SPECIFICATIONS

OPERATIONS ZONE REDEVELOPMENT
PHASE 1A BUILDING DEMOLITION AND SITE REMOVALS

Date: 30 September 2015

Issued for Tender

TABLE OF CONTENTS

Pages

Division 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

Division 01 - GENERAL REQUIREMENTS

Division 02 - EXISTING CONDITIONS

Division 21 – FIRE SUPPRESSION

Division 26 - ELECTRICAL

Division 32 - EXTERIOR IMPROVEMENTS

Appendix 1

Appendix 2

END OF TABLE

Part 1 General

1.1 WASTE MANAGEMENT

.1 Include all information requested for Reuse, Recycling, Qualitative Reuse Evaluation, Project Management and Methodology, and Waste Management System Prior of this Section.

.2 NCC's Waste Management Goal is 70 percent of total Project Waste to be diverted from landfill sites. NCC will likely look to retain some older wood and old dimensional lumber and this is to be considered in the score of 70% as it accounts as reuse.

.3 The WRW shall become part of the contract. Waste diversion performance must meet the forecasted percentages of reuse and recycling itemized in the WRW.

.4 Accomplish maximum control of solid construction waste.

.5 Preserve environment and prevent pollution and environment damage.

.6 The NCC staff may remove operational heating equipment (i.e. new boilers, tanks) prior to the building deconstruction / demolition program.

.7 The removal of the old wood and/or stone may require manual deconstruction to maintain the integrity of the material. Refer to the architectural drawings A1.1, A 2.0, and A 2.1 and specification 01 74 21 for a description of the wood elements to be salvaged and returned to the NCC. The specific wood elements to be salvaged shall be also identified on site during the mandatory site visit. During the salvaging process, the Contractor shall coordinate with the NCC representative.

.8 Waste / material piles on site to be kept to a minimum due to site constraints. Large scale material separation to occur off site.

1.2 RELATED SECTIONS

.1 00 01 00 Instructions to Bidders

.2 01 74 21 Construction/Demolition Waste Management and Disposal

1.3 REUSE

.1 Reuse applies to removal of material from the site for the reuse in other facilities in both the intact original form and as a component of constituent structures.

.2 The evaluation score for reuse is based on the percentage of material reused, relative to the overall quantity of material produced during the project. The percentage of material reused is converted to a score as shown in Table 1. A full score of 35 is achieved by resuming 100% of the material generated during the course of the project.

.3 The reuse category carries a greater relative weighting than the recycling category to reflect the environmental advantages of reuse (energy conservation, social benefits, etc. and the order of precedence of the 3Rs' protocol; Reduce, Reuse and Recycle.

.4 The verification of the percentage of reuse subsequent to project commencement will be performed by analysis of data obtained as per the submittal requirements as provided in this Section.

.5 Submission Requirements: On the form provided the Contractor shall:

.1 Clearly identify the percentage of material to be reused relative to the **total amount** of material produced.

.2 Specify details of the proposed method of reuse including:

.1 Name and address of reuse facility.

.2 Specific materials to be re-used.

.3 Method and schedule of material transport.

1.4 RECYCLING

.1 Recycling applies to the transformation of project material into another saleable or otherwise useable product.

.2 Reuse of the crushed concrete / stone on-site as fill materials qualifies as recycled material. Any crushing of material will likely be done off-site as space is restricted.

.3 The NCC may select and keep old wood, at their discretion. Coordinate with the NCC representative.

.4 Provide documentation as required in Section 01 74 21.

.5 The evaluation score for recycling is based on the percentage of material recycled, relative to the overall quantity of material produced during the project. The percentage of material recycled is converted to a score as shown in Table 1. A full score of 25 is given for 100% recycling.

.6 The verification of the percentage of recycle subsequent to project commencement will be performed by analysis of data obtained as per the submittal requirements as provided in this Section.

.7 Submission Requirements: On the form provided the Contractor shall:

.1 Clearly identify the percentage of material to be recycled relative to the **total amount** of material produced.

.2 Specify details of the proposed method of reuse including:

.1 Name and address of recycling facilities.

.2 Source separation plan and tippage schedules.

.3 Specific materials to be recycled.

.4 Method, names of carrier and schedule of material transport.

.5 Site set up details, if on site recycling facilities are utilized.

1.5 QUALITATIVE REUSE EVALUATION

.1 The Qualitative Reuse Evaluation provides an evaluation of the proposed reuse and recycling plan and efforts made to promote reuse over recycling.

.2 The qualitative evaluation will be evaluated on the organization and the clear demonstration of a coordinated plan to maximize **reuse** of materials.

.3 The technical adequacy and application of tracking documentation will also be evaluated.

.4 Submission Requirements: The Contractor shall provide:

.1 The completed Waste Audit Summary Chart indicating forecasted percentages of reuse, recycling and landfill.

.2 A statement of the Contractor's commitment/policy which shall be used to ensure that reuse opportunities are maximized; and

.3 A description of the reporting mechanisms that will be used to track quantities of reuse and recycling to ensure forecasted diversion percentages are met.

1.6 PROJECT MANAGEMENT AND METHODOLOGY

.1 Project management and methodology consists of the manpower, resources and management to meet the project performance and scheduling objectives

.2 This part of the submission must demonstrate that the Contractor's proposed approach and methodology follows an efficient and logistical sequence that will meet the contract requirements. The Contractor must demonstrate that the Contractor has the necessary background and experience to carry out the requirements of this section.

.3 Submission Requirements: On the attached form, the Contractor shall identify:

.1 The project team, schedule, and methods to be used to manage the work.

1.7 WASTE MANAGEMENT SYSTEM

.1 The Waste Management System applied to the proposed method of managing material generated from the demolition. It includes the preparation and implementation of a high recovery demolition/deconstruction plan including all reporting and documentation required.

.2 The WRW should include details regarding selective demolition, the expected composition of waste generated, the strategies employed to minimize waste generation and in turn maximize landfill diversion, dust control, and noise abatement strategies, the specific method of source separation, energy conservation of demolition activities, material management strategies, etc.

.3 Submission Requirement: On the attached form, the Contractor shall provide:

.1 Clear and concise presentation of all information on the attached form.

.2 Only project specific information is requested (Do not submit generic company literature).

.4 The WRW shall be evaluated on the basis of organization, completeness and the clear demonstration of a coordinated plan to manage generated materials. The technical adequacy and application of tracking documentation will be evaluated.

1.8 WASTE REDUCTION WORKPLAN (WRW) EVALUATION MATRIX

.1 The following evaluation matrix will be used in the evaluation of the WRW.

EVALUATION CATEGORY	SCORE
% REUSE	Varies from 0 to 35 as per Table 2
% RECYCLING	Varies from 0 to 25 as per Table 2
QUALITATIVE REUSE	Varies from 0 to 10
PROJECT MANAGEMENT & METHODOLOGY	Varies from 0 to 10
WASTE MANAGEMENT SYSTEM	Varies from 0 to 20
TOTAL	/100

1.9 SCORES FOR REUSE AND RECYCLING

REUSE (%)	SCORE	RECYCLE (%)	SCORE
100	35	100	25
90	32	90	22
80	29	80	19
70	26	70	16
60	23	60	13
50	20	50	10
40	17	40	8
30	14	30	6
20	11	20	4
10	8	10	2
0	0	0	0

1.10 WASTE PROCESSING SITES

.1 The following list of facilities lists local firms for the reuse and recycling of the materials that will be generated on the project.

.2 This list should not be considered exhaustive, nor does NCC support or endorse the services of activities of any of the companies listed herein.

.3 The NCC is not responsible for the accuracy of the list. All this information for the facilities should be verified by the Contractor prior to its use and should not be relied upon to estimate job costing.

.4 All of the phone numbers and contact names are accurate at the time of publication and should be used to verify all information prior to use. For more information regarding the reuse and recycling of used building materials contact: The Building Materials Reuse Association at www.ubma.org or 1-800-990-2671.

Ontario:

1. Appliance Recycling Depot
   66 Colonnade Rd. Ottawa
   Telephone: 613-725-0551

2. WM (Waste Management)
   2383 Carp Rd., Carp
   Telephone: 800-665-1898
   Or
   2301 Carp Rd., Carp
   Telephone: 800-267-7874

3. BFI Navan
   3354 Navan Rd., Orleans
   Telephone: 613-824-7289

4. Drummond Pit Concrete (concrete/no reber)
   3717 Cedarview Rd.
   613-226-4440
   Dave Donohue

5. Wood Source (wood)
   6178 Mitch Owens
   Manotick
   613-822-6800

6. Cohen and Cohen (metal)
   92 Bentley Ave.
   Ottawa
   613-225-9111

7. Habitat for Humanity (light fixtures, kitchen cabinets, trim, shelving, doors)
   2370 Walkley Rd., Ottawa
   613-744-7769

.5

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 WASTE AUDIT -SHOP

Building Component	Concrete		Wood		Metal		Other	
	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)
Shop								
Concrete	0	0	0	0	0	0	0	0
Stone	0	0	0	0	0	0	0	0
Wood	0	0	7.39	3645	0	0	0	0
Framing, cable copper	0	0	0	0	0.12	287	0	0
Floor tile, drywall, roofing, hot water tanks, Vinyl siding, toilets, insulation	0	0	0	0	0	0	26.2	3600
Subtotals	0	0	7.39	3645	0.12	287	26.2	3600
% of Total	0	0	22	48.4	0.3	3.8	77.7	47.7

TOTAL VOLUME = 33.71 m^3
TOTAL WEIGHT = 7,532 kg

3.2 WASTE AUDIT – SHED

Building Component	Concrete		Wood		Metal		Other	
	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)
Shed								
Poured concrete base	15.96	38,304	0	0	0	0	0	0
Stone	0	0	0	0	0	0	0	0
Older dimensional lumber and older wood. **Refer to Section 00 02 00, article 1.1.7**	0	0	1.11	555	0	0	0	0
Wood	0	0	12	6008	0	0	0	0
Framing (steel frame, wires)	0	0	0	0	0.06	495	0	0
Roofing finishes material, garage doors	0	0	0	0	0	0	4.2	1005
Subtotals	15.96	38,304	13.11	6563	0.06	495	4.2	1005
% of Total	47.8	82.6	39.3	1.4	0. 1	1.1	12.6	2.2

TOTAL VOLUME = 33.33 m^3
TOTAL WEIGHT = 46,367 kg

3.3 WASTE AUDIT – Main Building - OFFICES

Building Component	Concrete		Wood		Metal		Other	
	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)
Main Building - Offices								
Poured concrete base	107.6	258,192	0	0	0	0	0	0
Stone	24.4	63,266	0	0	0	0	0	0
Older dimensional lumber and older wood. **Refer to Section 00 02 00, article 1.1.7**	0	0	116.4	58,200	0	0	0	0
Wood (main floor framing, exterior cladding)	0	0	33.3	16,650	0	0	0	0
Steel and metals (beams and OWSJ in garage), posts in basement	0	0	0	0	1.75	11,045	0	0
Drywall, asphalt roof, vinyl tile, carpet, electrical panels, washroom facilities, garage door, hot water tank, insulation	0	0	0	0	0	0	28.9	6644
Subtotals	132	321,458	149.7	74,850	1.75	11,045	28.9	6644
% of Total	42.2	78.4	47.9	18	0.5	2.6	0.09	1.6

Note: Boiler system and associated equipment were not included in these calculations but are likely estimated to exceed 150 kg.

TOTAL VOLUME = 312.3 m^3
TOTAL WEIGHT = 413,997 kg

3.4 WASTE AUDIT – GARAGES

Building Component	Concrete		Wood		Metal		Other	
	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)	Volume (m^3)	Weight (kg)
Garages								
Poured concrete base and foundation	18	43,200	0	0	0	0	0	0
Stone	0	0	0	0	0	0	0	0
Wood(columns / beam / panel / joists) in main floor and attic	0	0	11.35	5,675	0	0	0	0
Wood (basement wood, interior dividing walls exterior walls)	0	0	5.15	2,575	0	0	0	0
Steel and Metals (beam and some cables)	0	0	0	0	0.1	250	0	0
Drywall, asphalt roof, insulation, garage doors, windows	0	0	0	0	0	0	31.7	1790
Subtotals	18	43,200	16.5	8250	0.1	250	31.7	1790
% of Total	27.2	80.76	24.9	15.4	0.1	0.4	47.8	3.3

Note: Estimates on insulation behind wood / drywall are based on suspected insulation being present.

TOTAL VOLUME = 66.2 m^3
TOTAL WEIGHT = 53,490 kg

END OF SECTION

Contractor's Name: _____

_____

1.0 REUSE

(Provide specific details on this page only of the method of Reuse including items outlined in Section 00 02 00 WRW Submission Requirements, Waste Audit and the Project Specifications)

Contractor's Name: _____

_____

2.0 RECYCLING

(Provide specific details on this page only of the method of Recycling including items outlined in Section 00 02 00 WRW Submission Requirements, Waste Audit and the Project Specifications)

Contractor's Name: _____

_____

3.0 QUALITATIVE REUSE EVALUATION

(Complete the Waste Audit Summary Chart and provide brief summary on this page only of the proposed plan to maximize and promote reuse of demolition materials over recycling as per Section 00 02 00 WRW Submission Requirements and the Project Specifications.)

WASTE AUDIT SUMMARY CHART – SHED

Material	Volume (m^3) Weight kg)	% of Total Volume % of Total Weight	Forecast		
			% Reuse	% Recycled	% Landfilled
Concrete	15.96	47.8			
	38,304	82.6			
Stone	0	0			
	0	0			
Older dimensional lumber and older wood.	1.11	3.3			
Refer to Section 00 02 00, article 1.1.7	555	1.1			
Wood	12	36			
	6,008	12.9			
Metals and Steel	0.06	0.1			
	495	1.1			
Other (old tires,plastic)	4.2	12.6			
	1,005	2.2			
Total Volume	**33.33**				
Total Weight	**46,367**				

1. The estimates of the volume and weight are based on a cursory review of the building exterior and based on construction practice assumptions.
2. The % 's are to be filled in as best as possible, based on the Waste Audit information provided.
3. The total % of material reused, recycled and landfilled shall equal 100%. Note that 70% of the project's materials are specified to be diverted from the landfill.

Contractor's Name: _____

_____

WASTE AUDIT SUMMARY CHART – Main Building OFFICES

Material	Volume (m^3) Weight kg)	% of Total Volume % of Total Weight	Forecast		
			% Reuse	% Recycled	% Landfilled
Concrete	107.6	34.4			
	258,192	62.3			
Stone	24.4	7.8			
	63,266	15.2			
Older dimensional lumber and older wood.	116.4	37.3			
Refer to Section 00 02 00, article 1.1.7	58,200	14.1			
Wood	33.3	10.6			
	16,650	4			
Metals and Steel	1.75	0.5			
	11,045	2.6			
Other (old tires,plastic)	28.9	0.09			
	6,644	1.6			
Total Volume	**312.3**				
Total Weight	**413,997**				

1. The estimates of the volume and weight are based on a cursory review of the building exterior and based on construction practice assumptions.
2. The % 's are to be filled in as best as possible, based on the Waste Audit information provided.
3. The total % of material reused, recycled and landfilled shall equal 100%. Note that 70% of the project's materials are specified to be diverted from the landfill.

Contractor's Name: _____

_____

WASTE AUDIT SUMMARY CHART – GARAGES

Material	Volume (m^3) Weight kg)	% of Total Volume % of Total Weight	Forecast		
			% Reuse	% Recycled	% Landfilled
Concrete	18	27.2			
	43,200	80.76			
Stone	0	0			
	0	0			
Wood	11.35	17.2			
	6,675	10.6			
Wood	5.15	7.7			
	2,575	4.8			
Metals and Steel	0.1	0.1			
	250	0.4			
Other (old tires,plastic)	31.7	47.8			
	1790	3.3			
Total Volume	**66.2**				
Total Weight	**53,490**				

1. The estimates of the volume and weight are based on a cursory review of the building exterior and based on construction practice assumptions.
2. The % 's are to be filled in as best as possible, based on the Waste Audit information provided.
3. The total % of material reused, recycled and landfilled shall equal 100%. Note that 70% of the project's materials are specified to be diverted from the landfill.

Contractor's Name: _____

_____

WASTE AUDIT SUMMARY CHART – SHOP

Material	Volume (m^3) Weight kg)	% of Total Volume % of Total Weight	Forecast		
			% Reuse	% Recycled	% Landfilled
Concrete	0	0			
	0	0			
Stone	0	0			
	0	0			
	0	0			
	0	0			
Wood	7.39	22			
	3645	48.4			
Metals and Steel	0.12	0.3			
	287	3.8			
Other (old tires,plastic)	26.2	77.7			
	3600	47.7			
Total Volume	**33.71**				
Total Weight	**7,532**				

1. The estimates of the volume and weight are based on a cursory review of the building exterior and based on construction practice assumptions.
2. The % 's are to be filled in as best as possible, based on the Waste Audit information provided.
3. The total % of material reused, recycled and landfilled shall equal 100%. Note that 70% of the project's materials are specified to be diverted from the landfill.

Contractor's Name: _____

_____

4.0 PROJECT MANAGEMENT AND METHODOLOGY

(Provide a brief summary on this page only of the proposed project management team and methods as per Section 00 02 00 WRW Submission Requirements and the Project Specifications.)

Contractor's Name: _____

_____

5.0 WASTE MANAGEMENT SYSTEM

(Provide a brief summary on this page only of the proposed waste management system as per Section 00 02 00 WRW Submission Requirements and the Project Specifications.)

END OF WASTE REDUCTION WORKPLAN SUBMISSION

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

.1 The work of this contract will take place on a heritage site located in Ottawa, ON and consists of the following scope of work:

i. Demolition of four (4) wood buildings

ii. Removal of designated substances

iii. Removal of contaminated soil;

.2 The work of this contract is described by drawings and specification sections as identified in the Index Sections.

.3 Site Supervisor: Provide competent site supervisor (minimum 10 years of experience), capable of managing the site operations of this Contract on a full-time basis during the duration of the implementation of the work of this Contract at the site.

.4 Site Safety Officer: Appoint a Site Safety Officer responsible for health and site safety for activities and duration of the implementation of the work of this Contract.

1.2 TIME OF START AND COMPLETION

.1 Final Completion for the demolition and abatement is Jan 30th, 2016.

.2 Final Completion for the soil removal is June 15th 2016.

1.3 PRE-CONTRACT AWARD CONDITIONS

.1 Prior to the award of Contract, the Contractor must submit within 10 days of receiving the letter of notification: a site specific health and safety plan, corporate health and safety policy, and all other documents required by the letter of notification (Performance and Labour & Material bonds, insurance certificate, WSIB certificate), and information required for security access application.

.2 If the requested documentation is not received within 10 business days of receiving the letter of notification, the NCC reserves the right to proceed on to the next lowest compliant bidder.

1.4 ADDENDA

.1 Answers to questions directed to the NCC Representative and all amendments to the drawings or specifications during the tender period shall be issued in the form of Addenda.

.2 Addenda form part of the Contract Documents.

PART 2 ON-SITE ACTIVITIES

2.1 OCCUPANCY and USERS of the SITE

.1 The site & surrounding buildings shall remain occupied during implementation of the work of this contract.

.2 Coordinate and cooperate with NCC so as to minimize conflict and impacts to other activities in building.

.3 Specific to the Work Area:

.1 Contractor access to the work area will be from the gate entrance only.

2.2 BUILDING/SITE SERVICES

.1 Services for this Contract: Existing and available services required for the work may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing loads. Connect, use and disconnect at own expense and responsibility. The following itemizes availability of site services:
   .1 Water and electrical service are available.
   .2 The Contractor is to arrange and supply required services above and beyond what is available, in order to carry out work of this contract within the time period specified. Any such arrangements shall be at no additional cost to the Contract.
   .3 Provide 14 days' notice to and obtain requisite permissions from the NCC Representative and utility companies of any intended interruption of services. Keep duration of these interruptions to a minimum. These notifications shall be subject to review and acceptance by the NCC Representative.

2.3 **USE OF SITE & FACILITIES**

.1 The Contractor shall arrange with the NCC Representative and site security, a work schedule and procedures for access, deliveries and transportation of materials to and from the work site.

.2 Contractor Facilities: Contractor shall make provision for an administrative and lunch area with adequate lighting, heat, and ventilation for use by the Contractor and sub-contractors workforce.

.3 Communication: Contractor shall ensure provision of telecommunication equipment (i.e. cellular phones, email, etc.) necessary to ensure continuous progress of operations of the work of this contract on site.

.4 Protection and Hoarding, identification of the Designated Work Site Area: the Contractor shall clearly demarcate the work site area by erecting hoarding and/or fencing. Review proposed installations with NCC Representative.

.5 Temporary Barriers and Enclosures for mandatory hoarding around the Work area.
   .1 Erect hoarding indicated and as necessary to protect building occupants, the public, workers and property from injury or damage.

.6 Weather Enclosures
   .1 Provide weathertight closures at openings in floors and roofs where required to protect building components as the work proceeds.
   .2 Design enclosures to withstand wind pressure.

.7 Dust Tight Screens
   .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, building occupants and public.
   .2 Surround, where necessary,all construction zones with required tarps, add negative airs in construction zones, sticky mats at the entrance/exit of construction zones to minimize spread of dirt from contractor boots.
   .3 Maintain and relocate protection until such Work is complete.

.8 Storage: NCC Representative will establish on-site areas for storage of material.

.9 Waste bin shall be permitted in area designated and pre-approved by NCC Representative and shall be planned for minimal duration. Waste containers for potential designated substances shall be in accordance to applicable regulations.

.10 Materials and equipment shall not be permitted to encumber any area outside of the designated work site area unless pre-authorized by NCC Representative.

.11 Execute work with least possible interference or disturbance to the normal use of the site's operations. Confine the Work and operations of employees to limits indicated by Contract Documents and as directed by the NCC Representative. Make arrangements with NCC Representative to facilitate work as stated.

.12 Ventilation
- .1 As required, provide ventilation to prevent accumulation of dust, fumes, mists, vapours, or gases in areas of Work.
- .2 .
- .3 Dispose of exhaust materials in manner that does not contaminate adjacent areas.
- .4 Continue operation of ventilation and exhaust systems for sufficient time after cessation of operations to ensure removal of pollutants.

.13 Temporary Heating
- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Building electrical supply may be used. Ensure capacity is adequate prior to imposing loads. Connect, use and disconnect at own expense and responsibility. Coordinate with NCC Representative. All temporary electricity generator(s) shall be provided by Contractor where required for the work.

.14 Parking: Access and parking on site for contractor's work force and sub-trades shall be as approved by NCC Representative at the start of the work. Parking along the entrance lane is strictly forbidden.

.15 Deliveries to the site shall be within pre-arranged and authorized time frames by NCC Representative with a minimum 24 hours' notice.

.16 Provide for personnel and vehicle access. Maintain safe exiting routes from the site and building at all times.

.17 Waste Disposal: unloading and disposing of waste to and from the work site shall be coordinated with the NCC Representative. It is the responsibility of the Contractor that all site lanes and roads used by the Contractors' vehicles be kept clear of dirt and debris at all times and /or as instructed by the NCC Representative.

.18 The use of a boom trucks or lifts is only allowed after working hours: before 7:00am and after 6:00pm.

.19 Scaffolding may be erected to allow access to the roofs and upper floors. Scaffolding may not be erected along the entrance lane.

.20 Smoking is prohibited within 50 feet of any buildings. A designated smoking area shall be identified by the NCC Representative. The Contractor is to ensure adequate sealed cigarette butt disposal.

.21 Washrooms: The Contractor shall provide his own washroom facilities. Use of water for the project and cleaning of equipment is strictly forbidden from any washrooms.

.22 Location of Utilities: Ensure locates of site services and infrastructures, prior to any work. Where unknown services are encountered, immediately advise the NCC Representative and confirm findings in writing. Stop work immediately upon encountering services suspect of being part of the security infrastructure.

.23 Please follow the guidelines below, to respect adjacent users and functions within site:
- .1 Language and behaviour deemed inappropriate will not be tolerated on site.
- .2 Talk at sound level deemed reasonable.
- .3 Ensure staff and sub-trades dress appropriately while on site. Abstain from wearing profane depiction or graphics on pieces of clothing, equipment or hardhat.

2.4 SIGNAGE

.1 All signage for this project shall be bilingual in French and English.

.2 Proposed wording and signage shall be submitted for review and approval by NCC Representative.

.3 Contractor is to provide warning signage to clearly identify area under construction and access restrictions (protective gear, sign-in, etc.).

.4 No promotion signage will be permitted.

.5 No signage representing supply and installations companies and/or contractors and consultants shall be permitted.

2.5 **CO-OPERATION WITH OTHERS and PUBLIC RELATIONS**

.1 At all times during the design and construction activities of the work of this contract, the Contractor shall permit and facilitate access to the work site to NCC construction services and to NCC contracted consultants for design and implementation phases of this work.

.2 The Contractor may be in contact with users/visitors on site. If interacting with users/visitors to the site, the Contractor shall, at all times, be courteous, helpful and respectful to the users/visitors.

.3 Behaviour, demeanor and conduct at the work site shall be in good practices. Profane language from the Contractor's workforce is not acceptable at the work site.

.4 The Contractor shall at all times during work of this contract, respect traffic regulations of the site.

.5 Co-operate with site operations and maintenance staff and services at all times.

.6 Co-operate with Other Contractors retained for site operations and maintenance services.

2.6 **DAMAGES**

.1 Restore or replace to their original condition existing public and/or privately owned property, structures, finishes, services and/or utilities damaged during the execution of the work of this contract, or make adequate compensation to affected parties.

.2 The terms "restore" and "replace" include labour, equipment and material costs.

2.7 FIRE SAFETY

.1 Provide fire extinguishers to protect the work in progress.

.2 Advise NCC Representative of any work that would impede fire apparatus / personnel response.

.3 Know the location of nearest fire alarm box and telephone, including the emergency phone number.

.4 Observe at all times smoking regulations. Smoking is not allowed in or near the Work. The NCC Representative will designate a smoking area.

2.8 ENVIRONMENTAL PROTECTION

.1 Fires
  .1 Fires and burning of rubbish on site not permitted.

.2 Disposal of Wastes
  .1 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.3 Drainage
  .1 Do not pump water containing suspended materials into waterways, sewer or drainage system.

.4 Tree and Plant Protection
  .1 Protect trees and plants on site.

.5 Pollution Control
- .1 Control emissions from equipment and plant to local authorities emission requirements.
- .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

.6 Spills Reporting
- .1 Prepare an environmental emergency measure plan and post at the place of work indicating:
  - .1 The site's refuelling area.
  - .2 The NCC Environmental Emergency Service telephone number (613) 239-5353. Call immediately in the event of accidental spill of fuel or other pollutant.
- .2 Assume financial responsibility to clean up effects of spill.

2.9 WASTE DISPOSAL

.1 Unless otherwise indicated or specified, materials indicated for removal become the Contractor's property and shall be taken from site.

.2 Dispose of waste materials in accordance with requirements of authorities having jurisdiction and as described in the Contract Documents.

2.10 POWER/EXPLOSIVE ACTUATED FASTENING DEVICES

.1 Do not employ power guns using explosives without prior written permission of NCC Representative.

2.11 PROTECTION OF WORK AND SITE

.1 Protect finished work against damage until take-over.

.2 Protect hard and soft landscaping adjacent to the work form damage unless indicated or described otherwise.

.3 Protect adjacent building spaces and occupants against spread of dust, harmful vapours, hazardous materials and dirt. Use devices and methods that minimize inconvenience and risk to the occupants.

2.12 CUTTING AND PATCHING

.1 Do cutting and patching as indicated and as specified.

.2 In the absence of explicit indication or specification, and as directed by the NCC Representative, do cutting and patching as follows:
- .1 Perform cutting, fitting, and patching to complete the Work.
- .2 Remove and replace defective and non-conforming work that is to form the base or substrate for new work.
- .3 Perform work to avoid damage to other work.
- .4 Prepare surfaces to receive patching and finishing.
- .5 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit, unless indicated otherwise.
- .6 Make cuts with clean, true, smooth edges.

2.13 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures, outlets and distribution systems indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures, outlets and distribution systems to minimize interference between systems, to allow access for maintenance and to maximize the usable space.

.3 Inform the NCC Representative of a conflicting installation. Install as directed

.4 Inform NCC Representative of impending installation and obtain approval for actual location

2.14 **EXISTING SERVICES**

.1 Where work involves disruption of existing services:
- .1 Execute work at times directed by NCC Representative,
- .2 Submit schedule to and obtain approval from NCC Representative for any shutdown or closure of active services,
- .3 Notify NCC Representative at least 14 days before service disruption,
- .4 Adhere to approved schedule.

2.15 **CLEAN-UP**

.1 Provide on-site waste containers for collection of waste materials and debris and locate as directed by NCC Representative. Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.2 At the end of each work period, and more often if directed by the NCC Representative, remove debris from site, neatly stack material for use, and clean up generally. Conduct disposal operations to comply with municipal and site ordinances, anti pollution laws and as required by the Contract Documents.

.3 Upon completion, remove temporary protections installed under this contract and remove surplus materials. Make good defects noted at this stage.

.4 Cleaning during construction
- .1 Clean-up work area as the work progresses in order to prevent migration of dust and debris.
- .2 Clean as directed by the NCC Representative.

.5 Final clean-up
- .1 For site, broom clean hard landscaped surfaces. Rake clean other landscaped areas. Hose down with water and wash hard landscaped surfaces as directed by NCC Representative.
- .2 Broom clean all interiors before inspection process.
- .3 Clean as directed by the NCC Representative.

2.16 **ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

.1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with NCC Representative to facilitate execution of work.

PART 3 CONTRACT ADMINISTRATION

3.1 **CONTRACT DOCUMENTS**

.1 All contract documents are complementary. Items indicated in one and not in the other are deemed to be included in the contract work.

.2 Drawings are intended to convey the scope of work and to indicate general arrangements. Obtain NCC Representative's approval of exact locations before installation.

.3 Obtain direction from NCC Representative before proceeding if a possible obstacle or interference with an indicated installation is identified.

.4 When the Contractor encounters an obstacle or interference that could have been reasonably foreseen and the Contractor failed to obtain direction from the NCC Representative in the matter, the NCC Representative may require that the work of the

Contractor be modified in whole or part in response to the obstacle or interference. The Contractor shall assume the costs of additional work arising from such work.

3.2 CODES, STANDARDS AND CONTRACT DOCUMENT CONFLICTS

.1 Unless otherwise specified or indicated, perform work in accordance with the National Building Code of Canada, current addition, and all applicable provincial or local building codes.

.2 In the instance of a conflict among building codes, referenced standards and contract documents, the more stringent requirement shall apply.

.3 In the instance of a conflict between the Master General Requirements Specification section, and the General Requirements Specification section part of each package, the more stringent requirement shall apply.

3.3 PERMIT, FEES & TAXES

.1 Contractor to pay all permit, fees & taxes properly levied by law Federal, Provincial, Municipal and other regulatory bodies.

.2 Obtain all permits required for the work of this contract Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.

.3 Occupancy permit: The Contractor shall be responsible for obtaining the occupancy permit confirming compliance of the completed Work.

.4 Pay for and obtain certificates of verification from applicable municipal, provincial and federal authorities for Work of this Contract.

.5 Pay for and obtain municipal building permit for all packages except the Basement Abatement package. The NCC shall pay to obtain the municipal building permit for the Basement Abatement package and shall supply a copy to the Contractor.

3.4 **SUBMITTALS**

.1 Administrative

.1 Submit to NCC Representative submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Review submittals and stamp all submittals with Contractor's shop drawing stamp prior to submission to NCC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of the Work and Contract Documents.

.4 Verify field measurements and affected adjacent Work are coordinated.

.2 Shop drawings and product data

.1 "Shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by Contractor to illustrate details of a portion of the Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connection, explanatory notes and other information necessary for completion of Work.

.3 Adjustments made on shop drawings by NCC Representative are not intended to change Contract Price.

.4 Make changes in shop drawings as NCC Representative may require.

.5 Submit one electronic copy in PDF format, unless indicated otherwise, of shop drawings for each requirement requested in specification Sections and as NCC Representative may reasonably request

.6 Submit one electronic copy in PDF format, unless indicated otherwise, of product data sheets or brochures for requirements requested in Specification Sections and as NCC Representative may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.

.3 Samples

.1 Submit for review, samples as requested in respective Specification Sections and as indicated on the drawings.

.2 Deliver samples prepaid to NCC Representative's business address.

3.5 CONTRACT PRICE BREAKDOWN

.1 Within 10 working days following award of this contract, the Contractor shall submit a sample request for payment, identifying the contract price breakdown by activity and/or sub-trade for review and approval.

.2 Approved cost breakdown will be used as basis for progress claim payments.

3.6 **PROJECT MEETINGS**

.1 Administrative

.1 NCC Representative will schedule and administer regular progress meetings throughout the progress of work, at times, frequency and locations set by the NCC Representative.

.2 The NCC Representative will distribute written notice of each meeting in advance of meeting date to Contractor, Consultant, and all other affected parties.

.3 The Contractor shall attend.

.4 The Contractor shall ensure affected Subcontractors attend.

.5 The NCC Representative will record minutes and include significant proceedings and decisions and identify 'action by' parties.

.6 The NCC Representative will reproduce and distribute copies of minutes to meeting participants and affected parties not in attendance.

3.7 **AS-BUILT DRAWINGS**

.1 NCC Representative will provide two sets of white prints for record drawing purposes.

.2 Maintain project record drawings and record accurately all deviations from Contract documents as project progresses. Maintain on-going as-built records on site, ready for inspection during the course of the construction.

.3 Update these drawings daily.

.4 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to NCC Representative.

.5 Provide a cost for the As-Built Drawings in the Contractor cost breakdown.

3.8 **DOCUMENTS REQUIRED ON-SITE**

.1 Maintain at job site, one copy each of following:

.1 Contract drawings,

.2 Specifications,

.3 Addenda,

.4 Change orders,

.5 Other modifications to Contract,

.6 Approved work schedule,

.7 Permits,

.8 Field test reports,

.9 Reviewed shop drawings,

.10 As-built drawings.

3.9 **QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP**

.1 Use only new materials, unless indicated otherwise.

.2 Exceed or meet the minimum requirements of standards referenced in the specifications, such as the Canadian Standards Association (CSA), and the National Building Code of Canada (current edition), and of all applicable federal, provincial, and municipal codes. In the case of conflict or discrepancy between these requirements, the most stringent applies.

.3 Workmanship
- .1 Workmanship shall be best quality, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Employ persons fit for and skilled in their required duties.
- .3 Assume the costs of redoing work that, in the NCC Representative's opinion, does not meet the specified quality of workmanship.

.4 Alternatives
- .1 The NCC Representative will only consider Alternatives
  - .1 for materials, products or processes specified with the term "and/or approved equivalent" applied and;
  - .2 submitted in accordance with the "General Instructions for Tendering".
- .2 The NCC Representative will approve alternatives that are in his opinion equal in material content, workmanship and quality to the materials, products or processes identified and at least conformant to the standards specified.
- .3 Assume the cost of additional work or modifications to the design due to the use of NCC Representative approved alternatives.

3.10 SECURITY CLEARANCE

.1 In accordance with the Security Policy of the Government of Canada, all persons undertaking work or services at the property covered by this contract shall be required to meet the requirements of a Site Access Reliability clearance.

.2 The NCC reserves the right to refuse access to personnel not passing a Site Access Reliability Check.

.3 Unless otherwise indicated, access to the site (employees, deliveries, visitors and pick-ups of materials, etc.) must be coordinated with and approved by NCC Representative.

.4 Reasonable care must be exercised to ensure the security of any material prepared or received in handling this project. No part of this project may be discussed, published, or displayed without the written permission of the NCC.

3.11 **SITE SECURITY**

.1 Provide site security as Contractor deems necessary to ensure protection of Contractor's materials, equipment, and building.

.2 Where security has been reduced by work of the Contract, provide temporary means to maintain security.

.3 Cooperate with NCC and security staff in maintenance of site security.

3.12 **SECURITY AND CONFIDENTIALITY**

.1 Exercise utmost care to ensure the security of any material prepared or received in handling this project.

.2 Without the prior written permission of the NCC Representative, do not distribute, publish, display or reproduce any documents, photographs, site plans, maps or information related to the project (or collected during the project), in any medium, including the internet.

.3 Without the prior written permission of the NCC Representative, do not disclose any documents, photographs, site plans, maps or information related to the project unless such disclosure:

.1 Is reasonably required to obtain necessary permits and approvals to perform the work;

.2 Is reasonably required to facilitate the contracting and performance of sub-contractors, consultants and other parties involved in completing the contracted work;

.3 Is required by law.

.4 When requested by the NCC, return to the NCC all copies of all site photographs and construction documents, site plans and maps related to the project.

.5 All the above restrictions apply to all sub-contracts for work and services related to the project.

3.13 RELICS AND ANTIQUITIES

.1 Protect relics and antiquities, items of historical or scientific interest and similar objects found during the course of work.

.2 Immediately notify NCC Representative of any findings and await NCC Representative's written instructions before proceeding with work adjacent to findings.

.3 If any vestiges of early human occupancy of the land are uncovered during construction, suspend construction activity and notify the NCC Representative.

.4 Relics, antiquities and items of historical or scientific interest shall remain the property of the Crown.

3.14 SCHEDULING OF WORK and RESTRICTIONS

.1 The Contractor shall schedule work activities to prevent and minimize any disruption to the occupants and users of the site. Disruptive work activities and their scheduling shall be done in co-ordination with the NCC Representative and site security

.2 Within 10 working days following notification of intent to award this contract, the Contractor shall submit and review with NCC Representative the sequencing of intended work and activity schedule for approval:

.1 Shop drawings submittals.

.2 Work commencement.

.3 Contractor's on-site mobilization area.

.4 Protection, hoarding and temporary shoring structures.

.5 Installation and delivery of equipment and waste disposal bins.

.6 Deliveries of materials.

.7 Sequencing of and preparation measures for dis-assembly and selective demolition, assembly and construction activities.

.8 Identification of noisy and disruptive activities; identification of service interruptions.

.9 Connection to site infrastructures for water, power, fire and security systems.

.10 Testing and commissioning of components and systems.

.11 Exterior landscaping.

.3 The Contractor shall submit to the NCC Representative for review the proposed implementation methodology for work of this Contract.

3.15 SCHEDULE

.1 Submit a schedule of work for approval, in a form acceptable to NCC Representative and within ten (10) days of award of contract. Show in schedule dates for:

.1 shop drawing, material lists and samples submissions;
.2 equipment and material delivery;
.3 work commencement and completion for each trade as corresponds to each trade section of the Specification;
.4 Substantial and final completion date within time period required by Contract Documents.

.2 Submit updated schedules at each progress meeting and as reasonably requested by the NCC Representative.

3.16 **HOURS OF WORK / WORK WEEK**

.1 Standard authorised hours of work are Monday to Friday, 07:00 hours to 18:00 hours.

.2 As required, extended hours and weekend work shall be performed by Contractor to ensure work is completed on schedule. The Contract price will not be changed for this work.

.3 Obtain prior permission through NCC Representative for work outside of 07:00h to 18:00h / Monday to Friday time frame. Assume any extra costs for labour, material or equipment associated with work performed outside of the standard authorised time frame unless specifically requested by Owner.

3.17 WORK STOPPAGES, RESTRICTIONS AND INTERRUPTIONS

.1 Work stoppages constitute a request from the NCC Representative for on-site work to be stopped and the vacating of the site's by the Contractor's work forces for a determined period of time. The Contractor shall make provisions for the following work stoppages:

.2 Two(2) separate one (1) day work stoppages with a minimum of 24 hours' notice from Nov. 15, 2015 to January 30, 2016.

.3 Two(2) separate half-day work stoppages with a minimum of 8 hours' notice from Nov. 15 ,2015 to January 30, 2016.

.4 Two(2) separate one (1) day work stoppages with a minimum of 24 hours' notice from April 15, 2016 to June 15th, 2016.

.5 Two(2) separate half-day work stoppages with a minimum of 8 hours' notice from April. 15 2016, to June 15th, 2016.

.6 Include in the contract price for the cost of these work stoppages, restrictions and interruptions.

.7 Substantial Performance and Total Completion dates will not be changed as a result of these work stoppages.

.8 Include for and indicate all the work stoppages in the Contractor prepared schedule.

3.18 **PROJECT COORDINATION**

.1 Coordinate progress of the Work, progress schedules, submittals, use of the site, temporary utilities and construction facilities and controls.

3.19 **SETTING-OUT OF WORK**

.1 Provide devices needed to lay out and carry out the work. Supply such devices as required to facilitate NCC Representative's inspection of work.

3.20 **CO-ORDINATION of the WORK and SUB-TRADES**

.1 Co-ordination of the work: It is the Contractors' responsibility to co-ordinate work to be carried out as identified in the contract documents between all trades.

.2 Should there be discrepancies, conflicts in the instructions of the contract documents and/or conflicts with applicable regulations, the Contractor shall notify the NCC Representative prior to proceeding with implementation of the work and wait for instructions and directions on how to proceed.

.3 Manage the sequencing of the work activities in consideration of health and safety of the work area and adjacent structures and site.

.4 Ensure adequate access and equipment is supplied for work of the contract.

.5 Cut surfaces as required to accommodate work.

.6 Remove, dis-assemble all items so shown or specified. Identify, protect from damage components to be retained for re-installation.

.7 Patch and make good surfaces cut, damaged or disturbed, to NCC Representative's approval. Match existing material, colour, finish and textures unless indicated otherwise.

PART 4 EXECUTION

4.1 **NOT USED**

.1 Not used.

END OF SECTION

Part 1 Summary

1.1 SUMMARY OF WORK

.1 Description of Work:
- .1 Work under this contract covers Phases for the preparation for operation zone redevelopment defined as follows.
- .2 **Phase 1A (Selective Demolition)** work includes, but is not limited to:
  - .1 Garage
  - .2 Storage Shed
  - .3 Shop
  - .4 Site Office
  - .5 Designated substances for building structures.

.2 Contact Method
- .1 Construct Work under single stipulated price contact.

.3 Work covered by Contract Documents:
- .1 Work included in Phase 1A: refer to Division 00 to 32, as identified in drawings and items in Appendix 1.

.4 Project-related Conditions:
- .1 Project Boundaries: Refer to Site Plan A1, Drawing 1/A0.0.
- .2 Hazardous materials: Refer to Appendix 1.

.5 Contractor Use of Premises
- .1 Limit use of premises for Work, for storage, and access to:
  - .1 Confined to areas within contract, as shown on site plan.
  - .2 Co-ordinate access to work area and site with *NCC Representative.*
- .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work, which remain.
- .4 Repair or replace portions of existing work, which have been altered during construction operations to match existing or adjoining work, as directed by *NCC Representative.*
- .5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.2 EXAMINATIONS OF DOCUMENTS AND SITE

.1 Each Tenderer, before submitting their Tender, shall carefully examine the drawings and specifications to establish the extent of the work and should visit and examine the site and fully inform himself/herself of all the existing conditions, limitations and difficulties which may arise and include in his/her Tender the cost of all labour, materials, equipment and services required to complete the Work.

.2 Interpretation
- .1 The *Contract Documents* are complementary and what is required by any one shall be as binding as if required by all.
- .2 Words and abbreviations that have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- .3 All terminology used within these documents identifying Engineer”,

"Architect", "Consultant", "NCC Engineer", etc. shall be replaced by "*NCC Representative*" as defined in the *General Conditions*.

.3 Priority of *Contract Documents*

.1 The priority of documents, from highest to lowest, is:

.1 Addendums
.2 Division 1 of the Specifications,
.3 Appendix 1
.4 Divisions 2 through 07 of the specifications *(included on plans)*
.5 *material* and finishing schedules *(included on plans)*, and
.6 the drawings.

.2 Later dated documents govern over earlier documents of the same type.

.3 Architectural documents govern over structural documents with respect to the location of structural components.

.4 In the event of any discrepancy between one drawing and another, the larger scale drawing shall apply. If an item is shown on a smaller scale Drawing but not on the larger it is part of the Contract. A request to the NCC Representative should be made for approval, if accepted a Site Instruction will be issued.

.5 Architectural and landscape documents govern over mechanical and electrical documents with respect to fixture quantities and locations

.6 Sub-Contractors are responsible to familiarize themselves with the Contract Documents and the work of all trades therein. Sub-Contractors must base their quotations to the General Contractor on a thorough review of the entire contract Drawings and Specifications.

.7 Resolve conflict or discrepancy between the two language versions of the *Contract Documents* as directed by *NCC Representative*.

.4 Site Examination

.1 The NCC will conduct a mandatory job showing of the work to be contracted. Claims for additional compensation will not be entertained for any items of labor or material required to complete the work that could have been reasonably ascertained by the Site Examination.

.5 Subsurface Conditions

.1 Promptly notify *NCC Representative* in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should *NCC Representative* determine that conditions do differ materially; instructions will be issued for changes in Work as provided in Changes and Change Orders.

.6 Addenda

.1 Answers to questions directed to the *NCC Representative* and all amendments to the drawings or specifications during the tender period shall be issued in the form of Addenda to all. Addenda form part of the Contract Documents.

.7 Reasonably foreseeable hidden conditions and interference

.1 Obtain directions from *NCC Representative* before proceeding with work if a substrate or subsurface condition or interference may be reasonably anticipated while not fully described in the *Contract Documents*.

.2 Redo work if directed by *NCC Representative* when such condition or interference is encountered without seeking prior direction from *NCC Representative*. Assume the costs of work required for this reason.

.8 Additional Drawings / Clarifications:
- .1 *NCC Representative* may furnish additional drawings for clarifications. These additional drawings have the same meaning and intent as if they are included with plans referred to in Contract documents.
- .2 Clarifications:
  - .1 Clarifications are issued for the purpose of recording any clarification or interpretation of the contract documents or giving direction on problems resulting from field conditions.
  - .2 Clarifications are subject to the provisions of the contract documents.
  - .3 Should the contractor require a change in contract price or project schedule resulting from a clarification, he shall submit to the *NCC Representative* with 5 days of the date hereof, an itemized proposal. If the proposal is accepted by the NCC Representative, the clarification will be superseded by a change order.

Part 2 Quality Requirements

2.1 REGULATORY REQUIREMENTS

.1 Refer to Section 01 41 00 – Regulatory Requirements.
.2 Building Smoking Environment
- .1 Comply with smoking restrictions. Smoking is not permitted.

2.2 CODES

.1 Perform work in accordance with *National Building Code of Canada (NBC), Ontario Building Code (OBC), CSA B651-12 Accessible Design for the built Environment* and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.

.2 Meet or exceed requirement of:
- .1 Contract Document.
- .2 Specified standards, codes and Referenced documents

.3 Where standards and referenced documents have changed, the most recent version shall apply.

2.3 REFERENCES

.1 Associations/organizations
- .1 CSA: Canadian Standards Association
- .2 FCC: Fire Commissioner of Canada
- .3 HRSDC: Human Resources and Skills Development Canada
- .4 NCC: The National Capital Commission
- .5 NRC: National Research Council of Canada
- .6 ULC: Underwriters Laboratories of Canada

.2 Standards
- .1 ULC-S115: ULC, ULC-S115 (Standard Method of Fire Tests of Firestop Systems)
- .2 NBC: NRC, National Building Code (2005)
- .3 NBC Part 8: NRC, National Building Code (2005), Part 8 (Construction Safety Measures)

.4 WHMIS: HRSDC, Workplace Hazardous Materials Information System
.5 FC 301: FCC, FC 301 (Standard for Construction Operations)
.6 FC 302: FCC, FC 302 (Welding and Cutting Operations)
.7 Ontario Building Code (OBC) 2012
.8 CSA B651-12 Accessible Design for the Build Environment.

2.4 QUALITY CONTROL

.1 Refer to Section 01 45 00 – Quality Control.

Part 3 Price and payment procedures

3.1 PAYMENT PROCEDURES

.1 Schedule of values
- .1 Submit a schedule of values:
  - .1 within five (5) days of contract award,
  - .2 with every progress claim, and
  - .3 as specified and directed by *NCC Representative*.
- .2 Include the following items, and other items as directed by *NCC Representative*:
  - .1 mobilization costs,
  - .2 individual fees, permits and licenses under GC 14,
  - .3 as-built records,
  - .4 work under individual trade sections of the specification, and
  - .5 change orders.
- .3 Update schedule and include current value of work performed for each line item for each schedule submission.
- .4 Obtain *NCC Representative* 's approval of schedule prior to first progress claim.
- .5 Use approved schedule as basis for progress claims.
- .6 Schedule of Values to follow the following format.

Item: Spec Section	Description of work	Contract value	% to Date	$$$ to date	%Previous	$ Previous	% This Claim	$ This Claim	Balance to complete

- .7 <u>The Cost will include a price of $3000.00 for construction progress documentations and as built drawings.</u> No progress claim can be made for this amount prior to total completion of construction progress documentations and as built drawings.

.2 Progress Claim Invoice
- .1 Make application for payment on account as monthly as work progresses.
- .2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.
- .3 Progress claim Invoice will contain the following information.
  - .1 Project description and NCC project number.
  - .2 "Progress billing for Period Ending" "MM/DD/YYYY"
  - .3 Amounts showing:
    - .1 ($$$) Total Progress This Period
    - .2 % Holdback on Progress this period
    - .3 ($$$) Subtotal (Total progress minus holdback)
    - .4 ($$$) HST

.5 ($$$) Total Payable this period

.4 Statutory Declaration

.1 The Contractor or supplier shall submit, with the 2nd and each subsequent progress payment claim, Statutory Declaration that indicates persons, organizations, suppliers and Sub-trades required to be paid have been paid.

.3 Payment Procedures for Testing Laboratory Services

.1 *NCC Representative* appoint and pay for services of testing laboratory expect follows:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.

.4 Mill tests and certificates of compliance.

.5 Tests specified to be carried out by Contractor under supervision of NCC Representative.

.6 Additional tests specified as requested.

.2 Contractor Responsibilities

.1 Provide labour, equipment and facilities to:

.1 Provide access to Work for inspection and testing.

.2 Facilitate inspections and tests.

.3 Make good Work disturbed by inspection and test.

.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify NCC Representative 72 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by *NCC Representative*.

Part 4 Administrative requirements

4.1 PROJECT MANAGEMENT AND COORDINATION

.1 Meetings

.1 Mobilization meeting

.1 Organize and conduct mobilization meeting within ten (10) days of *Contract* award, to be attended by *Contractor*, major subcontractor(s) and *NCC Representative(s)*.

.2 Review specified post-contract award submittals including schedules, security procedures and provisions for site access.

.3 Commence work only AFTER submittals, security procedures and provisions for site access have been confirmed and approved by *NCC Representative*.

.2 Progress meetings:

.1 Organize and conduct meetings, to be attended by *Contractor*, major subcontractor(s) and *NCC Representative*, as directed by *NCC Representative(s)*.

.2 Provide physical space and make arrangements for meetings.
.3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 days after meeting.
.4 Agenda to include the following:
.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting.
.3 Field observations, problems, conflicts.
.4 Problems which impede construction schedule.
.5 Review of off-site fabrication delivery schedules.
.6 Corrective measures and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for affect on construction schedule and on completion date.
.12 Other business.

.3 Maintain one copy each of the following at the job site:
.1 *Contract Documents*,
.2 site instructions,
.3 permits, licenses and inspection reports,
.4 reviewed copies of submittals, and
.5 construction progress documentation.
.6 Site Specific Safety Plan including emergency procedures.

.4 Execute work with least possible disruption to the normal use of premises.

.5 Service interruptions
.1 Notify *NCC Representative* and utility authorities 72-hours in advance of intended services interruptions
.2 Obtain required approvals, permits and inspections from utility authorities.
.3 Minimize duration of interruptions.
.4 Schedule interruptions outside standard hours of work coordinate with the NCC Representative.

4.2 CONSTRUCTION PROGRESS DOCUMENTATION

.1 Construction schedule
.1 Submit schedule to *NCC Representative* within five (5) days of contract award, showing schedule with project milestones with anticipated progress stages and final completion of work within time provide by contract documents in coloured Gantt chart formatted in computer project software.
.1 Microsoft Project
.2 Open Project
.3 Or approved equal.
.2 Include dates for following, other items as directed by *NCC Representative*:
.1 site mobilization,
.2 Submission of shop drawings, material list and samples.
.3 major equipment and *material* deliveries,
.4 commencement and completion of work in each specification trade section, and
.5 completion date within time required by *Contract Documents*.
.3 Interim review of work progress based on work schedule will be conducted as decided by *NCC Representative* and schedule update by Contractor in conjunction with and to approval of *NCC Representative*.

.2 As-built records
- .1 Maintain precise and accurate as-built progress records by annotating a set of drawings and specifications set aside for this purpose.
- .2 Update records daily to note all deviations from indicated and specified requirements, including actual location of service lines, hidden constructions and services, and *materials* installed in the finished *Work*.
- .3 Transfer records to two sets of drawings and specifications obtained from *NCC Representative* prior to *NCC Representative* 's inspection for issuance of *Final Certificate of Completion*.

.3 Construction Progress Photographs
- .1 Progress document photographs are to be reviewed and approved by *NCC Representative.*
- .2 At start of construction, Contractor to take detailed photos of all project areas, surfaces and affected site area and transmit to *NCC Representative* for approval. Annotate a set of drawings set aside for this purpose, showing photographs locations and dates.
- .3 During construction, Contractor to take a minimum 5 photographs per day, with additional as required for complex documentation.
- .4 Contractor to maintain precise photographs records by organizing the photos by groupings and labelling the photos, showing photograph locations and dates.
- .5 Photographs to be in digital format.
- .6 Provide one hard copy photograph in three ring binder format and two binder format and two CD versions for *NCC Representative's* inspection prior to issuance of Final Certificate of Completion.

4.3 SUBMITTAL PROCEDURES

.1 Refer to Section 01 33 00 – Submittal Procedures.

4.4 SPECIAL PROCEDURES

.1 Refer to Sections 01 35 29.06 - Health and Safety Requirements, 01 35 29.14 - Health and Safety for Contaminated Sites.

.2 Environmental procedures
- .1 Pressure-treated wood: Do not use wood treated with compounds containing metals including, but not limited to, copper and arsenic, unless otherwise specified or indicated.
- .2 Waste water: Dispose of water from cleaning operations, surface run-off, and pumping as directed by *NCC Representative*.
- .3 Solid waste disposal
  - .1 Dispose of waste materials in accordance with requirements of authorities having jurisdiction
  - .2 Submit dump slips and receipts indicating the disposal date, method, and location to *NCC Representative*.

.3 Designated Substances
- .1 Appendix 1:
  - .1 Designated Substances Survey for Site Office by *DST Consulting Engineers.*
  - .2 Designated Substances Survey for Storage Shed by *DST Consulting Engineers.*
  - .3 Designated Substances Survey for Storage Garage by *DST Consulting Engineers.*
  - .4 Designated Substances Survey for Shop by *DST Consulting*

Engineers.

.4 Security procedures
- .1 Confidentiality: Return of all copies of all documentation related to the project, except records required to meet records retention requirements set out in law, when directed by *NCC Representative*.
- .2 Site security: *NCC Representative* may require
  - .1 coordination and approval of all site visits and deliveries by a construction supervisor designated by *The Commission*,
  - .2 security escorts for all personnel working in non-public areas during normal working hours, and in all areas after normal working hours, and
  - .3 provision of temporary means and constructions to maintain the security of the building envelope and site perimeter.

Part 5 Temporary facilities and controls

5.1 TEMPORARY UTILITIES

.1 Temporary electricity
- .1 Existing service designated by *NCC Representative* may be used without charge; 100 Amps are available on site, co-ordinate with NCC Representative. Provide all required equipment to connect to existing service. If available charges/capacity not sufficient to execute work, provide temporary source (ie. generator).
- .2 Ensure capacity is adequate prior to imposing additional loads.
- .3 Connect and disconnect at own expense and responsibility.
- .4 Do not use electricity for space heating.

.2 Temporary fire protection: to FC 301 and FC 302.

.3 Temporary heating
- .1 Provide temporary heating if required during construction period.
- .2 Obtain *NCC Representative* 's approval for use of proposed heaters, heat distribution methods, venting method and location. Vent so as to prevent building staining and damage to plantations.
- .3 Obtain *NCC Representative* 's approval for temporary use of installed building heating system. Assume responsibility for care and maintenance of heating system affected by temporary use, including initial, periodical and final filter replacements.

.4 Temporary lighting: Provide temporary lighting throughout site, if required.

.5 Temporary telecommunication: Contractor to provide temporary telecommunications services and equipment required for their own use.

.6 Temporary water
- .1 Existing service designated by *NCC Representative* may be used without charge.
- .2 Ensure capacity is adequate prior to imposing additional loads.
- .3 Connect and disconnect at own expense and responsibility.

5.2 CONSTRUCTION AIDS

.1 Provide scaffolding, ladders, access equipment, conveyors, and other construction aids required for work.

.2 Support aids independently to minimize damage to structure, finished surfaces, landscaping, and paved surfaces.

.3 Locate, construct and maintain aids in accordance with applicable legislation.

.4 Access control
- .1 Fixed aids: At the end of each workday, disable, clearly mark as off-bounds and fasten down.
- .2 Mobile aids: Lock down when not in use. Store as directed by *NCC Representative* at close of workday.

5.3 TEMPORARY BARRIERS AND ENCLOSURES

.1 Construction fence at perimeter of site: refer to Section 01 56 00 – Temporary Barriers and enclosures.

.2 Protect adjacent work, occupants, air handling systems and building interior against spread of dust, harmful vapors and dirt. Use *materials* and methods that minimize inconvenience to occupants and damage to finished surfaces.

.3 Obtain *NCC Representative*'s approval of *materials* and methods including:
- .1 area pressurization, barrier seals, and openings in barriers or in permanent enclosures,
- .2 accommodation of activities affected by protection measures (ex. circulation, ventilation), and
- .3 contaminant collection devices.

.4 Provide weather-tight closures for unfinished building envelope openings.

5.4 PROJECT IDENTIFICATION

.1 Site boards and other advertising are prohibited.

.2 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, in both official languages or by the use of commonly-understood graphic symbols, to *NCC Representative* 's approval.

Part 6 Product requirements

6.1 COMMON PRODUCT REQUIREMENTS

.1 Use products compliant with standards referenced in applicable federal, provincial, and municipal legislation unless otherwise indicated or specified. Resolve conflict or discrepancy among standards as directed by *NCC Representative*.

6.2 PRODUCT STORAGE AND HANDLING REQUIREMENTS

.1 Store *materials* in accordance with manufacturer instructions unless otherwise specified, and as directed by *NCC Representative*.

.2 *NCC Representative* may designate on-site areas for storage of *material*. Equip

and maintain designated storage areas.

.3 Do not unreasonably encumber site with *materials* or equipment. Move stored *materials* or equipment that interfere with operations of other contractors or occupants as directed by *NCC Representative*.

.4 Obtain and pay for storage or work areas off-site as needed for operations.

Part 7 Execution and closeout requirements

7.1 EXAMINATION AND PREPARATION

.1 Acceptance of conditions, site examination
- .1 Examine site and review all information pertaining to existing conditions likely to affect the proper execution of the *Work*.
- .2 Claims for additional compensation will not be entertained for labor or *material* required to complete the *Work* that could have been reasonably ascertained by site examination and review of existing conditions.

.2 Construction layout
- .1 Provide all equipment, *material* and services required to set out the *Work*, and as required by *NCC Representative* to inspect setting out of the *Work*.
- .2 Set out the *Work* as indicated and specified. Resolve conflict or discrepancy among indicated and specified requirements as directed by *NCC Representative*.
- .3 Submit record of setting out to *NCC Representative* if requested.

7.2 EXECUTION

.1 Security
- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:
  - .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
  - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
  - .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
  - .4 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.

.2 Workmanship
- .1 Use best quality workmanship, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Install *materials* to manufacturer instructions unless otherwise specified.
- .3 Ensure cooperation of workers in laying out the *Work*. Maintain efficient and continuous supervision.
- .4 Pay for redoing work that, in the *NCC Representative* 's opinion, does not meet the indicated or specified quality of workmanship.

.3 Cutting, patching, and making good
- .1 Perform cutting, fitting, and patching to complete the *Work*.
- .2 Make cuts with clean, true, smooth edges. Do not use impact devices to cut

concrete, masonry or tile work.

.3 Prepare surfaces to receive patching and finishing. Remove and replace defective and non-conforming work that is to form the base or substrate for new work.

.4 Perform work to avoid damage to other work.

.5 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assemblies to attachment points.

.6 Fit work airtight to pipes, sleeves, ducts and conduits and, in the case of work penetrating exterior building elements, make watertight.

.7 Prior to any cutting, coring, or drilling, a scan or x-ray is required to locate conduits, pipes, and structural Steel.

.4 Concealment

.1 Conceal pipes, ducts and wiring in floors, wall and ceiling construction of finished areas except where indicated otherwise

.5 Firestops and smoke seals: Install as required and to ULC-S115 to provide fire resistance not less than that of surrounding fire separation.

.6 Sleeves, hangers and inserts: Coordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain *NCC Representative*'s approval before cutting into structure.

7.3 CLEANING AND WASTE MANAGEMENT

.1 Refer to Sections 01 74 11 – Cleaning and 01 74 21 - Construction/Demolition Waste Management and Disposal.

7.4 PROTECTING INSTALLED CONSTRUCTION

.1 Protect adjacent property and installed construction such as hard and soft landscaping, roads, utilities, structures, and finishes, from damage including the effects of extreme heat or cold.

.2 Restore property and construction damaged during the execution of the *Work*, or provide appropriate compensation to affected parties.

.3 Prevent snow and ice accumulation on the *Work*.

7.5 CLOSEOUT PROCEDURES

.1 Refer to Section 01 77 00 – Closeout Procedures.

7.6 CLOSEOUT SUBMITTALS

.1 Refer to Section 01 78 00 – Closeout Submittals.

END OF SECTION

TABLE OF CONTENTS

PART 1 – GENERAL

PART 1- GENERAL

1.1 GENERAL

.1 All conditions of the Contract apply to this and all other Sections.

.2 This Section applies to all sections incorporated in the Tender Documents.

.3 In interpreting the Specifications, in the event of discrepancies or conflicts between Section 01 00 00.02 – General Requirements and other Sections, Section 01 00 00.02 – General Requirements governs.

1.2 PROJECT COORDINATION

.1 The Contractor shall cooperate with the NCC Representative and other contractors, as well as all those having authority to access the Operations Zone (hereinafter referred to as the “Site”) and those having an interest in the project.

.2 The Contractor shall bring any conflict associated with the Project to the attention of the NCC Representative for review and resolution. The NCC Representative’s decision shall be final and binding within the terms of the Contract.

.3 Coordinate use of the Site and common facilities during the Work through procedures established by the NCC Representative for intra- project communications, submittals, reports and records, recommendations, etc.

.4 Attend administrative and problem solving Site meetings, as required by the NCC Representative.

.5 The NCC Representative arranges and manages project progress meetings, records and issues minutes identifying significant proceedings and action items.

.6 It is stipulated that soil removal and reinstatement of the area immediately adjacent and west of the "Concrete building "of 7 m width is to be completed first and in such a manner as to maintain continued vehicle access to the "Concrete building ".

.7 All on-site workers will be required to have NCC Site Access Level Security clearances.

1.3 DRAWINGS AND SPECIFICATIONS

.1 Carry out all Work in accordance with the Specifications and Contract Drawings.

.2 Borehole logs from investigation undertaken within the Site are provided within the Complementary Documentation provided as an Appendix to the Specifications Package. An itemized list of Complementary Documentation is provided in Section 00 01 10– Table of Contents.

.3 Additional Drawings showing details as to the Work to be carried out may be provided from time to time, as found necessary, to define the project requirements. The Contractor shall guide his Work on the dimensions provided on the detailed Drawings. Where such dimensions are not available, the Contractor shall review field measurements with the NCC Representative prior to proceeding with the portion of the Work affected. In every case, detailed Drawings shall take precedence over general Drawings.

.4 The Contractor shall be provided with a reproduction of each Contract Drawing, as well as a copy of all revisions and Specifications, which may be reproduced to suit the project requirements. The Contractor shall keep at least one copy of the Drawings and Specifications in the Field Office at the Site.

1.4 SCHEDULE

.1 The Contractor shall submit the proposed construction schedule to the NCC Representative within 10 working days of the Contract award date. The schedule is to be presented in bar chart format and shall include milestone dates and all major activities or tasks identified in the Contract Documents and will specifically include all major price items as separate activities. The schedule shall be sufficiently detailed to allow for weekly progress reviews and updates.

.2 The Contractor shall include in the proposed construction schedule the critical dates provided elsewhere in the Tender Documents.

.3 The Contractor shall submit with each weekly progress update, an update of schedule showing changes in strategy, if any, and progress as a percentage completed for each activity, on a regular basis, as determined by the NCC Representative. Progress Reports will be submitted in a format satisfactory to the NCC Representative in order to show the status of the Work in detail and to compare actual progress with the Contract schedule.

1.5 SUBMITTALS

.1 Provide submittals to the NCC Representative as required and listed in the various sections of the Specifications. All submittals are to identify the applicable Specification section and paragraph for which the submittal is intended. Submittals from

subcontractors are to be reviewed for compliance to the Specifications by the Contractor prior to transmittal to the NCC Representative. All supporting documentation is to be provided when requested. Deficiencies in the submittals are to be addressed promptly. Work affected by a submittal shall not proceed until review and approval (when required) are completed.

.2 The Contractor shall provide the NCC Representative with copies of all permits, approvals, notifications and licenses related to and obtained for the Work, within 7 calendar days of their receipt.

1.6 FIELD ENGINEERING

.1 When specified, provide the services of professional practitioners to undertake field-engineering requirements. All Work shall be done according to industry standards, following the most current guidelines and practices.

.2 The Contractor shall establish all lines and grades on all parts of the works to the satisfaction of and as directed by the NCC Representative. The Contractor shall survey, under the direction of the NCC Representative, the limits of excavation; the Contractor laydown area layout and all other Site requirements as detailed in the Specifications and on the Drawings. Surveying Work shall be carried out by qualified personnel using equipment in conformity with industry standards.

.3 Submit pre-construction and final Site survey certificate in accordance with North American Datum of 1983 (NAD 83) and Modified Transverse Mercator (MTM) projection (3°, zone 9) using a survey grid density of at least 10 metres plus topographically significant features.

1.7 SUBSURFACE CONDITIONS

.1 Information on subsurface conditions, including soil characteristics and groundwater conditions, is available to the Contractor through the Complementary Documentation itemized in Section 00 01 10 – Table of Contents. If subsurface conditions differ significantly from those indicated, promptly notify the NCC Representative. Should the NCC Representative confirm that conditions are significantly different and that the differences impact on the Work, instructions will be issued as to changes in the Work.

.2 The NCC makes no guarantee, express or implied, about the characteristics of the Overburden Material to be removed from the Operations Zone. No additional compensation will be made for the overburden differing from the Contractor's expectations.

1.8 REFERENCES AND CODES

.1 Perform the Work in accordance with the latest revised and amended versions of all federal, provincial and municipal laws, acts, regulations, by-laws, ordinances, standards and guidelines,

as they may apply to the Work and in compliance with the Specifications as appropriate. Should there be any discrepancy or conflict between the documents (laws, acts, regulations, by-law, ordinances, standard or guidelines), the most stringent shall apply.

.2 Wherever in this Contract there is a list of statutes, regulations, by-laws, ordinances, standards, guidelines or other references under the heading “References and Codes” or any other heading, such list should be considered to be non-exhaustive and is included for information and illustration purposes only. It shall be the responsibility of the Contractor to make appropriate inquiries with respect to the applicable requirements.

.3 Without limiting the generality of paragraphs 1.8.1 and 1.8.2 above, the Project must be performed in a manner that meets or exceeds the requirements of the following list, including but not limited to federal, provincial and municipal laws, regulations, by-laws, ordinances, standards and guidelines:

.1 Contract Documents.
.2 Specified standards, codes and reference documents.
.3 Municipal Noise By-Laws.
.4 Sewer Use By-Law of the City of Ottawa.
.5 Ontario Environmental Protection Act.
.6 Ontario Water Resources Act.
.7 Guideline for Use at Contaminated Sites in Ontario, MOE.
.8 Ontario Provincial Standard Specifications (OPSS).
.9 Occupational Health and Safety Act R.S.O.
.10 Ontario Regulation 347– Waste Management.
11 Gasoline Handling Act.
.12 Canadian Environmental Protection Act.
.13 Transportation of Dangerous Goods Act.
.14 Canadian Environmental Quality Guidelines, CCME.
.15 Fisheries Act.
.16 Federal Brownfields Legislation.
.17 Migratory Birds Regulations.
.18 City of Ottawa Traffic and Parking By-Laws.
.19 Ontario Heritage Act.
.20 Historic Sites and Monuments Act.
.21 National Capital Act.
.22 Canadian Environmental Assessment Act

1.9 COMPLIANCE WITH APPLICABLE LAWS

.1 By submitting a tender, the Contractor certifies that he/she has the legal capacity to enter into a contract and is in possession of all valid licenses, permits, registrations, certificates, declarations, filings, or other authorizations necessary to comply with all federal, provincial and municipal laws and regulations applicable

to the submission of the tender by the Contractor and entry into any ensuing contract for the performance of the Work.

.2 For the purposes of validating the certification in clause 1.9.1, a Contractor shall, if requested, provide a copy of every valid license, permit, registration, certificate, declaration, filing or other authorization listed in the request, and shall provide such documentation within the time limits set out in said request.

.3 Failure to comply with the requirements of clause 1.9.1 shall result in disqualification of the tender.

1.10 HOURS OF WORK

.1 The Contractor shall comply with all pertinent legislation, regulations or by-laws regarding working hours. No Work shall be permitted on Saturdays, Sundays and statutory holidays without the approval of the NCC Representative.

.2 Prior to starting the Work the Contractor shall submit to the NCC Representative in writing the proposed hours of Work. The NCC Representative shall be advised in writing with 48 hours advance notice of any changes to the hours of Work.

.3 The Contractor shall Work between the hours of 7:00 am to 6:00 pm Monday through Friday. No Work shall be permitted outside of these hours without the approval of the NCC Representative.

.4 Should it be required, the Contractor is to provide for the NCC Representative's approval a proposed Work plan for Saturdays, Sundays and statutory holidays 48 hours prior to the Work (ie. Thursday) detailing the extent of Work and proposed resource assignment.

1.11 OCCUPATIONAL HEALTH AND SAFETY ACT

.1 This Contract is considered to be a project under the Ontario Occupational Health and Safety Act.

.2 The Contractor shall be registered with the Workplace Safety and Insurance Board (WSIB) and provide a copy of said registration or other suitable documentation to the NCC Representative prior to undertaking any Work on the Site.

1.12 SITE SAFETY

.1 The Contractor shall provide a copy of the Project Health and Safety Manual to the NCC Representative prior to undertaking any Work on the Site. The Project Health and Safety Manual shall include the additional health and safety requirements outlined in Section 01 35 29.14 – Health and Safety for Contaminated Sites.

.2 The Contractor shall ensure that the Work performed, the equipment supplied and all services provided under his contract, either by the Contractor or under subcontracts, comply with all federal and provincial regulatory requirements, as well as the Project Health and Safety Manual.

1.13 QUALITY OF WORKMANSHIP EQUIPMENT, MATERIALS AND SUBCONTRACTORS

.1 All Work shall be carried out by tradespersons trained and experienced in the tasks assigned. All equipment, vehicles, tools, etc., are to be in good working order, well maintained and suitable for the Work to be done. All materials and consumables shall be new and in compliance with the Specifications. Subcontracted Work shall be awarded to firms with appropriate expertise, tradespersons, equipment and financial soundness to successfully fulfill their project commitments.

.2 The NCC Representative reserves the right to investigate the suitability of any subcontractor proposed by the Contractor and reject such subcontractor if it is determined that they are not capable of successfully undertaking the task assigned.

1.14 QUALITY ASSURANCE AND QUALITY CONTROL

.1 The Contractor shall ensure that the Work is performed and completed in compliance with references, codes and specifications by implementing quality management techniques on the Site.

.2 The Contractor shall provide access to and co-operate with the NCC Representative during Work inspections.

.3 Provide timely notice to the NCC Representative requesting inspections when the Work is subject to inspections, testing or approvals by the NCC Representative and regulatory agencies.

.4 The Contractor is fully responsible for uncovering or redoing Work that has not been inspected or tested as specified.

1.15 TEMPORARY FACILITIES

.1 Sanitary facilities shall be provided by the Contractor.

.2 The Contractor shall provide, install and maintain sufficient and suitable facilities within the Work area on-Site for all administrative requirements, staff lunch rooms, etc. as required.

.3 The Contractor shall provide, install and maintain a small tools storage area within the Work area, as required.

.4 The Contractor shall keep facilities clean and free from clutter and litter, so as to not present a hazard to the adjacent grounds and not provide grounds for complaints. Installations are to meet all municipal by-laws.

.5 The proposed location and configuration of Site facilities must be submitted and approved by the NCC Representative prior to installation.

.6 The Contractor shall make all necessary applications, obtain required permits and approvals, and pay all fees and charges for such additional facilities and their use.

.7 Parking of non-construction related and personal vehicles will generally not be permitted in the Work area. Designated parking areas for the Contractor's supervisory personnel and the NCC Representative are at the Contractor Parking Lot.

.8 Only signs approved by the NCC Representative shall be erected or posted on the Site.

1.16 CONSTRUCTION SERVICES

.1 If additional public utility services are required, approval shall be obtained from the appropriate agencies for use of and tie-in to existing services, including power, sewer, telephone and water, as may be required. The Contractor shall also be responsible for the installation, maintenance and shutdown of services/facilities upon completion of the Work. Access to municipal water supply will be provided on-Site to the Contractor by the NCC.

1.17 WORK ACCESS

.1 The Contractor shall access his/her assigned Work area in such a way as to avoid damage to property and inconvenience to the adjacent properties' owners or occupants. Haulage vehicles shall follow the predetermined trucking routes approved by the NCC Representative; see Section 01 35 30 – Traffic Control.

.2 The Contractor shall obtain Road Occupancy Permits as may be required while undertaking the Work and obtain authorization for accessing the street from the Site with all project equipment. Site access is not to interfere with the current operations or public use of existing transportation routes.

.3 Access to the Work area shall be restricted to authorized personnel only. Throughout the course of the Work the Contractor shall maintain a system of Site security and controlled access to his assigned area. This system will:

- Maintain a list of persons authorized to enter the Work area;
- Minimize the occurrence of unwanted or unintentional entry into the Work area; and,

- Supervise, control and document the access and egress of authorized persons to and from each Work area.

.4 The boundaries of the controlled access areas will be based on the construction Site limits and defined Contractor lay down areas.

.5 To minimize the danger of accidentally spreading contaminated material from the excavation area, the Work areas shall be equipped with appropriate decontamination installations at their exit.

.6 The Contractor will make efforts to prevent the spread of contamination. All equipment leaving the Work area will be monitored by the NCC Representative to ensure that it is free of contamination.

.7 The Contractor may be required to share project access roads and gates with other contractors and project personnel. The Contractor shall co-operate with others with regards to usage of such access and assist the NCC Representative with co-ordination as may be required.

1.18 PROTECTION OF PRIVATE PROPERTY

.1 The Contractor shall not encroach upon properties adjacent to the Work area and shall take such precautions and provide such protection as necessary to prevent any damage to private property during the Work.

.2 The Contractor is entirely responsible for all damage to private property, equipment, etc., arising from the Work and caused by negligence or any act by himself or any person engaged on the Work including subcontractors, service companies and employees thereof.

1.19 SITE SECURITY

.1 The Contractor shall be responsible for the security of his assigned Work area. The Work area under the Contractor's responsibility includes the area within the Site construction limits. The NCC Representative will not assume responsibility or liability for any loss or damage of materials, equipment, tools, consumables, temporary installations or personal items suffered by the Contractor, subcontractors, suppliers and/or any employees thereof. The Contractor shall provide reasonable access in areas under the Contractor's responsibility to all authorized firms, personnel and equipment.

.2 The Contractor and subcontractor's personnel shall be restricted to the Work Site, and are not to access private property outside of the designated Work area, except for where his/her Work merges with another Contractor's Work. In this case, the Contractor shall advise the NCC Representative of the schedule

of the merging Work and shall obtain approval from the NCC Representative before proceeding with this Work.

1.20 FIRE PREVENTION

.1 Fire prevention instructions are to be included in the Project Health and Safety Manual.

1.21 SITE SUPERVISION

.1 The Contractor shall provide and post on-site, the name and phone number of an authorized representative of the Contractor who can be contacted on a 24-hour basis, in case of an emergency.

1.22 SERVICE CLEARANCES AND NOTIFICATION

.1 Drawings are for reference only, and any services identified on such Drawings may not be accurate or complete.

.2 Prior to undertaking the Work, the Contractor shall notify all utility and service companies and municipalities to verify the locations of existing services including sewers, water mains, gas mains and all other underground and overhead installations, and shall obtain, when possible, certificates or written confirmation that they have visited the Site and have identified the locations of their respective services. The Contractor shall comply with all existing regulations and reasonable requests from the affected service companies pertaining to protective measures, inspections, temporary support, dismantling, reinstatement and safety. The Contractor shall advise road authorities and obtain authorization prior to routing construction traffic onto roadways and/or restricting or changing in any way normal traffic patterns. Copies of all applications, certificates, licenses or other authorization forms are to be provided to the NCC Representative, as well as displayed in an appropriate location on the Site.

1.23 PROTECTION OF SERVICES, UTILITIES, STRUCTURES AND VEGETATION

.1 Take due care during the course of the Work to avoid damage to existing structures, equipment and utilities to be maintained. The Contractor is entirely responsible for all damage caused, intentionally or otherwise, by himself, his employees, his subcontractors or any other person engaged by the Contractor to undertake Work under this Contract.

.2 Sustain in place and protect from any damage any and all services to be maintained during the Contract in a manner approved by the NCC Representative and the respective service company or authority.

.3 Protect from damage all vegetation including trees outside the excavation and filling areas at Operations Zone. Protect from damage all vegetation, including trees, within the work area, as shown on Contract Drawings.

.4 Any damages to vegetation shall be fixed, or equivalent replacement provided, to the satisfaction of the NCC Representative and paid for by the Contractor.

1.24 APPROVALS, PERMITS, LICENSES AND STANDARDS

.1 The National Capital Commission (NCC) is responsible for obtaining all authorizations as may be required under the Canadian Environmental Assessment Act.

.2 Other than .1 above, the Contractor shall secure, provide, pay for and maintain all permits, licenses and approvals that may be required to undertake the Work by federal, provincial, municipal and/or any other authority having jurisdiction.

1.25 CONSTRUCTION MAINTENANCE

.1 The Contractor shall maintain in good working order all temporary facilities, construction fencing and gates, temporary access ways, supports, etc., other than the services provided by the NCC Representative, for the duration of the Work. Deficiencies identified by the NCC Representative shall be immediately remedied to the satisfaction of the NCC Representative.

1.26 PUBLIC/ NCC ROADS

.1 This section applies to public or NCC roads other than those reconstructed or modified as part of the Work.

.2 Execute the Work in such a manner that the use of adjacent public or NCC roads by vehicles engaged in the Work will not inconvenience or endanger public, cyclists, pedestrians and vehicular traffic, nor hinder the use of such facilities.

.3 The Contractor shall provide all necessary flag persons, warning lights, signs and barricades to direct and protect vehicular and pedestrian traffic from vehicles assigned to the Work, entering or leaving the Site, in accordance with regulatory requirements and municipal standards. Road blockages due to the Work conducted shall be undertaken in accordance to regulatory requirements and municipal standards, including prior notification, application and payment of permits, signage and detour posting.

.4 Haulage routes shall be restricted to the ones identified on the Urban and Rural Truck Routes Maps of the City of Ottawa. The

Contractor shall follow predetermined trucking routes, or as approved by the NCC Representative; see Section 01 35 30 – Traffic Control.

.5 The Contractor shall ensure that there is no deposit and build- up of soil or other debris on road surfaces due to his Work. Cleanup, if required, shall include the use of strict dust control measures and street sweeping. The Contractor shall proceed immediately with the road cleanups when requested by the NCC Representative or by municipal authorities.

.6 The Contractor is responsible for dust control, as specified in Section 02 36 20 – Dust and Soil Tracking Control.

1.27 HOUSEKEEPING

.1 Maintain all occupied Site areas in a neat and orderly fashion, free from accumulation of debris for the duration of the project. Waste materials, rubbish and debris shall not be allowed to accumulate. Under no circumstances shall soil be tracked beyond the confines of the Work area. There shall be no debris left or discarded in adjacent areas by the Contractor and/or his personnel, including but not limited to: roadways, parking areas, NCC property, common or public areas and public property. Construction supplies, tools and equipment are to be organized and stored so as to maintain a safe and visually acceptable Work Site. The Contractor is to have on-Site only materials and equipment necessary to perform the Work.

1.28 ENVIRONMENTAL CONTROLS

.1 Environmental monitoring and compliance of all activities on the Work Site shall be governed by Sections 01 35 13 – Special Procedures for Contaminated Sites; 01 56 10 – Environmental Protection; 02 31 40 – Filling and Backfilling; 02 32 00 – Surface Water and Groundwater Management; 02 36 20 – Dust and Soil Tracking Control and 02 61 00 – Soil Removals. The provisions detailed in these sections apply to all personnel assigned to the Work or present on the Site.

.2 Conduct all activities in an environmentally responsible manner, in compliance with all references and codes and meet current industry standards in such a manner as to reasonably minimize impact upon the environment.

.3 The Contractor shall be responsible for cooperating with the NCC Representative and other project personnel to ensure that all Site activities comply with the provisions of the Specifications.

.4 The Contractor shall also cooperate with the NCC Representative's staff in obtaining bulk samples and field testing for contaminants.

.5 Oil, grease, gasoline, diesel and other potential hazardous materials shall be stored in a manner acceptable to the NCC Representative and in compliance with the Ontario Environmental Protection Act and the Canadian Environmental Protection Act.

.6 All liquid industrial wastes, including waste oil and fuel, shall be registered with the Ontario Ministry of the Environment by the Contractor, as necessary, under Ontario Regulation 347 and transported by a licensed waste carrier to a waste disposal site certified to accept such wastes.

.7 The Contractor shall provide the NCC Representative, for review, a written procedure, including location map and spill prevention and response, for on-Site equipment re-fuelling and maintenance.

1.29 GARBAGE AND REFUSE

.1 The Contractor shall be responsible for the disposal of all garbage and refuse from within the Work area. The Contractor shall ensure that his/her Work force, including subcontractors and service personnel, will be responsible for any cleanup of debris caused by his personnel.

1.30 DUST CONTROL

.1 Implement all necessary control measures to minimize dust generated by any and all activities, as indicated in Section 02 36 20 – Dust and Soil Tracking Control.

1.31 TRACKING CONTROL

.1 Take all necessary precautions to prevent the tracking of soil waste onto municipal/provincial/federal roadways and private properties. All moving of equipment from the excavation area is to be controlled through a decontamination zone, which may include a decontamination pad, as detailed in the Specifications. The Contractor shall immediately clean all debris and dust deposits resulting from the Work, to the satisfaction of the NCC Representative, using strict dust control measures, as detailed in paragraphs 1.27, 1.28 and 1.30 above. Dry sweeping of roadways, sidewalks, curbs, etc., as well as flushing into municipal sewer will not be tolerated.

.2 Comply with Section 02 36 20 – Dust and Soil Tracking Control.

1.32 SURFACE WATER CONTROL

.1 Take all necessary precautions to prevent non-filtered water from entering the storm and sanitary sewer systems or discharge beyond or outside the Work area along surface routes, in compliance with the City of Ottawa Sewer Use By- Law. The Contractor shall seal all manhole covers and construct sludge traps around all storm water catch basins. The Contractor shall also inspect and/or clean out all sludge traps on a scheduled basis to ensure their satisfactory performance.

.2 Comply with Sections 01 35 13 – Special Procedure for Contaminated Sites and 02 32 00 – Surface Water and Groundwater Management.

1.33 ADVERSE WEATHER CONDITIONS

.1 Site operations, including excavation and preparation Work, shall be suspended at any time when, in the opinion of the NCC Representative, satisfactory material control cannot be maintained on account of rain, wind or other unsatisfactory weather conditions.

1.34 EMERGENCY SPILLS

.1 All spills should be dealt in accordance with the Ontario Environmental Protection Act and the Canadian Environmental Protection Act.

.2 The responsible party shall clean up the spill immediately using all resources required to bring the Site back to pre-spill conditions.

.3 The Contractor shall submit to the NCC Representative for his approval a Spill or Emergency Control Plan within 7 days of the Contract award date. No Work shall proceed until the NCC Representative has provided written approval to the Contractor.

.4 The Contractor shall have cleanup materials on-Site to deal with all types of predicted spills.

.5 The Contractor shall provide notifications, as required by the Ontario Environmental Protection Act and the Canadian Environmental Protection Act to the NCC Representative.

.6 In addition to Clause 1.34.1, preparation for and response to emergency spills shall be governed by the Sections 02 32 00 – Surface Water and Groundwater Management and 02 61 00 – Soil Removals. The provisions detailed in these sections apply to all personnel assigned to the Work or present on the Site.

.7 The Contractor shall have a written procedure incorporating the provisions of Sections 02 32 00 – Surface Water and

Groundwater Management and 02 61 00 – Soil Removals, for responding to an emergency spill within the Work area, the fuelling pad, on adjacent property, on public roadways, NCC roadways and in public areas. The procedure shall comply with existing regulatory requirements and Specifications and shall address the need for immediate control and containment of the spilled product, as well as cleanup of all affected areas and monitoring for remnant contaminants. The procedure shall provide specific details for personnel training and protection, controlling entry into sewer systems, cleanup and verification (by the NCC Representative) of decontamination of affected areas, reporting and documentation.

.8 The Contractor shall have suitable materials (e.g., sawdust, wood chips, absorbents, brooms, etc.) for the cleanup of fuel spills. Any spillage of oil, grease, gasoline, diesel or other hazardous material shall be controlled by the Contractor, as required under the Canadian Environmental Protection Act, the Ontario Environmental Protection Act and reported immediately to the NCC Representative.

1.35 ARCHAEOLOGICAL CONSIDERATIONS

.1 The Operations Zone is not known to be an area of Archaeological significance. No archaeological monitoring during excavation is required. The Contractor must notify the NCC Representative if any suspected items of archaeological significance are encountered. The Contractor is requested to cooperate within the terms of the Contract in the investigation of any archaeological significant areas or in recovery of artifacts.

.2 If archaeological artifacts or structures of interest are uncovered during excavation, excavation in this specific location within the Site will be stopped to allow qualified archaeologists to proceed with the examination of the uncovered material. The Contractor will not be allowed to claim any standby time caused by such archaeological investigations, if the equipment can be reasonably relocated to another Work area within two hours of the instruction to stop Work. Should the Contractor be requested by the NCC Representative to assist in the investigation, such Work shall be executed and compensated, in accordance with the General Conditions.

1.36 TITLE TO PROPERTY FOUND AT SITE

.1 The title to all artifacts, relics, natural objects or other items of archaeological or historical interest and any other material and property discovered, developed or obtained in the excavation or other operations by the Contractor or subcontractor, or any of their employees, is hereby expressly reserved by the NCC, and neither the Contractor nor subcontractor, nor any of their employees shall have any right, title or interest in or to any part thereof; neither shall they, nor any of them, assert or make any

claims thereto. The Contractor shall report immediately any such find to the NCC Representative.

1.37 CONFIDENTIALITY

.1 The Contractor and all subcontractors shall maintain confidentiality of the information provided both during tendering and during the performance of the Work at all times, except for the information specifically required to obtain permits and approvals, for submitting notices to appropriate agencies and for purposes of securing subcontractor services. The Contractor shall not enter into any discussions relating to the Work with any persons or agencies without explicit written consent from the NCC Representative. The obligation to ensure that the information remains confidential shall survive termination of the Contract.

1.38 PROJECT CLOSEOUT

.1 When the Work is substantially performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Collect reviewed submittals, assemble documents executed by subcontractors, suppliers and manufacturers, and submit this material to the NCC Representative.

.3 Carefully inspects the Work to ensure it is complete, that major and minor construction deficiencies and defects are corrected, and that the Site is clean and in a suitable condition. Notify the NCC Representative in writing of satisfactory completion of the Work and request an inspection. Cooperate with the NCC Representative during the inspection and correct deficiencies.

PART 2 – PRODUCTS

2.1 EQUIPMENT

.1 The Contractor shall supply, operate and maintain equipment, tools and supplies suitable for the Work required to be undertaken, clean, free of defects and in compliance with regulatory and safety requirements. The Contractor shall provide:

.1 all fuel and lubricants required to operate the equipment; and

.2 all maintenance and repairs necessary to keep equipment and tools in good condition and working order.

.2 No bulk storage of fuel, oil or other lubrication products will be permitted on the project Site, unless explicitly approved in writing by the NCC Representative. Equipment fuelling and oil change operations shall be undertaken in an area specified by the NCC

Representative and only after suitable means of spill containment have been implemented.

.3 The Contractor shall undertake regular preventive maintenance on major equipment off-hours to avoid delays in the Work. Should a breakdown of major equipment occur, the Contractor shall immediately arrange for repair or replacement of the defective unit. Under no circumstances will delays associated with equipment breakdown be allowed to exceed one day (24 hours). All costs associated with repairs or replacement shall be at the expense of the Contractor, including project delays.

.4 Should the Contractor fail to repair or replace the defective equipment within the specified period of time, the NCC Representative will take all necessary steps to replace the equipment and the total cost of the replacement, including all associated expenses incurred by the NCC Representative, shall be the responsibility of the Contractor.

PART 3 – EXECUTION NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 The term “submittals” means drawings, diagrams, illustrations, Schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

1.2 ADMINISTRATIVE

.1 Submit to NCC Representative submittals listed for review. Submittal list in Table -1 (under 01 33 00) is for information only. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete and accepted.

.3 Review submittals prior to submission to the NCC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific Project will be returned without being examined and will be considered rejected.

.4 Notify NCC Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.5 Contractor's responsibility for errors and omissions in submission is not relieved by NCC Representative review of submittals.

.6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by NCC Representative review.

.7 Keep one (1) reviewed copy of each submission on site.

1.3 SUBMISSION

.1 Allow seven (7) days for NCC Representative review of each submission.

.2 Adjustments made on Submittals by NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to NCC Representative prior to proceeding with Work.

.3 Present shop drawings and product data, in SI Metric units.

.4 Where items or information is not produced in SI Metric units, converted values are acceptable.

.5 Make changes in Submittals as NCC Representative may require, consistent with Contract Documents. When re-submitting, notify NCC Representative in writing of any revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of submittal.
- .5 Other pertinent data.

.7 Submissions to include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Sub-Contractor.
  - .2 Supplier.
  - .3 Manufacturer
- .4 Contractor's stamp, signed by Contractor's authorized representative/ qualified professional, registered or licensed in Ontario, Canada as required, certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Capacities.
  - .2 Standards.
  - .3 Relationship to adjacent work.
  - .4 Layout, showing dimensions, including identified field dimensions and clearances.
  - .5 Setting or erection details.
  - .6 Performance Characteristics.
  - .7 Operating weight.
  - .8 Single line and schematic diagrams.

.8 After NCC Representative's review, distribute copies.

.9 Submit three (3) prints and one (1) electronic copy (pdf) of submittals for each requirement requested in specification Sections and as NCC Representative may reasonably request.

.10 Delete information not applicable to Project.

.11 Supplement standard information to provide details applicable to Project.

.12 If upon review by NCC Representative, no errors or omissions are discovered or if only minor comments are made, two (2) copies will be returned and fabrication and installation of Work may proceed. If submittals are rejected, noted copy will be returned and resubmission of corrected submittal, through same procedure indicated above, must be performed before Work may proceed.

.13 The review of submittals by NCC Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review does not mean that NCC Representative approves submittals, responsibility for which remains with Contractor submitting same, and such review does not relieve Contractor of responsibility for errors or omissions in submittals or of responsibility for meeting all requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

.1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to NCC Representative's business address office.

.3 Notify NCC Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Adjustments made on samples by NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to NCC Representative prior to proceeding with Work.

.5 Make changes in samples which NCC Representative may require, consistent with Contract Documents.

.6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 PHOTOGRAPHS

.1 Provide date marked digital photos in .jpg format for Progress Photographs and Final Photographs.

.2 Digital photographs to have a minimum of 2,592 x 1,944 pixel (5 Megapixel) resolution.

.3 Provide “before and after” photos of site showing key areas before soil removal and after soil removal. To get after photos from the same vantage point as the before photos, the contractor is to record the locations, and photographic viewpoints, on a set of drawings, of all before photos taken. The before photos should be chosen with input from NCC Representative.

.4 Captioned progress and final photographs to be submitted on a compact disc (CD). Provided one (1) copy of the progress photographs and two (2) copies of the final photographs.

.5 Identification: Typewritten or generated by computer, the name and number of the Project on cover and spine of binder and CD case. Provide a written description of each photograph in photographic log format. Photographic log to be included with each CD and in a binder. Description to include:

.1 Digital photograph file name;
.2 Name and description of feature;
.3 View direction;
.4 Date of exposure.
.5 Before and after photographs of key areas of soil removal.

.6 Quantity: Provide sufficient number of photographs to adequately describe the Work activities carried out during the reporting period. A minimum of two (2) photographs taken from two (2) viewpoints are to be provided for each clean-up/construction activity. Viewpoint locations for final digital photographs to be determined by NCC Representative.

.7 Submit progress photographs weekly or as directed by NCC Representative.

.8 Submit final photographs prior to final progress payment request.

.9 Provide two (2) sets in two binders of final digital photographs and log.

1.6 MEASURMENT OF PAYMENT

.1 All direct costs for the preparation of the photographic record as outlined above for the project are to be included under Item BOPC-1, Balance of Project Costs in the Basis of Payment Schedule. Indicate the cost of this Work as a separate line item in the cost breakdown table.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

Please reference Submittal List in Table -1 below

Specification Section	Description	Date
01 00 00	Emergency Spill Response Plan	Within 7 days of the Contract award date
01 33 00	Excavation Progress Photography	Ongoing- prior to and during work operations
01 35 13	Site Layout Drawings showing existing conditions, facilities and temporary controls	Within 14 days of date of Notice to Proceed and prior to mobilizations to Site
01 35 13	Erosion and Sedimentation Control Plan	Prior to commencing work
01 35 13	Proposed Stormwater Management and Groundwater Management Methods Plan	Within 14 days prior to beginning work
01 35 25	Erosion and Sedimentation Control Inspection Report and Log	Required following greater than 15 mm precipitation event
01 35 30	Traffic Control Plan	Within 7 days of the Contract award date
01 35 30	Traffic Management Plan	Within 7 days of the Contract award date
01 56 10	Tree Protection Zone (TPZ) pre-construction meeting	Pre-construction meeting to confirm TPZ locations
01 71 10	Certificate indicating that all elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.	At conclusion of project
01 71 10	Pre-Construction Topographic Survey	Prior to commencing work
01 71 10	Post-Excavation Topographic Survey	Following completion of excavation activities
01 71 10	Post- backfill and Final Grading Survey	At conclusion of project
02 22 50	Certified weigh bills and receipts from authorized disposal sites and recycling facilities for all materials removed from Site	On a daily basis
02 22 50	Confirm location of buried utilities to be maintained	Prior to commencing excavation work
02 22 50	Condition survey of existing buildings, trees, fencing, service poles, etc.	Prior to commencing excavation work
02 22 50	Copies of all clearance certificates from utility and service companies.	Prior to commencing excavation work
02 31 10	Prior to the commencement of any of his Work, the Contractor shall submit product information documentation, as provided by the manufacturer.	Prior to commencing work
02 31 40	Inform Engineer at least two (2) weeks prior to commencing work of the proposed source of any imported granular materials proposed for back fill along with analytical test data demonstrating compliance with the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) for commercial land use and MOE Table 7 (commercial) Standards.	Minimal two (2) weeks prior to commencing back fill work
02 31 40	Submit 5 kg of samples of type of granular fill, sub-base material specified to the NCC Representative in tightly closed containers to prevent contamination.	Minimal two (2) weeks prior to commencing back fill work

Specification Section	Description	Date
02 32 00	Water Management Plan	Prior to commencing work
02 36 20	Dust Control Plan	Prior to commencing work
02 36 20	Soil Tracking Control Plan	Prior to commencing work
02 36 20	All reported complaints associated with dust or noise	During and upon completion of the work
02 36 20	All reported complaints addressing the tracking of soil onto public roads	During and upon completion of the work
02 36 20	Log of Dust Control activities undertaken	Available for daily review and submitted upon completion of work
02 61 00	Operating procedures respecting the excavation area and the contractor lay down area, including equipment inspection area.	Prior to commencing work
02 61 00	Quantity and assignment of equipment and staff on the Work Site + Sequencing of work operations.	Prior to commencing work
02 61 00	Copies of all applicable Certificates of Approval issued by the Ministry of the Environment under Part V of the Environmental Protection Act for all off-Site waste management and recycling sites selected to receive waste soil and debris, as well as for all waste haulers.	Prior to commencing work
02 61 00	Copies of all clearance certificates from utility and service companies.	Prior to commencing excavation work
02 61 00	Documentation pertaining to off-Site disposal and movement of Overburden Material, wastes, recyclables and all other materials.	During and upon completion of the work
02 61 00	Daily reports of quantities of Work executed for each relevant item of the Form of Tender.	During and upon completion of the work
02 61 00	Details about any spill of Overburden Materials or Other Materials on public property and roadways, including the circumstances of the incident, reports to authorities and clean-up efforts.	During and upon completion of the work
02 61 00	Submit a description of the procedure proposed to achieve the requirements of Bottom of Excavations.	Prior to commencing excavation work
02 70 10	Submit all sampling and testing results for quality control	Prior to bringing aggregate materials onto the Site
32 12 16	Submit Hot mix asphalt design specifications	Submit 10-working days prior to asphalt paving operations

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

.2 The Contractor shall execute the Work in a manner that meets or exceeds applicable codes/ laws/ regulations.

1.2 RELATED WORK

.1 Section 01 00 00.02 – General Requirements

.2 Section 01 56 10 – Environmental Protection

.3 Section 02 31 10 – Site Grading, Access Roadways

.4 Section 02 31 40 – Filling and Backfilling

.5 Section 02 32 00 – Surface Water and Groundwater Management

.6 Section 02 36 20 – Dust and Soil Tracking Control

.7 Section 02 61 00 – Soil Removals

1.3 REFERENCE STANDARDS

.1 Ontario Provincial Standard Specifications and Drawings (OPSS 805), OPSD-219.110

.2 City of Ottawa Sewer Use By-Law 2003-514

.3 Ontario Regulation 387/04 -Water Taking

.4 Ontario Regulation 153/04- Records of Site Condition-Part XV.1 of the Act & Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.

.5 CCME -Canadian Environmental Quality Guidelines

1.4 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein and on the Drawings, including but not limited to:

.1 Appropriate submittals: site layout drawings, traffic control, emergency spill response, water management plan, dust control plan, soil tracking control plan, erosion and sediment control, operating procedures, weigh bills and receipts for materials disposal/recycling.

1.5 SEQUENCING AND SCHEDULING

.1 Work shall be sequenced so that vehicles do not travel over areas of the Site that have been remediated.

.2 Excavation Work shall not commence until all mitigation measures in Part 3 of this Section are in place.

.3 Excavation of material shall be carried out as per Section 02 61 00 – Soil Removals.

.4 All workers on-site are required to have NCC Site Access Level Security.

1.6 SUBMITTALS

.1 Site Layout: Within fourteen days of date of Notice to Proceed and prior to the mobilization to Site, submit Site layout Drawings showing existing conditions and facilities, construction facilities and temporary controls to be provided by the Contractor.

.2 The Contractor shall submit an Erosion and Sedimentation Control Plan, as per Clause 2.2 of this Section and an Emergency Spill Response Plan to the NCC Representative for review prior to beginning construction.

.3 The Contractor shall submit all documents listed in Section 01 33 00 – Submittal Procedures.

.3 The Contractor shall submit for review by NCC Representative proposed stormwater management methods and groundwater management methods at least 2 weeks prior to beginning Work.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Engineered Granular Fill: refer to Section 02 31 40 – Filling and Backfilling

2.2 EROSION AND SEDIMENT CONTROL

.1 Provide and maintain temporary measures, which may include but are not limited to: silt fence barriers, straw bales, flow checks and dams, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes and any other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off-Site or to other areas of the Site where damage might result. Ensure that sediment control measures are available during

construction. Installation of the erosion and sedimentation control measures should be in accordance with Ontario Provincial Standard Specifications (OPSS 805, OPSD-219.110).

PART 3 – EXECUTION

3.1 VEHICULAR ACCESS

.1 Maintenance and Use:

.1 Prevent contamination of access roads. Immediately collect debris or material on access roads which are suspected to be contaminated, as determined by the NCC Representative; transport and dispose of in appropriate off-Site landfill site. Clean access roads at least once per shift.

.2 The NCC Representative may collect soil samples for chemical analysis from the travelling surfaces of constructed and existing access routes prior to, during and upon completion of Work. Excavate and dispose of clean soil contaminated by the Contractor's activities at no additional cost.

3.2 DUST AND PARTICULATE CONTROL

.1 Execute Work so as to minimize creation of dust from operations.

.2 Implement and maintain dust and particulate control measures, as deemed necessary by the NCC Representative during construction and in accordance with provincial and municipal regulations and with Section 02 36 20 – Dust and Soil Tracking Control.

.3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use water or calcium chloride solution for dust and particulate control, as required.

.4 Affix appropriate covers on trucks hauling fine or dusty materials. Use watertight vehicles to haul wet materials.

.5 Prevent dust from spreading to adjacent property.

.6 The NCC Representative may stop Work at any time when the Contractor's control of dust and particulates is inadequate for wind conditions on-Site. There will be no compensation for Work stoppages.

.7 If the Contractor's control of dust and particulate in the atmosphere is not sufficient, a stop Work order will be issued. Make all necessary changes to operations prior to resuming any

excavation, handling, processing or any other Work that may cause release of dust or particulates.

3.3 POLLUTION CONTROL

.1 Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.

.2 Be prepared to intercept, clean up and dispose of spills or releases that may occur, whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on-Site.

.3 Spills should also be managed in accordance with the applicable regulatory requirements listed in Section 01 00 00.02 - General Requirements, Clause 1.8 (References and Codes) and Clause 1.34 (Emergency Spills).

.4 Promptly report spills and releases potentially causing damage to the environment to:

.1 Authority having jurisdiction or interest in spill or release, including any conservation authority, water supply authorities, drainage authority, road authority and fire department;

.2 Owner of pollutant, if known;

.3 Person having control over pollutant, if known; and,

.4 The NCC Representative.

.5 Take immediate action to contain and mitigate effects from spill or release on environment and people, using available resources.

3.4 EQUIPMENT DECONTAMINATION

.1 The Contractor shall decontaminate equipment after working in potentially contaminated Work areas, as well as prior to subsequent Work or travel in clean areas and prior to leaving the Site. This applies to both the Site and the selected off-site disposal facility.

.2 As a minimum precaution, perform following steps during equipment decontamination: mechanically remove packed dirt, grit and debris by scraping and brushing, without using water. If not effective in removing contaminated material from equipment, establish a washing station using high-pressure, low-volume, water. Any wash water is to be contained within the remediation limits and directed to retention tanks or equivalent for testing prior to off-Site discharge or disposal. Perform assessment, as

directed by the NCC Representative, to determine effectiveness of decontamination.

.3 Each piece of equipment may be inspected by the NCC Representative after decontamination and prior to removal from Site and/or travel in clean areas. The NCC Representative will have the right to require that additional decontamination be completed, if deemed necessary.

.4 Transfer wash water mud collected in the decontamination area to the selected off-site disposal facility along with any other contaminated soil materials.

3.5 PESONNEL DECONTAMINATION

.1 The Contractor shall make available a boot-brush and hand broom at all work area exits.

.2 The Contractor shall instruct all on-site labourers to clean soles of work boots prior to exiting the site, for decontamination purposes.

.3 The Contractor shall provide hand broom for purposes of removal of dusts/particulates from off of work clothing/PPE.

3.6 WATER CONTROL

.1 Maintain excavations free of water. Excavation areas shall be free of water in order to complete remediation activities and for NCC Representative to verify and accept the remediated area.

.2 Protect Site from puddling or running water. Grade Site to drain and backfill excavations to required elevation above the groundwater table following remediation in areas below the groundwater table or where surface water ponding has occurred, (see Section 02 31 40 – Filling and Backfilling).

.3 Provide sediment and erosion control as necessary to protect Site from soil erosion.

.4 Prevent surface water runoff from leaving Work areas.

.5 Do not discharge decontaminated water, surface water runoff or groundwater or any water feature, directly off the Site into existing water bodies or into municipal sewers (other than those so designated).

.6 Monitor and maintain surface drainage, including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks, except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.

.7 Dispose of water in manner not injurious to public health or safety, to property or to any part of Work completed or under construction.

.8 Provide, operate and maintain necessary equipment appropriately sized to keep excavations, staging areas and other Work areas free from water.

.9 Have on hand sufficient pumping equipment, machinery and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

.10 All dewatering and discharge of water will be in accordance with MOECC requirements, the City of Ottawa Sewer Discharge Agreement and City of Ottawa Sewer Use By-Law.

3.7 WATER MANAGEMENT FACILITIES

.1 Surface water and groundwater encountered during excavations to be collected and transferred to a retention tank or equivalent for testing prior to discharge to municipal sewers at a location to be determined by the NCC Representative.

.2 Stormwater dewatering pumps to be of sufficient size and capacity to efficiently handle the water volumes.

.3 Discharge from dewatering pumps to be filtered prior to discharge to the retention tank or equivalent.

.4 Free-phase petroleum products, if present, to be recovered using absorbent booms in the excavation zone. The booms will be supplied, installed, maintained, handled and disposed of in adequate containers at a licensed facility. Refer to Section 02 32 00 – Surface Water and Groundwater Management.

.5 Provide, operate and maintain retention tanks, or their equivalent, of sufficient volume to retain the water removed from the excavation. Retention tanks, or equivalent, must be of sufficient volume to allow for the settlement of suspended materials to occur to a degree which meets the City of Ottawa sewer discharge By-law requirements for suspended solids.

.6 Discharge from the retention tanks, or equivalent, is to be directed to the municipal sewer system, at a location to be determined by the NCC Representative.

.7 Samples of the discharge water shall be taken from the retention tanks, or equivalent, and tested in a laboratory approved by the NCC Representative. Results are to be approved by the NCC Representative prior to discharge. Testing parameters and

frequency to be in accordance with the requirements of the City of Ottawa sewer discharge By-Law requirements.

.8 The characteristics of the discharge water are to meet the requirements of the City of Ottawa storm sewer discharge criteria prior to discharge to the municipal sewer. If testing indicates that these requirements cannot be met, additional sediment removal or treatment are to be achieved. All costs for additional sediment removal, and all associated Work, is to be included in the Tendered price.

.9 If the characteristics of the discharge from the retention tank(s), or equivalent, does not meet the requirements of the City of Ottawa storm sewer by-law, for parameters other than those resulting from elevated suspended solids, the discharge shall be directed to the sanitary sewer system, at a location to be determined by the NCC Representative.

.10 The contractor is responsible for obtaining all permits and agreements for sewer discharge.

.11 The additional cost for disposal to sanitary will be the responsibility of the NCC if every effort has been made to reduce contaminant levels resulting from excess suspended solids content.

3.8 EROSION AND SEDIMENT CONTROL

.1 Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas and other Work areas. Prevent erosion and sedimentation in compliance with the Erosion and Sediment Control Plan prepared by the Contractor and reviewed by the NCC Representative.

.2 The Erosion and Sediment Control Plan will conform to Ontario Provincial Standard Specification 805.

.3 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical. Strip vegetation, regrade or otherwise develop in such a way as to minimize erosion. Remove accumulated mud resulting from activity from adjoining surface and from drainage systems within the Work area, and repair damage caused by soil erosion and sedimentation, as directed by the NCC Representative.

.4 Unless otherwise instructed by the NCC Representative, preserve at all times a 15 metre buffer zone between all Work areas from any watercourse. Preserve all existing vegetation within this buffer zone except as directed by the NCC Representative.

.5 Do not disturb existing embankments or embankment protection.

.6 Periodically inspects landscapes and earthworks to detect evidence of erosion and sedimentation; promptly apply corrective measures.

.7 The NCC Representative shall inspect and monitor the erosion and sediment measures on a regular basis and direct the Contractor to take corrective actions as may be necessary.

.8 If soil and debris from Site accumulate in low areas, sewers, roadways, gutters, ditches or any other areas where the NCC Representative determines it is undesirable, remove accumulation and restore area to its original condition. In the event the Contractor causes sediment to accumulate in a watercourse, the Contractor will have to obtain approval from National Capital Commission prior to removing accumulation and restoring area to its original condition.

.9 Maintain and repair all environmental protection measures (straw bales, end runs, undercutting beneath bales, silt fence barriers, rock flow check dams, etc.).

.10 Unless indicated or directed by the NCC Representative, remove temporary erosion and sediment control devices upon completion of Work. Mud accumulated in drainage ditches and in low points of the excavation shall be removed, hauled and disposed of at the selected off-site disposal facility.

3.9 PROGRESS CLEANING

.1 Maintain cleanliness of Work areas and surrounding Site to comply with federal, provincial, and local fire and safety laws, ordinances, codes, and regulations.

.2 Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

3.10 FINAL DECONTAMINATION

.1 Perform final decontamination of temporary installations, equipment, and materials that may have come in contact with potentially contaminated materials prior to removal from Site.

.2 Perform decontamination to remove potentially contaminated materials as specified to the satisfaction of the NCC Representative. The NCC Representative will direct the Contractor to perform additional decontamination if required.

3.11 REMOVAL AND DISPOSAL

.1 Remove surplus materials and temporary facilities from Site.

.2 Dispose of all non-contaminated waste materials, litter, debris, and rubbish off-Site.

.3 Do not burn or bury rubbish and waste materials on-Site.

.4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner as well as any other waste or wastewater in storm or sanitary drains, streams or waterways.

.5 Dispose of following materials at appropriate off-Site facility identified by the Contractor and approved by the NCC Representative: debris including excess construction material, non-contaminated litter and rubbish; disposable Personal Protection Equipment worn during removal operations; wastewater removed from wastewater storage tank, wastewater generated from final decontamination operations.

.6 Dispose of materials in accordance with Section 02 61 00 – Soil Removals, as directed by the NCC Representative.

END OF SECTION

PART 1 – GENERAL

1.1 OBJECTIVES

.1 Prevent the loss of soil from the construction site resulting from storm water runoff, wind erosion, and construction activities.

.2 Prevent the sedimentation of storm sewers and receiving waters.

.3 Prevent air pollution caused by dust and particulate matter.

.4 Comply with City of Ottawa erosion and sedimentation control policies.

1.2 DESCRIPTION OF WORK

.1 Implement the Erosion and Sedimentation Control (ESC) measures indicated in project documents including the Contractor's ESC plan.

.2 Install ESC products in accordance with manufacturer instructions and the prescribed installation procedures outlined in the referenced MTO documents.

.3 Inspect ESC measures on a weekly basis and following all significant storm events. If deficiencies are found, make repairs within 24 hours of detection.

.4 Maintain an ESC inspection log to document observations, deficiencies, and corrective actions.

1.3 REFERENCES

.1 Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects, February 2007 (as updated). Ministry of Transportation Ontario (MTO)

.2 U.S. Environmental Protection Agency, Office of Water. "Chapter 3: Sediment and Erosion Control" and Chapter 4: Other Controls". Document No. EPA B32-R-92-005 Storm Water Management for Construction Activities. 1992 .

.3 Canada Green Building Council. "Sustainable Sites Prerequisite 1: Erosion & Sedimentation Control". Leadership in Energy and Environmental Design Reference Package for New Construction & Major Renovations (LEED® Canada-NC) Version 1.0.2004.

1.4 CONTRACTOR RESPONSIBILITIES:

.1 The Contractor shall be responsible for:

.1 Supervising on-site ESC activities on a daily basis;

.2 Conducting ESC inspections;

.3 Coordinating ESC tasks with subcontractors to ensure timely and orderly progress of the work;

.4 Preparing ESC documentation and submittals;

.5 Reporting ESC progress to the NCC Representative.

1.5 SUBMITTALS

.1 Inspection Report - Schedule A

.1 Prepare the report to include all measures indicated. Report to be prepared following greater than 15 mm precipitation events.

.2 Complete a new report with each inspection and store completed reports with the inspection log documentation.

.2 Weekly Inspection Log - Schedule B

.1 Complete the log on a weekly basis and keep all documentation on-site and available for review by the NCC Representative.

.2 The weekly inspection log shall be completed for each inspection, and must document deficiencies for all measures indicated as "Not OK" on the inspection checklist.

.3 Each deficiency must be initialed and each log signed, only after all corrective measures have been completed and documented.

.4 Submit all ESC documentation (e.g. inspection report and inspection logs) to the NCC Representative as part of Closeout Submittals.

.3 Site Map:

.1 Prepare a site map on letter-size paper to record location of measures and deficiencies.

.2 Measures and deficiencies may be hand drawn and must be legible.

.4 Photographs:

.1 A minimum of three (3) digital photographs shall be taken (from various viewpoints) of each ESC measure implemented on-site immediately following installation.

.2 A minimum of three (3) digital photographs shall be taken (from the same viewpoints used in sentence 1) of each ESC measure implemented on-site at the end of construction or prior to dismantling, whichever comes first.

.3 Photographs shall have electronic date stamp.

.4 Submit all digital photographs to the NCC Representative within 7 days of being taken.

Part 2 – PRODUCTS NOT USED

Part 3 - EXECUTION

3.1 MEASURES

.1 Construct a Stabilized Construction Entrance (SCE) before construction begins at every point where traffic leaves the site and enters onto a public road and/or any unpaved entrance/exit location where there is a risk of transporting mud or sediment onto paved roads.

.2 The SCE is considered a minimum of 3.6 m wide and 13.0 m in length. The SCE shall be constructed using Mud Mats product by Terrafix Geosynthetics Inc. or approved equivalent.

Terrafix Geosynthetics Inc.
455 Horner Avenue
Toronto, ON
M8W 4W9
Phone: (416) 674-0363

.3 All construction trailers and equipment shall be positioned to reduce the disturbance of site. They shall be located close to the current phase of construction to minimize traffic damage to the site.

.4 If material in stockpile will not be used within 24 hours, it must be stabilized using one of the following measures:

- Tarps
- Compaction

.5 A tarp is required to prevent soil erosion/run-off during rain events or dust creation during windy conditions.

.6 Install ESC products in accordance with manufacturer instructions and the prescribed installation procedures in the referenced MTO document.

.7 Stakes shall be used to indicate limits of construction, grading and disturbance. Trees shall be clearly marked to be preserved and protected from ground disturbances around the base.

.8 Structural Practices

.1 Construct posts with a filter fabric media to remove sediment from storm water volumes flowing through the fence unless directed by the NCC Representative to fasten filter fabric to existing fence.

.2 The lower edge of the fabric is to be vertically trenched and covered by backfill.

.3 Filter fabric should be a pervious sheet of polypropylene, nylon, polyester, polyethylene or equivalent and have the following characteristics:

- Filtering Efficiency: 75%-85% (minimum)
- Tensile Strength at 20% Standard Strength - 30 Ib/linear in. (min.)
- (maximum) Elongation Extra Strength 50 Ib/linear inch
- Slurry Flow Rate 0.3 gal/ft^2/min (maximum)

.9 Outlet Protection

.1 Install stone, riprap or settling basins at all pipe, interceptor dike, swale, or channel section outlets where the velocity of flow may cause erosion or pools at the outlet of an ESC measure.

.10 Inlet Protection

.1 Install filter fabric around catch basins and manhole covers to prevent silting of inlets, storm drainage systems, or receiving channels.

.11 Check Dams

.1 Install check dams in steeply sloped swales, or in swales where adequate vegetation cannot be established, and only in small open channels which will not overflow once dams are constructed.

.2 Construct a small, temporary or permanent dam of straw bales across a drainage ditch, swale, or channel to slow water flow and allow suspended sediment to settle.

.12 Drainage Swale

.1 Construct a channel with a lining of vegetation, riprap, asphalt, concrete, or other material to convey runoff from the bottom or top of a slope.

.2 Intercepted runoff shall be diverted to an appropriate outlet with sediment trap if required; swale shall have a positive grade with no dips to collect water.

.3 Swale shall be lined using geo-textiles, grass, sod, riprap, asphalt, or concrete - based on the volume and velocity of the expected runoff.

.13 Other Measures

.1 Implement additional measures as required by local jurisdictions.

3.2 INSPECTIONS AND MAINTENANCE

.1 Inspection procedures specified below summarize the MTO document and shall be followed in conjunction with details, drawings, and manufacturer requirements.

.2 All control measures shall be inspected at least once each week (unless otherwise noted) and following any significant storm event (15 mm of precipitation or greater). The inspection log shall be completed for each inspection, and kept in an accessible location on site until all corrective measures have been documented. Each competed log must be submitted to the NCC Representative for review. Each completed inspection report must be submitted to NCC Representative for review.

.3 All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.

.4 Stabilized Construction Entrance: Remove and replace mats as damaged mats as required, remove sediments and other materials from all areas to minimize clogging. Keep adjacent public roadway(s) free of sediment.

.5 Site Arrangement: Complete construction activities in distinct phases with the ESC stabilization of each phase completed before progressing to the next phase.

.6 Material Stockpile: Inspect for effective prevention of runoff and erosion. Remove built-up sediment from silt fence when it has reached 1/3 of the height of the filter fabric.

.7 Preservation of Natural Vegetation: Remove any debris, and ensure area is protected from traffic.

.8 Silt Fence: Silt fence to be inspected for depth of sediment, tears, loose fabric attachment at the fence posts, channel erosion beneath fence, sagging or collapse, and to ensure the fence posts are firmly in the ground. Built up sediment is to be removed from silt fence when it has reached one-third the height of the fence. Conduct repairs such that fence is in original installation condition.

.9 Outlet Protection: Inspect outlet for erosion and pooling of water. Necessary repairs to be made as required reducing exit velocity of runoff. If a riprap apron is used, inspect for riprap displacement and damage to filter fabric.

.10 Inlet Protection: Inspect that measures are in original installed condition. Ensure measures are effectively trapping sediment. Remove accumulated sediment and debris. Repair protection measures as required.

.11 Surface Roughening: Inspect for small eroded watercourses, as little as a few inches deep, or washout of roughened grading. Fill, re-grade, and reseed immediately.

.12 Check Dams: Inspect for sediment and debris accumulation and erosion of sides. Sediment should be removed when it reaches one half of the original dam height. Repair dams as required.

.13 Drainage Swale: Inspect for dips or low points along the swale where water is pooling and ensure that runoff is being directed to sediment-trapping measure used on site.

3.3 REMOVAL OF PRODUCTS

.1 ESC measures shall be fully inspected and maintained until final landscaping adjacent to ESC measures is completed.

.2 Removal of ESC measures shall be by the Contractor to an offsite disposal location. Cost for associated disposal fees shall be included in the Contractors price.

Erosion and Sedimentation Control
Inspection Report

Project Name: _____

Completed by: _____ Date: _____

Weekly Inspection?: Y or N

Post Significant Rainfall Inspection?: Y or N

Instructions

Inspections shall be carried out weekly and following any significant precipitation (15 mm or greater).

For each measure:

- Check the "Pass" box if there are no repairs or maintenance required;
- Check the "Fail" box if attention is required per the inspection/maintenance procedures in the ESC Specification.

Include site map indicating locations of measures indicated.

Pass	Fail	Measure	Location on Site
		Preserve existing trees	Where indicated
		Silt Fence	Site perimeter, where required
		Stabilized Construction Entrance	All site entrances
		Silt Fence	base of material stockpiles, where required
		Inlet Protection	Storm sewer inlets and catch basins
		Outlet Protection	Install rip-rap to reduce flow rate of run-off water where required.
		Tarping or Compaction using Bulldozer (treads perpendicular to slope)	Material stockpiles that will be undisturbed for greater than 24 hrs
		Check Dams (Straw Bale)	Where required

Inspection Log
Enter all inspection reports in Inspection Log.

All deficiencies shall be corrected within 24 hours of inspection.

For all measures marked as "Fail," the Inspection Log must be completed. List the measures that are deficient in the "Deficiencies" column on the Log sheet and record the maintenance performed. Submit checklist and the inspection log to the NCC Representative after all maintenance activities have been completed and recorded.

Notes:

Erosion & Sedimentation Control
Weekly Inspection Log – Schedule B

Project Name: _____ Log Number: . _____

Log Start Date: . _____ Project Address: _____

Log End Date: . _____

Log Complete by: . _____

Company: . _____

Telephone No: . _____

Inspection Date	General Observations (i.e. site conditions, weather, temp)	Deficiencies (& location)	Corrective Measures	Date	Initials

Signature of Authorized Official Title Date

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Health and safety considerations required to ensure that the *Commission* shows due diligence towards health and safety on construction sites, and meets the requirements laid out in the *Commission's Policy* - Occupational Health and Safety for Construction.

1.2 RELATED REQUIREMENTS

.1 **Section 02 11 00 Summary of Work - Soil Removals**

.2 **Appendix 1 - Designated Substance Specifications.**

1.3 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Ontario

.1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c.0.1, as amended and O. Reg. 213/91 as amended - Updated 2014 O. Reg. 252/14.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Section 01 00 00.02 General Requirements – Soil Removals

.3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to *NCC Representative* weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.7 *NCC Representative* will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to *NCC Representative* within 3 days after receipt of comments from *NCC Representative*.

.8 *NCC Representative*'s review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to *NCC Representative*.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.5 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.6 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.7 MEETINGS

.1 Schedule and administer Health and Safety meeting with *NCC Representative* prior to commencement of Work.

1.8 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Various hazardous materials are present within both buildings and site. **See Appendix 1 - Designated Substance Specifications by DST Consulting Engineers for building related materials.**

.2 **See Section 02 61 00 - Soil Removal for soil related materials.**

1.10 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 *NCC Representative* may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.11 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

.3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.12 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91 as amended - Updated 2014 O. Reg. 252/14.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.13 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Safety Officer and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise *NCC Representative* verbally and in writing.

1.14 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have minimum 2 years site-related working experience specific to activities associated with **demolition and site remediation**.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.15 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with *NCC Representative*.

1.16 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by *NCC Representative*.

.2 Provide *NCC Representative* with written report of action taken to correct non-compliance of health and safety issues identified.

.3 *NCC Representative* may stop Work if non-compliance of health and safety regulations is not corrected.

1.17 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by *NCC Representative*.

1.18 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from *NCC Representative*.

1.19 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 13 Special Requirement for Contaminated Sites

.2 Section 01 35 25 Erosion and Sediment Control

1.2 REFERENCES

.1 Province of Ontario

.1 Occupational Health and Safety Act, R.S.O. 2004.

.2 Canada Labour Code, Canada Occupational Safety and Health Regulations 2002.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures and Section 01 35 13 Special Procedures for Contaminated sites.

.2 Submit site-specific Health and Safety Plan, within 7 days after date of Notice to Proceed and prior to mobilization to site. Address following items:

.3 Safety and health risk or hazard analysis for each site task and operation found in work plan.

.4 Develop checklist for items to be inspected on a daily basis. Document actions taken.

.5 Personnel training requirements including:

.1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

.2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan.

.6 Personal protective equipment (PPE) program addressing:

.1 Donning and doffing procedures.

.2 PPE selection based upon site hazards.

.3 PPE use and limitations of equipment.

.4 Work mission duration, PPE maintenance and storage.

.5 PPE decontamination and disposal.

.6 PPE inspection procedures prior to, during, and after use.

.7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.

.8 Medical surveillance requirements for personnel assigned to work at site.

.9 Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.

.10 Site control measures employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.

.11 Decontamination procedures for both personnel and equipment.

.12 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

.13 Written respiratory protection program for project activities.

.14 Procedures dealing with heat and/or cold stress.

.7 *NCC Representative* will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to *NCC Representative* within 5 days after receipt of comments from *NCC Representative*.

.8 Medical Surveillance: submit certification of medical surveillance for site personnel, within 7 days after date of Notice to Proceed and prior to mobilization to site. Submit additional certifications as personnel are sent to site.

.9 Respirator Fit Testing: submit proof of respirator fit testing for site personnel, within 7 days after date of Notice to Proceed and prior to mobilization to site.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 REGULATORY REQUIREMENTS

.1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.5 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan prior to commencing site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Ensure Health and Safety guidelines provide for safe and minimal risk working environment for site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.

.3 Relief from or substitution for portion or provision of minimum Health and Safety Guidelines specified or reviewed site-specific Health and Safety Plan must submitted to *NCC Representative* in writing. *NCC Representative* will respond in writing, either accepting or requesting improvements.

1.6 RESPONSIBILITY

.1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HAZARD COMMUNICATION REQUIREMENTS

.1 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulation, R.R.O.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.

.3 Provide *NCC Representative* with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site.

1.8 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. *NCC Representative* may also stop Work for health and safety considerations.

1.9 UNFORESEEN HAZARDS

.1 Should unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, stop work and immediately advise *NCC Representative* verbally and in writing.

1.10 PERSONNEL HEALTH, SAFETY, AND HYGIENE

.1 Medical Surveillance:

.1 Conduct medical surveillance of personnel as required by specified regulations.

.2 Training: ensure personnel entering site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.

.3 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity. Provide minimum PPE required for each level of protection required and identify in Site Specific Health and Safety Plan.

.1 Provide minimum standards and equipment types for:

.1 Respiratory

.2 Head, Eye and Ear Protection

.3 Hand and Foot Protection

.4 Clothing

.5 Other

.4 Personal Protective Equipment:

.1 Furnish site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and maintained.

.5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:

.1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.

.2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.

.3 Dispose of or decontaminate PPE worn on site at end of each workday.

.4 Decontaminate reusable PPE before reissuing.

.5 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.

.6 Ensure facial hair does not interfere with proper respirator fit.

.6 Respiratory Protection:

.1 Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.

.2 Develop, implement, and maintain respirator program.

.3 Monitor, evaluate, and provide respiratory protection for site personnel.

.4 Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified on site.

.5 Ensure appropriate respiratory protection during work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.

.6 Assess ability for site personnel to wear respiratory protection.

.7 Ensure site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.

.7 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:

.1 Suitable containers for storage and disposal of used disposable PPE.

.2 Potable water and suitable sanitation facility.

.8 Emergency and First-Aid Equipment:

.1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.

.2 2 self-contained breathing apparatus units; blankets and towels; stretcher; and 1 hand-held emergency siren.

.3 As minimum, provide 1 certified first-aid technician on site at all times when work activities are in progress.

.9 Site Communications:

.1 Post emergency numbers near site telephones.

.2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.

.3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.

.4 Furnish selected personnel with 2-way radios.

.5 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

.10 Custodian: employ and assign to Work Custodian to report directly to Health and Safety Officer and who is responsible for keeping safety equipment and facilities clean, properly

equipped, and maintained. Custodian may perform other duties for Contractor but Custodian's first priority is maintenance of protective equipment and personnel decontamination area.

1.11 CONTINGENCY AND EMERGENCY RESPONSE

.1 Meet specified requirements.

.2 Arrange and attend co-ordination meeting held with appropriate authorities including City, Fire, Hospital, Provincial and City Police, Ministry of Transportation, Ministry of Health, and Community Emergency Co-ordinator; meeting will identify off-site Emergency Response Co-ordinator through whom information and co-ordination will occur in event of incident.

1.12 SITE CONTROL

.1 Prior to commencing work involving handling of drums and other containers, submit procedures for safe handling of drums and other containers. Implement and enforce drum handling program during activities involving drummed waste characterization including but not limited to handling, opening, sampling, staging, and consolidating.

.1 Occupational Health and Safety Act, Regulations for construction projects, O. Reg., Part II - General Construction.

.2 Occupational Health and Safety Act, Industrial Establishments Regulation, R.R.O., Part I - Safety Regulations.

.3 Canada Labour Code, Canada Occupational Safety and Health Regulations, Part XI - Confined Spaces.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 02 31 10 – Site Grading and Access Roadways
.2 Section 02 61 00 – Soil Removals

1.3 DEFINITIONS

.1 Traffic Control Device(s) (TCD): A generic term used to describe any person, sign, signal, marking or device placed upon, over or adjacent to a roadway by or at the direction of a public authority or official having jurisdiction (such as the City of Ottawa) or their designate, for the purpose of regulating, warning, guiding or informing a vehicle operator or pedestrian of an existing condition or hazard.

.2 Traffic Control Plan (TCP): A detailed plan for the control of traffic, including vehicular and pedestrian movements, required to allow the Contractor to fulfill all conditions of the Contract, taking into account the organized, systematic safe conduct of the project. This includes, as applicable, detours, staging sequences, work, public and emergency vehicle access and egress, public access and separation from hazardous areas, temporary barriers, removal of old pavement markings, and the selection of appropriate typical layouts and devices necessary for traffic control.

.3 Traffic Control Persons (TCP's): A person duly trained and authorized to direct traffic at a work zone through the use of the Traffic Control Sign (STOP/SLOW Paddle).

.4 Traffic Protection Plan (TPP): A plan required by the Occupational Health and Safety Act and its regulations for the protection of workers in a work zone. The plan must contain a written description of the traffic hazards to which workers may be exposed and measures used to protect them.

.5 Traffic Management Plan (TMP): TMP means a standard outlining the particulars of proposed Work on any road within the City and is submitted by or on behalf of the Contractor to the City of Ottawa for approval, as may be required. The traffic management plan shall contain the information respecting how the applicant intends to comply with City of Ottawa by-laws including but not limited to the following:

a) start and completion times of Work;
b) specific location of Work;
c) requirement to Work during peak hours, if any;
d) lane use requirements;
e) trucking queue line requirements / location;

f) requirements for road closure;
g) public notification undertaken;
h) parking meters affected by Work;
i) requirement for temporary no stopping signs;
j) identification of any bus route(s) and bus stops affected by Work activity; and,
k) traffic routing and detour requirements where required.

1.4 REFERENCE STANDARDS

.1 Ontario Traffic Manuals (OTM), most recent:
- .1 Book 1 – Introduction of the Ontario Traffic Manuals
- .2 Book 5 – Regulatory Signs
- .3 Book 6 – Warning Signs
- .4 Book 7 – Temporary Conditions
- .5 Book 11 – Markings and Delineations
- .6 Book 12 – Traffic Signs

1.5 SITE ACCESS GATE

.1 Contact NCC Representative to verify truck maneuvering constraints at access gate point. Hauling operations may need to be modified to minimize circulation conflicts at access gate.

1.6 PROTECTION OF PUBLIC FROM TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to present minimum of interference and hazard to traveling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.3 Do not close any lanes of road without approval of NCC Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in the OTM, Book 7.

.4 Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.

.1 Provide minimum 7 m wide temporary roadway for traffic in two-way sections through Work Area and on detours.

.2 Provide minimum 3.5 m wide temporary roadway for traffic in one-way sections through Work Area and on detours.

1.7 SUBMITTALS

.1 Preconstruction Submittals.

.1 Submit Traffic Control Plan within 7 working days after Contract award showing all required traffic control and protection systems to be installed, operated, maintained and removed by the Contractor.

.2 Contractor to submit a detailed Traffic Management Plan within 7 working days after Contract award. The Contractor shall be responsible for submitting the plan to the City of Ottawa for their review and approval, as may be required.

1.8 INFORMATIONAL AND WARNING DEVICES

.1 Provide, install and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project Work.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in the OTM. All signs to be bilingual.

.3 Place signs and other devices in locations recommended in the OTM.

.4 Meet with NCC Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on-Site changes, revise list following approval of NCC Representative.

.5 Continually maintain traffic control devices in use by:

1. Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace signs to ensure clarity and reflectance.

2. Removing or covering signs which do not apply to conditions existing from day to day.

1.9 CONTROL OF PUBLIC TRAFFIC

.1 Provide flag persons, trained in accordance with, and properly equipped as specified in the OTM in the following situations:

.1 When public traffic is required to pass working vehicles or equipment which blocks all or part of travelled roadway.

.2 Where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use. Flag persons shall be provided (one at each access point to the Site) during peak periods.

.3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 Where temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workmen, working equipment and public traffic is not provided by other traffic control devices.

.7 Delays to public traffic due to Contractor's operations: maximum 5 minutes.

1.10 OPERATIONAL REQUIREMENTS

.1 If any hauling operations are undertaken during the seasonal load restriction period, the City of Ottawa seasonal road restrictions must be followed.

.2 Hauling operations should be organized to minimize circulation on public roads during peak hours to the extent possible. This implies that during peak hours, efforts will be made to operate less than the average number of trucks each direction per hour, with volumes in the off peak hours making up the difference.

.3 The contractor shall ensure there is no deposit and build up of soil and other debris on road surface due to the Work. Cleanup on public roads by means of water trucks as per standard construction practice.

.4 The contractor will be required to use tarpaulin, retractable or otherwise, on every truck leaving the Site to minimize the possibility of debris exiting the truck during transport.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 **Appendix 1 - Designated Substance Specifications**.

1.2 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify the NCC Representative. Refer to **Appendix 1 - Designated Substance Specifications**.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify NCC Representative. Refer to **Appendix 1 - Designated Substance Specifications**.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify NCC Representative. Refer to **Appendix 1 - Designated Substance Specifications**.

1.4 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008, Stipulated Price Contract.

1.2 INSPECTION

.1 Refer to CCDC 2, GC 2.3 .

.2 Allow *NCC Representative* access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by *NCC Representative* instructions, or law of Place of Work.

.4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.5 *NCC Representative* will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, *NCC Representative* shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by *NCC Representative* for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by *NCC Representative*.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by *NCC Representative* at no cost to *NCC Representative*. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency and *NCC Representative* in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

.1 Refer to CCDC, GC 2.4 .

.2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by *NCC Representative* as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.3 Make good other Contractor's work damaged by such removals or replacements promptly.

.4 If in opinion of *NCC Representative* it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by *NCC Representative*.

1.7 REPORTS

.1 Submit electronic copies of inspection and test reports to *NCC Representative*.

.2 Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by NCC Representative and may be authorized as recoverable.

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to *NCC Representative*.

.3 Prepare mock-ups for *NCC Representative*'s review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.10 MILL TESTS

.1 Submit mill test certificates as requested..

1.11 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 00 Traffic Control

.2 Section 02 31 10 Site Grading and Access Roadway

.3 Section 02 61 00 – Soil Removals

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 CONSTRUCTION FENCE

.1 Erect temporary site enclosures to enclose and secure the project site and associated laydown area, and provide screening from construction activities.

.2 Plywood construction fence.

.1 All fencing wood materials to be new, Grade 1 or 2 or better.

.2 Wood construction fence as detailed on drawings.

.3 Fencing to remain after project completion, and will be come property of the NCC.

.3 Provide one double 6 m double lockable entrance gate and at least two 915 mm pedestrian gates as directed and conforming to applicable traffic restrictions on adjacent streets. Pedestrian gates are to be equipped to provide unrestricted egress access.

.4 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

.5 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure and snow loading.

1.6 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.9 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with *NCC Representative* locations and installation, schedule days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

.2 This Section applies to all construction Work involved on the Site.

.3 Where there is a conflict between this Section and the other Sections of the Specifications, the most stringent shall apply in all cases.

1.2 RELATED WORK

.1 This Section applies to all sections included in the Specifications.

1.3 OUTLINE OF WORK

.1 The Contractor shall provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein and on the Drawings, including but not limited to:

.1 Conduct the Work in a manner to prevent detrimental impacts on the Environment (air, water, soil and biota).

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION

3.1 FIRES

.1 Fires and burning of rubbish on-Site are not allowed.

.2 The Contractor shall provide supervision, attendance and fire protection measures as directed.

3.2 DISPOSAL OF WASTES

.1 The Contractor shall not bury rubbish and waste materials on-Site.

.2 The Contractor shall not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner on-Site or into waterways, waterbodies, storm or sanitary sewers.

3.3 DRAINAGE

.1 Drainage to be controlled within the Work area according to Section 02 32 00 – Surface Water and Groundwater Management and Section 01 35 13 – Special Procedures for Contaminated Sites to prevent uncontrolled release of Site surface water or groundwater to waterbodies, sewers or other potential receivers.

3.4 SITE CLEARING, TREE AND PLANT PROTECTION

.1 Contractor shall prepare a Tree Protection Plan, for review and acceptance by the NCC Representative;

.2 Protect trees and plants as required outside the Work area as indicated on the Drawings and on adjacent properties.

.3 No trees shall be removed, cut or disturbed outside the Work Area Limits in any way without the explicit written authorization from the NCC Representative.

.4 Contractor shall retain an Arborist (ISA –certified) for evaluation of tree condition and assess tree protection requirements.

.5 Perform all Work necessary and required to protect and maintain all trees, shrubs and groundcover, not identified for removal, within the limits of the Work Area in healthy growing condition at all times during the Project. The preservation of designated existing trees to remain is a critical project requirement. The Contractor is to take all necessary precautions to protect the existing trees from injury or death. Protection shall be given to the roots, trunk, limbs and foliage of all trees to be preserved.

.6 Contractor shall be directly responsible for protection and welfare of existing trees within the limits of the Work and directly adjacent to limits of the Work. This responsibility shall continue until the entire Project is completed and accepted by the NCC Representative.

.7 The Tree Protection Zone is defined for each individual species. Species tolerant to construction impacts and the tree's age determine the radius of the Tree Projection Zone. The Tree Projection Zone is defined as 0.5m per 25mm of trunk diameter, unless otherwise specified by the NCC Representative.

.8 It shall be the responsibility of the Contractor to call for a pre-construction meeting at the Project site with the NCC Representative to review what work is to be conducted near trees, which trees are to be preserved, discuss what mitigation measures are required for potential impacts on trees to be preserved and establish the pre-construction conditions of all

existing trees. The Contractor and NCC Representative shall document the condition of the trees within and immediately adjacent to the Remediation area.

.9 Contractor shall install tree protection fencing around trees to be preserved at a distance required from the base of trunk to encompass the protection zone. All fencing shall remain in place until Project completion, and it shall then be removed only as directed by the NCC Representative. Tree protection fencing shall be chain-link fencing with minimum 1.8 m height on concrete anchor blocks, unless otherwise noted. During construction, fencing may only be relocated after notifying the NCC Representative.

.10 During the course of construction, no roots larger than 50 mm in diameter are to be cut without prior written approval by the NCC Representative.

.11 Do not permit the following within the tree protection zone of an existing tree, except as specified in this section:

.1 Storage or parking of vehicles or construction equipment;

.2 Stockpiling of soil, debris, building materials, or refuse;

.3 Skinning or bruising of bark;

.4 Dumping of poisonous materials on or around trees and roots;

.5 Use of trees as support posts, power poles or signposts or other similar functions;

.6 Damage to trunks, limbs or foliage caused by manoeuvring vehicles or equipment too close to the tree;

.7 Compaction of the root area by movement of trucks, grading machines or other equipment, storage of earth, fill, or construction supplies, etc.

.12 Excavation within the Tree Protection Zone shall be done only where absolutely necessary and at the direction and with written approval from the NCC Representative. Backfilling within the Tree Protection Zone shall be performed using approved fill material without the use of mechanical compaction equipment. Cutting or pruning of trees within the Tree Protection Zone shall be done only with the specific permission and direction of the NCC Representative.

3.5 FLORA AND FAUNA HABITAT PROTECTION

.1 All the water collected within the Work area must be managed according to Section 02 32 00 – Surface Water and Groundwater Management and Section 01 35 13 – Special Procedures for Contaminated Sites in order to preserve existing aquatic habitats.

.2 All Work activities with the potential to disturb or destroy migratory birds, such as vegetation clearing (excluding short grass) and fill placement in vegetated areas, will not take place in migratory bird nesting habitat during breeding season, which is defined to be from May 1 to August 10 for most species utilizing these habitats in this region of Ontario.

.3 If Work affecting breeding bird habitats must be completed during the identified breeding season for migratory birds, the services of a qualified avian biologist will be obtained by the NCC Representative to conduct a nest survey prior to commencement of the Work to identify and locate nests of species covered by the Migratory Birds Convention Act, 1994.

3.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed as per this Contract.

.2 Control emissions from equipment to local authorities' emission requirements. Make sure that the exhaust system of all machinery is in good condition.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Dispose of wastes materials off-Site on a weekly basis, or as required.

.4 Turn off the engines of haulage trucks waiting to be loaded or unloaded if waiting time is uncertain or prolonged.

3.7 ENVIRONMENTAL CONTROL

.1 The Contractor is responsible for ensuring all environmental controls described in Sections 01 35 13 – Special Procedures for Contaminated Sites; 02 32 00 – Surface Water and Groundwater Management; 02 36 20 – Dust and Soil Tracking Control; 02 61 00 – Soil Removals.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 01 00 00.02 – General Requirements

.2 Section 01 33 00 –Submittal Procedures

.3 Section 01 78 00 – Closeout Submittals

1.3 REQUIREMENTS INCLUDED

.1 Surveying and Field Engineering services

1.4 QUALITY CONTROL

.1 Land Surveyor: Registered in the Province of Ontario, and acceptable to the NCC.

.2 Professional Engineer: Registered Professional Engineer of the discipline required for specific service on Project, licensed in the province of Ontario.

1.5 PROJECT CLOSEOUT SUBMITTALS

.1 Submit certificate signed by the Surveyor and/or the Engineer certifying that all elevations and locations of improvements are in conformance with Contract Documents.

1.6 PROJECT RECORD DOCUMENTS

.1 The Contractor shall maintain complete, accurate log of control and survey work as it progresses.

.2 Submit Pre-Construction Survey.

.3 Submit Post- Excavation Survey.

.4 Submit Post-Backfill and Final Grading Survey, as listed under provisions of Section 01 78 00- Closeout Submittals.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 SURVEY REFERENCE POINTS

.1 Establish, maintain and protect survey control points prior to starting work, using base reference points as shown on Plans. Promptly notify the NCC Representative of any discrepancies discovered.

.2 Provide a survey of existing conditions for the area within “boundaries of survey” which is defined as the Work Area. Provide bearing and distances of all property lines within the survey boundaries.

.3 Provide one suitable permanent reference monument. Reference monuments shall be identified by X, Y coordinates related to certificate in accordance with North American Datum of 1983 (NAD 83) and Modified Transverse Mercator (MTM) projection (3°, zone 9) using a survey grid density of at least 10 metres plus topographically significant features.

.4 Locate all existing trees six inches or larger trunk diameter, for the area within “boundaries of survey”, with assistance from the project NCC landscape representative in identifying trees of significance. Approximate foliage of the canopy will be noted.

.5 Turn in two (2) signed and sealed copies of survey and digital media of survey data in AutoCAD Release 2000 or higher. Survey shall include NAD83 Coordinates System Grid.

.6 All known and visible utility services, including pipe size, the locations, invert elevations and directions of flow of all piping, mains, sewers, poles, wires, hydrants, catch basins and manholes upon, over or under the site, or adjacent to the site within the approved scope of survey, including but not limited to fuel tanks, including the name of the operating authority of each utility.

.7 Official data upon which the elevations are based and the bench mark established on or adjacent to the site shall be clearly indicated. Only one such data point or benchmark shall be used on any one site for establishing the grades for a project.

3.2 PREPARATION

.1 Establish a minimum of one permanent bench mark on site, referenced to established control points. Record locations, with horizontal and vertical data, on Project Record Documents.

.2 Verify the accuracy of all lines and grades given on the Plans with existing lines and grades and immediately call all discrepancies to the NCC Representative, in writing, requesting determination before proceeding with the work.

.3 Establish lines and levels, locate and lay out by instrumentation and similar appropriate means:

1. Site improvements, including pavements; stakes for grading, fill and topsoil placement, utility locations, slopes and excavation invert elevations.

2. Grid or axis for structures.

3. Building foundation, column locations, and ground floor elevations.

4. Rim elevations of the Site including rim elevations of Drainage and Structures to ensure positive drainage.

5. Periodically verify layouts by same means.

3.3 SURVEYS FOR MEASUREMENT AND PAYMENT

.1 When required in the Technical Specifications, perform surveys to determine quantities of unit cost work, including control surveys to establish measurement reference lines.

.2 The NCC Representative shall be provided with duplicate of surveyor field notes for purposes of calculation and certification of quantities for payment purposes.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 00 00.02 - General Requirement – Soil Removals

.2 Section 02 11 00 - Summary of work – Soil Removals

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008, Stipulated Price Contract.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by NCC Representative. Do not burn waste materials on site.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by NCC Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors .

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.11 Wax, seal or prepare floor finishes, as recommended by manufacturer.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs, gutters, areaways, and sunken wells.

.16 Sweep and wash clean paved areas.

.17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.18 Clean roofs, downspouts, and drainage systems.

.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.20 Remove snow and ice from access to building.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal .

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with *NCC Representative* to review and discuss Waste Management Plan and Goals.

.2 Waste Management Goal 70 percent of total Project Waste to be diverted from landfill sites. Provide *NCC Representative* documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

.3 Accomplish maximum control of solid construction waste.

.4 Preserve environment and prevent pollution and environment damage.

1.2 RELATED SECTIONS

.1 Section 00 02 00 – Waste Reduction Workplan Submission Requirements.

.2 Section 00 06 00 Waste Reduction Submission Form.

.3 Section 01 33 00 - Submittal Procedures

1.3 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.11 Separate Condition: refers to waste sorted into individual types.

.12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.

.14 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.4 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

.1 Waste Audit.
.2 Waste Reduction Workplan.
.3 Material Source Separation Plan.
.4 Schedules A, B, C, completed for project.

1.5 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures .

.2 Prepare and submit following prior to project start-up :

.1 Submit 2 copies of completed Waste Audit (WA): Schedule A.
.2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.
.3 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.
.4 Submit 2 copies of Materials Source Separation Program (MSSP) description.
.5 For each of the above submit also electronically.(email / CD-ROM).

.3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.

.1 Failure to submit could result in hold back of final payment.
.2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
.3 For each material reused, sold or recycled from project, include amount in tonnes quantities by number, type and size of items and the destination.
.4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.6 WASTE AUDIT (WA)

.1 Conduct WA prior to project start-up .

.2 Prepare WA: Schedule A.

.3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.7 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

.1 Destination of materials listed.
.2 Deconstruction/disassembly techniques and sequencing.
.3 Schedule for deconstruction/disassembly.
.4 Location.
.5 Security.
.6 Protection.
.7 Clear labelling of storage areas.
.8 Details on materials handling and removal procedures.
.9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

.9 Coordinate with Section 00 02 00 Waste Reduction workplan Submission Requirements and Section 00 06 00 Waste Reduction WorkPlan Submission.

1.8 DEMOLITION WASTE AUDIT (DWA)

.1 Prepare DWA prior to project start-up.

.2 Complete DWA: Schedule C.

.3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

.4 Coordinate with Section 00 02 00 Waste Reduction workplan Submission Requirements and Section 00 06 00 Waste Reduction WorkPlan Submission.

1.9 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by NCC Representative .

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

.1 Transport to approved and authorized recycling facility to users of material for recycling.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship materials to site operating under Certificate of Approval premises of Owner.

.2 Materials must be immediately separated into required categories for reuse or recycling.

1.10 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by NCC Representative .

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify NCC Representative .

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.
.3 Provide waybills for separated materials.

1.11 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil and paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

.1 Number and size of bins.
.2 Waste type of each bin.
.3 Total tonnage generated.
.4 Tonnage reused or recycled.
.5 Reused or recycled waste destination.

.4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.12 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility .

1.13 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 SELECTIVE DEMOLITION

.1 Reuse of Building Elements: this project has been designed to result in end of project rates for reuse of building elements as follows: do not demolish building elements beyond what is indicated on Drawings without approval by NCC Representative.

3.2 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.3 CLEANING

.1 Clean-up work area as work progresses.

.2 Source separate materials to be reused/recycled into specified sort areas.

3.4 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by NCC Representative, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of salvaged recovered reusable recyclable materials is permitted is not permitted.

.3 Demolition Waste:

3.5 WASTE MANAGEMENT SCHEDULES

.1 As per Section 00 06 00 Waste Reduction Workplan Submission

3.6 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West Toronto ON M4V 1P5	416-323-4321 800-565-4923	416-323-4682

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify *NCC Representative* in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request *NCC Representative* inspection.

.2 *NCC Representative* Inspection:

.1 NCC Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates for tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, adjusted and balanced and fully operational.

.4 Operation of systems: demonstrated to Owner's personnel.

.5 Commissioning Decommissioning of mechanical systems: completed in accordance with General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to NCC Representative .

.6 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by NCC Representative, and Contractor.

.2 When Work incomplete according to Owner and *NCC Representative*, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when *NCC Representative* considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:

.1 When *NCC Representative* considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 Refer to Section 01 00 00.01 General Requirements when Work deemed incomplete by NCC Representative , complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning .

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with contractor's representative and *NCC Representative*, in accordance with Section 01 00 00.01 General Requirements to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 *NCC Representative* to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures .

.2 Two weeks prior to Substantial Performance of the Work, submit to the *NCC Representative* three printed and electronic final copies of operating and maintenance manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by process flow, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of NCC Representative, Sub-contractor, Contractors and name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control .

1.5 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for NCC Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by NCC Representative .

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by NCC Representative

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.7 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and General Commissioning (Cx) Requirements.

.15 Additional requirements: as specified in individual specification sections.

1.8 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 Provide information for re-ordering custom manufactured products .

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.9 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to *NCC Representative.*

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to *NCC Representative.*

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to *NCC Representative.*

.2 Include approved listings in Maintenance Manual.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by *NCC Representative.*

1.11 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to *NCC Representative* approval.

.3 Warranty management plan to include required actions and documents to assure that *NCC Representative* receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.7 Conduct joint 5 month and 11 month warranty inspection, measured from time of acceptance, by *NCC Representative.*

.8 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems, .

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 5 and 11 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.9 Respond in timely manner to oral or written notification of required construction warranty repair work.

.10 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the *NCC Representative* to proceed with action against Contractor.

1.12 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by *NCC Representative.*

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 01 35 13 – Special Procedures for Contaminated Sites
.2 Section 01 35 25 – Erosion and Sediment Control
.3 Section 01 35 30 – Traffic Control
.4 Section 01 56 10 – Environmental Protection
.5 Section 01 71 10 – Surveying and Field Engineering
.6 Section 01 78 00 – Closeout Submittals
.7 Section 02 22 50 – Dismantling Work
.8 Section 02 31 10 – Site Grading and Access Roadways
.9 Section 02 31 40 – Filling and Backfilling
.10 Section 02 32 00 – Surface Water and Groundwater Management
.11 Section 02 36 20 – Dust and Soil Tracking Control
.12 Section 02 61 00 – Soil Removals
.13 Section 02 70 10 – Aggregate: General
.14 Section 32 11 23 – Aggregate Base Courses
.15 Section 32 12 16 – Asphalt Paving

1.3 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work on this Contract includes the removal of soil from the Operations Zone. Work includes the excavation of all overburden material to the top of intact bedrock surface within the specific areas shown on Drawings and to a depth of 690 mm within the remainder of the Work Limits. Excavations may terminate upon encountering bedrock if found at less than 690 mm depth. Further information on the work is outlined in Section 02 61 00 – Soil Removals and Section 02 31 40 – Filling and Backfilling.

1.4 CONTRACT METHOD

.1 Construction Work under single stipulated price contract.

1.5 WORK BY OTHERS

.1 Work executed prior to this Contract:

.1 Demolition of existing buildings within the Phase 1A work area.

1.6 SITE DESCRIPTION

.1 The Site includes an area of approximately 3,500 m^2, as shown on the Site Drawings.

.2 The Operations Zone will be subject to soil removals, as defined by the Work Limits on the Drawings. All excavated soil will be disposed of at an approved landfill site.

.

1.7 WORK METHODOLOGY

.1 The approach to the soil removal activities for the Operations Zone Phase 1A program includes the removal of Overburden soil to a depth of 690 mm below grade and disposal at an approved landfill site via standard excavation methods. Excavation activity does not need to progress deeper if shallow competent bedrock is encountered at less than 690 mm depth. Specific areas are to be excavated to expose the bedrock surface, as shown on Drawings.

.2 The approach in .1 may require groundwater control at portions of the Site where bedrock depressions, service trenches or foundations may extend below the groundwater table. Refer to Section 02 32 00 – Surface Water and Groundwater Management.

.3 The approach in .1 may require removal of weathered bedrock at portions of the Site where bedrock is raised in elevation and where proposed building foundations are to be constructed.

PART 2 – PRODUCTS **NOT USED**

PART 3 – EXECUTION **NOT USED**

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 02 32 00 – Surface Water and Groundwater Management

.2 Section 02 61 00 – Soil Removals

1.3 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, transportation and other services necessary for undertaking and completing the Work detailed and specified herein and in the Contract Documents, including the removal of existing asphalt within the work limits but not limited to: removing and disposing wholly or in part of, or salvaging or abandoning various objects or structures identified on the Drawings or designated in the Contract Documents or by the NCC Representative to be removed or partially removed, salvaged or abandoned including but not limited to concrete, roadways, maintenance holes, catch basins and piping (removal, sealing, filling), duct bank, and pavers. Provisions include for sealing and abandoning in place any buried pipe ends, where necessary as instructed by NCC Representative.

1.4 PROTECTION OF EXISTING FEATURES

.1 Care must be exercised to prevent damage to existing utilities that are to remain.

.2 Existing buried utilities and structures:

.1 All existing information on services and public utilities shown on the Drawings is based on available records and is shown to assist the Contractor and shall not be considered to be complete or accurate.

.2 Prior to commencing excavation Work, notify applicable authorities having jurisdiction and establish location and state of use of buried utilities and structures.

.3 Where necessary, confirm the location of buried utilities and structures by conducting hydrovac techniques followed by careful test excavations.

.4 Maintain and protect all utilities and structures from damage, unless otherwise indicated in the Contract Drawings or by the NCC Representative.

.5 Where utilities or structures not shown on the Drawings are found in the excavation area, obtain directives from the NCC Representative before removing or rerouting.

.6 Record the location of maintained, rerouted and abandoned underground utilities.

.3 Existing building and surface features:

.1 Conduct with the NCC Representative a condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement sidewalks, survey benchmarks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of NCC Representative.

.3 Protect existing items designated to remain and items designated for salvage. In the event of damage to such items, immediately replace or make repairs to approval of the NCC Representative and at no cost to Owner.

.4 In all circumstances ensure that demolition/ asphalt removal Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.5 Do not dispose of waste or volatile materials such as, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.

.6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Section 02 32 00 – Surface Water and Groundwater Management.

.8 Protect trees, plants and foliage on-Site and adjacent properties where indicated.

1.5 SUBMITTALS

.1 Supply certified weigh bills and receipts from authorized disposal sites and recycling facilities for all materials removed from Site on a daily basis or upon request of NCC Representative.

.2 Copies of all clearance certificates from utility and service companies.

.3 Completed pre-excavation Condition Survey

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A5, Type 10.

.2 Other concrete materials: to CAN/CSA-A23.1.

2.2 CONCRETE MIX

.1 Proportion non-shrink lean concrete in order to obtain a minimum compressive strength at 28 days of 10 MPa.

.2 Submit mix information including class of exposure, nominal maximum size of coarse aggregate, slump, air content and admixtures to obtain a non-shrink lean concrete with pumpability characteristics.

PART 3 – EXECUTION

3.1 PREPARATION

.1 Inspect Site with the NCC Representative and verify extent and locations of items designated for removal, disposal, salvage, as well as items to remain.

.2 Locate confirm and protect utilities to remain. Preserve active utilities traversing Site in operating condition.

.3 Coordinate Work with the NCC, City of Ottawa and other public utility companies, when required.

3.2 DESIGNATED INFRASTRUCTURE TO BE REMOVED

.1 Pre-designated aboveground and underground items specified within the limit of excavation on the Drawings are to be removed, lowered, abandoned or sealed, unless indicated otherwise. Otherwise, all existing infrastructure is to be preserved and protected.

3.3 REMOVAL PROCEDURE

.1 Remove items required to complete the Work as shown on the Drawings.

.2 Do not disturb items designated to remain in place. In the event of damage, immediately replace or make repairs to the satisfaction of the NCC Representative, at no additional cost.

.3 Before removal of pavements, sidewalks, curbs, curbs and gutters, neatly saw cut in clean straight lines at the limit of removal or pulverization.

.4 Sidewalks, curbs and gutters shall be saw cut full height and width. Pavements shall be saw cut full depth.

.5 When removing pavement, disturb as little of the underlying crushed stone as possible. Asphalt must be disposed of off- Site at an authorized asphalt recycling facility.

.6 When removing traffic signs or lamp posts, also remove the concrete foundations. Both the steel and the concrete are to be disposed of off-Site. As required and when suitable, sever the pole from the concrete footing at the excavation Site. Signs owned by the NCC shall be turned over to their respective owner as requested by the NCC Representative.

.7 If the Contractor's Work and equipment causes damage beyond the cut line, the Contractor shall repair the damage and replacement of asphalt shall be to the width as directed by the NCC Representative at the Contractor's own expense.

.8 When removing pipes, valves or hydrants, excavate at least 300 mm below pipe invert or as required to remediate the Site. Seal or cap pipe ends with suitable material after pipe removal.

.9 When removing maintenance holes, valve chambers, catch basins, excavate to expose the structure and completely remove it including casting and outlet trap, concrete encasement and bricks, as applicable.

.10 The Contractor is advised that structures may extend below bedrock level and the width of the trenching is unknown. If this is the case, the Contractor must plan the removal of these structures with the appropriate equipment.

.11 When salvageable material is to remain Owner property, such material shall be delivered by the Contractor to a designated location within the City of Ottawa limits.

.12 The Contractor shall take every precaution to maintain salvaged items in good condition.

3.4 EXCAVATION ACTIVITY

.1 The excavation bottom shall be brought to grade as needed to remove existing utilities and structures, and strengthened as necessary by tamping or by other means satisfactory to the NCC Representative.

.2 Excavations shall be brought to the minimal lines, grades and dimensions required to dismantle the designated infrastructures.

.3 Excavated soils shall be managed according to Section 02 61 00 – Soil Removals.

.4 Sloping of trenches and excavations shall be completed in accordance with applicable safety codes. The width of the trench at the bottom shall not exceed the width at the top.

.5 Construction methods, procedures and precautions shall be employed to ensure excavations are stable, free from disturbance and dry.

.6 Build temporary structures in the required position to the required depth and height.

.7 Keep excavated and stockpiled materials a safe distance away from edge of excavation and trench as directed by the NCC Representative.

.8 The NCC Representative shall be notified immediately if the bottom of the excavation or trench appears to present an unsuitable foundation. Unsuitable materials shall be excavated and the resulting excavation shall be backfilled as directed by NCC Representative and compacted to obtain a suitable foundation.

.9 If the depth of excavation is beyond the limits of the required excavation without NCC Representative's authorization, bedding material shall be placed and compacted in the excavation to reinstate the required limits.

.10 Notify the NCC Representative when bottom of excavation is reached.

.11 Obtain NCC Representative's approval of completed excavation.

.12 The Contractor shall maintain the excavation free of water at all times. Water should be managed according to Section 02 32 00-Surface Water and Groundwater.

3.5 PIPE SEALING AND FILLING

.1 As deemed necessary by the NCC Representative, seal abandoned pipe ends at low points to avoid loss of fill material or non-shrink lean concrete during backfilling or injection operations. Securely plug to form watertight seal. Submit seal details to the NCC Representative for approval.

3.6 DISPOSAL OF MATERIAL

.1 Dispose of materials in accordance with requirements outlined in Section 02 61 00 – Soil Removals.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 01 00 00.02 – General Requirements

.2 Section 01 35 13 – Special Procedures for Contaminated Sites

.3 Section 01 56 10 – Environmental Protection

.4 Section 01 78 00 – Closeout Submittals.

.5 Section 02 32 00 – Surface Water and Groundwater Management

.6 Section 02 36 20 – Dust and Soil Tracking Control

.7 Section 02 61 00 – Soil Removals

1.3 OUTLINE OF WORK

.1 A portion of the existing access roadway along the east portion of the site must be maintained to provide continual delivery/maintenance truck access to an adjacent site building. Following soil removal and excavation of 690 mm soil depth (or less where bedrock is close to surface), new granular backfill is required and one lift of asphalt paving is needed to provide a minimum interruption for vehicular access to the building. Refer to drawing sheet SR-1 for the exact location of access roadway. The Contractor shall provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein, including but not limited to: general grading, construction of temporary access roadways, ramps and pads, and surface drainage requirements.

1.4 EXISTING CONDITIONS

.1 The Work area location is shown on the Drawings.

.2 Approximate locations of known underground and surface utility lines and buried objects are as indicated on the Drawings. The Contractor is responsible for establishing the precise location of services and the material nature of the utility, prior to excavation or undertaking any Work which may result in disturbance or breakage of installations.

1.5 SUBMITTALS/SHOP DRAWINGS

1 Prior to the commencement of any of his Work, the Contractor shall submit for the NCC Representative's information the following:

1 Product information documentation, as provided by the manufacturer.

.2 Upon completion of the Work, the Contractor shall submit to the NCC Representative the following:

.1 As-built Drawings showing finished elevations, contours and location of all installations, as required in Section 01 78 00 – Closeout Submittals.

1.6 PROTECTION OF EXISTING FEATURES

.1 The Contractor shall prevent damage to fencing, trees, landscaping, natural features, bench marks, existing pavement, sidewalks and utility lines which are to remain.

.1 Repair any damaged items to the satisfaction of the NCC Representative; and,

.2 Replace any damaged trees designated to remain, as directed by the NCC Representative.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION

3.1 GRADING

.1 All ground surfaces shall be evenly graded to reduce ponding areas or low points except where approved by the NCC Representative.

3.2 TEMPORARY ACCESS ROADS AND RAMPS

.1 The Contractor shall construct temporary access roads and ramps, where needed.

.2 The Contractor shall construct temporary off-Site access roads and ramps not travelled by the public, as follows:

.1 Must be of suitable construction for the purpose of accessing the Site, including the movement of heavy trucks and all equipment required to execute the contract.

.2 Ensure that temporary roadways and/or ramps are even with existing road surfaces where they intersect.

3 The Contractor is responsible for the maintenance and snow clearing, as applicable, to allow continuous access to the Site for duration of the Contract.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED WORK

.1 Section 01 35 13 – Special Procedures for Contaminated Sites

.2 Section 01 56 10 – Environmental Protection

.3 Section 02 31 10 – Site Grading and Access Roads

.4 Section 02 32 00 – Surface Water and Groundwater Management

.5 Section 02 61 00 – Soil Removals

.6 Section 02 70 10 – Aggregates: General

1.3 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, transportation and other services necessary for undertaking and completing the work detailed and specified herein and in the Contract Documents, including but not limited to:

.1 Provision of clean suitable fill materials as outlined within this Section.

.2 Backfilling excavated areas at the Operations Zone as identified in the Drawings to prevent the collection of standing water and to eliminate unsafe excavation walls.

.3 Importation and compaction of Engineered fill for Site access, and slope protection.

,4 Importation and compaction of Engineered fill for pavement granular sub-base at area adjacent to east work area roadway to be maintained. Backfill for this east work area roadway to comprise 150 millimetre lift of OPSS Granular A base, over 450 millimetres of OPSS Granular B Type 2 sub-base.

.2 In general, the work area is to remain at 0.69 m below existing grades at the conclusion of the soil removal project phase, unless shallow bedrock is encountered. Final site filling, backfill and grading is to occur under a separate contract.

1.4 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-95, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136-01, Standard Test Method for Sieve Analysis of Fine and Course Aggregates.

.3 ASTM D 422-65, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D 698-00, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft) (600 kN-m/m).

.5 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 401 (Nov. 2013), Trenching, Backfilling and Compacting.

.2 OPSS 1004 (Nov. 2012), Material Specification for Aggregates – Miscellaneous.

.3 OPSS.MUNI 206 (Nov. 2013) – Construction Specification for Grading.

.6 Canadian Council of Ministers on the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health (as updated).

.7 Ontario Regulation 153/04 –Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act- (April 15, 2001)

1.5 SUBMITTALS

.1 Inform NCC Representative at least two (2) weeks prior to commencing work of the proposed source of any imported materials proposed for filling along with analytical test data demonstrating compliance with the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) for commercial land use and MOE Table 7 (commercial) Standards related to metals, VOC, PAH and PHC concentrations. In conflicts, the most stringent of the two standards will apply.

.2 Submit 5 kg of samples of type of fill, sub-base material and topsoil specified to the NCC Representative in tightly closed containers to prevent contamination. The NCC Representative shall be permitted to go to the source and sample the material, if necessary.

.3 Obtain approval of the NCC Representative for proposed imported materials prior to bringing them on-Site.

.4 Upon completion of the Work, the Contractor shall submit for the NCC Representative's review and approval a survey of the final filling grades at the Operations Zone- Phase 1A, as indicated in Section 01 78 00 – Closeout Submittals. Survey to be completed at a 10 metre grid spacing.

1.6 TESTING

.1 Following approval of the fill by the NCC Representative, the Contractor will be responsible for providing continued analytical testing results in accordance with CCME SQG for a commercial land use and MOE Table 7 (commercial land use) for all imported fill brought to the Sites. A set of analytical results will be provided for every 1000 cubic metres of imported material, provided the source of said materials does not change. Testing will include metals (to include the following elements Ba, Be, B, Cd, Cr, CrVI, Co, Cu, Pb, Mo, Na, Ni, Ag, V, Zn, As, Se, Sb, Hg, U), VOCs, PAHs and petroleum hydrocarbons (fractions F1-F4) or as approved by the NCC Representative.

.2 The contractor will provide grain size testing result of each material type to demonstrate compliance with the requirements outlined in Section 02 70 10 – Aggregates and Clause 2.1 of this section.

1.7 FILL QUALITY

.1 All imported fill must meet the CCME Soil Quality Guidelines for a commercial land use and MOE Table 7 (commercial land use) requirements. In conflicts, the most stringent of the two standards will apply.

.2 Fill may be rejected if there is visual evidence of debris or other deleterious materials.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Engineered Granular Fill: includes Granular A and B as per Section 02 70 10 – Aggregates: General. Must also comply with Clause 1.7 of this Section.

PART 3 – EXECUTION

3.1 BACKFILLING – OPERATIONS ZONE

.1 Backfill using Granular B (Type 2) within the Limit of Work as shown on the Drawings:

.1 Within the remediation limit such that all trenches and former foundations are filled to top of surrounding bedrock surface, where required, and to maintain a safe excavation. Backfill will be placed in 300 mm lifts and compacted to at least 98% minimum Standard Proctor dry density. Backfill to be placed to achieve a 2H:1V slope.

.2 Against exposed soil side slopes to create a 2H:1V sloped granular protective cap and maintain a safe excavation.

.2 Backfill using Granular A and Granular B (Type 2) for pavement granular sub-base at the area adjacent to east extent of Work Area associated with roadway to be maintained, as shown on Drawings. Backfill beneath this roadway is to comprise 150 millimetre lift of OPSS Granular A base, over 450 millimetres of OPSS Granular B Type II sub-base, unless shallow bedrock is encountered.

.3 Allow 3 working days from the time of the completion of the soil excavation activity until such time that the NCC Representative either directs the excavation to be backfilled, directs further excavation, or deems the excavation sufficient.

.4 Areas to be backfilled are to be free from debris, snow, ice, water and frozen ground and satisfy Clause 3.8 of Section 02 61 00 – Soil Removals.

.5 Do not use backfill material which is frozen or contains ice, snow, or debris.

.6 All backfill will also comply with Clause 1.7 of this Section or equivalent, as approved by the NCC Representative.

.7 During backfilling, take care to avoid displacing or damaging utilities.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements, apply to this Section.

1.2 RELATED WORK

.1 Section 01 35 13 – Special Procedures for Contaminated Sites

.2 Section 02 31 10 – Site Grading and Access Roadways

.3 Section 02 31 40 – Filling and Backfilling

.4 Section 02 61 00 – Soil Removals

1.3 REFERENCE STANDARDS

.1 Temporary Erosion and Sediment Control Measures OPSS 805 (Nov. 2010)

.2 City of Ottawa Sewer Use By-Law 2003-514.

.3 Ontario Regulation 387/04 Water Taking.

1.4 OUTLINE OF WORK

.1 The Contractor shall provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein, including but not limited to:

.1 Manage surface water to minimize entry into the excavations and maximize natural infiltration. As required, direct surface water to retention tank(s), or equivalent, for sediment removal/treatment.

.2 Construct drainage ditches and sumps with filter-equipped pumps, to be located at the bottom of the excavation(s) as required to collect excavation water and maintain dry conditions.

.3 Excavation areas shall be free of water in order to complete soil removal activities and for the NCC Representative to verify and accept the excavated area.

.4 Operate and maintain the Water Management Facilities including retention tanks or equivalent with all pumps and filters and those described in Section 01 35 13 – Special Procedures for Contaminated Sites, as necessary, for the duration of the Contract.

.5 Provide, operate and maintain pumping equipment at the water collection areas.

1.5 EXISTING CONDITIONS

.1 Soil conditions and depth of excavations to final grades may require water management during remediation.

.2 The surface water and groundwater across the Site generally does not contain substantial levels of contamination, and treatment of water to remove contaminants will not be required. The principal treatment required will involve suspended solids control or as identified during discharge compliance testing.

1.6 PERMITS AND TESTING

.1 All water collected in the excavation will be directed to the retention tanks, or equivalent, for sediment removal/treatment prior to discharge to the City of Ottawa sewer. Testing as required under the City of Ottawa Sewer Use By-Law will be completed at the point of discharge from the retention tank(s) or equivalent, prior to discharge by the Contractor, see Section 01 35 13 – Special Procedures for Contaminated Sites.

.2 The contractor may choose to discharge to the sanitary sewer as an alternative to the installation of additional sediment removal/treatment facilities. The contractor is responsible for obtaining an agreement to discharge to the sanitary sewer from the City. All associated compliance monitoring and testing for compliance will be at no additional cost unless it can be demonstrated that the discharge to sanitary sewer is required due to a contaminant unrelated to the suspended material (i.e. remains present following the removal of suspended solids to below the storm sewer discharge criteria).

.3 All discharges of surface water and groundwater from the Site must comply with all applicable permits and environmental regulations and by-laws.

1.7 SUBMITTALS/ SHOP DRAWINGS

.1 The Contractor shall submit to the NCC Representative a water management plan prior to commencing excavation work. The water management plan will include the design of the proposed drainage system, sediment removal system (i.e. retention tank(s), or equivalent) and identify the point of discharge and system flow rating and storage capacity.

PART 2 – PRODUCTS

2.1 EQUIPMENT

.1 Pumps shall be of sufficient size and capacity to efficiently handle the anticipated water volume while staying within the permitted maximum flow rates.

.2 Water supplies for the decontamination of equipment shall be stored, as required, in tanks of sufficient capacity. The Contractor shall supply, operate and maintain the required tanks and pumps.

.3 Metering and sampling equipment required to comply with the conditions of the City of Ottawa sewer bylaw and other applicable permits.

PART 3 – EXECUTION

3.1 TEMPORARY SUMP CONSTRUCTION

.1 The Contractor shall excavate temporary sumps at the base of the main excavation and wherever water is collecting without infiltrating and install filter-equipped pumps to direct water to the retention tank(s), or equivalent, via tanker trucks or conduit.

.2 Relocate temporary sumps and filter-equipped pumps for each successive excavation cut, as required to collect and manage water so as to maintain a dry workable Site.

.3 Maintain perimeters and other open drains across the base of the excavation, as required to control collecting water.

.4 Maintain grade along the base of the excavation to encourage unimpeded drainage of surface water to the sump.

.5 Construct additional sumps and supply necessary pumping and conveying equipment as required.

3.2 FENCING

.1 Install temporary fencing to secure temporary water collection areas and sumps.

3.3 LIFT STATION

.1 Pump water from the filter-equipped sumps, as required.

.2 Maintain water collection sumps by removing fines and repairing sump area, as may be required. Collected mud is to be recovered, dried out, and hauled to an off-site disposal landfill.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED WORK

.1 Section 01 35 13 – Special Procedures for Contaminated Sites

.2 Section 01 56 10 – Environmental Protection

.3 Section 02 31 10 – Site Grading and Access Roadways

.4 Section 02 31 40 – Filling and Backfilling

.5 Section 02 32 00 – Surface Water and Groundwater Management

.6 Section 02 61 00 – Soil Removals

1.3 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein, including but not limited to dust and soil tracking control. (Note: in this context soil is defined as material originating on the Sites including Overburden Material defined in Section 02 61 00 Soil Removals).

1.4 EXISTING CONDITIONS

.1 Refer to Section 01 00 00.02 – General Requirements.

1.5 REFERENCE STANDARDS

.1 Ontario Provincial Standard Specifications (Material):

.1 OPSS 2501 Calcium Chloride Flake and Calcium Chloride solution.

.2 Ontario Provincial Standard Specifications (Construction):

.1 OPSS 506 Construction Specification for Dust Suppressants.

.3 Canadian General Standards Board Specification:

1 Standard for calcium chloride (15.1-92).

.4 Ontario Regulation 419/05- Air Pollution- Local Air Quality.

1.6 SUBMITTALS

.1 Prior to the commencement of any Site Work, the Contractor shall submit for the NCC Representative's review and approval, the following:

.1 A Dust Control Plan detailing measures to be taken to minimize the release of airborne particulates during all Work activities.

.2 A Soil Tracking Control Plan detailing measures to be taken to minimize the tracking of soil onto public roadways and methods to be used to clean compacted surfaces.

.2 During and upon completion of the Work, the Contractor shall submit for the NCC Representative's information the following:

.1 All reported complaints associated with dust, which may have been generated as a result of the Work.

.2 All reported complaints addressing the tracking of soil onto public roadways.

.3 Any complaints are to be reported immediately to the NCC Representative.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Calcium chloride, Type I, to CGSB 15-GP-1M or equivalent is to be delivered to the Site in moisture-proof bags with name of manufacturer, name of product and net weight (mass), or alternatively, a liquid calcium chloride solution or equivalent, subject to the approval of the NCC Representative.

.2 Water shall be free of contaminants that could adversely affect fill material or the environment.

PART 3 – EXECUTION

3.1 DUST CONTROL MEASURES

.1 The contractor must comply with Section 49 of O.Reg. 419/05- Air Pollution- Local Air Quality.

.2 Dust control measures shall include:

.1 Instructing workers on dust control methods.

.2 Adjustment of the excavation rate, grading activities and soil handling to minimize dust emission.

.3 Limiting the speed of construction vehicles in the construction area to 15 km/h.

.4 Use of dust suppression technologies (e.g., application of water, calcium chloride (CaCl2) or any other equivalent dust suppressing agent), as required.

.5 Use of tarpaulins over haulage trucks (incoming and outgoing).

.6 Monitoring dust emission visually and taking action to suppress dust, as necessary.

.7 Monitoring wind conditions and adjusting excavation, soil handling and/or haulage rates or suspending work, as necessary.

.8 Supplying and having available at all times suitable dust suppressant equipment to control and prevent dust on the Work Site.

.3 Spray water using a system equipped with shut-off device and capable of uniform application at the following rates using low pressure, low volume nozzles:

.1 0.36 L/m^2 for every 20 heavy vehicular passes during very hot and dry conditions.

. .2 0.36 L/m^2 for every 38 heavy vehicular passes during warm and overcast conditions.

.3 0.36 L/m^2 for every 76 heavy vehicular passes during cool conditions.

.4 No stipulated watering rate is specified for wet or rainy conditions.

.4 Apply calcium chloride or equivalent to supplement the mandated water application as instructed by the NCC Representative.

3.2 RECORDING AND DOCUMENTATION

.1 The Contractor shall maintain a daily log of dust control related activities recording the following information: date, time, vehicular traffic, water application rates (L/m^2), weather conditions and visual observations regarding dust.

.2 Daily log of dust control is to be made available for daily NCC Representative review and submitted at completion of the work.

.2 Any complaints must be documented in the Daily log of dust control activities.

3.3 DUST MONITORING

.1 The NCC Representative will monitor dust emissions, as well as the effectiveness of dust control methods and complaints or reports from the public.

.2 Should the dust control measures implemented by the Contractor not address the problem to the satisfaction of the NCC Representative, the activities generating the dust shall be discontinued until conditions change, to allow the operation to continue in compliance with the requirements.

.3 Should the NCC Representative determine that the weather conditions are such that control of dust emission becomes difficult or that exposure might occur, the Contractor will be ordered to stop any operation that is aggravating the condition and take the appropriate mitigating action.

.4 The Contractor shall not resume the ceased activities or operations until, in the opinion of the NCC Representative, weather conditions and/or Site conditions are suitable.

3.4 SOIL TRACKING CONTROL MEASURES

.1 The Contractor shall clean all equipment and vehicles exiting the Sites, including brushing and washing tires and undercarriage, as may be required to remove the soil. See Section 01 35 13 – Special Procedures for Contaminated Sites.

.2 Avoid overfilling haulage vehicles. Loads should be lower than the top of the dump box at all times.

.3 Apply tarpaulins and secure tailgates of all loaded haulage vehicles prior to accessing public roads.

.4 Take all necessary precautions to prevent the tracking of soil waste onto public roadways and private properties. All movement of equipment off the Work Site is to be controlled through decontamination zones. The Contractor shall immediately clean all debris and dust deposits resulting from the work, to the satisfaction of the NCC Representative, using strict dust control measures.

.5 A street sweeper will be used to clean the access roads and public roadways where soil tracking off-Site has occurred, or as required by the NCC Representative. It is expected that daily sweeping will be required after rainfall events or where work areas are wet. Where this occurs, daily sweeping will continue until Site conditions dry out and soil tracking is reduced to acceptable levels.

3.5 HAULAGE VEHICLE TARPAULINS

.1 Roller tarpaulins will be permitted and used for both incoming and outgoing haulage vehicles when moist fill conditions exist and dust is not generated from the truck boxes as set out in the Dust Control Plan.

.2 When permitted, roller tarpaulins shall be maintained in a state of good repair at all times.

.3 When dry conditions exist and dust is seen to be coming from the truck boxes from above the edge of the box or below the side of the roller tarpaulins, the latter shall be tied down to the side of the box to reduce the opening.

.4 In the event that properly secured roller tarpaulins do not eliminate dust emissions from the truck box, additional controls including the use of a water spray to dampen the surface of the load or the use of overlapping tarpaulins tied down to the outside of the box shall be applied.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 02 00 - Waste Reduction Workplan Submission Requirements

.2 Section 00 06 00 – Waste Reduction Submission Form

1.2 REFERENCES

.1 CSA International

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures, 01 74 21 - Construction/Demolition Waste Management Disposal.

.2 Submit demolition drawings:

.1 Submit for review and approval by *NCC Representative* shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario Canada, showing proposed method.

.3 Sustainable Design Submittals:

.1 Construction Waste Management:

.1 Submit project Waste Reduction Workplan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that the required percentages of construction wastes were recycled or salvaged as per Section 00 02 00 - Waste Reduction Workplan Submission Requirements.

.2 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance Section 01 35 25 Erosion and Sediment Control with authorities having jurisdiction.

1.4 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify NCC Representative immediately.

.1 Proceed only after receipt of written instructions have been received from *NCC Representative.*

.3 Notify *NCC Representative* before disrupting access or services.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect buildings and site with *NCC Representative* and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify *NCC Representative* and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the *NCC Representative* should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: Section 01 35 25 Erosion and Sediment control.

.2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

.2 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of buildings to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Demolition/Removal:

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by *NCC Representative*.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.3 Remove parts of existing building to permit new construction.

.4 Trim edges of partially demolished building elements to tolerances as defined by *NCC Representative* to suit future use.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.4 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements, apply to this Section.

1.2 RELATED WORK

.1 Section 01 00 00.02 – General Requirements

.2 Section 01 35 13 – Special Procedures for Contaminated Sites

.3 Section 01 56 10 – Environmental Protection

.4 Section 01 78 00 – Closeout Submittals

.5 Section 02 22 50 – Dismantling Work

.6 Section 02 31 10 – Site Grading and Access Roadways

.7 Section 02 31 40 – Filling and Backfilling

.8 Section 02 32 00 – Surface Water and Groundwater Management

.9 Section 02 36 20 – Dust and Soil Tracking Control

1.3 SITE DESCRIPTION

.1 The Site includes an area of approximately 3,500 m^2, as shown on the Site Drawings. Access is via the main north roadway entrance.

.2 The Operations Zone will be subject to soil removals, as defined by the limits shown on the Drawings. Due to the potential presence of soil contamination, all excavated soil will be disposed of at an approved landfill site. Excavation to extend to 0.69 m below current grade or until bedrock is encountered. Asphalt pavement is to be removed and directed to an asphalt recycling facility.

1.4 BACKGROUND AND SITE CONDITIONS

.1 The Overburden Material found on the Work Site is predominantly heterogeneous fill materials, in which soils (including silt, sand, gravel, cobbles) are mixed with debris (primarily trace brick fragments, trace cinders/ coal, concrete, rock, and metal). Bedrock across the site is found at depths varying between from 0.08 to 5.79 mbgs.

.2 Overburden Materials contain concentrations of contaminants above the clean fill standards in Ontario (MOECC Table 1 and 7 Standards) and/or CCME criteria for select metals - primarily lead as well as arsenic and selenium in addition to Polycyclic

Aromatic Hydrocarbons (several parameters) and VOCs (benzene, ethyl benzene, toluene).

.3 Current TCLP testing indicates the Overburden Materials are classified as a solid non- hazardous waste.

.4 The groundwater does not contain concentrations of any contaminants above the applicable Ontario groundwater standards (MOECC Table 7 standards), based on Phase II ESA data.

.5 The Work area will require excavation of Overburden Material to 0.69 m depth (or stopped upon reaching the shallow bedrock surface). Excavation depths are generally above the groundwater level. Bedrock depressions, service trenches and former basement excavations within the work limits may extend below the water table and contain saturated fill materials. Groundwater levels across the Site vary based on the proximity to the utilities, as well as seasonally.

.6 The Overburden Materials may contain former curbs, concrete slabs, asphalt and boulders. Excavation equipment must be suited to excavate, break, and transport these materials.

.7 Buried services exist within the Work Limits at the Operations Zone Phase 1A site. Such utilities include the stormwater catch basins and laterals, steam lines, and other known services as indicated on the Drawings. Other services may also be present. All services will require protection, unless otherwise indicated by the NCC site representative or as indicated on Drawings.

.8 Arrangements for Landfill disposal are to be made by the Contractor.

.9 Excavation activities may require removal of weathered bedrock at portions of the Site where bedrock is raised in elevation and where proposed building foundations are to be constructed. Weathered bedrock removal by excavator or hoe ram may be required. Maximum thickness of weathered bedrock assumed as 0.6 m. No blasting is expected.

1.5 COMPLIMENTARY DOCUMENTATION

.1 The Contractor will be provided with an electronic version of the following complementary documentation as provided in the Appendix to the Contract Documents:

.1 Phase II ESA- Operations Zone, Ottawa, ON- Decommissioning Consulting Services; 15 September 2014.

.2 The Memorandum entitled: Results of Soil Fill Quality Testing- Operations Zone, Ottawa, dated 5 March 2015 as prepared by Decommissioning Consulting Services.

1.6 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, consumables, transportation and other services necessary for undertaking and completing the Work detailed and specified herein and on the Drawings, including but not limited to:

.1 Excavation and removal of all asphalt within Work Limits for disposal at an asphalt recycling facility;

.2 Excavation of all Overburden Material to 0.69 m below current grade within the Limits of the Work area or to expose the shallow bedrock surface if encountered at lesser depths.

.3 Excavation of all Overburden Material to exposed bedrock across areas shown on Drawings. Weathered bedrock will require removal in such areas.

.4 Transportation of overburden to the contractor's selected MOECC-approved disposal facility. To be disposed of as a solid non-hazardous waste.

1.7 EXISTING UTILITIES AND STRUCTURES

.1 Size, depth and location of existing utilities and structures as indicated on the Drawings and Specifications are for guidance only.

.2 Prior to commencing excavation Work, the Contactor shall establish location and state of use of buried utilities and structures and report such to NCC Representative.

.3 The Contactor shall confirm locations of buried utilities and structures by hydrovac daylighting and careful test excavations.

.4 Maintain and protect from damage all utilities and structures unless otherwise indicated on the Drawings or by NCC Representative.

.5 Where utilities or structures exist in the area of the excavation, obtain direction of the NCC Representative before removing or rerouting.

.6 The Contactor shall record location of maintained, rerouted and abandoned underground utilities.

.7 The Contactor shall retain a licensed Surveyor to survey and reinstate existing property markers and or other existing survey datum.

1.8 WORK SEQUENCE AND SCHEDULE

.1 The following restrictions are to be taken into account in the sequence of Work:

.1 The City of Ottawa Seasonal Half Load Restrictions.

.2 Any vegetation clearing cannot occur between May 1 and August 10, unless authorized by the NCC Representative.

.2 The following general Work sequence is considered:

.1 Contract Award;
.2 Topographical survey of the Site;
.3 Utility Locates
.4 Mobilization on Site, including installation of temporary fencing;
.5 Site preparation/temporary installations set-up;
.6 Construct or improve temporary access/haulage roads;
.7 Excavate Overburden materials and transport and dispose of at an approved landfill site;
.8 Complete a survey of final base of excavation.
.9 Clean bedrock surface of residual soil to the standard of acceptance;
.10 Where required, provide backfill as support for excavated zones around work area periphery;
.11 Remove construction fencing;
.12 Complete a final site survey
.13 Final clean-up of Site;
.14 Submit Final Site Survey certificate; and,
.15 Demobilization and project closeout.

1.9 CONTRACTOR USE OF PREMISES

.1 The Contractor has unrestricted use of the Site, within the parameters set forth in the Contract General Conditions, Specifications and Drawings, until completion of Work. The Work area is shown on the Drawings.

1.10 SUBMITTALS

.1 Prior to the commencement of any Site Work, the Contractor shall submit for the NCC Representative's review and approval the following:

.1 Operating procedures respecting the excavation area and the contractor lay down area, including equipment inspection area.

.2 Quantity and assignment of equipment and staff on the Work Site.

.3 Sequencing of work operations.

.2 Prior to the commencement of any Site Work, the Contractor shall submit for the NCC Representative's review and approval the following:

.1 Copies of all applicable Certificates of Approval issued by the Ministry of the Environment under Part V of the Environmental Protection Act for all off-Site waste management and recycling sites selected to receive waste soil and debris, as well as for all waste haulers.

.3 Prior to the commencement of excavation Work, the Contractor shall submit for the NCC Representative's review and approval the following:

.1 Copies of all clearance certificates from utility and service companies.

.4 Prior to the commencement of excavation Work, the Contractor shall submit for the NCC Representative's review and approval the following:

.1 A topographical survey of the Work area to document existing ground surface elevation by using a survey grid spacing of at least 10 metres plus any topographically significant features such as existing infrastructure and shall provide the reference datum used to calibrate the survey.

.5 During and upon completion of the Work, the Contractor shall submit for the NCC Representative's information the following:

.1 Documentation pertaining to off-Site disposal and movement of Overburden Material, wastes, recyclables and all other materials.

.2 Daily reports of quantities of Work executed for each relevant item of the Form of Tender.

.3 Details about any spill of Overburden Materials or other materials on public property and roadways, including the circumstances of the incident, reports to authorities and clean-up efforts.

.6 Upon completion of the Work, the Contractor shall submit for the NCC Representative's review and approval a survey of the final excavation area limits, features and elevations, as indicated in Section 01 78 00 – Closeout Submittals. Survey to be completed at a 10 metre grid spacing plus include any significant topographical features such as trenches and slopes.

.7 Where appropriate, weigh bills from licensed disposal facilities must be turned over to the NCC Representative, on a daily basis along with the report on quantities of Work executed.

.8 Prior to commencing excavation Work, the Contractor will provide the NCC Representative a description of the procedure proposed to achieve the requirements of Bottom of Excavations in Clause 3.7 of this Section.

1.11 TESTING

.1 The NCC Representative may carry out laboratory testing to classify unexpected contamination. Regular laboratory turnaround will be completed for testing. The Contractor is responsible for staging the excavation Work such that sampling and laboratory testing does not delay the Work. The Contractor will not be compensated for delays resulting from sampling/analytical testing. In general, excavation depths are to proceed to 0.69 m and are not to be determined based on the results of laboratory testing.

.2 The NCC Representative will need to perform supplemental subsurface soil testing to the north of the Office building (in vicinity of former diesel aboveground fuel storage tank) to verify the presence/absence of petroleum hydrocarbon contamination. The Contractor is responsible for staging the excavation Work such that sampling and laboratory testing does not delay the Work. The Contractor will not be compensated for delays resulting from sampling/analytical testing. Additional excavation may be required to evaluate soil conditions to the north of the Office building.

1.12 REFERENCE STANDARDS

.1 Ontario Environmental Protection Act, 1990

.2 Ontario Water Resources Act, 1990

.3 Ontario Regulation 153/04; Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

.4 Canadian Council of Ministers on the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Human Health and the Environment

.5 Ontario Regulation 903- Wells

.6 Ontario Ministry of Labour: Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended

1.13 DOCUMENTS REQUIRED

.1 Maintain at Site, one copy of each of the following:

.1 Contract Drawings;
.2 Specifications;

.3 Addenda;
.4 Reviewed submittals;
.5 Change orders;
.6 Field test reports;
.7 Copy of approved schedule;
.8 Health and Safety Plan and other safety related documents
.9 Copies of all Appendix documents listed in Specifications package; and,
.10 Other documents as specified.

PART 2 – PRODUCTS

2.1 EXCAVATION EQUIPMENT

.1 Excavation equipment shall be suited for the intended Work, be in good working condition and sized to effectively perform the Work.

2.2 SOIL HANDLING EQUIPMENT

.1 Excavators, loaders, bulldozers, compactors, etc., as required.

2.3 HAULAGE VEHICLES

.1 Size and configuration of haulage vehicles will be appropriate for the Site conditions. It is anticipated that dual-axle and tri-axle vehicles will be required for haulage of Overburden Materials and other materials.

.2 Haulage vehicles will be constructed in a manner to avoid spillage of material, with a tight fitting tailgate closure arrangement complete with locking device.

.3 Haulage vehicles are to be equipped with appropriate tarpaulins of suitable size and design to comply with Section 02 36 20 – Dust and Soil Tracking Control.

.4 Vehicles required to access public roads shall be licensed to do so.

.5 Haulage vehicles required to access public roads shall operate by authorization of a Certificate of Approval (Waste Management System) issued by the Ontario Ministry of the Environment under Part V of the Environmental Protection Act.

PART 3 – EXECUTION

3.1 SITE PREPARATION

.1 Conduct a condition survey with the NCC Representative of existing trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments, and any other structure or installation which may be affected by the Work.

.2 Remove existing surface features in the Work area including but not limited to storm water catch basins, as required.

.3 Protect existing surface structures outside the Work limits from damage while Work is in progress. In the event of damage, immediately make repairs to the satisfaction of the NCC Representative.

.4 Construction laydown area, construction fencing, Site access roads shall be constructed, as required, and maintained by the Contractor for the duration of the excavation program in accordance with Section 02 31 10 – Site Grading and Access Roadways.

.5 Strip and dispose asphalt to an asphalt recycling facility and cut and remove concrete curbs. Replacement of asphalt and concrete curbing is not part of this contract. However, the access needs to be in a condition suitable for continued use following the contract and is subject to approval by the NCC Representative.

3.2 PROTECTION OF MONITORING WELLS

.1 Any existing environmental monitoring wells within the Work area should already have been decommissioned in advance by a licensed Well Contractor under contract with the NCC. Care should be taken to protect any existing environmental monitoring wells located outside of the Work area.

3.3 EXCAVATION

.1 Excavate all Overburden Material to a depth of 0.69 m below current grades (unless shallow bedrock surface is encountered (see Clause 3.7 Bottom of Excavations)) within the Work Area shown on the Drawings and inclusive of trenches present for former/existing services. Overburden Material is defined as all material present above the bedrock surface and includes but is not limited to soil, gravel, cobbles, boulders, waste materials, peat. Overburden Material may include boulders, former foundation elements, concrete, including reinforced concrete,

maintenance holes, pipes and slabs that will require breaking to accommodate removal and transportation and placement at the contractor's selected Landfill Site. Excavation to exposed bedrock is required within the former Site Office building footprint.

.2 Excavate all Overburden Material to a minimum of 0.69 m below current grade within the Work area on the Drawings and inclusive of trenches present for former/existing services.

.3 Any damage to utilities requiring protection will be immediately repaired at no extra cost to the owner by the Contractor.

.4 Load, haul and dispose of all excavated Overburden Material off-Site at the contractor selected disposal facility:

.1 The contractor selected disposal facility must be an MOECC approved waste disposal site and approved by the NCC Representative.

.2 Non-soil and non-rock material, i.e., waste, other than concrete, greater than 400 mm in diameter (e.g. furniture, railway ties, vehicles, etc.) or at the discretion of the NCC Representative which will be sent to an MOECC approved waste disposal site. The Contractor will be responsible for breaking any oversized material into manageable pieces acceptable to the receiving site. Recyclable materials greater than 400 mm will be separated and diverted to an MOECC approved recycling facility. Waste materials stockpiled on-Site prior to off-Site disposal cannot be placed on remediated areas of the Site and will be covered with a tarp to manage dust.

.3 Asphalt stripped shall be disposed of at a licensed asphalt recycling facility.

.5 Excavation Work shall be performed so that the bottom and slopes of previously excavated areas are kept clean and free of soil/materials and debris at all times.

.6 Existing storm sewer and abandoned gas line will be removed in accordance with Section 02 22 50 - Dismantling Work, as required.

3.4 OVERBURDEN MATERIAL HAULAGE

.1 Haulage vehicle drivers shall remain in their vehicles when inside the Work area.

.2 Loading shall be such as to maximize vehicle capacity without mounding Overburden Material or other material over the sides and allowing for proper application of tarpaulins. Trucks shall not be filled above the box panels.

.3 The Contractor shall comply with municipal and provincial restrictions, concerning truck loads during the spring thaw period, of the territories his trucks have to travel through for off-Site disposal of Overburden Materials and other materials.

.4 For off-Site haulage, the Contractor shall provide the NCC Representative with detailed list of trucking movements per day in addition to weight scale receipts or individual weigh tickets issued by the disposal facility.

.5 The Contractor shall maintain records of quantities of material disposed of off-Site at an MOECC-approved disposal facility, along with the weigh tickets from such approved disposal sites.

.6 Haulage vehicles with water leaking from the tailgate or box shall be directed to return to the loading point and tip the contents of the box at the excavation Site to permit them to be mixed with drier material, as appropriate, before reloading to avoid spillage of liquid onto roadways.

.7 Haulage operations shall be performed in accordance with applicable municipal, provincial and federal laws and regulations.

.8 Haulage vehicles shall follow the predetermined trucking routes approved by the NCC Representative; see Section 01 35 30 – Traffic Control.

3.5 WASTE/SOIL SPILL RESPONSE

.1 Every effort must be made to minimize the risk of a spill of Overburden Material, other material or waste on public property and roadways.

.2 The Contractor shall submit to the NCC Representative, before starting any Work on-Site, an Emergency Spill Response Plan and must implement this plan once approved by the NCC Representative.

.3 The Contractor shall advise the NCC Representative and appropriate authorities of any spill in accordance with the requirements of Part X of the Environmental Protection Act and/or other applicable legislation.

.4 Secure the affected area using markers or flares and minimize adverse effect on traffic. Advise police if spill impacts on traffic or public safety in any way, and MOE Spills Action Centre if spill occurs on public thoroughfare.

.5 Dispatch labour and equipment to the spill area to proceed to cleanup to the satisfaction of the NCC Representative at no extra cost.

3.6 EXCAVATION ZONE PERIMETER SLOPING AND PROTECTION AGAINST CROSS-CONTAMINATION

.1 Sloping shall be completed in accordance with the Drawings. Unsupported soil excavations greater than 1.2 metres in vertical height shall be sloped at a grade of one vertical to one horizontal above the water table or one vertical to three horizontal below the water table or as approved by the NCC Representative.

.2 The bottoms and slopes of previously excavated areas shall be kept clean and free of soil/materials and debris at all times, with the exception of backfill in the areas outlined in Section 02 31 40 – Filling and Backfilling.

.3 Former service trenches or other trenches or excavations within the bedrock will also be backfilled.

.4 The temporary slope geometry used to determine requirements of the side slopes shall be according to the Occupational Health and Safety Act and sufficient to support all structures and utilities designated to be protected

3.7 BOTTOM OF EXCAVATIONS

.1 The bottom of the Site Office building footprint area is to be comprised of an intact bedrock surface and will be free of Overburden Material (residual soil material), including loosened bedrock pieces that may be underlain by Overburden Material, to the satisfaction of the NCC Representative. Standard of acceptance for residual soil shall be 0.0125 m^3 / m^2 of excavated surface as determined by the NCC Representative through visual observation and/or measurement. Excavation areas outside of the former Site Office building footprint are to terminate at a depth of 0.69 m below current grades within the overburden soil.

.2 Residual Overburden Material remaining following standard machine excavation procedures may require removal from bedrock depressions, trenches, fractures, etc. by other means than standard machine excavation, as necessary to achieve the standard of acceptance.

.3 The bottom of the soil removal footprint area (outside of building footprint locations) is to be comprised of either an intact soil or

bedrock surface. Exposed bedrock surfaces must be made free of residual soil material, including loosened bedrock pieces, to the satisfaction of the NCC Representative. Standard of acceptance for residual soil over bedrock shall be 0.0125 m^3 / m^2 of excavated surface as determined by the NCC Representative through visual observation and/or measurement.

3.8 END OF EXCAVATION

.1 Notify the NCC Representative when bottom of excavation is reached.

.2 Obtain approval of the NCC Representative for completed excavation.

.3 Survey the final excavation area limits, as indicated in Section 01 71 10 – Surveying and Field Engineering, and submit to NCC Representative for approval.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 01 00 00.02 – General Requirements

.2 Section 01 35 13 – Special Procedures for Contaminated Sites

.3 Section 02 31 10 – Site Grading and Access Roadways

1.3 OUTLINE OF WORK

.1 This specification covers the material requirements for aggregates for use as granular subgrade, subbase, base course, shouldering and bedding and backfill to sewers, water mains, culverts and other structures as well as for slope protection. The Contractor must verify on Drawings and in the Contract Documents which of the following aggregate types are needed for the present Contract.

.2 Granular A base and Granular B sub-base will be required on the east end of the work area to provide for a road base immediately following the soil removal operations.

1.4 REFERENCE STANDARDS

.1 Ontario Provincial Specifications:

.1 Ontario Provincial Standard Specifications, OPSS 1001 (Nov. 2013), Aggregates – General.

.2 Ontario Provincial Standard Specifications, OPSS.MUNI 1004 (Nov. 2013), Aggregates – Miscellaneous.

.3 Ontario Provincial Standard Specifications, OPSS 314 (Nov. 2013), Untreated Granular, Subbase, Base, Surface Shoulder, and Stockpiling.

.2 City of Ottawa Standard Tender Document for Unit Price Contract, March 2014. Special Provision SP No. 3147.

1.5 SOURCE APPROVAL

.1 The Contractor must inform the NCC Representative of proposed source of aggregates and provide access for sampling at least two weeks prior to commencing production. Allow continual access and sampling by the NCC Representative during production.

.2 Install sampling facilities at discharge end of production conveyor to allow NCC Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by NCC Representative to permit full cross section sampling.

.3 If, in opinion of NCC Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.4 The Contractor shall advise the NCC Representative two weeks in advance of proposed change of material source.

.5 Acceptance of material at source does not preclude future rejection if it fails to conform to specified requirements, lacks uniformity, or if its field performance is found to be unsatisfactory.

.6 The Contractor shall pay the cost of sampling and testing of aggregates that fail to meet specified requirements.

1.6 DEFINITIONS

.1 Crushed material: means the pieces of aggregate having at least one well-defined face resulting from fracture.

.2 Quarried Rock: means the material which has been or is being removed from an open excavation made in solid mass of rock, which, prior to removal, was integral with the parent mass.

.3 Reclaimed Asphalt Pavement (RAP): means the bituminous pavement which is either removed by process such as milling, full depth pick up or pulverized in place.

.4 Reclaimed Portland Cement Concrete: means the crushed Portland cement concrete removed from sidewalks, driveways, structures, curb and gutter, and pavement, and which is free of embedded materials that are not normal constituents of the concrete mix.

.5 Quality Control: means a system or a series of activities performed by the Contractor to ensure that materials supplied for the work meet the specified requirements.

.6 Quality Assurance: means a system or series of activities carried out by the NCC Representative to ensure that materials received from the Contractor meet the specified requirements.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Granular O, A, M and B aggregates shall conform to the requirements of City of Ottawa S.P. no.# F-3147.

.2 Granular A and M: Granular A and M shall be produced by crushing material free of earth, humus, clay coatings, and clay lumps or fragments of any size or shape, and produced from crushed bedrock or gravel, cobbles, boulders, sand and fines produced from naturally formed deposits.

.3 Granular O shall be produced from crushed bedrock or crushed boulders retained on the 50 mm sieve.

.4 Granular B: Granular B aggregates shall be composed of clean, hard, durable particles free of earth, humus, clay coating and clay lumps or fragments of any size or shape.

Granular B (Type I) shall consist of a blend of natural aggregates from deposits of gravel or sand, talus rock or quarried rock. Natural aggregates for Granular B (type I) do not require crushing.

Granular B (Type II) shall be obtained from quarried rock.

.5 Select Sub-grade Material (SSM) shall be non-plastic material and granular or sandy type soil. Reclaimed materials are not permitted within the Remediation Limit.

.6 Granular A, B (Type I and II), M, O and Select Sub-grade Material shall meet the requirements of Table 1 and Table 2.

.7 Clear stone: 19.0 mm clear stone shall meet the quality and percentage crushed requirements for Granular “A” and shall meet the following gradation requirements:

Gradation Requirements- Clear Stone

MTO Sieve Designation	Percentage Passing
26.5 mm	100
19.0 mm	90 - 100
9.5 mm	0 - 55
4.75 mm	0 - 10

Table 1- Physical Property Requirements

Laboratory Test	***MTO Test Number***	***Granular O***	***Granular A***	***Granular B***		***Granular M***	***Select Subgrade Material***
				Type I	***Type II***		
Coarse Aggregate Petrographic Requirement	LS-609	(Note 2)	(Note 1) (Note 2)	(Note 1) (Note 2)	(Note 2)	(Note 1) (Note 2)	(Note 2)
Freeze-Thaw Loss, % Maximum	LS-614	15	-	-	-	-	-
Fine Aggregate Petrographic Requirement	LS-616 LS-709	(Note 3)					
Micro-Deval Abrasion Coarse Aggregate Loss, % Maximum	LS-618	21	25	30 (Note 4)	30	25	30 (Note 4)
Micro-Deval Abrasion Fine Aggregate Loss, % Maximum	LS-619	25	30	35	35	30	-
Plasticity Index	LS-704	0	0	0	0	0	0

Note 1: Granular A, B (Type I) and M shall not contain crushed glass and/or ceramic material;

Note 2: Granular O, A, B (Type I) and M shall not contain wood, clay brick and/or gypsum and/or gypsum wall board or plaster. Granular B (Type II) and SSM shall not contain wood (Note: Petrographic classification of rock type need not be reported);

Note 3: For materials north of the French/Mattawa Rivers only: for materials with > 6.0% passing the 75 µm sieve, the amount of mica retained on the 75 µm (passing 150 µm sieve) shall not exceed 10% of the material in that sieve fraction unless testing (LS-709) determines permeability values > 1.0×10^{-4} cm/s and/or field experience show satisfactory performance (prior data demonstrating compliance with this requirement will be acceptable provided such testing has been done within the past five years and field performance has been satisfactory); and,

Note 4: The coarse aggregate micro-Deval abrasion loss test requirement will be waived if the material has more than 80% passing the 4.75 mm sieve.

Table has been reproduced from S.P No. F-3147, and modified for this Contract.

Table 2- Production Requirements

Laboratory Test	***MTO Test Number***	***Granular O***	***Granular A***	***Granular B***		***Granular M***	***Select Subgrade Material***
				Type I	***Type II***		
Sieve Analysis percent passing	LS-602 (sieve size)			Type I (Note 1)	Type II		
	150 mm	-	-	100	100	-	100
	37.5 mm	100	-	-	-	-	-
	26.5 mm	95.0 - 100	100	50.0 - 100	50.0 - 100	-	50.0 - 100
	19.0 mm	80.0 - 95.0	85.0 - 100 87.0 - 100*	-	-	100	-
	13.2 mm	60.0 - 80.0	65.0 - 90.0 75.0 - 95.0*	-	-	75.0 - 95.0	-
	9.5 mm	50.0 - 70.0	50.0 - 73.0 60.0 - 83.0*	-	-	55.0 - 80.0	-
	4.75 mm	20.0 - 45.0	35.0 - 55.0 40.0 - 60.0*	20.0 - 100	20.0 - 55.0	35.0 - 55.0	20.0 - 100
	1.18 mm	0 - 15.0	15.0 - 40.0	10.0 - 100	10.0 - 40.0	15.0 - 40.0	10.0 - 100
	300µm	-	5.0 - 22.0	2.0 - 65.0	5.0 - 22.0	5.0 - 22.0	5.0 - 95.0
	150µm	-	-	-	-	-	2.0 - 65.0
	75µm	0 - 5.0	2.0 - 8.0 2.0 - 10.0**	0 - 8.0 0 - 10**	0 - 10	2.0 - 8.0 2.0 - 10.0**	0 - 25.0
Percent Crushed minimum	LS-607	100	60	0	100	60	-
Particles with 2 or more crushed faces, minimum, percent	LS-617	85	-	-	-	-	-
Amount of Asphalt Coated Particles in Coarse Aggregate, percent maximum	OPSS 314	OPSS 314		See OPSS -314	See OPSS	See OPSS	See OPSS

* Where the aggregate is obtained from an iron blast furnace slag source.

** Where the aggregate is obtained from a quarry or blast furnace slag or nickel slag source.

Note 1: Where Granular B is used for granular backfill for pipe sub- drains, 100 percent of the material shall pass the 37.5 mm sieve.

.8 Sand bedding for buried utilities: shall consist of sand conforming to the gradation requirements of mortar sand as following:

Gradation Requirements- Sand Bedding (MTO Lab Test no. LS-602)

MTO Sieve Designation	Percentage Passing
4.75 mm	100
2.36 mm	95 – 100
1.18 mm	60 – 100
600 µm	35 – 80
300 µm	15 – 50
150 µm	2 – 15
75 µm	0 – 5

.9 Granular material substitution is allowed if the Contractor proposes to the NCC Representative for approval, at least two weeks before the work start-up, a substitute material that is cheaper and is of better quality than the designated material and is in conformity with one of the granular classes as described in the present Section. Granular classes that can be substituted for a better material consist only of granular type A, B, M and Select Subgrade Material. The NCC Representative has no obligation to approve any granular material substitution.

2.2 ENVIRONMENTAL QUALITY

.1 Material imported to the Site for use within the Limits of Work must conform with the environmental quality requirements outlined in Section 02 31 40 – Filling and Backfilling.

PART 3 – EXECUTION

3.1 PRODUCTION

.1 Stripping of raw aggregate source, processing, washing and blending of aggregates shall be done in accordance to OPSS 1001.

3.2 HANDLING AND STOCKPILING

.1 Handling and stockpiling shall be done in accordance to OPSS 1001 and the following:

.1 If applicable, stockpile aggregates on-Site as directed by NCC Representative.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by NCC Representative within 48 hours of rejection.

.4 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as required.

.5 Do not use cone piles or spill material over edges of piles.

.6 Do not use conveying stackers.

3.3 QUALITY CONTROL

.1 The Contractor shall do sampling and testing for Quality Control as per S.P. no.# F-3147.

.2 The Contractor will be responsible for all costs associated with testing for Quality Control requirements.

.3 Sampling and testing are required to ensure complete conformance of each aggregate with physical and production requirements.

.4 All tests results shall be submitted to the NCC Representative and approved prior to bringing the materials onto the Site.

.5 Laboratories conducting tests for physical and production requirements shall be designated by the Contractor and must meet the requirements listed in SP no.# F-3147.

3.4 QUALITY ASSURANCE

.1 Quality Assurance will be carried out by the NCC Representative to ensure that materials used in work conform to the physical and production requirements.

END OF SECTION

Part 1 General

1.1 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect equipment from nicks, scratches, and blemishes.

.4 Handle demolition materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.2 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

3.3 EQUIPMENT

.1 Protect removed mechanical equipment, clean, and turn over to the client.

3.4 SITE SERVICES WORK

.1 For mechanical site services work, involving removal of piping. Refer to Section 31 23 33.01 – Excavating, Trenching and Backfilling.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2.

.2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)

.1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

.3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

.1 IEEE SP1122-2000, he Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.3 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates and labels for control items in English and French.

.4 Use one nameplate or label for both languages.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control. Provide CSA certified equipment and material.

.1 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.

.2 Submit test results of installed electrical systems and instrumentation.

.3 Permits and fees: in accordance with General Conditions of contract.

.4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.

.5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

1.5 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.

.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.

.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

.2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction & inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

.3 Factory assembles control panels and component assemblies.

2.2 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of NCC Representative.

.2 Decal signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, matt white finish face, black white core, lettering accurately aligned and engraved into core.

.2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by NCC Representative prior to manufacture.

.4 Allow for minimum of twenty-five (25) letters per nameplate and label.

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. [___]" as directed by NCC Representative.

.7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.8 Terminal cabinets and pull boxes: indicate system and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered & coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system. CONDUIT AND CABLE IDENTIFICATION

.5 Colour code conduits, boxes and metallic sheathed cables.

.6 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.7 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

Part 3 Execution

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: schedule 40 steel pipes, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 DEMOLITION AND WORK IN EXISTING BUILDINGS

.1 The contractor shall be responsible for disconnecting and removing all electrical equipment, including but not limited to, luminaires, receptacles, baseboard heaters and wiring, including voice/data from areas being altered or demolished.

.2 Wiring, conduit and equipment required to maintain services in other buildings shall be identified and supported, rerouted, serviced or relocated as required, prior to demolition.

.3 Obsolete and redundant conduits and cables shall be disconnected from their source of supply and removed. All existing wiring not removed shall be disconnected, made safe, identified and blanked-off.

.4 Coordinate all system shutdowns with the client and owner, prior to any work.

.5 Provide all cleanup, lifting, storage, cutting, patching and flashing as required. Remove all excess debris material and equipment from site. Refer to Waste Management specification for disposal of all equipment.

3.5 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for fertilizing and preserving root systems of plants affected by changing grades or excavation.

.2 Related Sections:

.1 Section 01 00 00.01 – General Requirements.
.2 Section 01 33 00 - Submittal Procedures.
.3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CSA G30.5-M1983(R1998), Welded Steel Wire Fabric for Concrete Reinforcement.

.2 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.2 Fertilizers Act (R.S. 1985, c. F-10).
.3 Fertilizers Regulations (C.R.C., c. 666).
.4 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.3 Health Canada - Pest Management Regulatory Agency (PMRA).

.1 National Standard for Pesticide Education, Training and Certification in Canada (1995).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

1.3 DEFINITION

.1 Mycorrhiza : association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures

.2 Submit monthly written reports on maintenance during warranty period, to *NCC Representative* identifying:

.1 Maintenance work carried out.
.2 Development and condition of plant material.
.3 Preventative or corrective measures required which are outside Contractor's responsibility.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 00 00.01 – General Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Divert unused wood materials from landfill by composting.

.4 Divert unused stone and aggregate materials from landfill.

.5 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.

.6 Do not dispose of unused fertilizer material into sewer system, into streams, lakes, onto ground or in any other location where they will pose health or environmental hazard.

.7 Ensure emptied containers are sealed and stored safely.

.8 Fold up metal banding, flatten and place in designated area for recycling.

1.7 SCHEDULING

.1 Obtain approval from NCC Representative of schedule indicating beginning of Work.

1.8 MAINTENANCE DURING WARRANTY PERIOD

.1 From time of acceptance by *NCC Representative* to end of warranty period, perform following maintenance operations.

.1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

.2 Apply pesticides in accordance with National Standard for Pesticide Education, Training and Certification in Canada, Federal, Provincial and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from prior to application.

.3 Apply fertilizer in early spring at rate of 0.025 kg of nitrogen/m^2.

.4 Remove dead, broken or hazardous branches from plant material.

Part 2 Products

2.1 MATERIALS

.1 Fill:

.1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.

.2 Type (B): excavated soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc).

.2 Coarse washed stones: 35-75 mm diameter clean round hard stone.

.3 Draintile: 100 mm diameter corrugated plastic perforated tubing complete with snap couplings. Fill vents with 20 mm clear stone.

.4 Peatmoss:

.1 Derived from partially decomposed species of Sphagnum Mosses.
.2 Elastic and homogeneous.
.3 Free of wood and deleterious material which could prohibit growth.
.4 Shredded minimum particle size: 5 mm.

.5 Fertilizer:

.1 To Canada Fertilizer Act and Fertilizers Regulations.
.2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.

.6 Anti-desiccant: commercial, wax-like emulsion.

.7 Filter Cloth:

.1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m^2 mass.
.2 Type 2: biodegradable burlap.

.8 Wood posts: 38 x 89 x 2400 mm length, untreated wood.

.9 Welded wire fabric (WWF): 100 x 100 mm, MW x MW, to CSA G30.5.

Part 3 Execution

3.1 IDENTIFICATION AND PROTECTION

.1 Do construction occupational health and safety in accordance with Section 01 00 00.01 – General Requirements.

.2 Identify plants and limits of root systems to be preserved as approved by *NCC Representative.*

.3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by NCC Representative.

.4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an aborist or Canadian Certified Horticultural Technician (CCHT) as approved by *NCC Representative.*

3.2 ROOT CURTAIN SYSTEM

.1 Identify limits for required construction excavation as approved by *NCC Representative.*

.2 Prior to construction excavation, hand dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.

.3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.

.4 Install wooden posts and welded wire fabric against construction edge of trench.

.5 Securely attach Type 2 filter fabric on plant side of wire mesh.

.6 Prepare homogeneous mixture of fertilizer, parent material and organic matter.

.1 Add organic matter to mixture to achieve 7-9 % organic matter content by weight.

.2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5kg/m^3.

.7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85% Standard Proctor Density.

.8 Protect root curtain from damage during construction operations.

.9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.

.10 Protect root curtain before and during backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

3.3 AIR LAYERING SYSTEM

.1 Using manual methods, carefully remove turf, plants, leaves and organic matter in area of root system, dispose of plant matter through compost site and slightly loosen topsoil surface. Avoid damage to root system.

.2 Lay horizontal system of perforated drain pipe on surface of existing grade.

.1 Slope drain tile minimum 3 % for drainage away from trunk of tree.

.2 Connect system with general site drainage system or drain to low point on site.

.3 Install plastic "vent" pipes vertically over joints in horizontal pipe system or where indicated. Top of vent pipe to be 20 mm above finished grade of fill. Keep top of vent pipe covered during construction.

.4 Cover joints with Type 1 filter fabric and place coarse washed stone around joints and vertical pipes to secure their position.

.5 Construct drywell around trunk of tree.

.1 Ensure open ends of vertical vent pipes are left exposed for air circulation to root system.

.2 Protect openings from blockage during construction.

.3 Install protective caps on exposed horizontal openings.

.6 Place 200 mm depth of coarse washed stone on surface of original ground and horizontal pipe system to limits.

.7 Place Type 1 filter fabric over surface of granular layer.

.8 Place Type A fill over filter fabric to required depth without disturbing or damaging drain pipe system. Avoid damage to filter fabric.

.9 Complete topsoil and sodding over area of sub-surface system within one week of placing fill.

.10 Remove temporary protective covering from vent pipe openings. Install protective caps flush with finished grade.

3.4 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

.1 Centre line location and limits of trench/tunnel excavation to be approved by *NCC Representative* prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.

.2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.

.3 Excavate tunnel under centre of tree trunk using methods and equipment approved by *NCC Representative.*

.4 Minimum acceptable depth to top of tunnel: 1000 mm.

.5 Backfill for tunnel and trench to 85 % Standard Proctor Density. Avoid damage to trunk and roots of tree.

.6 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

3.5 LOWERING GRADE AROUND EXISTING TREE

.1 Begin Work in accordance with schedule approved by *NCC Representative.*

.2 Cut slope not less than 500 mm from tree trunk to new grade level.

.3 Excavate to depths as indicated. Protect from damage root zone which is to remain.

.4 When severing roots at excavation level, cut roots with sharp tools.

.5 Cultivate excavated surface manually to 15 mm depth.

.6 Prepare homogeneous soil mixture consisting by volume of:

.1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
.2 25 % coarse, clean sterile sand.
.3 15 % organic matter.
.4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m^3.

.7 Place soil mixture over area of excavation to finished grade level. Compact to 85 % Standard Proctor Density.

.8 Water entire root zone to optimum soil moisture level.

.9 Install surface cover of sodding.

3.6 PRUNING

.1 Prune if required to ensure health of tree or shrub.

.2 Prune crown to compensate for root loss while maintaining general form and character of plant.

3.7 ANTI-DESICCANT

.1 Apply anti-desiccant to foliage where applicable and as directed by *NCC Representative.*

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 SECTION INCLUDES

.1 Sub-base courses.

.2 Base courses.

1.3 RELATED SECTIONS

.1 Section 02 70 10- Aggregates: General

.2 Section 32 12 16 - Asphalt Paving: asphalt paved areas.

1.4 OUTLINE OF WORK

.1 Provide all supervision, labour, equipment, tools, materials, transportation and other services necessary for undertaking and completing the Work detailed and specified herein and in the Contract Documents including but not limited to: furnishing, placing and compacting crushed aggregate material for construction of one or more layers of granular base upon a roadway to be re-instated at east end of Work Area and in conformity with the lines, grades and depth as indicated on Contract Drawings or established by the NCC Representative. As shallow bedrock is anticipated, Granular 'A' may be the only base material required.

1.5 REFERENCES

.1 ASTM D698-07el: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 OPSS 510: Construction Specification for Compacting

.3 OPSS 1010: Material Specification for Aggregates - Base, Subbase, Select Subgrade and Backfill Material.

1.6 SUBMITTALS

.1 Test Reports: Include specified and actual results for compaction, moisture content, suitability, and other required standards for sub-surface material.

1.7 SAMPLES

.1 Samples: 4.5 kg sample of each type of fill to testing laboratory, in air-tight containers.

.2 Inform NCC Representative of proposed source of granular base material and provide access for sampling at least two (2) weeks prior to commencing work in order to assess the quality of material and uniformity of supply.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

.1 Fine Granular Fill: to OPSS 1010, crushed Granular Class A; moisture content within plus or minus 2 percent of the requirements of ASTM D698.

.2 Coarse Granular Fill: to OPSS 1010, crushed Granular Class B, Type II; moisture content within plus or minus 2 percent of the requirements of ASTM D698.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Compact subgrade to density requirements for subsequent backfill materials outlined in OPSS 510. Cut out soft areas of subgrade not capable of insitu compaction and compact.

3.2 PROTECTION OF EXISTING UTILITIES

.1 The Contractor shall ensure that aggregates, debris from the Work area are prevented from entering existing maintenance holes and catch basins.

.2 Filter cloth is to be placed under existing maintenance hole covers and catch basins in the vicinity of material stockpiles.

3.3 BACKFILLING

.1 Backfill areas to contours and elevations with unfrozen materials.

.2 Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

.3 Place and compact materials in continuous layers not exceeding 150 mm compacted depth.

.4 Employ a placement method that does not disturb or damage adjacent Work.

.5 Make grade changes gradual. Blend slope into level areas.

.6 Backfill adjacent along east end of work area to comprise 150 millimetre lift of OPSS Granular A base, over 450 millimetres of OPSS Granular B Type 2 sub-base; subject to modification as a result of possible shallow depth to bedrock.

3.4 INSPECTION OF UNDERLYING SUB-BASE SURFACE

.1 Place granular base after subbase surface is inspected and approved by NCC Representative.

3.5 FIELD QUALITY CONTROL

.1 Conduct tests and analysis of fill material in accordance with ASTM D698.

.2 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

.3 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.

.4 Obtain approval of subgrade by NCC Representative before placing granular sub-base and granular base.

3.6 SCHEDULE

.1 Fill Under Medium Duty Asphalt Paving

.1 Sub-base and Base Course: compacted to 98 percent Standard Proctor maximum dry density.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 All conditions of the Contract and Section 01 00 00.02 – General Requirements apply to this Section.

1.2 RELATED SECTIONS

.1 Section 02 31 40- Filling and Backfilling

.2 Section 32 11 23- Aggregate Base Course

1.3 REFERENCES

.1 ASTM D698-07el: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 OPSS 301 – Construction Specification for Restoring Unpaved Roadway Surfaces

.3 OPSS 302 – Construction Specifications for Priming Granular Base

.4 OPSS 310: Construction Specification for Hot Mix Asphalt.

.5 OPSS 1003: Material Specification for Aggregates - Hot Mix Asphalt.

.6 OPSS 1101: Material Specification for Performance Graded Asphalt Cement.

.7 OPSS 1103: Material Specification for Emulsified Asphalt.

.8 OPSS 1150: Material Specification for Hot Mix Asphalt.

1.4 SUBMITTALS

.1 Section 01 33 00 - Submittal Procedures

.2 The Contractor shall submit product information, source and mix design to the NCC Representative for approval, not less than 10 working days prior to commencing paving operations.

.3 Test Reports: Include specified and actual results for compaction, suitability, and other required standards for asphaltic material.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with OPSS 310 – Construction Specification for Hot Mix Asphalt.

.2 Maintain on site one copy of Quality Assurance documentation.

.3 Obtain raw materials from same source throughout.

.4 NCC Representative is permitted to verify mix design specifications by having it tested at an accredited laboratory.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Mix and place asphalt concrete heated to temperatures between 121 - 163 degrees Celsius.

.2 Place pavement at ambient air temperatures at or above 5 degrees Celsius.

.3 Avoid placing pavement during rainy or inclement weather.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Asphalt Cement: to OPSS 1101.

.2 Aggregate for Binder Course Mix: 100 percent passing a 19 mm sieve, to OPSS 1003.

.3 Primer, Tack and Sealer Coat: SS-1 asphaltic emulsion, to OPSS 1103.

.4 Do not change approved mix/material design without written approval by the NCC Representative.

2.2 ASPHALT PAVING MIXES

.1 Binder Course: ready mixed, hot laid asphaltic concrete, to OPSS 1150, Type HL8.

2.3 AGGREGATE

.1 Aggregate for Binder Course Mix: 100 percent passing a 19 mm sieve, to OPSS 1003.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine prepared base before paving. Report any defects in base to the NCC Representative. Do not commence work if base is frozen or otherwise unsatisfactory.

.2 Verify that compacted granular base is dry and ready to support paving and imposed loads.

.3 Verify gradients and elevations of base are correct.

3.2 PROTECTION OF EXISTING WORK

.1 Protect structures, buildings, sidewalks, landscaping and other surface features against damage caused by paving operations and asphalt spray.

3.3 PREPARATION

.1 Shape finished subgrade parallel to proposed finished grades.

.2 Proof roll subgrade to 98% Standard Proctor maximum dry density.

3.4 ASPHALT PAVING

.1 Obtain approval of base from consultant before placing asphalt.

.2 Lay asphalt paving to OPSS 310, rolled to firm compaction.

.3 Lay mixture on dry aggregate base course, free from standing water.

.4 Spread mixture with a mechanical self-propelled power spreader capable of spreading the mixture to a line and grade.

.5 Before roller compaction is started, check the surface for inequalities, flat spots, etc. and adjust.

.6 Finished Surface: smooth and true to the established crown, free from depressions.

.7 Where paving is to extend existing surfaces, saw cut existing edges to form a neat joint between old and new work.

.8 Paint exposed vertical edge of asphalt joints, edges of manholes and catch basin frames, curbs and similar items with hot asphalt cement of emulsified asphalt prime prior to placing asphalt courses.

.9 Where paving comprises two courses, overlap longitudinal joints minimum 150mm.

3.5 FIELD QUALITY CONTROL

.1 Conduct tests and analysis of asphaltic concrete paving in accordance with ASTM D698.

.2 If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.6 ADJUSTMENTS

.1 Repair low or defective areas by cutting out the course as required and replacing it with fresh, hot mixture immediately compacted to conform to the surrounding area.

.2 Ensure 100 percent bond to existing adjacent paving.

3.7 SCHEDULE OF THICKNESSES

.1 Medium Duty Asphaltic Paving

.1 Lay a 60 mm thick layer of binder course asphaltic concrete, compacted 92 to 96.5 percent Maximum Relative Density.

3.8 PAVING AT CATCH BASINS, MANHOLES AND VALVES

.1 Ensure surface drainage to catch basins.

.2 Ensure that surface runoff will not drain into manholes and valve chambers.

.3 Do not pave over manholes or valve chambers. Adjust valve chambers and manhole rims to finished adjacent pavement elevation.

3.9 CLEAN-UP

.1 Remove loose pavement and aggregate from site.

.2 Remove all spillage and over-spray of liquid asphalt from pavement, sidewalks, buildings and other listed features.

.3 Clean out manhole pits and ensure free operation of valves after completion of paving operations.

3.10 PROTECTION OF COMPLETED WORK

.1 Keep vehicular traffic off newly paved areas until pavement surface temperature has cooled below 39 degrees Celsius. Do not permit stationary loads on pavement until 24 hours after placement.

END OF SECTION

APPENDIX 1

Designated Substance Specifications by DST Consulting Engineers
Various Designated Substance Survey Reports

Part 1 General

1.1 SUMMARY

.1 An investigation into the presence of designated substances at the selected buildings listed in Subsection 1.2.2 was performed in order to meet the requirements of Section 30 of the Ontario Occupational Health and Safety Act, Revised Statues of Ontario, 1990, Chapter 0.1. The Canada Labour Code also stipulates under Part II, Section 124 that every employer shall ensure that the health and safety at work of every person employed by the employer is protected. By having a Designated Substance Survey conducted, the NCC Representative will be able to inform NCC staff, Consultants and contractors of any designated substances that may be present and possibly disturbed throughout the duration of the project.

.2 The designated substances identified in the Ontario Occupational Health and Safety Act and its corresponding regulations are:

- .1 Acrylonitrile: O. Reg. 490/09, as amended
- .2 Arsenic: O. Reg. 490/09, as amended
- .3 Asbestos
  - .1 O. Reg. 490/09, as amended
  - .2 O. Reg. 278/05, as amended
- .4 Benzene: O. Reg. 490/09, as amended
- .5 Coke Oven Emissions: O. Reg. 490/09, as amended
- .6 Ethylene Oxide: O. Reg. 490/09, as amended
- .7 Isocyanates: O. Reg. 490/09, as amended
- .8 Lead: O. Reg. 490/09, as amended, and the Surface Coating Materials Regulations, (S.O.R./2005-109)
- .9 Mercury: O. Reg. 490/09, as amended
- .10 Silica: O. Reg. 490/09, as amended
- .11 Vinyl Chloride: O. Reg. 490/09, as amended

.3 All contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

1.2 VALIDITY DATE

.1 The information for this report has been gathered from a review of previous reports by other consultants as well as by various staff members of DST Consulting Engineers Inc. who have participated into a series of site surveys spanning the period August 2009 to March 2015.

.2 The scope of work for this report included visual inspections of building materials for the presence of suspected designated substances in the following buildings:

- .1 Shed
- .2 Shop
- .3 Garages
- .4 Site Offices

.3 The surveys were limited to those areas which could be accessed by non-destructive means. The visual inspection and sampling was limited to readily accessible areas. Due to the nature of building construction, some inherent limitations exist as to the possible

thoroughness of the designated substance survey. The survey did not include the demolition of floors, floor finishes, ceilings or walls (other than exterior perimeter walls of the Shop) or other areas to examine concealed conditions. Confined spaces were not accessed for the purposes of this report.

.4 It is possible that the designated substances mentioned above are present in non-accessed areas and concealed spaces (i.e., wall and ceiling cavities), or confined spaces. No other areas outside the defined work boundaries have been assessed.

.5 Prior to beginning work, confirm with the NCC Representative that no additional designated substances have been brought to the project area.

.6 There is a possibility that materials may exist which could not be reasonably identified within the scope of this assessment, or which were not apparent during previous site visits. Should any designated substance be encountered in the course of demolition, stop work, take preventative measures, and notify the NCC Representative immediately. Do not proceed until written instructions have been received.

Part 2 Designated Substances

2.1 SURVEY RESULTS

.1 ACRYLONITRILE: Not Identified

.2 ARSENIC: Not Identified

.3 ASBESTOS: Identified

.1 Asbestos is a naturally occurring material. In general, it has historically been intentionally added to many building materials in the construction industry to increase thermal or chemical resistant properties. More common uses are thermal insulation for pipes and boilers, structural steelwork fireproofing, floor tiles and in wall and ceiling plasters. There are two classes of asbestos containing materials: these are friable and non-friable. Friable asbestos containing materials are loose in composition or can be easily crumbled using hand pressure. Non-friable asbestos containing materials are more durable and are held together by a binder such as cement, vinyl or asphalt.

.2 Representative bulk samples collected from the project area have been analyzed for asbestos content. The analytical results are summarized in the Tables below.

Table 1 - Asbestos Sample Results – Shed

Sample I.D.	Sample Location	Material Description	Asbestos (%)
335848-01A	**Basement**	**Tectum Paper**	**60% Chrysotile**
335848-01B			Not Analyzed
335848-01C			Not Analyzed
335848-02A	Basement	Drywall Joint compound	Not Analyzed
335848-02B			Not Analyzed
335848-02C			Not Analyzed
335848-02D			<0.5% Chrysotile
335848-02E			<0.5% Chrysotile
335848-02F			None Detected
335848-02G			None Detected
335848-02H			None Detected
335848-03A	Mezzanine	Tar Paper	None Detected
335848-03B			None Detected
335848-03C			None Detected

Window caulking is non-friable suspected asbestos-containing material.

Table 2 - Asbestos Sample Results – Shop

Sample I.D.	Sample Location	Material Description	Asbestos (%)
94189-01A	Survey Location #3	Vinyl Floor Tiles, White, 12”x12”	None Detected
94189-01B			None Detected
94189-01C			None Detected
94189-02A	Survey Location #1	Drywall Joint Compound	None Detected
94189-02B			None Detected
94189-02C			None Detected
94189-02D	Survey Location #3		None Detected
94189-02E	Survey Location #6		None Detected
94189-03A	Survey Location #5 (Bathroom)	Vinyl Floor Tiles, Blue, 12”x12”	None Detected
94189-03B			None Detected
94189-03C			None Detected
94189-04A	Survey Location #7	Vinyl Sheet Flooring	None Detected
94189-04B			None Detected
94189-04C			None Detected

Window caulking is non-friable suspected asbestos-containing material.

Table 3 - Asbestos Sample Results – Garages

Sample I.D.	Sample Location	Material Description	Asbestos (%)
335846-01A	West Wall at Redundant Opening	Parging Cement	None Detected
335846-01B			None Detected
335846-01C			None Detected
01A	Inside of Garages at wall	Tar Paper	<MDL
01B			<MDL
01C			<MDL

MDL: Method Detection Limit of 0.5% (0.5% is the minimum regulated concentration of asbestos, as per *O.Reg. 278/05*, as amended).

Window caulking is non-friable suspected asbestos-containing material.

Table 4 - Asbestos Sample Results – Site Offices

Sample I.D.	Sample Location	Material Description	Asbestos (%)
243867-01A	Garages washroom	Wall surfacing material	None Detected
243867-01B			None Detected
243867-01C			None Detected
243867-02A	Garages	Drywall joint compound	None Detected
243867-02B			None Detected
243867-02C			None Detected
243867-03A	Basement	Stonework surface parging material	None Detected
243867-03B			None Detected
243867-03C			None Detected
243867-03D			None Detected
243867-03E			None Detected
243867-04A	**Basement (Mechanical Room/Storage Area)**	**Grey cement compound on pipe fittings**	**90% Chrysotile**
243867-05A	**Basement (Mechanical Room/Storage Area)**	**Layered cardboard wrap and tar paper insulation**	**20% Chrysotile**
243867-06A	Ground floor shower room	Light brown vinyl sheet flooring	None Detected
243867-06B			None Detected
243867-06C			None Detected
243867-07A	Ground floor shower room	Drywall joint compound	None Detected
243867-07B			None Detected
243867-07C	Ground floor rear common room		None Detected
243867-07D	Ground floor front common room		None Detected
243867-07E	Ground floor front entrance		None Detected
243867-08A	Ground floor rear office	yellow vinyl sheet flooring	None Detected
243867-08B			None Detected
243867-08C			None Detected
243867-09A	Ground floor rear common area	12” x 12” Cream colour vinyl floor tile	None Detected
243867-09B			None Detected
243867-09C			None Detected
243867-10A	Ground floor office at entrance	12” x 12” Lay-in ceiling tile	None Detected
243867-10B			None Detected
243867-10C			None Detected

Sample I.D.	Sample Location	Material Description	Asbestos (%)
243867-11A	Ground floor front common room	Blue/grey vinyl sheet flooring	None Detected
243867-11B	Ground floor front washroom		None Detected
243867-11C	Ground floor front corridor		None Detected
243867-12A	Attic	Roofing shingle debris	None Detected
243867-12B			None Detected
243867-12C			None Detected
243867-13A	**Attic**	**Tar paper debris**	**1% Chrysotile**
243867-14A	Attic chimney	Brick mortar	None Detected
243867-14B			None Detected
243867-14C			None Detected
243867-15A	Exterior windows at ground level	Window caulking	None Detected
243867-15B			None Detected
243867-15C			None Detected

Friable suspect asbestos-containing light heat shields associated with light fixtures being stored in the attic were noted.

Tar paper debris within the Attic is suspected to contain asbestos given sample results.

Packings within the joints of cast iron drain pipe are suspected to contain asbestos.

.4 BENZENE: Not Identified

.5 COKE OVEN EMISSIONS: Not Identified

.6 ETHYLENE OXIDE: Not Identified

.7 ISOCYANATES: Not Identified

.8 LEAD: Identified

.1 Lead is a naturally occurring metal. It was used primarily in paint prior to the 1980's in order to increase the drying process. Lead in paint becomes a danger when it becomes old or damaged as it creates lead dust and chips. Lead can also be found in soldered joints installed on piping up to the mid-1990s and in older cast iron bell and spigot joints.

.2 According to the Federal Canada Consumer Product Safety Act's *Surface Coating Materials Regulations SOR/2005-109, as amended*, the allowable concentration of lead in surface coatings is 0.009percent by weight (weight of lead to weight of paint), which is equivalent to 90 ppm.

.3 Lead is expected to be present in the following materials:

.1 Solder on the joints of copper piping.

.2 Caulking in the joints of cast iron drain pipes.

.3 Glazing on ceramic tiles in the washrooms.

.4 Lead-acid batteries in emergency lights.

.4 Representative paint chip samples collected from the project area have been analyzed for lead content. The analytical results for samples collected are summarized in The Tables below.

Table 5 - Lead Sample Results – Shed

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
335848-LP-01	**Building Exterior**	**White on trim and wood clapboards**	**85,000**

Table 6 - Lead Sample Results – Shop

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
94189-LP-01	Survey Location #1	White, Drywall Ceiling	<50
94189-LP-02	Survey Location #4	Beige, Drywall Walls	<50
94189-LP-03	**Exterior**	**Black, Wood Skirt**	**2,140**

Table 7 - Lead Sample Results – Garages

Sample I.D.	Sample Location	Paint Description	Paint Condition	Lead (ppm)
335846-LP-01	**Exterior**	**White on wood siding**	**POOR**	**13,700**
335846-LP-02	**Interior**	**Beige on wood finishes**	**GOOD**	**4,170**

Table 8 - Lead Sample Results – Site Offices

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
243867-LP-01	**Ground floor front common room**	**White radiator paint**	**19,800**
243867-LP-02	**Front entrance exterior**	**White porch paint**	**200,000**
243867-LP-03	**Exterior window trim**	**Black trim paint**	**322,000**

.9 MERCURY: Identified

.1 Fluorescent light tube will contain a single droplet of mercury. This droplet vapourizes when the tube is energized.

.2 Glass ampoules filled with liquid mercury are present in wall mounted thermostats.

.10 SILICA: Identified

.1 Free crystalline silica is present in:

.1 Concrete and concrete elements.

.2 Ceramic tiles.

.11 VINYL CHLORIDE MONOMER: Not Identified

.12 OTHER HAZARDOUS MATERIALS: Identified

.1 Although not designated substances, Polychlorinated Biphenyls (PCBs), and Ozone Depleting Substances (ODSs) are regulated both federally and provincially.

.1 Fluorescent light fixtures are presumed to contain ballasts with PCB capacitors.

.2 Refrigeration equipment (e.g. refrigerators, Air conditioning units, etc.) are presumed to contain ODSs.

.2 Waste chemicals such as cleaners, oils, paints, may be present. Handling and disposal of these items are subject to provincial/federal regulations.

2.2 RECOMMENDATIONS

.1 ASBESTOS

.1 Refer to Section 02 82 00.01, Asbestos Abatement – Minimum Precautions.

.2 Refer to Section 02 82 00.02, Asbestos Abatement – Intermediate Precautions.

.2 LEAD

.1 The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbance as either Type 1, Type 2a, Type 2b or Type 3 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 would serve as a reasonable, peer reviewed standard for work procedures.

.2 If required by the Work, copper or cast iron piping can be cut away from the joints to eliminate disturbance of the lead solder or lead caulking and to avoid potential worker exposure to lead.

.3 Refer to Section 02 86 00 - Lead Abatement.

.4 Select representative sampling of materials with lead-containing surfacing coatings have confirmed that the following materials are non-hazardous for disposal.

.1 Painted black wood porch and trim elements of the Shop, and white exterior wood cladding of the Garages can be classified as Solid, Non-Hazardous Waste with respect to lead.

.5 The following materials are classified/considered as Hazardous Waste with respect to lead.

.1 Exterior white painted wood cladding of the Shed. Any waste painted architectural elements of the Shed are also considered hazardous with respect to lead.

.2 Exterior white painted wood window frames of the Site Offices. Any painted architectural elements of the Site Offices are also considered as lead waste.

.3 Exterior painted wood cladding is present beneath the vinyl siding of the Shop. The paint coating on this cladding is suspected to be lead based paint.

.3 MERCURY

.1 Refer to Section 02 41 99.02, Demolition for Minor Works.

.4 SILICA

.1 The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published the document entitled *Guideline: Silica on Construction Projects*. This document classifies the disturbance of materials containing silica as either Type

1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. These work procedures should be followed when performing work involving the disturbance of silica-containing materials.

.2 Silica dust can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Silica was found in concrete finishes within the project area, and therefore, appropriate respiratory protection and ventilation must be utilized during demolition or modifications of these building components.

.5 OTHER HAZARDOUS MATERIALS

.1 Refer to Section 02 41 99.02, Demolition for Minor Works.

.6 CONTRACTOR'S DUTIES

.1 The contractor must review the designated substance report and take the necessary precautions to protect the health and safety of the workers and the environment. As per s. 27 (2) (a, b, c) of the Ontario Occupational Health and Safety Act, while onsite, the contractor supervisor shall take every reasonable precaution in the protection of a worker.

END OF SECTION

Part 1 GENERAL

1.1 References

.1 Province of Ontario.

.1 Occupational Health and Safety Act, R.S.O. (1990).

.2 Canada Labour Code, Canada Occupational Safety and Health Regulations, SOR/96-525.

1.2 ACTION AND INFORMATION SUBMITTALS

.1 Contractor's site-specific Health and Safety Plan: Prior to mobilization to site, submit site-specific Health and Safety Plan for review and approval by the NCC Representative. Work cannot proceed without an approved Plan. Contractor's site-specific Health and Safety Plan must address items as follows:

.1 Safety and health risk or hazard analysis for each site task and operation.

.2 Personnel training requirements including as follows:

.1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

.2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan.

.3 Personal protective equipment (PPE) program addressing:

.1 Donning and doffing procedures.

.2 PPE selection based upon site hazards.

.3 PPE use and limitations of equipment.

.4 Work mission duration, PPE maintenance and storage.

.5 PPE decontamination and disposal.

.6 PPE inspection procedures prior to, during, and after use.

.7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.

.8 Medical surveillance requirements for personnel assigned to work at site.

.9 Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.

.10 Site control measures to be employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.

.11 Decontamination procedures for both personnel and equipment.

.12 Emergency response requirements addressing: Pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section,

emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, and procedures for reporting incidents to local, provincial, or federal agencies.

.13 Written respiratory protection program for project activities.

.14 Procedures dealing with heat and/or cold stress.

.15 Confined space entry procedures if required by the Work.

.16 Spill containment program if drummed waste material is generated, excavated, stored, or managed on site.

.4 Respirator Fit Testing: Within 2 business days after date of Notice to Proceed and prior to mobilization to site, submit proof of respirator fit testing for site personnel.

.5 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

.6 Off-site Contingency and Emergency Response Plan:

.1 Prior to commencing Work involving handling of hazardous materials, develop an off-site Contingency and Emergency Response Plan.

.2 Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from site.

1.3 REGULATORY REQUIRMENTS

.1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.4 SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Designated Substances. Refer to Section 01 04 25, Designated Substance Report.

.1 Non-friable Asbestos-Containing Materials (ACMs). Refer to Section 02 82 00.01, Asbestos Abatement – Minimum Precautions.

.2 Friable ACMs. Refer to Section 02 82 00.02, Asbestos Abatement – Intermediate Precautions.

.3 Lead. Refer to Section 02 86 00, Lead Abatement.

.4 Mercury. Refer to Section 02 41 99.02, Demolition for Minor Works.

.5 Silica. Refer to Section 01 04 25, Designated Substance Report.

.2 Other Hazardous Materials. Refer to Section 01 04 25, Designated Substance Report.

.1 Polychlorinated Biphenyls (PCBs), Ozone Depleting Substances (ODSs), and Waste chemicals. Refer to Section 02 41 99.02, Demolition for Minor Works.

1.5 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications Health and Safety Plan must be reviewed and approved by the NCC Representative.

.2 Ensure Health and safety guidelines provide for safe and minimal risk working environment for site personnel and minimize impact of activities involving contact with

any hazardous materials or hazardous wastes on general public and surrounding environment.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan must submitted to NCC Representative in writing. NCC Representative will respond in writing, either accepting or requesting improvements.

1.6 RESPONSIBILITY

.1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HAZARD COMMUNICATION REQUIREMENTS

.1 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulation, R.R.O. 1990, Reg. 860, as amended.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.

.3 Provide NCC Representative with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site prior to site mobilization.

1.8 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.2 Assign responsibility and obligation to Health and Safety Representative where required to stop or start Work when, at Health and Safety Representative‘s discretion, it is necessary or advisable for reasons of health or safety. NCC Representative or designated representatives may also stop Work for health and safety considerations.

1.9 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, stop work and immediately advise NCC Representative verbally and in writing.

1.10 HEALTH AND SAFETY REPRESENTATIVE

.1 Employ and assign to Work competent and authorized representative as Health and Safety Adviser. Health and Safety Adviser must:

.1 Have minimum 5 years site-related working experience specific to activities associated with asbestos abatement, lead-based paint removal, and hazardous materials.

.2 Have a working knowledge of specified occupational safety and health regulations.

.3 Be responsible for completing Health and Safety Training Session and ensuring that personnel not successfully completing the required training are not permitted to enter site to perform Work in Exclusion Zone or Contaminant Reduction Zone.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Health and Safety Plan.

.5 Be on site at all times during execution of Work.

1.11 PERSONNEL HEALTH, SAFETY AND HYGIENE

.1 Medical Surveillance:

.1 Conduct medical surveillance of personnel as required by specified regulations.

.2 Training: Ensure personnel entering site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.

.3 Levels of Protection: Establish levels of protection for each Work area based on planned activity and location of activity.

.4 Personal Protective Equipment:

.1 Furnish site personnel with appropriate PPE as specified. Ensure that safety equipment and protective clothing is kept clean and well maintained.

.5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include the following procedures as minimum:

.1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.

.2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.

.3 Dispose of or decontaminate PPE worn on site at end of each workday.

.4 Decontaminate reusable PPE before re-issuing.

.5 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.

.6 Ensure facial hair does not interfere with proper respirator fit.

.6 Respiratory Protection:

.1 Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.

.2 Develop, implement, and maintain respirator program.

.3 Monitor, evaluate, and provide respiratory protection for site personnel.

.4 Ensure levels of protection as listed have been chosen to be consistent with site-specific potential airborne hazards associated with major contaminants identified on site.

.5 Ensure appropriate respiratory protection during work activities. As a minimum, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.

.6 Assess ability for site personnel to wear respiratory protection.

.7 Ensure site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.

.7 Emergency and First-Aid Equipment:

.1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.

.2 As a minimum, provide 1 certified first-aid technician on site at all times when work activities are in progress.

.8 Site Communications:

.1 Post emergency numbers near site telephones.

.2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.

.3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.

.4 Furnish selected personnel with 2-way radios if required for effective communication during specific tasks.

.5 Safety Meetings: Conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on an as-needed basis.

1.12 SITE CONTROL

.1 Meet specified requirements.

.2 Prior to commencing work involving handling of drums and other containers, submit procedures for safe handling of drums and other containers. Implement and enforce drum handling program during activities involving drummed waste characterization including but not limited to handling, opening, sampling, staging, and consolidating.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M, Code of Practice for Safety in Demolition of Structures.

.2 The Safe Handling of Mercury, A Guideline for the Construction Industry; Ontario Ministry of Labour, 1991.

.3 Guideline, Lead on Construction Projects; Ontario Ministry of Labour, 2004, as revised.

.4 Guideline, Silica on Construction Projects; Ontario Ministry of Labour, 2004, as revised.

.5 Identification of Lamp Ballasts Containing PCBs; Environment Canada, August 1991.

.6 Transportation of Dangerous Goods Act, 1992 (TDGA).

.7 R.R.O. 1990, Reg. 347, General – Waste Management, as amended.

1.2 ACTION AND INFORMATION SUBMITTALS

.1 Before proceeding with demolition of load bearing walls, and/or where required by authority having jurisdiction, allow forty-eight (48) hours for NCC Representative to review drawings prior to start of demolition.

.1 Submit for review and approval by NCC Representative shoring and underpinning drawings prepared by qualified professional structural engineer registered or licensed in the Province of Ontario, showing proposed method.

.2 Submit the following to the NCC Representative:

.1 Contact information for hauler and disposal of lead-based waste.

.2 Contact information for hauler and recycler for fluorescent light tubes.

.3 Contact information for hauler and recycler/disposal of liquid mercury-containing components.

.4 Contact information for hauler and storage site for PCB light ballasts.

.5 Certificates of destruction for all PCB materials removed from site.

.6 Delivery Waybills

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Ensure all personnel are familiar with and understand current lead-based waste management procedures, use of personal protective equipment and clean-up techniques.

.2 Ensure all personnel are familiar with and understand current mercury waste management procedures, use of personal protective equipment and clean-up techniques.

.3 Ensure all personnel are familiar with and understand current PCB waste management procedures, use of personal protective equipment and clean-up techniques.

1.4 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 Should material resembling asbestos or other designated substances and/or hazardous materials not identified be encountered, stop work, take preventative measures, and notify NCC Representative immediately.

.1 Do not proceed until written instructions have been received from NCC Representative.

.3 Notify NCC Representative before disrupting building services.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Cardboard Containers: New cardboard boxes. Suitable for packaging of fluorescent light tubes to prevent breakage of tubes.

.2 Containment Pails: New 20L metal pails with handles and sealable lids or 205L metal drums. Free from corrosion and punctures.

.1 Label containers of PCB material and drained containers of PCB material with chlorobiphenyl concentration exceeding 50 parts per million by weight with non-serialized, Warning Label for PCB-Contaminated Equipment, measuring 150 mm x 150 mm, as approved by NCC Representative in accordance with Environment Canada Manual of Spills of Hazardous Materials.

.3 Liners: Clear polyethylene bags, 0.15 mm thick. Used to line containment pails (or 205L drums).

.4 Absorbent Material: Vermiculite, certified non-asbestos, or approved equivalent.

.5 HEPA Vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.6 Negative Pressure System: A system that extracts air directly from work area, filters such extracted air through a High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building. This system shall maintain a minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas.

2.2 PRODUCTS

.1 Mercury/chemical Spill Response Kit consisting of:

.1 HEPA vacuum dedicated for use with mercury spills.

.2 Air-purifying cartridge respirators with mercury absorbing cartridges and an end-of-life service indicator.

.3 Impermeable gloves to prevent skin exposure when handling droplets of mercury.

.4 Neutralizing compound such as 20% calcium polysulfide or 20% sodium thiosulfide to clean spilled surfaces.

.2 PCB Emergency Response Equipment:

.1 Temporary storage site clean-up materials.

.1 Ensure availability at all time of sorbent or solvents, for clean-up of liquid or solid PCBs.

.2 Ensure availability at all times of inert absorbent in sufficient quantity to contain minor leakage.

.1 Place in bottom of each container holding PCB fluorescent light ballasts.

.2 Respirators (for use in emergency situations).

.1 Use approved full-face organic vapour cartridge respirator for exposure to hot PCB.

Part 3 EXECUTION

3.1 PREPARATION

.1 Inspect all buildings with the NCC Representatives and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain prior to start of demolition. Provide a minimum of forty-eight (48) hours notice to NCC Representative prior to inspection.

.2 Lead-based coating removals (i.e. lead-stripping work) are not to occur on the Operations Zone Project site, nor on the surrounding grounds.

.3 Disable electrical supply to:

.1 All fluorescent light fixtures.

.2 All emergency lighting systems.

.3 All areas of the buildings being demolished/dismantled.

.4 Any others systems or areas where an active electrical distribution system presents a work hazard.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent parts of building to remain in place. Provide bracing and shoring required.

.2 Protect building systems, services and equipment. Provide temporary support to plumbing, electrical and other services at risk of damage from demolition work.

.3 Provide temporary dust screens, covers, railings, supports and other protection as required.

.4 Do Work in accordance with Section 01 35 31 - Health and Safety for Contaminated Sites.

3.3 DEMOLITION AND REMOVALS

.1 Asbestos-Containing Materials

.1 Non-friable Asbestos-Containing Materials (ACMs). Refer to Section 02 82 00.01, Asbestos Abatement – Minimum Precautions.

.2 Friable ACMs. Refer to Section 02 82 00.02, Asbestos Abatement – Intermediate Precautions.

.2 Lead-containing Materials:

.1 Refer to Section 02 86 00, Lead Abatement.

.3 Fluorescent Light Fixtures:

.1 Ensure that electrical power to light fixtures has been locked out at the distribution panel.

.2 Carefully remove fluorescent light tubes from fluorescent light fixtures and place in cardboard containers.

.1 Place tubes in container as they are removed from fixtures. Ensure that tubes are packaged in a manner to prevent breakage.

.2 Avoid rough handling of tubes to avoid breakage.

.3 Store full containers in a central location on site prior to transportation to an approved recycling facility.

.3 Remove ballasts from light fixtures. Sort according to manufacturer and model. Ballasts with unknown PCB content shall be considered to contain PCBs and handled accordingly. Use impervious clothing (nitrile), gloves, face shields and other appropriate protective clothing necessary to prevent any skin contact with PCBs. Do not use natural rubber, neoprene, or polyvinyl chloride (PVC). Place contaminated clothing in closed containers for storage. Dispose of contaminated clothing in same manner as PCBs. Ensure that contaminated non-pervious clothing is removed promptly and not reworn until cleaned. Wear splash-proof safety goggles where liquid chlorodiphenyl (54% chlorine) may contact eyes.

.1 PCB-containing ballasts and contaminated clothing shall be placed in properly labelled, appropriate containment pails, temporarily stored in a secured area, if necessary, and transported to an approved waste disposal facility.

.2 Handle and dispose of contaminated waste as required by O. Reg. 347/90, as amended and the Transportation of Dangerous Goods Act.

.3 Completed copies of waste manifests and certificates of destruction, when available, shall be provided to the NCC Representative.

.4 Emergency Lighting Systems:

.1 Ensure that electrical power to emergency lighting systems has been locked out at the distribution panel.

.2 Disconnect lighting systems from electrical distribution system.

.3 Remove lead-acid batteries from fixtures. Dispose of in accordance with requirements of authorities having jurisdiction or deliver to an approved recycler.

.4 Dispose of fixture.

.5 Thermostats:

.1 Disconnect thermostats.

.2 Carefully remove ampoules containing liquid mercury.

.3 Place ampoules in a containment pail (or 205L drum) that has been lined with polyethylene and partially filled with approved absorbent material.

.4 As each ampoule is added to the containment pail, add additional absorbent material to prevent contact between ampoules.

.5 Fill remainder of containment pail with absorbent material, seal polyethylene liner and install lid.

.6 Label containment pail with contents and quantity.

.7 Transfer from site in accordance with the Transportation of Dangerous Goods Act. Dispose of in accordance with requirements of authorities having jurisdiction or deliver to an approved recycler.

.6 Silica-containing Materials:

.1 Refer to Section 01 04 25, Designated Substance Report.

.7 ODSs

.1 Ozone Depleting Substances must be captured and reclaimed by a licensed technician in any suspected halocarbon-containing equipment that is taken out of service. All handling must follow, and appropriate records of equipment decommissioning must be maintained, in accordance with requirements of the Federal Halocarbon Regulations, 2003, and O.Reg 463/10, *Ozone Depleting Substances and Other Halocarbons.*

.8 Waste Chemicals

.1 Waste chemicals should be handled and disposed of in accordance with the requirements given in their respective Material Safety Data Sheets (MSDS). Follow all applicable Workplace Hazardous Materials Information System (WHMIS) regulations.

.1 Disposal of waste chemicals must also be in accordance with *Ontario Regulation 347/90 – General – Waste Management,* as amended.

3.4 DISPOSAL

.1 Dispose of removed materials, except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 .Comply with the requirements of this Section when performing the following work:

.1 Removal of packings within the joints of cast iron drain pipe suspected to contain asbestos.

.2 Removal of tar paper debris within the Attic of the Site Offices.

.3 Removal of any suspect asbestos-containing light heat shields associated with light fixtures within the buildings.

.4 Removal of any suspect asbestos-containing window caulking associated with the Shop, Garages, and Shed.

1.2 RELATED REQUIREMENTS

.1 Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions.

1.3 REFERENCES

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.3 Ontario Ministry of Environment (MoE).

.1 Environmental Protection Act, R.S.O. 1990, c. E.19 (EPA).

.1 R.R.O. 1990, Reg. 347, General – Waste Management.

.4 Ontario Ministry of Labour (MoL).

.1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1 (OHSA).

.2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations, as amended.

1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Amended Water: Water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): Materials identified under Existing Conditions including fallen materials and settled dust.

.4 Asbestos Work Area: Area where work takes place which will, or may, disturb ACMs.

.5 Authorized Visitors: NCC Representative, Consultants or designated representatives, and representatives of regulatory agencies.

.6 Non-friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.7 Occupied Area: Any area of the building or work site that is outside Asbestos Work Area.

.8 Polyethylene: Polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.9 Sprayer: Garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.5 QUALITY ASSURANCE

.1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.

1.6 ACTION AND INFORMATION SUBMITTALS

.1 Submit proof satisfactory to NCC Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.2 Submit Provincial and/or local requirements for Notice of Project Form.

.3 Submit to NCC Representative all necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed of.

1.7 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMs present within the Project Area are available for inspection at the office of the NCC Representative.

.2 Refer to Section 01 04 25, Designated Substance Report, for information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project.

.3 Notify NCC Representative of suspect asbestos-containing material discovered during work and not apparent from drawings, specifications, or report pertaining to work. Do not disturb such material pending instructions from NCC Representative.

1.8 INSTRUCTION AND TRAINING

.1 Before commencing work, provide to NCC Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at a minimum:

.1 Fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 Instruction and training must be provided by a competent, qualified person.

1.9 WORKER PROTECTION

.1 Do construction occupational health and safety in accordance with Section 01 35 29.15 - Health and Safety Requirements for Hazardous Materials.

.2 Protective equipment and clothing to be worn by workers while in the Asbestos Work Area shall include:

.1 Non-powered reusable or replaceable filter-type respirator equipped with HEPA filter cartridges, personally issued to the worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to the Provincial Authority having jurisdiction.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.

.3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.4 Before leaving the Asbestos Work Area, dispose of protective clothing as contaminated waste as specified.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects the seal between the respirator and the face.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Drop Sheets: 0.15 mm thick polyethylene.

.1 Polyethylene: 0.15 mm thick.

.2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: Contain waste in two separate containers. Inner container: 0.15 mm thick sealable polyethylene waste bag. Outer container: sealable metal or fibre type where there are sharp objects included in the waste material; otherwise outer container may be a sealable metal or fibre type or a second 0.15 mm thick sealable polyethylene bag. Labelling requirements: Affix a pre-printed cautionary asbestos warning in both official languages that is clearly visible when ready for removal to disposal site.

Part 3 EXECUTION

3.1 PROCEDURES

.1 Before beginning work, isolate Asbestos Work Area using, at a minimum, pre-printed cautionary asbestos warning signs in both official languages that are clearly visible at all access routes to the Asbestos Work Area. Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.

.2 Prevent the spread of dust from Asbestos Work Area using measures appropriate to the work to be done.

.3 Wet materials containing asbestos to be removed unless wetting creates a hazard or causes damage. Use garden reservoir type low-velocity, fine-mist sprayer. Perform work in a manner to reduce dust creation to lowest levels practicable. All work will be subject to visual inspection and air monitoring. Any contamination of surrounding areas indicated by visual inspection or air monitoring will require the complete enclosure and clean-up of the affected areas.

.4 Secure appropriately packaged asbestos-containing waste in covered bins when waste is stored on site.

.5 Clean-Up:

.1 Frequently during the work and immediately after completion of work, clean up dust and asbestos-containing waste using a HEPA vacuum or by damp mopping.

.2 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as an asbestos waste; wet and fold these items to contain dust, then place in plastic bags.

.3 Clean the exterior of each waste-filled bag using damp cloths or a HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.

.4 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of work areas and adjacent areas affected by the work using HEPA vacuum.

3.2 INSPECTION

.1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviation(s) from these requirements that have not been approved in writing by NCC Representative may result in Work stoppage, at no cost to NCC.

.2 NCC Representative may inspect Work at any time during the project for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

.3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur NCC Representative may order Work shutdown.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Comply with the requirements of this Section when performing the following work:

.1 Removing asbestos-containing grey cement compound insulation from pipe fittings, including but not necessarily limited to elbows, valves, tees, hangers, etc., in the Basement of the Site Offices.

.2 Removing asbestos-containing layered cardboard wrap and tar paper insulation from pipes in the Basement of the Site Offices.

.3 Removing asbestos-containing tectum paper insulation from areas in the Basement of the Shed.

1.2 RELATED REQUIREMENTS

.1 Section 02 82 00.01 – Asbestos Abatement – Minimum Precautions.

1.3 REFERENCES

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.3 Ontario Ministry of Environment (MoE).

.1 Environmental Protection Act, R.S.O. 1990, c. E.19 (EPA).

.1 R.R.O. 1990, Reg. 347, General – Waste Management.

.4 Ontario Ministry of Labour (MoL).

.1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1 (OHSA).

.2 O.Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations, as amended.

1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any dimension at 99.97% efficiency.

.2 Amended Water: Water with a non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): Materials identified under Existing Conditions (Section 1.5), including fallen materials and settled dust.

.4 Asbestos Work Area: Area where work takes place which will, or may disturb ACMs.

.5 Authorized Visitors: NCC Representative, or designated representatives, and representatives of regulatory agencies.

.6 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.7 Occupied Area: Any area of the building or work site that is outside the Asbestos Work Area.

.8 Polyethylene: Polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.9 Glove Bag: Prefabricated glove bag as follows:

.1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.

.2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.

.3 Equipped with reversible double-pull double throw zipper on top and at approximately the mid-section of the bag.

.4 Straps for sealing ends around pipe.

.5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.

.10 Sprayer: Garden reservoir type sprayer or airless spray equipment capable of producing a mist or fine spray. Must have appropriate capacity for scope of work.

1.5 QUALITY ASSURANCE

.1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at the time the work is performed.

1.6 ACTIONS AND INFORMATION SUBMITTALS

.1 Submit proof satisfactory to the NCC Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.2 Submit Provincial and/or local requirements for Notice of Project Form.

.3 Submit proof of Asbestos Liability Insurance.

.4 Submit to NCC Representative all necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed of.

.5 Submit proof satisfactory to NCC Representative that all employees have had instruction on hazards of asbestos exposure, respirator use, dress, entry and exit from Asbestos Work Area, and all aspects of work procedures and protective measures.

.6 Submit proof that supervisory personnel have attended an asbestos abatement course, of not less than two days duration, approved by NCC Representative. Minimum of one supervisor for every ten workers.

.7 Submit Worker's Compensation Board status and transcription of insurance.

.8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets for chemicals or materials including:

.1 encapsulants;

.2 amended water;

.3 slow-drying sealer.

1.7 EXISITNG CONDITIONS

.1 Reports and information pertaining to ACMs present within the Project Area are available for inspection at the office of the NCC Representative.

.2 Refer to Section 01 04 25, Designated Substance Report, for information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project.

.3 Notify NCC Representative of suspect asbestos-containing material discovered during work and not apparent from drawings, specifications, or report pertaining to work. Do not disturb such material pending instructions from NCC Representative.

1.8 INSTRUCTION AND TRAINING

.1 Before commencing work, provide to NCC Representative satisfactory proof that every worker has had instruction and training in the hazards of asbestos exposure, in personal hygiene and work practices, in use of glove bag procedures, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at a minimum:

.1 Fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 Instruction and training must be provided by a competent, qualified person.

1.9 WORKER PROTECTION

.1 Do construction occupational health and safety in accordance with Section 01 35 29.15 - Health and Safety Requirements for Hazardous Materials.

.2 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Non-powered reusable or replaceable filter-type respirator equipped with HEPA filter cartridges, personally issued to the worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to the Provincial Authority having jurisdiction.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.

.3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.4 Before leaving the Asbestos Work Area, dispose of protective clothing as contaminated waste as specified.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects the seal between the respirator and the face.

1.10 VISITOR PROTECTION

.1 Provide protective clothing and approved respirators to Authorized Visitors to Asbestos Work Area.

.2 Instruct Authorized Visitors in use of protective clothing, respirators, and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Drop and Enclosure Sheets:

.1 Polyethylene: 0.15 mm thick.

.2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: Contain waste in two separate containers. The inner container shall be a 0.15 mm thick sealable polyethylene bag, or where the glove bag method is used, the glove bag itself. Outer container: sealable metal or fibre type where there are sharp objects included in the waste material; otherwise the outer container may be sealable metal or fibre type or a second 0.15 mm thick sealable polyethylene bag. Labelling requirements: Affix a pre-printed cautionary asbestos warning, in both official languages, that is clearly visible when ready for removal to disposal site.

.4 Glove Bag:

.1 Acceptable materials: Safe-T-Strip products in configuration suitable for work, or an Alternative Material approved by addendum during the tendering period in accordance with the Instructions to Tenderers. Glove bags intended for use in more than one location must be equipped with a reversible, double-pull, double-throw zipper on the top and at approximately the mid-section of the bag.

.5 Tape: Tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

.6 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for the purpose of trapping residual asbestos fibres. Sealer shall have flame spread and smoke developed rating less than 50.

Part 3 EXECUTION

3.1 SUPERVISION

.1 A minimum of one Supervisor for every ten workers is required.

.2 An approved Supervisor must remain within the Asbestos Work Area at all times during the disturbance, removal, or other handling of asbestos-containing materials.

3.2 PROCEDURES

.1 Before beginning work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case ’Helvetica Medium’ letters reading as follows, where the number in parentheses indicates the font size to be used: ’CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)’.

.2 Before beginning work remove visible dust from surfaces in the work area where dust is likely to be disturbed during the course of the work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.

.3 Enclosure Method:

.1 Prevent the spread of dust from the Asbestos Work Area using measures appropriate to the work to be done. Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over all flooring in work areas where dust or contamination cannot otherwise be safely contained. Prior to removing asbestos-containing material erect an enclosure of polyethylene sheeting around the work area, shut off the mechanical ventilation system serving the work area and seal ventilation ducts to and from the work area.

.2 Other than loose material which shall be removed by HEPA vacuum, friable material containing asbestos to be removed or disturbed shall be thoroughly wetted before and during work unless wetting creates a hazard or causes damage. Use garden reservoir type low-velocity sprayer or airless spray equipment capable of producing a mist or fine spray. Perform work in a manner to reduce dust creation to lowest levels practicable.

.4 Pipe Insulation Removal Using Glove Bag:

.1 Place tools necessary to remove insulation in tool pouch. Wrap the bag around pipe and close zippers. Seal bag to pipe with cloth straps.

.2 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.

.3 Insert nozzle of a garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.

.4 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through the elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.

.5 After removal of bag ensure that pipe is free of all residue. Remove all residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow-drying sealer to seal in any residual fibres.

.5 All work is subject to visual inspection and air monitoring. Any contamination of surrounding areas indicated by visual inspection or air monitoring will require the complete enclosure and clean-up of affected areas.

.6 Clean-up:

.1 Frequently during the work and immediately after completion of the work, clean up dust and asbestos-containing waste using a HEPA vacuum or by damp mopping.

.2 Place dust and asbestos-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.

.3 Immediately before their removal from the Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.

.4 Seal and remove double-bagged waste from site. Dispose of in accordance with requirements of Provincial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by the work using HEPA vacuum.

3.3 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, the NCC Representative may collect air samples on a daily basis outside of Asbestos Work Area enclosures.

.1 Contractor will be responsible for monitoring inside enclosure in accordance with applicable Provincial/Territorial Occupational Health and Safety Regulations.

.2 Ensure that respiratory safety factors for Workers are not exceeded.

.2 If air monitoring shows that areas outside work area enclosures are contaminated, enclose, maintain, and clean these areas in same manner as that applicable to Asbestos Work Areas

.1 Stop work and clean areas outside of Asbestos Work Areas when Phased Contrast Microscopy measurements exceed 0.05 fibres per cubic centimetre (f/cc) and correct procedures.

.2 All required cleaning, re-cleaning, additional air testing and/or inspections will be performed at no extra charge to the Client.

.3 The NCC Representative may collect clearance air samples following a final visual inspection of the Asbestos Work Area by the Departmental Representative. Samples will be analyzed and compared to applicable regulations.

.1 Final air monitoring results must show fibre levels of less than 0.05 fibres per cubic centimetre (f/cc).

.2 If air monitoring shows that areas inside the Asbestos Work Area enclosures are contaminated; enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area at no additional cost to the client.

.3 Repeat as necessary until fibre levels are less than 0.05 f/cc

.4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

END OF SECTION

Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Removal and disposal of all lead-based painted architectural elements of the Site Offices, Shed, and Shop as required to accommodate the project scope.

.2 Any other work which disturbs lead-based paint finishes, materials, products, equipment, and/or debris.

1.2 RELATED SECTIONS

.1 Section 02 82 00.01 – Asbestos Abatement – Minimum Precautions

.2 Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions

1.3 REFERENCES

.1 Department of Justice Canada.

.1 Canadian Environmental Protection Act (CEPA), 1999.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.4 Ontario Ministry of Environment (MoE).

.1 R.R.O. 1990, Reg. 347, General – Waste Management, as amended.

.5 Ontario Ministry of Labour (MoL).

.1 Occupational Health and Safety Act, R.S.O. 1990, c. O.1 (OHSA).

.1 R.R.O. 1990, Regulation 490/09, Designated Substances, as amended.

.2 Guideline: Lead on Construction Projects, September 2004, (Revised April, 2011).

1.4 DEFINITIONS

.1 Airlock: system for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated area, typically consisting of two curtained doorways at least 2 m apart unless Site Conditions dictate otherwise.

.2 Architectural elements: all exterior and interior wood components including cladding, siding, all trim boards, sheathing, soffits, soffit boards, all trims, fascia boards, wainscoting, bases, skirt boards, shingles, roof decking, rafter sides and ends, window frames, jambs, sashes, sills, heads, columns, posts, corner boards, decorative elements and all other miscellaneous wood items.

.3 Authorized Visitors: National Capital Commission (NCC) Representatives and representatives of regulatory agencies.

.4 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway. Reinforce free edges of polyethylene with duct tape and weight bottom

edge to ensure proper closing. Overlap each polyethylene sheet at openings not less than 1.5 m on each side unless Site Conditions dictate otherwise.

.5 Lead-Based Paint: Paint that contains lead in concentrations greater than 90 parts per million (ppm).

.6 Lead-Containing waste considered hazardous for disposal purposes: Waste that exceeds or is assumed to exceed the hazardous characterization limit of 5 mg/L lead based on the Toxicity Characteristic Leachate Procedure, specified for lead by Ontario Regulation 347/90 - General – Waste Management, as amended.

.7 Lead-containing materials/equipment: Materials/equipment suspected of containing lead through historic application, or identified as lead containing through labels/tags.

.8 NCC Representative: Any representative as designated by the NCC.

.9 Occupied Area: any area of building or work site that is outside the Lead Work Area.

1.5 ACTION AND INFORMATION SUBMITTALS

.1 One (1) week prior to the start of abatement work, submit proposed methodology for abatement procedures for review by NCC Representative. The proposed methodology shall include:

.1 Products used complete with MSDS information.

.2 List of protective equipment to be used by workers.

.3 Plan identifying area(s) of work for abatement procedures.

.4 Requirements for engineering controls, ventilation, etc.

.5 Requirements for access to and egress from the Lead Work Area.

.6 A written Health and Safety Plan specific to work of this Section. As a minimum this document must include:

.1 Classification of all lead abatement work in accordance with the criteria used in the document Guideline: Lead on Construction Projects issued by the Ontario Ministry of Labour.

.2 The identity of the “competent person” who will, on behalf of the Contractor, perform regular inspections of the lead abatement activities to prevent dangerous, unhealthy or unsafe conditions. The “competent person” must be on site at all times while lead abatement activities are in progress.

.3 A description of the equipment and materials, controls, crew size, job responsibilities, and operations and maintenance procedures for each activity involved in the work of this Section.

.4 A description of the specific control methods to be used in the lead-based paint abatement process.

.5 A strategy to ensure that personnel are not exposed to airborne lead or other contaminants in concentrations that exceed the current Time Weighted Average Exposure Value (TWAEV).

.6 A description of the medical surveillance program in place for lead abatement workers.

.7 Names of products to be used in lead abatement work.

.2 Before beginning work:

.1 Obtain from appropriate agency and submit to NCC Representative all necessary permits for transportation and disposal of hazardous waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal.

.2 Submit proof satisfactory to NCC Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, use of showers,

entry and exit from work areas, and aspects of work procedures and protective measures.

.3 Submit proof in the form of a certificate that supervisory personnel have attended a lead-based paint abatement course, of not less than 1-day duration.

.3 For each load of waste that leaves the site, submit landfill weigh scale receipts, shipping documents, and hazardous waste manifests.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 31 - Health and Safety Requirements for Contaminated Sites.

.2 Safety Requirements: worker and visitor protection.

.1 Eating, drinking, chewing, and smoking are not permitted in the Lead Work Area.

.2 Washing facilities consisting of a wash basin, water, soap and towels shall be provided by the Contractor. All workers shall use these washing facilities before eating, drinking, smoking or leaving the work site.

.3 Protective equipment and clothing to be worn by workers while in the Lead Work Area includes:

.1 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.

.2 Respirator, personally issued to worker and marked as to efficiency and purpose, and acceptable to Authority having jurisdiction as suitable for level of lead exposure in the Lead Work Area. If disposable type filters are used, provide sufficient filters so that workers can install new filters following disposal of used filters and before re-entering contaminated areas.

.4 Ensure that no person required to enter the Lead Work Area has facial hair that affects seal between respirator and face.

.5 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from the Lead Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.3 Disposal of lead waste, including wash and rinse water, generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Label containers with appropriate warning labels.

.4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed facility for disposal.

1.8 EXISTING CONDITIONS

.1 Reports and information pertaining to lead-containing materials to be handled, removed, or otherwise disturbed and disposed of during this Project are available for inspection, and included in the specifications, at the office of the NCC Construction Manager.

.2 Refer to Section 01 14 25, Item 2.1.8.

.3 Select representative sampling of materials with lead-containing surfacing coatings have confirmed that the following materials are non-hazardous for disposal.

.1 Painted black wood porch and trim elements of the Shop, and white exterior wood cladding of the Garages can be classified as Solid, Non-Hazardous Waste with respect to lead.

.4 The following materials are classified/considered as Hazardous Waste with respect to lead.

.1 Exterior white painted wood cladding of the Shed. Any waste painted architectural elements of the Shed are also considered hazardous with respect to lead.

.2 Exterior white painted wood window frames of the Site Offices. Any painted architectural elements of the Site Offices are also considered as lead waste.

.3 Exterior painted wood cladding present beneath the vinyl siding of the Shop. The paint coating on this cladding is suspected to be lead based paint.

Part 2 PRODUCTS

2.1 MATERIALS

.1 All materials brought to project site must be in good condition and free of lead dust. Disposable items must be of new materials only.

.2 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of Environment. Labelled as required. Comprised of one of the following:

.1 A 0.15 mm sealed polyethylene bag, inside a second 0.15 mm sealed polyethylene bag.

.2 A barrel suitable for lead wash water and/or sludge. Container must be acceptable to the hazardous waste hauler.

.3 Lead Cleaning Agent: A cleaning agent suitable for lead dust. Acceptable products:

.1 Detergents with a high phosphate content (containing at least 5% trisodium phosphate).

.2 Phosphate-free lead dissolving agent.

.4 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.

.5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions.

2.2 EQUIPMENT

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Sprayer: Garden reservoir type, low velocity, capable of producing a mist or fine spray.

Part 3 EXECUTION

3.1 PREPARATION

.1 Type 1 Work Areas:

.1 Install polyethylene drop sheets below lead operations which produce or may produce dust, chips, or debris containing lead.

.2 Type 2 Work Areas:

.1 Install polyethylene drop sheets below lead operations which produce or may produce dust, chips, or debris containing lead.

.2 Post signs in sufficient numbers to warn of the lead hazard. There shall be a sign, at least, at each entrance to the Lead Work Area. The signs shall display the following information in large, clearly visible letters using both official languages:

.1 Lead dust, fume or mist hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.3 Type 3 Work Areas:

.1 Post signs in sufficient numbers to warn of the lead hazard. There shall be a sign, at least, at each entrance to the Lead Work Area. The signs shall display the following information in large, clearly visible letters using both official languages:

.1 Lead dust, fume or mist hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.2 Barriers, Partial Enclosures and Full Enclosures: Barriers, partial enclosures, and full enclosures shall be constructed to separate the Lead Work Area from the rest of the project. Barriers shall only be used where full and partial enclosures are not practical.

.1 Barriers:

.1 Ropes or barriers do not prevent the release of contaminated dust or other contaminants into the environment. However, they can be used to restrict access of workers who are not adequately protected with proper PPE, and also prevent the entry of workers not directly involved in the operation. Ropes or barriers shall be placed at a distance far enough from the operation that allows the lead-containing dust to settle. If this is not achievable, warning signs should be posted at the distance where the lead-containing dust settles to warn that access is restricted to persons wearing PPE.

.2 Partial Enclosures:

.1 Partial enclosures allow some emissions to the atmosphere outside of the enclosure. Partial enclosures may consist of vertical tarps and floor tarps so long as the tarps are overlapped and securely fixed together at the seams. A partial enclosure is not a suitable containment system if significant dust is being generated.

.3 Full Enclosures:

.1 Full enclosures are tight enclosures (with tarps that are generally impermeable and fully sealed joints and entryways). Full enclosures allow minimal or no fugitive emissions to reach the

environment outside of the Lead Work Area. For full enclosures, the following requirements shall be met:

.1 The enclosure shall be constructed of windproof materials that are impermeable to dust.

.2 The enclosure shall be supported by a secure structure.

.3 All joints in the enclosure shall be fully sealed.

.4 Entrances to the enclosure shall be equipped with air locks.

.5 The escape of abrasive and debris from the enclosure shall be controlled, at air supply points, by the use of baffles, louvers, flap seals and filters.

.3 Worker Decontamination Enclosure System: Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:

.1 Equipment and Access Room: build an Equipment and Access Room between Shower Room and Lead Work Area, with two curtained doorways, one to Shower Room and one to Lead Work Area. Install a waste receptor and storage facilities for workers' shoes and protective clothing to be reworn in Lead Work Area. Build and Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.

.2 Shower Room: build a Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five or fewer workers. Provide constant supply of hot and cold, or warm (between 40°C and 50°C) potable water. Provide piping and connect to water sources and drains. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.

.3 Clean Room: build a Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install a mirror to permit workers to fit respiratory equipment properly.

.4 Maintenance of Enclosures:

.1 Maintain enclosures in tidy condition.

.2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

.3 Visually inspect enclosures at beginning of each working period.

.4 Do not begin lead abatement work until:

.1 Arrangements have been made for disposal of hazardous waste.

.2 Arrangements have been made for containing, filtering, testing and disposal of waste water.

.3 Work areas, decontamination enclosures and parts of project site required to remain in use are effectively segregated.

.4 Tools, equipment, and materials waste containers are on hand.

.5 Arrangements have been made for building security.

.6 Warning signs are displayed where access to contaminated areas is possible.

.7 Notifications have been completed and other preparatory steps have been taken.

.8 NCC Representative has reviewed preparatory work and provided written approval for lead abatement work to proceed.

3.2 SUPERVISION

.1 Minimum of one Supervisor for every ten or fewer workers is required.

.2 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead-based paint and other lead contaminated materials.

3.3 LEAD REMOVAL

.1 Before removing lead-based paint or disturbing other lead contaminated materials:

.1 Prepare site.

.2 Spray surfaces to be disturbed, that are finished with lead-containing paint, with water using airless spray equipment capable of providing a “mist” application to prevent the release of dust.

.3 Lead dust and/or debris from construction/demolition activities must be controlled, and not be allowed to enter the surrounding environment and/or water ways.

.2 Prohibited methods of lead-based paint removal include:

.1 Dry scraping.

.2 Open flame burning, torching, fossil fuel-powered heat plates, welding, cutting torches, and heat guns operating at temperatures greater than 590°C.

.3 Machine grinding or sanding without a HEPA-filtered exhaust tool.

.4 Hydroblasting or high-pressure water wash.

.5 Abrasive blasting or sandblasting.

.6 Chemical paint removers containing methylene chloride.

.3 Methods of lead-based paint removal that may be used, pending approval from the NCC Representative, include:

.1 Electric-powered flameless heat guns that operate at temperatures less than 230°C followed by manual scraping with round edge scrapers.

.2 Mechanical removal methods such as HEPA sanding and wet scraping.

.3 Chemical removal methods that use non-caustic strippers.

.4 Intact lead-based painted building materials removal generating little or no dust and debris.

.5 Other method(s) at the sole discretion of the NCC Representative

.4 Test Area Mock-ups:

.1 Prepare a test area as directed by the NCC Representative, not less than 0.3m² in surface area, for each type of substrate that requires lead-based paint removal.

.2 Remove the paint from each test area using a method listed in Item 3.3.3. above to allow the NCC Representative to evaluate the effectiveness of the method on that particular substrate.

.3 Once a test area mock-up has been approved by the NCC Representative, this will represent the standard of acceptance for that type of substrate.

.5 Remove other lead-based products as required to accommodate the project scope of work.

.6 Treat all paint removed and/or lead-containing waste materials removed as hazardous waste and dispose of as such. Seal filled containers. Clean external surfaces of

containers thoroughly by wet sponging. Remove from immediate working area pending removal to outside the Lead Work Area.

.7 At completion of lead-based paint removal, perform the following clean-up:

.1 Wait at least 1-hour after active lead abatement work has ceased to allow airborne lead particles to settle.

.2 HEPA vacuum all surfaces within the Lead Work Area. Start vacuuming at the highest levels furthest from the Decontamination Facilities and work progressively downwards towards the Decontamination Facilities.

.3 Wash all surfaces with Lead Cleaning Agent and rinse with clean water. Start washing and rinsing at the highest levels furthest from the Decontamination Facilities and work progressively downwards towards the Decontamination Facilities.

.4 Repeat HEPA vacuuming, washing and rinsing as required to achieve clearance criteria.

3.4 FINAL CLEANUP

.1 Following cleaning specified in Item 3.3.7 above, and when the Lead Work Area has met the air monitoring and residual lead dust levels specified in Item 3.5 if required, proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it towards the centre of the Lead Work Area. Immediately vacuum any visible paint chips, particles, dust and debris observed during cleanup using HEPA vacuum equipment.

.3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in sealed labelled waste containers for transport.

.4 Include in clean-up Work areas, Equipment and Access Room, Shower Room, and other contaminated enclosures.

.5 Include in clean-up all Work areas within the project area as well as the site as required.

.6 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, at appropriate time in cleaning sequence.

.7 A final check may be carried out to ensure that no lead dust or debris remains on surfaces as a result of dismantling operations.

.8 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled waste containers.

.1 Dispose of hazardous waste in accordance with R.R.O. 1990, Regulation 437, as amended. Ensure that waste hauler and receiver are fully aware of hazardous nature of material to be disposed of and that guidelines and regulations for hazardous waste disposal are followed.

.2 Ensure that materials removed during the Work of this Section are treated, packaged, transported and disposed of as hazardous waste.

.3 Clean up waste routes and loading area after each load. Use lead abatement procedures if appropriate or requested by NCC Representative

.4 Drop waste bins at designated locations. Keep bins covered and enclosed while at the site. Bin loading area shall be kept clean at all times.

.5 Transport all waste to a landfill licensed by the Ontario Ministry of Environment (MOE).

.6 Provide NCC Representative with copies of shipping documents and hazardous waste manifests for each load of waste. The Contractor is responsible to ensure that written documentation is submitted for each load of waste leaving the site.

.7 Cooperate with MOE inspectors and immediately carry out instructions for remedial work at landfill to maintain environment, at no additional cost to NCC.

3.5 AIR MONITORING AND SURFACE WIPE SAMPLING

.1 From beginning of Work until completion of cleaning operations, the NCC Representative or designated representative may be on site to collect air samples either inside or outside of the Lead Work Area in accordance with standard methods for workplace air sampling and analysis.

.1 This air monitoring does not relieve the Contractor of any responsibility for air monitoring inside the Lead Work Area to verify that the respiratory protection in use provides a suitable protection factor.

.2 Use results of air monitoring inside the Lead Work Area to establish type of respirators to be used. Workers may be required to wear sample pumps for up to full-shift periods.

.1 If airborne lead concentrations are above the protection factor of respirators in use, the Contractor shall:

.1 Stop abatement.

.2 Introduce more stringent engineering controls.

.3 Use a higher protection factor in respiratory protection for persons inside the Lead Work Area.

.2 If air monitoring shows that airborne lead concentrations outside the Lead Work Area exceed 0.025 mg/m³, the Contractor shall maintain and clean these areas, in same manner as applicable to the Lead Work Area, at no additional cost to the NCC.

.3 Final clearance air monitoring will be performed at the sole discretion of the NCC Construction Manager.

.1 Final air monitoring results must show airborne lead levels less than 0.005 mg/m³.

.2 If air monitoring results show airborne lead levels in excess of 0.005 mg/m³, the Contractor shall re-clean the Lead Work Area.

.3 Repeat as necessary until airborne lead levels are less than 0.005 mg/m³.

.4 The following criteria shall be used to define an acceptable level of cleanliness after lead abatement activities, at the discretion of the Departmental Representative:

.1 Surfaces visibly free of paint(s) and primers(s) where required to accommodate scope of work.

.2 Surfaces visibly free of settled dust and residue.

.3 Residual lead dust sampling may be performed at the sole discretion of the Departmental Representative. Lead concentrations must be less than:

.1 430 micrograms/square metre for interior floor surfaces

.2 2,691 micrograms/square metre for interior windowsills

.3 8,611 micrograms/square metre for exterior surfaces

.4 Repeat cleaning, as necessary, until lead concentrations are below specified levels, at no additional cost to the Departmental Representative.

.4 Demolition Work Area:

.1 Visibly free of paint chips and settled dust.

3.6 INSPECTION

.1 Perform inspections of all project areas and Lead Work Area(s) to confirm compliance with specification and requirements of authorities having jurisdiction. Deviation from these requirements that have not been approved in writing by the NCC Representative may result in Work stoppage, at no cost to the NCC.

.2 NCC Construction Manager or designated representatives will inspect Work for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

.3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When a leakage of liquid, dust or fume from the project area and/or Lead Work Area(s) has occurred or is likely to occur the NCC Representative may order Work shutdown.

.1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

END OF SECTION

DESIGNATED SUBSTANCE SURVEY

Site Offices

Ottawa, Ontario

September 23, 2015

DST File No.: BE-OT-010540

DST Consulting Engineers Inc.
2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9
Tel.: (613) 748-1415 Fax: (613) 748-1356 E-mail: ottawa@dstgroup.com

Executive Summary

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Site Offices located in Ottawa, Ontario.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are followed as an environmentally responsible protocol consistent results for its buildings located in both Ontario and Quebec.

DST performed the site visit for the Site Offices on August 27, 2009.

The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Urea Formaldehyde Foam Insulation (UFFI);
- Other hazardous materials, as viewed pertinent by the consultant.

In preparing this report DST project personnel reviewed the following document:

- Hazardous Material and Designated Substance Survey, Site Office, Ottawa, Ontario; Jacques Whitford Environmental Limited (JWEL), Project No. ONO62535, December 20, 2002.

The following table summarizes the remaining findings of the Site Offices survey. The table includes the results of the JWEL report referenced above, where appropriate.

Designated/ Hazardous Substance	Findings	Recommendations
Asbestos	Friable, poor condition, asbestos-containing, grey cement compound was identified on pipe fittings in the basement storage/mechanical room. Friable, good condition asbestos-containing layered cardboard wrap insulation was noted on pipe runs in the basement storage/mechanical room. Some friable, poor condition debris is associated with this insulation. Non-friable, poor condition tar paper debris is present in the attic. Suspected ACMs were identified within the building: • Light heat shields associated with fixtures stored in the attic (friable); and, • Packings within the joints of cast iron drain pipes (non-friable). All asbestos bulk sample results including materials sampled by JEWL can be found in Section 3.3 of this report.	Poor condition grey cement compound and layered cardboard wrap debris should be completely removed following work procedures outlined in O.Reg. 278/05. Estimated remediation cost - $1,500. Poor condition tar paper debris should be completely removed following work procedures outlined in O.Reg. 278/05. Estimated remediation cost - $500. Although remedial action is not currently required for layered cardboard wrap insulation on pipe runs and light heat shields stored in the attic cost benefits could be incurred if this material was removed at the same time as the above noted materials. Estimated remediation cost - $500 per item in addition to above costs. Although the materials sampled by JWEL and noted in Section 3.3 of this report did not contain regulated concentrations of asbestos the sampling requirements of O.Reg. 278/05 were not satisfied. This regulation requires that a minimum of three (3) bulk samples of these material types be sampled and all found not contain regulated concentrations of asbestos before the materials be deemed non asbestos-containing. Additional sampling of these materials will be required.

Designated/ Hazardous Substance	Findings	Recommendations
Lead	All paints sampled by DST as well as some of the paints sampled by JWEL were identified as having amounts of lead greater than 600 ppm: • White paint on radiators; • White paint on exterior wood siding and porch; • Black paint on exterior window trims; • Light yellow paint on interior window trims (JWEL); • Grey Stain on exterior of old section (JWEL); • Brown garage door paint (JWEL); and, • Grey Floor paint (JWEL). All bulk paint chip sample results including those sampled by JEWL can be found in Section 3.8 of this report. Lead is suspected to be present in the following materials: • Solder on the joints of copper piping; • Glazing on ceramic tiles in the washroom(s), kitchen, entrance vestibule; • Caulking in the joints of cast iron drainage pipes; and, • Lead sheeting on a support column in the Basement Storage Area (uncertain if remaining)	DST recommends removal of only the loose, delaminating, flaking areas of paint (leaving the remaining areas of paint intact and undisturbed). Estimated remediation cost - $2,000 assuming materials are non-hazardous for disposal purposes. 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.
Mercury	Fluorescent light tubes and thermostats throughout the building are suspected to contain mercury.	No remedial action is required at this time. The Occupational Health and Safety Division of the Ontario Ministry of Labour publication *The Safe Handling of Mercury: A Guide for the Construction Industry*, should be followed during the disturbance of materials containing mercury.

Designated/ Hazardous Substance	Findings	Recommendations
Silica	Silica is present within concrete and masonry building materials, and wall surfacing material.	No remedial action is required at this time. 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.*
Benzene	Benzene may be a constituent of fuels, oils, paints, thinners, and cleaning solvents stored in the Garage.	No remedial action is required at the present time. The transport and disposal of chemical waste is governed by O.Reg 347/90 - General – Waste Management, as amended to O.Reg. 217/08. Handling of this waste should be undertaken by those with proper training (e.g. Workplace Hazardous Materials Information System, TDGA, etc.).
Polychlorinated Biphenyls (PCBs)	PCBs may be present in unidentified fluorescent light ballasts (suspected) observed within the building. At the time of the JWEL survey the following ballasts were observed and confirmed to be non-PCB-containing[1]: • Phillips, RQM-2S40 TPC, R-140 TPC; • Alliance, 17A 128E; • Magnatek, 446-L-SLH-TL-P; • Advance, R-140-1-TP (Mark III); • Sola Select, 570-30 2SX; • Sylvania, RS-110-TP; • Valmount, 8G1063 WE; and, • CGE, 8G3912 E1, 17A 128E, 17A 829E, 17A 148E, 17A 240E .	No remedial action is required at the present time. DST recommends that unidentified fluorescent light ballasts be examined (after the electrical feeds are tagged and locked out by an electrician) to determine the PCB content of the ballasts.

[1] Determination made according to the Environment Canada publication *Identification of Lamp Ballasts containing PCBs,* August, 1991.

Designated/ Hazardous Substance	Findings	Recommendations
Ozone-Depleting Substances (ODSs)	ODSs are suspected present within refrigerators, A/C units, and a water cooler found within the building. These are not considered integral parts of the building or structure.	No remedial action is required at the present time. When these units are taken out of service, the ODS refrigerants must be captured and reclaimed by a licensed technician.
Mould	The following mould impacted building materials were observed during the site visit: • Approximately 10 square metres on the underside of wooden floor boards in the basement storage area.	Given the location of the observed mould impacted building materials, remediation of the mould and renovations to limit the risk of the mould returning may be considered impractical. Consider restricting access to this area for those who are sensitive to mould exposure. Also, restricting storage of materials within this area may be warranted. If remedial activities are desired, DST recommends that: • Mould impacted materials be remediated following procedures outlined in the Canadian Construction Association mould guidelines (CCA 82-2004). • The source of the water/moisture infiltration be investigated and corrected prior to reinstatement of building materials that are removed to accommodate mould remediation. Estimated remediation cost - $2,000.

Designated/ Hazardous Substance	Findings	Recommendations
Other Hazardous Materials	Paints, aerosols, oils, etc. were observed in the Garage and basement storage area chemical locker. These products are assumed to be used for maintenance activities.	No remedial action is required at this time. When these materials are no longer in use, or are spent they should be disposed of appropriately. The transport and disposal of chemical waste is governed by O.Reg 347/90 - General – Waste Management, as amended to O.Reg. 217/08. Handling of this waste should be undertaken by those with proper training (e.g. Workplace Hazardous Materials Information System, TDGA, etc.).

This Executive Summary should be read in conjunction with, and is subject to the same Limitations as, the entire report.

DESIGNATED SUBSTANCE SURVEY
Site Offices

Ottawa, Ontario

TABLE OF CONTENTS

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Site Offices located in Ottawa, Ontario. The Site Offices is a one-storey building, consisting of a ground floor and partial second floor, with an attic/storage level, and an unfinished basement. The building is exterior is wood siding on a stonework foundation. The roof is shingled. Heating is by radiator and utilities include hydro, domestic water, and municipal sewer service.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

Designated Substances, as identified under the Ontario Occupational Health & Safety Act are:

1. Acrylonitrile;
2. Arsenic;
3. Asbestos (both friable and non-friable);
4. Benzene;
5. Coke Oven Emissions;
6. Ethylene Oxide;
7. Isocyanates;
8. Lead;
9. Mercury;
10. Silica; and,
11. Vinyl Chloride.

Other Hazardous Materials, which are not classified as Designated Substances, but which are still of concern due to other regulations, best practice guidelines and/or potential risks to human health and/or the environment, include:

12. Polychlorinated Biphenyls (PCBs);
13. Ozone Depleting Substances (ODS);
14. Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
15. Mould;
16. Urea Formaldehyde Foam Insulation (UFFI);

17. Radioactive Smoke Detectors; and,
18. Other hazardous materials, as viewed pertinent by the consultant.

2.0 SCOPE OF WORK AND METHODOLOGY

In preparing this report DST project personnel reviewed the following documents:

- 1-page building information summary from the Asset Inventory System; and,
- Hazardous Material and Designated Substance Survey, Site Office, Ottawa, Ontario; Jacques Whitford Environmental Limited (JWEL), Project No. ONO62535, December 20, 2002.

DST performed the site visit for the Site Offices on August 27, 2009. The survey included a walkthrough assessment of all accessible areas of the building. While on site DST personnel:

- Conducted surveying, sampling and/or monitoring as required to address any data gaps and to reassess areas investigated during previous assessments (all sampling locations appear on the drawings in Appendix A);
- Define the extent and approximate quantities of Designated Substances and Hazardous Materials;
- Determine the source and extent of mould proliferation, if applicable; and,
- Collected sufficient information to subsequently enable DST to recommend appropriate mitigation measures to bring the building into compliance with applicable legislation and/or to mitigate risks to human health and/or the environment.

Materials suspected of containing designated substances and other hazardous materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician. Visual identification of materials suspected to contain asbestos or lead (in paint) was supported by the collection and analysis of a limited number of representative samples. Materials suspected of containing designated substances other than asbestos or lead (in paint) 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% by dry weight. ACMs can be divided into two categories: friable and non-friable material. A friable asbestos-containing material (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, drywall joint compound, plaster, asbestos textile products and asbestos cement products (transite). Some of these products may become friable with time or when disturbed (e.g. drywall joint compound).

Forty-nine (49) bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were analyzed for their asbestos content at LEX Scientific (LEX). LEX is certified under the National Institute of Science and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis (NVLAP No.: 101949). 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. The analytical results for asbestos in bulk materials are included in Appendix B.

This report includes bulk asbestos sample results from the referenced JWEL survey report.

Although the 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 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/cm^2), or at least 0.5% lead content by weight (5,000 ppm). This criteria was widely, although not universally, used in Canada. In Canada, the Federal Hazardous Product Act has recently lowered the allowable concentration of lead in paints for new consumer products to 0.06% lead content by weight (600 ppm). For the purposes of this survey and report, paints having a lead content greater than 0.06% are considered to be lead-based. Disturbance of paints having lead content below 600 ppm are less likely to release significant concentrations of airborne lead during disturbance and therefore are not likely considered harmful.

Three (3) painted finishes, representative of the painted finishes in the building, were sampled and submitted to Paracel Laboratories for lead content analysis. The samples were analyzed using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6020. The analytical results for lead in the paint chip samples are included in Appendix C.

This report includes bulk paint chip sample results from the referenced JWEL survey report.

One (1) tape-lift sample of suspected mould-impacted material was collected by physically adhering a piece of clear tape to the affected material and then peeling the tape off the substrate. The tape was then placed in a clean plastic bag and labelled. The microbial sample was analyzed by Paracel Laboratories Ltd. (Paracel) located in Ottawa, Ontario. Paracel is accredited by the Standards Council of Canada (ISO/IEC 17025) and the Canadian Association for Laboratory Accreditation (CALA). The analytical results for mould samples are included in Appendix D.

Selected photographs are included in Appendix E.

3.0 FINDINGS

The following sections outline the complete findings of all designated substances and hazardous materials assessed within the Site Offices located in Ottawa, Ontario.

3.1 Acrylonitrile

Acrylonitrile was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.2 Arsenic

Arsenic was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.3 Asbestos

Forty-nine (49) bulk samples of suspected ACMs were collected by DST during the site investigation. Sample descriptions and analytical results are summarized in the following tables.

Table 1: Summary of Bulk Samples Analyzed for Asbestos

Sample I.D.	Sample Location	Material Description	Asbestos (%)
243867-01A	Garage washroom	Wall surfacing material	None Detected
243867-01B			None Detected
243867-01C			None Detected
243867-02A	Garage	Drywall joint compound	None Detected
243867-02B			None Detected
243867-02C			None Detected
243867-03A	Basement	Stonework surface parging material	None Detected
243867-03B			None Detected
243867-03C			None Detected
243867-03D			None Detected
243867-03E			None Detected
243867-04A	**Basement (Mechanical Room/Storage Area)**	**Grey cement compound on pipe fittings**	**90% Chrysotile**
243867-05A	**Basement (Mechanical Room/Storage Area)**	**Layered cardboard wrap and tar paper insulation**	**20% Chrysotile**
243867-06A	Ground floor shower room	Light brown vinyl sheet flooring	None Detected
243867-06B			None Detected
243867-06C			None Detected
243867-07A	Ground floor shower room	Drywall joint compound	None Detected
243867-07B			None Detected
243867-07C	Ground floor rear common room		None Detected
243867-07D	Ground floor front common room		None Detected
243867-07E	Ground floor front entrance		None Detected
243867-08A	Ground floor rear office	yellow vinyl sheet flooring	None Detected
243867-08B			None Detected

Table 1: Summary of Bulk Samples Analyzed for Asbestos			
Sample I.D.	**Sample Location**	**Material Description**	**Asbestos (%)**
243867-08C			None Detected
243867-09A	Ground floor rear common area	12” x 12” Cream colour vinyl floor tile	None Detected
243867-09B			None Detected
243867-09C			None Detected
243867-10A	Ground floor office at entrance	12” x 12” Lay-in ceiling tile	None Detected
243867-10B			None Detected
243867-10C			None Detected
243867-11A	Ground floor front common room	Blue/grey vinyl sheet flooring	None Detected
243867-11B	Ground floor front washroom		None Detected
243867-11C	Ground floor front corridor		None Detected
243867-12A	Attic	Roofing shingle debris	None Detected
243867-12B			None Detected
243867-12C			None Detected
243867-13A	**Attic**	**Tar paper debris**	**1% Chrysotile**
243867-14A	Attic chimney	Brick mortar	None Detected
243867-14B			None Detected
243867-14C			None Detected
243867-15A	Exterior windows at ground level	Window caulking	None Detected
243867-15B			None Detected
243867-15C			None Detected

Note: In Ontario regulated concentration of asbestos is $\geq$ 0.5%.

3.3.1 Friable Asbestos Materials

Friable asbestos-containing grey cement compound (DST Sample 243867-04A, JWEL Sample SA-04) was noted on pipe fittings in the basement storage/mechanical room The material is exposed and considered to be in POOR condition. There are approximately 4 fittings. This material is accessible to maintenance staff.

Friable asbestos-containing layered cardboard wrap insulation (Sample 243867-05A, JWEL Sample SA-05) was noted on pipes the basement storage/mechanical room. Some debris associated with this material was also noted on the ground in this area. There is approximately 3 linear metres of layered cardboard wrap insulation on pipe runs which is in GOOD condition. The exposed debris is considered to be in POOR condition. There is less than one square metre of insulation debris.

Friable suspect asbestos-containing light heat shields associated with light fixtures being stored in the attic were noted during the survey. This material was in good condition at the time of the survey and was thus not sampled in order to avoid damaging the material prior to poitentail future use. This material is accessible to maintenance staff.

3.3.2 Non-Friable Asbestos Materials

Non-friable asbestos-containing tar paper debris (Sample 243867-13A) was noted on the ground in the Attic. The material is exposed and considered to be in POOR condition. There is less than one square metre of debris. It is unsure if this material is remnants from roofing retrofit or if it remains concealed as part of the roof structure.

Non-friable suspect ACM was noted as follows.

- Packings within the joints of cast iron drain pipe.

The following materials sampled by JEWL were determined not to contain regulated amounts of asbestos:

- Blown thermal insulation between the ceiling of the main floor and the attic (JWEL Sample SA-15);
- Wire insulation in the Basement Storage Area (JWEL Sample SA-12);
- Tar paper on the roof of the newer section of the building (JWEL Sample SA-09);
- A shingle on the older part of the building (JWEL Sample SA-10); and,
- Tar paper on the older part of the building (JWEL Sample SA-11).

No wire insulation was observed in the Basement Storage Area during the DST site investigation. The samplilng of this material by JWEL did not meet the sampling requirements of the current O.Reg. 278/05. As such, should any of this wire insulation be observed as part of future work, it should be considered asbestos-containing unless additional sampling proves otherwise.

Given that tar paper debris sampled by DST (Sample 243867-13A) was determined to contain asbestos and tar paper sampled during the JWEL survey do not meet the sampling requirements of O.Reg. 278/05 all tar paper at the subject site should be considered asbestos-containing unless additional sampling proves otherwise.

Assuming that the shingle sampled by JWEL and those sampled by DST (243867-12A-C) are homogenous materials these shingles are not considered asbestos-containing.

3.3.3 Non-Asbestos Materials

Bulk sampling and subsequent laboratory analysis has demonstrated that the following building materials do not contain regulated concentrations of asbestos:

- Wall surfacing material (DST Samples 243867-01A-C) ;
- Drywall joint compound (DST Samples 243867-02A-C, 243867-07A-E, JWEL Samples SA-12 to SA-14);
- Stonework surface parging material (DST Samples 243867-03A-E;
- Vinyl sheet flooring (JWEL Samples SA-02, SA-03, SA-06 to SA-08);
- 12” x 12” Vinyl floor tiles (DST Samples 243867-09A-C, JWEL Sample SA-01);
- 12” x 12” Lay-in ceiling tile (DST Samples 243867-10A-C);
- Roofing shingle debris (DST Samples 243867-12A-C);
- Chimney brick mortar (DST Samples 243867-14A-C); and,

- Window caulking (DST Samples 243867-15A-C).

Based upon visual observations, the surveyors were also able to visually identify the following building materials as non-asbestos:

- Blown thermal insulation between the ceiling of the main floor and the attic;
- 1' x 1' cellulose ceiling tile; and,
- Fibreglass pipe insulation.

3.4 Benzene

Benzene may be a constituent of fuels, oils, paints, thinners, and cleaning solvents stored in the Garage.

3.5 Coke Oven Emissions

Coke Oven Emissions were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.6 Ethylene Oxide

Ethylene Oxide was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.7 Isocyanates

Isocyanates were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.8 Lead

Three (3) representative paint finishes in total were sampled from within the buildings and submitted for lead content analysis. The sample descriptions and analytical results are summarized in the following table.

Table 2: Summary of Paint Chip Samples Analyzed for Lead

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
243867-LP-01	**Ground floor front common room**	**White radiator paint**	**19,800**
243867-LP-02	**Front entrance exterior**	**White porch paint**	**200,000**
243867-LP-03	**Exterior window trim**	**Black trim paint**	**322,000**

All of the paint chip samples collected and analyzed contained a lead concentration in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act. The following list describes each paint sample with a lead concentration in excess of the 600 ppm:

- White radiator paint was noted on radiators throughout the building. Approximately 1ft^2 of damage was noted in the front common room;
- Exterior white paint was observed on the wood siding and the porch of the front entrance of the building. Approximately 100 ft^2 of damage was noted in various locations around the building; and,
- Exterior black wood trim paint was noted on the windows on the exterior of the building. Approximately 100 ft^2 of damage was noted in various locations.

Sample descriptions and analytical results for samples collected by JWEL from the referenced report are summarized in the following table.

Table 3: Summary of Paint Chip Samples Analyzed for Lead (JWEL)

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
Lead-001	Janitor's Closet	Off White Wall Paint	<50
Lead-002	Main Floor Kitchen	Yellow Wall Paint	<50
Lead-003	**Main Floor Kitchen**	**Light Yellow Interior Window Trim Paint**	**81,000**
Lead-004	Main Office Area	Grey Floor Paint	3,100
Lead-005	Garage	Off White Wall Paint	<50
Lead-006	Garage	Gold Joist Paint	300
Lead-007	Garage Doors	Brown Paint	1,500
Lead-008	Exterior	White	200
Lead-009	Workshop	Cream Wall Paint	<50
Lead-010	**Attic**	**Black Over White Exterior Window Trim Paint**	**170,000**
Lead-011	2nd Floor Kitchen	Yellow Wall Paint	<50
Lead-012	2nd Floor Office	Yellow Wall Paint	<50
Lead-013	2nd Floor Office	Green Wall Paint	<50
Lead-014	2nd Floor Office	Off White Wall Paint	300
Lead-016	**Attic, exterior of Old Section**	**Grey Stain**	**310,000**
Lead-017	**Exterior Under Siding, Old Section**	**White Paint**	**6,100**
Lead-018	**Exterior Under Siding, New Section**	**White Paint**	**49,000**

The referenced JWEL report references regulations set by the U.S. Department of Housing and Urban Development where 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/cm^2), or at least 0.5% lead content by weight (5,000 ppm). This criteria was widely, although not universally, used in Canada.

In addition to paints sampled by JWEL containing lead concentrations greater than 5,000 ppm the following paints also contain lead in excess of 600 ppm:

- Grey floor paint in the Main Office; and,

- Brown Garage Doors.

As part of DST's site visit, no additional paints that contained elevated concentrations of lead were identified other than those listed above and sampled by DST.

The referenced JWEL survey report also noted that lead sheeting containing 17,000 ppm lead was present on a support column in the Basement Storage Area. DST did not note this during the survey of the Basement Storage Area, and it is uncertain if this material remains in this location

Based upon the historic composition of building materials, lead is also expected to be present in:

- Solder on the joints of copper piping;
- Glazing on ceramic tiles in the washrooms; and,
- Caulking in the joints of cast iron drainage pipes.

3.9 Mercury

Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized.

A glass ampoule filled with liquid mercury is present inside each wall mounted thermostat.

3.10 Silica

Based on the historic composition of building materials, silica is expected to be present in:

- Concrete and masonry elements of the building; and,
- Ceramic tiles.

3.11 Vinyl Chloride

Vinyl Chloride was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.12 Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs), also known as Chlorobiphenyls, are hazardous chemicals which were used in the manufacturing of a variety of equipment, such as electrical equipment, heat exchangers, hydraulic systems, and for several other specialized applications. PCBs are commonly found within electrical ballasts manufactured prior to 1981, found within fluorescent light fixtures and high intensity discharge lamps.

Light fixtures with T12 lamps are more likely to contain ballasts that were manufactured prior to 1981. T8 lamps are associated with light fixtures that were manufactured after the phase-out of PCB-containing ballasts. The letter "T" denotes the shape of the light fixture (e.g. tubular) and the number which follows indicates the diameter in eights of an inch.

The JWEL survey determined that the following ballasts observed throughout the building and in storage in the Attic are non-PCB-containing[2]:

- Phillips, RQM-2S40 TPC, R-140 TPC;
- Alliance, 17A 128E;
- Magnatek, 446-L-SLH-TL-P;
- Advance, R-140-1-TP (Mark III);
- Sola Select, 570-30 2SX;
- Sylvania, RS-110-TP;
- Valmount, 8G1063 WE; and,
- CGE, 8G3912 E1, 17A 128E, 17A 829E, 17A 148E, 17A 240E .

Unidentified fluorescent light ballasts associated with the light fixtures observed throughout the building are suspected to contain PCBs until proven otherwise.

3.13 Ozone-Depleting Substances (ODSs)

Ozone depleting substances (ODSs) include a variety of chlorofluorocarbon (CFC) and bromine (halon) gases which have been shown to contribute to the destruction of the earth's stratospheric ozone layer, and contribute to global warming. Direct exposure to some ODSs such as halon is a health hazard as well. ODSs are commonly used as refrigerants in a variety of equipment and in fire suppression systems.

Suspect ODS were observed in the following equipment:

- Window A/C units no access to info plate;
- Refrigerators/freezers, no access to info plate; and,
- Water cooler, no access to info plate.

No other ODS-containing equipment was identified within the building.

3.14 Fecal Waste

Fecal waste was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.15 Mould

One (1) tape-lift sample (Sample 243867-TL-01) from the white-stained, wooden surface of the underside of the ground floor was collected in the Basement. Laboratory results showed low levels of hyaline mycelia fragments. The presence of these fragments indicates that mould is impacting this building material. There is approximately 10 square metre of obvious mould impacted wooden floorboard.

No other mould-impacted materials were noted in any of the other buildings surveyed.

[2] Determination made according to the Environment Canada publication *Identification of Lamp Ballasts containing PCBs,* August, 1991.

3.16 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.17 Radioactive Smoke Detectors

Smoke detectors were not observed in the building.

3.18 Other Hazardous Materials

Paints, aerosols, oils, etc. were observed in the Garage and basement storage area chemical locker. These products are assumed to be used for maintenance activities.

4.0 CONCLUSIONS AND RECOMMENDATIONS

DST Consulting Engineers Inc. (DST) was retained to perform a Designated Substance Survey (DSS) of the Site Offices located in Ottawa, Ontario.

The site visit was performed by DST on August 27, 2009. The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Urea Formaldehyde Foam Insulation (UFFI); and,
- Radioactive Smoke Detectors.

4.1 Asbestos

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O.Reg. 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations* enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter 0.1)*. This regulation classifies all asbestos disturbance as either Low Risk, Moderate Risk, or High Risk, each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition. The Ontario Ministry of Labour (MoL) must be notified of any project involving removal of more than a minor amount of friable asbestos material.

Friable grey cement compound insulation (DST Sample 243867-04A, JWEL Sample SA-04) contains 90% Chrysotile asbestos and was identified on pipe fittings in the basement storage/mechanical room. The material is exposed and considered to be in POOR condition. There are approximately 4 fittings. This material is accessible to maintenance staff.

Friable asbestos-containing layered cardboard wrap insulation (Sample 243867-05A, JWEL Sample SA-05) was noted on pipes the basement storage/mechanical room. Some debris associated with this material was also noted on the ground in this area. There is approximately 3 linear metres of layered cardboard wrap insulation on pipe runs which is in GOOD condition. The exposed debris is considered to be in POOR condition and remediation is recommended for this material. There is less than one square metre of insulation debris.

Remedial action is recommended for POOR condition pipe fittings and layered cardboard wrap insulation debris to minimize the human health risk associated with exposure to airborne asbestos fibres. This material can be completely removed using Type 2 asbestos work procedures (estimated abatement cost of $1,500). Although remedial action is not currently required for the GOOD condition pipe run insulation cost benefits could be incurred if this material was removed at the same time as the noted grey cement compound and layered cardboard wrap insulation debris. This material can be completely removed using Type 2/Glovebag asbestos work procedures (additional estimated abatement cost of $500).

Friable suspect asbestos-containing light heat shields associated with light fixtures being stored in the attic were in Good condition at the time of the survey. This material is accessible to maintenance staff. Although no remediation is currently necessary for this material proactive removal can be performed using Type 2 procedures (estimated cost $500).

Non-friable asbestos-containing tar paper debris (Sample 243867-13A) was noted on the floor in the Attic. The material is exposed and considered to be in POOR condition. There is less than one square metre of debris. This material should be cleaned using type 1 procedures (estimated cost $500).

With consideration of the results of the sampling programs by both DST and JWEL, all tar paper associated with the subject building should be considered asbestos-containing unless additional sampling proves otherwise.

Wire insulation in the Basement Storage Area, previously sampled by JWEL, was not observed by DST. If this materials is encountered as part of future renovation work, it should be assumed to contain asbestos unless additional sampling confirms otherwise.

4.2 Benzene

No current action for items in the garage for which benzene may be a constituent is required. The transport and disposal of chemical waste is governed by O.Reg 347/90 - General – Waste Management, as amended to O.Reg. 217/08. Handling of this waste should be undertaken by those with proper training (e.g. Workplace Hazardous Materials Information System, TDGA, etc.).

4.3 Lead

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbance as either Type 1, Type 2a, Type 2b or Type 3 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 would serve as a reasonable, peer reviewed standard for work procedures.

The following paints have been confirmed to contain concentrations of lead greater than 600 ppm:

- White paint on interior radiators (DST Sample 243867-LP-01);
- White paint on exterior wood siding and porch (DST Sample 243867-LP-02, JWEL Samples Lead-017, Lead-018);
- Black paint on exterior window trims (DST Sample 2438674-LP-03, JWEL Sample Lead-010);
- Light yellow paint on interior window trim (JWEL Sample Lead-003);
- Grey stain on the exterior of the old section (JWEL Sample Lead-016);
- Grey floor paint (JWEL Sample Lead-004); and,
- Brown garage door paint (JWEL Sample SA-04).

These results suggest that radiator, exterior siding and window trim paints (e.g., paints on baseboards, door casings and window frames) have the greatest potential to contain the highest concentrations of lead. Over the years older layers of interior paints have likely been covered with lower lead content paints. If not already sampled, DST recommends that these older paints in particular be sampled prior to future maintenance, renovation, demolition disturbance.

Lead paint samples with elevated concentrations of lead can pose a health risk to humans if ingested. 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.

DST recommends removal, following the above noted guideline, of only the loose, delaminating, flaking areas of paint (leaving the remaining areas of paint intact and undisturbed). The estimated remediation cost is $2,000 assuming materials are non-hazardous for disposal purposes.

No remedial action is required for the remaining lead-based materials at the present time since all are in good condition. If required at some future date to accommodate renovation, demolition or maintenance work, the following procedures are appropriate:

- copper piping can be cut a small distance (e.g. 50 mm) from the joints to avoid direct disturbance of the lead solder;
- cast iron drain pipes can be cut away from the joints to avoid direct disturbance of the lead caulking (and possibly asbestos packings) in the joints; and,
- ceramic tiles can be removed using Type 2a work procedures and respiratory protection provided that only non-powered hand tools are used.

If lead sheeting is present on a support column in the Basement Storage Area as noted by JWEL appropriate procedures as recommended by the above noted guideline should be employed when this material is disturbed/removed.

4.4 Mercury

There are no regulations that specifically govern the disturbance of mercury on construction projects. However, the Occupational Health and Safety Division of the Ontario Ministry of Labour has published *The Safe Handling of Mercury: A Guide for the Construction Industry*. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills. In the absence of specific legislation for mercury on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

When removal of the fluorescent light tubes is required, the tubes should be removed intact from the fixtures. This prevents worker exposure to mercury vapour, particularly if the tubes were energized shortly before removal. Sources of liquid mercury should be removed in a similar fashion (intact) to prevent worker exposure.

It is now common practise to recycle fluorescent light tubes and liquid mercury sources, recovering the component materials, and avoiding the generation of hazardous waste.

4.5 Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbance as either Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for silica on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Silica is present in concrete and masonry elements, and hard plaster finishes throughout the building. No remedial work is required at the present time.

Dust control procedures, which are typical of any well executed demolition project, are usually sufficient to control airborne silica levels. 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 to silica.

4.6 Polychlorinated Biphenyls (PCBs)

Unidentified fluorescent light ballasts associated with the light fixtures observed throughout the building should be suspected to contain PCBs until proven otherwise.

In Canada revised federal PCB Regulations came into force in September 2008. The Regulations impose deadlines on the elimination of all PCBs and PCB-containing material currently in storage, and requires all other PCBs to be phased out. In general, the end-of-use deadlines imposed by this new regulation are as follows:

- December 31, 2009, all equipment containing PCBs in a concentration of 500 parts per million (ppm) or more (excluding pole-mounted equipment and light ballasts).

- December 31, 2009, all equipment containing PCBs in a concentration of 50 ppm or more at any sensitive location, including within 100 metres of drinking water treatment plants, food and feed processing plants, child care facilities, preschool, primary and secondary schools, hospitals, and senior citizen care facilities (excluding pole-mounted equipment and light ballasts).
- December 31, 2025, all equipment containing PCBs in a concentration of 50 ppm or more (including pole-mounted equipment and light ballasts).

In general terms, the steps for compliance are as follows:

- Survey of PCB-containing equipment, waste, etc. if none is available.
- Testing of equipment for which PCB content cannot be readily, visually identified.
- PCB Management Plan to ensure implementation of the federal PCB Regulation.

No other materials suspected of containing PCBs were identified within the building.

4.7 Ozone-Depleting Substances (ODSs)

The handling, transport and disposal of ODSs are governed by the following regulations under the Canadian Environmental Protection Act (CEPA), 1999:

- Ozone-depleting Substances Regulations, 1998; and
- Federal Halocarbon Regulations, 2003.

Suspect ODS were observed in the following equipment:

- Refrigerators, no access to info plate;
- Window A/C units, no access to info plate and,
- Water cooler, no access to info plate.

When these units are taken out of service, the ODS refrigerants must be captured and reclaimed by a licensed technician.

No other ODS-containing equipment was identified within the building.

4.8 Mould

The term “mould” applies to a large group of micro-organisms, which together, with mushrooms and yeast, form the Fungi Kingdom of living matter. Mould organisms grow by degrading nutrients from organic substrates such as wood and wood products, fabrics, foodstuff, plant and soil. The growth of mould necessitates three essential conditions; a suitable temperature, an appropriate substrate and adequate moisture.

Public health and regulatory agencies acknowledge mould growth to be a risk factor for adverse health effects in occupants. Occupants may experience allergic responses such as asthma, headache, respiratory tract irritation, eye irritation, skin irritation, and sinus congestion. More severe health effects are rare and typically limited to individuals with suppressed immune systems, children, elderly people and persons with high occupational exposure.

Currently, there are no regulations pertaining to mould on construction projects. Most jurisdictions have issued alerts or bulletins concerning the hazard of mould in indoor environments. The Canadian Construction Association (CCA) published the following document as a response to concerns in the construction industry: CCA 82-2004, “Mould Guidelines for the Canadian Construction Industry”, 2004. The Guideline recommends Level I, II and III mould abatement procedures for small (<1 m^2), medium (1 m^2 to 10 m^2) and large scale (>10 m^2) mould abatement operations that are to be determined by professionals based on the extent and density of mould on site.

One (1) tape-lift sample (Sample 243867-TL-01) from the white-stained, wooden surface of the underside of the ground floor was collected in the Basement. Laboratory results showed low levels of hyaline mycelia fragments. The presence of these fragments indicates that mould is impacting this building material. There is approximately 10 square metre of obvious mould impacted wooden floorboard.

The cause of the mould in this case appears to be the fact that the storage area is essentially a crawl space, with the ground consisting of earth, exposed to the elements. The conditions of this area are conducive to mould growth. Given these conditions, it would likely require significant renovations to achieve an environment less conducive to mould growth here. As such, it may be more practical to restrict access to the area rather than perform remediation.

If remediation is desired the mould growth identified within the basement storage room can be remediated following medium (Level II) abatement operations outlined in the CCA 82-2004 guidelines.

4.9 Other Hazardous Materials

Paints, aerosols, oils, etc. observed in the Garage and the basement storage area chemical locker are assumed to be used for maintenance activities. Handling and use of these materials should be undertaken by those with proper training (e.g. Workplace Hazardous Materials Information System, etc.).

No remedial action is required at this time. When these materials are no longer in use, or are spent they should be disposed of appropriately. The transport and disposal of chemical waste is governed by O.Reg 347/90 - General – Waste Management, as amended to O.Reg. 217/08. Handling of this waste should be undertaken by those with proper training (e.g. Workplace Hazardous Materials Information System, TDGA, etc.).

5.0 LIMITATIONS OF REPORT

This report is intended for client use only. 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 asbestos bulk sampling, paint chip sampling, and microbial sampling in select representative

areas for laboratory analysis. 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. DST is not in a position to evaluate the health risks associated with exposure to the mould and/or mites referenced in this report. Since human reactions to mould exposure vary widely amongst individuals, and specific segments of the population are generally recognized to be more susceptible than others, an evaluation of health risks can only be made on an individual basis and even then, only by a licensed medical practitioner equipped with knowledge of the individual's medical history.

Any use of this report by the client and any other party is contingent upon their understanding and acceptance of the following condition:

"Mould is a naturally occurring substance and regardless of the results of an assessment or how completely it is removed, it could reoccur."

Regardless of the effectiveness of any remedial actions, mould growth may occur/reoccur anywhere within a building at any time, should conditions be favourable. It is therefore essential to maintain buildings, surfaces, appliances and furnishings under conditions which are not favourable to mould incubation and growth (warm, dry, and clean). The scope of services provided by DST for this assignment did not include a detailed evaluation of the thermal and moisture management characteristics of the exterior wall assembly, or a detailed building envelope investigation to ascertain every potential root cause of the water infiltration that created an environment favourable to mould proliferation. Similarly, DST has not been engaged to provide detailed designs for the reinstatement of building finishes or for improvements to the building envelope.

Note also that standards, guidelines and practices related to mould 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.

6.0 CLOSURE

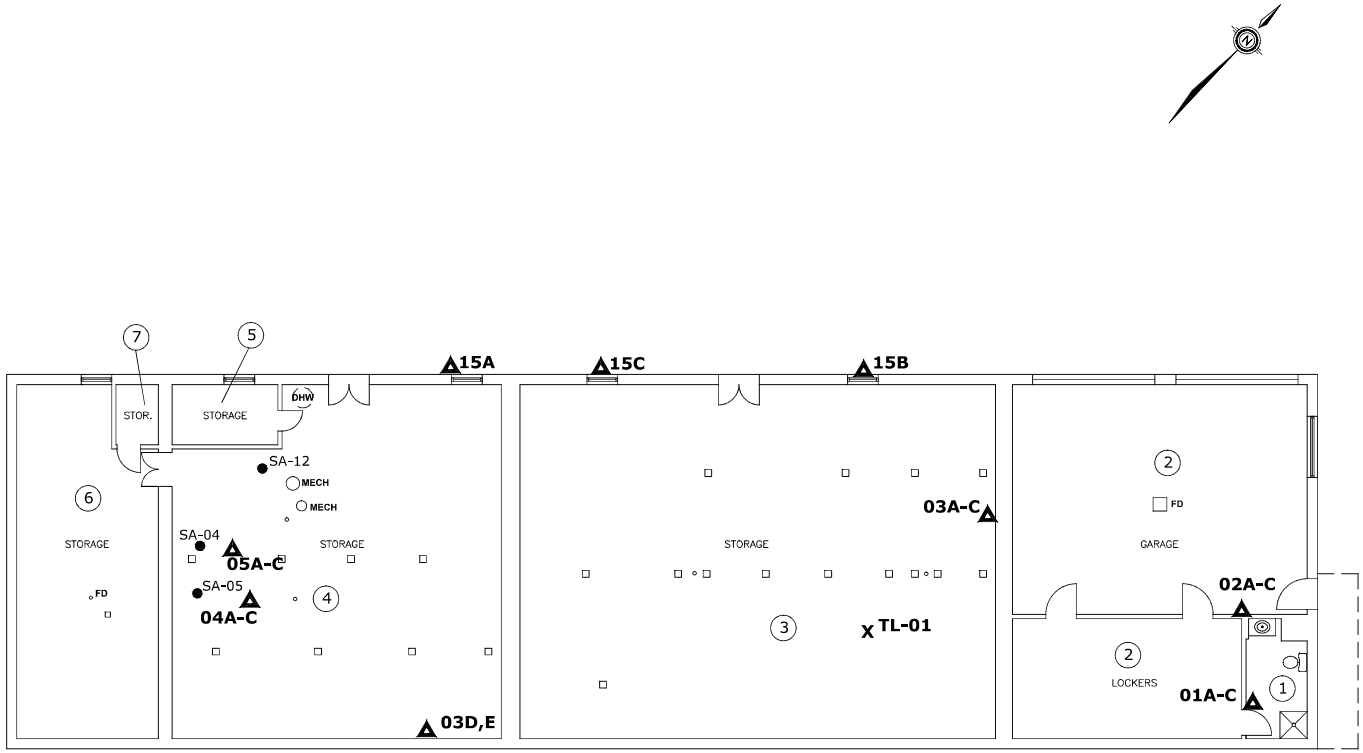
We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

DST CONSULTING ENGINEERS INC.

Matt DesRoches, M.Sc., CIH
Project Manager
mdesroches@dstgroup.com

Brendan Harrigan, P.Eng.
Principal
bharrigan@dstgroup.com

Appendix A
Floor Plans



FLOOR PLAN – BASEMENT

DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.
4. BASE DRAWING PROVIDED BY NCC.

LEGEND:

01A-C	APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
TL-01	APPROXIMATE TAPE LIFT LOCATION, MICROBIAL TESTING
1	SURVEY LOCATION REFERENCE
SA-05	APPROXIMATE ASBESTOS SAMPLE LOCATION, 2002, JACQUES WHITFORD

REV	DATE	ISSUE	APPROVAL
0	28/06/10	ORIGINAL	M.D.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

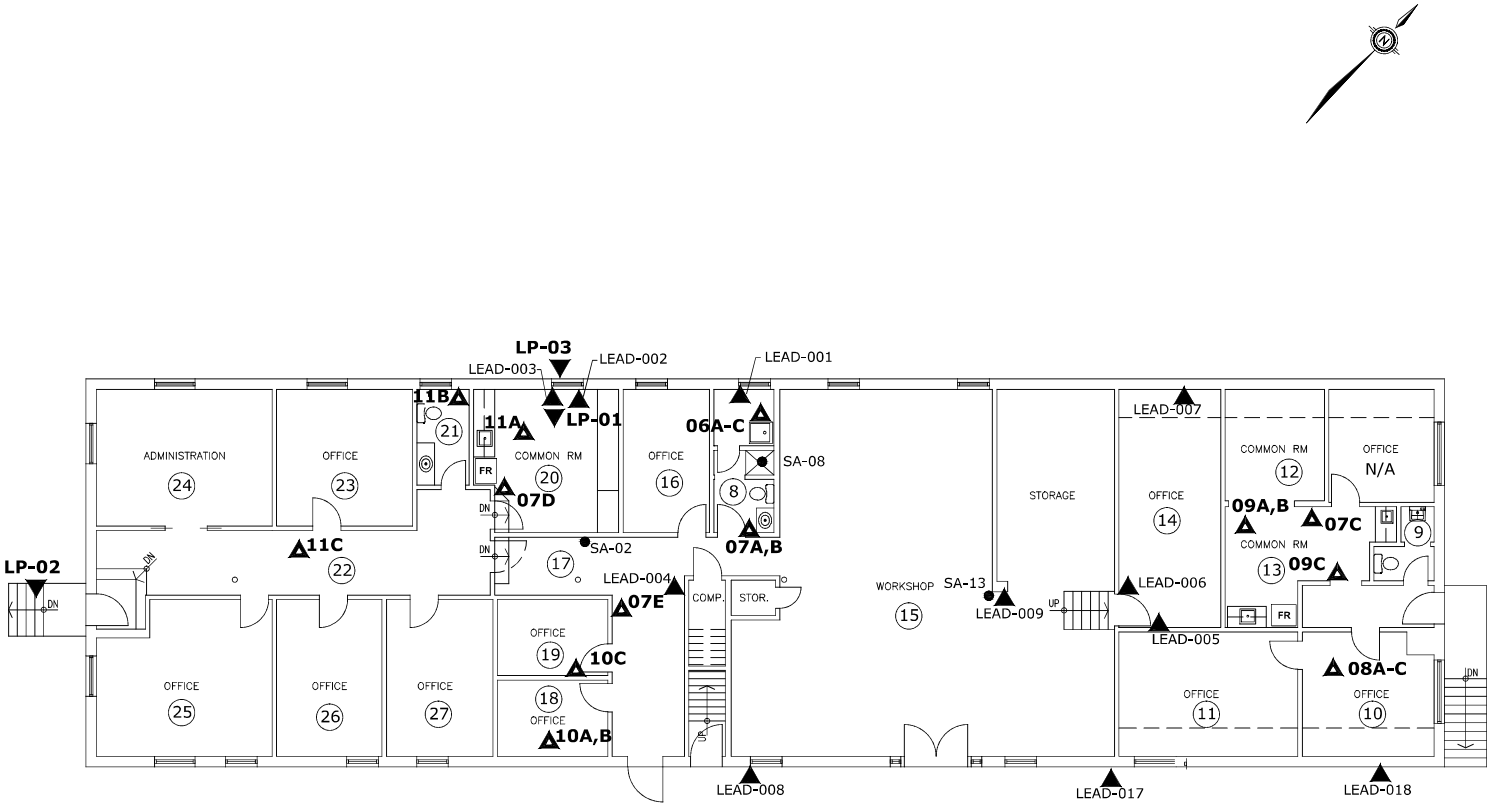
DRAWING TITLE

SAMPLE LOCATION PLAN
SITE OFFICE

BASEMENT LEVEL

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE June 2010
APPROVED BY M.D.	PROJECT NO.: BE-OT-010540

FIGURE 1



FLOOR PLAN – LEVEL 1

DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.
4. BASE DRAWING PROVIDED BY NCC.

LEGEND:

01A-C	APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
LP-01	APPROXIMATE PAINT SAMPLE LOCATION, LEAD TESTING (LP-#), AS APPLICABLE
1	SURVEY LOCATION REFERENCE
SA-08	APPROXIMATE ASBESTOS SAMPLE LOCATION, 2002, JACQUES WHITFORD
LEAD-001	APPROXIMATE LEAD PAINT SAMPLE LOCATION, 2002, JACQUES WHITFORD

REV	DATE	ISSUE	APPROVAL
0	28/06/10	ORIGINAL	M.D.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

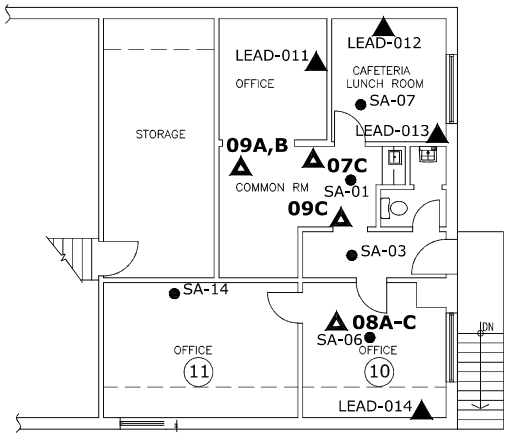
DRAWING TITLE

SAMPLE LOCATION PLAN
SITE OFFICE

GROUND LEVEL

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE June 2010
APPROVED BY M.D.	PROJECT NO.: BE-OT-010540

FIGURE 2



FLOOR PLAN – LEVEL 2

DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.
4. BASE DRAWING PROVIDED BY NCC.

LEGEND:

01A-C — APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE

1 — SURVEY LOCATION REFERENCE

SA-08 — APPROXIMATE ASBESTOS SAMPLE LOCATION, 2002, JACQUES WHITFORD

LEAD-001 — APPROXIMATE LEAD PAINT SAMPLE LOCATION, 2002, JACQUES WHITFORD

REV	DATE	ISSUE	APPROVAL
0	28/06/10	ORIGINAL	M.D.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

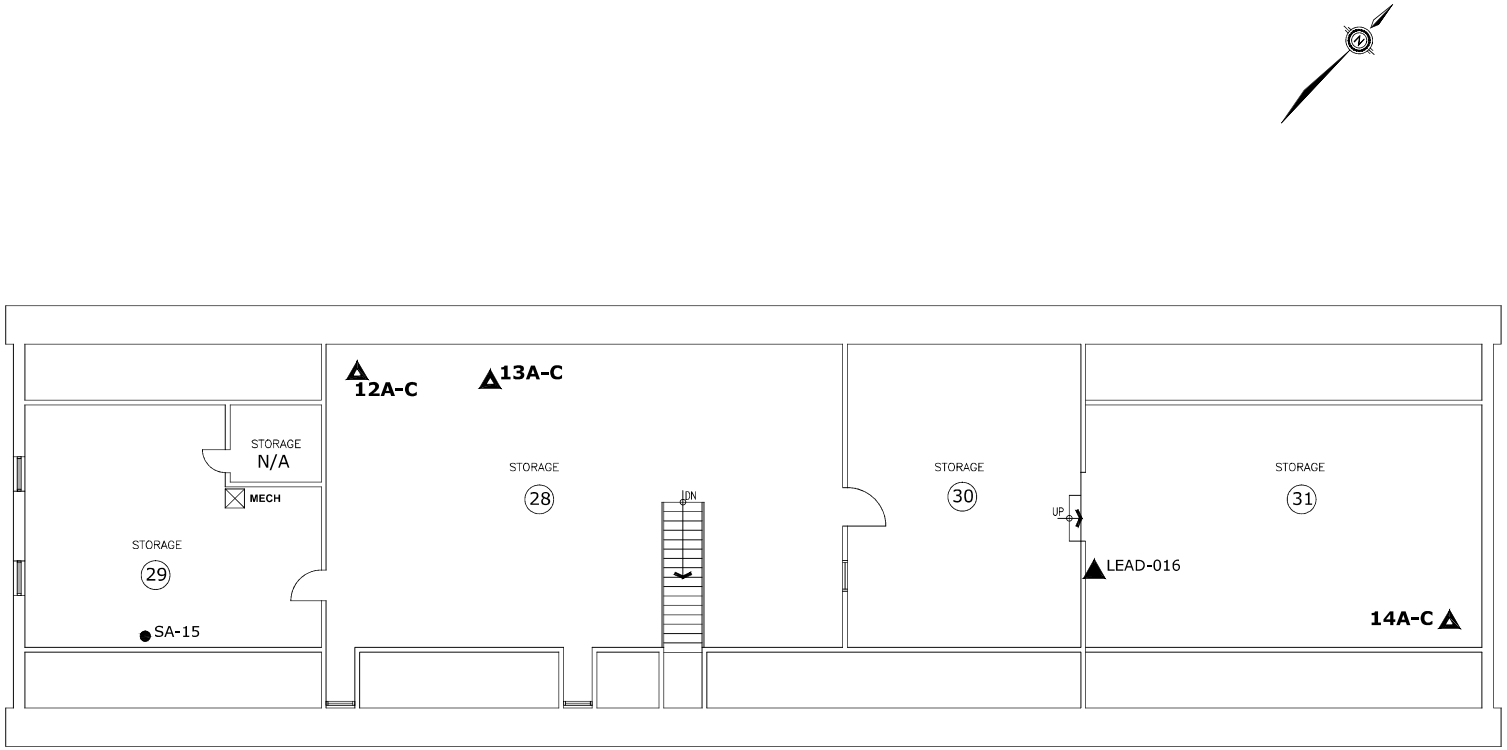
DRAWING TITLE

SAMPLE LOCATION PLAN
SITE OFFICE

SECOND LEVEL

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE June 2010
APPROVED BY M.D.	PROJECT NO.: BE-OT-010540

FIGURE 3



FLOOR PLAN – ATTIC LEVEL

DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.
4. BASE DRAWING PROVIDED BY NCC.

LEGEND:

01A-C	APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
1	SURVEY LOCATION REFERENCE
SA-05	APPROXIMATE ASBESTOS SAMPLE LOCATION, 2002, JACQUES WHITFORD
LEAD-001	APPROXIMATE LEAD PAINT SAMPLE LOCATION, 2002, JACQUES WHITFORD

REV	DATE	ISSUE	APPROVAL
0	28/06/10	ORIGINAL	M.D.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

DRAWING TITLE

SAMPLE LOCATION PLAN
SITE OFFICE

ATTIC LEVEL

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE June 2010
APPROVED BY M.D.	PROJECT NO.: BE-OT-010540

FIGURE 4

ROOF LEVEL

DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.
4. BASE DRAWING PROVIDED BY NCC.

LEGEND:

- 01A-C — APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
- (1) — SURVEY LOCATION REFERENCE
- SA-05 — APPROXIMATE ASBESTOS SAMPLE LOCATION, 2002, JACQUES WHITFORD
- LEAD-001 — APPROXIMATE LEAD PAINT SAMPLE LOCATION, 2002, JACQUES WHITFORD

REV	DATE	ISSUE	APPROVAL
0	28/06/10	ORIGINAL	M.D.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

DRAWING TITLE

SAMPLE LOCATION PLAN
SITE OFFICE

ROOF

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE June 2010
APPROVED BY M.D.	PROJECT NO.: BE-OT-010540

FIGURE 5

Appendix B
Laboratory Certificates of Analysis – Bulk Asbestos

SOLUTIONS
FOR A WORKING WORLD

CERTIFICATE OF ANALYSIS

Company:	DST Consulting Engineers Inc.	**Report Date:**	03-Sep-09
Contact:	Mr. Marc Acouri	**Analysis Date:**	02-Sep-09
Client Address:	2150 Thurston Drive, Suite 203, OTTAWA, ON	**Received Date:**	01-Sep-09
Client Reference:	BEOT010540 Location 243867	**LEX Project Number:**	08092771
Sampling Date:	27-Aug-09	**Number of Analyses:**	48

Analysis Requested **Bulk Asbestos by PLM**

Analysis was performed in accordance with the method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials adopted in Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act Ontario Regulation 278/05. LEX Scientific Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP 101949) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

German Leal, B.Sc.
Laboratory Manager

Analysis Notes: Not mastic found for sample 243867-09B

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-01A	**Asbestos Detected?**	**No**		
LEX Sample:	01	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Wall surfacing material	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

2 Quebec Street, Suite 204 Guelph, Ontario N1H 2T3
Phone: 519.824.7082 Fax: 519.824.5784 Toll Free: 1.800.824.7082
e-mail: admin@lexscientific.com Website: www.lexscientific.com

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-01B	**Asbestos Detected?**	**No**		
LEX Sample:	02	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Wall surfacing material	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-01C	**Asbestos Detected?**	**No**		
LEX Sample:	03	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Wall surfacing material	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-02A	**Asbestos Detected?**	**No**		
LEX Sample:	04	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-02B	**Asbestos Detected?**	**No**		
LEX Sample:	05	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-02C	**Asbestos Detected?**	**No**		
LEX Sample:	06	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-03A	**Asbestos Detected?**	**No**		
LEX Sample:	07	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Stone parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-03B	**Asbestos Detected?**	**No**		
LEX Sample:	08	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Stone parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-03C	**Asbestos Detected?**	**No**		
LEX Sample:	09	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Stone parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-04A	**Asbestos Detected?**	**Yes**		
LEX Sample:	10	**Chrysotile:**	90	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Grey cement compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	10
		Comments:			
Client Sample:	243867-05A	**Asbestos Detected?**	**Yes**		
LEX Sample:	13	**Chrysotile:**	20	**Cellulose:**	70
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown/Black	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Layered cardboard wrap	**Other Amphiboles:**	None Detected	**Non Fibers:**	10
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-06A	**Asbestos Detected?**	**No**		
LEX Sample:	16	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown/Beige	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:	Unable to layer		
Client Sample:	243867-06B	**Asbestos Detected?**	**No**		
LEX Sample:	17	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown/Beige	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:	Unable to layer		
Client Sample:	243867-06C	**Asbestos Detected?**	**No**		
LEX Sample:	18	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown/Beige	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:	Unable to layer		
Client Sample:	243867-07A	**Asbestos Detected?**	**No**		
LEX Sample:	19	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-07B	**Asbestos Detected?**	**No**		
LEX Sample:	20	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-07C	**Asbestos Detected?**	**No**		
LEX Sample:	21	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-07D	**Asbestos Detected?**	**No**		
LEX Sample:	22	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-07E	**Asbestos Detected?**	**No**		
LEX Sample:	23	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-08A	**Asbestos Detected?**	**No**		
LEX Sample:	24.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-08A	**Asbestos Detected?**	**No**		
LEX Sample:	24.2	**Chrysotile:**	None Detected	**Cellulose:**	20
Layers Analyzed:	Backing	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	80
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-08B	**Asbestos Detected?**	**No**		
LEX Sample:	25.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-08B	**Asbestos Detected?**	**No**		
LEX Sample:	25.2	**Chrysotile:**	None Detected	**Cellulose:**	20
Layers Analyzed:	Backing	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	80
		Comments:			
Client Sample:	243867-08C	**Asbestos Detected?**	**No**		
LEX Sample:	26.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-08C	**Asbestos Detected?**	**No**		
LEX Sample:	26.2	**Chrysotile:**	None Detected	**Cellulose:**	20
Layers Analyzed:	Backing	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Yellow)	**Other Amphiboles:**	None Detected	**Non Fibers:**	80
		Comments:			
Client Sample:	243867-09A	**Asbestos Detected?**	**No**		
LEX Sample:	27.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12" x 12" Vinyl floor tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-09A	**Asbestos Detected?**	**No**		
LEX Sample:	27.2	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Mastic	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12" x 12" Vinyl floor tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-09B	**Asbestos Detected?**	**No**		
LEX Sample:	28.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12" x 12" Vinyl floor tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-09C	**Asbestos Detected?**	**No**		
LEX Sample:	29.1	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Tile	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12" x 12" Vinyl floor tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-09C	**Asbestos Detected?**	**No**		
LEX Sample:	29.2	**Chrysotile:**	None Detected	**Cellulose:**	1
Layers Analyzed:	Mastic	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12" x 12" Vinyl floor tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	99
		Comments:			
Client Sample:	243867-10A	**Asbestos Detected?**	**No**		
LEX Sample:	30	**Chrysotile:**	None Detected	**Cellulose:**	60
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	20
Colour:	Beige/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	2' x 4' Lay-in ceiling tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	20
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-10B	**Asbestos Detected?**	**No**		
LEX Sample:	31	**Chrysotile:**	None Detected	**Cellulose:**	60
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	20
Colour:	Beige/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	2' x 4' Lay-in ceiling tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	20
		Comments:			
Client Sample:	243867-10C	**Asbestos Detected?**	**No**		
LEX Sample:	32	**Chrysotile:**	None Detected	**Cellulose:**	70
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	10
Colour:	Grey/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	2' x 4' Lay-in ceiling tiles	**Other Amphiboles:**	None Detected	**Non Fibers:**	20
		Comments:			
Client Sample:	243867-11A	**Asbestos Detected?**	**No**		
LEX Sample:	33	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	1
Colour:	Blue/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	99
		Comments:	Unable to layer		
Client Sample:	243867-11B	**Asbestos Detected?**	**No**		
LEX Sample:	34	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	1
Colour:	Blue/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	99
		Comments:	Unable to layer		
Client Sample:	243867-11C	**Asbestos Detected?**	**No**		
LEX Sample:	35	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	1
Colour:	Blue/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	99
		Comments:	Unable to layer		

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-12A	**Asbestos Detected?**	**No**		
LEX Sample:	36	**Chrysotile:**	None Detected	**Cellulose:**	60
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Roofing materials	**Other Amphiboles:**	None Detected	**Non Fibers:**	38
		Comments:			
Client Sample:	243867-12B	**Asbestos Detected?**	**No**		
LEX Sample:	37	**Chrysotile:**	None Detected	**Cellulose:**	60
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Roofing materials	**Other Amphiboles:**	None Detected	**Non Fibers:**	38
		Comments:			
Client Sample:	243867-12C	**Asbestos Detected?**	**No**		
LEX Sample:	38	**Chrysotile:**	None Detected	**Cellulose:**	50
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Roofing materials	**Other Amphiboles:**	None Detected	**Non Fibers:**	48
		Comments:			
Client Sample:	243867-13A	**Asbestos Detected?**	**Yes**		
LEX Sample:	39	**Chrysotile:**	1	**Cellulose:**	96
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	3
Description:	Tar paper	**Other Amphiboles:**	None Detected	**Non Fibers:**	None Detected
		Comments:			
Client Sample:	243867-14A	**Asbestos Detected?**	**No**		
LEX Sample:	42	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Brick mortar	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-14B	**Asbestos Detected?**	**No**		
LEX Sample:	43	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Brick mortar	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-14C	**Asbestos Detected?**	**No**		
LEX Sample:	44	**Chrysotile:**	None Detected	**Cellulose:**	1
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Brick mortar	**Other Amphiboles:**	None Detected	**Non Fibers:**	99
		Comments:			
Client Sample:	243867-15A	**Asbestos Detected?**	**No**		
LEX Sample:	45	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Window caulking	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-15B	**Asbestos Detected?**	**No**		
LEX Sample:	46	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/Black	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Window caulking	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-15C	**Asbestos Detected?**	**No**		
LEX Sample:	47	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/Black	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Window caulking	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	243867-03D	**Asbestos Detected?**	**No**		
LEX Sample:	48	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Stone parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	243867-03E	**Asbestos Detected?**	**No**		
LEX Sample:	49	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Stone parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst Z. Samsewa

Appendix C
Laboratory Certificates of Analysis – Paint Chips

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com
OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Maurice Graveline

Phone: (613) 748-1415
Fax: (613) 748-1356

Client PO:
Project: BE 0T 010540
Custody: 61870

Report Date: 2-Sep-2009
Order Date: 31-Aug-2009
Order #: 0936041

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

Paracel ID	Client ID
0936041-01	243867-LP-01
0936041-02	243867-LP-02
0936041-03	243867-LP-03

Approved

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

PARACEL LABORATORIES LTD

Order #: 0936041

Certificate of Analysis

Report Date: 02-Sep-2009
Order Date:31-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE 0T 010540

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion, ICP-MS	1-Sep-09	1-Sep-09

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

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

PARACEL LABORATORIES LTD

Order #: 0936041

Certificate of Analysis

Report Date: 02-Sep-2009
Order Date:31-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE 0T 010540

Sample Results

Lead

Matrix: Paint
Sample Date: 27-Aug-09

Paracel ID	Client ID	Units	MDL	Result
0936041-01	243867-LP-01	ug/g	50	19800
0936041-02	243867-LP-02	ug/g	50	200000
0936041-03	243867-LP-03	ug/g	50	322000

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	50	ug/g						
Matrix Duplicate									
Lead	172000	50	ug/g	205000			17.8	44	
Matrix Spike									
Lead	52.3		ug/L	ND	105	80-120			

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ⊙ NIAGARA FALLS ⊙ MISSISSAUGA ⊙ SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody Record

№ 61870

Pg. ___ of ___

Company Name: DST Consulting Engineers
Contact Name: Maurice Graveline
Address: 2150 Thurston Drive
Tel: 613-748-1415 Cell:
Email: mgraveline@dstgroup.com

Project Ref: BEOT010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: [ ] 1-day [ ] 2-day [✓] Regular
Regulatory/Guideline Requirements

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Paracel Order # 0936041	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Lead in paint	Direct Microscopic Examination												Hazardous? (Y/N)
1	243867-LP-01				27/08/09	X													
2	243867-LP-02				"	X													
3	243867-LP-03				"	X													
4	243867-TL-01				"		X												
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Relinquished By: Marc Acoci Date: Aug 31/09 Time: 4:10pm	Received at Depot: Date: Time:	Received at Lab: [illegible] Date: 8/31/09 Time: 16:12	Verified By: [illegible] Date: 8/31/09 Time: 16:45

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements

WHITE - Lab Copy PINK - Client Copy

Appendix D
Laboratory Certificates of Analysis – Mould

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON
K1G 5T9

04-Sep-09

Attn: Maurice Graveline
Tel: (613) 748-1415
Fax: (613) 748-1356

Re: BE OT 010540 *Paracel Report No.: 0936054*

Please find attached the final assessment of sample(s) received on 31-Aug-09 and analyzed in our Ottawa West Lab location. Information on common indoor/outdoor fungi may be found on our website at the link below; however, interpretation of the results is the responsibility of the

Paracel Species Ecology List

If you have any questions or comments regarding the enclosed information, please feel free to contact us anytime.

Sincerely,

Don Belisle, MSc For Heather S.H. McGregor, BSc
Laboratory Director - Microbiology

PARACEL LABORATORIES LTD

Client:	DST Consulting Engineers Inc. (Ottawa) 203-2150 Thurston Dr. Ottawa, ON K1G 5T9	**Attn:**	Maurice Graveline Tel: (613) 748-1415 Fax: (613) 748-1356
Project:	BE OT 010540	**Received Date:**	31-Aug-09
Paracel Report No.:	0936054	**Report Date:**	04-Sep-09

Microscopic Fungal - Tape Lifts

Sample I.D.	Sample Date	Background Debris**	Propagule Summary	Relative Amount*
0936054-01	27-Aug-09	High	Client Sample Name:243867-TL-01	
			hyaline mycelial fragments	Low

*Relative Amount:
Trace = 2 propagules or less noted per mm² of tape surface
Low = 2-10 propagules noted per mm²
Moderate = 11-100 propagules noted per mm²
High = > than 101 propagules noted per mm²

**Background Debris - Definitions:
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

ND - No fungal propagules detected.

NA - Not applicable; calculations cannot be performed on non-numerical data.

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ® NIAGARA FALLS ® MISSISSAUGA ® SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody Record

№ 61870

Pg. __ of __

Company Name: DST Consulting Engineers
Contact Name: Maurice Graveline
Address: 2150 Thurston Drive
Tel: 613-748-1415 Cell:
Email: mgraveline@dstgroup.com

Project Ref: BEOT010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: ☐ 1-day ☐ 2-day ☑ Regular
Regulatory/Guideline Requirements

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Sample Information						Analysis Required													
Paracel Order # 0936054	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Lead in paint	Direct Microscopic Examination												Hazardous? (Y/N)
1	243867-LP-01				27/08/09	X													
2	243867-LP-02				"	X													
3	243867-LP-03				"	X													
4	243867-TL-01				"		X												
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Relinquished By:	Received at Depot:	Received at Lab:	Verified By:
Marc Acouri	Velo C	Karen Wiggins	Karen Wiggins
Date: Aug 31/09 Time: 4:10pm	Date: 8/31/09 Time: 16:12	Date: 09/01/09 Time: 10:13	Date: 09/01/09 Time: 10:51

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

WHITE - Lab Copy, PINK - Client Copy

Appendix E
Selected Photographs

Photo 1: Exterior view of the Site Offices.

Photo 2: Drywall joint compound (Samples 243867-02A-C) sampled in the Garage does not contain asbestos.

Photo 3: Wall surfacing material (Samples 243867-01A-E) sampled in the Garage washroom does not contain asbestos.

Photo 4: Paints, aerosols, oils, etc. stored in the basement storage area chemical locker.

Photo 5: Stonework surface parging material (Samples 243867-03A-E) sampled does not contain asbestos.

Photo 6: Mould impacted underside of wooden floorboards (Sample 243867-TL-01) was observed in the basement storage room. Affected area is approximately 10 square metres total.

Photo 7: Grey cement compound on pipe fittings in the basement mechanical/storage room contains 90% chrysotile asbestos (Sample 243867-04-A). There are 4 fittings exposed and in POOR condition.

Photo 8: Layered cardboard wrap insulation (Sample 243867-05A) noted on pipes the basement storage/mechanical room contains 20% Chrysotile asbestos in the tar paper layer. Some debris (POOR condition) associated with this material was also noted on the ground in this area.

Photo 9: Light brown coloured vinyl sheet flooring (Samples 243867 06A-C) sampled does not contain asbestos (ground floor shower room pictured here).

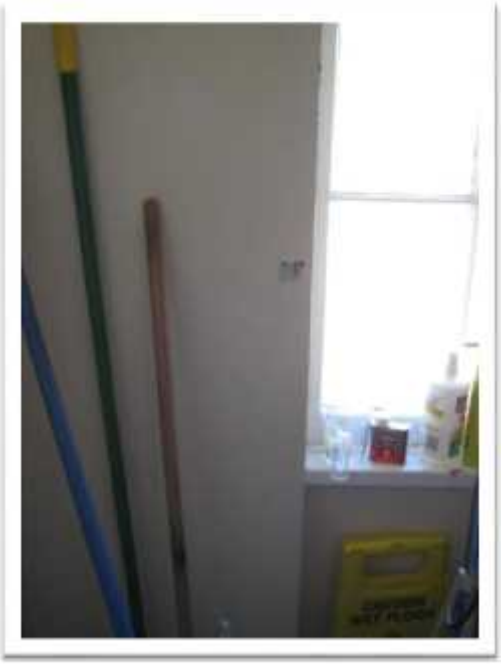


Photo 10: Drywall joint compound (Samples 243867-07A-E) sampled throughout the ground floor does not contain asbestos (ground floor shower room pictured here).

Photo 11: Brown vinyl sheet flooring sampled in the ground floor rear office does not contain asbestos (Samples 243867-08A-C).

Photo 12: Brown 12” x 12” vinyl tile flooring sampled in the ground floor rear common area does not contain asbestos (Samples 243867-09A-C).

Photo 13: White radiator paint (Sample 243867-LP-01) contains 19,800 ppm lead.

Photo 14: 2’ x 4’ lay-in ceiling tile sampled in the ground floor front offices does not contain asbestos (Samples 243867-10A-C).

Photo 15: Grey/blue vinyl sheet flooring sampled throughout the ground floor does not contain asbestos (Samples 243867-11A-C).

Photo 16: Roof shingle debris sampled in the attic does not contain asbestos (Samples 243867-12A-C).

Photo 17: Tar paper debris in the attic (Sample 243867-13A) contains 1% chrysotile asbestos.

Photo 18: Light heat shields on light fixtures stored in the attic are suspected to contain asbestos.

Photo 19: Chimney brick mortar sampled does not contain asbestos (Samples 243867-14A-C).

Photo 20: Exterior white porch paint at front entrance contains 200,000 ppm lead (Sample 243867-LP-02).

DESIGNATED SUBSTANCE SURVEY

Storage Shed

Ottawa, Ontario

Prepared for:

Environmental Services

September 23, 2015

DST File No.: BE-OT-010540

DST Consulting Engineers Inc.
2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9
Tel.: (613) 748-1415 Fax: (613) 748-1356 E-mail: ottawa@dstgroup.com

Executive Summary

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Storage Shed located in Ottawa, Ontario.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects;
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

DST performed site visits for the Storage Shed on August 20, 2009, and on January 20, 2010.

The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Ozone Depleting Substances (ODS);
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Mould;
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

The following table summarizes the remaining findings of the Storage Shed survey.

Designated/ Hazardous Substance	Findings	Recommendations
Asbestos	The only confirmed friable ACMs in the building are the tectum paper remnants observed in the basement. The total amount of material is minor (e.g. less than 1 m^2) but consists of several pieces in POOR condition. Type 2 removal is recommended. The asphalt roof shingles are a non-friable suspected asbestos-containing material. No other suspected ACMs were identified within the building. Bulk sampling and laboratory analysis has demonstrated that specific building materials do not contain regulated concentrations of asbestos. These materials are described in Section 3.3.3 of the report.	DST recommends Type 2 removal of the POOR condition tectum paper in the basement. Opinion of Probable Cost: $1,000. Prior to construction disturbance the asphalt roof materials should be sampled for asbestos content.
Lead	Exterior paint located on trim and wood clapboards, has lead concentrations in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act. Most of this paint is in GOOD condition but some signs of localized delamination were observed. Lead is also suspected of being present in solder on the joints of copper piping. No other building materials suspected of containing lead were observed during the site visit.	DST recommends removal of the loose, delaminating, flaking white exterior paint (leaving the areas with good bond to the wood substrate intact and undisturbed). The remaining lead-based exterior paint can then be encapsulated with a layer of non-lead paint. Opinion of Probable Cost: $2,000.00. 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.
Mercury	Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized.	No remedial action required. The Occupational Health and Safety Division of the Ontario Ministry of Labour publication *The Safe Handling of Mercury: A Guide for the Construction Industry*, should be followed during the disturbance of materials containing mercury.

Designated/ Hazardous Substance	Findings	Recommendations
Silica	Silica is present within concrete and masonry elements of the building.	No remedial action required. 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.*
Polychlorinated Biphenyls (PCBs)	Fluorescent light fixtures observed in the building had T12 lamps and are therefore suspected to contain PCB ballasts.	No remedial action required. DST recommends to undertake the following actions with respect to PCBs: • Survey of PCB-containing equipment, waste, etc. if none is available. • Testing of equipment for which PCB content cannot be readily, visually identified. • PCB Management Plan to ensure implementation of the federal PCB Regulation.

This Executive Summary should be read in conjunction with, and is subject to the same Limitations as, the entire report.

DESIGNATED SUBSTANCE SURVEY
Storage Shed

Ottawa, Ontario

TABLE OF CONTENTS

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Storage Shed located in Ottawa, Ontario. The Storage Shed is a single storey, wood framed structure with an asphalt shingle roof. There is a partial basement under the west part of the building. The building does not appear to be heated.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects;
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

Designated Substances, as identified under the Ontario Occupational Health & Safety Act are:

1. Acrylonitrile;
2. Arsenic;
3. Asbestos (both friable and non-friable);
4. Benzene;
5. Coke Oven Emissions;
6. Ethylene Oxide;
7. Isocyanates;
8. Lead;
9. Mercury;
10. Silica; and,
11. Vinyl Chloride.

Other Hazardous Materials, which are not classified as Designated Substances, but which are still of concern due to other regulations, best practices guidelines and/or potential risks to human health and/or the environment, include:

12. Polychlorinated Biphenyls (PCBs);
13. Ozone Depleting Substances (ODS);
14. Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
15. Mould;
16. Urea Formaldehyde Foam Insulation (UFFI);
17. Radioactive Smoke Detectors; and,
18. Other hazardous materials, as viewed pertinent by the consultant.

2.0 SCOPE OF WORK AND METHODOLOGY

Prior to the commencement of field work, DST project personnel reviewed the following documents provided:

- 1-page building information summary from the Asset Inventory System.

DST performed the site visits for the Storage Shed on August 20, 2009, and on January 20, 2010. The survey included a walkthrough assessment of all accessible areas of the building. While on site DST personnel:

- Compiled and summarized existing characterization data for the building;
- Conducted surveying, sampling and/or monitoring as required to address any data gaps and to reassess areas investigated during previous assessments (all sampling locations appear on the drawings in Appendix A);
- Defined the extent and approximate quantities of Designated Substances and Hazardous Materials;
- Determined the source and extent of mould proliferation, if applicable; and,
- Collected sufficient information to subsequently enable DST to recommend appropriate mitigation measures to bring the building into compliance with applicable legislation and/or to mitigate risks to human health and/or the environment.

Materials suspected of containing designated substances and other hazardous materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician. Visual identification of materials suspected to contain asbestos or lead (in paint) was supported by the collection and analysis of a limited number of representative samples. Materials suspected of containing designated substances other than asbestos or lead (in paint) 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% by dry weight. ACMs can be divided into two categories: friable and non-friable material. A friable asbestos-containing material (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 broken, cut, drilled, abraded, ground, sanded or vibrated. Common non-friable ACMs include vinyl floor products, drywall joint compound, plaster, asbestos textile products and asbestos cement products (transite). Some of these products may become friable with time or when disturbed (e.g. drywall joint compound).

Fourteen (14) bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were analyzed for their asbestos content at LEX Scientific (LEX). LEX is certified under the National Institute of Science and Technology's National Voluntary

Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis (NVLAP No.: 101949). 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. The analytical results for asbestos in bulk materials are included in Appendix B.

Although the 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 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/cm^2), or at least 0.5% lead content by weight (5,000 ppm). This criteria was widely, although not universally, used in Canada. In Canada, the Federal Hazardous Product Act has recently lowered the allowable concentration of lead in paints for new consumer products to 0.06% lead content by weight (600 ppm). For the purposes of this survey and report, paints having a lead content greater than 0.06% are considered to be lead-based. Disturbance of paints having lead content below 600 ppm are less likely to release significant concentrations of airborne lead during disturbance and therefore are not likely considered harmful.

A single painted finish, representative of the painted finishes on the building exterior, was sampled and submitted to Paracel Laboratories for lead content analysis. The sample was analyzed at using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6020. The analytical result for lead in the paint chip sample is included in Appendix C.

Selected photographs are included in Appendix D.

3.0 FINDINGS

The following sections outline the complete findings of all designated substances and hazardous materials assessed within the Storage Shed located in Ottawa, Ontario.

3.1 Acrylonitrile

Acrylonitrile was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.2 Arsenic

Arsenic was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.3 Asbestos

Fourteen (14) bulk samples of suspected ACMs were collected by DST during the site investigation. Sample descriptions and analytical results are summarized in the following table.

Table 1: Summary of Bulk Samples Analyzed for Asbestos			
Sample I.D.	**Sample Location**	**Material Description**	**Asbestos (%)**
335848-01A	**Basement**	**Tectum Paper**	**60% Chrysotile**
335848-01B			Not Analyzed
335848-01C			Not Analyzed
335848-02A	Basement	Drywall Joint compound	Not Analyzed (Note 1)
335848-02B			Not Analyzed (Note 1)
335848-02C			Not Analyzed (Note 1)
335848-02D			<0.5% Chrysotile
335848-02E			<0.5% Chrysotile
335848-02F			None Detected
335848-02G			None Detected
335848-02H			None Detected
335848-03A	Mezzanine	Tar Paper	None Detected
335848-03B			None Detected
335848-03C			None Detected

Note: 1) Insufficient sample material for analysis.

3.3.1 Friable Asbestos Materials

Tectum paper remnants, in POOR condition, were observed in the Basement.

3.3.2 Non-Friable Asbestos Materials

Asphaltic roofing materials (e.g. shingles and tar/felt paper) are suspected non-friable ACMs.

3.3.3 Non-Asbestos Materials

Bulk sampling and subsequent laboratory analysis has demonstrated that the following building materials do not contain regulated concentrations of asbestos:

- Drywall Joint Compound; and,
- Tar paper on wall insulation batts.

3.4 Benzene

Benzene was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

A diesel aboveground storage tank (AST) and three (3) Petroleum, Oil & Lubricants (POL) storage cabinets were observed adjacent to the exterior of the building. These are not considered an inherent part of the building structure or its finishes, and are therefore outside the scope of this survey program. The stored contents may contain benzene.

3.5 Coke Oven Emissions

Coke Oven Emissions were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.6 Ethylene Oxide

Ethylene Oxide was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.7 Isocyanates

Isocyanates were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.8 Lead

A single representative paint finish was sampled from the building and submitted for lead content analysis. The sample description and analytical result is summarized in the following table.

Table 2: Summary of Paint Chip Samples Analyzed for Lead

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
335848-LP-01	Building Exterior	White on trim and wood clapboards	85,000

The single paint chip sample collected and analyzed contained a lead concentration in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act.

Additional paint chip samples were not required as the interior of the building was unpainted.

Based upon the historic composition of building materials, lead is also expected to be present in:

- Solder on the joints of copper piping.

Lead is also suspected in ceramic tiles and lead-acid batteries stored in the building. Because these are stored materials, they are not integral elements of the building structure or its finishes. They are therefore outside the scope of this survey.

3.9 Mercury

Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized.

Fluorescent light fixtures were observed in the building in energeized fixtures. Additional fluorescent light fixtures were observed stored in the building.

3.10 Silica

Based on the historic composition of building materials, silica is expected to be present in:

- Concrete and masonry elements of the building.

3.11 Vinyl Chloride

Vinyl Chloride was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.12 Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs), also known as Chlorobiphenyls, are hazardous chemicals which were used in the manufacturing of a variety of equipment, such as electrical equipment, heat exchangers, hydraulic systems, and for several other specialized applications. PCBs are commonly found within electrical ballasts manufactured prior to 1981, found within fluorescent light fixtures and high intensity discharge lamps.

Light fixtures with T12 lamps are more likely to contain ballasts that were manufactured prior to 1981. T8 lamps are associated with light fixtures that were manufactured after the phase-out of PCB-containing ballasts. The letter “T” denotes the shape of the light fixture (e.g. tubular) and the number which follows indicates the diameter in eights of an inch.

Fluorescent light fixtures observed in the building had T12 lamps and are therefore suspected to contain PCB ballasts.

Several light ballasts were also observed stored in the building. Each of these could be identified by label information as a non-PCB ballast.

No other materials suspected of containing PCBs were identified within the building.

3.13 Ozone-Depleting Substances (ODSs)

ODSs were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

Several stored refrigerators were observed in the building. These may have ODS regrigerants. Since these are stored items, they are not an integral part of the building structure or its finishes, and are therefore outside the scope of this survey.

3.14 Fecal Waste

Fecal waste was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.15 Mould

Mould was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.16 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.17 Radioactive Smoke Detectors

Smoke detectors were not observed in the building.

3.18 Other Hazardous Materials

No other Hazardous Materials were either observed in the building, or suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment.

4.0 CONCLUSIONS AND RECOMMENDATIONS

DST Consulting Engineers Inc. (DST) was retained to perform a Designated Substance Survey (DSS) of the Storage Shed located in Ottawa, Ontario.

The site visits were performed by DST on August 20, 2009, and on January 20, 2010. The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Ozone Depleting Substances (ODS);
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Mould;
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

4.1 Asbestos

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O.Reg. 278/05, Asbestos on Construction Projects and in*

Buildings and Repair Operations enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter 0.1)*. This regulation classifies all asbestos disturbance as either Type 1, Type 2, or Type 3, each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition. The Ontario Ministry of Labour (MOL) must be notified of any project involving removal of more than a minor amount (e.g. typically 1 m^2) of friable asbestos material.

The only confirmed friable ACMs in the building are the tectum paper remnants observed in the basement. The total amount of material is minor (e.g. less than 1 m^2) but consists of several pieces in POOR condition. Type 2 removal is recommended for regulatory compliance.

The only suspect non-friable ACM at the Storage Shed are the non-friable asphalt components of the roof assembly (e.g. shingles and tar/felt paper). These materials were not sampled since this requires a full depth core sample which often compromises the integrity of the building envelope.

These suspected non-friable materials, even if they do contain regulated concentrations of asbestos, represent only a *de minimis* risk to human health or the environment in their present state since they are the types of materials that do not readily release significant concentrations of asbestos fibres even when subjected to construction disturbances.

No remedial action is required for the above-noted suspected non-friable ACMs as they were observed to be in GOOD condition. However, DST recommends that they be sampled for asbestos content prior to any major construction disturbance. If the analysis demonstrates that these materials contain asbestos, then they can be removed as a Type 1 asbestos operation in accordance with the work procedures outlined in O.Reg 278/05.

4.2 Lead

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbance as either Type 1, Type 2a, Type 2b or Type 3 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 would serve as a reasonable, peer reviewed standard for work procedures.

The exterior white paint on wood trim and clapboards has a lead concentration in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act.

Approximately 200 ft^2 of this white paint is in POOR condition with signs of delamination from the wood substrate. Paint chips with elevated concentrations of lead can pose a health risk to humans if ingested. Paint chips 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. DST recommends removal of the loose, delaminating, flaking areas of white exterior paint (leaving any areas still exhibiting a good bond intact and undisturbed). The remaining lead paint can then be encapsulated with a layer of non-lead paint.

Lead is also suspected in solder on the joints of copper piping. If required at some future date to accommodate renovation, demolition or maintenance work, the copper piping can be cut a small distance (e.g. 50 mm) from the joints to avoid direct disturbance of the lead solder.

No other building materials suspected of containing lead were observed during the site visit.

4.3 Mercury

There are no regulations that specifically govern the disturbance of mercury on construction projects. However, the Occupational Health and Safety Division of the Ontario Ministry of Labour has published *The Safe Handling of Mercury: A Guide for the Construction Industry*. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills. In the absence of specific legislation for mercury on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized. When removal of the fluorescent light tubes is required, the tubes should be removed intact from the fixtures. This prevents worker exposure to mercury vapour, particularly if the tubes were energized shortly before removal.

It is now common practise to recycle fluorescent light tubes, recovering the component materials, and avoiding the generation of hazardous waste.

4.4 Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbance as either Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for silica on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Silica is present in concrete and masonry elements of the building. No remedial work is required at the present time.

Dust control procedures, which are typical of any well executed demolition project, are usually sufficient to control airborne silica levels. 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 to silica.

4.5 Polychlorinated Biphenyls (PCBs)

Fluorescent light ballasts associated with the light fixtures observed in the building are suspected to contain PCBs.

In Canada revised federal PCB Regulations came into force in September 2008. The Regulations impose deadlines on the elimination of all PCBs and PCB-containing material

currently in storage, and requires all other PCBs to be phased out. In general, the end-of-use deadlines imposed by this new regulation are as follows:

- December 31, 2009, all equipment containing PCBs in a concentration of 500 parts per million (ppm) or more (excluding pole-mounted equipment and light ballasts).
- December 31, 2009, all equipment containing PCBs in a concentration of 50 ppm or more at any sensitive location, including within 100 metres of drinking water treatment plants, food and feed processing plants, child care facilities, preschool, primary and secondary schools, hospitals, and senior citizen care facilities (excluding pole-mounted equipment and light ballasts).
- December 31, 2025, all equipment containing PCBs in a concentration of 50 ppm or more (<u>including</u> pole-mounted equipment and light ballasts).

In general terms, the steps for compliance are as follows:

- Survey of PCB-containing equipment, waste, etc. if none is available.
- Testing of equipment for which PCB content cannot be readily, visually identified.
- PCB Management Plan to ensure implementation of the federal PCB Regulation.

No other materials suspected of containing PCBs were identified within the building.

5.0 LIMITATIONS OF REPORT

This report is intended for client use only. 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 asbestos bulk sampling, paint chip sampling, and microbial sampling in select representative areas for laboratory analysis. 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. DST is not in a position to evaluate the health risks associated with exposure to the mould and/or mites referenced in this report. Since human reactions to mould exposure vary widely amongst individuals, and specific segments of the population are generally recognized to be more susceptible than others, an evaluation of health risks can only be made on an individual basis and even then, only by a licensed medical practitioner equipped with knowledge of the individual's medical history.

Any use of this report by the client and any other party is contingent upon their understanding and acceptance of the following condition:

"Mould is a naturally occurring substance and regardless of the results of an

assessment or how completely it is removed, it could reoccur."

Regardless of the effectiveness of any remedial actions, mould growth may occur/reoccur anywhere within a building at any time, should conditions be favourable. It is therefore essential to maintain buildings, surfaces, appliances and furnishings under conditions which are not favourable to mould incubation and growth (warm, dry, and clean). The scope of services provided by DST for this assignment did not include a detailed evaluation of the thermal and moisture management characteristics of the exterior wall assembly, or a detailed building envelope investigation to ascertain every potential root cause of the water infiltration that created an environment favourable to mould proliferation. Similarly, DST has not been engaged to provide detailed designs for the reinstatement of building finishes or for improvements to the building envelope.

Note also that standards, guidelines and practices related to mould 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.

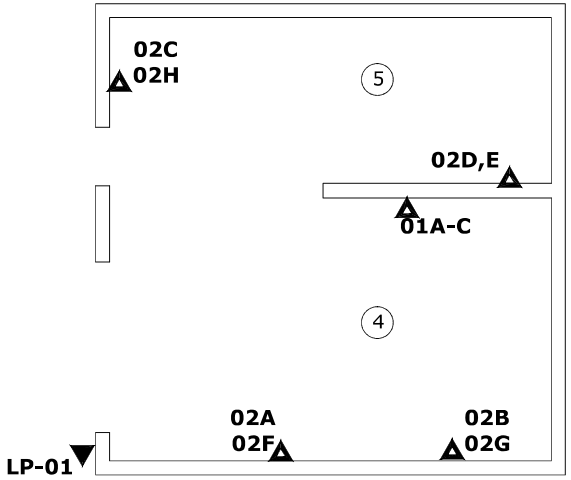
6.0 CLOSURE

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.

Maurice Graveline, P.Eng.
Principal
mgraveline@dstgroup.com

Appendix A
Floor Plans



DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.

LEGEND:

▲ 01A-C	APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
▼ LP-01	APPROXIMATE PAINT SAMPLE LOCATION, LEAD TESTING (LP-#), AS APPLICABLE
(1)	SURVEY LOCATION REFERENCE

REV	DATE	ISSUE	APPROVAL
0	10/05/10	ORIGINAL	M.G.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

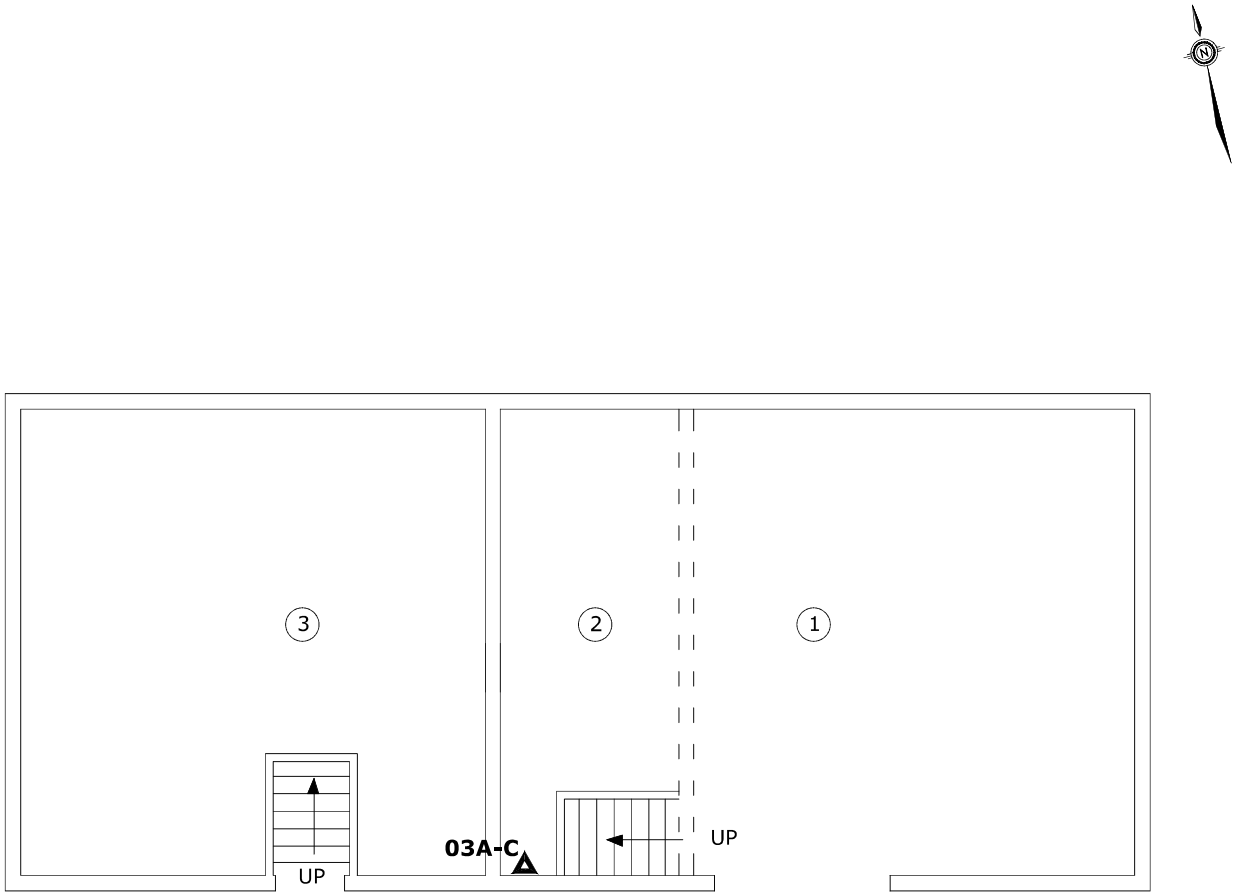
DRAWING TITLE

SAMPLE LOCATION PLAN
SHED

BASEMENT

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE May 2010
APPROVED BY M.G.	PROJECT NO.: BE-OT-010540

FIGURE 1



DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.

LEGEND:

01A-C — APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE

1 — SURVEY LOCATION REFERENCE

REV	DATE	ISSUE	APPROVAL
0	10/05/10	ORIGINAL	M.G.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

DRAWING TITLE

SAMPLE LOCATION PLAN
SHED

GROUND FLOOR

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE May 2010
APPROVED BY M.G.	PROJECT NO.: BE-OT-010540

FIGURE 2

Appendix B
Laboratory Certificates of Analysis – Bulk Asbestos

SOLUTIONS
FOR A WORKING WORLD

CERTIFICATE OF ANALYSIS

Company:	DST Consulting Engineers Inc.	**Report Date:**	26-Aug-09
Contact:	Mr. Marc Acouri	**Analysis Date:**	26-Aug-09
Client Address:	2150 Thurston Drive, Suite 203, OTTAWA, ON	**Received Date:**	24-Aug-09
Client Reference:	BEOT010540	**LEX Project Number:**	08092704
Sampling Date:	20-Aug-09	**Number of Analyses:**	6

Analysis Requested **Bulk Asbestos by PLM**

Analysis was performed in accordance with the method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials adopted in Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act Ontario Regulation 278/05. LEX Scientific Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP 101949) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

German Leal, B.Sc.
Laboratory Manager

Analysis Notes: Not enough material submitted for samples 02A, 02B & 02C

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	335848-01A	**Asbestos Detected?**	**Yes**		
LEX Sample:	01	**Chrysotile:**	60	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Tectum Paper	**Other Amphiboles:**	None Detected	**Non Fibers:**	40
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst Z. Samsewa

2 Quebec Street, Suite 204 Guelph, Ontario N1H 2T3
Phone: 519.824.7082 Fax: 519.824.5784 Toll Free: 1.800.824.7082
e-mail: admin@lexscientific.com Website: www.lexscientific.com

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	335848-02D	**Asbestos Detected?**	**Yes**		
LEX Sample:	07	**Chrysotile:**	<0.5	**Cellulose:**	3
Layers Analyzed:	Joint Compound	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Cream/Yellow	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Joint Compound on tape	**Other Amphiboles:**	None Detected	**Non Fibers:**	97
		Comments:			
Client Sample:	335848-02E	**Asbestos Detected?**	**Yes**		
LEX Sample:	08	**Chrysotile:**	<0.5	**Cellulose:**	2
Layers Analyzed:	Joint Compound	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Cream/Yellow	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Joint Compound on tape	**Other Amphiboles:**	None Detected	**Non Fibers:**	98
		Comments:			
Client Sample:	335848-03A	**Asbestos Detected?**	**No**		
LEX Sample:	09	**Chrysotile:**	None Detected	**Cellulose:**	70
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Tar Paper	**Other Amphiboles:**	None Detected	**Non Fibers:**	28
		Comments:			
Client Sample:	335848-03B	**Asbestos Detected?**	**No**		
LEX Sample:	10	**Chrysotile:**	None Detected	**Cellulose:**	70
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Tar Paper	**Other Amphiboles:**	None Detected	**Non Fibers:**	28
		Comments:			
Client Sample:	335848-03C	**Asbestos Detected?**	**No**		
LEX Sample:	11	**Chrysotile:**	None Detected	**Cellulose:**	70
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Black	**Crocidolite:**	None Detected	**Other Fibers:**	2
Description:	Tar Paper	**Other Amphiboles:**	None Detected	**Non Fibers:**	28
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

SOLUTIONS
FOR A WORKING WORLD

CERTIFICATE OF ANALYSIS

Company:	DST Consulting Engineers Inc.	**Report Date:**	26-Jan-10
Contact:	Mr. Maurice Graveline	**Analysis Date:**	25-Jan-10
Client Address:	2150 Thurston Drive, Suite 203, Ottawa, ON	**Received Date:**	21-Jan-10
Client Reference:	BEOT010540	**LEX Project Number:**	08100098
Sampling Date:		**Number of Analyses:**	3

Analysis Requested **Bulk Asbestos by PLM**

Analysis was performed in accordance with the method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials adopted in Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act Ontario Regulation 278/05. LEX Scientific Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP 101949) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

German Leal, B.Sc.
Laboratory Manager

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	335848 - 02F	**Asbestos Detected?**	**No**		
LEX Sample:	01	**Chrysotile:**	None Detected	**Cellulose:**	3
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	DJC	**Other Amphiboles:**	None Detected	**Non Fibers:**	97
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

2 Quebec Street, Suite 204 Guelph, Ontario N1H 2T3
Phone: 519.824.7082 Fax: 519.824.5784 Toll Free: 1.800.824.7082
e-mail: admin@lexscientific.com Website: www.lexscientific.com

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	335848 - 02G	**Asbestos Detected?**	**No**		
LEX Sample:	02	**Chrysotile:**	None Detected	**Cellulose:**	3
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	DJC	**Other Amphiboles:**	None Detected	**Non Fibers:**	97
		Comments:			
Client Sample:	335848 - 02H	**Asbestos Detected?**	**No**		
LEX Sample:	03	**Chrysotile:**	None Detected	**Cellulose:**	2
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/Cream	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	DJC	**Other Amphiboles:**	None Detected	**Non Fibers:**	98
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst Z. Samusevich

LEX SCIENTIFIC INC.

Appendix C
Laboratory Certificates of Analysis – Paint Chips

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com
OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Marc Acouri

Phone: (613) 748-1415
Fax: (613) 748-1356

Client PO:
Project: BE OT 010540
Custody: 61853

Report Date: 26-Aug-2009
Order Date: 21-Aug-2009
Order #: 0934196

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

Paracel ID	Client ID
0934196-01	335848-LP-01

Approved

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

PARACEL LABORATORIES LTD

Order #: 0934196

Certificate of Analysis

Report Date: 26-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion, ICP-MS	24-Aug-09	24-Aug-09

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

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

PARACEL LABORATORIES LTD

Order #: 0934196

Certificate of Analysis

Report Date: 26-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Sample Results

Lead

Matrix: Paint
Sample Date: 20-Aug-09

Paracel ID	Client ID	Units	MDL	Result
0934196-01	335848-LP-01	ug/g	50	85000

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	50	ug/g						
Matrix Duplicate									
Lead	ND	50	ug/g	ND				44	
Matrix Spike									
Lead	109		ug/L	68.4	81.1	80-120			

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ◉ NIAGARA FALLS ◉ MISSISSAUGA ◉ SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody Record
№ 61853
Pg. ___ of ___

Company Name: DST Consulting Engineers
Contact Name: Marc Acouri
Address: 2150 Thurston Dr, Ottawa, ON
Tel: 613-748-1415 Cell:
Email: macouri@dstgroup.com

Project Ref: BE-OT-010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: ☐1-day ☐2-day ☑Regular
Regulatory/Guideline Requirements

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A–Air O–Other RDW–Regulated Drinking Water

Sample Information						Analysis Required													
Paracel Order # 0934196	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Lead in paint													Hazardous? (Y/N)
1	335848-LP-01				20/08/09	X													
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Relinquished By:	Received at Depot:	Received at Lab:	Verified By:
Marc Acouri	Vicol	Vicol	Vicol
Date: Aug 21/09 Time: 10:37	Date: 8/21/09 Time:	Date: 8/21/09 Time: 10:31	Date: 8/21/09 Time: 10:51

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

WHITE - Lab Copy, PINK - Client Copy

Appendix D
Selected Photographs

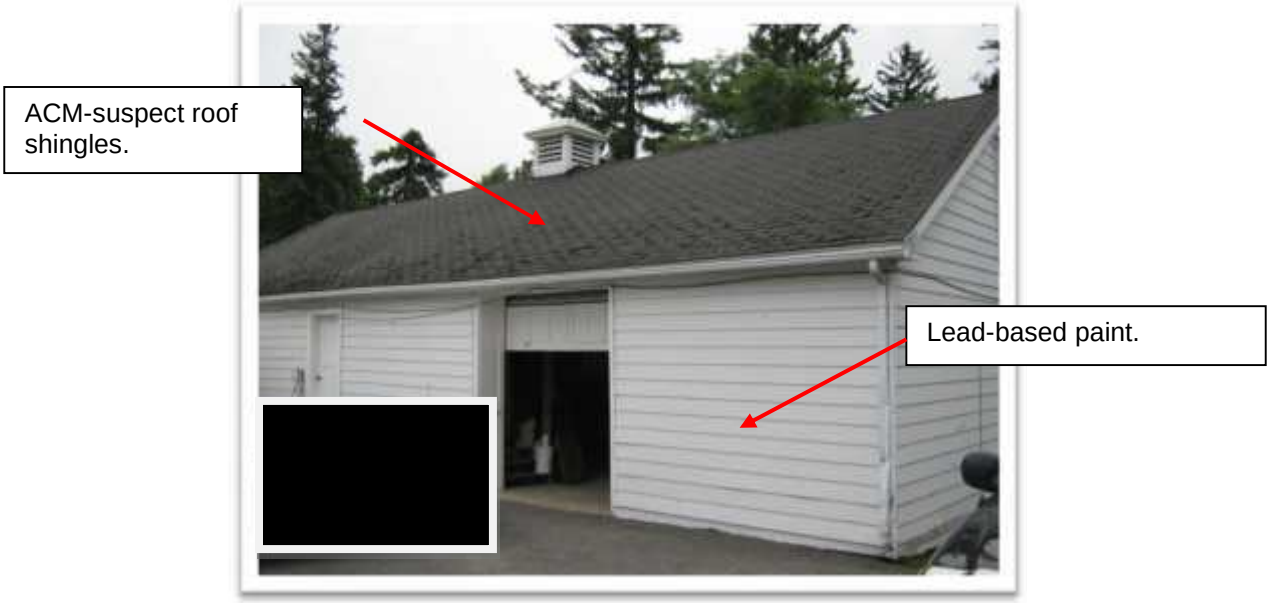


Photo 1: Exterior view of the Storage Shed. The exterior white paint has been tested and confirmed to be lead-based. The asphaltic roofing materials are ACM-suspect.

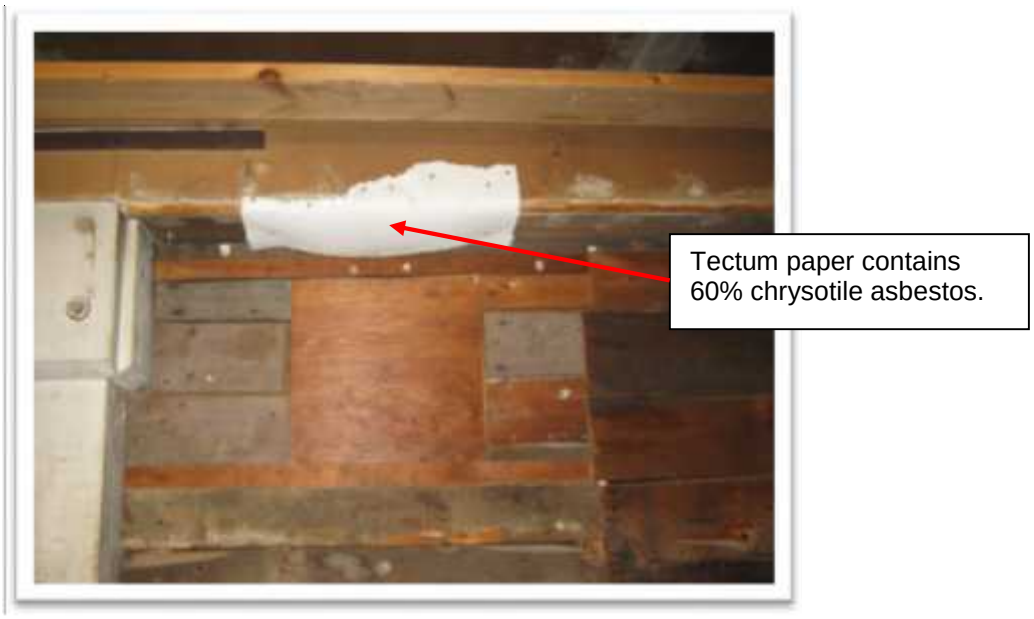


Photo 2: Tectum paper remnants have been tested and confirmed to contain 60% chrysotile asbestos. Type 2 removal is recommended for regulatory compliance.

Photo 3: Drywall joint compound has been tested and does not contain regulated concentrations of asbestos.

Photo 4: Tar paper has been tested and does not contain asbestos.

Photo 5: Typical fluorescent light fixture. Each light tube will contain a single droplet of mercury. The ballasts are also suspected to contain PCBs.

DESIGNATED SUBSTANCE SURVEY

Storage Garage
Ottawa, Ontario

Prepared for:

Environmental Services

September 23, 2015

DST File No.: BE-OT-010540

DST Consulting Engineers Inc.
2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9
Tel.: (613) 748-1415 Fax: (613) 748-1356 E-mail: ottawa@dstgroup.com

Executive Summary

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Storage Garage located in Ottawa, Ontario.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects;
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

DST performed the site visit for the Storage Garage on August 17, 2009.

The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Polychlorinated Biphenyls (PCBs);
- Ozone Depleting Substances (ODS);
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

The following table summarizes the remaining findings of the Storage Garage survey.

Designated/ Hazardous Substance	Findings	Recommendations
Asbestos	No friable ACMs were observed. Non-friable asphalt roof materials are a suspected non-friable ACM. No other suspected ACMs were identified within the building.	No remedial action is required at the present time. Prior to construction disturbance the asphalt roof materials should be sampled for asbestos content.
Benzene	Benzene is a constituent of the fuels stored in the building, but not as an integral part of the building structure. There is visual evidence of several small spills on the concrete floor slab. These appear to have been cleaned up with adsorbent materials.	Historic minor fuel spills on the concrete floor slab, which appear to have been cleaned up with adsorbent materials, represent only a *de minimis* risk. No remedial action is required at the present time.
Lead	Interior and exterior paints both show lead concentrations in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act. • Exterior white paint is in POOR condition with significant signs of delamination from the wood substrate. • Interior beige paint still exhibits a good bond to its wood substrate and is rated in GOOD condition. No other building materials suspected of containing lead were observed during the site visit.	DST recommends removal of the loose, delaminating, flaking white exterior paint (leaving the areas with good bond to the wood substrate intact and undisturbed). The remaining lead-based exterior paint can then be encapsulated with a layer of non-lead paint. Opinion of Probable Cost: $6,000.00. 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.
Mercury	Fluorescent light tubes each contain a single droplet of mercury which vaporizes when the tube is energized. No other sources of mercury were observed during the site visit.	No remedial action is required at the present time. The Occupational Health and Safety Division of the Ontario Ministry of Labour publication *The Safe Handling of Mercury: A Guide for the Construction Industry*, should be followed during the disturbance of materials containing mercury.

Designated/ Hazardous Substance	Findings	Recommendations
Silica	Silica is present within the concrete floor slab.	No remedial action is required at the present time. 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.*
Mould	Laboratory analysis confirmed that the area above the polyethylene sheeting suspended from the rafters is supporting mould growth. This is to be expected given the water trapped by the polyethylene. The area is relatively small (e.g. less than 10 m^2).	DST recommends that the area above the polyethylene sheeting suspended from the rafters be remediated using Level II CCA precautions are adequate for remediation. Opinion of Probable Cost: $1,500.00.

This Executive Summary should be read in conjunction with, and is subject to the same Limitations as, the entire report.

DESIGNATED SUBSTANCE SURVEY

Storage Garage

Ottawa, Ontario

TABLE OF CONTENTS

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Storage Garage located in Ottawa, Ontario. The Storage Garage is a single-storey,slab-on-grade wood framed structure with a flat asphalt roof.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

Designated Substances, as identified under the Ontario Occupational Health & Safety Act are:

1. Acrylonitrile;
2. Arsenic;
3. Asbestos (both friable and non-friable);
4. Benzene;
5. Coke Oven Emissions;
6. Ethylene Oxide;
7. Isocyanates;
8. Lead;
9. Mercury;
10. Silica; and,
11. Vinyl Chloride.

Other Hazardous Materials, which are not classified as Designated Substances, but which are still of concern due to other regulations, best practice guidelines and/or potential risks to human health and/or the environment, include:

12. Polychlorinated Biphenyls (PCBs);
13. Ozone Depleting Substances (ODS);
14. Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
15. Mould;
16. Urea Formaldehyde Foam Insulation (UFFI);
17. Radioactive Smoke Detectors; and,
18. Other hazardous materials, as viewed pertinent by the consultant.

2.0 SCOPE OF WORK AND METHODOLOGY

Prior to the commencement of field work, DST project personnel reviewed the following document provided:

- 1-page building information summary from the Asset Inventory System.

DST performed the site visit for the Storage Garage on August 17, 2009. The survey included a walkthrough assessment of all accessible areas of the building. While on site DST personnel:

- Compiled and summarized existing characterization data for the building;
- Conducted surveying, sampling and/or monitoring as required to address any data gaps and to reassess areas investigated during previous assessments (all sampling locations appear on the drawings in Appendix A);
- Defined the extent and approximate quantities of Designated Substances and Hazardous Materials;
- Determined the source and extent of mould proliferation; and,
- Collected sufficient information to subsequently enable DST to recommend appropriate mitigation measures to bring the building into compliance with applicable legislation and/or to mitigate risks to human health and/or the environment.

Materials suspected of containing designated substances and other hazardous materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician. Visual identification of materials suspected to contain asbestos or lead (in paint) was supported by the collection and analysis of a limited number of representative samples. Materials suspected of containing designated substances other than asbestos or lead (in paint) 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% by dry weight. ACMs can be divided into two categories: friable and non-friable material. A friable asbestos-containing material (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 broken, cut, drilled, abraded, ground, sanded or vibrated. Common non-friable ACMs include vinyl floor products, drywall joint compound, plaster, asbestos textile products and asbestos cement products (transite). Some of these products may become friable with time or when disturbed (e.g. drywall joint compound).

Three (3) bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were analyzed for their asbestos content at LEX Scientific (LEX). LEX is certified under the National Institute of Science and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis (NVLAP No.:

101949). 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. The analytical results for asbestos in bulk materials are included in Appendix B.

Although the 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 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/cm^2), or at least 0.5% lead content by weight (5,000 ppm). This criteria was widely, although not universally, used in Canada. In Canada, the Federal Hazardous Product Act has recently lowered the allowable concentration of lead in paints for new consumer products to 0.06% lead content by weight (600 ppm). For the purposes of this survey and report, paints having a lead content greater than 0.06% are considered to be lead-based. Disturbance of paints having lead content below 600 ppm are less likely to release significant concentrations of airborne lead during disturbance and therefore are not likely considered harmful.

Two (2) painted finishes, representative of the painted finishes in the building, were sampled and submitted to Paracel Laboratories for lead content analysis. The samples were analyzed at using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6020. The analytical results for lead in the paint chip samples are included in Appendix C.

One (1) bulk sample and 1 tape-lift sample of suspected mould-impacted material were collected by either removing a piece of the material or by physically adhering a piece of clear tape to the affected material and then peeling the tape off the substrate. The bulk sample or tape was then placed in a clean plastic bag and labelled. Microbial samples were analyzed by Paracel Laboratories Ltd. (Paracel) located in Ottawa, Ontario. Paracel is accredited by the Standards Council of Canada (ISO/IEC 17025) and the Canadian Association for Laboratory Accreditation (CALA). The analytical results for mould samples are included in Appendix D.

Selected photographs are included in Appendix E.

3.0 FINDINGS

The following sections outline the complete findings of all designated substances and hazardous materials assessed within the Storage Garage located in Ottawa, Ontario.

3.1 Acrylonitrile

Acrylonitrile was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.2 Arsenic

Arsenic was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.3 Asbestos

Three (3) bulk samples of suspected ACMs were collected by DST during the site investigation. Sample descriptions and analytical results are summarized in the following table.

Table 1: Summary of Bulk Samples Analyzed for Asbestos

Sample I.D.	Sample Location	Material Description	Asbestos (%)
335846-01A	West Wall at Redundant Opening	Parging Cement	None Detected
335846-01B			None Detected
335846-01C			None Detected

3.3.1 Friable Asbestos Materials

The only suspected friable ACM observed in the building was the parging cement over a redundant opening (possibly for a former metal chimney) in the west wall. Laboratory analysis of the parging cement (Sample 335846-01) has confirmed that it does not contain asbestos.

3.3.2 Non-Friable Asbestos Materials

Asphalt roofing materials are a suspected non-friable ACM. These materials were not sampled since this requires a full depth core sample which compromises the integrity of the building envelope.

3.4 Benzene

Benzene is a constituent of the fuels stored in the building, but not as an integral part of the building structure.

There is visual evidence of several small spills on the concrete floor slab. These appear to have been cleaned up with adsorbent materials.

3.5 Coke Oven Emissions

Coke Oven Emissions were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.6 Ethylene Oxide

Ethylene Oxide was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.7 Isocyanates

Isocyanates were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.8 Lead

Two (2) representative paint finishes in total were sampled from building finishes and submitted for lead content analysis. The sample descriptions and analytical results are summarized in the following table.

Table 2: Summary of Paint Chip Samples Analyzed for Lead

Sample I.D.	Sample Location	Paint Description	Paint Condition	Lead (ppm)
335846-LP-01	Exterior	White on wood siding	POOR	13,700
335846-LP-02	Interior	Beige on wood finishes	GOOD	4,170

Both of the paint chip samples collected and analyzed showed lead concentrations in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act. The exterior white paint is in POOR condition with significant signs of delamination from the wood substrate. The interior beige paint still exhibits a good bond to its wood substrate and is rated in GOOD condition.

No other building materials suspected of containing lead were observed during the site visit.

3.9 Mercury

Fluorescent light fixtures were observed in the building. Fluorescent light tubes each contain a single droplet of mercury which vaporizes when the tube is energized.

No other sources of mercury were observed during the site visit.

3.10 Silica

Based on the historic composition of building materials, silica is expected to be present in the concrete floor slab.

No other sources of silica were observed during the site visit.

3.11 Vinyl Chloride

Vinyl Chloride was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.12 Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs), also known as Chlorobiphenyls, are hazardous chemicals which were used in the manufacturing of a variety of equipment, such as electrical equipment, heat exchangers, hydraulic systems, and for several other specialized applications. PCBs are

commonly found within electrical ballasts manufactured prior to 1981, found within fluorescent light fixtures and high intensity discharge lamps.

Light fixtures with T12 lamps are more likely to contain ballasts that were manufactured prior to 1981. T8 lamps are associated with light fixtures that were manufactured after the phase-out of PCB-containing ballasts. The letter “T” denotes the shape of the light fixture (e.g. tubular) and the number which follows indicates the diameter in eights of an inch.

All of the fluorescent light fixtures observed throughout the building contained T8 lamps and are not suspected to contain PCBs.

No other materials suspected of containing PCBs were identified within the building.

3.13 Ozone-Depleting Substances (ODSs)

ODS were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.14 Fecal Waste

Fecal waste was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.15 Mould

The following suspected mould impacted building materials were noted during the site visit:

- Less than 1 m^2 of suspected mould growth (minor black spotting) on the rear wall (Sample 335846-TL-01); and,
- Less than 10 m^2 of suspected mould growth above the polyethylene sheeting suspended from the rafters to catch roof leaks (Sample 335846-BLK-01).

Laboratory analysis showed that the minor black spotting on the rear wall did not contain any mould. This is not unusual. Carbon deposits from internal combustion engines operating indoors often appear very similar to certain types of light, spotty mould growth.

Laboratory analysis did, however, confirm that the area above the polyethylene sheeting suspended from the rafters was indeed supporting mould growth. This is to be expected given the water trapped by the polyethylene.

In addition to the confirmed mould growth, much of the interior wood exhibits signs of historic water damage. Water infiltration creates opportunities for mould gowth. All water infiltration does not, however, result in mould growth. If the wetted substrate can dry within a reasonable time period, the potential for mould growth is significantly reduced. Given the nature of the Storage Garage construction (e.g. wide open garage doors for easy ventilation, no real concealed wall cavities) it is reasonable to expect that wetted interior surfaces will dry relatively quickly, thus reducing the potential for mould growth.

3.16 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.17 Radioactive Smoke Detectors

Smoke detectors were not observed in the building.

3.18 Other Hazardous Materials

No other Hazardous Materials were either observed in the building, or suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment.

4.0 CONCLUSIONS AND RECOMMENDATIONS

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Storage Garage located in Ottawa, Ontario.

The site visit was performed by DST on Auust 17, 2009. The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Polychlorinated Biphenyls (PCBs);
- Ozone Depleting Substances (ODS);
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

4.1 Asbestos

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O.Reg. 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations* enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter 0.1)*. This regulation classifies all asbestos disturbance as either Type 1, Type 2, or Type 3, each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition. The Ministry of Labour must be notified of any project involving removal of more than a minor amount (e.g. typically 1 m²) of friable asbestos material.

The only suspect ACM at the Storage Garage is the non-friable asphalt component(s) of the roof assembly. These materials were not sampled since this requires a full depth core sample which compromises the integrity of the building envelope.

These materials, even if they do contain regulated concentrations of asbestos, represent only a *de minimis* risk to human health or the environment in their present state since they are the types of materials that do not readily release significant concentrations of asbestos fibres even when subjected to construction disturbances.

No remedial action is required for the above-noted materials as they were observed to be in GOOD condition. However, DST recommends that they be sampled for asbestos content prior to any major construction disturbance. If the analysis demonstrates that these materials contain asbestos, then they can be removed as a Type 1 asbestos operation in accordance with the work procedures outlined in O.Reg 278/05.

4.2 Benzene

Benzene is a constituent of the fuels stored in the building, but not as an integral part of the building structure. There is visual evidence of several small spills on the concrete floor slab. These appear to have been cleaned up with adsorbent materials.

Historic minor fuel spills on the concrete floor slab, which appear to have been cleaned up with adsorbent materials, represent only a *de minimis* risk. No remedial action is required at the present time.

4.3 Lead

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbance as either Type 1, Type 2a, Type 2b or Type 3 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 would serve as a reasonable, peer reviewed standard for work procedures.

Both of the paint chip samples collected and analyzed contained a lead concentration in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act.

The exterior white paint is in POOR condition with significant signs of delamination from the wood substrate. Paint chips with elevated concentrations of lead can pose a health risk to humans if ingested. Paint chips 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. DST recommends removal of the loose, delaminating, flaking areas of white exterior paint (leaving any areas still exhibiting a good bond intact and undisturbed). The remaining lead paint can then be encapsulated with a layer of non-lead paint.

The interior beige paint still exhibits a good bond to its wood substrate and is rated in GOOD condition. No remedial action is required for this paint at the present time.

No other building materials suspected of containing lead were observed during the site visit.

4.4 Mercury

Fluorescent light tubes each contain a single droplet of mercury which vaporizes when the tube is energized. No other sources of mercury were observed during the site visit.

There are no regulations that specifically govern the disturbance of mercury on construction projects. However, the Occupational Health and Safety Division of the Ontario Ministry of Labour has published *The Safe Handling of Mercury: A Guide for the Construction Industry*. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills. In the absence of specific legislation for mercury on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

When removal of the fluorescent light tubes is required, the tubes should be removed intact from the fixtures. This prevents worker exposure to mercury vapour, particularly if the tubes were energized shortly before removal. It is now common practise to recycle fluorescent light tubes, recovering the component materials, and avoiding the generation of hazardous waste.

4.5 Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbance as either Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for silica on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Silica is present in the concrete floor slab. No remedial work is required at the present time.

Dust control procedures, which are typical of any well executed demolition project, are usually sufficient to control airborne silica levels when disturbance of the material is necessary. 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 to silica.

4.6 Mould

The term “mould” applies to a large group of micro-organisms, which together, with mushrooms and yeast, form the Fungi Kingdom of living matter. Mould organisms grow by degrading nutrients from organic substrates such as wood and wood products, fabrics, foodstuff, plant and soil. The growth of mould necessitates three essential conditions; a suitable temperature, an appropriate substrate and adequate moisture.

Public health and regulatory agencies acknowledge mould growth to be a risk factor for adverse health effects in occupants. Occupants may experience allergic responses such as asthma, headache, respiratory tract irritation, eye irritation, skin irritation, and sinus congestion. More severe health effects are rare and typically limited to individuals with suppressed immune systems, children, elderly people and persons with high occupational exposure.

Currently, there are no regulations pertaining to mould on construction projects. Most jurisdictions have issued alerts or bulletins concerning the hazard of mould in indoor environments. The Canadian Construction Association (CCA) published the following document as a response to concerns in the construction industry: CCA 82-2004, "Mould Guidelines for the Canadian Construction Industry", 2004. The Guideline recommends Level I, II and III mould abatement procedures for small (<1m^2), medium (1m^2 to 10m^2) and large scale (>10m^2) mould abatement operations that are to be determined by professionals based on the extent and density of mould on site.

Laboratory analysis confirmed that the area above the polyethylene sheeting suspended from the rafters is supporting mould growth. This is to be expected given the water trapped by the polyethylene. The area is relatively small (e.g. less than 10 m^2) so Level II CCA precautions are adequate for remediation.

5.0 LIMITATIONS OF REPORT

This report is intended for client use only. 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 asbestos bulk sampling, paint chip sampling, and microbial sampling in select representative areas for laboratory analysis. 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. DST is not in a position to evaluate the health risks associated with exposure to the mould and/or mites referenced in this report. Since human reactions to mould exposure vary widely amongst individuals, and specific segments of the population are generally recognized to be more susceptible than others, an evaluation of health risks can only be made on an individual basis and even then, only by a licensed medical practitioner equipped with knowledge of the individual's medical history.

Any use of this report by the client and any other party is contingent upon their understanding and acceptance of the following condition:

"Mould is a naturally occurring substance and regardless of the results of an assessment or how completely it is removed, it could reoccur."

Regardless of the effectiveness of any remedial actions, mould growth may occur/reoccur anywhere within a building at any time, should conditions be favourable. It is therefore essential to maintain buildings, surfaces, appliances and furnishings under conditions which are not favourable to mould incubation and growth (warm, dry, and clean). The scope of services provided by DST for this assignment did not include a detailed evaluation of the thermal and

moisture management characteristics of the exterior wall assembly, or a detailed building envelope investigation to ascertain every potential root cause of the water infiltration that created an environment favourable to mould proliferation. Similarly, DST has not been engaged to provide detailed designs for the reinstatement of building finishes or for improvements to the building envelope.

Note also that standards, guidelines and practices related to mould 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.

6.0 CLOSURE

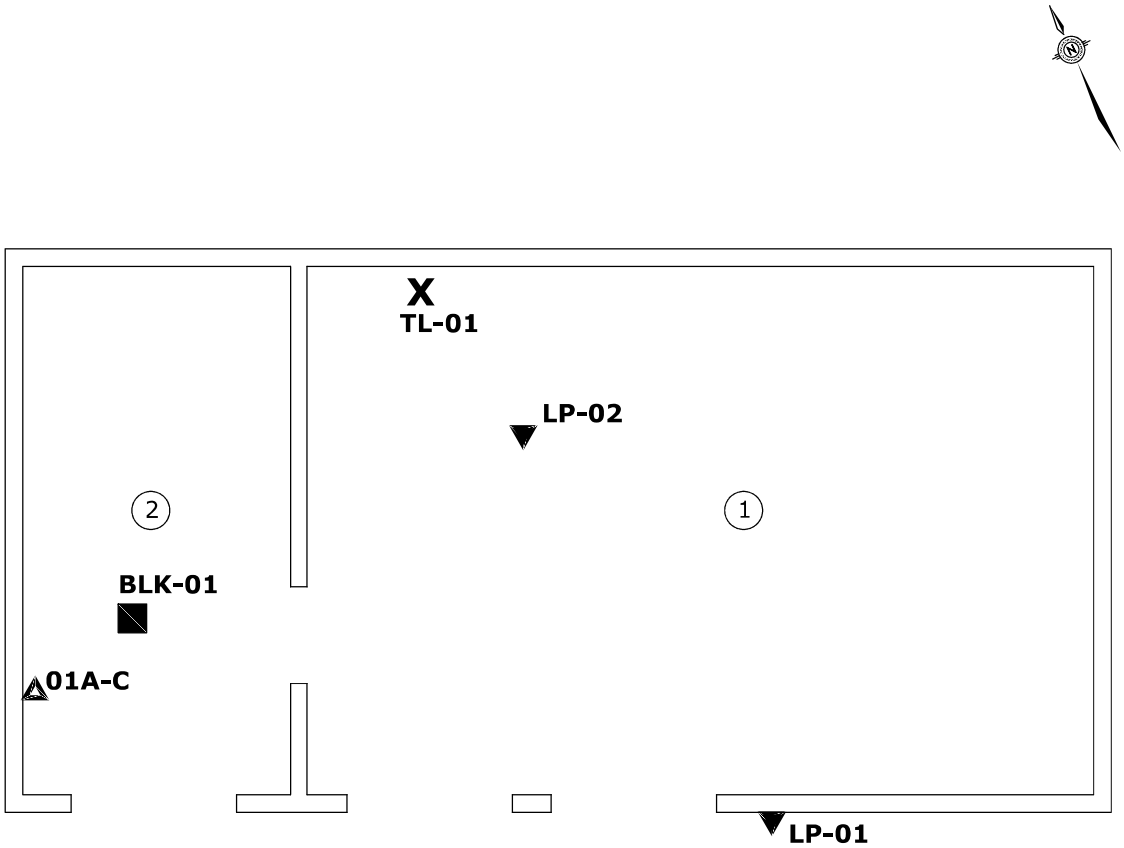
We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

DST CONSULTING ENGINEERS INC.

Signature appears on original copy

Maurice Graveline, P.Eng.
Principal
mgraveline@dstgroup.com

Appendix A
Floor Plans



DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.

LEGEND:

01A-C	APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
LP-01	APPROXIMATE PAINT SAMPLE LOCATION, LEAD TESTING (LP-#), AS APPLICABLE
1	SURVEY LOCATION REFERENCE
X TL-01	APPROXIMATE TAPE LIFT LOCATION, MICROBIAL TESTING
BLK-01	APPROXIMATE BULK MATERIALS LOCATION, MICROBIAL TESTING

REV	DATE	ISSUE	APPROVAL
A	20/01/10	PRELIMINARY	M.G.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

DRAWING TITLE

SAMPLE LOCATION PLAN
GARAGE

GROUND FLOOR

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE January 2010
APPROVED BY M.G.	PROJECT NO.: BE-OT-010540

FIGURE 1

Appendix B
Laboratory Certificates of Analysis – Bulk Asbestos

SOLUTIONS
FOR A WORKING WORLD

CERTIFICATE OF ANALYSIS

Company:	DST Consulting Engineers Inc.	**Report Date:**	27-Aug-09
Contact:	Mr. Marc Acouri	**Analysis Date:**	27-Aug-09
Client Address:	2150 Thurston Drive, Suite 203, OTTAWA, ON	**Received Date:**	24-Aug-09
Client Reference:	BEOT010540	**LEX Project Number:**	08092705
Sampling Date:	17-Aug-09	**Number of Analyses:**	3

Analysis Requested **Bulk Asbestos by PLM**

Analysis was performed in accordance with the method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials adopted in Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act Ontario Regulation 278/05. LEX Scientific Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP 101949) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

German Leal, B.Sc.
Laboratory Manager

			Fibrous Asbestos Content %	**Other Materials Content %**	
Client Sample:	335846-01A	**Asbestos Detected?**	**No**		
LEX Sample:	01	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst _____

2 Quebec Street, Suite 204 Guelph, Ontario N1H 2T3
Phone: 519.824.7082 Fax: 519.824.5784 Toll Free: 1.800.824.7082
e-mail: admin@lexscientific.com Website: www.lexscientific.com

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	335846-01B	**Asbestos Detected?**	**No**		
LEX Sample:	02	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	335846-01C	**Asbestos Detected?**	**No**		
LEX Sample:	03	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Grey/White	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Parging	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst _____

Appendix C
Laboratory Certificates of Analysis – Paint Chips

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com
OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Marc Acouri

Phone: (613) 748-1415
Fax: (613) 748-1356

Client PO:
Project: BE OT 010540
Custody: 61858

Report Date: 25-Aug-2009
Order Date: 21-Aug-2009
Order #: 0934202

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

Paracel ID	Client ID
0934202-01	335846-LP-01 White
0934202-02	335846-LP-02 Beige

Approved

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

PARACEL LABORATORIES LTD

Order #: 0934202

Certificate of Analysis

Report Date: 25-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion, ICP-MS	24-Aug-09	24-Aug-09

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

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

PARACEL LABORATORIES LTD

Order #: 0934202

Certificate of Analysis

Report Date: 25-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Sample Results

Lead

Matrix: Paint
Sample Date: 17-Aug-09

Paracel ID	Client ID	Units	MDL	Result
0934202-01	335846-LP-01 White	ug/g	50	13700
0934202-02	335846-LP-02 Beige	ug/g	50	4170

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	50	ug/g						
Matrix Duplicate									
Lead	ND	50	ug/g	ND				44	
Matrix Spike									
Lead	109		ug/L	68.4	81.1	80-120			

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ◉ NIAGARA FALLS ◉ MISSISSAUGA ◉ SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8

p: 1-800-749-1947
e: paracel@paracellabs.com

www.paracellabs.com

Chain of Custody Record

Nº 61858

Pg. ___ of ___

Company Name: DST Consulting Engineers
Contact Name: Marc Acouri
Address: 2150 Thurston Drive, Ottawa, ON
Tel: 613-748-1415 Cell:
Email: macouri@dstgroup.com

Project Ref: BEOT010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: | | 1-day | | 2-day |√| Regular
Regulatory/Guideline Requirements

Matrix Types: S-Soil/Sed GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Sample Information						Analysis Required													
Paracel Order # 0934202	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Microbial	Lead in Paint												Hazardous? (Y/N)
1	335846-TL-01				17/08/09	X													
2	335846-BLK-01				"	X													
3	335846-LP-01 (White)				"		X												
4	335846-LP-02 (Beige)				"		X												
5																			
6																			
7																			
8																			
9																			
10																			

Comments:
TL = Tape-Lift , BLK = Bulk Material

Relinquished By: Marc Acouri Date: Aug 21/09 Time: 10:30	Received at Depot: VLoc Date: ~~Aug~~ 8/21/09 Time:	Received at Lab: VLoc Date: 8/21/09 Time: 10:30	Verified By: MB Date: Aug 21, 09 Time: 11:00

Appendix D
Laboratory Certificates of Analysis – Microbial Samples

PARACEL LABORATORIES LTD.

TRUSTED. RESPONSIVE. RELIABLE.

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON
K1G 5T9

26-Aug-09

Attn: Marc Acouri
Tel: (613) 748-1415
Fax: (613) 748-1356

Re: BE OTO 10540 *Paracel Report No.: 0934248*

Please find attached the final assessment of sample(s) received on 21-Aug-09 and analyzed in our Ottawa West Lab location. Information on common indoor/outdoor fungi may be found on our website at the link below; however, interpretation of the results is the responsibility of the
Please refer to 'Report Notes' for special conditions present on some of the samples submitted.
Paracel Species Ecology List

If you have any questions or comments regarding the enclosed information, please feel free to contact us anytime.

Sincerely,

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

PARACEL LABORATORIES LTD

Client:	DST Consulting Engineers Inc. (Ottawa) 203-2150 Thurston Dr. Ottawa, ON K1G 5T9	**Attn:**	Marc Acouri Tel: (613) 748-1415 Fax: (613) 748-1356
Project:	BE 0T0 10540	**Received Date:**	21-Aug-09
Paracel Report No.:	0934248	**Report Date:**	26-Aug-09

Microscopic Fungal - Tape Lifts

Sample I.D.	Sample Date	Background Debris**	Propagule Summary	Relative Amount*
0934248-01	17-Aug-09	High	Client Sample Name:335846-TL-01	
			ND	

*Relative Amount:
Trace = 2 propagules or less noted per mm² of tape surface
Low = 2-10 propagules noted per mm²
Moderate = 11-100 propagules noted per mm²
High = > than 101 propagules noted per mm²

**Background Debris - Definitions:
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

ND - No fungal propagules detected.

NA - Not applicable; calculations cannot be performed on non-numerical data.

Microscopic Fungal - Bulk

Sample I.D.	Sample Date	Background Debris**	Propagule Summary	Relative Amount*
0934248-02	17-Aug-09	High	Client Sample Name:335846-BLK-01 [M-AL]	
			[M-SM] *bacteria*	High
			hyaline mycelial fragments	High
			unidentified spore	High
			Aspergillus/Penicillium-like spores	Moderate
			ascospores	

*Relative Amount:
Trace = 2 propagules or less on entire slide
Low = < than 10 propagules noted per mm² of slide surface
Moderate = 11-100 propagules noted per mm² of slide surface
High = > than 101 propagules noted per mm² of slide surface

**Background Debris - Definitions:
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

ND - No fungal propagules detected.

NA - Not applicable; calculations cannot be performed on non-numerical data.

Report Notes

0934248-02: M-AL	Algae was reported for this sample.
0934248-02: M-SM bacteria	The propagule was present in a smear. The high density prevented individual propagules from being discerned and counted.

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ◉ NIAGARA FALLS ◉ MISSISSAUGA ◉ SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: parace@paracellabs.com
www.paracellabs.com

Chain of Custody Record

№ 61858

Pg. __ of __

Company Name: DST Consulting Engineers
Contact Name: Marc Acouri
Address: 2150 Thurston Drive, Ottawa, ON
Tel: 613-748-1415 Cell:
Email: macouri@dstgroup.com

Project Ref: BEOT010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: [ ] 1-day [ ] 2-day [✓] Regular
Regulatory/Guideline Requirements

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A–Air O–Other RDW–Regulated Drinking Water

Sample Information						Analysis Required													
Paracel Order # 0934248	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Microbial	Lead in Paint												Hazardous? (Y/N)
1	335846-TL-01				17/08/09	X													
2	335846-BLK-01				"	X													
3	335846-LP-01 (White)				"		X												
4	335846-LP-02 (Beige)				"		X												
5																			
6																			
7																			
8																			
9																			
10																			

Comments:
TL = Tape-Lift , BLK = Bulk Material

Relinquished By: Marc Acouri	Received at Depot: Ottec	Received at Lab: Karen Wiggins	Verified By: Karen Wiggins
Date: Aug 21/09 Time: 10:30	Date: ~~8/20~~ 8/21/09 Time: 10:30	Date: 08/21/09 Time: 321	Date: 08/21/09 Time: 410

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

WHITE - Lab Copy, PINK - Client Copy

Appendix E
Selected Photographs

Photo 1: Exterior view the Storage Garage.

Photo 2: Parging cement over redundant opening in the west wall. Laboratory analysis has confirmed that the material (Sample 335846-01) does not contain asbestos.

Photo 3: Roof of the Storage Garage. The asphalt materials are a suspected non-friable ACM.

Photo 4: Typical example of a minor fuel spill on the concrete floor slab (which contains silica). In general, these spills appear to have been cleaned with adsorbent materials.

Photo 5: Exterior white paint (Sample 335846-LP-01) contains 13,700 ppm lead. This paint is delaminating from its wood substrate and is in POOR condition. Remedial action is required.

Photo 6: Interior beige paint (Sample 335846-LP-02) contains 4,170 ppm lead. This paint retains its bond with the wood substrate and is on GOOD condition. No remedial action is required.

Photo 7: Typical fluorescent light fixture with T8 tubes is not expected to contain a PCB ballast. Each tube will, however, contain a droplet of mercury which vapoutizes when the tube is energized.

Photo 8: Mould impacted materials above the polyethylene sheeting sheeting suspended from the rafters. DST recommends Level II CCA mould remediation.

DESIGNATED SUBSTANCE SURVEY

Shop

Ottawa, Ontario

Prepared for:
Environmental Services

September 23, 2015

DST File No.: BE-OT-010540

DST Consulting Engineers Inc.
2150 Thurston Drive, Suite 203, Ottawa, Ontario K1G 5T9
Tel.: (613) 748-1415 Fax: (613) 748-1356 E-mail: ottawa@dstgroup.com

Executive Summary

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Shop located in Ottawa, Ontario.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects;
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

DST performed the site visit for the Shop on August 21, 2009.

The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Mould;
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

The following table summarizes the remaining findings of the Shop survey.

Designated/ Hazardous Substance	Findings	Recommendations
Asbestos	Asphaltic roofing materials and window caulking are both non-friable suspected asbestos-containing materials. No other suspected ACMs were identified within the building. Specific building materials do not contain regulated concentrations of asbestos. These materials are described in Section 3.3.3 of the report.	No remedial action required. Prior to construction disturbance the asphaltic roofing materials and window caulking should be sampled for asbestos content. If the analysis demonstrates that these material contain asbestos, they can be removed as a Type 1 asbestos operation in accordance with the work procedures outlined in O.Reg 278/05.
Lead	The black paint on the wood skirt around the base of the building exterior had a lead concentration of 2,140 ppm, which classifies it as a lead-based paint. This black paint was noted to generally be in GOOD condition, although a small quantity (e.g. approximately 10 ft^2) was rated in POOR condition as it was peeling and delaminating from its wood substrate. Based upon the historic composition of building materials, lead is also expected to be present in the solder on the joints of copper piping. Specific paints do not contain regulated concentrations of lead. These paints are described in Table 2 and Section 3.8 of the report.	DST recommends removal of the loose, delaminating, flaking black exterior paint (leaving the areas with good bond to the wood substrate intact and undisturbed). The remaining lead-based exterior paint can then be encapsulated with a layer of non-lead paint. Opinion of Probable Cost: $500.00. 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.
Mercury	Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized. No other suspected sources of mercury were observed during the site visit.	No remedial action required. The Occupational Health and Safety Division of the Ontario Ministry of Labour publication *The Safe Handling of Mercury: A Guide for the Construction Industry*, should be followed during the disturbance of materials containing mercury.

Designated/ Hazardous Substance	Findings	Recommendations
Silica	Silica is present in concrete building elements.	No remedial action required. 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.*
Polychlorinated Biphenyls (PCBs)	Fluorescent light fixtures observed throughout the building had T12 lamps and are therefore suspected to contain PCB ballasts.	No remedial action required. DST recommends to undertake the following actions with respect to PCBs: • Survey of PCB-containing equipment, waste, etc. if none is available. • Testing of equipment for which PCB content cannot be readily, visually identified. • PCB Management Plan to ensure implementation of the federal PCB Regulation.
Ozone-Depleting Substances (ODSs)	ODSs are suspected in the following equipment: • Window mounted air conditioners; • Refrigerators; and, • Water coolers. None of this equipment is considered to be part of the building structure or its finishes. No other ODS-containing equipment was identified within the building.	No remedial action required. When these units are taken out of service, the ODS refrigerants must be captured and reclaimed by a licensed technician.

This Executive Summary should be read in conjunction with, and is subject to the same Limitations as, the entire report.

DESIGNATED SUBSTANCE SURVEY
Shop

Ottawa, Ontario

TABLE OF CONTENTS

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Shop located in Ottawa, Ontario. The Shop is a single-storey, slab-on-grade wood structure with a sloped, asphalt roof. The building exterior is finished with vinyl siding.

The objectives of the DSS are to:

1. Identify building materials (interior and exterior) and fixed equipment (e.g. heating/cooling systems) that contain designated substance/hazardous materials;
2. Determine the potential risks to human health and the environment associated with the identified materials;
3. Determine the potential impact the identified materials may have on future construction/renovation projects;
4. Create an inventory of the designated substances present in the building(s); and,
5. Provide baseline reports for future construction/renovation projects.

The survey program implemented by DST was designed for consistency with the record of materials containing the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. The Designated Substances Regulations as per the Ontario Act are generally followed as an environmentally responsible protocol to provide consistent results for its buildings located in both Ontario and Quebec.

Designated Substances, as identified under the Ontario Occupational Health & Safety Act are:

1. Acrylonitrile;
2. Arsenic;
3. Asbestos (both friable and non-friable);
4. Benzene;
5. Coke Oven Emissions;
6. Ethylene Oxide;
7. Isocyanates;
8. Lead;
9. Mercury;
10. Silica; and,
11. Vinyl Chloride.

Other Hazardous Materials, which are not classified as Designated Substances, but which are still of concern due to other regulations, best practice guidelines and/or potential risks to human health and/or the environment, include:

12. Polychlorinated Biphenyls (PCBs);
13. Ozone Depleting Substances (ODS);
14. Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
15. Mould;
16. Urea Formaldehyde Foam Insulation (UFFI);
17. Radioactive Smoke Detectors; and,
18. Other hazardous materials, as viewed pertinent by the consultant.

2.0 SCOPE OF WORK AND METHODOLOGY

Prior to the commencement of field work, DST project personnel reviewed the following documents provided:

- 1-page building information summary from the Asset Inventory System.

DST performed the site visit for the Shop on August 21, 2009. The survey included a walkthrough assessment of all accessible areas of the building. While on site DST personnel:

- Compiled and summarized existing characterization data for the building;
- Conducted surveying, sampling and/or monitoring as required to address any data gaps and to reassess areas investigated during previous assessments (all sampling locations appear on the drawings in Appendix A);
- Defined the extent and approximate quantities of Designated Substances and Hazardous Materials;
- Determined the source and extent of mould proliferation, if applicable; and,
- Collected sufficient information to subsequently enable DST to recommend appropriate mitigation measures to bring the building into compliance with applicable legislation and/or to mitigate risks to human health and/or the environment.

Materials suspected of containing designated substances and other hazardous materials were visually identified, based on the surveyor's knowledge of the historic composition of building products. Equipment that may contain ODSs (e.g. air conditioning and refrigeration equipment) or PCBs (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician. Visual identification of materials suspected to contain asbestos or lead (in paint) was supported by the collection and analysis of a limited number of representative samples. Materials suspected of containing designated substances other than asbestos or lead (in paint) 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% by dry weight. ACMs can be divided into two categories: friable and non-friable material. A friable asbestos-containing material (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 broken, cut, drilled, abraded, ground, sanded or vibrated. Common non-friable ACMs include vinyl floor products, drywall joint compound, plaster, asbestos textile products and asbestos cement products (transite). Some of these products may become friable with time or when disturbed (e.g. drywall joint compound).

Fourteen (14) bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were analyzed for their asbestos content at LEX Scientific (LEX). LEX is certified under the National Institute of Science and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis (NVLAP

No.: 101949). 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. The analytical results for asbestos in bulk materials are included in Appendix B.

Although the 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 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/cm^2), or at least 0.5% lead content by weight (5,000 ppm). This criteria was widely, although not universally, used in Canada. In Canada, the Federal Hazardous Product Act has recently lowered the allowable concentration of lead in paints for new consumer products to 0.06% lead content by weight (600 ppm). For the purposes of this survey and report, paints having a lead content greater than 0.06% are considered to be lead-based. Disturbance of paints having lead content below 600 ppm are less likely to release significant concentrations of airborne lead during disturbance and therefore are not likely considered harmful.

Three (3) painted finishes, representative of the painted finishes in the building, were sampled and submitted to Paracel Laboratories for lead content analysis. The samples were analyzed at using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) in accordance with U.S. EPA Method 6020. The analytical results for lead in the paint chip samples are included in Appendix C.

No airborne, bulk or tape-lift microbial samples were collected during the site visit.

Selected photographs are included in Appendix D.

3.0 FINDINGS

The following sections outline the complete findings of all designated substances and hazardous materials assessed within the Shop located in Ottawa, Ontario.

3.1 Acrylonitrile

Acrylonitrile was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.2 Arsenic

Arsenic was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.3 Asbestos

Fourteen (14) bulk samples of suspected ACMs were collected by DST during the site investigation. Sample descriptions and analytical results are summarized in the following table.

Table 1: Summary of Bulk Samples Analyzed for Asbestos

Sample I.D.	Sample Location	Material Description	Asbestos (%)
94189-01A	Survey Location #3	Vinyl Floor Tiles, White, 12”x12”	None Detected
94189-01B			None Detected
94189-01C			None Detected
94189-02A	Survey Location #1	Drywall Joint Compound	None Detected
94189-02B			None Detected
94189-02C			None Detected
94189-02D	Survey Location #3		None Detected
94189-02E	Survey Location #6		None Detected
94189-03A	Survey Location #5 (Bathroom)	Vinyl Floor Tiles, Blue, 12”x12”	None Detected
94189-03B			None Detected
94189-03C			None Detected
94189-04A	Survey Location #7	Vinyl Sheet Flooring	None Detected
94189-04B			None Detected
94189-04C			None Detected

3.3.1 Friable Asbestos Materials

Friable asbestos materials were neither observed in the building, nor suspected of being present, during the site visit.

3.3.2 Non-Friable Asbestos Materials

Asphaltic roofing materials and window caulking are both non-friable suspected asbestos-containing materials. These materials were not sampled to avoid the risk of leakage through the roof or around the window assemblies.

3.3.3 Non-Asbestos Materials

Bulk sampling and subsequent laboratory analysis has demonstrated that the following building materials do not contain regulated concentrations of asbestos:

- Vinyl Floor Tiles (all applications);
- Vinyl Sheet Flooring; and,
- Drywall Joint Compound.

Based upon visual observations, DST was also able to identify the following building materials as non-asbestos:

- Lay-in acoustic ceiling tiles (fiberglass); and,

- Attic insulation (fiberglass batts).

3.4 Benzene

Benzene was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.5 Coke Oven Emissions

Coke Oven Emissions were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.6 Ethylene Oxide

Ethylene Oxide was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.7 Isocyanates

Isocyanates were neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.8 Lead

Three (3) representative paint finishes in total were sampled from the building and submitted for lead content analysis. The sample descriptions and analytical results are summarized in the following table.

Table 2: Summary of Paint Chip Samples Analyzed for Lead

Sample I.D.	Sample Location	Paint Description	Lead (ppm)
94189-LP-01	Survey Location #1	White, Drywall Ceiling	<50
94189-LP-02	Survey Location #4	Beige, Drywall Walls	<50
94189-LP-03	**Exterior**	**Black, Wood Skirt**	**2,140**

Both of the interior paint chip samples collected and analyzed contained lead concentrations below the 600 ppm maximum limit recently established by the Federal Hazardous Products Act. Based upon these results, the interior paints are not considered to be lead-based paints.

The paint chip sample collected from the black wood skirt around the base of the building exterior had a lead concentration in excess of the 600 ppm limit recently established by the Federal Hazardous Products Act. This is a lead-based paint. This black paint was noted to generally be in GOOD condition, although a small quantity (e.g. approximately 10 ft^2) was rated in POOR condition as it was peeling and delaminating from its wood substrate.

Based upon the historic composition of building materials, lead is also expected to be present in the solder on the joints of copper piping.

3.9 Mercury

Fluorescent light tubes contain a single droplet of mercury which vaporizes when the tube is energized.

No other suspected sources of mercury were observed during the site visit.

3.10 Silica

Silica is present in concrete building elements.

3.11 Vinyl Chloride

Vinyl Chloride was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.12 Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs), also known as Chlorobiphenyls, are hazardous chemicals which were used in the manufacturing of a variety of equipment, such as electrical equipment, heat exchangers, hydraulic systems, and for several other specialized applications. PCBs are commonly found within electrical ballasts manufactured prior to 1981, found within fluorescent light fixtures and high intensity discharge lamps.

Light fixtures with T12 lamps are more likely to contain ballasts that were manufactured prior to 1981. T8 lamps are associated with light fixtures that were manufactured after the phase-out of PCB-containing ballasts. The letter “T” denotes the shape of the light fixture (e.g. tubular) and the number which follows indicates the diameter in eights of an inch.

Fluorescent light fixtures observed throughout the building had T12 lamps and are therefore suspected to contain PCB ballasts.

No other materials suspected of containing PCBs were identified within the building.

3.13 Ozone-Depleting Substances (ODSs)

Ozone depleting substances (ODSs) include a variety of chlorofluorocarbon (CFC) and bromine (halon) gases which have been shown to contribute to the destruction of the earth’s stratospheric ozone layer, and contribute to global warming. Direct exposure to some ODSs such as halon is a health hazard as well. ODSs are commonly used as refrigerants in a variety of equipment and, and in fire suppression systems.

ODSs are suspected in the following equipment:

- Window mounted air conditioners;
- Refrigerators; and,
- Water coolers.

None of this equipment is considered to be part of the building structure or its finishes.

No other ODS-containing equipment was identified within the building.

3.14 Fecal Waste

Fecal waste was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.15 Mould

Mould was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.16 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was neither observed in the building, nor suspected of being present, in forms or quantities that would either impact future work or pose risks to human health or the environment.

3.17 Radioactive Smoke Detectors

Smoke detectors were not observed in the building.

3.18 Other Hazardous Materials

No other Hazardous Materials were either observed in the building, or suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment.

4.0 CONCLUSIONS AND RECOMMENDATIONS

DST Consulting Engineers Inc. (DST) was retained by the to perform a Designated Substance Survey (DSS) of the Shop located in Ottawa, Ontario.

The site visit was performed by DST on August 21, 2009. The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present in forms or quantities that would either impact future work or pose risks to human health or the environment:

- Acrylonitrile;
- Arsenic;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride;
- Fecal Waste (e.g. animal feces, bird and bat guano, etc.);
- Mould;
- Urea Formaldehyde Foam Insulation (UFFI);
- Radioactive Smoke Detectors; and,
- Other hazardous materials, as viewed pertinent by the consultant.

4.1 Asbestos

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O.Reg. 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations* enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter 0.1)*. This regulation classifies all asbestos disturbance as either Type 1, Type 2, or Type 3, each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition. The Ontario Ministry of Labour (MOL) must be notified of any project involving removal of more than a minor amount (e.g. typically 1 m^2) of friable asbestos material.

Asphaltic roofing materials and window caulking are both non-friable suspected asbestos-containing materials. These materials were not sampled to avoid the risk of leakage through the roof or around the window assemblies.

These materials, even if they do contain regulated concentrations of asbestos, represent only a *de minimis* risk to human health or the environment in their present state as both are the type of material that does not readily release significant concentrations of asbestos fibres even when subjected to construction disturbances.

No remedial action is required for the ACM-suspect asphaltic roofing materials and window caulking as both were observed to be in GOOD condition. However, DST recommends that both materials be sampled for asbestos content prior to any major construction disturbance. If the analysis demonstrates that these materials contain asbestos, they can be removed as a Type 1 asbestos operation in accordance with the work procedures outlined in O.Reg 278/05.

4.2 Lead

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbance as either Type 1, Type 2a, Type 2b or Type 3 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 would serve as a reasonable, peer reviewed standard for work procedures.

The black paint on the wood skirt around the base of the building exterior had a lead concentration of 2,140 ppm, which classifies it as a lead-based paint. This black paint was noted to generally be in GOOD condition, although a small quantity (e.g. approximately 10 ft^2) was rated in POOR condition as it was peeling and delaminating from its wood substrate. Paint chips with elevated concentrations of lead can pose a health risk to humans if ingested. Paint chips 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 on the building. DST recommends removal of the loose, delaminating, flaking areas of black exterior paint (leaving any areas still exhibiting a good bond intact and undisturbed). The remaining lead paint can then be encapsulated with a layer of non-lead paint.

Based upon the historic composition of building materials, lead is also expected to be present in the solder on the joints of copper piping.

If required at some future date to accommodate renovation, demolition or maintenance work, the copper piping can be cut a small distance (e.g. 50 mm) from the joints to avoid direct disturbance of the lead solder. Disposal of the solder is not problematic since there is a mature market for recycled metals.

4.3 Mercury

There are no regulations that specifically govern the disturbance of mercury on construction projects. However, the Occupational Health and Safety Division of the Ontario Ministry of Labour has published *The Safe Handling of Mercury: A Guide for the Construction Industry*. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills. In the absence of specific legislation for mercury on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Fluorescent light tubes contain a single droplet of mercury which vapourizes when the tube is energized. No other suspected sources of mercury were observed during the site visit.

When removal of the fluorescent light tubes is required, the tubes should be removed intact from the fixtures. This prevents worker exposure to mercury vapour, particularly if the tubes were energized shortly before removal.

It is now common practise to recycle fluorescent light tubes, recovering the component materials, and avoiding the generation of hazardous waste.

4.4 Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour has published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbance as either Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for silica on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

Silica is present in concrete building elements. No remedial work is required at the present time.

Dust control procedures, which are typical of any well executed demolition project, are usually sufficient to control airborne silica levels. 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 to silica.

4.5 Polychlorinated Biphenyls (PCBs)

Fluorescent light fixtures observed throughout the building had T12 lamps and are therefore suspected to contain PCB ballasts.

In Canada revised federal PCB Regulations came into force in September 2008. The Regulations impose deadlines on the elimination of all PCBs and PCB-containing material

currently in storage, and requires all other PCBs to be phased out. In general, the end-of-use deadlines imposed by this new regulation are as follows:

- December 31, 2009, all equipment containing PCBs in a concentration of 500 parts per million (ppm) or more (excluding pole-mounted equipment and light ballasts).
- December 31, 2009, all equipment containing PCBs in a concentration of 50 ppm or more at any sensitive location, including within 100 metres of drinking water treatment plants, food and feed processing plants, child care facilities, preschool, primary and secondary schools, hospitals, and senior citizen care facilities (excluding pole-mounted equipment and light ballasts).
- December 31, 2025, all equipment containing PCBs in a concentration of 50 ppm or more (including pole-mounted equipment and light ballasts).

In general terms, the steps for compliance are as follows:

- Survey of PCB-containing equipment, waste, etc. if none is available.
- Testing of equipment for which PCB content cannot be readily, visually identified.
- PCB Management Plan to ensure implementation of the federal PCB Regulation.

No other materials suspected of containing PCBs were identified within the building.

4.6 Ozone-Depleting Substances (ODSs)

The handling, transport and disposal of ODSs are governed by the following regulations under the Canadian Environmental Protection Act (CEPA), 1999:

- Ozone-depleting Substances Regulations, 1998; and
- Federal Halocarbon Regulations, 2003.

ODSs are suspected in the following equipment:

- Window mounted air conditioners;
- Refrigerators; and,
- Water coolers.

None of this equipment is considered to be part of the building structure or its finishes.

When these units are taken out of service, the ODS refrigerants must be captured and reclaimed by a licensed technician.

No other ODS-containing equipment was identified within the building.

5.0 LIMITATIONS OF REPORT

This report is intended for client use only. 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 asbestos bulk sampling, paint chip sampling, and microbial sampling in select representative areas for laboratory analysis. 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. DST is not in a position to evaluate the health risks associated with exposure to the mould and/or mites referenced in this report. Since human reactions to mould exposure vary widely amongst individuals, and specific segments of the population are generally recognized to be more susceptible than others, an evaluation of health risks can only be made on an individual basis and even then, only by a licensed medical practitioner equipped with knowledge of the individual's medical history.

Any use of this report by the client and any other party is contingent upon their understanding and acceptance of the following condition:

"Mould is a naturally occurring substance and regardless of the results of an assessment or how completely it is removed, it could reoccur."

Regardless of the effectiveness of any remedial actions, mould growth may occur/reoccur anywhere within a building at any time, should conditions be favourable. It is therefore essential to maintain buildings, surfaces, appliances and furnishings under conditions which are not favourable to mould incubation and growth (warm, dry, and clean). The scope of services provided by DST for this assignment did not include a detailed evaluation of the thermal and moisture management characteristics of the exterior wall assembly, or a detailed building envelope investigation to ascertain every potential root cause of the water infiltration that created an environment favourable to mould proliferation. Similarly, DST has not been engaged to provide detailed designs for the reinstatement of building finishes or for improvements to the building envelope.

Note also that standards, guidelines and practices related to mould 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.

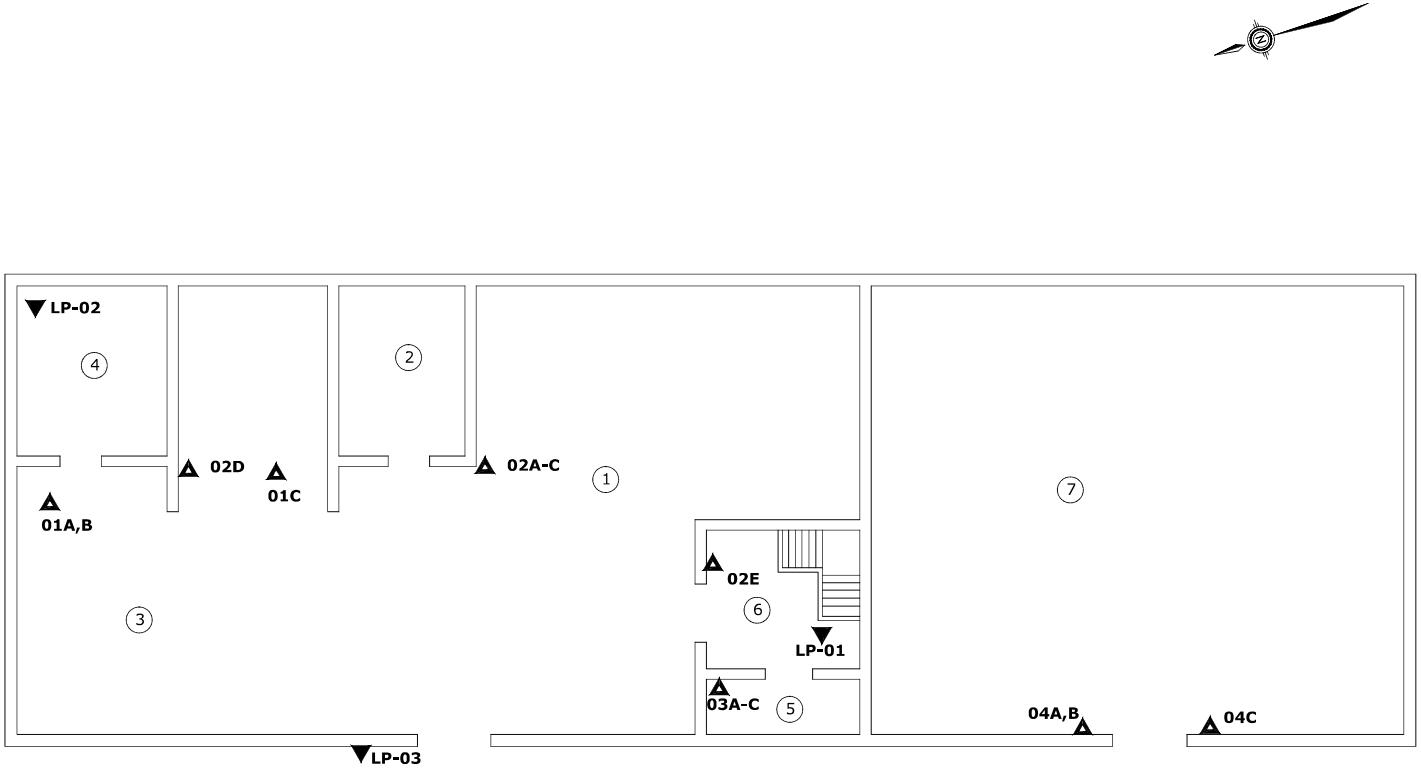
6.0 CLOSURE

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.

Maurice Graveline, P.Eng.
Principal
mgraveline@dstgroup.com

Appendix A
Floor Plans



DST CONSULTING ENGINEERS
2150 THURSTON DRIVE, SUITE 203
OTTAWA, ONTARIO, K1G 5T9
TEL (613) 748-1415 FAX (613) 748-1356
www.dstgroup.com

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ASSOCIATED TECHNICAL REPORT.
2. DO NOT SCALE DRAWING.
3. ALL SAMPLE IDENTIFIERS ARE PREFIXED WITH THE BUILDING ASSET NUMBER WHICH WAS LEFT OUT FOR DRAWING CLARITY.

LEGEND:

- 01A-C — APPROXIMATE ASBESTOS SAMPLE LOCATION, AS APPLICABLE
- LP-01 — APPROXIMATE PAINT SAMPLE LOCATION, LEAD TESTING (LP-#), AS APPLICABLE
- 1 — SURVEY LOCATION REFERENCE

REV	DATE	ISSUE	APPROVAL
0	13/05/10	ORIGINAL	M.G.

PROJECT TITLE

DESIGNATED SUBSTANCE SURVEY

DRAWING TITLE

SAMPLE LOCATION PLAN
SHOP

GROUND FLOOR

DESIGNED BY M.A.	SCALE NTS
DRAWN BY V.C.	DATE May 2010
APPROVED BY M.G.	PROJECT NO.: BE-OT-010540

FIGURE 1

Appendix B
Laboratory Certificates of Analysis – Bulk Asbestos

SOLUTIONS
FOR A WORKING WORLD

CERTIFICATE OF ANALYSIS

Company:	DST Consulting Engineers Inc.	**Report Date:**	26-Aug-09
Contact:	Mr. Marc Acouri	**Analysis Date:**	26-Aug-09
Client Address:	2150 Thurston Drive, Suite 203, OTTAWA, ON	**Received Date:**	24-Aug-09
Client Reference:	BEOT010540	**LEX Project Number:**	08092699
Sampling Date:	21-Aug-09	**Number of Analyses:**	14

Analysis Requested **Bulk Asbestos by PLM**

Analysis was performed in accordance with the method EPA/600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials adopted in Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Health and Safety Act Ontario Regulation 278/05. LEX Scientific Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP 101949) by the National Institute of Standards and Technology for analysis of bulk materials for asbestos.

German Leal, B.Sc.
Laboratory Manager

				Fibrous Asbestos Content %		**Other Materials Content %**	
Client Sample:	94189-01A	**Asbestos Detected?**	**No**				
LEX Sample:	01		**Chrysotile:**	None Detected		**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized		**Amosite:**	None Detected		**MMVF:**	None Detected
Colour:	White/Yellow		**Crocidolite:**	None Detected		**Other Fibers:**	None Detected
Description:	12"x12" Vinyl Floor tiles (White)		**Other Amphiboles:**	None Detected		**Non Fibers:**	100
			Comments:				

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst Z. Samsewa

2 Quebec Street, Suite 204 Guelph, Ontario N1H 2T3
Phone: 519.824.7082 Fax: 519.824.5784 Toll Free: 1.800.824.7082
e-mail: admin@lexscientific.com Website: www.lexscientific.com

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	94189-01B	**Asbestos Detected?**	**No**		
LEX Sample:	02	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Yellow	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12"x12" Vinyl Floor tiles (White)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-01C	**Asbestos Detected?**	**No**		
LEX Sample:	03	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Yellow	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12"x12" Vinyl Floor tiles (White)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-02A	**Asbestos Detected?**	**No**		
LEX Sample:	04	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Pink	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-02B	**Asbestos Detected?**	**No**		
LEX Sample:	05	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Pink	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-02C	**Asbestos Detected?**	**No**		
LEX Sample:	06	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	94189-02D	**Asbestos Detected?**	**No**		
LEX Sample:	07	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-02E	**Asbestos Detected?**	**No**		
LEX Sample:	08	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	White/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Drywall joint compound	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-03A	**Asbestos Detected?**	**No**		
LEX Sample:	09	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Blue/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12"x12" Vinyl floor tiles (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-03B	**Asbestos Detected?**	**No**		
LEX Sample:	10	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Blue/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12"x12" Vinyl floor tiles (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-03C	**Asbestos Detected?**	**No**		
LEX Sample:	11	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Blue/Brown	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	12"x12" Vinyl floor tiles (Blue)	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Z. Samsewa

Analyst _____

LEX SCIENTIFIC INC.

			Fibrous Asbestos Content %		Other Materials Content %
Client Sample:	94189-04A	**Asbestos Detected?**	**No**		
LEX Sample:	12	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Beige/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-04B	**Asbestos Detected?**	**No**		
LEX Sample:	13	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Beige/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			
Client Sample:	94189-04C	**Asbestos Detected?**	**No**		
LEX Sample:	14	**Chrysotile:**	None Detected	**Cellulose:**	None Detected
Layers Analyzed:	Sample Homogenized	**Amosite:**	None Detected	**MMVF:**	None Detected
Colour:	Beige/Grey	**Crocidolite:**	None Detected	**Other Fibers:**	None Detected
Description:	Vinyl sheet flooring	**Other Amphiboles:**	None Detected	**Non Fibers:**	100
		Comments:			

Other Amphiboles: ac=actinolite, a=anthophyllite, t-tremolite, u=unidentified
MMVF: Man Made Vitreous Fibers: Fiberglass, Min. Wool, Rockwool, Glasswool
PLM - method detection limit is 0.1%

Analyst Z. Samsewa

Appendix C
Laboratory Certificates of Analysis – Paint Chips

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com
OTTAWA • NIAGARA FALLS • MISSISSAUGA • SARNIA

Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)
203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Marc Acouri

Phone: (613) 748-1415
Fax: (613) 748-1356

Client PO:
Project: BE OT 010540
Custody: 61869

Report Date: 25-Aug-2009
Order Date: 21-Aug-2009
Order #: 0934255

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

Paracel ID	Client ID
0934255-01	94189-LP-01
0934255-02	94189-LP-02
0934255-03	94189-LP-03

Approved

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

PARACEL LABORATORIES LTD

Order #: 0934255

Certificate of Analysis

Report Date: 25-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals	EPA 6020 - Digestion, ICP-MS	24-Aug-09	24-Aug-09

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

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

PARACEL LABORATORIES LTD

Order #: 0934255

Certificate of Analysis

Report Date: 25-Aug-2009
Order Date:21-Aug-2009

Client: **DST Consulting Engineers Inc. (Ottawa)**
Client PO: Project Description: BE OT 010540

Sample Results

Lead

Matrix: Paint
Sample Date: 21-Aug-09

Paracel ID	Client ID	Units	MDL	Result
0934255-01	94189-LP-01	ug/g	50	<50
0934255-02	94189-LP-02	ug/g	50	<50
0934255-03	94189-LP-03	ug/g	50	2140

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	50	ug/g						
Matrix Duplicate									
Lead	ND	50	ug/g	ND				44	
Matrix Spike									
Lead	109		ug/L	68.4	81.1	80-120			

PARACEL LABORATORIES LTD.

TRUSTED. RESPONSIVE. RELIABLE.

OTTAWA ⊙ NIAGARA FALLS ⊙ MISSISSAUGA ⊙ SARNIA

300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8

p: 1-800-749-1947
e: paracel@paracellabs.com

www.paracellabs.com

Chain of Custody Record
№ 61869

Pg. ___ of ___

Company Name: DST Consulting Engineers
Contact Name: Marc Acour
Address: 2150 Thurston Drive, Ottawa, ON
Tel: 613-748-1415 Cell:
Email: macour@dstgroup.com

Project Ref: BEOT010540
PO#
Quote # ☐Not Quoted
Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: | 1-day | 2-day | ✓Regular
Regulatory/Guideline Requirements

Matrix Types: S-Soil/Sed GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Sample Information						Analysis Required													
Paracel Order # 0934255	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	Lead in paint													Hazardous? (Y/N)
1	94189-LP-01				21/08/09	X													
2	94189-LP-02				21/08/09	X													
3	94189-LP-03				21/08/09	X													
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Relinquished By: Marc Acour	Received at Depot:	Received at Lab:	Verified By:
Date: August 21, 09 Time: 3:09pm	Date: Time:	Date: Aug 24/09 Time: 3:10	Date: Aug 24/09 Time: 4:41

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

WHITE - Lab Copy, PINK - Client Copy

Appendix D
Selected Photographs

Photo 1: Exterior view of the Shop. Asphaltic roofing materials and window caulking are both non-friable suspected ACMs.

Photo 2: Vinyl floor tiles in Survey Location #3 have been tested (Samples 94189-01A-C) and confirmed to contain no asbestos.

Photo 3: Vinyl floor tiles in Survey Location #5 (Bathroom) have been tested (Samples 94189-03A-C) and confirmed to contain no asbestos.

Photo 4: Vinyl sheet flooring in Survey Location #7 has been tested (Samples 94189-04A-C) and confirmed to contain no asbestos.

Photo 5: The exterior black paint (Sample 94189-LP-03) on the wood skirts at the base of the building's exterior contains 2,140 ppm lead. This is classified as a lead-based paint. The concrete corner slabs will contain silica.

Photo 6: Typical fluorescent light fixture. The T12 lamps will contain liquid mercury which vapourizes when the lamp is energized. The fixture may contain a PCB ballast. White ceiling paint and beige wall paint have both been tested and confirmed to contain <50 ppm lead.

Photo 7: Typical water cooler will contain an ODS-suspect refrigerant. Refrigerators and window mounted air conditioners will also contain ODS-suspect refrigerants. None of this equipment is an integral part of the building structure or its finishes.

APPENDIX 2

Geotechnical Investigation, Operations Zone; April 2013
Decommissioning Consulting Services Limited

GEOTECHNICAL INVESTIGATION
OPERATIONS ZONE

OTTAWA, ONTARIO

Prepared by:

DECOMMISSIONING CONSULTING SERVICES LIMITED
260 Hearst Way, Suite 512
Ottawa, Ontario K2L 3H1
CANADA

Tel: (613) 230-2405
Fax: (613) 230-1403
E-Mail: engineers@dcsltd.ca
Web Page: www.dcsltd.ca

April 2013

450181

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS
(Continued)

PAGE

LIST OF TABLES

ON PAGE

LIST OF FIGURES/DRAWINGS

AT REAR OF REPORT

LIST OF APPENDICES

AT REAR OF REPORT

1.0 INTRODUCTION

Decommissioning Consulting Services Limited (DCS) was retained to complete a geotechnical investigation at the Operations Zone, in the City of Ottawa, Ontario ('subject property').

The purpose of the geotechnical investigation was to determine subsurface soil conditions and bedrock depths at the property in advance of proposed building foundation construction. The scope of work also included providing general comments to guide proposed design and construction for the subsurface elements of the proposed structure(s).

For the purposes of this geotechnical investigation and report, the project area of interest was delineated into seven specified project zones outlined in the site plan.
DCS understood that Zone 1 referred to the existing site offices; Zone 2 to an exterior asphalt-paved surface; Zone 3 to the one storey vehicle garage; Zone 4 to the location ; ——— to the exterior asphalt paved surface; Zone 6 to the shop and Zone 7 to an exterior asphalt-paved surface.

Based on this site plan, twelve boreholes were advanced on 6, 7 and 8 March 2013 to provide overall coverage of the area of interest. One borehole in Zone 2 was advanced within the interior of an existing storage garage structure due to the presence of underground services beneath paved areas adjacent to the garage. Nine boreholes were advanced using a truck-mounted CME-55 drill rig, while three boreholes were advanced using a Pionjar-type hammer drill method with split spoon sampling.

The geotechnical boreholes were typically sampled continuously to bedrock using a split spoon sampler in conjunction with Standard Penetration Testing (SPT) with a combination of hollow-stem and solid stem auger methodology.

In advance of the field work, DCS provided copies of our site-specific Health and Safety Plan, dated 13 February 2013. DCS also prepared and issued to the Quality Control Plan, the Work Plan for the proposed investigation, and our Records Management Plan (in English only) as well as our Configuration Management Plan (dated 26 February 2013), Risk Management Log (dated 4 March 2013) and the Conflict Management Issues Log (dated 27 February 2013).

No risk issues arose, other than the need to add a borehole (BH13-13). This borehole addition occurred during the field work which caused the need to call the underground service locator back and incur drill rig standby time during the re-clearance of underground services.

2.0 SITE CONDITIONS

The subject property is at the "Operations Zone", Ottawa.
The study area is accessed by vehicle from the Princess Avenue gate. The project area of interest is located in the Operations section at the south end of the grounds.

Old buildings currently exist on the property.
The buildings and construction dates vary considerably. Various sections of this area are covered with asphalt, grass and several mature trees. There are asphalt roadways and parking lots in the subject area. The paved area to the west of the large office was found to have an average ground surface elevation of 63.6 m geodetic. The paved parking area to the east of the office was raised in grade with an average ground surface elevation of 65.3 m geodetic. A short retaining wall exists between the office and the garage with steps to accommodate the grade separation.

Surface drainage is directed to the on-site catch basins or nearby roadway or permitted to infiltrate into the surrounding lawn areas.

For an indication of site conditions, refer to the Site Plans at the rear of the report and Site Photographs in Appendix B.

3.0 PREVIOUS INVESTIGATIONS

Two previous geotechnical reports completed in the general vicinity of the study zones. The reports are listed as follows:

2. Draft Geotechnical Investigation Report, Expansion of the Octagonal Building, Ottawa, Ontario by Stantec Limited- dated 10 June 2009.

2009 Draft Geotechnical Investigation

The June 2009 investigation was undertaken immediately to the north of the current area under investigation for the extension to the north building. The extension was to consist of an octagonal-shaped building of 40 m^2 footprint founded on strip footings.

The 2009 field investigation consisted of the advancement of four boreholes inside the proposed building footprint and two in the area of proposed roadway works. The geotechnical investigation was advanced by a portable tripod drill unit. Bedrock was cored in two locations using 50mm thin wall coring equipment. One monitoring well was installed.

Four of the boreholes were advanced to an average depth of 1.3 m below grade based on split-spoon refusal while two boreholes included rock coring and were advanced to an average of 5.8 m below grade. One monitoring well was installed into one of the cored holes with an invert depth of 5.75 m.

Based on split spoon refusal, shallow limestone bedrock was inferred to have been encountered in all six boreholes. The two boreholes advanced by coring showed an average bedrock depth of 2.7 mbgs. The shallow bedrock was overlain by either pavement or topsoil with underlying fill consisting of silty sand with gravel. The groundwater was measured at a static level of 2.4 m below grade.

Laboratory testing consisted of grain-size and moisture content analysis as well as two samples submitted for corrosivity testing. The report provided recommendations for conventional footings placed directly on rock.
Two samples from the limestone were submitted for unconfined compressive strength testing, with an average result of 157 MPa.

4.0 FIELD INVESTIGATION

4.1 PREPARATORY WORK

Prior to commencing the field work, a reconnaissance of the subject property was completed on 25 February 2013 by DCS to become familiar with site conditions and to lay out the boreholes. Borehole locations were selected to provide general coverage of areas of the site under investigation and that were accessible to the truck-mounted drill rig.

The locations of the boreholes drilled as part of the geotechnical investigation were determined to be free of interference with underground utilities using Ontario One Call and the services of USL-1 underground service locators of Ottawa.
Utility clearance operations were completed on 6 March 2013.
The density of underground utilities in various locations in the study area was quite high causing several proposed borehole locations to be moved or simply deleted from the program as no safe drilling location could be found. Thus, there is no borehole BH13-8 shown on the site plan as this location could not be advanced off the east side of the large office building due to the presence of numerous underground utilities. One borehole, BH13-9, was advanced through the floor of the shed as no nearby exterior locations were deemed to be free of underground utilities.

The boreholes were laid out in the field by DCS staff, at the locations shown on Drawing 450181-1, with reference to topographic features such as existing fence lines, walls, building, etc. DCS staff obtained GPS measurements at the each of the borehole locations.

4.2 FIELD WORK

Drilling of the recent geotechnical boreholes took place between March 6 and 8, 2013 as contracted to G. Downing Estate Drilling (Hawkesbury, Ontario), under the full time supervision of DCS field staff.

Sampling in nine of the geotechnical boreholes was carried out on a continuous basis using a standard split spoon sampler in conjunction with the Standard Penetration Testing (SPT) and using a Pionjar vibratory drill in the other three boreholes. Soil samples were secured using a 50 mm diameter split-spoon sampler within the boreholes. The split-spoon samples were logged on site and placed into sealed plastic bags. All samples were transported to our laboratory for further review. In total, twelve boreholes were advanced at the subject property. No groundwater wells were installed due to insufficient water in the overburden. Office logs of the boreholes are provided in Appendix A.

One borehole was advanced as an interior borehole through the floor of the shed (BH13-9). This location was cored first prior to Pionjar-type hammer drilling and split spoon sampling to evaluate subsurface soil conditions.

All boreholes were backfilled using soil cuttings (if any) in addition to bentonite hole plug. All boreholes advanced through the asphalt pavement were replaced with asphalt patch at the conclusion of the drilling program.

Where conducted, the Standard Penetration Tests (SPTs) were conducted in conjunction with the split spoon sampling and were recorded as 'N' values on the borehole logs. The 'N' value refers to the number of blows required to drive a split-spoon sampler 300 mm into the soil after an initial 150mm penetration using a 63.5 kg hammer falling from a height of 760 mm.

All soil samples will be stored in the DCS laboratory for a period of 60 days after issuance of the final report. The samples will be discarded following the 60 day period unless DCS is otherwise directed.

DCS noted that the ground topography was generally flat. Ground surface elevations for the boreholes were surveyed by DCS staff relative to a local benchmark.
The measured ground surface elevations are listed
on the individual borehole logs. The GPS coordinates for the completed borehole locations are shown below:

TABLE 4.1
GPS LOCATIONS AND ELEVATIONS OF BOREHOLES

BOREHOLE	GPS COORDINATES	GROUND ELEVATION (m)
BH-1	N 45.44525, W 75.68403	64.056
BH-2	N 45.44513, W 75.68418	63.999
BH-3	N 45.44517, W 75.68394	64.148
BH-4	N 45.44501, W 75.68399	63.966
BH-5	N 45.44489, W 75.68405	64.019
BH-6	N 45.44491, W 75.68370	65.255
BH-7	N 45.44512, W 75.68362	65.469
BH-8	Not advanced due to utility conflicts	
BH-9 (inside)	N 45.44520, W 75.68353	65.232
BH-10	N 45.44525, W 75.68384	64.062
BH-11	N 45.44526, W 75.68391	64.301
BH-12	N 45.44483, W 75.68344	65.237
BH-13	N 45.44538, W 75.68399	64.10

One soil sample (BH-3-3-2) was selected for purposes of laboratory testing to determine the concentration of sulphate, chloride, resistivity and pH of the native soil, as outlined in Section 4.4.2 below. A rock core sample was submitted for compressive strength testing from BH-3. Laboratory analytical results are found in Appendix C.

4.3 SUMMARIZED SUBSURFACE CONDITIONS

The borehole locations were selected to obtain an overall coverage of the subject property.

A summary of subsurface conditions encountered in the boreholes is provided in the following paragraphs. The reader is cautioned that conditions between and beyond boreholes may vary.

The subject property is located in the physiographic region known as the St-Lawrence Lowlands, as delineated in *The Atlas of Canada* (Natural Resources Canada, atlas.gc.ca, 2006 – Canada Physiographic Regions Map). The Lowlands are characterized by plain-like areas. They were affected by the Pleistocene Glaciation and the subsequent Champlain Sea which was fed by the retreating glaciers. They are covered by surficial deposits, consisting mostly of pulverised rock and other fine material, and features associated with glaciers.

The generalized bedrock geology was referenced from the Geological Survey of Canada, Map 1508A for Ottawa-Hull. According to the mapping information provided, the bedrock at the subject property is the Ottawa formation comprising limestone with some shaly partings and some sandstone in the basal part. The extreme southwest corner of the property is characterized as the Eastview bedrock formation comprising dark grey almost black limestone.

Quaternary sediments and surficial geology were referenced from the Geological Survey of Canada, Map 1506A for Ottawa and portrayed the majority of the site as characterized by a Champlain Sea till plain with local relief of less than 5 m. Exposed bedrock escarpments are shown to the northwest of the Operations Zone.
Adjacent to the study area, there was also reference to abandoned drainage channels running in a southeast direction.

Based on the presence of the bedrock outcrops to the north, shallow groundwater flows are expected to flow in a southeast direction, eventually draining in the direction of the Ottawa River. The overall groundwater regime is expected to flow northeasterly towards the Ottawa River. Historic borehole and water well records were not referenced for purposes of the current project.

On site grading is generally flat aside from a small exposed bedrock knoll to the south of the heating plant. Exposed bedrock was observed in the north crawlspace basement of the site office. It appears that site grades were raised by approximately 1.5 m on the east side of the office. It was reported by local staff that blasting of bedrock was required to install underground services and sewer structures.

4.3.1 Fill Soils

4.3.1.1 *Asphalt*

An asphalt surface was encountered in all boreholes aside from BH13-1, BH 13-9 (interior location), BH 13-12 and BH13-13. The asphalt layer had an approximate thickness of 50 mm. The asphalt layer was typically found over top of a grey sandy gravel fill layer which in many cases was then underlain by a grey silty sand with gravel.

4.3.1.2 *Topsoil*

A frozen layer of topsoil was encountered in borehole BH13-12. This layer extended to depths ranging from grade to 0.6 m below existing grade. This layer was described as dark brown to black, with occasional rootlets, and occasional trace brown brick.

The moisture content of the sample from this layer was 35%, indicating a saturated condition which was partially caused by the ice and snow cover present at the time of drilling. No Standard Penetration Test "N" values were obtained for this material.

4.3.1.3 *Sand to Gravelly Sand*

A grey sand layer, with gravel, was encountered beneath asphalt. A gravel fill overlying a sand fill was encountered at BH13-1. The grey sand was often found to be in combination with a black or brown colouring. Occasional cobbles were found in this layer. This stratum was noted to be damp and heterogeneous. In some instances, a trace of wood was encountered in the sand fill (in BH13-4 and BH13-13) or brick (in BH13-5, BH13-10 and BH13-12). Trace ash fill was encountered in BH13-10.

Moisture contents ranged from 4 to 14%, indicating a dry to moist condition. Standard Penetration Test "N" values indicated relative density of the sand ranged from dense to compact.

4.3.2 Native Soils

4.3.2.1 *Sand to Gravelly Sand*

A uniform light brown to brown, medium to coarse sand material was encountered at the subject property. This stratum was encountered in all boreholes (except BH 13-4, 13-7 and 13-4) and was encountered at a minimum depth of 0.15 m and extended to a maximum depth of 2.77 m below grade. Moisture contents in this unit ranged from 4 to 21%, indicating a dry to very moist

condition. Standard Penetration Test "N" values indicated the relative density of the sand layer ranged from loose to compact.

4.3.2.2 *Till*

A grey native till material was encountered at the subject property within boreholes BH13-2, 13-7, 13-10, and 13-11. This deposit was described as grey, damp, with a medium to fine sand, some silt, gravel and cobbles, and homogeneous. The till was encountered beneath native sands at depths ranging between 0.91 m to 2.74 mbgs.

Standard Penetration Testing indicated a state of relative density that ranged from loose to very dense (50 blows per 50mm); the latter likely as a result of encountering cobble or large gravel within the till stratum. Moisture contents ranged from 4 to 6%, indicating a generally dry to only slightly moist condition.

4.3.2.3 *Bedrock*

Inferred limestone bedrock was encountered at typical elevations between 61.286 to 63.887 m or at an average of 2.1 m below grade. The inferred presence of boulders and cobbles in the overburden made verification of the bedrock depths in some borehole locations difficult due to refusal during split spoon penetration testing. The table below lists the inferred bedrock surface depths at the site:

TABLE 4.2
INFERRED BEDROCK SURFACE DEPTHS

Borehole	Depth below Grade	Bedrock Elevation
BH 13-1	2.77 m	61.286 m
BH 13-2	2.64 m	61.359 m
BH 13-3	2.18 m	61.968 m
BH 13-4	1.83 m	62.136 m
BH 13-5	2.54 m	61.479 m
BH 13-6	1.57 m	63.685 m
BH 13-7	1.65 m	63.819 m
BH 13-9	1.83 m	63.402 m
BH-13-10	2.72 m	61.342 m
BH-13-11	2.92 m	61.381 m

BH 13-12	1.35 m	63.887 m
BH 13-13	1.83 m	62.27 m

The depth to bedrock was proven at three locations (BH13-2, 13-3, and 13-10). Rock Quality Designation (RQD) ratings ranged from 14 to 47% indicating very poor to poor rock mass quality. The recovered rock cores consisted of grey limestone with horizontal dark grey shale partings in some instances. The rock condition ranged from slightly weathered to un-weathered with depth. Joint spacings ranged from very close to close with a dipping orientation being typically flat, ranging from 0 to 20 degrees from horizontal.

4.4 LABORATORY TESTING

4.4.1 Corrosivity Testing

One soil sample was selected (BH 13-3 sample 3-2 native sand sample (from 1.52 - 1.83 m depth)) for purposes of laboratory testing to determine the corrosivity of the native soil. The sample was tested at Exova Laboratories of Ottawa. The results of analytical testing on soil are shown below:

TABLE 4.3
CORROSIVITY TEST RESULTS

Sample BH 13-3 sample 3-2 (1.52 - 1.83 mbgs)	
Parameter	Concentration
pH	8.8
Resistivity	4170 Ohm-cm
Chloride	< 5 mg/L
Sulphate	10 mg/L
Electrical Conductivity	0.24 mS/cm

The findings of the laboratory corrosivity testing are discussed in Section 4.11 below.

4.4.2 Bedrock Strength Testing

Unconfined compressive strength testing was carried out on one sample of intact rock by St. Lawrence Testing Co. Ltd. and found to have an unconfined compressive strength of 121 MPa, which is classified as very strong. DCS referenced the average unconfined compressive rock

strengths in the previous 2009 geotechnical investigation and found three samples to have an average of 157 MPa which is consistent with the results of the current investigation.

4.5 GROUNDWATER CONDITIONS

No groundwater monitoring wells were installed as part of the 2013 geotechnical investigation as no water accumulations were observed in any of the open boreholes.

It was noted that the 2009 Geotechnical investigation included the installation of one monitoring well (MW09-6) which was installed into one of the cored holes with an invert depth of 5.75 mbgs. The groundwater was measured at a static level of 2.4 m below grade which corresponded roughly to just above the elevation of the bedrock surface at 2.6 m bgs at this test location. It should be noted that fluctuations in groundwater levels can occur due to seasonal variations.

5.0 DISCUSSION

5.1 FOUNDATIONS

.

A sliding resistance for concrete foundations bearing on clean intact level bedrock may be calculated using an un-factored friction coefficient of 0.7.

5.1.1 Earthquake Response

Based on the presence of relatively shallow bedrock, there are no expected issues with respect to liquifaction or cyclic mobility as it relates to earthquake resistant design.

Shear Wave Velocity field testing was not conducted at the subject property as shallow bedrock was encountered. Shear Wave Velocity field testing is not conducted in conditions where the bedrock is less than 3m below grade, which is the case for the study area. The study area would be controlled by bedrock conditions and would likely have a V_{s30} greater than 760 m/s and fall under a "Class B" site classification. For the Ottawa area, a peak horizontal ground acceleration of 0.42 g and a design earthquake magnitude of 6.1 should be used in design, in accordance with the Ontario Building Code (2012) and the 2010 National Building Code of Canada (NBCC).

5.2 SITE PREPARATION

Should fill be imported for grading or beneath buildings, it should consist of clean imported granular materials, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the subject property. It should be placed in lifts no greater than 300 mm thickness. Fill placed beneath building areas should be compacted to at least 98% of its Standard Proctor maximum dry density (SPMDD).

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is not of concern. These materials should be spread in thin lifts and compacted by the tracks of construction spreading equipment to eliminate voids. If these materials are to be used to build up the subgrade level for building areas or zones to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Non-specified fill soil is not suitable for use as a backfill against foundation walls.

Foundation walls are to be backfilled with free-draining non frost susceptible granular materials, such as imported clean sand or OPSS Granular B Type I material. Excavated native sands would be suitable for foundation wall backfill, subject to inspection and approval.

Unless a slab-on-grade construction approach is chosen, a perimeter foundation structure is recommended. Perimeter damp-proofing is recommended for all basement walls.

5.3 TEMPORARY EXCAVATIONS

All excavations should conform to the requirements of O.Reg. 213/91 made under the Occupational Health and Safety Act.

Bedrock excavation may be required in order to provide for footings or to achieve design grades. As the site bedrock consists of a grey limestone with shale partings, the upper weathered materials (with very poor RQD values) possibly could be removed using heavy excavation equipment or with pneumatic hoe-ramming equiment. Line drilling may be required if deeper bedrock excavations are required. Contractors should review site conditions and make an independent decision regarding rock excavation techniques. Rock excavation contracts should include stipulations to limit vibration effects and requirements for preconstruction surveys and vibration monitoring if a significant depth of bedrock is to be removed.

Open cut excavations will encounter Type 3 fill and native sands or till soils classified as Type 2 soils to 2 m depth. As the bedrock depth averages 2.1 m below grade, excavations greater than this depth will not require sloping of excavation side walls. Slopes in excess of a 3 m height should be inspected on a periodic basis by competent geotechnical personnel to determine if the side slopes are exhibiting signs of failure.

Temporary shoring is not anticipated, however, DCS would be pleased to provide recommendations for temporary shoring design, if required. Excavation side slopes extending to a maximum depth of 3 m should be cut back at a 1H:1V or flatter slope angle.

Excavation materials should not be placed in stockpiles directly at the top of excavations. Heavy construction equipment should be kept away from excavation crests. Where trenches are to be constructed with steep or vertical side slopes, a trench box is recommended to protect construction personnel working therein. Trenching structures should conform to O. Reg. 213/91 and the current Material Specifications & Standard Detail Drawings from the City of Ottawa, Department of Infrastructure Services and Community Sustainability Infrastructure Services Branch (current revision); Drawing Detail No. S6, S7 and W17.

Pipe bedding and backfill materials should also conform to the current Material Specifications & Standard Detail Drawings from the City of Ottawa. Pipe bedding should be constructed with at

least 150 mm thickness of OPSS Granular A beneath sewer and water pipes. The bedding should not extend above the springline of the pipe. Cover material, from the springline to at least 300 mm above the obvert of pipe should also consist of OPSS Granular A. Bedding and cover materials are to be placed in a maximum 225 mm lift thickness and compacted to a minimum of 95% of the material's Standard Proctor Maximum Dry Density (SPMDD).

Excavation within 5 m of adjacent structures should be reviewed by a geotechnical engineer prior to commencing excavation activities.

5.4 SLABS-ON-GRADE

5.5 LATERAL EARTH PRESSURES & RETAINING WALLS

The fill materials currently at the subject property consist primarily of sands. Structural elements intended to resist lateral earth pressures generated by the fill soils on site may be designed using the following generic geotechnical parameters:

Unit Weight, kN/m^3	18.0
Coefficient of Active Earth Pressure, K_a	0.25
Coefficient of Passive Earth Pressure, K_p	3.0
Coefficient of Friction	30°

Recommended earth pressures are provided for imported materials in Table 5.1 below and are based on the assumption that a permanent horizontal back slope will be utilized behind a basement or any site retaining wall. The granular backfill must be provided within a wedge extending from the base of the wall at a 45° or smaller angle to the horizontal. If a smaller wedge is used, the coefficients of earth pressure for the soil materials outside of the wedge must be used for design purposes. To prevent hydrostatic pressure build-up, it is recommended that the basement or retaining wall backfill comprise free-draining granular materials which must be at least 0.9 m in width and be connected to a drain pipe system at the base of the wall. A geosynthetic drainage layer may also be applied.

TABLE 5.1
RECOMMENDED LATERAL EARTH PRESSURE PARAMETERS (STATIC CONDITIONS)

Parameter	OPSS Select Subgrade Materials (SSM)	OPSS Granular 'A'	OPSS Granular 'B'
Angle of Internal Friction, Φ'	30°	35°	32°
Unit Weight (kN/m^3)	20.5	22.8	21.2
Coefficient of Earth Pressure at Rest, K_o	0.50	0.43	0.47

Where backfilled areas will be beneath walkway pavement or sidewalks, the backfill should consist of OPSS Select Subgrade materials and placed in lifts no thicker than 300 mm and compacted using suitable equipment to at least 95% SPMDD. When working immediately adjacent to foundation walls, care should be taken to avoid over-compaction of the granular fill, which may result in damage to the foundation walls, through the use of suitable compaction equipment.

5.6 OBSTRUCTIONS

Obstructions, such as cobble and boulders, should be anticipated within the underlying native sand stratum at depths greater than 1.5 m below grade. Over-excavation may be required to remove large cobbles from the base or sidewalls of foundation excavations.

5.7 GROUNDWATER INFILTRATION DURING CONSTRUCTION

Based on the absence of groundwater in open boreholes and the review of previous geotechnical investigations, it is inferred that the depth to groundwater is roughly equivalent to the surface elevation of the shallow bedrock at an average depth of 2.1 m below grade.

Any excavations approaching depths greater than 2.1 m below grade may experience a minor inflow of groundwater. It is recommended that, to the extent possible, temporary excavations not extend below 2 m below grade. The contractor should be prepared to direct accumulating water away from all bearing surfaces and subgrades to prevent disturbance to the founding medium, and can be accomplished using portable pumps placed into open sump pits. A municipal permit will be required if impounded water is pumped into the sanitary sewer.

5.8 PAVEMENT DESIGN

It is assumed that the re-development of the subject property will consist of on-site parking and will require heavy duty pavement.
The following pavement design is presented at this time based on the information available and assumes pavement use by maintenance vehicles with occasional use by emergency vehicles and delivery trucks. The proposed driveway pavement design is shown in Table 5.2 below:

TABLE 5.2
RECOMMENDED PAVEMENT STRUCTURE

Thickness (mm)	Description of Material
40	*Wear Course*- HL-3 or Superpave 12.5 Asphaltic concrete (PG58-34)
50	*Asphalt Binder*- Superpave 19 Level B (PG58-34)
150	*Base*- OPSS Granular A crushed stone
300	*Sub-base*- OPSS Granular B- Type I
	Sub-grade- Either fill, *in-situ* soil or OPSS Granular B (Type I or II) material compacted in place above native soil

If soft spots develop in the sub-grade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II materials. The pavement granular base and sub-base should be placed in a maximum 300 mm lift thickness and compacted to a minimum of 98% of the material's SPMDD using suitable compaction equipment. Asphalt should be compacted to a minimum of 96% of the re-compacted Marshall Density. All sub-grade and finished pavement surfaces need to be graded to direct water into

suitable storm drainage systems. All granular materials are to be inspected and approved for use by a geotechnical engineer.

5.9 WINTER CONSTRUCTION

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site include frost susceptible materials (till soils). In the presence of water and freezing conditions, ice lenses could form within the soil mass. Heaving and settlement upon thawing could occur.

All exterior spread footings and all footings for unheated structures should be protected from frost penetration action by a minimum soil cover of 1.8 m or made equivalent with SM insulation. Perimeter footings and interior footings within 1.5m distance from perimeter walls of heated structures may be installed at a depth of 1.5 m below grade for frost protection. The soil cover thicknesses may be reduced by 50% where footings are founded on competent bedrock.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the sub-grade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions.

5.10 CORROSION POTENTIAL AND SULPHATE ATTACK ON CONCRETE

The results of analytical corrosivity testing on soil indicate that the sulphate content is less than 0.1%. This result provides indication that Type GU cement (cement for general use) would be appropriate for use at this site.

The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environmental for exposed ferrous metals at this site.

A low soil resistivity relates to increased potential corrosion activity and is governed by the content of electrolytes, which consist of moisture, minerals and dissolved salts which can vary throughout the season. Based on the soil sample tested, the corrosion rating for the subject property soil is only a mildly aggressive corrosive environment.

5.11 GEOTECHNICAL RECOMMENDATION REVIEW

The geotechnical recommendations provided herein to assist foundation and building design were of necessity, preliminary in nature and should be reviewed by DCS prior to construction to assess their applicability to the proposed structures as the project design becomes more advanced. Site-specific foundation design recommendations may be required for components of the proposed structures.

5.12 GEOTECHNICAL FIELD SUPERVISION

Development of the subject property will require movement of a variety of soil types. It is recommended that a qualified geotechnical engineer be retained to inspect and approve the rock subgrade prior to placement of building foundations. Geotechnical supervision should also be provided to ensure that engineered fills placed beneath floor slab areas and roadways are properly compacted. The geotechnical engineer should also be available to provide for compaction control and field density testing as well as inspection of the condition of any unsupported excavation slopes, if required. Sampling and testing of any imported fill materials is recommended.

6.0 REFERENCES

Canadian Geotechnical Society - Canadian Foundation Engineering Manual, 4th Edition, 2006.

City of Ottawa Standard Tender Documents for Unit Price Contracts, Volumes 1 & 2 (current version).

Geological Survey of Canada map 1425A – Surficial Geology

Geological Survey of Canada map 1508A – Bedrock Geology

Jacques, Whitford and Associates Limited, Geotechnical Investigation Report; Ottawa, Ontario dated 4 September 2003

Lajoie, Paul G., *Clay flows and the formation of bluffs and low terraces on the Ottawa and St-Lawrence ancient and actual river courses*, First Edition, 25 March 2001.

Landry, Bruno et Mercier, Michel, *Notions de Geologie* –, 3rd edition, 1992.

National Building Code, 2010

Natural Resources Canada; Topographic Mapping; 31 G/5 –Ottawa (1 :50,000 scale)

The Ontario Building Code, current edition.

Stantec Limited, Draft Geotechnical Investigation Report; Expansion of the , Ottawa, Ontario, dated 10 June 2009.

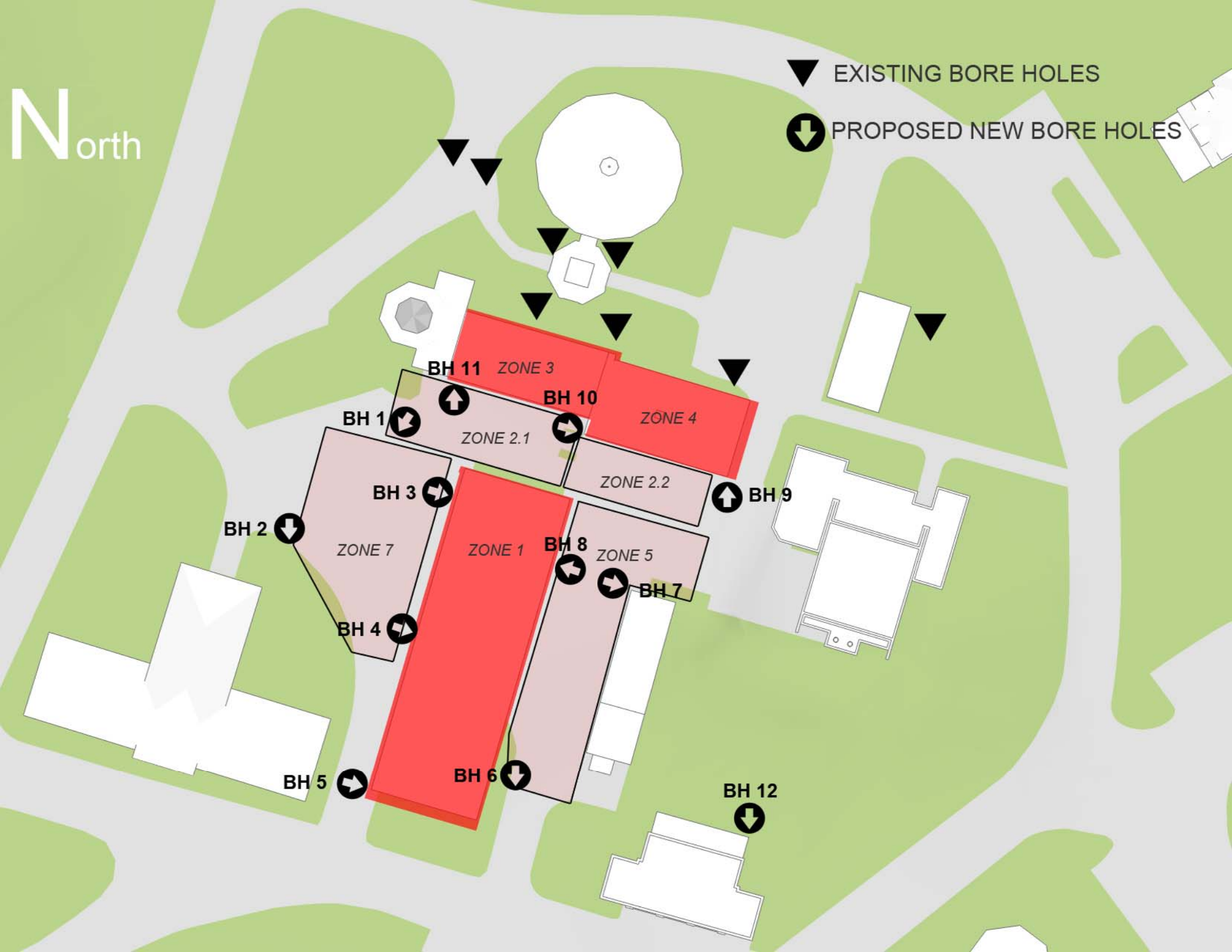
8.0 STATEMENT OF LIMITATIONS OF THIS GEOTECHNICAL INVESTIGATION REPORT

The conclusions and recommendations presented in this geotechnical investigation report are based on the information determined at the borehole locations. The information contained within this report in no way reflects the environmental aspect of the site or soil, unless specifically reported upon. Subsurface and groundwater conditions between and beyond the test locations may differ from those encountered at the specific locations tested, and conditions may be encountered during construction which were not detected and could not be anticipated at the time of the site investigation. It is recommended that DCS be retained during construction to confirm that the subsurface conditions throughout the subject property do not differ materially from those conditions encountered at the test locations.

The design recommendations provided in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not have been available at the time this report was prepared, it is recommended that DCS be retained during future stages of the design process to verify that the design is consistent with the recommendations of this report, and that the assumptions made in the analyses contained in this report are still valid.

The comments given in this report on potential construction problems and possible methods of construction are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all of the factors that may affect construction methods and costs (e.g., the thickness of surficial topsoil and fill layers can vary markedly and unpredictably). Contractors bidding on the project or undertaking the construction should, therefore, make their own interpretations of the factual information in this report and draw their own conclusions as to how the subsurface conditions may affect their bid or work.

DCS accepts no liability, whether in negligence, contract or arising on any other basis for damages or from indemnification arising from decisions or actions by others based on this report.


North
EXISTING BORE HOLES
PROPOSED NEW BORE HOLES
ZONE 3
ZONE 4
ZONE 2.1
ZONE 2.2
ZONE 7
ZONE 1
ZONE 5
BH 1
BH 2
BH 3
BH 4
BH 5
BH 6
BH 7
BH 8
BH 9
BH 10
BH 11
BH 12

LEGEND:

BH13-1 BOREHOLE LOCATION (DCS, MARCH 2013)

09-1 BOREHOLE LOCATION (STANTEC, 2009)

03-1 BOREHOLE LOCATION (JACQUES WHITFORD, 2003)

NOTES:

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

0 15 30 metres

SCALE 1:750±

DCS

DECOMMISSIONING CONSULTING SERVICES LIMITED

GEOTECHNICAL INVESTIGATION

(OPERATIONS ZONE)
OTTAWA, ONTARIO

BOREHOLE LOCATION PLAN

Drawn By:	I.S.Z.	Approved By:	T.A.	Project No:	450181
Date:	April 2013	Scale:	1:750±	Drawing No:	450181-1

Apr 08, 2013 – 4:42pm – USER ianstry
Z:\450000 Series\450181 Rideau\dwg\450181 Geotech Invest.dwg

APPENDIX A

BOREHOLE LOGS

Project: _ - Geotechnical Investigation Contract No: 450181

Borehole: BH13-01

Boring date: 06/03/2013 Supervised by: J.Mauchan

Monitoring Well: n/a

Borehole Location: _ -Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation:64.06m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) / Headspace TOV(%LEL) / Water Content (%)	Remarks and Sample Analyses
	63.91 / 0.15	**GRAVEL (FILL)** grey, wet, with sand, homogeneous				1-1		10	75		N	19	
		SAND (FILL) grey to black, damp, coarse sand with gravel and occasional cobble, heterogeneous, compact				1-2		24 28 32			N	4	
		- spoon stopped on big cobble at 0.64m bgs.				2-1		10 14 6 8	5		N	3	
1						3-1		4 6 8	40		N	4	
	62.49 / 1.57	**SAND (NATIVE)** brown, damp, fine to medium sand with cobbles, heterogeneous, loose				3-2		5 5			N	2	
2	62.08 / 1.98	**SAND** grey, damp to wet, with silt, homogeneous, compact				4-1		5 12 10	75		N	1	
						5-1		15 44 50/1	15		N	1	
3	61.29 / 2.77	**END of borehole at 2.77m bgs, split spoon refusal on inferred bedrock**											
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation Contract No: 450181

Boring date: 06/03/2013 Supervised by: J.Mauchan

Borehole Location: Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling and HQ rock coring

Borehole: BH13-02

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation:64.00m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) / Headspace TOV(%LEL) / Water Content (%)	Remarks and Sample Analyses
	63.95	**ASPHALT** black, homogeneous				1-1		44	85		N	3	
	0.05	**SAND (FILL)** black, damp, coarse sand with gravel and cobbles, heterogeneous				1-2		45			N	10	
	63.85							35					
	0.15	**SAND (NATIVE)** brown, damp, coarse sand with gravel and cobbles, some oxidation, heterogeneous, very dense						20					
	63.24					2-1		12	45		N	20	
	0.76	**SAND** brown, damp, medium to fine sand, some oxidation, homogeneous, loose				2-2		11			N		
1								8					
								5					
						3-1		4	45		N	19	
								3					
								16					
	62.32							23					
	1.68	**TILL** grey, damp, medium to fine sand, some silt, gravel and cobbles, homogeneous, very dense				3-2					N	8	
2								50/4	0				
	61.56												
	2.44	**LIMESTONE BEDROCK** light grey to white, fractured				5-1		18	25		N	3	
						run-1		50/2	78	14	N		RQD= 14%
3													
4													
						run-2			92	47	N		
5													RQD= 47%
6	57.98												
	6.02	**END of borehole at 6.02m bgs**											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation Contract No: 450181

Boring date: 06/03/2013 Supervised by: J.Mauchan

Borehole Location: Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling and HQ rock coring

Borehole: BH13-03

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:64.15m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV(%LEL) 20 40 60 80 / Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	64.10	ASPHALT black, homogeneous											
	0.05	SAND (FILL) brown to grey and black, damp, some gravel and cobbles, heterogeneous, compact to loose				1-1		11	85		N		
						1-2		22 16 5			N		
						2-1		2 5	50		N		
	63.24							3					
1	0.91	SAND (NATIVE) light brown, damp, with gravel, some oxidation, homogeneous, native				2-2		9			N		
						3-1		2 12	25		N		
	62.63							14					
	1.52	SAND (NATIVE) light brown, damp, with gravel, some oxidation, homogeneous, with light grey weathered limestone cobbles, very loose				3-2		18			N		corrosivity testing
						4-1		1 1 50/2	5		N		
2	61.97												
	2.18	LIMESTONE BEDROCK light grey to white, fractured				run-1			79	41	N		
3													rock compressive strength testing at 121 MPa
4	59.88												
	4.27	END of borehole at 4.27m bgs											
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: Geotechnical Investigation — Contract No: 450181

Borehole: BH13-04

Boring date: 06/03/2013 — Supervised by: J.Mauchan

Monitoring Well: n/a

Borehole Location: -Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description (Ground Surface Elevation:63.97m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV(%LEL) 20 40 60 80 / Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	63.92	ASPHALT black, homogeneous				1-1		12	75		N	3	
	0.05	SAND (FILL) brown to black, damp, some gravel and cobbles, heterogeneous, dense to compact				1-2		24 22 22			N	8	
		- layer of wood with coarse sand, gravel and cobbles at 0.76m to 0.91m				2-1		13 13 10 5	5		N	7	
1						3-1		6 12	20		N	8	
	62.45					3-2		30 50			N	2	
	1.52	WEATHERED LIMESTONE light grey to white, damp, with sand and silt, weathered and heavily fractured											
	62.14												
2	1.83	END of borehole at 1.83m bgs, split spoon refusal on inferred bedrock											
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation
Contract No: 450181
Borehole: BH13-05
Boring date: 07/03/2013
Supervised by: J.Mauchan
Monitoring Well: n/a
Borehole Location: Operations Zone, Ottawa, Ontario
Driller: George Downing Estate Drilling
Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:64.02m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV(%LEL) 20 40 60 80 / Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	63.97	ASPHALT black, homogeneous				1-1		5	50		N	4	
	0.05	SAND (FILL) brown to grey, damp, some gravel and cobbles, heterogeneous, compact						10 13 11					
								5 24 14					
	63.11	- trace brick debris at 0.76m										7	
1	0.91	SAND (NATIVE) light brown, damp, with gravel and cobbles, heterogeneous, compact to loose				2-1		12	15		N		
						3-1		6 5 4 4	10		N	8	
	62.19					4-1		3	5		N	9	
2	1.83	SAND grey, damp, coarse with gravel and cobbles, heterogeneous, loose						5 8 9					
	61.48	- becoming wet at 2.44m bgs.				5-1		50/4	100		N	12	
	2.54	END of borehole at 2.54m bgs, split spoon refusal on inferred bedrock											
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard
Checked by: T.Austrins
Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: Geotechnical Investigation | Contract No: 450181 | Borehole: BH13-06

Boring date: 07/03/2013 | Supervised by: J.Mauchan | Monitoring Well: n/a

Borehole Location: -Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:65.26m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) / Headspace TOV(%LEL) / Water Content (%)	Remarks and Sample Analyses
	65.21	**ASPHALT** black, homogeneous											
	0.05	**SAND (FILL)** grey, damp, some gravel and cobbles, trace roots, heterogeneous, compact				1-1		6 9	40		N	4	
						1-2		10 11			N	7	
	64.50							6					
	0.76	**COBBLES (NATIVE)** grey, dry, with medium to coarse sand and gravel matrix, trace oxidation, heterogeneous, compact				2-1		8 6 15	50		N	4	
1		- sand matrix becoming fine to medium at 1.22m bgs.				3-1		12 26 50/2	20		N	8	
	63.84												
	1.42	**SAND** light brown, dry, with gravel and cobbles, trace oxidation, heterogeneous											
	63.69												
	1.57	**END of borehole at 1.57m bgs, split spoon refusal on inferred bedrock**											
2													
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation
Contract No: 450181
Borehole: BH13-07
Boring date: 07/03/2013
Supervised by: J.Mauchan
Monitoring Well: n/a
Borehole Location: -Operations Zone, Ottawa, Ontario
Driller: George Downing Estate Drilling
Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:65.47m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	⊕ Headspace TOV (ppm) 100 200 300 400 / □ Headspace TOV(%LEL) 20 40 60 80 / △ Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	65.42	**ASPHALT** black, homogeneous				1-1		6	75		N	△ 14	
	0.05	**SAND (FILL)** grey to black, damp, coarse sand, some gravel and cobbles, heterogeneous, compact				1-2		12			N	△ 8	
	65.17							10					
	0.30	**SAND (FILL)** brown, dry, with gravel and cobbles, oxidation, heterogeneous, compact to dense						12					
						2-1		13	75		N	△ 8	
								26					
	64.56							32					
1	0.91	**TILL (NATIVE)** grey, damp, medium to fine sand, some silt, gravel and cobbles, homogeneous, loose to dense				2-2		30			N	△ 4	
								3	40				
								3					
						3-1		50/5			N	△ 4	
	63.82												
	1.65	**END of borehole at 1.65m bgs at split spoon refusal on inferred bedrock**											
2													
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard
Checked by: T.Austrins
Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation
Contract No: 450181
Borehole: BH13-09
Boring date: 08/03/2013
Supervised by: J.Mauchan
Monitoring Well: n/a
Borehole Location: Operations Zone, Ottawa, Ontario
Driller: George Downing Estate Drilling
Drilling Method: Pionjar hammer - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:65.23m)	Symbol	Well Details	Water Level	Samples: Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV(%LEL) 20 40 60 80 / Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	65.18	CONCRETE grey, homogeneous, concrete floor inside Ice Shed				1-1		n/a	25		N	4	
	0.05												
	64.98	SAND (FILL) grey white, dry, homogeneous,											
	0.25	SAND (FILL) dark brown, damp, medium to coarse sand, some gravel, homogeneous											
	64.47					2-1		n/a	50		N	3	
	0.76	SAND (NATIVE) light brown, damp, medium to coarse sand with gravel, homogeneous											
1						3-1		n/a	90		N	4	
	63.71												
	1.52	SAND black, damp, fine sand, trace coarse sand and oxidation, homogeneous				3-2		n/a			N	20	
	63.40												
2	1.83	END of borehole at 1.83m bgs at split spoon refusal on cobble or inferred bedrock											
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard
Checked by: T.Austrins
Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: · Geotechnical Investigation

Contract No: 450181

Borehole: BH13-10

Boring date: 08/03/2013

Supervised by: J.Mauchan

Monitoring Well: n/a

Borehole Location:)perations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling and HQ rock coring

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation:64.06m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) / Headspace TOV(%LEL) / Water Content (%)	Remarks and Sample Analyses
	64.01	**ASPHALT** black, homogeneous				1-1		5	60		N	19	
	0.05	**SAND (FILL)** dark brown to black, damp, coarse sand, some gravel, homogeneous, dense						25					
	63.81					1-2		18			N	18	
	0.25	**SAND (FILL)** brown to grey, damp, coarse sand with gravel and cobbles, heterogeneous, dense						14					
	63.60					1-3					N		
	0.46	**ASH (FILL)** black, damp, coarse sand with gravel, homogeneous, compact				2-1		4	25		N	24	
	63.45							3					
	0.61	**SAND (FILL)** black, damp, coarse sand, trace brick debris, trace ash fill, heterogeneous, loose						12					
1	63.15							30					
	0.91	**SAND (NATIVE)** brown, damp, with gravel and cobbles, trace oxidation, homogeneous, dense				2-2					N	8	
	62.99					3-1		11	10		N	8	
	1.07	**SAND** grey to white, dry, coarse sand with gravel and cobbles, homogeneous, very dense						33					
								28					
								36					
	62.23												
	1.83	**GRAVELLY SAND** brown to grey, damp, coarse sand with gravel and cobbles, heterogeneous, very loose				4-1		8	40		N	4	
2								40					
								34					
								50					
	61.47												
	2.59	**TILL (NATIVE)** grey, damp, medium to fine sand, some silt, gravel and cobbles, homogeneous, very dense				5-1		8	10		N	8	
	61.34					run-1		50/5		47	N		
	2.72	**LIMESTONE BEDROCK** light grey to white, fractured/weathered											
3													
													RQD=47%
4													
	59.56												
	4.50	**END of borehole at 4.50m bgs**											
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: Geotechnical Investigation | Contract No: 450181 | Borehole: BH13-11

Boring date: 06/03/2013 | Supervised by: J.Mauchan | Monitoring Well: n/a

Borehole Location: -Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: CME 55 - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation:64.30m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) / Headspace TOV (%LEL) / Water Content (%)	Remarks and Sample Analyses
	64.25	**ASPHALT** black, homogeneous											
	0.05	**SAND (FILL)** brown to black, damp, coarse sand, with gravel, homogeneous, dense				1-1		12	80		N	25	
	64.15					1-2		25			N		
	0.15	**GRAVELLY SAND (FILL)** brown to black, damp, gravel with medium to coarse sand, trace cobbles, heterogeneous, compact				1-3		8 4			N	22	
	63.69 0.61	**SAND (NATIVE)** brown, damp, trace oxidation, homogeneous, loose				2-1 2-2		4 6 3 4	40		N N	21	
1													
	63.08 1.22	**SAND** brown to grey, dry, coarse sand with gravel and cobbles, heterogeneous, compact to very dense				3-1		6 18	30		N	5	
						3-2		44 12			N	8	
						4-1		20 15 12 9	10		N	8	
2													
	61.86 2.44	**SAND** brown, damp, some oxidation, homogeneous, compact				5-1		8 15	50		N	13	
	61.71 2.59	**TILL** grey, damp, medium to fine sand, some silt, gravel and cobbles, homogeneous				5-2		22 50/1			N	8	
	61.56 2.74	**LIMESTONE BEDROCK** light grey to white, fractured/weathered											
3	61.38 2.92	**END of borehole at 2.92m bgs at split spoon refusal in bedrock**											
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation
Contract No: 450181
Borehole: BH13-12
Boring date: 07/03/2013
Supervised by: J.Mauchan
Monitoring Well: n/a
Borehole Location: -Operations Zone, Ottawa, Ontario
Driller: George Downing Estate Drilling
Drilling Method: Pionjar hammer - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:65.24m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	⊕ Headspace TOV (ppm) 100 200 300 400 / ☐ Headspace TOV(%LEL) 20 40 60 80 / △ Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	65.09 0.15	**ORGANIC TOPSOIL** dark brown, wet, with silt and sand, homogeneous				1-1		n/a	95		N	△35	
		SAND (FILL) dark brown to black, damp, some brick rubble and rootlets, heterogeneous											
	64.63 0.61	**SAND (NATIVE)** brown, damp, coarse sand with gravel, heterogeneous				2-1		n/a	50		N	△0	
1													
	63.89 1.35	**END of borehole at 1.35m bgs at split spoon refusal on cobble or inferred bedrock**											
2													
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: P.Simard
Checked by: T.Austrins
Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: - Geotechnical Investigation

Contract No: 450181

Borehole: BH13-13

Boring date: 08/03/2013

Supervised by: J.Mauchan

Monitoring Well: n/a

Borehole Location: 1 -Operations Zone, Ottawa, Ontario

Driller: George Downing Estate Drilling

Drilling Method: Pionjar hammer - Split spoon sampling

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation:64.10m)	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV(%LEL) 20 40 60 80 / Water Content (%) 20 40 60 80	Remarks and Sample Analyses
	63.85 / 0.25	**ORGANIC TOPSOIL** dark brown, wet, with silt and sand, homogeneous				1-1		n/a	95			20	
	63.57 / 0.53	**SAND (FILL)** grey, damp, medium to coarse sand, homogeneous				1-2		n/a					
	63.19 / 0.91	**SAND (FILL)** dark brown to black, damp, medium sand with gravel, trace cobble, trace wood debris, heterogeneous				2-1		n/a	30			14	
1		**SAND (NATIVE)** light brown, damp, some gravel, homogeneous				2-2		n/a				19	
						3-1		n/a	50				
						3-2		n/a				19	
	62.27 / 1.83	**END of borehole at 1.83 bgs at split spoon refusal on cobble or inferred bedrock**											
2													
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: P.Simard

Checked by: T.Austrins

Date: 28/03/13

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

APPENDIX C

COMPRESSION TESTING
LAB DATA

DCS

St. Lawrence Testing & Inspection Co. Ltd.
P.O. Box 997, Cornwall, ON, Canada K6H 5V1
814 Second Street W., Phone (613) 938-2521
E-mail: slt@ontarioeast.net Fax (613) 938-7395

March 21, 2013

Mr. Troy Austrins
Decommissioning Consulting Services Ltd.
260 Hearst Way, Unit 512
Ottawa, ON
K2L 3H1

Re: Rock Core Sample, Project # 450181
BH 3 (10 ft. to 10.6 ft.)
Report No. 13C38

Dear Mr. Austrins:

On Tuesday March 12, 2013, one rock core sample from the above noted project was delivered to our laboratory for compressive strength determination. The core was sampled on March 06, 2013 and measured 47 mm. in diameter, with a nominal length of 153 mm.

On March 13, 2013 the specimen was trimmed to achieve a length to diameter ratio of 2 to 1 and was tested accordingly.

Following are the compressive test results which were reported to you verbally the same day of testing:

Report No. 13C38
Continued

Core No.	Unit Weight (Kg./cu.m.)	Strength
1 (BH 3)	2765	121.4 MPa or 17,608 p.s.i.

Respectfully submitted

ST. LAWRENCE TESTING & INSPECTION CO. LTD.

G.G. McIntee, P. Eng.

GGM:njw

APPENDIX D

LABORATORY CERTIFICATES OF ANALYSIS

DCS

EXOVA OTTAWA

Certificate of Analysis

Exova

Client: Decommissioning Consulting Services Limited
260 Hearst Way, Suite 512
Ottawa, ON
K2L 3H1
Attention: Mr. Troy Austrins
PO#:
Invoice to: Decommissioning Consulting Services Limited

Report Number: 1304145
Date Submitted: 2013-03-12
Date Reported: 2013-03-14
Project: 450181
COC #: 127862

Dear Troy Austrins:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Lorna Wilson
Inorganic Laboratory Supervisor

Exova (Ottawa) is certified and accredited for specific parameters by:
CALA, Canadian Association for Laboratory Accreditation (to ISO 17025), OMAF, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils), Licensed by Ontario MOE for specific tests in drinking water.

Exova (Mississauga) is accredited for specific parameters by:
SCC, Standards Council of Canada (to ISO 17025)

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only.

EXOVA OTTAWA

Certificate of Analysis

Client: Decommissioning Consulting Services Limited
260 Hearst Way, Suite 512
Ottawa, ON
K2L 3H1
Attention: Mr. Troy Austrins
PO#:
Invoice to: Decommissioning Consulting Services Limited

Report Number: 1304145
Date Submitted: 2013-03-12
Date Reported: 2013-03-14
Project: 450181
COC #: 127862

				Lab I.D.	1015222
				Sample Matrix	Soil
				Sample Type	
				Sampling Date	2013-03-06
				Sample I.D.	BH 3 SA 3-2
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Agri. - Soil	Electrical Conductivity	0.05	mS/cm		0.24
	pH	2.0			8.8
General Chemistry	Cl	0.002	%		0.005
	Resistivity	1	ohm-cm		4170
	SO4	0.01	%		<0.01

Guideline = *** = Guideline Exceedence**
** = Analysis completed at Mississauga, Ontario.
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.

EXOVA OTTAWA

Certificate of Analysis

Client: Decommissioning Consulting Services Limited
260 Hearst Way, Suite 512
Ottawa, ON
K2L 3H1
Attention: Mr. Troy Austrins
PO#:
Invoice to: Decommissioning Consulting Services Limited

Report Number: 1304145
Date Submitted: 2013-03-12
Date Reported: 2013-03-14
Project: 450181
COC #: 127862

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 247222 **Analysis Date** 2013-03-13 **Method** Ag Soil			
Electrical Conductivity	<0.05 mS/cm	104	80-120
pH		99	90-110
Resistivity			
SO4	<0.01 %	98	70-130
Run No 247304 **Analysis Date** 2013-03-14 **Method** C CSA A23.2-4B			
Cl	<0.002 %	103	90-110

Guideline = *** = Guideline Exceedence**
** = Analysis completed at Mississauga, Ontario.
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective.