# NIAGARA-ON-THE-LAKE, ON
# NIAGARA RIVER RANGE REAR LIGHTHOUSE
# SPECIFICATIONS FOR LEAD PAINT ABATEMENT AND CONTAMINATED SOIL REMEDIATION
# DFRP No. 86598

## Document No. 196651-0000-DD10-SPE-0001

*Prepared for:*

## PWGSC Ontario

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Project Title

NIAGARA-ON-THE-LAKE, ON
NIAGARA RIVER RANGE REAR LIGHTHOUSE
LEAD PAINT ABATEMENT AND SOIL REMEDIATION
DFRP No. 86598

Project Number

R.090007.001

Project Date

2017-08-29

END

END OF SECTION

| Drawing No. | Title |
|---|---|
| C-1 | Site Locality Plan |
| C-2 | Metals Impacted Soil Removal |
| A-1 | Light House Elevations |

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Work of this contract comprises lead paint abatement and repainting affected surfaces and metals impacted soil/grass removal and replacement.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises soil remeditation, located at Niagara-on-the-Lake, Ontario; and further identified as PWGSC Project Number R.090007.001. The two main phases on this project are:

.1 Abatement of lead-based paint on the lighthouse structure, as well as repainting of the lighthouse.

.2 Excavation and disposal of the top 0.3 m (minimum) of metals (lead, mercury, zinc, and selenium) impacted topsoil on the lighthouse site and site reinstatement.

.3 Abatement of lead-based paint shall occur prior to excavation and disposal of metals contaminated soil.

.2 The Departmental Representative will take confirmatory samples. Wait for field screening results and if results indicate contaminated soil remains, Departmental Representative will direct an additional depth of excavation. Wait for clean results, before commencing backfill of the excavated area, as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.2 MINIMUM STANDARDS

.1 Execute work to meet or exceed:

.1 Rules and regulations of authorities having jurisdiction.

.2 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, Workplace Safety and Insurance Act and municipal statutes and authorities.

.3 Environmental Protection Act, Revised Statutes of Ontario 1990, Chapter E19 as amended, O. Reg. 102/94, Waste Audits and Waste Reduction Work Plans, and O. Reg. 103/94, Industrial, Commercial and Institutional Source Separation Programs. O. Reg. 153-04 as amended O. Reg. 347-General Waste Management.

.4 CCME (Canadian Council of Ministers of the Environment) Contaminated Sites, Contaminated Soil and Groundwater, and Remediation of Contaminated Sites most current publications.

.5 Canadian Environmental Assessment Act.

.6 Canadian Environmental Protection Act (New Substance Notification Regulations).

.7 Transportation of Dangerous Goods Act.

.8 Fisheries Act.

.9 Migratory Birds Convention Act.

.10 Migratory Birds Regulations.

.11 Province of Ontario;

.1 Endangered species Act (SO 2007, C-6).

.2 Management of Excess Soil - A Guide for Best Management Practices (MOECC January 2014).

1.3 AUTHORITIES HAVING JURISDICTION

.1 PWGSC Fire Protection is the sole authority having jurisdiction over this project with regards to fire standards.

1.4 ROAD LOAD RESTRICTIONS

.1 Comply with posted restrictions. Acquire and submit copies of all necessary permits to Departmental Representative.

1.5 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.6 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

.2 Prior to commencement of work, notify Departmental Representative in writing of any discrepancies between contract documents and site conditions.

1.7 DOCUMENTS

.1 Keep one copy of contract documents and pertinent information on the site.

1.8 ELECTRONIC SUBMITTALS

.1 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files; on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.9 CONTRACTOR'S AS-BUILT DRAWINGS, SPECIFICATIONS AND AERIAL PHOTOGRAPHS

.1 As work progresses, neatly record significant deviations from the Contract drawings, specifications and arial photographs using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.

1.9 CONTRACTOR'S AS-BUILT DRAWINGS, SPECIFICATIONS AND AERIAL PHOTOGRAPHS (Cont'd)

.2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT". Also circle on List of Drawings/Photographs each title and number of drawing/photograph marked with "AS-BUILT" information. Circle on Table of Contents each specification section number and title of specification sections marked with "AS-BUILT" information.

.3 Departmental Representative will provide one electronic set of drawings, schedules, specifications and aerial photographs for as-built drawing and specification purposes.
.1 Drawings are in Autocad.
.2 Aerial Photographs are in pdf format.
.3 Specifications are in NMSEdit Professional.
.4 Amendments and addenda are in MS Word.

.4 Record following significant deviations:
.1 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
.2 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
.3 Field changes of dimension.
.4 Other significant deviations which are concealed in construction and can not be identified by visual inspection.
.5 Approved alternative materials and systems installed replacing original materials and systems specified by trade name.

.5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings, specifications and aerial photographs over to Departmental Representative on completion of work.

.6 If project is completed without significant deviations from Contract drawings, specifications and aerial photographs submit to Departmental Representative one set of drawings and specifications and aerial photographs marked "AS-BUILT".

1.10 SHOP DRAWINGS AND PRODUCT DATA SHEETS

.1 Prior to submission check and certify as correct, shop drawings and product data sheets. Issue to Departmental Representative each submission at least 14 days before submission will be needed.

.2 Where technical sections specify that shop drawings bear the stamp of a Registered Professional Engineer, the Engineer must be registered in the Province of Ontario.

.3 Submit 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.4 Submit 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.5 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. 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.

.6 Submit 1 electronic of product data sheets for standard manufactured items. Indicate VOC's in g/l for adhesives, primers, sealants, paints, curing and sealing compounds, sealers, particleboard, plywood, preserved wood, and any other product that emits more than 25 g/l VOC during application, curing, initial off gassing or end use.

1.10 SHOP DRAWINGS AND PRODUCT DATA SHEETS (Cont'd)

.7 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

1.11 CONSTRUCTION PHOTOGRAPHS

.1 Submit electronic copy of colour digital photography in jpg format, high resolution.

.2 Identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints and location of viewpoints determined by Departmental Representative.

.4 Frequency:
.1 Preconstruction
.2 At completion of:
.1 Scaffolding erection.
.2 Lead paint abatement.
.3 Painting.
.4 Soil removal.
.3 Regular intervals during progress of work as directed by Departmental Representative.

1.12 SAMPLES

.1 Submit duplicate samples of new materials being installed under this contract, when requested by Departmental Representative.

.2 Identify manufacturer's name and product.

.3 Installed work shall match reviewed sample.

1.13 ADDITIONAL DRAWING/PHOTOGRAPHS

.1 Departmental Representative may furnish additional drawings/aerial photographs to clarify work.

.2 Such drawings/aerial photographs shall become part of Contract Documents.

1.14 PROTECTION

.1 Protect existing work and adjacent structures from damage.

1.14 PROTECTION (Cont'd)

.2 Replace damaged existing work with material and finish to match original.

.3 Protect existing trees and plants on site and adjacent properties.

1.15 EXISTING SERVICES

.1 Establish location, protect and maintain existing utility lines.

.2 Maintain existing services in occupied areas.

.3 Provide sanitary facilities.

.4 Provide water and electrical services at no cost.

1.16 TEMPORARY FACILITIES AND SERVICES

.1 Provide and maintain temporary facilities and services required to carry out work.

.2 Remove temporary facilities and services on completion of work.

1.17 METRIC SIZED MATERIALS

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Claims for exemptions from use of metric sized products shall be provided in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

1.17 METRIC SIZED MATERIALS (Cont'd)

.4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.

.5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.18 MATERIAL AND EQUIPMENT

.1 Use new products unless otherwise specified.

.2 Deliver and store material and equipment in accordance with manufacturer's instructions and with manufacturer's labels and seals intact.

.3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.19 TEMPORARY SIGNS

.1 Erect dressed wood frame capable of supporting signs in 130 km/h winds.

.2 Public Works and Government Services Canada and Contractor's signs of 1200 x 2400 x 20 mm thick, medium density overlaid plywood. Apply to frames with non- ferrous or hot dip galvanized fasteners. Sand and seal plywood edges.

.3 Paint wood surfaces with 1 coat primer to CGSB 1-GP-55M and 2 coats exterior enamel to CAN/CGSB-1.59-M89, paints Ecologo certified. Frames black and signs white colour.

.4 Install overlay in accordance with manufacturer's instructions. Overlay and instructions supplied by Public Works and Government Services Canada.

1.19 TEMPORARY SIGNS (Cont'd)

.5 Contractor's sign to match size, style and format of PWGSC sign. All information in both official languages. Do not include Federal symbols and logo. Submit drawing of Contractor's sign for Departmental Representative's review prior to erection.

.6 Maintain signs for duration of project.

.7 Dismantle and dispose of signs and frames on completion of work. Recycle components where possible.

1.20 INSPECTION AND TESTING

.1 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.

1.21 COST BREAKDOWN

.1 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.22 SCHEDULING

.1 On Award of Contract submit bar chart construction schedule for work in accordance with Section 01 32 16.

.2 Carry out noise generating work in accordance with local by-laws.

1.23 CLEANING

.1 Maintain project free of accumulated waste and rubbish. Remove waste from site at completion of each work day.

.2 Final cleaning:
.1 Remove temporary protection.
.2 Remove dust, dirt and foreign matter from surfaces.
.3 Broom clean paved exterior surfaces, rake clean other exterior surfaces.

1.23 CLEANING (Cont'd)

.2 (Cont'd)

.4 Remove snow and ice from access to building and parking lots.

1.24 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert from D&C waste destined for landfill to maximum extent possible. Reuse, recycle or sell material off site for reuse except where indicated otherwise. On site sales are not permitted. Target for this project is 75% diversion from landfill.

.2 For construction and demolition projects, even for those not over 2,000 $m^2$ total floor area, source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.

.1 Provide facilities for collection, handling and storage of source separated wastes.

.2 Source separate the following waste:

.1 Brick and portland cement concrete.

.2 Corrugated cardboard.

.3 Wood, not including painted or treated wood or laminated wood.

.4 Gypsum board, unpainted.

.5 Steel.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.

.1 Indicate how material being removed from the site will be reused or recycled.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.25 ASBESTOS DISCOVERY

.1 If during alteration work existing asbestos material is discovered, stop work and immediately notify Departmental Representative. Do not remove any existing material containing asbestos fibres. Await instructions from Departmental Representative prior to recommencing work.
.1 Refer to Designated Substances and Hazardous Materials survey contained within the report included in Appendix C.

1.26 DESIGNATED SUBSTANCES

.1 The project site has been surveyed for the presence of designated substances referred to in the Occupational Health and Safety Act and Regulations for Construction Projects, O.Reg. 213/91 as amended.

.2 The list of designated substances present at the project site is provided in the Designated Substance Inventory, included in Appendix A.

.3 Provide copies of this list to each prospective subcontractor prior to entering into a contract with them.

.4 Post prominent notices identifying and warning of the hazardous agent in the part of the workplace in which the agent is found or used. Notices shall be in English and other languages prescribed under the Act.

1.27 SPECIAL PROTECTION AND PRECAUTIONS

.1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to ESDC - Labour Program.

1.28 POLLUTION CONTROL

.1 Spills of deleterious substances:
.1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
.2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.

1.28 POLLUTION CONTROL (Cont'd)

.1 (Cont'd)

.3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

1.29 OPSS AND OPSD

.1 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage.

1.30 PROJECT MEETINGS

.1 Administrative:

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

.2 Preconstruction meeting:

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors must be in attendance.

.3 Establish time and location of meeting and notify parties minimum 5 days before meeting.

1.30 PROJECT MEETINGS (Cont'd)

.2 (Cont'd)

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals.

.4 Requirements for temporary facilities, site sign, utilities and fences.

.5 Site security.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Owner provided products.

.8 Record drawings, specifications and aerial photographs.

.9 Maintenance manuals.

.10 Take-over procedures, acceptance, warranties.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

.3 Progress meetings:

.1 During course of Work and 1 week prior to project completion, schedule progress meetings weekly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 5 working days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

1.30 PROJECT MEETINGS (Cont'd)

.3 (Cont'd)

.5 (Cont'd)

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Corrective measures and procedures to regain projected schedule.

.6 Revision to construction schedule.

.7 Progress schedule, during succeeding work period.

.8 Review submittal schedules: expedite as required.

.9 Maintenance of quality standards.

.10 Review proposed changes for affect on construction schedule and on completion date.

.11 Other business.

1.31 LIGHTHOUSE LAMP OBSTRUCTIONS

.1 At no point shall the upper floor of the lighthouse or the lighthouse lamp be obstructed from view.

1.32 CO-ORDINATION AND CO-OPERATION

.1 Site will not be occupied during execution of work.

.2 Building will not be occupied during execution of work.

.3 Work area will not be occupied during execution of work.

.4 Execute work with minimum disturbance to public.

.5 Maintain access and exits.

.6 Where security has been reduced by work of contract, provide temporary means to maintain security.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END

PART 1 - GENERAL

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

1.1 DEFINITIONS (Cont'd)

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

1.4 SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 06.

.2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 3 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.
.1 Erection of scaffolding and barriers completed within 8 working days of award of contract date.

.2 Lead-based paint abatement completed within 15 working days of award of contract date.

1.5 PROJECT MILESTONES (Cont'd)

.3 Re-painting completed within 22 working days of award of contract date.

.4 Deconstruction of scaffolding completed within 24 working days of award of contract date.

.5 Excavation completed within 26 working days of award of contract date.

.6 Fill and grading completed within 28 working days of award of contract date.

.7 Sodding completed within 29 working days of award of contract date.

.8 Certificate of substantial performance within 30 working days of award of contract date.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits/Notice of Project.
.4 Mobilization.
.5 Lead Paint Abatement.
.6 Exterior Repainting.
.7 Excavation.
.8 Backfill and grading.
.9 Sodding.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CGSB 51-GP-51M-81, Polyethylene Sheet for Use in Building Construction.

.2 Transportation and Dangerous Goods Act (1999).

.3 Canadian Council of Ministers of the Environment (CCME) Documentation.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 11 06.

.2 Submit, prior to start of work, plan detailing management of hazardous wastes. Submit written documentation of weekly hazardous waste inspections on a monthly basis.

.3 Submittals for Progress Meetings: make submittals at least 24 hours prior to scheduled progress meetings as follows:
.1 Updated progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of Work, major problems and action taken, injury reports, equipment breakdown, and material removal.
.2 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work area.
.3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
.4 Other information required by Departmental Representative or relevant to agenda for upcoming progress meeting.

1.3 SUBMITTALS (Cont'd)

.4 Site Layout: within 7 days after date of Notice to Proceed and prior to mobilization to site, submit site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:
.1 Equipment and personnel decontamination areas.
.2 Means of ingress, egress and temporary traffic control facilities.
.3 Equipment and material staging areas.
.4 Soil stockpile areas and debris stockpile areas.
.5 Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's site-specific Health and Safety Plan.
.6 Grading, including contours, required to construct temporary facilities.

.5 Equipment Decontamination Plan: submit equipment decontamination plan to Departmental Representative for review and approval prior to commencing construction.

.6 Submit documentation verifying that hazardous materials employees have been trained, tested, and certified to safely and effectively carry out their assigned duties in accordance with Section 01 35 29.

1.4 REGULATORY REQUIREMENTS

.1 Provide erosion and sediment control in accordance with regulations.

.2 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.

.3 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
.1 Contractor: responsible for complying with amendments as they become effective.

.4 In event that compliance exceeds scope of work or conflicts with specific requirements of contract notify Departmental Representative immediately.

1.5 SEQUENCING AND SCHEDULING

.1 Do not commence Work involving contact with potentially contaminated materials until decontamination facilities, provided in the approved equipment decontamination plan, are operational.

1.6 EQUIPMENT DECONTAMINATION

.1 Implement measures of approved equipment decontamination plan prior to commencing work involving equipment in contact with potentially contaminated materials.

.2 Construct equipment decontamination system to accomodate largest piece of contaminated equipment.

.3 Provide, operate, and maintain necessary equipment required to collect and contain equipment decontamination byproducts and transfer materials to approved storage facility.

1.7 SOIL STOCKPILING FACILITIES

.1 Provide, maintain, and operate storage/stockpiling facilities as required .

.2 Install liner below proposed stockpile locations to prevent contact between stockpile material and ground. Equip facility with tarps capable of covering stockpiled material until Departmental Representative advises Contractor to dispose of material off site.

1.8 WASTEWATER STORAGE TANK

.1 Provide, operate, and maintain wastewater storage tanks to store wastewaters.

.2 Wastewater includes water collected from; Equipment Decontamination Facility, Personnel Hygiene/Decontamination Facility.
.1 Store wastewater from toilets, handbasins and showers separately from equipment decontamination facility wastewater.

1.8 WASTEWATER STORAGE TANK (Cont'd)

.3 Provide pumps and piping to convey collected wastewaters to designated wastewater storage tanks; provide wastewater storage tanks with minimum total live capacity of 20,000 L each such that effluent quality can be analyzed and approved prior to disposal.

.4 Install wastewater storage tanks in locations as directed by Departmental Representative.

.5 Support tanks on temporary aboveground foundations.

.6 Connect pumps, piping, valves, miscellaneous items, and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping, and miscellaneous items from freezing.

.7 Do not operate wastewater storage tanks until inspected and approved by Departmental Representative.

.8 Notify Departmental Representative 72 hours minimum in advance of when wastewater storage tank is anticipated to be full.
.1 Do not discharge additional liquids to filled tank following sampling by Departmental Representative.
.2 Departmental Representative will determine appropriate disposition of wastewaters based on sample analysis.

.9 Transport and dispose of wastewaters at off-site disposal facility as identified by Contractor and approved by Departmental Representative.

.10 Do not discharge wastewaters to site sewer systems.

1.9 DRUMS

.1 Storage of Liquid Waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

1.9 DRUMS (Cont'd)

.2 Storage of Solid Waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

1.10 VEHICULAR ACCESS AND PARKING

.1 Maintenance and Use:

.1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by Departmental Representative; transport and dispose of in appropriate off-site disposal facility. Clean access roads at least once per shift.

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

1.11 DUST AND PARTICULATE CONTROL

.1 Execute Work by methods to minimize raising dust from construction operations.

.2 Implement and maintain dust and particulate control measures as determined necessary by Departmental Representative during construction and in accordance with Provincial regulations.

.3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use water misting system for dust and particulate control.

.4 Use chemical means for water misting system for dust and particulate control only with Departmental Representative's prior written approval.

.5 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.

.6 Prevent dust from spreading to adjacent property sites.

1.11 DUST AND PARTICULATE CONTROL (Cont'd)

.7 Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.

.8 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.12 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 Promptly report spills and releases potentially causing damage to environment to:
.1 Ontario Ministry of Environment Spills Action Centre (1-800-268-6060).
.2 Owner of pollutant.
.3 Person having control over pollutant.
.4 Departmental Representative.

.4 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating action.

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

1.12 POLLUTION CONTROL (Cont'd)

.6 Provide spill response materials including, containers, absorbent towels, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

1.13 EQUIPMENT DECONTAMINATION

.1 Commence Work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational.

.2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

.3 Perform equipment decontamination on Contractor-constructed equipment decontamination system.

.4 Maintain inspection record on site which includes: equipment descriptions with identification numbers or license plates; time and date entering decontamination facility; time and date exiting decontamination facility; and name of inspector with comment stating that decontamination was performed and completed.

.5 Each piece of equipment will be inspected by Departmental Representative after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.

.6 Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

.7 Collect decontamination wastewaters and sediments which accumulate on equipment decontamination pad. Transfer wastewaters to designated wastewater storage tank.

1.13 EQUIPMENT DECONTAMINATION (Cont'd)

.8 Transfer sediments to disposal transport vehicle.

.9 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.14 WATER CONTROL

.1 Maintain excavations free of water.

.2 Protect site from puddling or running water. Grade site to drain.

.3 Prevent surface water runoff from leaving work areas.

.4 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off site or to municipal sewers.

.5 Prevent precipitation from infiltrating or from directly running off stockpiled soil and waste materials. Cover stockpiled soil and waste materials with an impermeable liner during periods of work stoppage including at end of each working day and as directed by Departmental Representative.

.6 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.

.7 Control 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.

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

1.14 WATER CONTROL (Cont'd)

.9 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.

.10 Contain water from stockpiled soil or waste materials. Transfer potentially contaminated surface waters to wastewater storage tanks.

.11 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.

1.15 EROSION AND SEDIMENT CONTROL

.1 Provide erosion and sediment control in accordance with approved erosion and sediment control plan, in accordance with Section 01 35 43.

.2 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.

.3 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical. Strip vegetation, regrade, or otherwise develop to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Departmental Representative.

1.15 EROSION AND SEDIMENT CONTROL (Cont'd)

.4 Provide and maintain temporary measures which may include, silt fences, hay or straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction. Place silt fences and/or hay or straw bales in ditches to prevent sediments from escaping from ditch terminations.

.5 Hay or Straw Bale: wire bound or string tied; securely anchored by at least 2 stakes or rebars driven through bale 300 mm to 450 mm into ground; chinked (filled by wedging) with hay or straw to prevent water from escaping between bales; and entrenched minimum of 100 mm into ground.

.6 Silt Fence: assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile: uniform in texture and appearance, having no defects, flaws, or tears that would affect its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure.

.7 Net Backing: industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.

.8 Posts: sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow minimum 450 mm embedment; post spacing 2.4 m maximum. Securely fasten each post to geotextile and net backing using suitable staples.

.9 Plan construction procedures to avoid damage to work or equipment encroachment onto water bodies or drainage ditch banks. In event of damage, promptly take action to mitigate effects. Restore affected bank or water body to existing condition.

1.15 EROSION AND SEDIMENT CONTROL (Cont'd)

.10 Installation:

.1 Construct temporary erosion control items as indicated on approved erosion and sediment control plan. Actual alignment and/or location of various items as directed by Departmental Representative.

.2 Do not construct bale barriers and silt fence in flowing streams or in swales.

.3 Check erosion and sediment control measures weekly after each rainfall; during prolonged rainfall check daily.

.4 Bales and/or silt fence may be removed at beginning of work day, replace at end of work day.

.5 Whenever sedimentation is caused by stripping vegetation, regrading, or other development, remove it from adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.

.6 Prior to or during construction, Departmental Representative may require installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes, guardrails, temporary roads, and other measures appropriate to specific condition. Temporary improvements must remain in place and in operation as necessary or until otherwise directed by Departmental Representative.

.7 Repair damaged bales, end runs, and undercutting beneath bales.

.8 Unless indicated otherwise by Departmental Representative, remove temporary erosion and sediment control devices upon completion of Work. Spread accumulated sediments to form a suitable surface for seeding or dispose of, and shape area to permit natural drainage to satisfaction of Departmental Representative. Materials once removed become property of Contractor.

.11 Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

.12 Do not disturb existing embankments or embankment protection.

1.15 EROSION AND SEDIMENT CONTROL (Cont'd)

.13 Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

.14 If soil and debris from site accumulate in low areas, storm sewers, roadways, gutters, ditches, or other areas where in Departmental Representative's determination it is undesirable, remove accumulation and restore area to original condition.

1.16 PROGRESS CLEANING

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

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

1.17 FINAL DECONTAMINATION

.1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.

.2 Perform decontamination as specified to satisfaction of Departmental Representative. Departmental Representative will direct Contractor to perform additional decontamination if required.

1.18 REMOVAL AND DISPOSAL

.1 Remove surplus materials and temporary facilities from site.

.2 Dispose of 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 in storm or sanitary drains.

1.18 REMOVAL AND DISPOSAL (Cont'd)

.5 Do not discharge wastes into streams or waterways.

.6 Dispose of following materials at appropriate off-site facility identified by Contractor and approved by Departmental Representative:
.1 Debris including excess construction material.
.2 Non-contaminated litter and rubbish.
.3 Disposable PPE worn during final cleaning.
.4 Wastewater removed from wastewater storage tank.
.5 Wastewater generated from final decontamination operations including wastewater storage tank cleaning.

.7 Dispose of materials as directed by Departmental Representative.

.8 Wastewater sample and analysis: Departmental Representative will perform sampling and analysis of stored wastewater for disposal purposes prior to removal from site. Results of analyses will determine appropriate methods of disposal. Upon receipt of analytical results, transfer tank contents without spills or release, as directed by Departmental Representative, to off-site disposal facility. Following completion of tank emptying, decontaminate tank interior with steam or high-pressure water wash supplemented by detergent. Dispose of tank decontamination water with tank contents.

.9 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.10 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
.1 Hazardous wastes recycled in manner constituting disposal;
.2 Hazardous waste burned for energy recovery;
.3 Lead-acid battery recycling;
.4 Hazardous wastes with economically recoverable precious metals.

1.19 RECORD KEEPING

.1 Maintain adequate records to support information provided to Departmental Representative regarding exception reports, annual reports, and biennial reports.

.2 Maintain lead and mercury waste shipment records for minimum of 3 years from date of shipment or longer period required by applicable law or regulation.

.3 Maintain bills of ladings for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

1.20 SANITARY FACILITIES

.1 Provide sanitary facilities for workforce in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA): Canada
.1 CSA-S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2015 (NBC):
.1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2015 (NFC):
.1 NFC 2015, Division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.

.4 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 Workplace Safety and Insurance Act, 1997.
.3 Municipal statutes and authorities.

.5 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board Fire Protection Standard, April 1, 2010.

1.2 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 11 06.

.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 operations found in work plan.
.3 Measures and controls to be implemented to address identified safety hazards and risks.

1.3 SUBMITTALS (Cont'd)

.2 (Cont'd)

.4 Contractor's and Sub-contractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations.

.3 Departmental 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 Departmental Representative within 3 days after receipt of comments from Departmental Representative.

.4 Departmental 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.

.5 Submit names of personnel and alternates responsible for site safety and health.

.6 Submit records of Contractor's Health and Safety meetings when requested.

.7 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.

.8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

.9 Submit copies of incident and accident reports.

.10 Submit Material Safety Data Sheets (MSDS).

.11 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

.12 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 Departmental Representative.

1.4 FILING OF NOTICE

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

1.5 WORK PERMIT

.1 Obtain permits related to project prior to commencement of Work.

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 Departmental Representative prior to commencement of Work.

1.8 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:
- .1 Mercury in paint and in soil.
- .2 Lead in paint and soil.
- .3 Metals in soil.
- .4 Guano from birds in work area.

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 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

1.10 GENERAL REQUIREMENTS (Cont'd)

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.12 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 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

1.13 UNFORSEEN HAZARDS

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

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

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:

1.14 HEALTH AND SAFETY CO-ORDINATOR (Cont'd)

.1 (Cont'd)

.1 Knowledgeable in abatement of lead containing material safety regulations.

.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.

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 of Ontario, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.

.2 Contractor's Violence and Harassment Policies.

.3 Constructor's Name.

.4 Notice of Project.

.5 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).

.6 Ministry of Labour Orders and reports.

.7 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.

.8 Address and phone number of nearest Ministry of Labour office.

.9 Material Safety Data Sheets.

.10 Written emergency Response Plan.

.11 Site Specific Safety Plan.

.12 Valid certificate of first aider on duty.

.13 Inspection card for first aid box.

.14 Location of nearest hospital and map.

.15 WSIB "In Case of Injury At Work" poster.

.16 Location of toilet and cleanup facilities.

.17 Danger signs in hazardous areas.

1.16 CORRECTION OF NON-COMPLIANCE

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

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

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

1.17 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 Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END

PART 1 - GENERAL

1.1 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.3 Green Remediation: the application of technologies and approaches that enhance a cleanup project's environmental, social, and economic footprints, as defined by the California Department of Toxic Substances Control.

1.2 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 11 06.

.2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues, including Green Remediation, which must be addressed during construction.

1.3 SUBMITTALS (Cont'd)

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.4 Environmental protection plan: include:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names of persons responsible for manifesting hazardous waste to be removed from the site.

.3 Names of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Drawings showing locations of proposed temporary excavations, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.

1.3 SUBMITTALS (Cont'd)

.4 (Cont'd)

.12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as clean-up water.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.15 Pesticide treatment plan: to be included and updated, as required.

.16 Green Remediation Plan: to the extent practicable, explore and implement green remediation strategies and applications in the performance of the requirements of this work assignment to maximize sustainability, including Energy, Water, Air & Atmosphere, Materials & Waste, and Land & Ecosystems:

.1 Energy management strategies to increase energy efficiency and use of renewable energy.

.2 Water management strategies to reduce water consumption, reuse treated water, and use efficient techniques to manage and protect surface water and groundwater.

.3 Air emission strategies to decrease emissions of harmful air pollutants from treatment processes, operation of heavy machinery, and transportation of vehicles.

.4 Solid and liquid waste management strategies to reduce Contractor and Project materials consumption and waste generation.

.5 Land and ecosystems management strategies to protect ecosystems during site cleanup.

1.4 FIRES

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

1.5 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

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

.3 Do not discharge wastes into streams or water ways.

.4 Separate and dispose of accumulated waste materials off-site in accordance with R.R.O. 1990, Reg. 347 General Waste Management, to MOE approved disposal facilities or approved transfer stations, including, but no limited to, the following:

.1 Debris including excess construction material.

.2 Non-contaminated litter and rubbish.

.3 Disposable PPE worn during final cleaning.

.4 Wastewater removed from wastewater storage tank.

.5 Wastewater generated from final decontamination operations including wastewater storage tank cleaning.

.6 Lumber from decontamination pads.

.5 Appropriate procedures shall be implemented for handling, temporary storage, transport and disposal of impacted soils during all phases of the project. Refer to Land Disposal Restrictions in O.Reg. 347 - General Waste Disposal under Ontario EPA and MOE Fact Sheet "Summary of Land Disposal Restrictions, Treatment and Notification Requirements for Waste Generators". Off-site disposal will be by licensed haulers to a MOE-approved disposal facility.

.6 Disposal/recycling of other waste generated during the project shall be done in compliance with Ontario Waste Regulations and the facilities used will be approved by the Departmental Representative.

1.6 VEHICULAR ACCESS AND PARKING

.1 Maintenance and Use:

.1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by Departmental Representative; transport and place into designated area approved by Departmental Representative. Clean access roads at least once per shift.

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

.2 Vehicles/equipment shall be in good working order and not be leaking any fuel or fluids.

.3 Restrict access of vehicles from creek banks to protect slope stability.

.4 During construction designated fuelling area(s) will be established.

.5 Refuelling of vehicles and equipment shall not be conducted near watercourses.

.6 Traffic management measures (such as 'flag man') shall be implemented if required at site access points to direct traffic.

1.7 EQUIPMENT DECONTAMINATION

.1 Commence Work involving equipment contact with potentially contaminated material only after Equipment Decontamination Pads are operational.

.2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

.3 Perform equipment decontamination on Contractor-constructed equipment decontamination pad to prevent cross contaminating unimpacted areas.

1.7 EQUIPMENT DECONTAMINATION (Cont'd)

.4 Equipment Decontamination Pads to include pad, potable wash water system, and a lined, dyked containment area with a water collection sump. Equipment decontamination pads shall be removed prior to conclusion of the project.

.5 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated reinstate generated. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by Departmental Representative. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in Clean Zone before removing from site or travelling on clean areas. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.

.6 Each piece of equipment will be inspected by Departmental Representative after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.

.7 Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

.8 Collect decontamination wastewaters and sediments which accumulate on equipment decontamination pad. Transfer wastewaters to designated wastewater storage tank.

.9 Transfer sediments to a designated area approved by the Departmental Representative.

.10 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.7 EQUIPMENT DECONTAMINATION (Cont'd)

.11 Provide sufficient pumping equipment, of adequate pumping capacity and associated machinery and piping in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment. Maintain piping and connections in good condition and leak-free.

1.8 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not allow water containing suspended materials to enter into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.4 Do not direct water flow in a manner which would cause erosion to existing areas.

1.9 SURFACE WATER AND GROUNDWATER QUALITY

.1 Materials and equipment shall be operated and stored in a manner that prevents deleterious substances (e.g., petroleum products, silt, etc.) as defined by the Fisheries Act from entering surface water.

.2 Impacted groundwater entering excavations shall be collected and disposed of at an MOE-approved facility.

1.10 VEGETATION

.1 Protect vegetation that does not have to be removed by fencing/ delineating construction working and/or storage areas.

.2 Operated construction machinery in a manner that minimizes damage to adjacent vegetation.

1.11 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

1.11 WORK ADJACENT TO WATERWAYS (Cont'd)

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Do not use water from waterways.

.5 Special care shall be exercised while working near water's edge including site-specific erosion and sediment control measures. Silt fences shall be used to minimize sediment transport as well as limit access to watercourses by site personnel.

1.12 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Vehicles and equipment must be maintained in good working condition, equipped with emission controls as applicable to local authorities' emission requirements.

.3 Implement dust abatement measures, as required to control dust.

.4 Control emissions from equipment and plant to local authorities' emission requirements.

.5 Prevent sandblasting, lead paint removal and other extraneous materials from contaminating air and waterways beyond removal/application area, by providing temporary enclosures.

.6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.7 Ensure hazardous substances (including fuel) are stored, handled and applied in a manner to prevent release to the environment and in a legal manner in accordance with hazardous waste regulations.

.8 Secure all materials at non-productive times (night and shut-down).

.9 Vehicles shall be shut off when not in use. No vehicle idling on-site.

1.12 POLLUTION CONTROL (Cont'd)

.10 Store hazardous or toxic substances in a designated area.

.11 Comply with requirements of WHMIS regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and provision of MSDS acceptable to Labour Canada.

1.13 SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES

.1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.

.2 All workers shall be fully aware of the spill prevention and response procedures including notification of Departmental Representative.

.3 The Ontario Ministry of Environment Spills Action Centre must be notified immediately by law at 1-800-268-6060.

.4 The Departmental Representative shall be immediately informed of all spills that occur on site.

.5 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

.6 Spill kits will be kept on-site during all project phases.

.7 Contractor shall take due care to ensure no deleterious materials including sediment-laden runoff leave the work site, or enter any: surface water, storm water, or sanitary sewers at or near the work site.

.8 Equipment fuelling or lubricating shall occur in a designated area with proper controls to prevent the release of deleterious substances, and shall be conducted away from any surface water drains or collection points.

.9 Any equipment remaining on site overnight shall have appropriately placed drip pans.

1.13 SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES (Cont'd)

.10 The rinse, cleaning water or solvents for glues, wood preservatives and other potentially harmful or toxic substances should be controlled so as to prevent leakage, loss or discharge into the storm drain system or into the marine environment.

.11 Protect the roadways from tracking of mud, soil, and debris throughout the work.

.12 During the purging of tanks and associated lines, procedures must prevent the release of any fuels to the surface, surface water, catch basins or soils within or surrounding the work site.

1.14 NOISE CONTROL

.1 All construction equipment shall be operated with exhaust systems in good repair to minimize noise.

.2 Construction activities that could create excessive noise shall adhere to the municipal noise by-law.

.3 If work is to be undertaken outside the specified period in the local noise by-law, then approval for an exemption to the by-law shall be obtained by the Contractor from the municipality.

.4 Ensure that noise control devices (i.e. mufflers, silencers) on construction equipment are properly maintained.

1.15 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be on site or in area are discovered during construction.

1.15 HISTORICAL/ ARCHAEOLOGICAL CONTROL (Cont'd)

.2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

.3 If archaeological deposits are discovered during the project work shall stop immediately and the Departmental Representative shall immediately be notified.

.4 Archaeologically significant material, if found on the property, remains the property of the Crown and shall not be removed from the site.

.5 Management of the archaeological materials will be coordinated through Departmental Representative.

1.16 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.17 SPECIES AT RISK

.1 Should a species or its critical habitat be encountered, measures are to be implemented to avoid destruction, injury or interference with the species, its residence and/or its habitat (e.g., through siting, timing or design changes). If the foregoing cannot be avoided Contractor should cease work and contact Departmental Representative for advice regarding mitigation measures.

.2 In the event that it is determined that the project likely may have unexpected adverse effects on species at risk (SAR), the Contractor shall notify the Department Representative immediately.

1.18 MIGRATORY BIRDS/WILDLIFE HABITAT

.1 Disturbance and destruction of habitat should be timed outside of breeding season of mid-April to end of July.

.2 Ensure all works are in compliance with the Migratory Birds Convention Act.

.3 Restrict vehicle movements to construction areas and access roads and avoid harassment of animals.

1.19 FISH/ FISH HABITAT

.1 All materials and equipment used will be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) as defined by the Fisheries Act from entering the surface water.

1.20 GREEN REMEDIATION

.1 Energy

.1 Select suitably sized power machinery and equipment that operate using clean alternative fuels, are energy efficient or hybrid, and maintain equipment at peak performance to maximize efficiency.

.2 Purchase materials from one supplier of locally produced products and select local providers for field operations.

.3 Coordinate outside services and service providers to minimize transport of equipment.

1.20 GREEN REMEDIATION (Cont'd)

.1 (Cont'd)

.4 Employ auxiliary power units to power cab heating and air conditioning when a machine is unengaged.

.5 Evaluate and optimize energy efficiency of equipment with high energy demands periodically and adjust operations accordingly.

.6 Replace, repower, or retrofit older engines with advanced emission control devices to reduce harmful pollutants.

.7 Control nuisance odours associated with diesel emissions from construction equipment.

.8 Maintain engines to meet original standards and train operators to run equipment efficiently.

.2 Water

.1 Minimize fresh water consumption.

.2 Prevent nutrient loading in nearby water bodies.

.3 Utilize biodegradable tarps and mats to contain dust rather than spraying with water.

.3 Air Emissions

.1 Reduce atmospheric release of toxic or priority pollutants and minimize dust export of contaminants.

.2 Consolidate on site and off site vehicular trips to reduce fuel consumption.

.3 Secure and cover loose, excavated material in open trucks, and reuse the with reuseable covers.

.4 Limit on site vehicle speeds to 10 miles per hour.

.5 Maintain engines of vehicles and machinery in accordance with manufacturer recommendations.

.6 Modify field operations through combined activity schedules, an idle reduction plan, and using machinery with automatic idle-shutdown devices.

.7 Minimize the use of heavy equipment that consumes high volumes of fuel and use cleaner fuels such as ultra-low sulphur diesel.

.4 Waste

.1 Minimize waste generation and re-use materials whenever possible.

.2 Minimize natural resource extraction and disposal.

1.20 GREEN REMEDIATION (Cont'd)

.4 (Cont'd)

.3 Segregate materials such as metals, concrete, and lumber for reuse or recycling.

.4 Select the closest waste receiver.

.5 Use products with recycled and bio-based content and recycling potential.

.5 Land and Ecosystems

.1 Establish efficient traffic patterns to minimize soil compaction in work areas.

.2 Install silt basins to capture sediment runoff along slopes.

.3 Ensure all equipment is clean prior to arrival on site to minimize potential of transporting invasive species.

.4 Use minimally invasive in situ technologies.

.5 Minimize soil and habitat disturbance and reduce noise and lighting disturbance.

.6 Minimize bioavailability of contaminants through adequate contaminant source and plume controls.

.7 Prevent topsoil compaction and increase subsurface water infiltration.

.8 At the end of the project work, thoroughly clean the project area of debris, dirt, and trash using non-phosphate, plant-based, and biodegradable cleaners and detergents.

.9 Use environmentally friendly lubricants for engine maintenance.

.10 Place decontamination station away from environmentally sensitive areas.

.11 Use secondary containment to avoid cross-contamination.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 ABBREVIATIONS AND ACRONYMS

.1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

.1 A:
- .1 AL: aluminum.
- .2 AB: anchor bolt.

.2 B:
- .1 B: base.
- .2 BEAST: benthic assessment of sediment.
- .3 BH: bore hole.
- .4 BL: bottom layer.
- .5 BLK: block.
- .6 BOT: bottom.
- .7 BMP: best management practice.
- .8 B PL: base plate.
- .9 BRG: bearing.
- .10 BSMT: basement.
- .11 BTEX: benzene, toluene, ethylbenzene, and xylenes.

.3 C:
- .1 CB: catch basin.
- .2 CC: centre to centre.
- .3 CCN: contemplated change notice.
- .4 CDF: controlled density fill.
- .5 CEC: Canadian electical code.
- .6 CHS: Canadian hydrographic service.
- .7 CL: centreline..
- .8 CLR: clear.
- .9 COL: column.
- .10 CONC: concrete.
- .11 CONC BLK: concrete block.
- .12 CONT: continuous.
- .13 COMPL: complete.
- .14 CPM: critical path method.
- .15 C/W: complete with.

.4 D:
- .1 D: deep.
- .2 DEG: degree.
- .3 DIA: diameter.
- .4 DIM: dimension.

1.2 MATERIALS, EQUIPMENT AND METHODS (Cont'd)

.4 (Cont'd)

.5 DL: dead load.

.5 E:

.1 EA: each.
.2 ECF: engineered containment facility.
.3 EE: each end.
.4 EF: each face.
.5 EL: elevation.
.6 ELEC: electric.
.7 ENCL: enclosure.
.8 EQ: equal.
.9 EXIST: existing.
.10 EW: each way.

.6 F:

.1 FC: fuel contributed.
.2 FDN: foundation.
.3 FEXT: fire extinguisher.
.4 FIN: finish.
.5 FIP: federal identity program.
.6 FLD: field.
.7 FRR: fire resistance rating.
.8 FTG: footing.

.7 G:

.1 GALV: galvanized steel.
.2 GC: General Conditions.
.3 GCL: geosynthetic clay liner.

.8 H:

.1 HOR: horizontal.
.2 HOR EF: horizontal each face.
.3 HP: hydro pole.
.4 HPA: Hamilton Port Authority.
.5 HT: height.
.6 HYD: hydrant.

.9 I:

.1 ID: inside diameter.

.10 J:

.1 JT: joint.

.11 L:

.1 LG: long.
.2 LL: live load.

.12 M:

.1 MAS: masonry.

1.2 MATERIALS, EQUIPMENT AND METHODS (Cont'd)

.12 (Cont'd)
- .2 MAX: maximum.
- .3 MET: metal.
- .4 MH: maintenance hole.
- .5 MIN: minimum.

.13 N:
- .1 NBC: national building code.
- .2 NF: near face.
- .3 NFC: national fire code.
- .4 NIC: not in contract.
- .5 NTS: not to scale.

.14 O:
- .1 OBC: Ontario building code.
- .2 OC: on centre.
- .3 OD: outside diameter.
- .4 OPNG: opening.

.15 P:
- .1 PAH: polynuclear aromatic hydrocarbons.
- .2 PCC: precast concrete.
- .3 PL: plate.
- .4 PLYWD: plywood.
- .5 PR: pair.
- .6 PREFAB: prefabricated.
- .7 PRFL: profile.
- .8 PT: paint.
- .9 PVC: polyvinyl cholide.

.16 R:
- .1 R: radius.
- .2 RC: reinforced concrete.
- .3 REINF: reinforced/reinforcing.
- .4 REQD: required.
- .5 REQT: requirement.
- .6 RO: rough opening.
- .7 RWL: rain water leader.

.17 S:
- .1 SAN SEW: sanitary sewer.
- .2 SCHED: schedule.
- .3 SD: smoke developed.
- .4 SECT: section.
- .5 SPEC: specification.
- .6 SS: stainless steel.
- .7 STD: standard.
- .8 STL: steel.
- .9 STC: sound tranmission class.
- .10 STL PL: steel plate.

1.2 MATERIALS, EQUIPMENT AND METHODS (Cont'd)

.17 (Cont'd)
.11 STN: stone.
.12 STR: structure or structural.
.13 ST SEW: storm sewer.

.18 T:
.1 T: top.
.2 T&B: top and bottom.
.3 TCB: turbidity control plan.
.4 TEL: telephone.
.5 THKNS: thickness.
.6 TRANSV: transverse.
.7 TYP: typical.

.19 U:
.1 UGRD: underground.
.2 UOS: unless otherwise specified.
.3 U/S: underside.

.20 V:
.1 VERT: vertical.
.2 VERT EF: vertical each face.

.21 W:
.1 WD: wood.
.2 WHMIS: workplace hazardous materials information system.
.3 WSIB: workplace safety and insurnace board.
.4 WT: weight.
.5 WTP: water treatment plant.

1.3 STANDARDS ORGANIZATIONS

.1 Standards writing organizations:
.1 AA - Aluminum Association.
.2 ACPA - American Concrete Pipe Association.
.3 ANSI - American National Standards Institute.
.4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
.5 ASTM - American Society for Testing and Materials.
.6 AWPA - American Wood Preservers' Association.
.7 AWWA - American Water Works Association.
.8 CCDC - Canadian Construction Documents Committee.
.9 CCMPA - Canadian Concrete Masonry Producers Association.
.10 CGSB - Canadian General Standards Board.

1.3 STANDARDS ORGANIZATIONS (Cont'd)

.1 (Cont'd)

.11 CNTA - Canadian Nursery Trades Association.
.12 CPCA - Canadian Painting Contractors Association.
.13 CSA - Canadian Standards Association.
.14 CSC - Construction Specifications Canada.
.15 CSI - Construction Specifications Institute.
.16 CSSBI - Canadian Sheet Steel Building Institute.
.17 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
.18 ESA - Electrical Safety Authority.
.19 FFC - Federal Fire Commissioner.
.20 FSC - Forest Stewardship Council.
.21 IEEE - Institute of Electrical and Electronics Engineers Inc.
.22 ISO - International Organization for Standardization.
.23 LEED - LEED Canada, Leadership in Energy and Environmental Design.
.24 MPI - Master Painters Insitute.
.25 NAAMM - National Association of Architectural Metal Manufacturers.
.26 NCPI - National Clay Pipe Institute.
.27 NEMA - National Electrical Manufacturers Association.
.28 NFPA - National Fire Protection Association.
.29 OPSD - Ontario Provincial Standard Drawings.
.30 OPSS - Ontario Provincial Standard Specifications.
.31 PPI - Plasctics Pipe Institute.
.32 SCAQMD - South Coast Air Quality Management District.
.33 TIA - Telecommunications Industry Association.
.34 UL - Underwriters Laboratories.
.35 ULC - Underwriters Laboratories of Canada.
.36 US EPA - United States Environmental Protection Agency.
.37 WH - Warnock Hersey.

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 Departments, agencies and crown corporations.
.1 CEAA - Canadian Environmental Assessment Agency.
.2 CSC - Correctional Service Canada.

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENGIES (Cont'd)

.1 (Cont'd)
.3 CRA – Canada Revenue Agency.
.4 DND – Department of National Defence.
.5 EC – Environment Canada.
.6 FHBRO – Federal Heritage Buildings Review Office.
.7 HCD – Heritage Conservation Directorate.
.8 LC – Labour Canada.
.9 PC – Parks Canada.
.10 PWGSC – Public Works and Government Services Canada.
.11 RCMP – Royal Canadian Mounted Police.
.12 TBS – Treasury Board Secretariat.
.13 TC – Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 MOEE – Ontario Ministry of Environment and Energy.

.2 MOL – Ontario Ministry of Labour.

.3 MTO and MOT – Ontario Ministry of Transportation.

1.6 INTERNATIONAL GOVERNMENT DEPARTMENTS AND AGENCIES

.1 DOHMH – New York City Department of Health and Mental Hygiene, USA.

.2 GSA – Government Services Administration, USA.

1.7 UNITS OF MEASURE METRIC

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 C: Celsius.
.2 cm: centimetre.
.3 kg: kilogram.
.4 $kg/m^3$: kilogram per cubic metre.
.5 kN: kilonewton.
.6 kPa: kilopascals.
.7 kw: kilowatts.
.8 l/s: litre per second.
.9 m: metre.
.10 $m^3$: cubic metre.
.11 mg/kg: milligrams per kilogram.
.12 mg/L: milligrams per litre.
.13 mm: millimetres.
.14 MPa: megapascal.

1.7 UNITS OF MEASURE METRIC (Cont'd)

.1 (Cont'd)
.15 NTU: nephelometric turbidity unit.
.16 ppm: parts per million.
.17 ug/L: micrograms per litre.
.18 ug/$m^3$: micrograms per cubic metre.

1.8 UNITS OF MEASURE IMPERIAL

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 F: Fahrenheit.
.2 ft: foot/feet.
.3 ga: guage.
.4 gpm: gallons per minute.
.5 in: inches.
.6 lbs: pounds.
.7 NTU: nephelometric turbidity unit.
.8 psi: pounds-force per square inch.
.9 ppm: parts per million.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

## PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Requirements for the installation of rigid frame scaffolding to access the work.

.2 Requirement for stamped shop drawings of scaffolding design by a professional engineer retained by contractor.

.3 Inspection of scaffolding installation by professional engineer retained by contractor.

1.2 REFERENCES

.1 Structural Review, Niagara-River Range Rear Light, Niagara-on-the-Lake, Novatech Engineering, March 16, 2017.

1.3 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

1.4 SUBMITTALS

.1 In accordance with Section 01 11 06.

.2 Submit to Departmental Representative 5 sets of complete shop drawings of scaffolding design.
.1 Shop drawings of scaffolding design shall be stamped and signed by a professional engineer registered and licensed in the Province of Ontario, and experienced in the design of scaffolding.

## PART 2 - PRODUCTS

2.1 SCAFFOLDING

.1 Scaffolding materials shall be new, or used materials suitable for purpose and in good condition.

PART 3 - EXECUTION

3.1 SCAFFOLDING AND BARRIERS

.1 Provide all scaffolding, ladders, access, lifting equipment, etc. as necessary to carry out the work of all trades and as per the requirements of the work. All work to be in accordance with Occupational Health and Safety Act. Field measure to ensure proper fit of all works.

.2 Scaffolding shall be erected on wood sills which are placed on continuous sheets of plywood under the scaffolding to protect the existing ground area from damage and, tarps in other areas to prevent discolouration or contamination of surfaces.

.3 Provide suitable ladders to scaffolding at each face of the structure or per each section of scaffold isolated from other sections, for full height of scaffold. Access from the ladder(s) to the scaffolding shall be clear of obstructions and cross bracing so personnel and materials can easily enter.

.4 Scaffolding installation shall be inspected by the professional engineer retained by the contractor to complete the scaffolding design prior to its use. The engineer retained by the contractor shall provide the Departmental Representative with a letter stating that the installation conforms with their design and is suitable for the Contractor's use. Provide for periodic inspections monthly as scaffolding and work progresses.

END

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Barriers.

.2 Traffic Controls.

.3 Fire Routes.

### 1.2 MEASUREMENT PROCEDURES

.1 Work included in this section will not be measured for payment and will be included as part of the lump sum price.

### 1.3 REFERENCES

.1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
.2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):
.1 CSA O121-17, Douglas Fir Plywood.

### 1.4 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

### 1.5 HOARDING FOR ENTIRE SITE

.1 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide two lockable truck entrance gates and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

.2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

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 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.8 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 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.

1.10 PROTECTION OF FINISHES

.1 Provide protection for building finishes, site furnishings, and equipment during performance of Work.

.2 Provide necessary screens, covers and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 00 01 - Earthwork for Soil Remediation.

.2 Section 32 90 00 - Landscaping.

1.2 SUMMARY

.1 Section includes contaminated soil removal and off site disposal at an approved disposal facility, and placement of backfill and topsoil.

.2 Soil remediation work includes:
.1 Provide equipment required for soil remediation.
.2 Co-ordination, supervision and preparation for remediation of contaminated soil. Departmental Representative requires 2 days notice previous to the commencement of site work for provision of site supervision.
.3 Provision and installation of materials and equipment necessary to remediate site.
.4 Preparation of soil storage over layout and installation of associated equipment.
.5 Implementation of safety work zones, temporary barriers, site Health and Safety Plans and Emergency Response Plans.
.6 Removal and disposal of contaminated soil.
.7 Placement of cobble stones and boulders (sieved from contaminated soil) in excavation.

1.3 DEFINITIONS

.1 Disposal Facility: an existing facility located in Canada where waste is placed in or on land. It is designed, constructed and operated to prevent any pollution from being caused by the facility outside the area of the facility. The facility must hold a valid and subsisting permit, certificate, approval, or any other form of authorization issued by the Province of Ontario for disposal of contaminated soil.

1.3 DEFINITIONS (Cont'd)

.2 Certificate of Disposal: shall be a document issued by the disposal facility, which includes, on company letterhead, the name and location where the material is being disposed, a description of the date and quantity for each shipment of material received, and signature by the identified authorized company representative.

1.4 MEASUREMENT PROCEDURES

.1 Soil removal and disposal shall be measured in metric tonnes of the actual weight of soil remediated. Measurement shall be based on the net weight of contaminated soil delivered at the disposal facility and substantiated by certified weigh bills from the disposal facility.

.1 Remove and dispose of contaminated soil to the extent and limits indicated and as directed on site by Departmental Representative.

.2 Separate cobbles, stones and boulders larger than 300 mm diameter from contaminated soils, and use as fill in the on site excavations.

.3 Price shall include: preparatory work including obtaining the required permits and certificates; quality control/quality assurance; geomembranes; screening (300 mm) and separation of cobbles, stones and boulders from contaminated soil; other required equipment; implementation of safety work zones; excavation; loading; required storage and delivery of contaminated soil to the disposal facility; replacing separated cobbles, stones and boulders to excavated areas; grading; and making good all disturbed surfaces.

.2 Mobilization to and demobilization from the site will be measured as part of the lump sum price.

.3 Imported clean fill will be measured in metric tonnes of material placed. Measurement shall be based on net weight of material delivered and placed on site and substantiated by certified weigh bills from quarry scale.

1.4 MEASUREMENT PROCEDURES (Cont'd)

.4 Imported topsoil will be measured in metric tonnes of material placed. Measurement shall be based on net weight of material delivered and placed on site, and substantiated by certified weigh bills from quarry scale.

1.5 SUBMITTALS

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.

.2 Provide quality assurance and quality control submittals in accordance with Section 01 11 06 as follows:
.1 Description of emergency plans in case of breakdown, spill or other problem.
.2 Waste management plan and complete list of wastes, including waste registration numbers as required by provincial regulations, that will be generated by activities.
.3 Detailed plan of soil remediation to be supplied by Departmental Representative.

.3 Provide closeout submittals as follows:
.1 Provide written proof that contaminated soil has been sent to disposal facility authorized by MOE for Province of Ontario.
.2 Provide written proof that waste and debris have been sent to disposal facility authorized by MOE for Province of Ontario or eliminated according to level of contamination.

1.6 QUALITY ASSURANCE

.1 Regulatory requirements: perform work in accordance with:

1.6 QUALITY ASSURANCE (Cont'd)

.2 (Cont'd)

.1 Acts, Regulations, Laws, guidelines codes of practice, directives and policies of government authorities pertaining to: environment; noise; water supply; waste water; air quality; health and safety; transportation; and waste management.

.2 WHMIS.

.3 Canadian Environmental Assessment Act.

.4 Canadian Environmental Protection Act (New Substance Notification Regulations).

.5 Transportation of Dangerous Goods Act.

.6 National Building Code of Canada.

.7 National Fire Code of Canada.

.8 The Fisheries Act.

.9 Migratory Birds Convention Act.

.10 Migratory Birds Regulations.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Contaminated soil:

.1 Store excavated, contaminated soil as determined by Departmental Representative in drums or water-tight temporary storage cells. Cover stored contaminated soil with cap to minimize cross contamination due to water run-off and wind erosion and underlay contaminated soil with flexible membrane to minimize or prevent leaching losses. Transport and dispose of contaminated soil and water according to current provincial regulations.

.2 Conduct sieving/screening of soils over an impermeable membrane as directed by the Departmental Representative, to minimize cross contamination due to screening activities.

.3 Store non-contaminated soil excavated by drilling or trenching only on non-contaminated site surface areas. Ensure no contact between non-contaminated excavated soil and drainage or contaminated water or contaminated soil.

.2 New materials and equipment:

.1 Ship, store and preserve in original packaging with manufacturer's seal and label remain intact.

.2 Ensure materials and equipment are not damaged, altered or soiled during shipment, handling and storage.

.3 Transport rejected equipment and materials from work site immediately.

1.7 DELIVERY, STORAGE, AND HANDLING (Cont'd)

.2 (Cont'd)
.4 Store materials and equipment according to manufacturer's and supplier's instructions.
.5 Establish quality management system for materials and equipment.

1.8 EXISTING CONDITIONS

.1 Buried services:
.1 Known underground utilities and buried objects as indicated on drawings are for guidance only. The utilities indicated may not be accurate or complete. The Contractor shall confirm the location of all utilities within the limit of work before proceeding.
.2 Confirm locations of buried utilities by careful text excavations.
.3 Remove obsolete buried services within 2 m of foundations and cap cut-offs.
.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
.5 Where utility lines or structures exist in area of excavation, obtain direction from Departmental Representative before re-routing or removing. Costs for re-routing to be paid by Departmental Representative. Removal of abandoned utility lines or structures will be considered incidental to the work and will not be paid for separately.
.6 Record location of maintained, re-routed and abandoned underground lines.

.2 Existing building and surface features:
.1 Conduct, with Departmental Representative,condition survey of existing buildings, trees, lawns, service poles, wires, survey bench marks and monuments and all other site features, as determined by Departmental Representative, which may be affected by Work.
.2 Protect all aforementioned features from damage while work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

1.9 PROJECT/SITE CONDITIONS

.1 Environmental Requirements:
.1 Review of environmental assessment to be completed by Departmental Representative.

1.9 PROJECT/SITE CONDITIONS (Cont'd)

.2 Existing Conditions: removal of contaminated soil;

.1 Set area aside for temporary storage of contaminated soils.

.2 Set area aside for screening of cobbles, stones and boulders larger than 300 mm diameter from contaminated soils.

.3 Restore excavated portion with gravel sieved from contaminated soil and grade excavations to match surrounding grade.

.4 Protect non-contaminated material from adjacent contaminated soil.

1.10 SEQUENCING

.1 Decontaminate equipment used in remediation procedures before removing equipment from work area.

1.11 MAINTENANCE OF ACCESS ROADS

.1 Unless otherwise directed maintain access roads as follows:

.1 Obtain permission to use existing roads/paths to access site.

.2 Maintain and clean roads/paths for duration of Work.

.3 Repair damage incurred from use of roads/paths.

.4 Provide photographic documentation of roads/paths used by construction vehicles before, during and after Work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Topsoil: to the requirements of Section 32 90 00.

.2 Clean Material: to the requirements of Section 31 00 01.

2.2 EQUIPMENT

.1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

2.2 EQUIPMENT (Cont'd)

.2 Geomembrane: impermeable.

.3 Trucks: use watertight truck bodies for transporting contaminated soil.

.4 Peripheral water drainage system, surface water.

.5 Environmental emergency response equipment.

.6 Safety equipment.

PART 3 - EXECUTION

3.1 EQUIPMENT

.1 Trucks:
.1 Clean meticulously between loads of contaminated soil and clean fill.
.2 Clean meticulously at end of Work.
.3 Cover truck bodies with tarpaulins during transportation.

3.2 PREPARATION

.1 Protection:
.1 Keep excavation sites water free throughout work.
.2 Protect excavation from rainwater.
.3 Provide temporary structures to divert flow of surface waters from excavation.
.4 Provide safety measures to ensure worker and public safety.

3.3 APPLICATION

.1 Soil Management:
.1 Store, transport, and eliminate off-site in accordance with applicable provincial standards, requirements and regulations.
.2 Do not dilute contaminated soil with less contaminated soil.

3.4 METHOD OF REMEDIATION

.1 Contaminated/volatile waste: store in covered metal containers.

.2 Hazardous waste: dispose of in accordance with regulations.

3.4 METHOD OF REMEDIATION (Cont'd)

.3 Use removal and off site disposal for contaminated soil. Soil removal and off-site disposal shall be completed by Contractor and supervised by Departmental Representative. Contractor is responsible to provide schedule for contaminated soil removal. Departmental Representative requires two weeks notice from Contractor to conduct on-site supervision.

.4 Soil removal and off-site disposal.
.1 Excavate contaminated soils so as to prevent contamination of non-contaminated soils. Store contaminated soil in drums and underlay stored contaminated soil with a flexible membrane (polyethylene liner - 15 mm or heavier).
.2 Remove contaminated soils as indicated, and as directed by Departmental Representative.
.3 Separate cobbles, stones and boulders from Contaminated soil using a 300 mm screen.

.5 Removal and off-site disposal of contaminated soils in accordance with applicable federal and provincial regulations.

.6 Place screened cobbles and stones in excavation.

3.5 RESTORATION

.1 Backfill and grade excavations in accordance with Section 31 00 01.

3.6 FIELD QUALITY CONTROL

.1 Site Tests:
.1 Ensure leachate test results conform to hazardous waste regulations.
.2 Remove and replace non-compliant materials.

3.7 EQUIPMENT DECONTAMINATION

.1 Decontaminate equipment used in remediation process and remove from site at end of remediation activities.

3.8 ENVIRONMENTAL PROTECTION

.1 While executing the project, implement the mitigation measures identified in the Environmental Effects Evaluation (Appendix B) prepared in accordance with the Canadian Environmental Assessment Act (CEAA) for this project. The contractor should verify that these measures have been undertaken and provide documentation to the Departmental Representative.

END

PART 1 - GENERAL

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work: Type 1 Operation.
.1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap.
.2 Abatement will be carried out on all painted surfaces on the lighthouse, including; wood, metal, and concrete surfaces.

1.2 MEASUREMENT PROCEDURES

.1 Lead-base paint abatement shall be measured in square metres of surface treated.

1.3 REFERENCES

.1 Ontario Ministry of Labour
.1 Occupational Health and Safety Branch, Guideline Lead On Construction Projects, September 2004, and O. Reg. 490/09 respecting Designated Substances - Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.

.2 Department of Justice Canada
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 Health Canada
.1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).

.4 Human Resources and Social Development Canada (HRSDC)
.1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.

.5 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.6 U.S. Environmental Protection Agency (EPA)
.1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.

1.3 REFERENCES (Cont'd)

.7 Environmental Abatement Council of Ontario.
.1 EACO - Lead Guideline for construction, Renovation, Maintenance or Repair, October 2014.

.8 Underwriters' Laboratories of Canada (ULC).

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 direction at 99.97% efficiency.

.2 Authorized Visitors: Departmental Representative or designated representatives.

.3 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. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.

.4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

.5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/$m^3$) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead based paint by methods noted in paragraph 1.1.

.6 Competent person: individuals Departmental Representative capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.

.7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.5 SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 06.

.2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.

.3 Provide proof of Contractor's General and Environmental Liability Insurance.

.4 Quality Control:
.1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that lead based paint waste has been received and properly disposed.
.2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial and local requirements pertaining to lead paint, 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 29.
.2 Safety Requirements: worker and visitor protection.
.1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
.1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of 10, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide sufficient amount of filters.

1.6 QUALITY ASSURANCE (Cont'd)

.2 (Cont'd)

.2 (Cont'd)

.2 Half mask respirator: half-mask particulate respirator with N - series filter, and 99% efficiency must be provided.

.2 Eating, drinking, chewing, and smoking are not permitted in work area.

.3 Ensure workers wash hands and face when leaving work area. Facilities for washing shall be provided by contractor.

.4 Visitor Protection:

.1 Provide approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.2 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of lead waste in sealed double thickness 0.152 mm thick bags or leak proof drums. Label containers with appropriate warning labels.

.3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 SCHEDULING

.1 Not later than two days before beginning Work on this Project notify following in writing:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Provincial Ministry of Labour.

.3 Disposal Authority.

.2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.

.3 Provide Departmental Representative copy of notifications prior to start of Work.

1.9 PERSONNEL TRAINING

.1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators. Training must be valid for duration of project.

.2 Instruction and training shall include, at minimum:
.1 Proper fitting of respirator equipment.
.2 Inspection and maintenance of respirator equipment.
.3 Disinfecting of respirator equipment.
.4 Limitations of respirator equipment.
.5 Training requirements outlined in the EACO-Lead Guideline for Construction, Renovation, Maintenance or Repair based on class of operations as described in aforementioned guideline.

.3 Instruction and training must be provided by competent, qualified person, as defined by the Ontario Occupational Health and Safety Act.

.4 Supervisory personnel to complete required training.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.

.2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

.3 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.

.4 Lead waste containers: metal type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.

2.1 MATERIALS (Cont'd)

.4 (Cont'd)
.1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

.1 One Supervisor for every ten workers is required.

.2 Supervisor must remain within work area during disturbance, removal, or handling of lead based paints.

3.2 PREPARATION

.1 Remove and store items to be salvaged or reused.
.1 Protect and wrap items and transport and store in area specified by Departmental Representative.

.2 Work Area:
.1 Place drop sheets to collect dust, chips or debris containing lead, or provide full enclosure as required by class of operation as described in the EACO - Lead Guideline for Construction, Renovation, Maintenance or Repair.
.2 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required.
.3 Provide electrical power and shut off for operation of powered tools and equipment . Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.

.3 Do not start work until:
.1 Arrangements have been made for disposal of waste.
.2 Tools, equipment, and materials waste containers are on site.
.3 Arrangements have been made for building security.

3.2 PREPARATION (Cont'd)

.3 (Cont'd)

.4 Notifications have been completed and preparatory steps have been taken.

.5 Drop sheets and/or enclosures are in place.

3.3 LEAD ABATEMENT

.1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap.

.2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.

.3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

.4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative apply continuous coat of slow drying sealer to surfaces of work area. Do not disturb work area for 8 hours no entry, activity, ventilation, or disturbance during this period.

3.4 INSPECTION

.1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.

3.4 INSPECTION (Cont'd)

.2 Departmental Representative 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.

3.5 LEAD SURFACE SAMPLING - WORK AREAS

.1 Final lead surface sampling to be conducted as follows:

.1 After work area has passed a visual inspection for cleanliness approved and accepted by Departmental Representative. Apply coat of lock-down agent to surfaces within enclosure, and appropriate setting period of 8 hours has passed, Departmental Representative will perform lead wipe sampling.

.1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.

.2 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.

.3 Repeat as necessary until fibre levels are less than 40 micrograms per square foot.

3.6 FINAL CLEANUP

.1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

3.6 FINAL CLEANUP (Cont'd)

.3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.2 The Master Painters Institute (MPI)
.1 Maintenance Repainting Manual 2004, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

.3 National Fire Code of Canada, 2015 (NFC).

.4 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.2 MEASUREMENT PROCEDURES

.1 Exterior re-painting shall be measured in square metres of surface covered.

1.3 QUALITY ASSURANCE

.1 Conform to latest MPI requirements for exterior repainting work including cleaning, preparation and priming.

.2 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, and solvents) to be in accordance with the latest edition of the MPI Approved Product List and to be from a single manufacturer for each system used.

.3 Paint materials such as linseed oil, shellac, and turpentine, to be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.

.4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

1.4 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements:

.2 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Departmental Representative for changes in work schedule.

.3 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

1.6 SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 06.

.2 Provide samples in accordance with Section 01 11 06.
.1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.

.3 Provide product data and manufacturer's installation/application instructions for paints and coating products to be used.

.4 Provide WHMIS Material Safety Data Sheets (MSDS) for paints and coating materials to be used.

.5 Quality Assurance Submittals:
.1 Manufacturer's Instructions: manufacturer's installation instructions.

.6 Closeout Submittals:
.1 Provide records of products used. List products in relation to finish system and include following:
.1 Product name, type and use (i.e. materials and location).
.2 Manufacturer's product number.
.3 Colour code numbers.

1.6 SUBMITTALS (Cont'd)

.6 (Cont'd)
.1 (Cont'd)
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Material Safety Data Sheets.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle materials in accordance with Section 01 11 06, supplemented as follows:
.1 Deliver and store materials in original containers, sealed, with labels intact.
.2 Labels to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.
.3 Remove damaged, opened and rejected materials from site.
.4 Store and handle in accordance with manufacturer's recommendations.
.5 Store materials and equipment in secure, dry, well-ventilated area with temperature range between 7 degrees C to 30 degrees C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.
.6 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. Upon completion of operations, return areas to clean condition to approval of Departmental Representative.
.7 Remove paint materials from storage in quantities required for same day use.
.8 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
.9 Fire Safety Requirements:
.1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site daily.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

.2 Paint, stain and wood preservative finishes and related materials are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.2 (Cont'd)

.5 (Cont'd)

.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.8 AMBIENT CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer.

.2 Do not perform repainting work when:

.1 Ambient air and substrate temperatures are below 10 degrees C, unless paint is specifically formulated for applications at low temperatures.

.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI and paint manufacturer's prescribed limits.

.4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow is forecast to occur before paint has thoroughly cured.

.6 It is foggy, misty, raining or snowing at site.

.3 Conduct moisture tests using properly calibrated electronic Moisture Meter, except test existing painted concrete floors for moisture using simple "cover patch test" on failed areas.

.4 Do not perform repainting work when maximum moisture content of substrate exceeds:

.1 12% for concrete and masonry.

.2 15% for wood.

.5 Test painted concrete and masonry surfaces for alkalinity as required.

.2 Application Requirements:

1.8 AMBIENT CONDITIONS (Cont'd)

.2 (Cont'd)

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted.

.3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

## PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Product List (APL) are acceptable for use on this project.

.2 Paint materials for repaint systems: products of single manufacturer.

2.1 MATERIALS (Cont'd)

.3 Only qualified products with E3 MPI "Environmentally Friendly" rating are acceptable for use on this project.

.4 Paints and coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.5 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.6 Each surface shall be painted with a paint appropriate for that type of surface.

2.2 COLOURS

.1 Colours:
.1 White: RAL ID 9016.
.2 Red: RAL ID 3020.

.2 First coat in two coat (Premium) repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Where thinner is used, addition not to exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

2.3 MIXING AND TINTING (Cont'd)

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following MPI gloss/sheen standard values:

| Gloss Level Category | Units @ 60 Degrees | Units @ 85 Degrees |
|---|---|---|
| G1 – matte finish | 0 to 5 | maximum 10 |
| G2 – velvet finish | 0 to 10 | 10 to 35 |
| G3 – eggshell finish | 10 to 25 | 10 to 35 |
| G4 – satin finish | 20 to 35 | minimum 35 |
| G5 – semi-gloss finish | 35 to 70 | |
| G6 – gloss finish | 70 to 85 | |
| G7 – high gloss finish | > 85 | |

.2 Gloss level ratings of repainted surface: G4 satin on wood and G6 gloss on metal and concrete.

2.5 EXTERIOR PAINTING SYSTEMS

.1 REX 3.1 – Concrete Surfaces: as recommended by manufacturers Technical Representative for exterior applications.

.2 REX 5.1 – Structural Steel and Metal surfaces :as recommended by manufacturer's Technical Representative for exterior applications.

.3 REX 6.2 – Dimension Lumber: as recommended by manufacturer's Technical Representative for exterior application.

.4 REX 6.3 – Dressed Lumber: as recommended by manufacturer's Technical Representative for exterior application.

2.5 EXTERIOR PAINTING SYSTEMS (Cont'd)

.5 REX 6.6 - Wood Shingle and Shake Siding: as recommended by manufacturer's technical representative for exterior application.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXISTING CONDITIONS

.1 Prior to commencing work, examine site conditions and existing exterior substrates to be repainted and report in writing to Departmental Representative and General Contractor damages, defects, unsatisfactory or unfavourable conditions of surfaces that will adversely affect this work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, and report findings to Departmental Representative and General Contractor. Maximum moisture content not to exceed specified limits.

.3 No repainting work to commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor .

.4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

| Condition | Description |
|---|---|
| DSD-0 | Sound Surface ( includes visual (aesthetic) defects that do not affect film's protective properties). |
| DSD-1 | Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface |

| | |
|---|---|
| | contamination, minor pin holes and scratches). |
| DSD-2 | Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining). |
| DSD-3 | Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges). |
| DSD-4 | Substrate Damage (repair or replacement of surface required). |

3.3 PROTECTION

.1 Protect windows, existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect general public and building occupants in and about the building.

.5 Removal of light fixtures, surface hardware on doors, and surface mounted equipment, fittings and fastenings to be done prior to undertaking painting operations. Store items and re-install after painting is completed.

.6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.4 APPLICATION

.1 Do not apply paint until surfaces have been accepted by the Departmental Representative.

3.4 APPLICATION (Cont'd)

.2 Apply paint by method that is best suited for substrate being repainted using brush roller air sprayer and/or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise. In each case method of application to be as pre-approved by Departmental Representative before commencing work.

.3 Brush and Roller Application:
.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces to be free of roller tracking and heavy stipple unless approved by Departmental Representative.
.5 Remove runs, sags and brush marks from finished work and repaint.

.4 Spray Application:
.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation by intermittent agitation as frequently necessary.
.3 Apply paint in uniform layer, with overlapping at edges of spray pattern.
.4 Back roll spray applications and brush out runs and sags immediately.
.5 Use brushes to work paint into cracks, crevices and places that are not adequately painted by spray.

.5 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

3.4 APPLICATION (Cont'd)

.6 Apply paint coats in a continuous manner and allow surfaces to dry and cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats not less than that recommended by manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

.7 Sand and dust between coats to remove visible defects.

.8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.9 Finish to doors include all edges including top and bottom edges. Surfaces concealed by door hardware be repainted unless otherwise pre-approved.

3.5 MECHANICAL / ELECTRICAL EQUIPMENT

.1 Unless otherwise noted, repainting to include exposed to view/previously painted exterior mechanical and electrical equipment and components (panels, conduits, piping, hangers, and ductwork).

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour and finish to match existing finish unless otherwise noted or scheduled.

.3 Do not paint over name plates or instruction labels.

.4 Standard of Acceptance: when viewed using natural prevailing sunlight at peak period of the day (mid-day) on surface viewed, surfaces to indicate following:
.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
.2 Soffits: no defects visible from grade at 45 degrees to surface.
.3 Final coat to exhibit uniformity of colour and sheen across full surface area.

3.6 FIELD QUALITY CONTROL

.1 Advise Departmental Representative and Paint Inspection Agency when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.2 Co-operate with Paint Inspection Agency and provide access to areas of work.

.3 Manufacturer's Field Services:
.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.7 CLEANING

.1 Proceed in accordance with Section 01 11 06.

.2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.3 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials and debris.

.4 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

.5 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as cleaning and protective materials (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as specified.

.6 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations to be disposed of in manner acceptable to authorities having jurisdiction.

3.7 CLEANING (Cont'd)

.7 Recycle paint and coatings in excess of repainting requirements as specified.

3.8 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 Backfilling and grading after removal and disposal of contaminated soil.

.2 Earthwork: excavating, backfilling and grading in areas not excavated under Section 02 61 00.

1.2 MEASUREMENT PROCEDURES

.1 Supply, placing and grading of backfill will be measured under Section 02 61 00.

1.3 RELATED REQUIREMENTS

.1 Section 02 61 00 - Removal and Disposal of Contaminated Soils.

.2 Section 32 90 00 - Landscaping.

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A653/A653M-15e1, Standard for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.2 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft$^3$) (600kN-m/m$^3$).
.3 ASTM D751-06(2011), Standard Test Methods for Coated Fabrics.
.4 ASTM D5034-09(2013), Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

.2 Canadian Standards Association (CSA International)
.1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.1 CAN/CSA-A3001-13, Cementitious Materials for Use in Concrete.

1.4 REFERENCES (Cont'd)

.2 (Cont'd)
.2 (Cont'd)

.3 Department of Justice Canada
.1 Explosives Act, R.S., c. E-15, s. 1 (updated September 27th, 2005).

.4 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
.1 OPSS.PROV 401 November 2015, Construction Specification for Trenching, Backfilling, and Compacting.
.2 OPSS.PROV 1004 November 2012,, Material Specification for Aggregates - Miscellaneous.
.3 OPSS.PROV 1010 April 2013, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

.5 U.S. Environmental Protection Agency (EPA)/Office of Water
.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.5 SUBMITTALS

.1 Provide submittals in accordance with Section 01 11 06.
.1 Submit to designated testing agency, 23 kg sample of clean material proposed for use, no later than one week before backfilling or filling work.

.2 Submit testing results and report as described in PART 3 - FIELD QUALITY CONTROL.

1.6 QUALITY ASSURANCE

.1 Do construction occupational health and safety in accordance with Section 01 35 29.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 06.

.2 Divert unused vegetation materials from landfill as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Topsoil: to the requirements of Section 32 90 00.

.2 Clean material: obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

PART 3 - EXECUTION

3.1 BACKFILLING

.1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Departmental Representative.

.2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.

.3 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill.
.1 Fill excavated areas with selected subgrade material gravel and sand compacted as specified for fill.

.4 Placing:
.1 Place backfill, fill and basecourse material in 150 mm lifts: add water as required to achieve specified density.

.5 Restore surface of excavation with material and finish to match existing adjoining surfaces.

.6 Compaction: compact each layer of material to following densities for material to ASTM D698:
.1 To underside of topsoil: 90%.

.7 Under seeded and sodded areas: use screened cobbles supplemented with clean material to bottom of topsoil.

3.1 BACKFILLING (Cont'd)

.8 Against existing foundations: clean material with no stones larger than 200 mm diameter within 600 mm of structures.

3.2 GRADING

.1 Fill and grade site to match existing grading.

3.3 FIELD QUALITY CONTROL

.1 Testing of materials and compaction of backfill will be carried out by testing laboratory designated by Departmental Representative.

.2 Not later than one week before backfilling or filling, provide to designated testing agency, samples of backfill as described in PART 1 - SUBMITTALS.

.3 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.

.4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative so that compaction tests can be carried out by designated testing agency.

3.4 SHORTAGE AND SURPLUS

.1 Supply necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.

.2 Dispose of surplus material off site.

3.5 CLEANING

.1 Proceed in accordance with Section 01 11 06.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Supply and placement of topsoil will be measured under Section 02 61 00.

1.2 RELATED REQUIREMENTS

.1 Section 02 61 00 - Removal and Disposal of Contaminated Soils.

1.3 REFERENCES

.1 Province of Ontario:
.1 Environmental Protection Act.

1.4 SOURCE QUALITY CONTROL

.1 Acceptance of topsoil subject to inspection and/or soil analysis test results. Do not commence work until topsoil accepted by Departmental Representative.

.2 Test topsoil from source prior to stripping and stockpiling, for clay, sand and silt, NPK, Mg, soluble salt content, pH value, growth inhibitors and soil sterilants.
.1 Use 25 mm diameter sampling tube or spade and in presence of Departmental Representative take 25 samples per hectare to full depth of top soil at random across entire area to be stripped. Mix samples together thoroughly before submitting for testing.
.2 Submit 0.5 kg sample of topsoil to testing laboratory and indicate present use, intended use, type of subsoil and quality of drainage. Prepare and ship sample in accordance with provincial regulations and testing laboratory requirements.
.3 Determine required limestone treatment to bring pH value of soil to between 5.5 and 7.5 level.
.4 Submit two copies of soil analysis and recommendations for corrections to Departmental Representative.

1.5 ENVIRONMENTAL CHOICE PROGRAM

.1 Provide products bearing the 'Ecologo' of the Environmental Choice Program, Department of the Environment, Canadian Environmental Protection Act, Environmental Choice Product Guidelines ECP/PCE-69-94 Polyethylene Film Products.

.2 Submit two copies of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the ECP to the Departmental Representative in accordance with Section 01 11 06. Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Topsoil: horticultural loam, pH value 5.5 to 7.5, free of toxic elements and debris and appropriate for supporting intended plant growth.
.1 Topsoil shall meet standards as per MOECC Table 1: background soil quality criteria of Part XV.1 of the Ontario Environmental Protection Act.

PART 3 - EXECUTION

3.1 TOPSOIL PLACEMENT

.1 Apply 150 mm topsoil as indicated.
.1 Spread and mix lime required to bring pH value to between 5.5 and 7.5 level into top 150 mm of soil in accordance with soil analysis recommendations.

END

PART 1 - GENERAL

1.1 MEASUREMENT AND PAYMENT

.1 Measurement for sodding will be in square metres and shall include:
.1 Sod.
.2 Fertilizer.
.3 Maintenance during establishment and warranty period.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:
.1 Schedule sod laying to coincide with preparation of soil surface.
.2 Schedule sod installation when frost is not present in ground.
.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 11 06.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for sod, and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS MSDS.

.3 Samples.
.1 Submit:
.1 Sod for each type specified.
.1 Install approved samples in1 square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.
.2 0.5 kg container of each type of fertilizer used.
.2 Obtain approval of samples by Departmental Representative.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements of seed mix, seed purity, and sod quality.

.5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties of seed mix, seed purity, and sod quality.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.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 in accordance with supplier's recommendations.
.2 Replace defective or damaged materials with new.

.4 Package Waste Management: remove for reuse and return of pallets, crates, padding, and packaging materials.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.

.2 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars.

.3 Number One Named Cultivars: Nursery Sod grown from certified seed.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 1 broadleaf weed and up to 1% native grasses per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

.2 Commercial Grade Turf Grass Nursery:

.1 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.

.2 Not more than 5 broadleaf weeds and up to 20% native grasses per 40 square metres.

.3 Water:

.1 Supplied by Departmental Representative at designated source.

.4 Fertilizer:

.1 To Canada "Fertilizers Act" and Fertilizers Regulations.

.2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

.1 Obtain written approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

PART 3 - EXECUTION

3.1 INSTALLERS

.1 Use installers who are experienced in the work

3.2 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.3 PREPARATION

.1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod and plus or minus 15 mm for Commercial Grade Turf Grass Nursery, surface to drain naturally.

3.3 PREPARATION (Cont'd)

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site in location as directed by Departmental Representative.

3.4 SOD PLACEMENT

.1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.

.2 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.4 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.5 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
.1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
.2 Not less than 3-6 pegs per square metre.
.3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative DCC Representative Consultant.
.4 Drive pegs to 20 mm above soil surface of sod sections.

3.6 FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods to following program:

| Date | Date | Rate | Ratio |
|---|---|---|---|
| May to | June | 687 kg/ha | 1:2:2 |
| Sep to | Oct | 687 kg/ha | 1:4:4 |

3.7 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.
.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials for reuse, compost and recycling.
.1 Remove recycling and compost containers and bins from site and dispose of materials at appropriate facility.
.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.8 PROTECTION BARRIERS

.1 Protect newly sodded areas from deterioration with snow fence on rigid frame as directed by Departmental Representative.

.2 Remove protection after inspection as directed by Departmental Representative.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.
.1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
.2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.
.3 Maintain sodded areas weed free 95%.

3.9 MAINTENANCE DURING ESTABLISHMENT PERIOD (Cont'd)

.1 (Cont'd)
.4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
.5 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.10 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
.1 Sodded areas are properly established.
.2 Sod is free of bare and dead spots.
.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Sodded Commercial Grade Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
.1 Sodded areas are properly established.
.2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.
.3 Sod is free of bare or dead spots and extent of weeds apparent in grass is acceptable.
.4 Sodded areas have been cut minimum 2 times prior to acceptance.
.5 Fertilizing in accordance with fertilizer program has been carried out at least once.

.3 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

.4 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

.5 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.11 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded Turf Grass Nursery Sod Commercial Grade Turf Grass Nursery Sod areas at sufficient intervals to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.

.3 Cut grass and remove clippings that will smother grass as directed by Departmental Representative to height as follows:

.1 Turf Grass Nursery Sod:

.1 50 mm during normal growing conditions.

.2 Commercial Grade Turf Grass Nursery Sod :

.1 60 mm during normal growing conditions.

.3 Cut grass at 2 week intervals or as directed by Departmental Representative, but at intervals so that approximately one third of growth is removed in single cut.

.4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Eliminate weeds by mechanical or chemical means to extent acceptable to Departmental Representative.

END

Public Works
Government Services
Canada

Ontario Region

Travaux publics
Services gouvernementaux
Canada

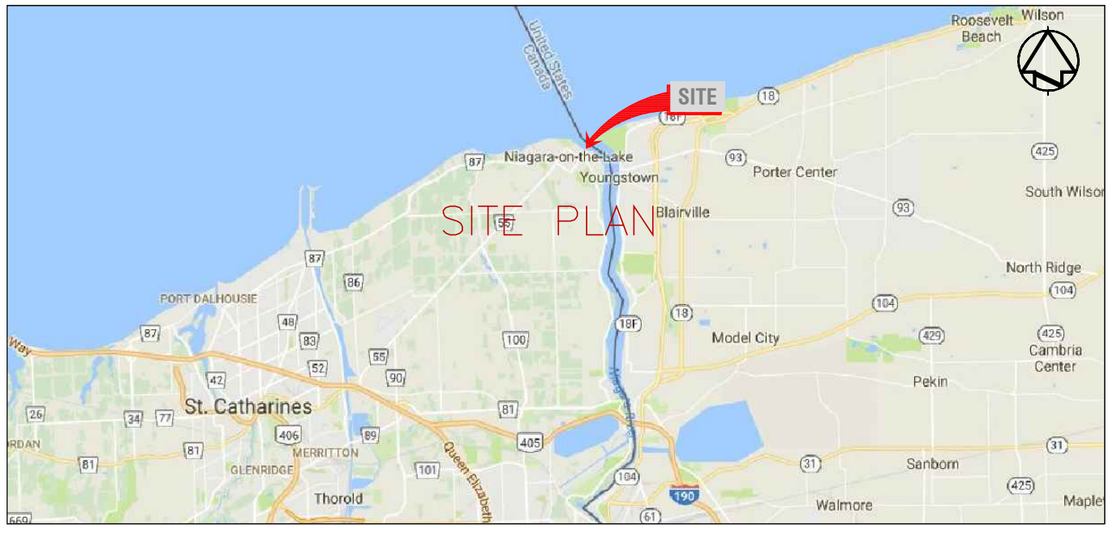
Région de l'Ontario

# NIAGARA RIVER RANGE REAR LIGHTHOUSE

## NAIAGARA–ON–THE–LAKE, ON

# LEAD BASE PAINT ABATEMENT AND CONTAMINATED SOIL REMOVAL

## PWGSC Proj. No.: R.090007.001




SITE PLAN

Canada

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

LIST OF DRAWINGS

SITE

C-1 SITE LOCALITY PLAN
C-2 METAL IMPACTED SOIL REMOVAL
A-1 LEAD BASED PAINT ABATMENT

| revision | | date |
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| 04 | | |
| 03 | | |
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Do not scale drawings. Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A Detail No. No. du détail
B drawing no. – where detail required dessin no. – où détail exigé
C drawing no. – where detailed dessin no. – où détaillé

project title / titre du projet: DFRP No. 86598

NIAGARA RIVER RANGE REAR
NIAGARA ON THE LAKE, ONTARIO

LEAD PAINT ABATEMENT AND SOIL REMEDIATION

drawing title / titre du dessin: COVER PAGE

drawn by / dessiné par: ZF

designed by / conc par: AC

approved by / approuvé par: SG

bid office / project manager soumissionner / gestionnaire de projets

project date / date du projet: 2017–08–24

project no. / no. du projet: R.090007.001

drawing no. / dessins no.: C–0


Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

LEGEND:

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| 01 | 0 | 2017-08-24 |
| revision | | date |

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project title / titre du projet — DFRP No. 86598

NIAGARA RIVER RANGE REAR

NIAGARA ON THE LAKE, ONTARIO

LEAD PAINT ABATEMENT AND SOIL REMEDIATION

drawing title / titre du dessin

# SITE LOCALITY PLAN

drawn by / dessine par: ZF

designed by / conc par: AC

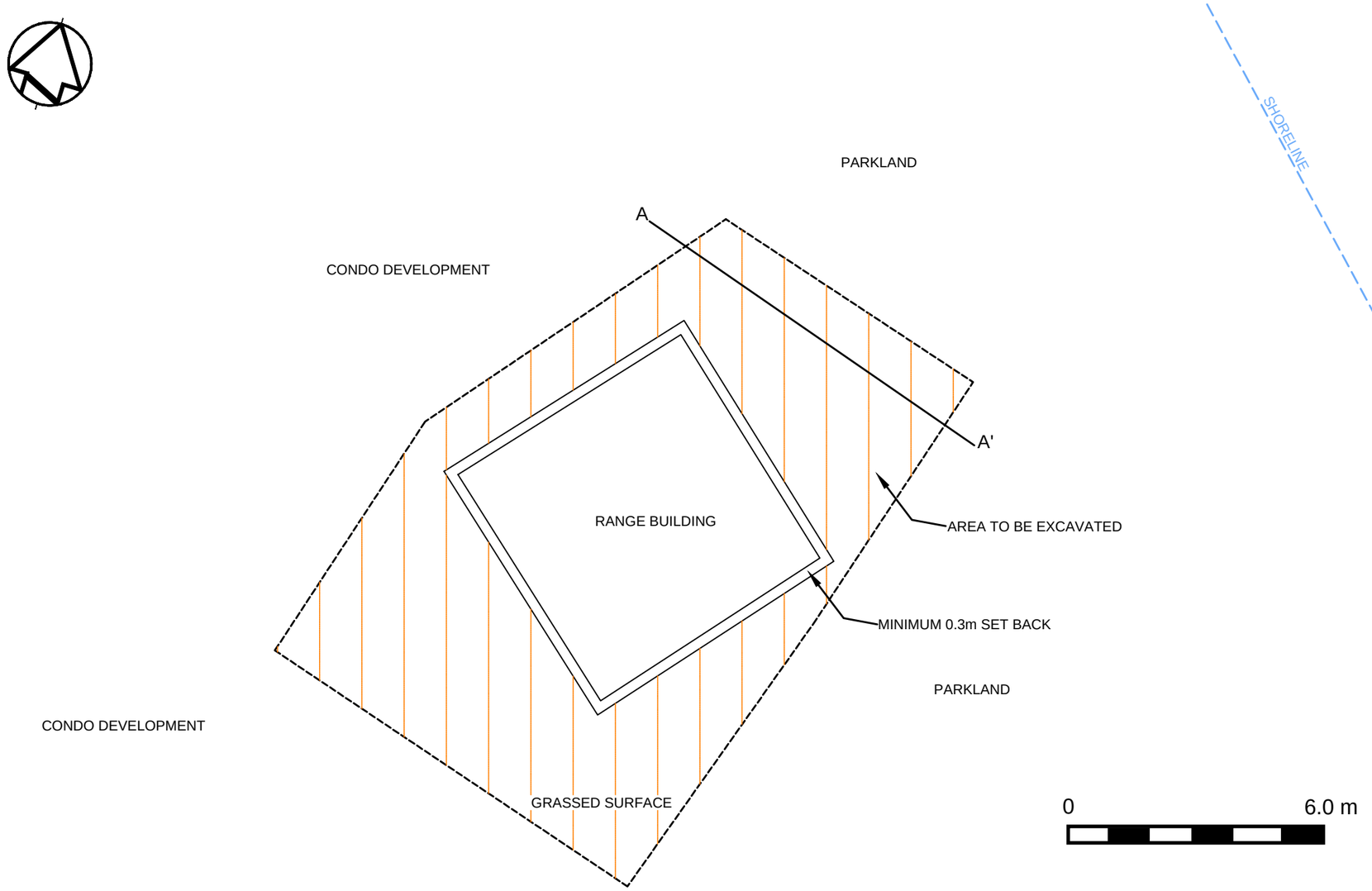
approved by / approuve par: SG

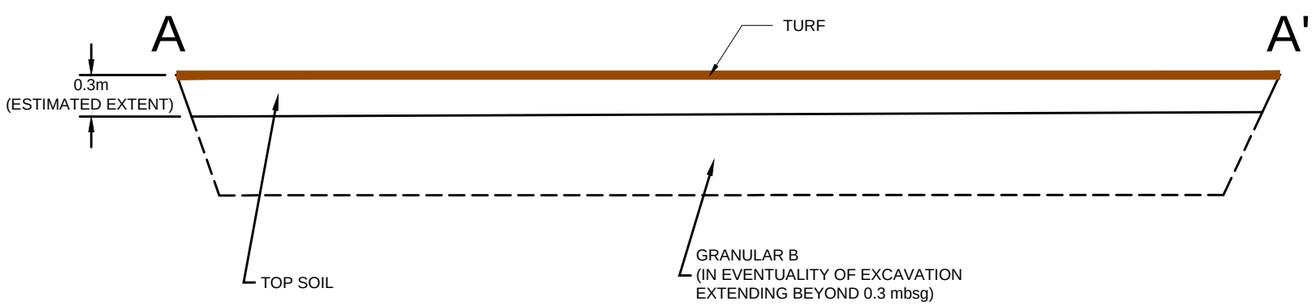
bid / offre — project manager / administrateur de projets

project date / date du projet: 2017-08-24

project no. / no. du projet: R.090007.001

drawing no. / dessine no.: C-1




NOT TO SCALE

Public Works and Government Services Canada
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LEGEND:
- PROPERTY LINE
- OPEN WATER
- CROSS SECTION LOCATION
- AREA TO BE EXCAVATED

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| 01 | 0 | 2017-08-24 |

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C drawing no. – where detailed / dessin no. – où détaillé

project title / titre du projet — DFRP No. 86598
NIAGARA RIVER RANGE REAR
NIAGARA ON THE LAKE, ONTARIO
LEAD PAINT ABATEMENT AND SOIL REMEDIATION

drawing title / titre du dessin
METAL IMPACTED SOIL REMOVAL

drawn by / dessine par: ZF
designed by / conc par: AC
approved by / approuve par: SG
bid / offre
project manager / administrateur de projets
project date / date du projet: 2017-08-24
project no. / no. du projet: R.090007.001
drawing no. / dessine no.: C-2

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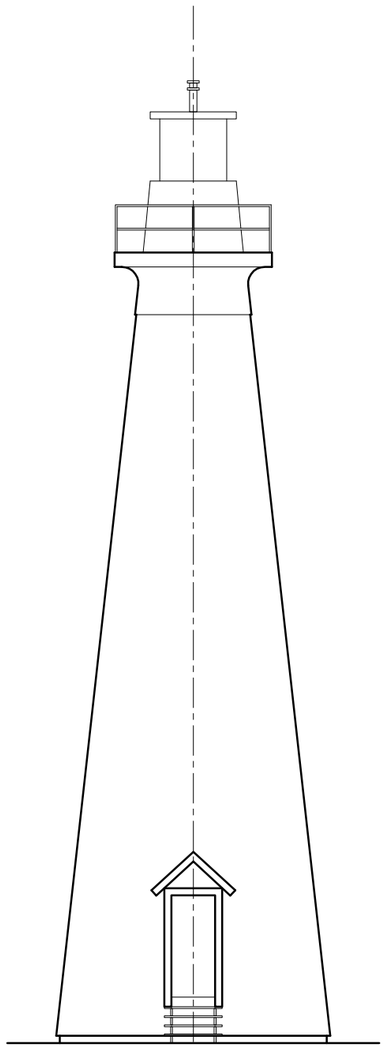

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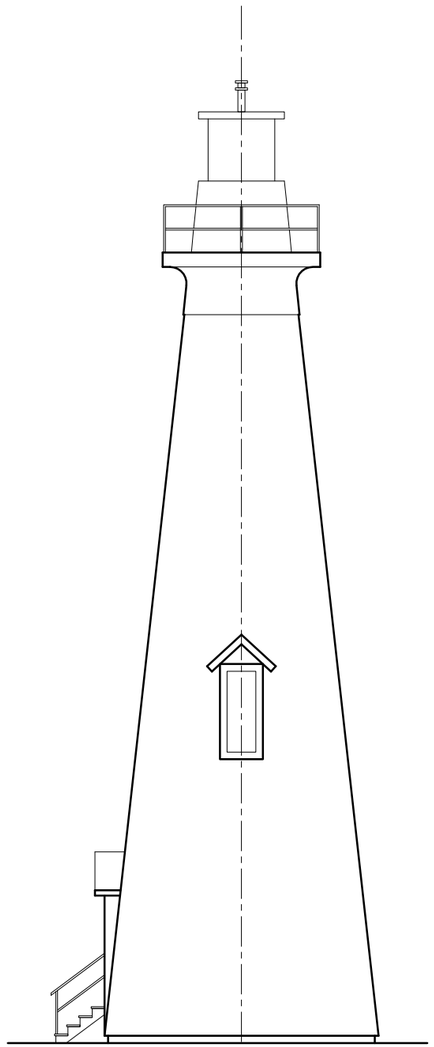

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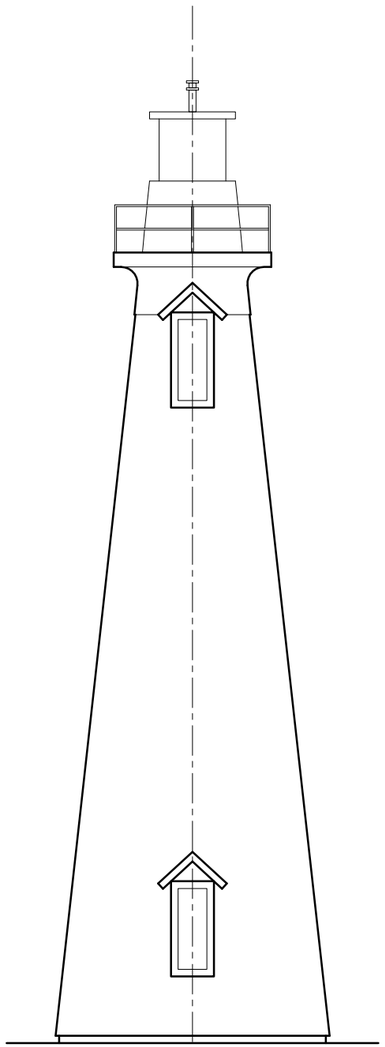

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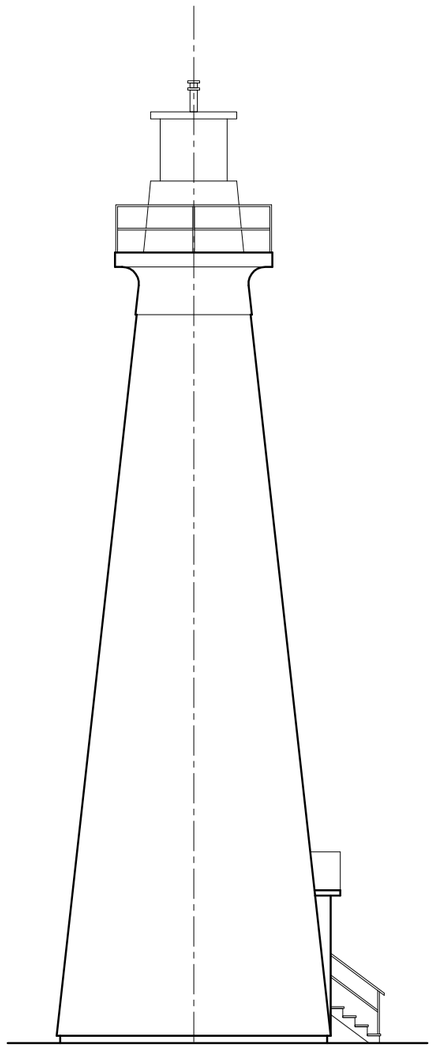

WEST

# ELEVATIONS - EXISTING TOWER

0 1 3 6m

SCALE 1:125

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

NOTES:

REMEDIATE ALL LEAD CONTAINING PAINT ON ALL EXTERIOR SURFACES.

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A Detail No. No. du détail
B drawing no. – where detail required dessin no. – où détail exigé
C drawing no. – where detailed dessin no. – où détaillé

project title / titre du projet
DFRP_NO._86598
NIAGARA_RIVER_RANGE_REAR
–
NIAGARA–ON–THE–LAKE,_ONTARIO
–
LEAD_PAINT_ABATEMENT_AND SOIL_REMEDIATION

drawing title / titre du dessin
TOWER_ELEVATIONS
–
–
REAR_RANGE_TOWER

drawn by / dessine par: GF

designed by / conc par: MM

approved by / approuve par: MM

bid / offre: –

project manager / administrateur de projets:

project date / date du projet: 2017–08–28

project no. / no. du projet: R.090007.001

drawing no. / dessine no.: A–1

GSC–A1 DATE PLOTTED: PLOT PLOT SCALE: PLSCALE CAD FILE: DWG

# Memorandum

**From:** Andrew Calder, P. Eng **Date:** **8/24/17**

**Ref:** Niagra River Range Rear, Lead and Mercury Paint Abatement and Soil Remediation R.090007.001

**Re:** Designated Substances Inventory

Based on a review of historical reports the following is an inventory of known designated substances present at the Site:

Asbestos Containing Materials:

- Black tar paper located beneath the subfloor of the hatch access to the crawl space; and,
- No other materials were observed to be suspected of containing asbestos.

Lead Containing Material:

- Exterior Red and white paint;
- Interior grey paint;
- All paint is considered leachate toxic; and,
- Based on the age of the building lead may be preset in pluming solder, but was not tested.

Mercury Containing Material:

- Exterior white paint; and,
- There may be other mercury containing material such as thermostats, light tubes, and a historical mercury bath for the light. None of these materials were tested.

Silica:

- Silica was not tested, but may be present in poured concrete, stone and mortar.

PCB Containing Equipment:

- No potential PCB containing equipment was observed at the Site

# 5. ENVIRONMENTAL EVALUATION

PWGSC has determined that the abatement of lead impacts at the Niagara River Range Rear Lighthouse is subject to evaluation the *Canadian Environmental Assessment Act 2012* (CEAA 2012). The project is not a designated project under CEAA 2012 and is therefore not subject to an environmental assessment. However, CEAA 2012 still requires an evaluation of potential project effects under Section 67. The evaluation non-designated projects under Section

67 may take two forms, an environmental effects evaluation or a basic project assessment, based on whether or not there is uncertainty around the potential for environmental effects and where mitigation measures are not known to be effective and established (CEAA, 2016).

The primary objective of the project will be the abatement of lead based paint on the lighthouse and the remediation of soils immediately adjacent to this building. No demolition of the existing structure is required and no construction will be required beyond temporary scaffolding. All project activities will be constrained to the subject property. Mitigative measures which will be employed are effective and established techniques for lead abatement and sediment and erosion control. Based on the scope of the project, the assessment has been classified as a basic project according to the assessment requirements described under Section 67 of the CEAA 2012. The following sections document the results of the basic project evaluation for the abatement of lead impacts at the Niagara River Range Rear Lighthouse.

### Section A: Project Identification

| | |
|---|---|
| **Project Title** | Remediation of Niagara River Range Rear Lighthouse |
| **Project Location** | **Niagara River Range Rear Lighthouse, Niagara-on-the-Lake, Ontario** |
| **Lead Authority** | Fisheries and Oceans Canada |
| **Contact Name:** | Jennifer Sifton |
| **Title:** | Environmental Officer |
| **Telephone No.** | 905-315-5287 |
| **Email address:** | Jennifer.Sifton@dfo-mpo.gc.ca |

| | |
|---|---|
| **Other Federal Authorities** | Public Works and Government Services Canada – Ontario Region |
| **Contact Name:** | Paul Schiller |
| **Title:** | Project Manager |
| **Telephone No.** | 416-512-5869 |
| **Email address:** | Paul.Schiller@tpsgc-pwgsc.gc.ca |

## Section B: Project Description and Description of the Environment

### Project Description

The purpose of this project is to remediate a lead impact to the shallow top soil surrounding the Niagara River Range Rear lighthouse. The two main phases of this project are:

- *Abatement of lead-based paint on the lighthouse structure, as well as repainting of the lighthouse.*
- *Excavation of the top 0.3 m of topsoil on the lighthouse site and site reinstatement and landscaping.*

All work will be conducted by licensed qualified contractors and supervised by an environmental consultant. No demolition of the existing structure is required and no construction will be required.

### Description of the Environment (if applicable):

The Niagara Range Rear lighthouse was constructed in 1904 and is operated in conjunction with the corresponding front range lighthouse located approximately 600 m distant as a navigational aide to boats entering or leaving the Niagara River which flows between Lake Ontario and Lake Erie. Environment Canada also maintains a small sampling station for bi-weekly water quality monitoring of the Niagara River within the structure.

The Niagara River Range Rear Lighthouse site is currently owned by the Town of Niagara-on-the-Lake and leased to the Fisheries and Oceans Canada (DFO). The Site is 0.014 hectares in area, roughly rectangular in shape with a triangular wedge removed from the north east corner. The dimensions of the site are approximately 10 m north-south and 14 m east-west. The site is developed with one building, the lighthouse itself, which is approximately 6 m by 6 m and 16 m high. The lighthouse is of wood frame construction on a concrete / stone foundation. Other than the lighthouse, the site consists of primarily mowed land with scattered ornamental trees along the margins.

The site bounds the shore of Lake Ontario along the northern edge. The shoreline consists of a concrete breakwater and armored shoreline consisting of rocks with scattered bushes. The site is bounded to the south, east by the Niagara Pumphouse Arts Centre and on the west by a condominium development and their associated parking lots.

Searches of the Ministry of Natural Resources Natural Heritage Information Center (NHIC) and Environment and Climate Change Canada's Species at Risk Database identified the potential presence of multiple species at risk/habitat located within 5 km of the site, including aquatic species from Lake Ontario. However, it is unlikely that any of these species have habitat on the lighthouse site as it is a developed property in an urban environment.

Previous environmental investigations completed at the Site between 2009 and 2010 identified soil contamination (leachate toxic lead) on the DFO leased lands. Contamination was noted to impact the top 0.3 m of the soil cover over an approximate area of 90 m² exceeding the federal Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and the provincial Ministry of the Environment and Climate Change (MOECC) Table 1 Site Condition Standards (SCS).

On September 20, 2016, BluMetric collected a composite soil sample from the vicinity of the lighthouse. The results of the analysis found the concentration of leachable lead in the soil was below the laboratory detection limit of 0.05 mg/L. This result supersedes the previous testing and therefore the identified lead impacted soil can be disposed of as non-hazardous impacted waste soil.

BluMetric Environmental Inc. conducted a designated substances and hazardous materials assessment (DSHMS) on the Niagara River Range Rear Lighthouse located in Niagara-on-the-Lake, Ontario, in August 2016. The assessment identified lead-based paint on the exterior and interior of the lighthouse structure. Mercury was also detected in exterior paints. Exterior paints were noted to be in poor to fair condition, with paint chips noted on the ground surrounding the structure.

### Section C: Resources

| | |
|---|---|
| Resources Consulted | Structural Review – Niagara-River Rear Range Light, Niagara-on-the-Lake, November 2016. Engineers, Planners, and Landscape Architects<br><br>Designated Substances and Hazardous Materials Survey (DSHMS)<br>Niagara River Range Rear, Niagara-on-the-Lake, Ontario, October 2016. BluMetric Environmental Inc.<br><br>Scaled Down Phase I/II Environmental Site Assessment, Niagara River Range Rear, October 2009. Decommissioning Consulting Services Inc.<br><br>Phase III Environmental Site Assessment, Niagara River Range Rear, December 2010. Decommissioning Consulting Services Inc. |

| | |
|---|---|
| | Department of Justice Canada<br>• Canadian Environmental Protection Act, 1999 (CEPA).<br><br>Health Canada<br>• Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).<br><br>Ontario Ministry of Labour<br>• Reg 490/09, Designated Substances as amended by O. Reg. 148/12 and O. Reg. 149/12.<br>• Health and Safety Guideline "Lead on Construction Projects", April 2011.<br><br>Ontario Ministry of the Environment and Climate Change<br>• O. Reg, 347/90 General – Waste Management as amended by O. Reg. 304/14.<br>• Environmental Protection Act.<br><br>Transport Canada (TC)<br>• Transportation of Dangerous Goods Act, 1992 (TDGA).<br><br>Canadian Environmental Assessment Agency, Projects on Federal Lands: Making Determination under Section 67 of the Canadian Environmental Assessment Act, 2012, July 2016 |

## Section D: Mitigation Measures Requirement

Check the following box if no mitigation measures are required. If mitigation measure are required, proceed to Section E.

| | |
|---|---|
| ☐ | **No mitigation measures are required as one or more of the following conditions apply.** |
| | ☐ **Potential impacts are limited to the interior of a building** |
| | ☐ **There are no potential adverse biophysical and/or socio economic effects** |
| | Continue to Section F. Do not complete Section E. |

## Section E: Identify Environmental Effects & Mitigation Measures

**Summarize the potential adverse environmental effects as well as any corresponding effective and established mitigation measures which will be implemented should the project proceed. Establish if the environmental effect is biophysical (B.P.) and/or socio-economic (S.E.) by checking the corresponding box for each completed row. Add rows as needed.**

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| Impacts to Erosion and Soils.<br>• Disturbance to soil from heavy equipment use.<br>• Contamination of soil due to temporarily stored material during soil remediation activities.<br>• Residual lead paint and impacted soils could contaminate soil if not properly removed<br>• Soil runoff during excavations.<br>• Contamination of existing soils due to accidents, spills, or leaks from equipment. | X | | • All work will be conducted by licensed and qualified contractors.<br>• Work must be scheduled to avoid periods of heavy precipitation. · The exposed soil area must be minimized by limiting the area that is exposed at one time and by limiting the time that any one area is exposed.<br>• All stockpiled soil must be covered and surrounded by sediment control/fencing to prevent erosion and release of sediment laden water.<br>• existing ground surface will be protected by the placement of tarps/plywood sheeting to prevent discolouration or contamination of surfaces<br>• Silt fencing and/or hay bales will be placed in ditches/drains to prevent sediment transport off-site.<br>• Following the completion of work exposed soil is to be replanted or sodded to ensure soil stabilization. . Accumulated sediments will be spread to form a suitable surface for seeding or be disposed of, and shape area to permit natural drainage to satisfaction of Departmental Representative.<br>• Erosion and sediment control measures will be checked weekly after each rainfall. During prolonged rainfall controls will be checked daily. Damaged control measures and end runs/undercutting will be repaired if documented during inspections<br>• Soil removed from the site will be carried from site by a licensed hauler using a truck with a watertight liner.<br>• Impacted soil will be transported and disposed of according to current provincial regulations.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order.<br>• Refueling must be done at least 30 m from any water body and on an impermeable surface. |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Basic petroleum spill clean-up equipment must be on-site. All spills or leaks must be promptly contained, cleaned up and reported to the 24-hour environmental emergencies reporting system (1-800-565-1633).<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Groundwater<br>• Contamination of groundwater from temporarily stored material during soil remediation activities.<br>• Residual petroleum products in the tank systems could contaminate groundwater if not removed prior to decommissioning.<br>• Contamination of groundwater from spills, leaks, or accidents involving machinery/equipment on site. | X | | • All work will be conducted by qualified, licensed contractors. Applicable legislation and regulations will be referenced and adhered to.<br>• An impermeable liner is required to be placed at any temporary storage site which is otherwise permeable, prior to placement of contaminated soils.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order.<br>• Refueling must be done at least 30 m from any water body and on an impermeable surface.<br>• existing ground surface will be protected by the placement of tarps/plywood sheeting to prevent discolouration or contamination of surfaces<br>• Basic petroleum spill clean-up equipment must be on-site.<br>• All spills or leaks must be promptly contained, cleaned up and reported to the 24-hour environmental emergencies reporting system (1-800-565-1633).<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Surface Water<br>• Impacts to surface water quality from heavy equipment use (disturbed soil from construction activities).<br>• Contamination of surface water from temporarily stored soils during soil remediation activities.<br>• Potential for impacts to surface water (Lake | X | | • Contaminated soil that is excavated as part of the remedial activities will only be stored on site for the shortest possible period of time possible, covered, and be disposed of at an approved facility.<br>• Site access will be controlled to ensure there is no access to contaminated soil.<br>• Work must be scheduled to avoid periods of heavy precipitation.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order. Refueling must be done at least 30 m from any |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| Ontario) under accidental spill or product-loss scenarios. | | | water body and on an impermeable surface. Basic petroleum spill clean-up equipment must be on-site. All spills or leaks must be promptly contained, cleaned up and reported to the 24- hour environmental emergencies reporting system (1-800-565-1633).<br>• Workers must be qualified to respond to accidental spills on site.<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Air Quality<br>• Use of heavy machinery may cause short-term elevated noise levels and green-house gas emissions at the site, along the transportation route, and may affect area residents and businesses.<br>• Construction activities may cause very slight increase in fugitive dust emissions on site. | X | | • All heavy mechanical equipment must be fitted with standard and well-maintained noise suppression devices.<br>• All construction equipment must be in good working order prior to arriving on site. Excessive noise from machinery will not be permitted.<br>• Construction activities must respect appropriate local time restrictions (by-laws).<br>• Appropriate dust suppression methods must be employed when required.<br>• Engines must not be allowed to idle between work periods.<br>• All loads on haul trucks will be covered.<br>• Power tools utilized for the removal of loose or rough lead-containing coatings or materials will be fitted with an effective dust collection system equipped with a HEPA filters. |
| Impacts to Public Health and Safety<br>• Persons present on or surrounding project site may be exposed to hazards including excavations, slumps, and hazardous materials. | | X | • A Site-specific, job-specific health and safety plan must be developed, implemented, and kept on site during the project.<br>• Workers who may come in contact with hazards must be provided with training, and use appropriate personal protective equipment.<br>• Site access must be restricted to authorized workers only through the use of temporary freestanding fencing. Entrances (pedestrian/vehicular will be lockable. Fencing will be maintained in good repair. |
| Impacts to Site Aesthetics<br>• Remediation activities will have a temporary impact on site aesthetics | | X | • Following remediation work, excavations will be backfilled and compacted to a similar state as neighboring native soil treatment. Surface grading will ensure that the site has the same appearance as before remediation work. |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Work site will be maintained in a clean and orderly manner free of garbage/litter.<br>• Work will be scheduled and conducted as quickly as possible to minimize the period of disturbance to neighboring residents.<br>• Following lead paint abatement, the lighthouse structure will be repainted in the same colour style to maintain site aesthetics.<br>• DFO will consult with neighboring property owners and Town of Niagara-on-the-Lake to confirm lack of impacts |
| Impacts to Archeological or Heritage Resources<br>• Remediation activities (soil) have the potential to impact previously undocumented archaeological resources | | X | • Surface grading will ensure that the site has the same appearance as before remediation work.<br>• Following lead paint abatement, the lighthouse structure will be repainted in the same colour style to maintain site aesthetics.<br>• Work will be scheduled and conducted as quickly as possible to minimize the period of disturbance to neighboring residents.<br>• Excavation of impacted soil will be limited to the upper 0.3 m of soil.<br>• In the event that previously undocumented archaeological resources are discovered during construction work will cease work immediately and a licensed archaeologist will be contacted to complete an archaeological review or assessment<br>• If human remains are discovered the local police, the coroner's office, and the Registrar of Cemeteries will be notified immediately. |
| Impacts to Terrestrial Species<br>• Remediation activities have the potential to impact terrestrial species and their habitat | X | | • Site areas which will be affected by remediation work consist of primarily mowed land. No habitat for terrestrial species will be affected.<br>• No SAR or species of conservation concern or sensitive habitats (i.e. hibernacula, wetlands, colonial nesting sites or overwintering areas) were observed within the project area.<br>• Work areas will be clearly demarcated by fencing<br>• Branches of trees that may overhang the work area will be pruned back to prevent unintentional harm. |
| Remediation activities have the potential to result in impacts associated with the transport and disposal of hazardous materials (paint, impacted soil) | | X | • Waste materials will be handled in accordance with the requirements of O.Reg 347, O.Reg 558 and the Transportation to Dangerous Goods Act.<br>• Waste containing waste paint will be transported within sealed containers for disposal at a licensed facility |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Updated analysis of impacted soil concluded that the concentration of leachable lead in the soil was below the laboratory detection limits Therefore, excavated soil can be disposed of as non-hazardous impacted waste soil at a registered landfill. |

## Section F: Determination

**Taking into account implementation of mitigation measures outlined in the analysis, this project:**

| | |
|---|---|
| X | Is not likely to cause significant adverse environmental effects |
| | Requires further analysis. Complete an Environmental Effects Evaluation (Step 3b) |

## Section G: Sign-off and Approval

**Completed by:**

| | | |
|---|---|---|
| Kai Markvorsen<br>BluMetric Environmental Inc. |  | 2017/02/24 |
| | Signature | Date |

**Copy and paste the below table for each Authority, as required, which approves the information and decisions described in this form.**

**Sign-off and Approval:**

| **Comments:** | | |
|---|---|---|
| Jennifer Sifton<br>Fisheries and Oceans Canada | | |
| | Signature | Date |

This document summarizes the results of a basic project evaluation of the proposed abatement of the Niagara River Range Rear Lighthouse that has been performed and completed by PWGSC in accordance with the *Canadian Environmental Assessment Act, 2012.* The basic project assessment has been completed based on the background information, field assessment and understanding of the proposed project. The decision is based on the interpretation of environmental effects and mitigation measures described in Section E of this report.

# ENVIRONMENTAL PROGRAM REPORT AND CEAA 2012, SECTION 67 ASSESSMENT

**Niagara River Range Rear Lighthouse**
**(Site No.CF00235; FSCI 00013933),**
**Niagara-on-the-Lake, Ontario**
DFRP No. 86598; PWGSC R.083149.011

Submitted to:

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

**Public Works & Government Services Canada – Ontario Region**
4900 Yonge Street
Toronto, ON M2N 6A6

Submitted by:

**BluMetric Environmental Inc.**
3108 Carp Road P.O. Box 430
Ottawa, ON K0A 1L0

Project Number: 160509
March 31, 2017

# ENVIRONMENTAL PROGRAM REPORT
# AND CEAA 2012 SECTION 67 ASSESSMENT)

## NIAGARA RIVER RANGE REAR LIGHTHOUSE
## (SITE NO. CF00235; FSCI 00013933)
## NIAGARA-ON-THE-LAKE, ONTARIO

DFRP No. 86598; PWGSC R.083149.011

Submitted to:

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

**PUBLIC WORKS & GOVERNMENT SERVICES CANADA – ONTARIO REGION**
4900 Yonge Street
Toronto, ON M2N 6A6

Submitted by:

**BluMetric Environmental Inc.**
3108 Carp Road P.O. Box 430
Ottawa, ON K0A 1L0

March 31, 2017

Project Number: 160509

# EXECUTIVE SUMMARY

BluMetric Environmental Inc. (BluMetric™) was retained by Public Works & Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to conduct an Environmental Program on the Niagara River Range Rear Light Station (FSCI 00013933). The Environmental Program was to include a designated substances survey, a structural assessment of the lighthouse, and development of plans and specifications for soil remediation and abatement of lead based paint on site structure.

The primary objective of the project is to be the abatement of lead based paint on the lighthouse and the remediation of soils immediately adjacent to this building. No demolition of the existing structure was required and no construction would be required. All project activities would be constrained to the subject property.

Previous investigations at the site have included an August 5, 2009 Phase I/II Environmental Site Assessment (ESA) on the site. This assessment found that a metals impact (i.e. lead, barium, and zinc) to surficial soil had occurred in the vicinity of the lighthouse. Waste characterization testing completed as part of the 2009 Phase I/II ESA indicated that the contaminated soils surrounding the structure were leachate toxic for lead.

In December, 2010, DCS published a Phase III ESA for the subject site. Based on the analytical results received the soil contamination at the site identified by the 2009 Phase I/II ESA was confirmed and found to be restricted to the lands leased by DFO. In addition, the contamination was confined to the upper 0.3 m of the soil.

On September 20, 2016, BluMetric collected a composite soil sample from the vicinity of the lighthouse. This result superseded the results of previous testing conducted as part of the 2009 ESA. Accordingly, the identified lead impacted soil can now be disposed of as non-hazardous impacted waste soil.

BluMetric also completed a Designated Substance and Hazardous Materials Survey. The assessment concluded that building paints contained both lead and mercury. No other hazardous materials were identified as part of the assessment.

Novatech Engineers, Planners, and Landscape Architects visited the Site on September 20, 2016 to complete a structural engineering assessment of the lighthouse structure. The assessment concluded that the structure was generally in good condition and that regular maintenance would be sufficient to minimize long term deterioration. As well, the structure was determined to be able to withstand the proposed paint abatement work.

Based on the scope of the project, this assessment has been classified as a basic project according to the assessment requirements described under Section 67 of the CEAA 2012. Following the assessment of background information and taking into account implementation of mitigation measures outlined in the analysis, this project is not likely to cause significant adverse environmental effects. Prior to commencing remediation work, DFO will consult with neighboring property owners and Town of Niagara-on-the-Lake.

## TABLE OF CONTENTS



## LIST OF FIGURES

# LIST OF APPENDICES

# 1. INTRODUCTION

BluMetric Environmental Inc. (BluMetric™) was retained by Public Works & Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to conduct an Environmental Program on the Niagara River Range Rear Light Station (FSCI 00013933). The Environmental Program was to include a designated substances survey, a structural assessment of the lighthouse, and development of plans and specifications for soil remediation and abatement of lead based paint on site structure.

## 1.1 PROJECT OBJECTIVE

The primary objective of the project was to be the abatement of lead based paint on the lighthouse and the remediation of soils immediately adjacent to this building. No demolition of the existing structure was required and no construction would be required. All project activities would be constrained to the subject property.

The objectives of the Environmental Program included the completion of the following activities:

- Review of available previous studies/investigations pertaining to the subject site;
- Waste characterization testing;
- Completion of a Designated Substances and Hazardous Materials Survey at the Niagara River Range Rear Site;
- Completion of a Structural Condition Evaluation of the lighthouse at Niagara River Range Rear Site;
- Completion of an Environmental Effect Evaluation (EEE) to meet the requirements of CEAA 2012 for the proposed remedial works at the Niagara River Range Rear Site; and,
- Development of plans and specifications for soil remediation and lead based paint abatement at the Niagara River Range Rear Site.

## 1.2 BACKGROUND

The Site is currently owned by the Town of Niagara-on-the-Lake and leased to the Fisheries and Oceans Canada (DFO). The Site is 0.014 hectares in area and is developed with one building (lighthouse) which is approximately 6 m by 6 m and 16 m high. The lighthouse is of wood frame construction on a concrete / stone foundation. The lighthouse, operated by the Canada Coast Guard – Fisheries and Oceans, was established in 1903 and is still currently used to navigate shipping on the Niagara River as well as bi-weekly water quality monitoring of the Niagara River completed by Environment Canada.

### 1.2.1 Previous Environmental Reports

In August 5, 2009, Decommissioning Consulting Services Limited (DCS) published as Phase I/II Environmental Site Assessment (ESA) report on the subject site. This found that a metals impact (i.e. lead, barium, and zinc) to surficial soil had occurred in the vicinity of the lighthouse. While the barium and zinc were thought to be naturally occurring, the source of the lead impact was inferred to be the paint that has been used in the past on the building itself. The paint currently on the building contained mercury and lead concentrations in excess of the levels allowed under the Surface Coating Materials Regulations. A composite of the soil samples was also submitted for leachate analysis of common metals. The results of this analysis found the soil contained leachable concentrations of lead; however, details on the sample location(s) and composition were not provided.

Removal of the paint on the building was recommended as it posed a continued risk to contamination of the soil in the area.

In December, 2010, DCS published a Phase III ESA for the subject site. Based on the analytical results received the soil contamination at the site identified by the 2009 Phase I/II ESA was confirmed and found to be restricted to the lands leased by DFO. In addition, the contamination was confined to the upper 0.3 m of the soil. The site continued to be assigned a contaminated site number (CS86598-001).

The contaminated soils cover an area of approximately 90 $m^2$ to an average depth of 0.3 m.

## 2. STRUTURAL ENGINEER REPORT SUMMARY

Mr. Peter James, P.Eng. of Novatech Engineers, Planners, and Landscape Architects visited the Site on September 20, 2016 to complete a structural engineering assessment of the lighthouse structure. The full report is presented below as Appendix A.

### 2.1 Assessment Scope

The scope of the Structural Condition Evaluation consisted of:

- Evaluation of the structure to determine its condition;
- Perform a visual inspection of the structure. Limited demolition and/or removal of finishes may be performed to expose areas at potential risk of deterioration as determined by

visual examination. The majority of openings will consist of drilled holes to permit the use of a bore scope to review the structure;
- Where the structure is not visible, inspect existing finishes for signs of structural distress (i.e.: excessive deflections, cracking, staining… etc.);
- A report detailing observations made on site, including recommendations and cost for implementation of remedial works and/or further investigation.

The findings of the structural engineering assessment were as follows.

## 2.2 General Findings

- The lighthouse is generally in good condition. Minor repair and maintenance work is recommended;
- With regular maintenance, there will be little risk of long-term deterioration; and,
- The structure was determined to be able to withstand the proposed paint abatement work.

## 2.3 Recommendations

The following maintenance work was recommended:

- The two defective girts should be repaired;
- The shingles should be repainted. When this is underway, the shingles should checked for loose nails, and projections (such as the window dormers) should be checked for weather tightness, and caulked as required;
- The cladding details of the underside of the exterior platform should be reviewed for weather-tightness. Possibly, an extended drip-flashing should be added;
- The metal components of the lantern room and platform should be repainted. If all the paint is removed (thus exposing bare metal), the joints between panels should be caulked before the metal is primed and repainted; and,
- Components such as windows, doors and hatches, particularly at the lantern level, should be checked for weather-tightness, and repaired or upgraded as required.

# 3. SOIL LEACHATE TESTING

As part of the overall project, conducted a soil leachate toxicity assessment of the Niagara River Range Rear Lighthouse site in order to corroborate the sparsely detailed previous testing.

BluMetric's Intermediate Occupational Hygiene / Environmental Technologist, Mrs. Julia LaRonde, visited the Site on September 20, 2016 to complete the field work.

While conducting the assessment, a Toxicity Characteristic Leaching Procedure (TCLP) sample was collected to assess the potentially impacted soil for lead leachability, with an eye towards future disposal options. Three (3) soil samples were collected from areas of potentially impacted soil around and inside of the lighthouse: soil-1 from the crawlspace underneath the lighthouse, and soil-2 and soil-3 from ~1 m northeast and ~2.5 m southeast of the base of the lighthouse respectively (see Figure 4). Small test pits were dug with a clean hand trowel and the samples were collected from ~ 0.1 meters below surface grade. Samples were immediately placed in a cooler containing ice to ensure the sample temperature was maintained near 4°C.

As the TCLP sample was collected to assist with identifying disposal options for any soil removed from the site. Soil-1 was not submitted for analysis as the soil in the lighthouse crawlspace will not be excavated. Soil-2 and Soil-3 were combined as a bulk sample and submitted to Paracel Laboratories of Ottawa, Ontario under strict chain of custody protocol to be analyzed for leachable lead. The laboratory certificate of analysis is included in Attachment B.

### 3.1 Results and Conclusions

The results of the analysis are presented in Table below.

**Table 1: Results of Composite Soil Sample Submitted for TCLP Leachate – September 20, 2016**

| Sample Identification | Sample Location | TCLP (mg/L) | Comments |
|---|---|---|---|
| soil 2 & soil 3 | Exterior | <0.05 | None |
| General Waste Management R.R.O 1990, Regulation 347, Schedule 4 | | 5 mg/L | -- |

The results of the analysis found the concentration of leachable lead in the soil was below the laboratory detection limit of 0.05 mg/L. This result supercedes the results of previous undetailed testing conducted as part of the 2009 ESA. Accordingly, the identified lead impacted soil can now be disposed of as non-hazardous impacted waste soil.

This result is considered representative for the impacted soil across the subject site. Therefore, the previously identified lead impacted soil can be disposed of as non-hazardous impacted waste soil.

# 4. DESIGNATED SUBSTANCE AND HAZRADOUS MATERIALS SURVEY

As part of the overall project, a designated substances and hazardous materials assessment (DSHMS) was conducted on the Niagara River Range Rear Lighthouse site. BluMetric's Environmental Technologist, Mrs. Julia LaRonde, visited the Site on September 20, 2016 to complete the DSHMS. As required by PWGSC, the DSHMS completed at the Site included:

- Complete a site survey to determine condition, location and quantity of all designated substances (acrylonitrile, arsenic, asbestos, benzene, coke oven emissions, ethylene oxide, isocyanates, lead, mercury, silica and vinyl chloride) and hazardous materials (e.g. polychlorinated biphenyls (PCBs), ozone depleting substances (ODSs), urea formaldehyde foam insulation (UFFI), radioactive materials, and mould) present;
- Collection of paint samples for lead and mercury analysis comparing results to Surface Coating Materials Regulation (SOR/2005-109); and,
- Prepare a summary of observations, recommendations and cost estimates for abatement procedures.

## 4.1 LEGISLATION

### 4.1.1 Asbestos Containing Materials

In Ontario, asbestos containing materials (ACMs) are defined as any material found to contain 0.5% or more asbestos by dry weight volume within one sample of a homogeneous material, as determined by the standard polarized light microscopy (PLM) method, as stipulated in Ontario Regulation 278/05 (O. Reg. 278/05), "*Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations".* O. Reg. 278/05 requires that a management program designed to prevent worker exposure to airborne asbestos fibres be established in buildings where asbestos is known to be present. This program includes training of workers who may disturb asbestos and routine inspection and maintenance of the materials. The regulations states that "Ongoing asbestos management in buildings applies to 1) the owner of a building has been advised under section 9 of the discovery of material that may be asbestos-containing material; and/or, an owner of a building knows or ought reasonably to know that asbestos-containing material has been used in a building for any purpose related to the building, including insulation, fireproofing and ceiling".

Although asbestos is not considered a hazardous waste, Ontario Regulation 347, revised by Reg. 558 - *made under the Ontario Environmental Protection Act*, does define specific requirements for the disposal of materials containing friable asbestos at landfills. These

requirements include notification of the landfill site, proper labeling and containment of the material.

As part of this work program, representative samples of suspected ACMs observed at the Site were taken in accordance with the requirements set out in O. Reg. 278/05. The number of samples collected was considered representative based on observations pertaining to like building materials and the minimum sampling requirements, as described in Table 1 below.

**Table 2: Minimum of Asbestos Bulk Material Sample Requirements**

| Type of Material | Size of Area of Homogeneous Material | Minimum Number of Bulk Material Samples to be Collected |
|---|---|---|
| Surfacing material, including without limitation, material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members | Less than 90 square metres | 3 |
| | 90 or more square metres, but less than 450 square metres | 5 |
| | 450 or more square metres | 7 |

Three (3) samples from one identified homogenized material suspected to be an ACM was submitted for laboratory analysis. Samples were placed into individual sample bags labeled with a unique sample number. Sampling tools, utility knives and scrapers, were cleaned between samples. The samples collected were sent to Paracel Laboratories in Ottawa, Ontario and analyzed by polarized light microscopy (PLM) using EPA Method 600/R-93/116/NYS-DOH 198.1. The lab was instructed to perform a 'stop positive' analysis, so that if one (of three) samples was identified to be asbestos containing they were to assume all samples of the homogenized material were asbestos containing, as per O. Reg 278/05. Paracel is NVLAP-accredited for bulk asbestos analysis by PLM.

### 4.1.2 Lead and Mercury

Lead and mercury are naturally occurring metal, although; when found in paint they may pose a potential health risk when the paint surface deteriorates with aging or is damaged and disturbed in such a manner that it creates dust and chips. Based on the age of the building, lead may also be present in other materials including solder used on plumbing lines and fixtures and in electrical equipment.

Lead and mercury containing paint is defined by the Canada Consumer Product Safety Act – Surface Coating Materials Regulations SOR/2005-109. This stipulates that the concentration of total lead present in a surface coating material must not be more than 90 $\mu$g/g, while the concentration of total mercury present in a surface coating material must not be more than

10 µg/g. There was formerly a criterion under the Hazardous Products Act; however, it has been revoked with no replacement value.

It is important to note that this standard serves primarily to reduce potential exposure to lead by ingestion in residential settings where children may have access to lead contaminated surfaces or coated materials. In the absence of a published criterion to determine whether an existing paint coating contains potentially hazardous levels of lead with respect to a potential airborne exposure, it is reasonable to use the aforementioned legislation as a screening benchmark. Thus, paint samples confirmed with a concentration ≥90 µg/g of lead are considered to be lead containing respectively. The established limits for lead on surfaces are intended to protect children from adverse health effects, primarily in residential settings (housing), schools, childcare establishments, yards, etc.

The Environmental Abatement Council of Ontario (EACO) published a document titled "*Lead Guideline for Construction, Renovation, Maintenance or Repair*" (2014) that classifies lead containing paint according to the hazard it presents to abatement workers. Paints containing less than 1,000 µg/g lead are considered low-level lead paints, paints between 1,000 µg/g and 5,000 µg/g are considered to be lead-containing, and paints containing more than 5,000 µg/g are defined as lead-based paints.

Paints that are found to be above the lead containing criteria were further analyzed for leachable lead content. According to the General Waste Management R.R.O. 1990, Regulation 347 within Schedule 4, Leachate Quality Criteria, materials having a leachable lead content greater than 5 mg/L are considered leachate toxic and must be handled and disposed as hazardous waste.

Three (3) samples of suspected lead based paint were submitted for analysis. Samples were placed into individual sample bags labeled with a unique sample number. Sampling tools, utility knives and scrapers, were cleaned between samples. The samples collected were sent to Paracel in Ottawa, Ontario for lead, mercury and leachate toxic lead analysis in accordance with EPA Method 6020-ICP-MS. Paracel is a CALA- and ISO-accredited laboratory for analysis of lead.

## 4.2 Site Observations – September 20, 2016

BluMetric's Intermediate Occupational Hygiene / Environmental Technologist, Mrs. Julia LaRonde, C.E.T., visited the Site on September 20, 2016 to complete the DSHMS. Mrs. LaRonde was met initially by two DFO employees who solely supplied access to the site. Observations made at the time of the Site visit include:

- Weather conditions were clear and dry with an approximate temperature of 20°C;

- Full access to the Site (grounds and building) were given;
- The exterior of the building is generally constructed of wood 'shingle' siding. The electric lantern room located at the top of the lighthouse is constructed of steel.
- The exterior of the building was primarily coated white (Paint-1) and red (Paint-2) paint. The white paint appeared to be in poor condition and was significantly weathered with some flaking. White paint chips were observed around the Site building on each side where rain water collects at the foot of the building. The red paint appeared to be in fair condition with minimal damage / chipping. No red paint chips were noted around the Site building;
- The interior of the building is primarily constructed of wood. The foundation appears to be concrete and stone. The building is unheated.
- The interior of the building appeared to be in good condition. One sample was taken of a black paper (ACM-1a,b,c) to determine the presence of asbestos.
- Two fluorescent light fixtures (with four T8 size tubes each) were observed within the building appeared to be of very recent construction (i.e. within last 10 years) and are therefore discounted from containing PCBs, as PCB containing ballasts have been prohibited for sale in Canada since 1977. Note that T8 light-tubes were first introduced in 1981.
- The foundation of the Site building appeared to be in good condition and constructed of stone and poured concrete, which may contain Silica. No other suspected designated substances or hazardous materials were observed within the Site building;
- The building's crawl space appeared to be clean and dry with no painted surfaces or suspected designated substances or hazardous materials;
- The main level appeared to be in good condition and constructed primarily of wood (floors, walls, ceiling and stairs) with grey (Paint-3) painted flooring. No other painted surfaces, designated substances or hazardous materials were observed. The main level consists of a small laboratory area for local water sampling of the river. This area is insulated with pink fiberglass insulation adhered to the building's exterior wood paneling;
- The first and second level appeared to be in good condition and constructed primarily of wood (floors, walls, ceiling and stairs) with grey (Paint-3) painted flooring, stairs and railings. No other painted surfaces, designated substances or hazardous materials were observed; and,
- The third level, small lantern room/hatch, appeared to be in good condition and constructed primarily of steel with white (Paint-1) within the small lantern room/hatch. The lighthouse light did not incorporate a 'mercury bath'.
- The site representatives were not aware of any designated substances or hazardous materials within the Site building or historical reports completed.

Sample locations are shown in Figure 3. Photographs of the observations and sampling locations detailed above are provided in Appendix D.

## 4.3 RESULTS AND RECOMMENDATIONS

### 4.3.1 Asbestos Containing Materials

Three (3) samples from one homogenized material suspected to be an ACM was submitted for laboratory analysis. The following non-friable material was sampled and determined not to contain asbestos:

- ACM -1: Black tar paper beneath subfloor located within the hatch access to the crawl space

No other materials observed during the Site visit were suspected to contain asbestos. The laboratory report and chain of custody record is provided in Appendix C.

*During renovation or demolition any materials encountered not previously sampled, which could contain ACMs, should be sampled and sent to laboratory for analysis. Any ACMs confirmed at the Site should be removed by a qualified asbestos abatement contractor in accordance with the conditions as set out in O. Reg. 278/05 and PWGSC Department Policy 057 – Asbestos Management.*

### 4.3.2 Lead Based Paint and Materials

#### Lead Based Paints

The three (3) paint samples collected were suspected to contain lead and submitted for laboratory analysis. The results of the lead paint sampling are presented in Table 3 below.

**Table 3: Results of Paint Samples Submitted for Lead – September 20, 2016**

| Sample Identification | Sample Location | Lead (µg/g) | Comments |
|---|---|---|---|
| **Paint-1** | Exterior | **64,100** | Exterior white<br>Poor to fair condition (chips on ground) |
| **Paint-2** | Exterior | **15,100** | Exterior red<br>Fair to good condition |
| **Paint-3** | Interior | **7,210** | Interior grey floors, stairs and railings<br>Good condition |
| **Canada Consumer Product Safety Act – Surface Coating Materials Regulations SOR/2005-109** | | **90** | -- |
| **EACO 2014 Lead Guideline – Lead based paint** | | **5,000** | -- |

Based on the regulated criteria, the three paint samples collected are considered to be lead based. The laboratory report and chain of custody record is provided in Appendix C.

- The approximate surface area of Paint-1 (exterior white) is 385 m²;
- The approximate surface area of Paint-2 (exterior red) is 18 m²; and,
- The approximate surface area of Paint-3 (interior grey) is 140 m². This area calculation does include not including fifty (50) stairs and eight (8) railings which is grossly estimated at an additional 20 m².

*Any worker or contractor who performs work that would disturb paint identified as lead containing should be informed of the presence of lead in the paint and the workers should take precautionary measures. The Ontario Ministry of Labour (MOL) "Lead on Construction Projects Guidelines" or the EACO "Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014" should be consulted for all work that may disturb the paint, and should include respiratory protection and work practices.*

### Leachate Toxic Paints

The three (3) paint samples collected are considered to be lead based (as detailed above). Based on these results, the paint samples were submitted for TCLP leachate toxic laboratory analysis. The results of the TCLP leachate toxic analysis is presented in Table 4 below.

**Table 4: Results of Paint Samples Submitted for TCLP Leachate Toxic – September 20, 2016**

| Sample Identification | Sample Location | TCLP (mg/L) | Comments |
|---|---|---|---|
| **Paint-1** | Exterior | **139** | Exterior white<br>Poor condition (chips on ground) |
| **Paint-2** | Exterior | **120** | Exterior red<br>Fair condition |
| **Paint-3** | Interior | **62** | Interior grey floors, stairs and railings<br>Good condition |
| **General Waste Management R.R.O 1990, Regulation 347** | | **5 mg/L** | -- |

Based on the regulated criteria, the three paint samples collected are considered to be leachate toxic. The laboratory report and chain of custody record is provided in Appendix C.

*Waste material which includes leachable lead must be treated as hazardous waste following the requirements of O. Reg. 347 – Waste Management under the Ontario Environmental Protection Act.*

### Lead Materials

Based on the age of the building, lead may also be present in other materials including solder used on plumbing lines and fixtures and in electrical equipment. These types of materials were not tested as part of this assessment. The amounts of lead present would be minimal and are physically bound into the solder and would not pose a significant concern during construction/demolition activities.

*During renovation or demolition any materials encountered not previously sampled, which could contain lead, should be sampled and sent to laboratory for analysis. Any lead confirmed at the Site should be removed as hazardous waste following the requirements of O. Reg. 347 – Waste Management under the Ontario Environmental Protection Act.*

### 4.3.3 Mercury Based Paints and Materials

### Mercury Based Paints

Mercury containing paint is defined by the Canada Consumer Product Safety Act – Surface Coating Materials Regulations SOR/2005-109. This stipulates that the concentration of total mercury present in a surface coating material must not be more than 10 µg/g.

The three (3) paint samples collected were suspected to contain mercury and submitted for laboratory analysis. The results of the mercury paint sampling are presented in Table 5 below.

**Table 5: Results Paint Samples Submitted for Mercury – September 20, 2016**

| Sample Identification | Sample Location | Mercury (µg/g) | Comments |
|---|---|---|---|
| **Paint-1** | Exterior | **13** | Exterior white<br>Poor to fair condition (chips on ground) |
| **Paint-2** | Exterior | <2 | Exterior red<br>Fair to good condition |
| **Paint-3** | Interior | <2 | Interior grey floors, stairs and railings<br>Good condition |
| **Canada Consumer Product Safety Act – Surface Coating Materials Regulations SOR/2005-109** | | **10** | -- |

Based on the regulated criteria, one paint sample collected is considered to be mercury based. The laboratory report and chain of custody record is provided in Appendix C.

- The approximate surface area of Paint-1 (exterior white) is 385 m².

*Mercury containing paints and materials should be handled with care during removal and treated as hazardous waste following the requirements of O. Reg. 347 – Waste Management under the Ontario Environmental Protection Act.*

### Mercury Materials

Mercury may be present in other materials including thermostats, fluorescent lights and potentially historical use of 'mercury bath' for lighthouse light. These types of materials were not tested as part of this assessment. When mercury is enclosed within a system (such as within a thermostat or fluorescent light), it is not in exposed form unless/until the encapsulation is broken. These materials must be disposed as mercury-containing waste.

Eight (8) fluorescent light tubes within two lighting units on the ground floor, as well as five (5) spare tubes. These tubes account for less than 5 kg of mercury. No other potentially mercury containing equipment was observed.

*During renovation or demolition any materials encountered not previously sampled, which could contain mercury, should be sampled and sent to laboratory for analysis. Any mercury confirmed at the Site should be removed as hazardous waste following the requirements of O. Reg. 347 – Waste Management under the Ontario Environmental Protection Act.*

### 4.3.4 Silica

Although not specifically sampled, silica may be present in the following building materials observed during the Site visit: poured concrete, stone and mortar.

*For silica containing materials precautions should be taken during construction activities such as coring through concrete slabs and demolition of masonry or concrete units to ensure that workers' exposure levels to respirable airborne crystalline silica do not exceed permissible exposure limits. Work which could disturb silica containing materials should follow the recommendations provided in the document entitled "Guideline: Silica on Construction Projects", issued by the Ontario Ministry of Labour, and include respiratory protection.*

### 4.3.5 PCB Containing Equipment

PCBs are not regulated under the Ontario Designated Substances Regulation (O. Reg. 490/09) but are included in hazardous materials surveys because of their potentially hazardous nature and the specialized handling required when removing and disposing.

Two (2) fluorescent light fixtures were observed within the Site building. As these light fixtures used T8 tubing (a tube size which were introduced in 1981) and appeared to be of recent construction, their ballasts are not considered a potential source of PCBs.

No potential PCB containing equipment was observed.

### 4.3.6 Other Designated Substances and Materials

Based on observations made during the Site visit and reported on-Site activities, there is no reason to believe that the following designated substances or hazardous materials are present: acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, vinyl chloride, ODSs, UFFI, radioactive materials, petroleum fuel or lubricant oils, and mould.

## 5. ENVIRONMENTAL EVALUATION

PWGSC has determined that the abatement of lead impacts at the Niagara River Range Rear Lighthouse is subject to evaluation the *Canadian Environmental Assessment Act 2012* (CEAA 2012). The project is not a designated project under CEAA 2012 and is therefore not subject to an environmental assessment. However, CEAA 2012 still requires an evaluation of potential project effects under Section 67. The evaluation non-designated projects under Section

67 may take two forms, an environmental effects evaluation or a basic project assessment, based on whether or not there is uncertainty around the potential for environmental effects and where mitigation measures are not known to be effective and established (CEAA, 2016).

The primary objective of the project will be the abatement of lead based paint on the lighthouse and the remediation of soils immediately adjacent to this building. No demolition of the existing structure is required and no construction will be required beyond temporary scaffolding. All project activities will be constrained to the subject property. Mitigative measures which will be employed are effective and established techniques for lead abatement and sediment and erosion control. Based on the scope of the project, the assessment has been classified as a basic project according to the assessment requirements described under Section 67 of the CEAA 2012. The following sections document the results of the basic project evaluation for the abatement of lead impacts at the Niagara River Range Rear Lighthouse.

### Section A: Project Identification

| | |
|---|---|
| **Project Title** | Remediation of Niagara River Range Rear Lighthouse |
| **Project Location** | **Niagara River Range Rear Lighthouse, Niagara-on-the-Lake, Ontario** |
| **Lead Authority** | Fisheries and Oceans Canada |
| **Contact Name:** | Jennifer Sifton |
| **Title:** | Environmental Officer |
| **Telephone No.** | 905-315-5287 |
| **Email address:** | Jennifer.Sifton@dfo-mpo.gc.ca |

| | |
|---|---|
| **Other Federal Authorities** | Public Works and Government Services Canada – Ontario Region |
| **Contact Name:** | Paul Schiller |
| **Title:** | Project Manager |
| **Telephone No.** | 416-512-5869 |
| **Email address:** | Paul.Schiller@tpsgc-pwgsc.gc.ca |

## Section B: Project Description and Description of the Environment

### Project Description

The purpose of this project is to remediate a lead impact to the shallow top soil surrounding the Niagara River Range Rear lighthouse. The two main phases of this project are:

- *Abatement of lead-based paint on the lighthouse structure, as well as repainting of the lighthouse.*
- *Excavation of the top 0.3 m of topsoil on the lighthouse site and site reinstatement and landscaping.*

All work will be conducted by licensed qualified contractors and supervised by an environmental consultant. No demolition of the existing structure is required and no construction will be required.

### Description of the Environment (if applicable):

The Niagara Range Rear lighthouse was constructed in 1904 and is operated in conjunction with the corresponding front range lighthouse located approximately 600 m distant as a navigational aide to boats entering or leaving the Niagara River which flows between Lake Ontario and Lake Erie. Environment Canada also maintains a small sampling station for bi-weekly water quality monitoring of the Niagara River within the structure.

The Niagara River Range Rear Lighthouse site is currently owned by the Town of Niagara-on-the-Lake and leased to the Fisheries and Oceans Canada (DFO). The Site is 0.014 hectares in area, roughly rectangular in shape with a triangular wedge removed from the north east corner. The dimensions of the site are approximately 10 m north-south and 14 m east-west. The site is developed with one building, the lighthouse itself, which is approximately 6 m by 6 m and 16 m high. The lighthouse is of wood frame construction on a concrete / stone foundation. Other than the lighthouse, the site consists of primarily mowed land with scattered ornamental trees along the margins.

The site bounds the shore of Lake Ontario along the northern edge. The shoreline consists of a concrete breakwater and armored shoreline consisting of rocks with scattered bushes. The site is bounded to the south, east by the Niagara Pumphouse Arts Centre and on the west by a condominium development and their associated parking lots.

Searches of the Ministry of Natural Resources Natural Heritage Information Center (NHIC) and Environment and Climate Change Canada's Species at Risk Database identified the potential presence of multiple species at risk/habitat located within 5 km of the site, including aquatic species from Lake Ontario. However, it is unlikely that any of these species have habitat on the lighthouse site as it is a developed property in an urban environment.

Previous environmental investigations completed at the Site between 2009 and 2010 identified soil contamination (leachate toxic lead) on the DFO leased lands. Contamination was noted to impact the top 0.3 m of the soil cover over an approximate area of 90 m² exceeding the federal Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and the provincial Ministry of the Environment and Climate Change (MOECC) Table 1 Site Condition Standards (SCS).

On September 20, 2016, BluMetric collected a composite soil sample from the vicinity of the lighthouse. The results of the analysis found the concentration of leachable lead in the soil was below the laboratory detection limit of 0.05 mg/L. This result supersedes the previous testing and therefore the identified lead impacted soil can be disposed of as non-hazardous impacted waste soil.

BluMetric Environmental Inc. conducted a designated substances and hazardous materials assessment (DSHMS) on the Niagara River Range Rear Lighthouse located in Niagara-on-the-Lake, Ontario, in August 2016. The assessment identified lead-based paint on the exterior and interior of the lighthouse structure. Mercury was also detected in exterior paints. Exterior paints were noted to be in poor to fair condition, with paint chips noted on the ground surrounding the structure.

### Section C: Resources

| | |
|---|---|
| Resources Consulted | Structural Review – Niagara-River Rear Range Light, Niagara-on-the-Lake, November 2016. Engineers, Planners, and Landscape Architects<br><br>Designated Substances and Hazardous Materials Survey (DSHMS)<br>Niagara River Range Rear, Niagara-on-the-Lake, Ontario, October 2016. BluMetric Environmental Inc.<br><br>Scaled Down Phase I/II Environmental Site Assessment, Niagara River Range Rear, October 2009. Decommissioning Consulting Services Inc.<br><br>Phase III Environmental Site Assessment, Niagara River Range Rear, December 2010. Decommissioning Consulting Services Inc. |

| | |
|---|---|
| | Department of Justice Canada<br>• Canadian Environmental Protection Act, 1999 (CEPA).<br><br>Health Canada<br>• Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).<br><br>Ontario Ministry of Labour<br>• Reg 490/09, Designated Substances as amended by O. Reg. 148/12 and O. Reg. 149/12.<br>• Health and Safety Guideline "Lead on Construction Projects", April 2011.<br><br>Ontario Ministry of the Environment and Climate Change<br>• O. Reg, 347/90 General – Waste Management as amended by O. Reg. 304/14.<br>• Environmental Protection Act.<br><br>Transport Canada (TC)<br>• Transportation of Dangerous Goods Act, 1992 (TDGA).<br><br>Canadian Environmental Assessment Agency, Projects on Federal Lands: Making Determination under Section 67 of the Canadian Environmental Assessment Act, 2012, July 2016 |

## Section D: Mitigation Measures Requirement

Check the following box if no mitigation measures are required. If mitigation measure are required, proceed to Section E.

| | |
|---|---|
| ☐ | **No mitigation measures are required as one or more of the following conditions apply.** |
| | ☐ **Potential impacts are limited to the interior of a building** |
| | ☐ **There are no potential adverse biophysical and/or socio economic effects** |
| | Continue to Section F. Do not complete Section E. |

## Section E: Identify Environmental Effects & Mitigation Measures

**Summarize the potential adverse environmental effects as well as any corresponding effective and established mitigation measures which will be implemented should the project proceed. Establish if the environmental effect is biophysical (B.P.) and/or socio-economic (S.E.) by checking the corresponding box for each completed row. Add rows as needed.**

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| Impacts to Erosion and Soils.<br>• Disturbance to soil from heavy equipment use.<br>• Contamination of soil due to temporarily stored material during soil remediation activities.<br>• Residual lead paint and impacted soils could contaminate soil if not properly removed<br>• Soil runoff during excavations.<br>• Contamination of existing soils due to accidents, spills, or leaks from equipment. | X | | • All work will be conducted by licensed and qualified contractors.<br>• Work must be scheduled to avoid periods of heavy precipitation. · The exposed soil area must be minimized by limiting the area that is exposed at one time and by limiting the time that any one area is exposed.<br>• All stockpiled soil must be covered and surrounded by sediment control/fencing to prevent erosion and release of sediment laden water.<br>• existing ground surface will be protected by the placement of tarps/plywood sheeting to prevent discolouration or contamination of surfaces<br>• Silt fencing and/or hay bales will be placed in ditches/drains to prevent sediment transport off-site.<br>• Following the completion of work exposed soil is to be replanted or sodded to ensure soil stabilization. . Accumulated sediments will be spread to form a suitable surface for seeding or be disposed of, and shape area to permit natural drainage to satisfaction of Departmental Representative.<br>• Erosion and sediment control measures will be checked weekly after each rainfall. During prolonged rainfall controls will be checked daily. Damaged control measures and end runs/undercutting will be repaired if documented during inspections<br>• Soil removed from the site will be carried from site by a licensed hauler using a truck with a watertight liner.<br>• Impacted soil will be transported and disposed of according to current provincial regulations.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order.<br>• Refueling must be done at least 30 m from any water body and on an impermeable surface. |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Basic petroleum spill clean-up equipment must be on-site. All spills or leaks must be promptly contained, cleaned up and reported to the 24-hour environmental emergencies reporting system (1-800-565-1633).<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Groundwater<br>• Contamination of groundwater from temporarily stored material during soil remediation activities.<br>• Residual petroleum products in the tank systems could contaminate groundwater if not removed prior to decommissioning.<br>• Contamination of groundwater from spills, leaks, or accidents involving machinery/equipment on site. | X | | • All work will be conducted by qualified, licensed contractors. Applicable legislation and regulations will be referenced and adhered to.<br>• An impermeable liner is required to be placed at any temporary storage site which is otherwise permeable, prior to placement of contaminated soils.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order.<br>• Refueling must be done at least 30 m from any water body and on an impermeable surface.<br>• existing ground surface will be protected by the placement of tarps/plywood sheeting to prevent discolouration or contamination of surfaces<br>• Basic petroleum spill clean-up equipment must be on-site.<br>• All spills or leaks must be promptly contained, cleaned up and reported to the 24-hour environmental emergencies reporting system (1-800-565-1633).<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Surface Water<br>• Impacts to surface water quality from heavy equipment use (disturbed soil from construction activities).<br>• Contamination of surface water from temporarily stored soils during soil remediation activities.<br>• Potential for impacts to surface water (Lake | X | | • Contaminated soil that is excavated as part of the remedial activities will only be stored on site for the shortest possible period of time possible, covered, and be disposed of at an approved facility.<br>• Site access will be controlled to ensure there is no access to contaminated soil.<br>• Work must be scheduled to avoid periods of heavy precipitation.<br>• Machinery must be checked for leakage of lubricants or fuel and must be in good working order. Refueling must be done at least 30 m from any |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| Ontario) under accidental spill or product-loss scenarios. | | | water body and on an impermeable surface. Basic petroleum spill clean-up equipment must be on-site. All spills or leaks must be promptly contained, cleaned up and reported to the 24- hour environmental emergencies reporting system (1-800-565-1633).<br>• Workers must be qualified to respond to accidental spills on site.<br>• Fuel levels in equipment and / or on-site fuel storage tanks must be inspected on a daily basis to ensure there is no leakage to the surrounding environment. |
| Impacts to Air Quality<br>• Use of heavy machinery may cause short-term elevated noise levels and green-house gas emissions at the site, along the transportation route, and may affect area residents and businesses.<br>• Construction activities may cause very slight increase in fugitive dust emissions on site. | X | | • All heavy mechanical equipment must be fitted with standard and well-maintained noise suppression devices.<br>• All construction equipment must be in good working order prior to arriving on site. Excessive noise from machinery will not be permitted.<br>• Construction activities must respect appropriate local time restrictions (by-laws).<br>• Appropriate dust suppression methods must be employed when required.<br>• Engines must not be allowed to idle between work periods.<br>• All loads on haul trucks will be covered.<br>• Power tools utilized for the removal of loose or rough lead-containing coatings or materials will be fitted with an effective dust collection system equipped with a HEPA filters. |
| Impacts to Public Health and Safety<br>• Persons present on or surrounding project site may be exposed to hazards including excavations, slumps, and hazardous materials. | | X | • A Site-specific, job-specific health and safety plan must be developed, implemented, and kept on site during the project.<br>• Workers who may come in contact with hazards must be provided with training, and use appropriate personal protective equipment.<br>• Site access must be restricted to authorized workers only through the use of temporary freestanding fencing. Entrances (pedestrian/vehicular will be lockable. Fencing will be maintained in good repair. |
| Impacts to Site Aesthetics<br>• Remediation activities will have a temporary impact on site aesthetics | | X | • Following remediation work, excavations will be backfilled and compacted to a similar state as neighboring native soil treatment. Surface grading will ensure that the site has the same appearance as before remediation work. |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Work site will be maintained in a clean and orderly manner free of garbage/litter.<br>• Work will be scheduled and conducted as quickly as possible to minimize the period of disturbance to neighboring residents.<br>• Following lead paint abatement, the lighthouse structure will be repainted in the same colour style to maintain site aesthetics.<br>• DFO will consult with neighboring property owners and Town of Niagara-on-the-Lake to confirm lack of impacts |
| Impacts to Archeological or Heritage Resources<br>• Remediation activities (soil) have the potential to impact previously undocumented archaeological resources | | X | • Surface grading will ensure that the site has the same appearance as before remediation work.<br>• Following lead paint abatement, the lighthouse structure will be repainted in the same colour style to maintain site aesthetics.<br>• Work will be scheduled and conducted as quickly as possible to minimize the period of disturbance to neighboring residents.<br>• Excavation of impacted soil will be limited to the upper 0.3 m of soil.<br>• In the event that previously undocumented archaeological resources are discovered during construction work will cease work immediately and a licensed archaeologist will be contacted to complete an archaeological review or assessment<br>• If human remains are discovered the local police, the coroner's office, and the Registrar of Cemeteries will be notified immediately. |
| Impacts to Terrestrial Species<br>• Remediation activities have the potential to impact terrestrial species and their habitat | X | | • Site areas which will be affected by remediation work consist of primarily mowed land. No habitat for terrestrial species will be affected.<br>• No SAR or species of conservation concern or sensitive habitats (i.e. hibernacula, wetlands, colonial nesting sites or overwintering areas) were observed within the project area.<br>• Work areas will be clearly demarcated by fencing<br>• Branches of trees that may overhang the work area will be pruned back to prevent unintentional harm. |
| Remediation activities have the potential to result in impacts associated with the transport and disposal of hazardous materials (paint, impacted soil) | | X | • Waste materials will be handled in accordance with the requirements of O.Reg 347, O.Reg 558 and the Transportation to Dangerous Goods Act.<br>• Waste containing waste paint will be transported within sealed containers for disposal at a licensed facility |

| Environmental Effect | B.P. | S.E. | Effective and Established Mitigation Measure |
|---|---|---|---|
| | | | • Updated analysis of impacted soil concluded that the concentration of leachable lead in the soil was below the laboratory detection limits Therefore, excavated soil can be disposed of as non-hazardous impacted waste soil at a registered landfill. |

## Section F: Determination

**Taking into account implementation of mitigation measures outlined in the analysis, this project:**

| | |
|---|---|
| X | Is not likely to cause significant adverse environmental effects |
| | Requires further analysis. Complete an Environmental Effects Evaluation (Step 3b) |

## Section G: Sign-off and Approval

**Completed by:**

| | | |
|---|---|---|
| Kai Markvorsen<br>BluMetric Environmental Inc. |  | 2017/02/24 |
| | Signature | Date |

**Copy and paste the below table for each Authority, as required, which approves the information and decisions described in this form.**

**Sign-off and Approval:**

| **Comments:** | | |
|---|---|---|
| Jennifer Sifton<br>Fisheries and Oceans Canada | | |
| | Signature | Date |

This document summarizes the results of a basic project evaluation of the proposed abatement of the Niagara River Range Rear Lighthouse that has been performed and completed by PWGSC in accordance with the *Canadian Environmental Assessment Act, 2012.* The basic project assessment has been completed based on the background information, field assessment and understanding of the proposed project. The decision is based on the interpretation of environmental effects and mitigation measures described in Section E of this report.

# 6. CLOSING

The information presented herein is based on observations and laboratory testing of samples collected from building materials at specific locations at specific points in time by BluMetric at the Niagara River Range Rear Lighthouse in Niagara-on-the-Lake, Ontario on September 20, 2016. Any inferences of material composition between specific sample result locations should be made with caution. Although every effort was made to collect representative samples from the building, it is possible that surfaces not sampled will be exposed when walls/floors/ceilings are altered. Any other materials not sampled which are encountered and are suspected to be hazardous should be sampled prior to work being conducted.

The conclusions presented in this report represent our professional opinion and are based on the conditions observed on the dates set out in the report, the information available at time this report was prepared, the scope of work, and any limiting conditions noted herein.

BluMetric provides no assurances regarding changes to conditions subsequent to the time of the assessment. BluMetric makes no warranty as to the accuracy or completeness of the information provided by others or of the conclusions and recommendations predicated on the accuracy of that information.

This report has been prepared for Public Works & Government Services Canada – Ontario Region and the Department of Fisheries and Oceans. Any use a third party makes of this report, any reliance on the report, or decisions based upon the report, are the responsibility of those third parties unless authorization is received from BluMetric in writing. BluMetric accepts no responsibility for any loss or damages suffered by any unauthorized third party as a result of decisions made or actions taken based on this report.

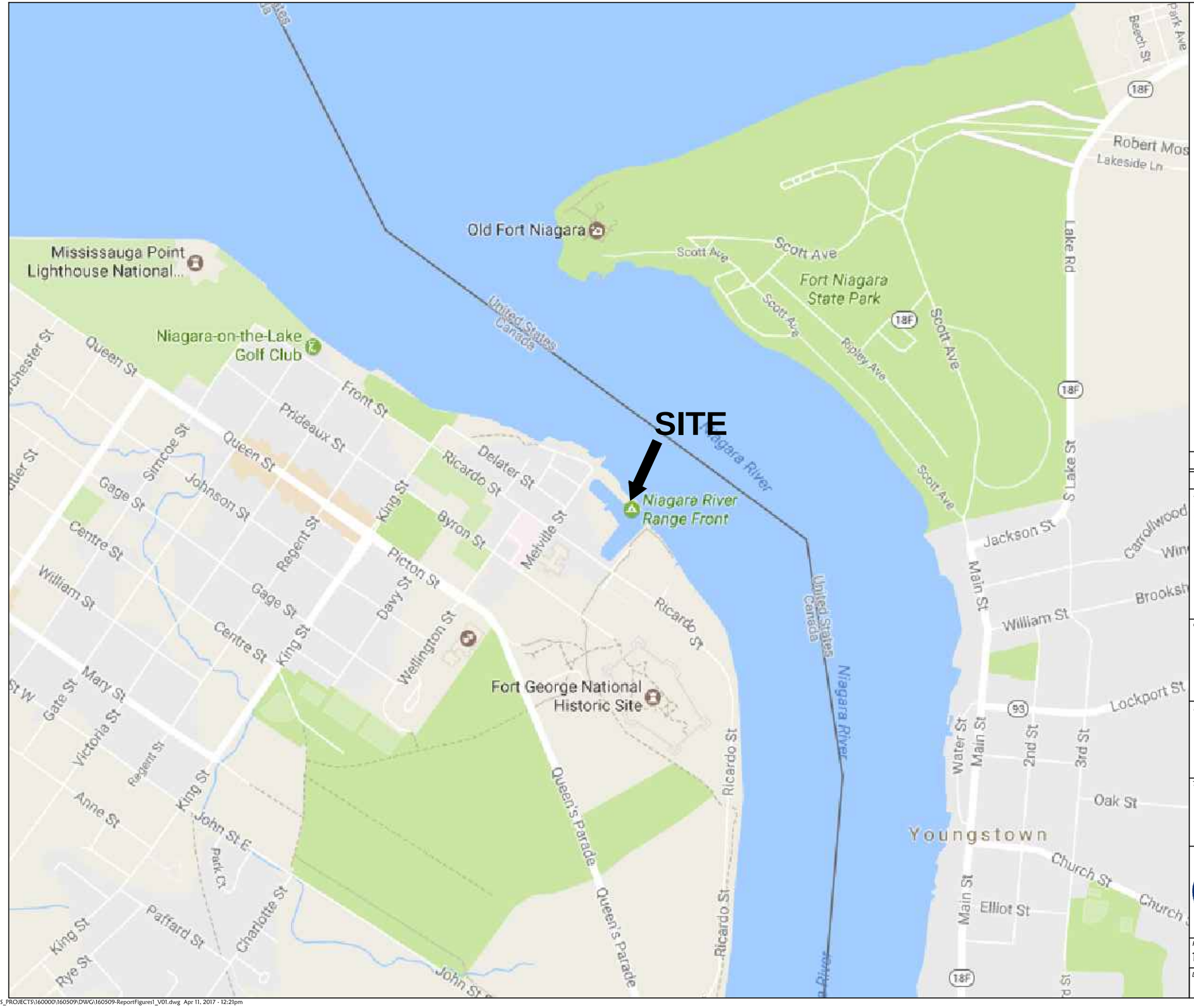
Respectfully submitted,
**BluMetric Environmental Inc.**

Kai Markvorsen, B.Sc.
Environmental Scientist

Julia Laronde, C.E.T.
Environmental Technologist

Carl Hentschel, P.Eng.
Environmental Engineer

Printed on 100% recycled paper.

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|---|---|---|---|---|
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REFERENCES



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THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION

N

CLIENT

PWGSC

PROJECT

NIAGARA RIVER RANGE
REAR LIGHTHOUSE
NIAGARA-ON-THE-LAKE

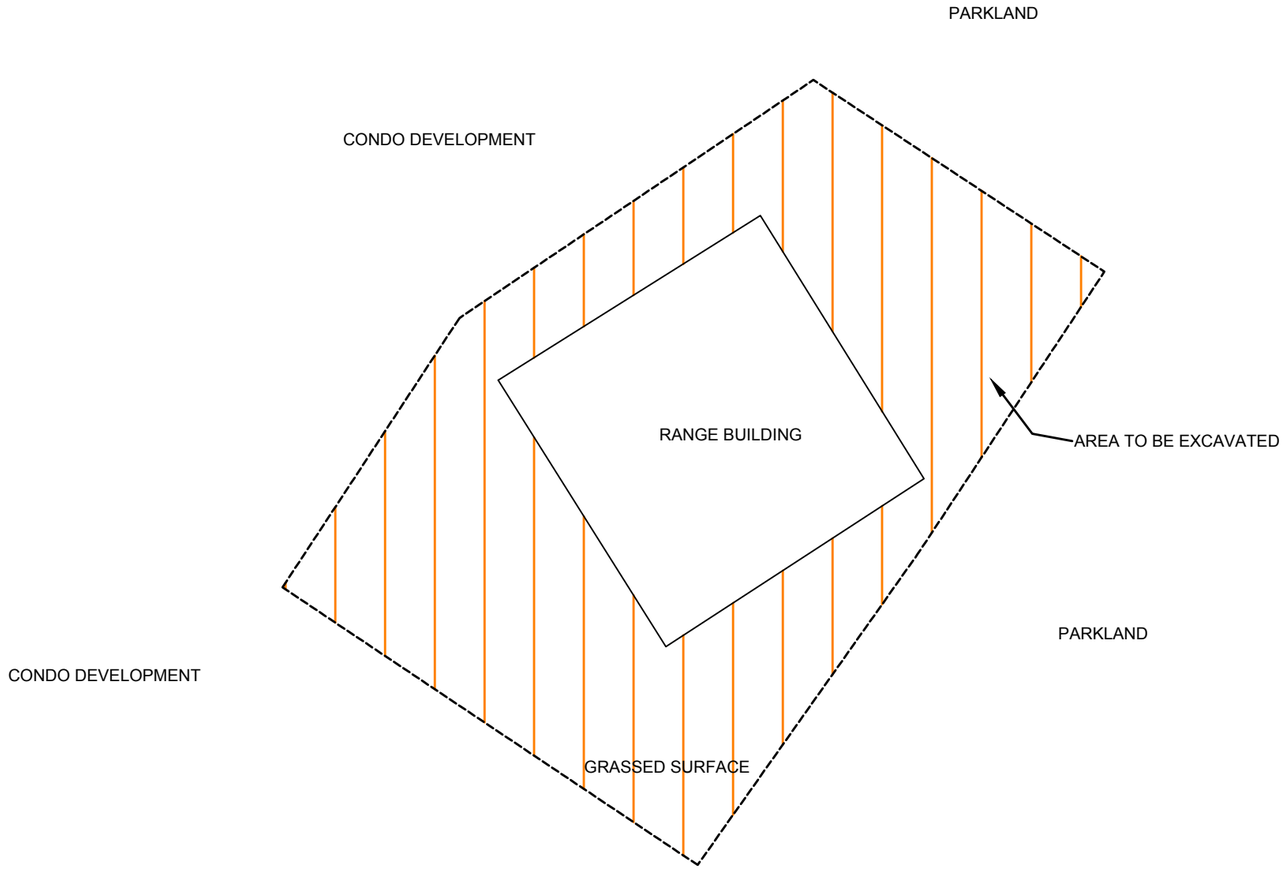
TITLE

KEY PLAN

BluMetric™ Environmental
3108 Carp Road PO Box 430
Ottawa, Ontario K0A 1L0
TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

| PROJECT # | DATE | | |
|---|---|---|---|
| 160509 | 2017-03-31 | | |
| DRAWN | CHECKED | DWG NO. | REV |
| GM | CH | 01 | 0 |

N:\GIS_PROJECTS\160000\160509\DWG\160509-ReportFigures1_V01.dwg Apr 11, 2017 - 12:21pm




*LEGEND*

- PROPERTY LINE
- OPEN WATER
- CROSS SECTION LOCATION
- AREA TO BE EXCAVATED

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|---|---|---|---|---|
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*REFERENCES*



N

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THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION

*CLIENT*

PWGSC

*PROJECT*

NIAGARA RIVER RANGE
REAR LIGHTHOUSE
NIAGARA-ON-THE-LAKE

*TITLE*

SITE PLAN

BluMetric™ Environmental
3108 Carp Road PO Box 430
Ottawa, Ontario K0A 1L0
TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

| PROJECT # | DATE |
|---|---|
| 160509 | 2017-03-31 |

| DRAWN | CHECKED | DWG NO. | REV |
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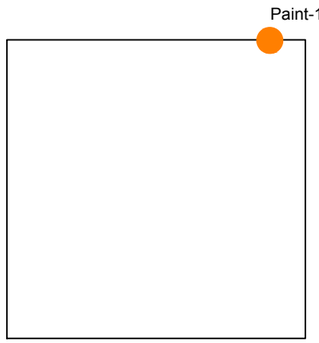
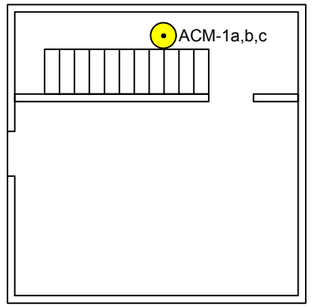
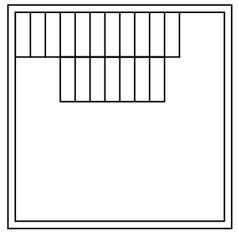


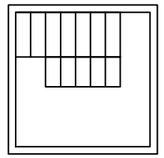

Lighthouse : Exterior




Lighthouse : Main Level



Lighthouse : First Floor



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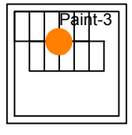


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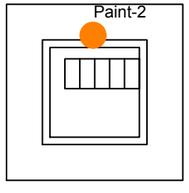


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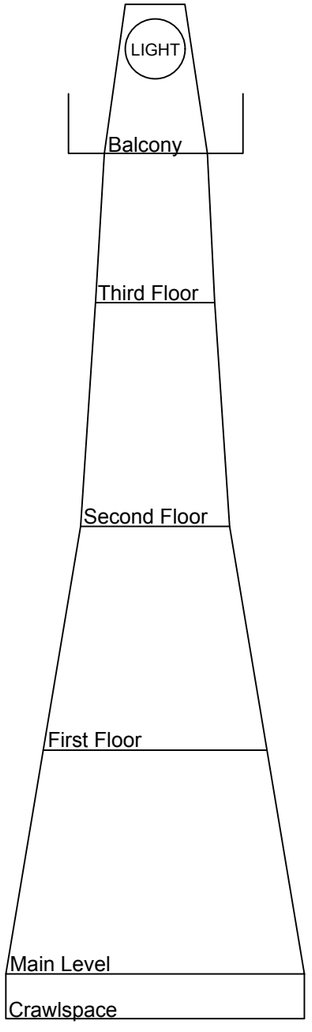


Lighthouse : Section View

*LEGEND*

- Asbestos Containing Material Sample
- Paint Sample

| REV. | DESCRIPTION | YY/MM/DD | BY | CHK |
|---|---|---|---|---|
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*REFERENCES*



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THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION

*CLIENT*

PWGSC

*PROJECT*

NIAGARA RIVER RANGE
REAR LIGHTHOUSE
NIAGARA-ON-THE-LAKE

*TITLE*

DSHMS
SAMPLE LOCATIONS

BluMetric™ Environmental
3108 Carp Road PO Box 430
Ottawa, Ontario K0A 1L0
TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

| PROJECT # | DATE |
|---|---|
| 160509 | 2017-03-31 |

| DRAWN | CHECKED | DWG NO. | REV |
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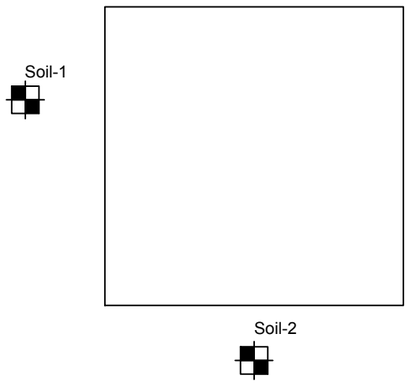
| GM | CH | 03 | 0 |

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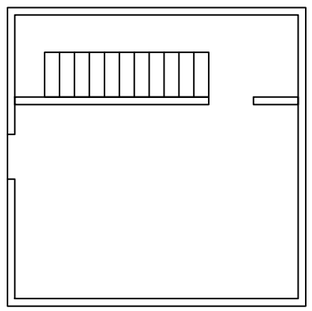
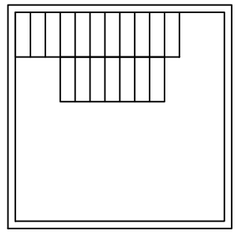
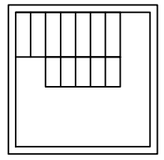


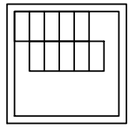
Lighthouse : Main Level



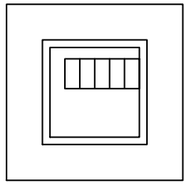
Lighthouse : First Floor



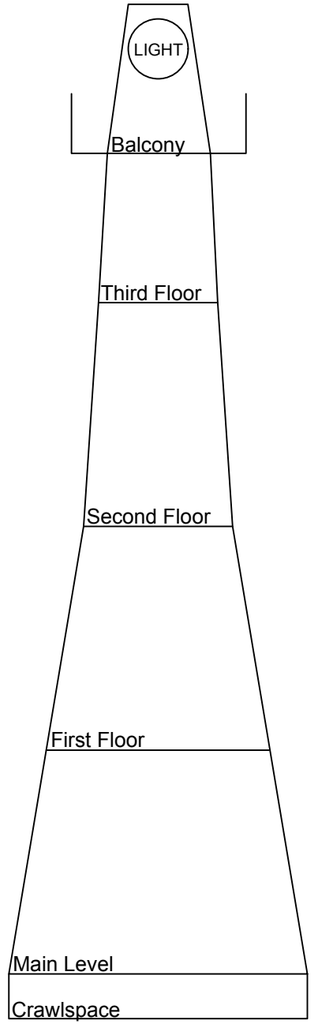
Lighthouse : Second Floor



Lighthouse : Third Floor



Lighthouse : Balcony




Lighthouse : Section View

*LEGEND*

Soil Sample

| REV. | DESCRIPTION | YY/MM/DD | BY | CHK |
|---|---|---|---|---|
| 1 | | | | |

*REFERENCES*



1:500 0 m 3 m 6 m 9 m 12 m 15 m

THIS SCALE TO BE USED TO OBTAIN
APPROXIMATE DIMENSIONS FOR INFORMATION

*CLIENT*

PWGSC

*PROJECT*

NIAGARA RIVER RANGE
REAR LIGHTHOUSE
NIAGARA-ON-THE-LAKE

*TITLE*

SOIL
SAMPLE LOCATIONS

BluMetric™ Environmental
3108 Carp Road PO Box 430
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TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

| PROJECT # | DATE |
|---|---|
| 160509 | 2017-03-31 |

| DRAWN | CHECKED | DWG NO. | REV |
|---|---|---|---|
| GM | CH | 04 | 0 |

# APPENDIX A

Structural Engineering Assessment

NOVATECH
Engineers, Planners & Landscape Architects

2017-03-16

BluMetric Environmental
3108 Carp Road
PO Box 430
Ottawa
K0A 1L0

**Attention:** **Karen Greer**

**Reference:** **Niagara-River - Rear Range Light - Structural Condition Evaluation**
**DFRP:** **86598**
**Site ID:** **CF00235**
**FCSI:** **00013933**
**Our File:** **116135**

## 1 Introduction

1.1 This report describes a visual evaluation of the structure of the Rear Range Light at Niagara-on-the-Lake.

1.2 The evaluation was undertaken for BluMetric Environmental in support of a Designated Substances and Hazardous Materials Survey, undertaken by BluMetric for PWGSC.

1.3 Recommendations are provided for future maintenance work to maintain the integrity of the lighthouse.

1.4 If the condition of the building might affect the proposed environmental abatement work, additional recommendations are provided, as required.

## 2 Methodology

2.1 Historical background information was obtained from a 1988 FHBRO report, and from selected unofficial webpages. The FHBRO report is included in Appendix A.

2.2 The site review was undertaken by Peter James, P.Eng, on September 20th, 2016.

2.3 No invasive tests were undertaken. Existing construction details were identified by visual inspection of physical features, and, where necessary, inferred by reference to typical construction practices. Photographs of typical and notable features are included in Appendix B.

2.4 Sometimes, original construction details may have been incomplete, or inadequate, or modified in an improper manner during the lifetime of a building. Some of these items could be hidden from view - and thus may not be accounted for in this report.

2.5 Dimensions are in millimetres, except where stated otherwise. The dimensions of original lumber are soft-converted to 2 significant figures. New lumber is described by its nominal metric sizes.



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## 3 General Description - Lighthouse Tower

3.1 The lighthouse is aligned approximately parallel with the Niagara River. For the purpose of this report, the face of the building parallel to the river is designated as the East face. The entrance door is at the south face.

3.2 The lighthouse was reportedly constructed in 1904, using a standard design for wood-framed lighthouses that was developed in the 19th century. It is a four-sided structure, tapering from 6.2 metres x 6.2 metres at its base to 1.68 metres x 1.68 metres at its top. The wood-framed tower structure is about 9.8 metres high. The structure of the lantern room is described separately.

3.3 The lighthouse is unheated, except for the water sampling laboratory, which has local electrical heating, probably to prevent freezing of the sampling equipment.

3.4 The tower has an unheated crawl space, accessed through a hatch in the ground floor. The crawl space has a sand floor. The foundation walls are cast-in-place concrete, thickness not confirmed. There is a brick pier at the centre of the crawl space. The footings were not investigated. The crawl space is ventilated with four 200 mm dia vents, one near each corner. Subjectively, the crawl space was “dry”. There is no insulation in the crawl space.

3.5 The ground floor is constructed with 50x250 joists at 600 spacing, aligned East-West supported on the east and west walls, and supported on a central 150x200 beam, aligned North-South. The beam is supported at the mid-points of the north and south walls, and on the central brick pier. The subfloor is 20 mm diagonal plank sheathing, covered with 20 mm finished flooring.

3.6 There are two intermediate floors, plus the top floor. All three floors are constructed with 50x250 joists, 20 mm sheathing, and 20 mm flooring. The joists are supported on 50x200 ribbon boards, which are set in recesses in the outer faces of the wall studs. The upper floor extends outwards in all directions beyond the walls of the tower to form the cantilevered exterior platform. Each floor is accessed by a wood-framed ladder, with flat treads. The ladder framing is “substantial”.

3.7 The walls have a 200x200 post at each corner. The posts are comprised of two pieces, each about 5 metres tall, spliced at approximately mid-height of the second storey. The walls are framed with 50x200 studs, typically at 700 spacing, that extend from mid-storey to mid-storey. At each mid-storey height, the studs are supported on a single-ply 50x200 girt that spans between the corner posts. The walls are sheathed with diagonal plank sheathing. There is no insulation in the walls. The exterior finish is wood shingles.

3.8 At the second storey, an approx 2.5 metre long section of one corner post has been replaced with a section of L-shaped post made from 2 - 38x184 studs & 2 - 38x115 studs (these studs were rip-cut from a 38x235 joist). When the new post was installed, the ends of both girts were removed and replaced by short sections of 38x184 lumber. The method of replacement did not maintain the continuity of the girts.

3.9 Most of the ground floor is in use by Environment Canada as a laboratory for water quality sampling. The walls and ceiling of this room are finished with plywood sheets. It is suspected that these walls are insulated.

3.10 Except as noted above, the wood framing is fully exposed (no insulation, no interior finishes, not painted). Except for the repair at one post, described above, the wood framing is in excellent condition throughout.



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3.11 The exterior of the tower is finished with painted wood shingles. Some of the paint is peeling. As best can be judged by visual inspection from the ground the shingles are otherwise in satisfactory condition.

## 4 General Description - Lantern Room

4.1 The lantern room is a metal-framed structure. The walls and the roof are constructed with several nominally flat metal panels, with integral angle sections around their edges, and bolted together through the angles. The metal panels appear to be wrought iron, although more detailed research is required to confirm this. Neither cast iron (an older material) nor rolled steel (a modern material) would be capable of being manufactured in the form of these panels (too thin for cast iron, integral angles not possible with rolled steel).

4.2 The glazing bars and other similar components are iron fabrications. The lantern room is vented at the highest point of its ceiling/roof.

4.3 The upper surface of the exterior platform, which is an extension of the upper floor, is covered with metal sheets. The condition of the structural framing could not be inspected.

4.4 The underside of the exterior platform is constructed as an outward-curved extension of the walls, finished with the same painted wood shingles as the walls. Some of the paint is peeling. The platform is too high above the ground to undertake any additional inspection.

4.5 The platform has railings around its outer edge, fabricated from iron or steel pipe, with threaded fittings at connections.

4.6 The lantern room, the platform, and the associated components all have several coats of paint. There is peeling paint at some horizontal surfaces, typically at locations where water could collect, and there is light corrosion at isolated locations.

4.7 Generally, the lantern room, platform, and associated components are in satisfactory condition. There is no significant corrosion, and no significant loss of structural strength, at the metal components. As noted above, the structural framing and underside cladding of the cantilevered exterior platform could not be inspected.

## 5 Comments

5.1 Generally, the lighthouse is of sturdy construction. The structural framing was well-designed, and well-built.

5.2 Overall, the structural components of the lighthouse are in good condition. Proper ventilation at both the crawl space and the roof of the lantern room has contributed to this good performance.

5.3 Potential problems are described below:

.1 By Code, the floor in a crawl space or a basement should have a ground cover to resist moisture entry from the soil below. The minimum Code requirement for ground covers in crawl spaces is 0.10 mm thick polyethylene sheeting over the exposed soil. However, the floor framing is in excellent condition, and there is no evidence of any deterioration related to excess moisture in the crawl space. Probably, because the four 200 mm diameter vents provide about twice the required ventilation, the ventilation is adequate to prevent moisture accumulation.

.2 The repair at the corner post is deficient, because the repaired girts are not fully continuous from post to post across the full width of the wall. This is a minor item that can readily be corrected.



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.3 The paint on the wall shingles is peeling.

.4 The shingles at the underside of the exterior platform are potentially vulnerable to moisture absorption from rainwater and snowmelt runoff from the platform

.5 The paint on some of the metal components of the lantern room and platform is peeling, and there is localized rusting.

## 6 Recommendations

6.1 The following maintenance work is recommended:

.1 The two deficient girts should be repaired.

.2 The shingles should be repainted. When this is underway, the shingles should be checked for loose nails, and projections (such as the window dormers) should be checked for weather tightness, and caulked as required.

.3 The cladding details of the underside of the exterior platform should be reviewed for weather-tightness. Possibly, an extended drip-flashing should be added.

.4 The metal components of the lantern room and platform should be repainted. If all the paint is removed (thus exposing bare metal), the joints between panels should be caulked before the metal is primed and repainted.

.5 Components such as windows, doors and hatches, particularly at the lantern level, should be checked for weather-tightness, and repaired or upgraded as required.

## 7 Environmental Abatement Work

7.1 To undertake this work, no structural remediation will be required, and no additional precautions will be required, other than those normally required for the type of work to be undertaken.

7.2 There should be no additional costs to the budget for the environmental abatement work on account of the structural condition of the lighthouse.

## 8 Summary

8.1 The lighthouse is generally in good condition. Minor repair and maintenance work is recommended.

8.2 There should be no additional costs for the environmental abatement work on account of the structural condition of the lighthouse.

Yours truly,

**NOVATECH**
Engineers, Planners & Landscape Architects

**Peter James, P.Eng**
**Senior Project Manager | Structural Engineering & Building Code**



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# APPENDIX B

Certificate of Analysis - Soil Leachate

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www.paracellabs.com

# Certificate of Analysis

**BluMetric Environmental Inc. (Carp)**

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Carl Hentschel

Client PO:
Project: 160509
Custody: 31950

Report Date: 24-Oct-2016
Order Date: 20-Oct-2016

**Order #: 1643299**

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

| Paracel ID | Client ID |
|---|---|
| 1643299-01 | S-2 & S-3 |

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO:**

Report Date: 24-Oct-2016
Order Date: 20-Oct-2016
**Project Description: 160509**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Metals, ICP-MS | EPA 6020 - Digestion - ICP-MS | 21-Oct-16 | 21-Oct-16 |
| Solids, % | Gravimetric, calculation | 22-Oct-16 | 22-Oct-16 |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO:**

Report Date: 24-Oct-2016
Order Date: 20-Oct-2016
**Project Description: 160509**

| | | | | | |
|---|---|---|---|---|---|
| | **Client ID:** | S-2 & S-3 | - | - | - |
| | **Sample Date:** | 20-Sep-16 | - | - | - |
| | **Sample ID:** | 1643299-01 | - | - | - |
| | **MDL/Units** | Soil | - | - | - |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 87.8 | - | - | - |
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | |
| Lead | 0.05 mg/L | <0.05 | - | - | - |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO:**

Report Date: 24-Oct-2016
Order Date: 20-Oct-2016
**Project Description: 160509**

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | ND | 0.05 | mg/L | | | | | | |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO:**

Report Date: 24-Oct-2016
Order Date: 20-Oct-2016
**Project Description: 160509**

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | ND | 0.05 | mg/L | ND | | | 0.0 | 32 | |
| **Physical Characteristics** | | | | | | | | | |
| % Solids | 81.2 | 0.1 | % by Wt. | 83.0 | | | 2.2 | 25 | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | 49.1 | | ug/L | 1.63 | 95.0 | 77-126 | | | |

**Qualifier Notes:**

None

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

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

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

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Page 1 of 1

| | |
|---|---|
| Client Name: BLUMETRIC | Project Reference: 160509 |
| Contact Name: CARL HENTSCHEL | Quote # |
| Address: | PO # |
| Telephone: 613.277.7578 | Email Address: C @ BLUMETRIC.CA |

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

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

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

**Required Analyses**

Paracel Order Number: 1643299

| | Sample ID/Location Name | Matrix | Air Volume | # of Containers | Sample Taken Date | Sample Taken Time | TCLP LEACHATE LEAD | COMPOSITE | HOLD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | S-1 | S | | 1 | SEP 20 | AM | ~~✓~~ | | ✓ | | | | | 120ml | | | |
| 2 | S-2 & S-3 | S | | 2 | ↳ | ↳ | ✓ | ✓ | | | | | | ✓ | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |

Comments:

Method of Delivery: Courier

| | | | |
|---|---|---|---|
| Relinquished By (Sign): | Received by Driver/Depot: | Received at Lab: | Verified By: |
| Relinquished By (Print): CARL HENTSCHEL | Date/Time: | Date/Time: Oct. 20 16 8:00 | Date/Time: Oct 20/16 |
| Date/Time: OCT 20, 2016 | Temperature: ____ °C | Temperature: 9.4 °C | pH Verified ☒ By: N/A 11:50 |

# APPENDIX C

Certificate of Analysis -
Designated Substance and Hazardous Materials Survey

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# Certificate of Analysis

**BluMetric Environmental Inc. (Carp)**

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Carl Hentschel

Client PO: 160509
Project: 160509
Custody: 17880

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016

**Order #: 1639391**

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

| Paracel ID | Client ID |
|---|---|
| 1639391-01 | Paint-1 |
| 1639391-02 | Paint-2 |
| 1639391-03 | Paint-3 |

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016
**Project Description: 160509**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Mercury by CVAA | EPA 7471B - CVAA, digestion | 28-Sep-16 | 28-Sep-16 |
| Metals, ICP-OES | based on MOE E3470, ICP-OES | 28-Sep-16 | 28-Sep-16 |

Certificate of Analysis

**Client: BluMetric Environmental Inc. (Carp)**

**Client PO: 160509**

Report Date: 28-Sep-2016

Order Date: 22-Sep-2016

**Project Description: 160509**

| | Client ID: | Paint-1 | Paint-2 | Paint-3 | - |
|---|---|---|---|---|---|
| | Sample Date: | 20-Sep-16 | 20-Sep-16 | 20-Sep-16 | - |
| | Sample ID: | 1639391-01 | 1639391-02 | 1639391-03 | - |
| | MDL/Units | Paint | Paint | Paint | - |
| **Metals** | | | | | |
| Lead | 20 ug/g | 64100 | 15100 | 7210 | - |
| Mercury | 2 ug/g | 13 | <2 | <2 | - |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016
**Project Description: 160509**

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | | | |
| Lead | ND | 20 | ug/g | | | | | | |
| Mercury | ND | 2 | ug/g | | | | | | |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016
**Project Description: 160509**

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | | | |
| Lead | 25.7 | 20 | ug/g | 26.6 | | | 3.4 | 30 | |
| Mercury | ND | 2 | ug/g | ND | | | | 30 | |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016
**Project Description: 160509**

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | | | |
| Lead | 241 | | ug/L | ND | 91.2 | 70-130 | | | |
| Mercury | 13 | 2 | ug/g | ND | 89.4 | 70-130 | | | |

**Qualifier Notes:**

None

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

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

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e: paracel@paracellabs.com

**Chain of Custody**
(Lab Use Only)
№ 17880

Page 1 of 1

| | |
|---|---|
| Client Name: Blumetric Environmental | Project Reference: 160509 |
| Contact Name: Carla Hentschel | Quote #: - |
| Address: 3108 Carp Rd, Ottawa, ON | PO #: 160509 |
| Telephone: 613-839-3053 x | Email Address: chentschel@blumetric.ca |

**Turnaround Time:**
☐ Immediate ☐ 1 Day
☐ 4 Hour ☐ 2 Day
☐ 8 Hour ☐ 3 Day
☑ Regular
Date Required:

## ASBESTOS & MOLD ANALYSIS

Matrix: ☐Air ☑Bulk ☐Tape Lift ☐Swab ☐Other Regulatory Guideline:

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

Paracel Order Number: 1639391 - Paint

| | Sample ID | Sampling Date | Air Volume (L) | Analysis Required | Asbestos - Bulk: Matrix Description | Positive Stop? (Y/N) | Is the Sample Layered? (Y/N) | If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all ** |
|---|---|---|---|---|---|---|---|---|
| 1 | ACM-1a | Sept 20/16 | - | PLM | black paper | Y | N | - |
| 2 | ACM-1b | " | - | " | black paper | Y | N | - |
| 3 | ACM-1c | " | - | " | black paper | Y | N | - |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | ~~Paint-2~~ BL | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | Paint-1 | Sept 20/16 | - | Pb, Hg | exterior white | N | - | - |
| 10 | Paint-2 | " | - | " | exterior red | N | - | - |
| 11 | Paint-3 | " | - | " | interior grey | N | - | - |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

*Each layer will be analyzed and charged separately **Homogenize = All layers are blended into a single uniform sample.

Comments: Please send results to jaronde@blumetric.ca too!

Method of Delivery: Priscel

| | | | |
|---|---|---|---|
| Relinquished By (Sign): | Received at Depot: | Received at Lab: | Verified By: |
| Relinquished By (Print): Julia Lukenda | | | |
| Date/Time: Sept 22/16. | Date/Time: 22/09/16 350 PM | Date/Time: 22/09/16 18:20 | Date/Time: Sept 23/16 |

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# Certificate of Analysis

**BluMetric Environmental Inc. (Carp)**

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Carl Hentschel

Client PO: 160509
Project: 160509
Custody: 17880

Report Date: 3-Oct-2016
Order Date: 29-Sep-2016

**Order #: 1640317**

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

| Paracel ID | Client ID |
|---|---|
| 1640317-01 | Paint -1 |
| 1640317-02 | Paint -2 |
| 1640317-03 | Paint -3 |

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 03-Oct-2016
Order Date: 29-Sep-2016
**Project Description: 160509**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Metals, ICP-MS | EPA 6020 - Digestion - ICP-MS | 30-Sep-16 | 30-Sep-16 |
| Solids, % | Gravimetric, calculation | 1-Oct-16 | 1-Oct-16 |

Certificate of Analysis

**Client: BluMetric Environmental Inc. (Carp)**

**Client PO: 160509**

Report Date: 03-Oct-2016

Order Date: 29-Sep-2016

**Project Description: 160509**

| | | | | | |
|---|---|---|---|---|---|
| | **Client ID:** | Paint -1 | Paint -2 | Paint -3 | - |
| | **Sample Date:** | 20-Sep-16 | 20-Sep-16 | 20-Sep-16 | - |
| | **Sample ID:** | 1640317-01 | 1640317-02 | 1640317-03 | - |
| | **MDL/Units** | Paint | Paint | Paint | - |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 100 | 100 | 100 | - |
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | |
| Lead | 0.05 mg/L | 139 | 120 | 62.0 | - |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 03-Oct-2016
Order Date: 29-Sep-2016
**Project Description: 160509**

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | ND | 0.05 | mg/L | | | | | | |

Certificate of Analysis
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 160509**

Report Date: 03-Oct-2016
Order Date: 29-Sep-2016
**Project Description: 160509**

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | ND | 0.05 | mg/L | ND | | | 0.0 | 32 | |
| **Physical Characteristics** | | | | | | | | | |
| % Solids | 91.9 | 0.1 | % by Wt. | 92.2 | | | 0.4 | 25 | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **EPA 1311 - TCLP Leachate Inorganics** | | | | | | | | | |
| Lead | 48.0 | | ug/L | 0.437 | 95.2 | 77-126 | | | |

**Qualifier Notes:**

None

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

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

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

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E: paracel@paracelabs.com

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№ 17880

Page 1 of 1

| | |
|---|---|
| Report Name: Bluffette Environmental | Project Reference: 160569 |
| Contact Name: Cindi Hentschel | Quote #: - |
| Address: 3108 Carp Rd, Ottawa, ON | PO #: 160569 |
| Telephone: 613-839-3053 x | Email Address: chentschel@blumetric.ca |

**Turnaround Time:**
☐ Immediate ☐ 1 Day
☐ 4 Hour ☐ 2 Day
☐ 8 Hour ☐ 3 Day
☑ Regular
Date Required:

## ASBESTOS & MOLD ANALYSIS

Matrix: ☐ Air ☑ Bulk ☐ Tape Lift ☐ Swab ☐ Other Regulatory Guideline:

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

Paracel Order Number: 1640317. ~~1639391 - Paint~~

| | Sample ID | Sampling Date | Air Volume (L) | Analysis Required | Asbestos - Bulk: Matrix Description | Positive Stop? (Y/N) | Is the Sample Layered? (Y/N) | If Layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all** |
|---|---|---|---|---|---|---|---|---|
| 1 | ACM-1a | Sep 26/16 | - | PLM | black paper | Y | N | - |
| 2 | ACM-1b | " | - | " | black paper | Y | N | - |
| 3 | ACM-1c | " | - | " | black paper | Y | N | - |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | ~~Paint-1~~ BL | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | Paint-1 | Sep 26/16 | - | TCLP Hg, Pb | exterior white | N | - | - |
| 10 | Paint-2 | " | - | " | exterior red | N | - | - |
| 11 | Paint-3 | " | - | " | interior grey | N | - | - |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

Revised Sep 29/16 -RS.

*Each layer will be analyzed and charged separately **Homogenize = All layers are blended into a single uniform sample.

Comments: Please send results to jlarondelle@blumetric.ca too!

Method of Delivery: Parcel

| Relinquished By (Sign): | Received at Depot: | Received at Lab: | Verified By: |
|---|---|---|---|
| Relinquished By (Print): | | | |
| Date/Time: Sept 23/16 | Date/Time: 22/09/16 350 | 22/09/16 | |

Sep 29/16 Rachel subject 1:46.

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# Certificate of Analysis

**BluMetric Environmental Inc. (Carp)**

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Carl Hentschel

Client PO: 160509
Project: 160509
Custody: 17880

Report Date: 28-Sep-2016
Order Date: 22-Sep-2016

**Order #: 1639459**

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

| Paracel ID | Client ID |
|---|---|
| 1639459-01 | ACM-1a |
| 1639459-02 | ACM-1b |
| 1639459-03 | ACM-1c |

Approved By:

Emma Diaz

Senior Analyst

PARACEL LABORATORIES LTD.

**Order #: 1639459**

Certificate of Analysis

**Client: BluMetric Environmental Inc. (Carp)**

**Client PO: 160509**

Report Date: 28-Sep-2016

Order Date: 22-Sep-2016

**Project Description: 160509**

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

| *Paracel I.D.* | *Sample Date* | *Layers Analyzed* | *Colour* | *Description* | *Asbestos Detected:* | *Material Identification* | *% Content* |
|---|---|---|---|---|---|---|---|
| 1639459-01 | 20-Sep-16 | sample homogenized | Black | Tar Paper | No | **Client ID: ACM-1a** [AS-PRE] | |
| | | | | | | Cellulose | 90 |
| | | | | | | Non-Fibers | 10 |
| 1639459-02 | 20-Sep-16 | sample homogenized | Black | Tar Paper | No | **Client ID: ACM-1b** [AS-PRE] | |
| | | | | | | Cellulose | 90 |
| | | | | | | Non-Fibers | 10 |
| 1639459-03 | 20-Sep-16 | sample homogenized | Black | Tar Paper | No | **Client ID: ACM-1c** [AS-PRE] | |
| | | | | | | Cellulose | 90 |
| | | | | | | Non-Fibers | 10 |

## Analysis Summary Table

| Analysis | Method Reference/Description | Lab Location | NVLAP Lab Code * | Analysis Date |
|---|---|---|---|---|
| Asbestos, PLM Visual Estimation | by EPA 600/R-93/116 | 2 - Ottawa West Lab | 200812-0 | 28-Sep-16 |

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

## Qualifier Notes

Sample Qualifiers :

AS-PRE: Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

## Work Order Revisions / Comments

*None*

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e: paracel@paracellabs.com

**Chain of Custody**
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№ 17880

Page 1 of 1

| | | | |
|---|---|---|---|
| Client Name: Blumetric Environmental | Project Reference: 160509 | **Turnaround Time:** | |
| Contact Name: Carla Hentschel | Quote #: - | ☐ Immediate | ☐ 1 Day |
| Address: 3108 Carp Rd, Ottawa, ON | PO #: 160509 | ☐ 4 Hour | ☐ 2 Day |
| | Email Address: chentschel@blumetric.ca | ☐ 8 Hour | ☐ 3 Day |
| Telephone: 613-839-3053 x | | | ☑ Regular |
| | | Date Required: | |

## ASBESTOS & MOLD ANALYSIS

**Matrix:** ☐Air ☑Bulk ☐Tape Lift ☐Swab ☐Other **Regulatory Guideline:**

**Required Analyses:** ☐Microscopic Mold ☐Culturable Mold ☐Bacteria GRAM ☐PCM ☑PLM ☐Chatfield ☐TEM

**Paracel Order Number:** 1639459

| | Sample ID | Sampling Date | Air Volume (L) | Analysis Required | Asbestos - Bulk: Matrix Description | Positive Stop? (Y/N) | Is the Sample Layered? (Y/N) | If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all ** |
|---|---|---|---|---|---|---|---|---|
| 1 | ACM-1a | Sept 20/16 | - | PLM | black paper | Y | N | - |
| 2 | ACM-1b | " | - | " | black paper | Y | N | - |
| 3 | ACM-1c | " | - | " | black paper | Y | N | - |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | ~~Paint~~ XBL | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | Paint-1 | Sept 20/16 | - | Pb, Hg | exterior white | N | - | - |
| 10 | Paint-2 | " | - | " | exterior red | N | - | - |
| 11 | Paint-3 | " | - | " | interior grey | N | - | - |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

*Each layer will be analyzed and charged separately **Homogenize = All layers are blended into a single uniform sample.

Comments: Please send results to jaronde@blumetric.ca too!

Method of Delivery: Paracel

| Relinquished By (Sign): | Received at Depot: | Received at Lab: | Verified By: |
|---|---|---|---|
| Relinquished By (Print): Julia Laronde | Date/Time: 22/09/16 3:50 PM | Date/Time: 09/22/16 4:29 pm | Date/Time: 09/23/16 2:27 pm |
| Date/Time: Sept 22/16. | | | |

# APPENDIX D

Photographs -
Designated Substance and Hazardous Materials Survey

Site
(Niagara River Range Rear Lighthouse)

Site
(General view of crawl space interior)

Site
(General view of main level)

Site
(General view of first level)

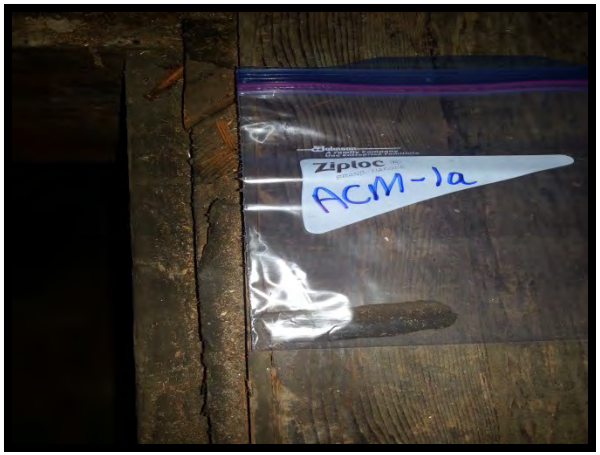
Site
(General view of second level)

Site
(General view of third level)

---

**Site Photographs**
PWGSC – Designated Substances and Hazardous Materials Survey
Niagara River Range Rear
Niagara-on-the-Lake, Ontario

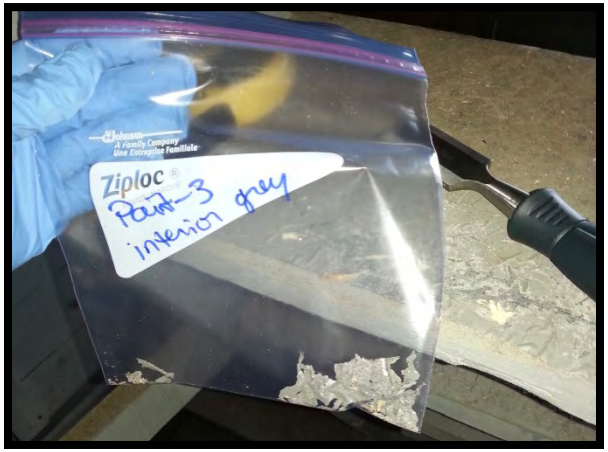
October 2016 - 160509




Site
(General view of ACM-1a,b,c black paper)


Site
(General view of Paint-1 exterior white paint)


Site
(General view of Paint-2 exterior red paint)




Site
(General view of Paint-3 interior grey paint)

Site
(General view of significant weathered exterior white paint – chips on ground)

Site
(General view of lighthouse light station)

**Site Photographs**
PWGSC – Designated Substances and Hazardous Materials Survey
Niagara River Range Rear
Niagara-on-the-Lake, Ontario

October 2016 - 160509