0.03		mg/kg	
		Ethylbenzene	2011/09/20	ND, RDL=0.03		mg/kg	
		Xylene (Total)	2011/09/20	ND, RDL=0.05		mg/kg	
		C6 - C10 (less BTEX)	2011/09/20	ND, RDL=3		mg/kg	
	RPD [KX3521-01]	Benzene	2011/09/20	NC		%	50
		Toluene	2011/09/20	NC		%	50
		Ethylbenzene	2011/09/20	NC		%	50
		Xylene (Total)	2011/09/20	NC		%	50
		C6 - C10 (less BTEX)	2011/09/20	NC		%	50
2620080 SPI	Matrix Spike [KX3521-01]	Isobutylbenzene - Extractable	2011/09/21		95	%	30 - 130
		n-Dotriacontane - Extractable	2011/09/21		107	%	30 - 130



CBCL Limited  
 Attention: Colin LeFrense  
 Client Project #: 113088.00  
 P.O. #:  
 Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

Quality Assurance Report (Continued)

Maxxam Job Number: ZB1E2745

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2620080 SPI	Matrix Spike [KX3521-01]	>C10-C16 Hydrocarbons	2011/09/21		90	%	30 - 130
		>C16-C21 Hydrocarbons	2011/09/21		112	%	30 - 130
		>C21-<C32 Hydrocarbons	2011/09/21		102	%	30 - 130
	Spiked Blank	Isobutylbenzene - Extractable	2011/09/21		97	%	30 - 130
		n-Dotriacontane - Extractable	2011/09/21		105	%	30 - 130
		>C10-C16 Hydrocarbons	2011/09/21		87	%	30 - 130
		>C16-C21 Hydrocarbons	2011/09/21		107	%	30 - 130
		>C21-<C32 Hydrocarbons	2011/09/21		103	%	30 - 130
		Isobutylbenzene - Extractable	2011/09/21		104	%	30 - 130
	Method Blank	n-Dotriacontane - Extractable	2011/09/21		106	%	30 - 130
		>C10-C16 Hydrocarbons	2011/09/21	ND, RDL=10		mg/kg	
		>C16-C21 Hydrocarbons	2011/09/21	ND, RDL=10		mg/kg	
		>C21-<C32 Hydrocarbons	2011/09/21	ND, RDL=15		mg/kg	
		>C10-C16 Hydrocarbons	2011/09/21	NC		%	50
>C16-C21 Hydrocarbons		2011/09/21	NC		%	50	
>C21-<C32 Hydrocarbons		2011/09/21	NC		%	50	
RPD [KX3521-01]				11.8	%	25	
2621153 JHW	RPD	Mofeture	2011/09/21				
2621504 SPN	Spiked Blank	Isobutylbenzene - Volatile	2011/09/21		113	%	60 - 140
		Benzene	2011/09/21		102	%	60 - 140
		Toluene	2011/09/21		101	%	60 - 140
		Ethylbenzene	2011/09/21		103	%	60 - 140
		Xylene (Total)	2011/09/21		103	%	60 - 140
		Isobutylbenzene - Volatile	2011/09/21		105	%	60 - 140
		Benzene	2011/09/21	ND, RDL=0.03		mg/kg	
	Method Blank	Toluene	2011/09/21	ND, RDL=0.03		mg/kg	
		Ethylbenzene	2011/09/21	ND, RDL=0.03		mg/kg	
		Xylene (Total)	2011/09/21	ND, RDL=0.05		mg/kg	
		C6 - C10 (less BTEX)	2011/09/21	ND, RDL=3		mg/kg	
		Benzene	2011/09/21	NC		%	50
		Toluene	2011/09/21	NC		%	50
		Ethylbenzene	2011/09/21	NC		%	50
RPD	Xylene (Total)	2011/09/21	NC		%	50	
	C6 - C10 (less BTEX)	2011/09/21	NC		%	50	
	Isobutylbenzene - Extractable	2011/09/22		92	%	30 - 130	
	n-Dotriacontane - Extractable	2011/09/22		99	%	30 - 130	
	>C10-C16 Hydrocarbons	2011/09/22		89	%	30 - 130	
	>C16-C21 Hydrocarbons	2011/09/22		114	%	30 - 130	
	>C21-<C32 Hydrocarbons	2011/09/22		113	%	30 - 130	
Spiked Blank	Isobutylbenzene - Extractable	2011/09/22		95	%	30 - 130	
	n-Dotriacontane - Extractable	2011/09/22		100	%	30 - 130	
	>C10-C16 Hydrocarbons	2011/09/22		87	%	30 - 130	
	>C16-C21 Hydrocarbons	2011/09/22		110	%	30 - 130	
	>C21-<C32 Hydrocarbons	2011/09/22		113	%	30 - 130	
	Isobutylbenzene - Extractable	2011/09/22		99	%	30 - 130	
Method Blank	n-Dotriacontane - Extractable	2011/09/22		95	%	30 - 130	
	>C10-C16 Hydrocarbons	2011/09/22	ND, RDL=10		mg/kg		
	>C16-C21 Hydrocarbons	2011/09/22	ND, RDL=10		mg/kg		
	>C21-<C32 Hydrocarbons	2011/09/22	ND, RDL=15		mg/kg		
	>C10-C16 Hydrocarbons	2011/09/22	NC		%	50	
	>C16-C21 Hydrocarbons	2011/09/22	NC		%	50	
	>C21-<C32 Hydrocarbons	2011/09/22	NC		%	50	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.  
 Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.  
 Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.



CBCL Limited  
Attention: Colin LeFransé  
Client Project #: 113088.00  
P.O. #:  
Site Location: BUTTER POT PARK TEST PITTING, BUTTER POT PARK

Quality Assurance Report (Continued)

Maxxam Job Number: ZB1E2745

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.  
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.  
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

**Validation Signature Page**

**Maxxam Job #: B1E2745**

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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

*Paula Chaplin*

\_\_\_\_\_  
PAULA CHAPLIN, Project Manager

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**INVOICE INFORMATION:**  
 Company Name: CVL Limited  
 Contact Name: Celia LeFevre  
 Address: 187 Kennecott Road  
St. John's, NL  
 Email: celia.lefevre@cvl.ca  
 Ph: 709-734-1832 Fax: 709-364-8627

**REPORT INFORMATION (if differs from invoice):**  
 Company Name:  
 Contact Name:  
 Address:  
 Email:  
 Ph:  
 Fax:

**PO #:**  
 Project #: 113028.03  
 Proj. Name: Batter Point Park  
 Location: Batter Point Park  
 Quotation#: MD  
 Submitted By: Celia LeFevre  
 Site Task #:

**MAXXAM JOB NUMBER:**  
BIE 2745  
**ENTERED BY, Init**  
MD  
 Client Code: 19037

Specify Guideline Requirements:  
TPH/BTEX - RBCA

\*Specify Matrix: Surface/Soil/Ground/Tapwater/Sewage/Effluent/Seawater/Potable/Non-Potable/Tissue/Soil/Sediment/Metal

Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water	Mercury	Available Metals Digest	Total Digest - for sediments	Metals Soil	TPH MUST (BTEX, C, Cd, Rb, K, A)	Soil (Potable), TPH MUST, NS Fuel Oil Spill	Policy Low Level BTEX & C, Cd	MD Potable Water	BTEX VPH, Low Level TPH	TPH Fractionation	PAHs	PCB #	VOCs EPA 624, 6260
TP1-02 (0.30-1.0m)	Soil	Sept 15/11	1005ml																		
TP1-03 (1.0m-1.3m)																					
TP2-02 (0.30-1.0m)																					
TP2-05 (1.0m-1.5m)																					
TP3-02 (0.30-1.0m)																					
TP3-03 (1.0-1.5m)																					
TP4-02 (0.30-1.0m)																					
TP4-03 (0.8m-1.5m)																					
TP5-01 (0-0.30m)																					
TP5-02 (0.3-0.5m)																					

**REQUISITIONED BY:** (Signature/Print) Celia LeFevre **RECEIVED BY:** (Signature/Print) [Signature]  
**DATE / TIME** 2011-09-16  
**PURPOSE OF CHANGE / REMARKS**  
**TEMP @ Maxxam Receipt** 18.4/18.4/18.3  
**INTEGRITY** (Yes/No) MD  
 Page 14 of 16

**INVOICE INFORMATION:**  
 Company Name: CBCL Limited  
 Contact Name: Celine LeFevre  
 Address: 187 Kenmount Rd.  
St. John's NL  
 Email: celine@cbcl.ca  
 Ph: 709-736-1832 Fax: 709-364-8187

**REPORT INFORMATION (if differs from invoice):**  
 Company Name:  
 Contact Name:  
 Address:  
 Email:  
 Ph:

PO #: 113088 00  
 Project #: 113088 00  
 Prof. Name: Butter Bay P.L.  
 Location: Butter Bay P.L.  
 Quotation#: MD  
 Submitted By: Celine LeFevre  
 Site Task #:

MAXXAM JOB NUMBER:  
BIE 2745  
 ENTERED BY, Init:  
MD  
 Client Code: 19037

Specify Guideline Requirements:  
TPH/BTEX - RBCA

Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles
TP6-01 (0-0.3m)	Soil	Sep 15/11	1486mL
TP6-02 (0.30-1.0m)			
TP7-01 (0-0.3m)			
TP7-02 (0.30-0.5m)			
TP8-01 (0.3-1.0m)			
TP8-02 (1.0-1.5m)			
TP9-01 (0-0.3m)			
TP9-02 (0.3-0.9m)			
TP10-01 (0.3-1.0m)			
TP10-02 (1.0-1.5m)			

Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Total Digest (Default Method)	Dissolved	Mercury is not included in soil or water metals scan	Available Metals Digest (HNO <sub>3</sub> /H <sub>2</sub> O <sub>2</sub> )	Default Method (HNO <sub>3</sub> /H <sub>2</sub> O <sub>2</sub> )	Total Digest - for sediments (HNO <sub>3</sub> /H <sub>2</sub> O <sub>2</sub> )	Metals Soil (HNO <sub>3</sub> /H <sub>2</sub> O <sub>2</sub> )	Tin (required for CME soils)	Selenium (low level) Field for CME Residential, Pastures, Agricultural	Hot Water Soluble Boron (required for CME Agricultural)	TPH MUST (BTEX, C-C <sub>2</sub> ) RBCA	Soil (Potable) TPH MUST NS Part Oil Spill	NB Potable Water	BTEX, YPH, Low Level TEH	TPH Fractionation	PAHs	PCBs	VOCs EPA 624, 8288

RECEIVED BY: (Signature/Print) [Signature] m Oate  
 DATE / TIME 2011-07-16  
 RECEIVED BY: (Signature/Print) [Signature] m Oate  
 DATE / TIME 1:10  
 PURPOSE OF CHANGE / REMARKS  
 TEMP @ Maxxam Receipt 18.4 / 18.4 / 18.3  
 INTEGRITY Yes  No  Init: MD  
 Page 15 of 16

**INVOICE INFORMATION:**  
 Company Name: CBCL Limited  
 Contact Name: Celia LeFranc  
 Address: 187 Kensington Rd.  
 Email: celia@cbcl.ca  
 Ph: 709-730-1898 Fax: 709-364-8627

**REPORT INFORMATION (if differs from invoice):**  
 Company Name:  
 Contact Name:  
 Address:  
 Email:  
 Ph:

PO #:  
 Project #: 113088.03  
 Proj. Name: Water Pollution  
 Location: Buttr Point Park  
 Quotation #:  
 Submitted By: Celia LeFranc  
 Site Task #:

MAXXAM JOB NUMBER:  
BIE 2745  
 ENTERED BY, Init:  
MD  
 Client Code: 19037

Specify Guideline Requirements:  
TPA/BTEX - RBCA

Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Total Digest (Default Method)	Metals Water	Dissolved	Mercury is not included in available metals digest	Available Metals Digest (HNO <sub>3</sub> /H <sub>2</sub> O <sub>2</sub> )	Total Digest - for sediments (HNO <sub>3</sub> /HF/HClO <sub>4</sub> )	Metals Soil (In (required for CME soils) (HNO <sub>3</sub> /HF/HClO <sub>4</sub> )	Reselenium (low level) Req'd for CME Residential, Pasture, Agricultural	Hot Water Soluble Boron (required for CME Agricultural)	TPH MUST (BTEX, C-C <sub>10</sub> -RBCA)	Soil Probe, TPH MUST, NS Test on Soil (Policy Low Level BTEX & C-C <sub>10</sub> )	NS Potable Water (BTEX, VPH, Low Level) TEH	TPH Fractionation	PAH's	PCB's	VOC's EPA 624.8260	Other Analysis or Comments/Hazards	Other Analysis or Comments/Hazards		
TP11-01 (0-0.30m)	Soil	Sgt. 15/11	1 x 800																								
TP11-02 (0.30-1.0m)	Soil																										
TP12-03 (0.30-1.0m)	S-1																										
TP13-03 (1.0-1.95m)	S-1																										

RELINQUISHED BY: (Signature/Print)  
[Signature]  
 RECEIVED BY: (Signature/Print)  
[Signature]  
 DATE / TIME: 2011-07-16  
 L.I.O. Page 16 of 16

TEMP @ Maxxam Receipt: 18.4 / 18.4 / 18.3  
 INTEGRITY: (Yes) MD (No)

