PROJECT-SPECIFIC DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

Rideau-Canal Rehabilitation/Repairs
Kingston Mills Locks 46-49
Kingston, Ontario
PWGSC SOA No: EQ447-141528-018

Prepared for:
Public Works and Government Services Canada
Nadine Hanneson, Senior Environmental Specialist
4900 Yonge Street
Toronto, Ontario

March 26, 2017

DST File No.: GV-OT-028212

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Executive Summary

DST Consulting Engineers Inc. (DST) was retained by Public Works and Government Services Canada (PWGSC) to conduct a project-specific Designated Substances and Hazardous Materials Survey (DSHMS) for the Rideau Canal Rehabilitation and Repairs located at the Kingston Mills Locks 46-49, Kingston, Ontario.

The DSHMS scope of work included an assessment for the presence of the 11 Designated Substances, as identified in the Occupational Health and Safety Act, as well as Creosote/Arsenic treated lumber, Polychlorinated Biphenyls (PCBs), Halocarbons, Urea-Formaldehyde Insulation (UFFI), Chemical storage, Radioactive Materials, Mould, and other miscellaneous hazardous materials or chemicals.

DST conducted the site visit for the Kingston Mills Locks 46-49 in Kingston, Ontario on February 28, 2017.

The following Table I provides an overview of Designated Substances and Hazardous Materials observed at the Kingston Mills Locks in Kingston, Ontario. A summary of Findings and Recommendations is provided in Table II.

Table I: Overview of Designated Substances and Hazardous Materials

Designated Substances and Hazardous Materials Identified	Designated Substances and Hazardous Materials Not Identified
• Creosote and Arsenic; • Lead; and • Silica.	• Asbestos • Acrylonitrile; • Benzene; • Coke Oven Emissions; • Creosote • Ethylene Oxide; • Fecal Matter Droppings; • Halocarbons; • Isocyanates; • PCBs; • Mercury; • Mould; • Radioactive materials; • Vinyl Chloride; • Urea-Formaldehyde Insulation; • Other Hazardous Materials.

Table II: Summary of Findings and Recommendations for Designated Substances and Hazardous Materials Identified..

Designated/ Hazardous Substance	Findings	Recommendations
Creosote and Arsenic	Detectable concentrations of Semi-Volatile Organic Compounds (SVOCs) and arsenic were identified in wood samples. Refer to Section 5.4.	Should future project work at the site include aggressive disturbance of wood (e.g. grinding, power sanding, or abrasive blasting), workers should be equipped with personnel protective equipment (PPE) including a respirator with an approved HEPA filtration cartridge, gloves, and full-body dust impermeable disposable coveralls. Worker exposure to arsenic is regulated under *Ontario Regulation 490/09 – Designated Substances*, as amended. The disposal of arsenic waste is regulated under *Ontario Regulation 347 – General – Waste Management,* as amended.
Lead	Detectable concentrations of lead were identified in paint finishes. Refer to Section 5.2.	The Occupational Health and Safety Branch of the Ontario Ministry of Labour publication *Guideline: Lead on Construction Projects* should be followed during the disturbance of materials containing lead. Although the Canada Consumer Product Safety Act's *Surface Coating Materials Regulations SOR/2005-109*, has set a limit of 90 parts per million (ppm) for surface coating materials, there may be a potential for exposure to high levels of lead depending on the activities performed that disturb the lead-containing materials even at low lead concentrations. Conducting a risk assessment to assess the potential for exposure to lead should be performed to determine the need to follow procedures such as those in the MOL guideline referenced above. This is particularly important for work operations that involve the aggressive disturbance of lead-containing materials (e.g. grinding, power sanding, or abrasive blasting). Worker exposure to lead is regulated under *Ontario Regulation 490/09 – Designated Substances*, as amended. The disposal of lead waste is regulated under *Ontario Regulation 347 – General – Waste Management,* as amended.
Silica	Silica is suspected to be present within concrete, stone blocks, masonry elements and associated mortars.	Dust control measures should be adopted during the disturbance of silica, including those outlined within the Occupational Health and Safety Branch of the Ontario Ministry of Labour *Guideline: Silica on Construction Projects.* Worker exposure to silica is regulated under *Ontario Regulation 490/09* – Designated *Substances*, as amended.

The Executive Summary should be read in conjunction with, and is subject to the limitations outlined in the Limitations of Report.

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Rideau Cana Rehabilitation/Repairs
Kingston Mills Locks 46-49
Kingston, Ontario

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1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by Public Works and Government Services Canada (PWGSC) to conduct a project-specific Designated Substances and Hazardous Materials Survey (DSHMS) for the Rideau Canal Rehabilitation and Repairs located at the Kingston Mills Locks 46-49, Kingston, Ontario.

2.0 SCOPE OF WORK

The survey implemented by DST included an on-site investigation and testing of 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. Designated Substances, as identified under the Ontario Occupational Health and Safety Act, are as follows:

- Acrylonitrile;
- Arsenic;
- Asbestos (both friable and non-friable);
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Lead;
- Mercury;
- Silica; and
- Vinyl Chloride.

Other Hazardous Materials which are not classified as Designated Substances, but were included as part of the survey and considered pertinent due to applicable regulations, best practice guidelines and/or potential risks to human health and/or the environment, are:

- Creosote/Arsenic treated lumber;
- Polychlorinated Biphenyls (PCBs);
- Halocarbons;
- Urea Formaldehyde Insulation;
- Fuel, oil and/or waste oil storage;
- Chemical Storage;
- Radioactive Materials; and
- Mould.

3.0 BACKGROUND SITE INFORMATION

The Kingston Mills Locks are on the site of the first mill built on the Rideau, the King’s Mill, built in 1784. The Site contains 3 locks (locks 47-49), a turning basin, and a detached upper lock (lock 46). The PWGSC Scope of Work for this project outlined that the rehabilitation of these locks will consist of concrete repairs to all the locks as well as the observation of possible staining and debris from the rail bridge, above locks 47/48.

4.0 METHODOLOGY

The field program for this survey was completed by DST on February 28, 2017. The survey determined the presence and condition of designated substances and hazardous materials within the project area.

Materials suspected of containing designated substances were visually identified, based on the surveyor's knowledge of the historic composition of building products. Visual identification of materials suspected to contain asbestos, lead (e.g. in paint), and creosote/arsenic (e.g. in wood) was supported by the collection and analysis of a limited number of representative samples, where applicable. Materials suspected of containing designated substances other than asbestos, lead (e.g. in paint), or creosote/arsenic (e.g. in wood) were identified by appearance, age, and knowledge of historic applications.

In Ontario, a material is defined as an Asbestos-Containing Material (ACM) if the material has a minimum asbestos content of 0.5 per cent (%) by dry weight, as O. Reg. 278/05, as amended. ACMs can be divided into two categories: friable and non-friable material. A friable ACM is a material that can be crumbled, powdered, or pulverized by hand pressure and can readily release fibres when disturbed. Common applications of friable ACMs are sprayed or trowelled surfacing materials (e.g. sprayed fireproofing and textured coatings) as well as mechanical and thermal insulation. Non-friable materials are materials that will generally release fibres only when cut or shaped. Common non-friable ACMs include vinyl floor products, caulking applications, asbestos textile products and asbestos cement products (Transite). Some of these products may become friable with time or when disturbed.

Bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were collected in order to meet the bulk sampling requirements stipulated in O.Reg. 278/05, as amended. The bulk samples were submitted to and analyzed by Paracel Laboratories Ltd. (Paracel). Paracel is certified under the National Institute of Science and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis. The bulk samples were analyzed using a combination of dispersion staining and polarised light microscopy (PLM). This analytical method complies with the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 dated July 1993, which is the regulatory approved protocol for bulk asbestos analysis in Ontario.

Bulk sample analysis was completed using a positive stop approach. Only one result of greater than 0.5% asbestos content is required to determine that material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos, as per O. Reg. 278/05, as amended.

With regards to lead in paint, although the Ontario Ministry of Labour (MoL) has published a guideline for control of lead exposures on construction projects in Ontario, it does not include criteria for the classification of lead-paint. Instead, it uses presumed airborne lead concentrations for specific tasks as criteria for classifying work. However, in regulations set by the United States (U.S.) Department of Housing and Urban Development, lead-based paint is classified as any paint application containing at least 1.0 milligrams of lead per square centimetre of surface area (1.0 mg/cm2), or at least 0.5% lead content by weight [(5,000 parts per million (ppm)]. This criterion was widely, although not universally, used in Canada. In Canada, the Federal Canada Consumer Product Safety Act's Surface Coating Materials Regulations SOR/2005-109 has lowered the

allowable concentration of lead in paints for new consumer products to 0.009% lead content by weight (90 ppm). For the purposes of this survey and report, paints having a lead content of 90 ppm or more are considered to be lead-containing.

A representative paint finish sample was collected during the survey and submitted to Paracel for lead content analysis. Paracel is certified under the Canadian Association for Laboratory Accreditation Inc. (CALA) to perform lead in paint sample analysis. The samples were analysed by Paracel using Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES) in accordance with MOE E3470, ICP-OES.

In Canada, no regulatory limits have been established for arsenic in surface coating materials such as wood coatings and paints. The Hazardous Products Act SOR/2011-17 sets the limit for *migratable heavy metals such as arsenic in surface coating materials applied to consumer toy products to 0.1% (1,000 ppm).* The exposure limits, as stated by O.Reg 490/09, as amended, sets the Time-Weighted Average Limit (TWAL) for arsenic to 0.01 mg/m^3 and the Ceiling Limit (C) to 0.5 mg/m^3. However, it does not outline worker exposure limits for dermal contact.

Although not a designated substance, creosote is an industrial preservative used to protect wood from deterioration and decay caused by fungi, insects, and marine organisms[1]. Creosote contains a substantial amount of polycyclic aromatic hydrocarbons (PAHs), about 85% by weight[2] as well as phenols. Primary PAHs in creosote include Naphthalene, Anthracene, 2-Methylnaphthalene, and Phenanthrene, with smaller amounts of Biphenyl, Fluorene, 1-Methylnaphthalene, and other various PAHs.

A representative wood sample was collected during the survey and submitted to Paracel for creosols and arsenic analysis. Paracel is certified under the Canadian Association for Laboratory Accreditation Inc. (CALA). The samples were analysed for arsenic using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS), and analyzed for creosote using SW-846 Method 8270 for Semi-Volatile Organic Compounds (SVOCs).

5.0 FINDINGS

The following sections outline the findings of accessible designated substances and hazardous building materials that were assessed within the confines of the project-specific scope of work.

5.1 Asbestos

The following section outlines the asbestos sampling completed by DST during the project-specific DSHMS.

[1] Environment and Climate Change Canada. Recommendations for the Design and Operation of Wood Preservation Facilities, 2013: Technical Recommendations Document (2014).
[2] http://scholar.lib.vt.edu/theses/available/etd-52898-0437/unrestricted/chapter3.pdf

Table 1 below presents the analytical results of the asbestos bulk sampling performed by DST:

Table 1: Summary of Bulk Samples Analyzed for Asbestos Content – DST (2017)			
Sample I.D.	**Sample Location**	**Sample Description**	**Asbestos Content**
KM-01A	Basin Walls – Lock 47, East Side	Mortar (New)	None Detected
KM-01B			None Detected
KM-01C			None Detected
KM-02A	Basin Walls - Throughout	Mortar (Old)	<MDL[1]
KM-02B			None Detected
KM-02C			None Detected
KM-02D			None Detected
KM-02E			None Detected
KM-03AC	Basin Walls – Lower Lock 46	Concrete Block with Mortar	<MDL
KM-03B			None Detected
KM-03C			None Detected
KM-04A	Basin Walls – Lock 47, East Side	Concrete Block (New)	None Detected
KM-04B			None Detected
KM-04C			None Detected

Bold items represent materials that contain 0.5% or more asbestos, and are considered asbestos-containing materials, as per O.Reg 278/05, as amended.
Note 1: <MDL represents trace amounts of asbestos observed below the minimum detection limit.

Based on laboratory analytical results summarized in Table 1, all the samples were confirmed to be non-detect for asbestos.

5.2 Lead

Three (3) representative paint finishes were sampled from the project area and submitted for lead content analysis. The sample descriptions and analytical results are summarized in Table 2 below:

Table 2: Summary of Paint Chip Samples Analyzed for Lead			
Sample I.D.	**Sample Location**	**Paint Description**	**Lead (ppm)**
KM-LP-01	**Wood Gate**	**Grey Paint**	**1080**
KM -LP-02	**Wood Gate and metal structures**	**Black Paint**	**105**
KM -LP-03	**Wood Gate**	**White Paint**	**260**

Bold items represent materials that contain 90 ppm or more of lead, and are considered lead-containing materials, as per SOR/2005-05, as amended.

Based on the analytical sample results, all paint samples were found to contain over 90 ppm, and are considered lead-containing paints. These paints are present on the Lock gates (wood), as well as the metal structures, including the railings, on Site.

5.3 Silica

Based on the historic composition of building materials, silica is expected to be present as a natural component in concrete, stone blocks, masonry elements, and associated mortars.

5.4 Creosote and Arsenic

A composite wood sample of the gates was submitted for creosote and arsenic content analysis. The sample description and analytical results are summarized in Table 3 below.

Table 3: Summary of Wood Samples Analyzed for Creosote (as PAHs and Phenols) and Arsenic

Sample I.D.	Sample Location	Sample Description	Creosote (ug/g)	Arsenic (ug/g)
KM-wood-01	Wood Gate	Wood	Minor quantities of select PAHs Present	1,260

Based on the analytical results, minor quantities of select PAH compounds were found to be over the minimum detection limit (MDL) in the creosote analysis. However, as creosote contains a substantial amount of PAHs by weight as well as phenols, the sampled wood is not considered to be a creosote containing material.

Based on the analytical results, the sample KM-wood-01 was found to contain 1,260ppm of arsenic and is considered to be arsenic-containing timber wood that make up the lock gates at Kingston Mills.

5.5 Other Designated Substances and Hazardous Materials

The following other Designated Substances and Hazardous Materials were neither observed, nor suspected of being present, in forms or quantities that would impact future work in the captioned project area:

- Acrylonitrile;
- Benzene;
- Mercury;
- Coke Oven Emissions;
- Ethylene Oxide;
- Chemical Storage,
- Fuel, Oil and/or Waste Oil Storage;
- Urea Formaldehyde Foam Insulation;
- Radioactive Materials;
- Polychlorinated Biphenyls;
- Halocarbons;

- Isocyanates;
- Vinyl Chloride; and
- Mould.

6.0 CONCLUSIONS AND RECOMMENDATIONS

DST's recommendations for each material, which are based upon both regulatory compliance and best practice guidelines, are included in the following sections below.

6.1 Arsenic

DST recommends that future disturbance of arsenic-containing wood should avoid operations that generate high levels of dust (e.g. grinding, power sanding, or abrasive blasting) and that should these aggressive operations be required, appropriate precautionary measures be implemented for worker exposure. Recommended personnel protective equipment (PPE) would include a respirator with an approved HEPA filtration cartridge, gloves, and full-body dust impermeable disposable coveralls.

The TWAEL for airborne arsenic is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne arsenic levels that exceed this TWAEL.

The disposal of construction waste containing arsenic is governed by O. Reg. 347/90 - General – Waste Management, as amended. The transport of the waste to the disposal site is controlled by the federal Transportation of Dangerous Goods Act (TDGA), 1992. Materials with elevated concentrations of arsenic should be subject to toxicity characteristic leaching procedure (TCLP) testing to determine toxicity with respect to arsenic prior to disposal, in accordance with O.Reg 347/90, as amended.

6.2 Lead

The Occupational Health and Safety Branch of the Ontario MoL has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbances as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for lead on construction projects, this guideline should be followed when disturbing lead-containing materials.

Paints containing elevated concentrations of lead can pose a health risk to humans if ingested or inhaled. Such lead paints are also a risk to the environment with the potential to contaminate soil and groundwater. Paints with elevated lead content can also pose a health risk to workers while completing renovations within the building.

Although the Federal Canada Consumer Product Safety Act's *Surface Coating Materials Regulations SOR/2005-109*, as amended, has set a limit of 90 ppm for surface coating materials, there may be a potential for exposure to high levels of lead depending on the activities performed that disturb the lead-containing materials, even at low lead concentrations. Conducting a risk assessment to assess the potential for exposure should be performed to determine the need to follow procedures such as those in the MoL guideline referenced above. This is particularly

important for work operations that involve the aggressive disturbance of lead-containing materials (e.g. grinding, power sanding, or abrasive blasting), which DST recommends avoiding.

The TWAEL for airborne lead is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne lead levels that exceed this TWAEL.

The disposal of construction waste containing lead is governed by O. Reg. 347/90 - General – Waste Management, as amended. The transport of the waste to the disposal site is controlled by the federal Transportation of Dangerous Goods Act (TDGA), 1992. Materials with elevated concentrations of lead should be subject to toxicity characteristic leaching procedure (TCLP) testing to determine toxicity with respect to lead prior to disposal, in accordance with O.Reg 347/90, as amended.

6.3 Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour have published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbances as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification.

The TWAEL for airborne silica is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne silica levels that exceed this exposure limit.

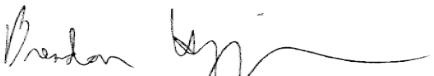
As a general rule, it is preferable to use more stringent dust suppression techniques and engineering controls as opposed to relying on respiratory protection to control worker exposure. Respiratory protection should only be relied on as a last resort when dust suppression techniques and engineering controls fail to control worker exposure.

7.0 CLOSURE

A Limitations of Report section, which forms an integral part of this report, is attached.

We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

DST CONSULTING ENGINEERS INC.



Brendan Harrigan, P.Eng.
Director of Government Client Group
bharrigan@dstgroup.com

LIMITATIONS OF REPORT

This report is intended for client use only, as well as the demolition contractor retained directly by the client. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included bulk sampling in select representative areas for laboratory analysis. There is a practical limitation on the number of intrusive test cuts that can be made and the number of samples that can be collected in an occupied building. This requires the investigator to extrapolate observations and analytical results between test cut locations. The uncertainty, and inherent risk, associated with this necessity increases with the distance between sampling locations. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.

Recommendations, when included, are made in good faith and are based on several successful experiences

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

Any comments given in this report on potential remediation problems and possible methods are intended only for the guidance of the designer. The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

Appendix A
Select Photographs

Photo 1: View of lock 47 upper gate, looking northwest. Black, grey, and white paints, located on the wood gates, as well as black paints located on the metal structures, including the railings, were found to be lead containing (DST Samples KM-LP-01, KM-LP-02, and KM-LP-03).

Photo 2: View of concrete blocks and mortar (DST Samples KM-04A-C and KM-01A-C, respectively), located on the eastern portion of lock 47, found to be non-detect for asbestos

Photo 3: View of lock 48 upper gates, looking north. Concrete mortar (older) (DST Samples KM-02A-E), non-detect for asbestos, located on the basin walls.

Photo 4: View of lock 46 lower gate, concrete blocks and mortar (newer) (DST Samples KM-03A-C, respectively), non-detect for asbestos, looking north

Photo 5: View of rust staining and debris from overhead rail bridge, located on the upper gate of lock 48 and lower gate of lock 47.

Appendix B
Laboratory Certificates of Analysis

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Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Andree Young

Client PO: Kingston Mills
Project: GV OT 28212
Custody:

Report Date: 10-Mar-2017
Order Date: 6-Mar-2017

Order #: 1710078

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

Paracel ID	Client ID
1710078-01	KM-01A (Mortar)
1710078-02	KM-01B (Mortar)
1710078-03	KM-01C (Mortar)
1710078-04	KM-02A (Mortar)
1710078-05	KM-02B (Mortar)
1710078-06	KM-02C (Mortar)
1710078-07	KM-02D (Mortar)
1710078-08	KM-02E (Mortar)
1710078-09	KM-03A (Concrete Block)
1710078-10	KM-03B (Concrete Block)
1710078-11	KM-03C (Concrete Block)
1710078-12	KM-03A (Mortar)
1710078-13	KM-03B (Mortar)
1710078-14	KM-04A (Mortar)
1710078-15	KM-04B (Mortar)
1710078-16	KM-04C (Mortar)

Approved By:

Heather S.H. McGregor, BSc
Laboratory Director - Microbiology

PARACEL LABORATORIES LTD.

Order #: 1710078

Certificate of Analysis

Client: DST Consulting Engineers Inc. (Ottawa)

Client PO: Kingston Mills

Report Date: 10-Mar-2017

Order Date: 6-Mar-2017

Project Description: GV OT 28212

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1710078-01	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-01A (Mortar)	
						Non-Fibers	100
1710078-02	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-01B (Mortar)	
						Non-Fibers	100
1710078-03	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-01C (Mortar)	
						Non-Fibers	100
1710078-04	28-Feb-17	sample homogenized	Grey	Mortar	Yes	Client ID: KM-02A (Mortar) [AS-PT]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1710078-05	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-02B (Mortar)	
						Non-Fibers	100
1710078-06	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-02C (Mortar)	
						Non-Fibers	100
1710078-07	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-02D (Mortar)	
						Non-Fibers	100
1710078-08	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-02E (Mortar)	
						Non-Fibers	100
1710078-09	28-Feb-17	sample homogenized	Grey	Concrete	Yes	Client ID: KM-03A (Concrete Block) [AS-PT]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1710078-10	28-Feb-17	sample homogenized	Grey	Concrete	No	Client ID: KM-03B (Concrete Block)	
						Non-Fibers	100
1710078-11	28-Feb-17	sample homogenized	Grey	Concrete	No	Client ID: KM-03C (Concrete Block)	
						Non-Fibers	100
1710078-12	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-03A (Mortar)	
						Non-Fibers	100
1710078-13	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-03B (Mortar)	
						Non-Fibers	100
1710078-14	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-04A (Mortar)	
						Non-Fibers	100
1710078-15	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-04B (Mortar)	
						Non-Fibers	100
1710078-16	28-Feb-17	sample homogenized	Grey	Mortar	No	Client ID: KM-04C (Mortar)	
						Non-Fibers	100

Certificate of Analysis

Client: DST Consulting Engineers Inc. (Ottawa)

Client PO: Kingston Mills

Report Date: 10-Mar-2017

Order Date: 6-Mar-2017

Project Description: GV OT 28212

**** Analytes in bold indicate asbestos mineral content.**

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	2 - Ottawa West Lab	200812-0	10-Mar-17

** Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.*

Qualifier Notes

Sample Qualifiers :

AS-PT: Asbestos quantitation by PLM Point Count method.

ASTrc: Trace asbestos was observed below the noted detection limit but could not be accurately quantified.

Work Order Revisions / Comments

None

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Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: DST	Project Reference: GVOT28212 - Kingston Mills	**Turnaround Time:**	
Contact Name: Andree Young	Quote #:	☐ Immediate	☐ 1 Day
Address: 2150 Thurston Dr	PO #:	☐ 4 Hour	☐ 2 Day
	Email Address: dkoning@dstgroup.com	☐ 8 Hour	☐ 3 Day
Telephone: 613-748-1415	ayoung@dstgroup.com		☑ Regular
		Date Required:_____	

ASBESTOS & MOLD ANALYSIS

Matrix: ☐ Air ☑ Bulk ☐ Tape Lift ☐ Swab ☐ Other **Regulatory Guideline:** ☑ ON ☐ QC ☐ AB ☐ SK ☐ Other:____

Analyses: ☐ Microscopic Mold ☐ Culturable Mold ☐ Bacteria GRAM ☐ PCM Asbestos ☐ PLM Asbestos ☐ Chatfield Asbestos ☐ TEM Asbestos

Paracel Order Number: 171078

	Sample ID	Sampling Date	Air Volume (L)	Analysis Required	Asbestos - Bulk: Identify Distinct Building Materials to Be Analyzed * see below	Combine Identified Materials? **see below	Positive Stop?
1	KM-01A-C	Feb 28, 2017		PLM	New Mortar (South Side)	☐	☑
2	KM-02A-E	↓		↓	Old Mortar	☐	☑
3	KM03A-C				Concrete Blocks with Mortar	☐	☑
4	KM-04A-C				New Concrete blocks (South Side)	☐	☑
5						☐	☐
6						☐	☐
7						☐	☐
8						☐	☐
9						☐	☐
10						☐	☐
11						☐	☐
12						☐	☐

* If left blank, Paracel will analyze all materials identified during analysis ** If left blank, Paracel will analyze all materials as individual samples (**at additional cost**) per EPA 600/R -93/116

Comments:

Method of Delivery: Walk in

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Andree Young	DBloom		
Date/Time: March 09, 2017	Date/Time: March 10 17 12:28	Date/Time: 03/10/17 1:40pm	Date/Time: 05/10/17 3:37pm

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Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Andree Young

Client PO: Kingston Mills
Project: GV OT 028212
Custody:

Report Date: 7-Mar-2017
Order Date: 6-Mar-2017

Order #: 1710049

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

Paracel ID	Client ID
1710049-01	KM-LP-01
1710049-02	KM-LP-02
1710049-03	KM-LP-03

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: DST Consulting Engineers Inc. (Ottawa)
Client PO: Kingston Mills

Report Date: 07-Mar-2017
Order Date: 6-Mar-2017
Project Description: GV OT 028212

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-OES	based on MOE E3470, ICP-OES	7-Mar-17	7-Mar-17

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Certificate of Analysis
Client: DST Consulting Engineers Inc. (Ottawa)
Client PO: Kingston Mills

Report Date: 07-Mar-2017
Order Date: 6-Mar-2017
Project Description: GV OT 028212

Sample Results

Lead

Matrix: Paint
Sample Date: 28-Feb-17

Paracel ID	Client ID	Units	MDL	Result
1710049-01	KM-LP-01	ppm	20	1080
1710049-02	KM-LP-02	ppm	20	105
1710049-03	KM-LP-03	ppm	20	260

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	**ND**	**20**	**ppm**						
Matrix Duplicate									
Lead	**83.5**	**20**	**ppm**	**67.4**			**21.4**	**30**	
Matrix Spike									
Lead	267		ug/L	33.7	93.4	70-130			

Paracel ID: 1710049

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Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: DST	Project Reference: GVOT028212 - Kingston Mills
Contact Name: Andree Young	Quote #
Address: 2150 Thurston Dr	PO #
Telephone: 613-748-1415	Email Address: dkoning@dstgroup.com ayoung@dstgroup.com

Turnaround Time:
☐1 Day ☐3 Day
☐2 Day ☑Regular
Date Required: _____

Criteria: ☐O. Reg. 153/04 (As Amended) Table __ ☐RSC Filing ☐O. Reg. 558/00 ☐PWQO ☐CCME ☐SUB (Storm) ☐SUB (Sanitary) Municipality: _____ ☐Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number:
1710049 - Paint
1710052 - other

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	LEAD (PPM)	CREOSOTE	ARSENIC				
1	KM-LP-01	P			FEB 28, 2017	130pm	☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
2	KM-LP-02	P			↓	↓	☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
3	KM-LP-03	P					☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
4	KM-Wood-01	O		1			☐	☐	☐	☐	☐	☐	☐	☐	✓	✓	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

→250 ml ea

Comments:

Method of Delivery: Walk in

Relinquished By (Sign):	Received by Driver/Depot: DROP OFF	Received at Lab:	Verified By: Rachel Subject
Relinquished By (Print): Andree Young	Date/Time: MAR 06, 17 12:28	Date/Time:	Date/Time: MAR 6/17
Date/Time: March 06, 2017	Temperature: _____ °C	Temperature: _____ °C	pH Verified ☒ By: N/A 1:21

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Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Andree Young

Client PO: Kingston Mills
Project: GV OT 028212
Custody:

Report Date: 10-Mar-2017
Order Date: 6-Mar-2017

Order #: 1710052

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

Paracel ID	Client ID
1710052-01	KM-Wood-01

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: DST Consulting Engineers Inc. (Ottawa)
Client PO: Kingston Mills

Report Date: 10-Mar-2017
Order Date: 6-Mar-2017
Project Description: GV OT 028212

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	9-Mar-17	9-Mar-17
Solids, %	Gravimetric, calculation	7-Mar-17	7-Mar-17
SVOCs - BNAs, standard scan	based on SW-846 8270	7-Mar-17	8-Mar-17

Certificate of Analysis

Report Date: 10-Mar-2017

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 6-Mar-2017

Client PO: Kingston Mills

Project Description: GV OT 028212

	Client ID:	KM-Wood-01	-	-	-
	Sample Date:	28-Feb-17	-	-	-
	Sample ID:	1710052-01	-	-	-
	MDL/Units	Other	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	100	-	-	-
Metals					
Arsenic	1 ug/g dry	1260	-	-	-
Semi-Volatiles					
1,2,4-Trichlorobenzene	0.1 ug/g dry	<0.1	-	-	-
1-Methylnaphthalene	0.05 ug/g dry	<0.05	-	-	-
2-Methylnaphthalene	0.05 ug/g dry	<0.05	-	-	-
Methylnaphthalene (1&2)	0.05 ug/g dry	<0.05	-	-	-
2,4-Dinitrotoluene	0.1 ug/g dry	<0.1	-	-	-
2,6-Dinitrotoluene	0.1 ug/g dry	<0.1	-	-	-
Dinitrotoluene (2,4 & 2,6)	0.2 ug/g dry	<0.2	-	-	-
2-Chloronaphthalene	0.1 ug/g dry	<0.1	-	-	-
3,3-Dichlorobenzidine	0.1 ug/g dry	<0.1	-	-	-
4-Chloroaniline	0.1 ug/g dry	<0.1	-	-	-
4-Chlorophenylphenylether	0.1 ug/g dry	<0.1	-	-	-
Acenaphthene	0.05 ug/g dry	<0.05	-	-	-
Anthracene	0.05 ug/g dry	0.1	-	-	-
Acenaphthylene	0.05 ug/g dry	<0.05	-	-	-
Benzo [a] anthracene	0.05 ug/g dry	<0.05	-	-	-
Benzo [a] pyrene	0.05 ug/g dry	<0.05	-	-	-
Benzo [b] fluoranthene	0.05 ug/g dry	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/g dry	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/g dry	<0.05	-	-	-
Benzylbutylphthalate	0.1 ug/g dry	0.1	-	-	-
Biphenyl	0.05 ug/g dry	<0.05	-	-	-
bis(2-Chloroethoxy)methane	0.1 ug/g dry	<0.1	-	-	-
Bis(2-chloroethyl)ether	0.1 ug/g dry	<0.1	-	-	-
Bis(2-chloroisopropyl)ether	0.1 ug/g dry	<0.1	-	-	-
Bis(2-ethylhexyl)phthalate	0.1 ug/g dry	3.9	-	-	-
Chrysene	0.05 ug/g dry	<0.05	-	-	-
Diethylphthalate	0.1 ug/g dry	<0.1	-	-	-
Dimethylphthalate	0.1 ug/g dry	<0.1	-	-	-
Dibenzo [a,h] anthracene	0.1 ug/g dry	<0.1	-	-	-
Di-n-butylphthalate	0.1 ug/g dry	<0.1	-	-	-
Di-n-octylphthalate	0.1 ug/g dry	<0.1	-	-	-

Certificate of Analysis

Report Date: 10-Mar-2017

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 6-Mar-2017

Client PO: Kingston Mills

Project Description: GV OT 028212

	Client ID:	KM-Wood-01	-	-	-
	Sample Date:	28-Feb-17	-	-	-
	Sample ID:	1710052-01	-	-	-
	MDL/Units	Other	-	-	-
Fluoranthene	0.05 ug/g dry	0.08	-	-	-
Fluorene	0.05 ug/g dry	<0.05	-	-	-
Hexachlorobenzene	0.1 ug/g dry	<0.1	-	-	-
Hexachloroethane	0.1 ug/g dry	<0.1	-	-	-
Hexachlorobutadiene	0.1 ug/g dry	<0.1	-	-	-
Hexachlorocyclopentadiene	0.1 ug/g dry	<0.1	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/g dry	<0.05	-	-	-
Naphthalene	0.05 ug/g dry	0.07	-	-	-
N-Nitrosodiphenylamine	0.1 ug/g dry	<0.1	-	-	-
Nitrobenzene	0.1 ug/g dry	<0.1	-	-	-
N-Nitroso-di-n-propylamine	0.1 ug/g dry	<0.1	-	-	-
Phenanthrene	0.05 ug/g dry	0.09	-	-	-
Pyrene	0.05 ug/g dry	0.07	-	-	-
2,3,4,5-Tetrachlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,3,4,6-Tetrachlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,3,5,6-Tetrachlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,4,5-Trichlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,4,6-Trichlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,4-Dichlorophenol	0.1 ug/g dry	<0.1	-	-	-
2,4-Dimethylphenol	0.1 ug/g dry	<0.1	-	-	-
2,4-Dinitrophenol	0.1 ug/g dry	<0.1	-	-	-
2-Chlorophenol	0.1 ug/g dry	<0.1	-	-	-
2-Methylphenol	0.1 ug/g dry	<0.1	-	-	-
2-Nitrophenol	0.1 ug/g dry	<0.1	-	-	-
3/4-Methylphenol	0.1 ug/g dry	0.1	-	-	-
4-Chloro-3-methylphenol	0.1 ug/g dry	<0.1	-	-	-
4-Nitrophenol	0.1 ug/g dry	<0.1	-	-	-
Pentachlorophenol	0.1 ug/g dry	<0.1	-	-	-
Phenol	0.1 ug/g dry	<0.1	-	-	-
2-Fluorobiphenyl	Surrogate	56.1%	-	-	-
Nitrobenzene-d5	Surrogate	58.9%	-	-	-
Terphenyl-d14	Surrogate	40.8% [1]	-	-	-
2,4,6-Tribromophenol	Surrogate	50.8%	-	-	-
2-Fluorophenol	Surrogate	38.5% [1]	-	-	-
Phenol-d6	Surrogate	36.4% [1]	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Arsenic	ND	1	ug/g						
Semi-Volatiles									
1,2,4-Trichlorobenzene	ND	0.1	ug/g						
1-Methylnaphthalene	ND	0.05	ug/g						
2-Methylnaphthalene	ND	0.05	ug/g						
Methylnaphthalene (1&2)	ND	0.05	ug/g						
2,4-Dinitrotoluene	ND	0.1	ug/g						
2,6-Dinitrotoluene	ND	0.1	ug/g						
Dinitrotoluene (2,4 & 2,6)	ND	0.2	ug/g						
2-Chloronaphthalene	ND	0.1	ug/g						
3,3-Dichlorobenzidine	ND	0.1	ug/g						
4-Chloroaniline	ND	0.1	ug/g						
4-Chlorophenylphenylether	ND	0.1	ug/g						
Acenaphthene	ND	0.05	ug/g						
Anthracene	ND	0.05	ug/g						
Acenaphthylene	ND	0.05	ug/g						
Benzo [a] anthracene	ND	0.05	ug/g						
Benzo [a] pyrene	ND	0.05	ug/g						
Benzo [b] fluoranthene	ND	0.05	ug/g						
Benzo [g,h,i] perylene	ND	0.05	ug/g						
Benzo [k] fluoranthene	ND	0.05	ug/g						
Benzylbutylphthalate	ND	0.1	ug/g						
Biphenyl	ND	0.05	ug/g						
bis(2-Chloroethoxy)methane	ND	0.1	ug/g						
Bis(2-chloroethyl)ether	ND	0.1	ug/g						
Bis(2-chloroisopropyl)ether	ND	0.1	ug/g						
Bis(2-ethylhexyl)phthalate	ND	0.1	ug/g						
Chrysene	ND	0.05	ug/g						
Diethylphthalate	ND	0.1	ug/g						
Dimethylphthalate	ND	0.1	ug/g						
Dibenzo [a,h] anthracene	ND	0.1	ug/g						
Di-n-butylphthalate	ND	0.1	ug/g						
Di-n-octylphthalate	ND	0.1	ug/g						
Fluoranthene	ND	0.05	ug/g						
Fluorene	ND	0.05	ug/g						
Hexachlorobenzene	ND	0.1	ug/g						
Hexachloroethane	ND	0.1	ug/g						
Hexachlorobutadiene	ND	0.1	ug/g						
Hexachlorocyclopentadiene	ND	0.1	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/g						
Naphthalene	ND	0.05	ug/g						
N-Nitrosodiphenylamine	ND	0.1	ug/g						
Nitrobenzene	ND	0.1	ug/g						
N-Nitroso-di-n-propylamine	ND	0.1	ug/g						
Phenanthrene	ND	0.05	ug/g						
Pyrene	ND	0.05	ug/g						
2,3,4,5-Tetrachlorophenol	ND	0.1	ug/g						
2,3,4,6-Tetrachlorophenol	ND	0.1	ug/g						
2,3,5,6-Tetrachlorophenol	ND	0.1	ug/g						
2,4,5-Trichlorophenol	ND	0.1	ug/g						
2,4,6-Trichlorophenol	ND	0.1	ug/g						
2,4-Dichlorophenol	ND	0.1	ug/g						
2,4-Dimethylphenol	ND	0.1	ug/g						
2,4-Dinitrophenol	ND	0.1	ug/g						
2-Chlorophenol	ND	0.1	ug/g						
2-Methylphenol	ND	0.1	ug/g						
2-Nitrophenol	ND	0.1	ug/g						
3/4-Methylphenol	ND	0.1	ug/g						
4-Chloro-3-methylphenol	ND	0.1	ug/g						
4-Nitrophenol	ND	0.1	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Pentachlorophenol	ND	0.1	ug/g						
Phenol	ND	0.1	ug/g						
Surrogate: 2-Fluorobiphenyl	*0.463*		*ug/g*		*69.4*	*42.1-125*			
Surrogate: Nitrobenzene-d5	*0.606*		*ug/g*		*90.8*	*52.8-125*			
Surrogate: Terphenyl-d14	*0.520*		*ug/g*		*78.0*	*75-125*			
Surrogate: 2,4,6-Tribromophenol	*0.633*		*ug/g*		*47.5*	*44.1-125*			
Surrogate: 2-Fluorophenol	*0.898*		*ug/g*		*67.4*	*42.1-125*			
Surrogate: Phenol-d6	*0.892*		*ug/g*		*66.9*	*76-125*			*S-GC*

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Arsenic	6510	10	ug/g dry	5630			14.6	30	
Physical Characteristics									
% Solids	93.0	0.1	% by Wt.	92.9			0.1	25	
Semi-Volatiles									
1,2,4-Trichlorobenzene	ND	0.1	ug/g dry	ND			0.0	200	
1-Methylnaphthalene	ND	0.05	ug/g dry	ND			0.0	200	
2-Methylnaphthalene	ND	0.05	ug/g dry	ND			0.0	200	
2,4-Dinitrotoluene	ND	0.1	ug/g dry	ND			0.0	200	
2,6-Dinitrotoluene	ND	0.1	ug/g dry	ND			0.0	200	
2-Chloronaphthalene	ND	0.1	ug/g dry	ND			0.0	40	
3,3-Dichlorobenzidine	ND	0.1	ug/g dry	ND				200	
4-Chloroaniline	ND	0.1	ug/g dry	ND			0.0	200	
Acenaphthene	ND	0.05	ug/g dry	ND			0.0	200	
Anthracene	ND	0.05	ug/g dry	0.10			0.0	200	
Acenaphthylene	ND	0.05	ug/g dry	ND			0.0	200	
Benzo [a] anthracene	ND	0.05	ug/g dry	ND			0.0	200	
Benzo [a] pyrene	ND	0.05	ug/g dry	ND			0.0	200	
Benzo [b] fluoranthene	ND	0.05	ug/g dry	ND			0.0	200	
Benzo [g,h,i] perylene	ND	0.05	ug/g dry	ND			0.0	200	
Benzo [k] fluoranthene	ND	0.05	ug/g dry	ND			0.0	200	
Bis(2-chloroethyl)ether	ND	0.1	ug/g dry	ND			0.0	200	
Bis(2-chloroisopropyl)ether	ND	0.1	ug/g dry	ND			0.0	200	
Bis(2-ethylhexyl)phthalate	0.98	0.1	ug/g dry	3.91			120.0	200	
Chrysene	ND	0.05	ug/g dry	ND			0.0	200	
Diethylphthalate	ND	0.1	ug/g dry	ND			0.0	200	
Dimethylphthalate	ND	0.1	ug/g dry	ND			0.0	200	
Dibenzo [a,h] anthracene	ND	0.1	ug/g dry	ND			0.0	200	
Fluoranthene	0.05	0.05	ug/g dry	0.08			41.8	200	
Fluorene	ND	0.05	ug/g dry	ND			0.0	200	
Hexachlorobenzene	ND	0.1	ug/g dry	ND			0.0	200	
Hexachloroethane	ND	0.1	ug/g dry	ND				200	
Hexachlorobutadiene	ND	0.1	ug/g dry	ND			0.0	200	
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/g dry	ND			0.0	200	
Naphthalene	0.07	0.05	ug/g dry	0.07			2.2	200	
Phenanthrene	0.07	0.05	ug/g dry	0.09			28.2	200	
Pyrene	ND	0.05	ug/g dry	0.07			0.0	200	
2,3,4,6-Tetrachlorophenol	ND	0.1	ug/g dry	ND			0.0	200	
2,3,5,6-Tetrachlorophenol	ND	0.1	ug/g dry	ND			0.0	50	
2,4,5-Trichlorophenol	ND	0.1	ug/g dry	ND			0.0	200	
2,4,6-Trichlorophenol	ND	0.1	ug/g dry	ND			0.0	200	
2,4-Dichlorophenol	ND	0.1	ug/g dry	ND			0.0	200	
2,4-Dimethylphenol	ND	0.1	ug/g dry	ND			0.0	200	
2,4-Dinitrophenol	ND	0.1	ug/g dry	ND				200	
2-Chlorophenol	ND	0.1	ug/g dry	ND				200	
2-Methylphenol	ND	0.1	ug/g dry	ND			0.0	200	
2-Nitrophenol	ND	0.1	ug/g dry	ND			0.0	200	
3/4-Methylphenol	0.16	0.1	ug/g dry	0.15			9.8	200	
4-Chloro-3-methylphenol	ND	0.1	ug/g dry	ND			0.0	200	
4-Nitrophenol	ND	0.1	ug/g dry	ND			0.0	200	
Pentachlorophenol	ND	0.1	ug/g dry	ND			0.0	200	
Phenol	ND	0.1	ug/g dry	ND				200	
Surrogate: 2-Fluorobiphenyl	*0.568*		*ug/g dry*		*56.8*	*42.1-125*			
Surrogate: Nitrobenzene-d5	*0.692*		*ug/g dry*		*69.2*	*52.8-125*			
Surrogate: Terphenyl-d14	*0.401*		*ug/g dry*		*40.1*	*75-125*			*S-04*
Surrogate: 2,4,6-Tribromophenol	*1.18*		*ug/g dry*		*58.9*	*44.1-125*			
Surrogate: 2-Fluorophenol	*1.05*		*ug/g dry*		*52.4*	*42.1-125*			
Surrogate: Phenol-d6	*1.06*		*ug/g dry*		*53.0*	*76-125*			*S-04*

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Arsenic	50.6		ug/L		101	70-130			
Semi-Volatiles									
1,2,4-Trichlorobenzene	0.21	0.1	ug/g		61.6	50-140			
1-Methylnaphthalene	0.22	0.05	ug/g		64.8	50-140			
2-Methylnaphthalene	0.17	0.05	ug/g		50.0	50-140			
2,4-Dinitrotoluene	0.22	0.1	ug/g		66.0	50-140			
2,6-Dinitrotoluene	0.22	0.1	ug/g		65.2	50-140			
2-Chloronaphthalene	0.23	0.1	ug/g		67.9	50-140			
4-Chloroaniline	0.18	0.1	ug/g		54.7	30-130			
Acenaphthene	0.20	0.05	ug/g		61.4	50-140			
Anthracene	0.22	0.05	ug/g		64.5	50-140			
Acenaphthylene	0.26	0.05	ug/g		76.9	50-140			
Benzo [a] anthracene	0.28	0.05	ug/g		83.0	50-140			
Benzo [a] pyrene	0.31	0.05	ug/g		92.0	50-140			
Benzo [b] fluoranthene	0.25	0.05	ug/g		75.3	50-140			
Benzo [g,h,i] perylene	0.26	0.05	ug/g		79.1	50-140			
Benzo [k] fluoranthene	0.23	0.05	ug/g		68.4	50-140			
Bis(2-chloroethyl)ether	0.21	0.1	ug/g		63.0	50-140			
Bis(2-chloroisopropyl)ether	0.25	0.1	ug/g		73.9	50-140			
Bis(2-ethylhexyl)phthalate	0.24	0.1	ug/g		71.3	50-140			
Chrysene	0.26	0.05	ug/g		78.2	50-140			
Diethylphthalate	0.20	0.1	ug/g		59.8	50-140			
Dimethylphthalate	0.21	0.1	ug/g		62.2	50-140			
Fluoranthene	0.24	0.05	ug/g		73.0	50-140			
Fluorene	0.23	0.05	ug/g		69.2	50-140			
Hexachlorobenzene	0.26	0.1	ug/g		76.8	50-140			
Hexachlorobutadiene	0.19	0.1	ug/g		56.7	50-140			
Indeno [1,2,3-cd] pyrene	0.24	0.05	ug/g		71.7	50-140			
Naphthalene	0.20	0.05	ug/g		59.7	50-140			
Phenanthrene	0.22	0.05	ug/g		65.6	50-140			
Pyrene	0.24	0.05	ug/g		72.3	50-140			
2,4,5-Trichlorophenol	0.23	0.1	ug/g		68.0	50-140			
2,4-Dichlorophenol	0.19	0.1	ug/g		56.0	50-140			
2,4-Dimethylphenol	0.23	0.1	ug/g		69.6	30-130			
2-Chlorophenol	0.18	0.1	ug/g		55.0	50-140			
2-Methylphenol	0.22	0.1	ug/g		67.2	50-140			
2-Nitrophenol	0.18	0.1	ug/g		53.0	50-140			
3/4-Methylphenol	0.22	0.1	ug/g		67.4	50-140			
4-Chloro-3-methylphenol	0.23	0.1	ug/g		67.9	50-140			
Phenol	0.23	0.1	ug/g		68.5	30-130			
Surrogate: 2-Fluorobiphenyl	*0.403*		*ug/g*		*60.4*	*42.1-125*			

Qualifier Notes:

Sample Qualifiers :

1 : The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

QC Qualifiers :

S-04 : The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

S-GC : Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

Paracel ID: 1710052

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e: paracel@paracellabs.com

Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: DST	Project Reference: GVDT028212 - Kingston Mills	**Turnaround Time:**
Contact Name: Andree Young	Quote #	☐1 Day ☐3 Day
Address: 2150 Thurston Dr	PO #	☐2 Day ☑Regular
Telephone: 613-748-1415	Email Address: dkoning@dstgroup.com ayoung@dstgroup.com	Date Required:

Criteria: ☐O. Reg. 153/04 (As Amended) Table __ ☐RSC Filing ☐O. Reg. 558/00 ☐PWQO ☐CCME ☐SUB (Storm) ☐SUB (Sanitary) Municipality: _____ ☐Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1710049 - Paint 1710052 - Other

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	LEAD (PPM)	CREOSOTE	ARSENIC				
1	KM-LP-01	P			FEB 28, 2017	130pm	☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
2	KM-LP-02	P			↓	↓	☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
3	KM-LP-03	P			↓	↓	☐	☐	☐	☐	☐	☐	☐	✓	☐	☐	☐	☐	☐	☐
4	KM-Wood-01	O		1	↓	↓	☐	☐	☐	☐	☐	☐	☐	☐	✓	✓	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

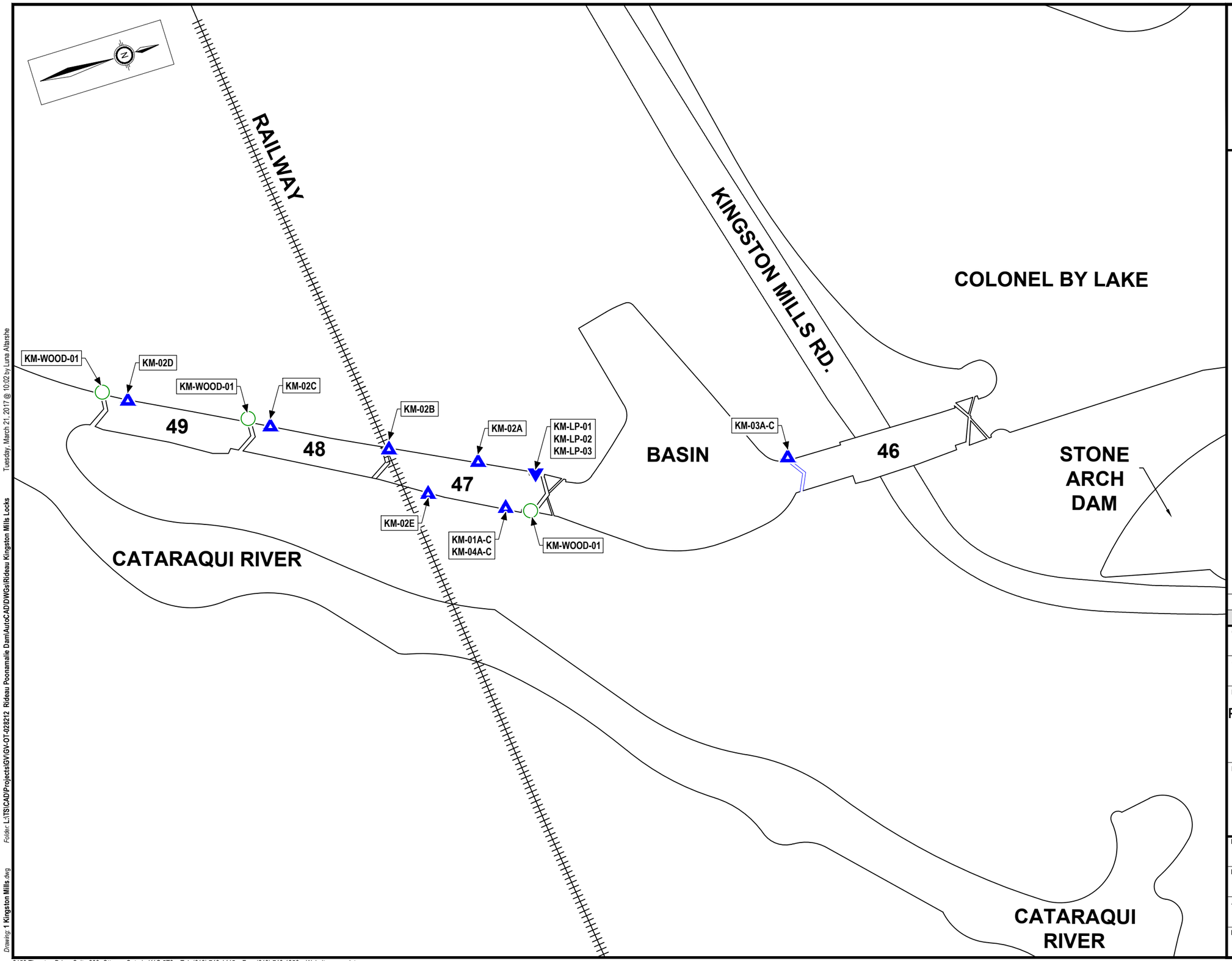
Comments:

Method of Delivery: Walk in

Relinquished By (Sign):	Received by Driver/Depot: Dropped off	Received at Lab:	Verified By: Rachel Sibbett
Relinquished By (Print): Andree Young	Date/Time: March 8, 17 13:30	Date/Time:	Date/Time: Mar 6/17
Date/Time: March 06, 2017	Temperature: ____ °C	Temperature: ____ °C	pH Verified [x] By: N/A 1:21

Chain of Custody (Env) - Rev 0.7 Feb. 2016

Appendix C
Site Plan



Notes

1. This drawing shall be read in conjunction with the associated technical report.
2. Do not scale drawing.

Legend

- Approximate asbestos sample location
- Approximate lead sample location
- Approximate creosote/arsenic sample location (composite)

Revision	Date	Issue	Approval
A	06/03/17	Preliminary	B.H.

Client: PWGSC

Site: Kingston Mills Lock 46-49, Kingston, ON

Report Title: Project Specific Designated Substance & Hazardous Material Survey
Rideau Canal Rehabilitation / Repairs

Drawing Title: Rideau Kingston Mills Locks Rehabilitation

Designed By	Scale
A.Y.	Not To Scale
Drawn By	**Date**
L.A.	March 2017
Approved By	**Project No.**
B.H.	GV-OT-028212

Figure No. 1

DRAFT

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