
PWGSC Ontario	SPECIFICATION	Section 00 00 00
Region Project	TITLE SHEET	Page 1
NUMBER: R.013137.006		2016-02-29

PROJECT TITLE LNAPL REMEDIATION PROJECT, PORT STANLEY,
ONTARIO

PROJECT NUMBER R.013137.006

PROJECT DATE 2016-02-29

END

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
00 00 00	SPECIFICATION TITLE SHEET	1
<u>Division 01 - General Requirements</u>		
01 10 00	SUMMARY OF WORK FOR LNAPL REMEDIATION	2
01 11 06	GENERAL INSTRUCTIONS FOR LNAPL REMEDIATION	12
01 32 16	CONSTRUCTION PROGRESS SCHEDULE - BAR (GANTT) CHART FOR LNAPL REMEDIATION	4
01 33 00	SUBMITTALS	6
01 35 13	SPECIAL PROJECT PROCEDURES FOR CONTAMINATED SITES	12
01 35 29	HEALTH AND SAFETY REQUIREMENTS FOR LNAPL REMEDIATION	6
01 35 43	ENVIRONMENTAL PROCEDURES FOR LNAPL REMEDIATION	14
01 42 13	ABBREVIATIONS AND ACRONYMS	7
01 56 00	TEMPORARY BARRIERS AND ENCLOSURES FOR LNAPL REMEDIATION	3
01 74 20	CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL	5
<u>Division 02 - Existing Conditions</u>		
02 41 15	DEMOLITION/DECONSTRUCTION	3
02 50 00	SITE REMEDIATION FOR LNAPL REMEDIATION	16
<u>Division 03 - Concrete</u>		
03 30 00	CAST-IN-PLACE CONCRETE	6
<u>Division 31 - Earthworks</u>		
31 32 19.01	GEOTEXTILES	4
31 32 19.02	GEOSYNTHETIC CLAY LINERS	4
<u>Division 32 - Exterior Improvements</u>		
32 12 16	ASPHALT PAVEMENT REPAIRS	3
<u>Division 33 - Utilities</u>		
33 29 00	WATER WELL ABANDONMENT	3
<u>Appendices</u>		
APPENDIX 1	BID AND ACCEPTANCE FORM AND COMBINED PRICE	
APPENDIX 2	LNAPL REMEDIATION CONSTRUCTION CHECKLIST	
APPENDIX 3	MITIGATION MEASURES CHECKLIST	
APPENDIX 4	BOREHOLE LOGS	
APPENDIX 5	SITE PHOTOGRAPHS	
APPENDIX 6	MCE SOIL CHEMISTRY	
<u>List of Drawings</u>		
C-01	COVER/DRAWING INDEX	
C-02	SITE LOCATION PLAN	
C-03	EXISTING CONDITIONS - EAST HEADLANDS	
C-04	LNAPL DISTRIBUTION PLAN - EAST HEADLANDS	
C-05	REMEDIATION PLAN & CROSS-SECTION - EAST HEADLANDS	
C-06	RESTORATION PLAN & CROSS-SECTION - EAST HEADLANDS	
C-07	EXISTING CONDITIONS - WEST PIER	
C-08	LNAPL DISTRIBUTION PLAN - WEST PIER	
C-09	REMEDIATION PLAN & CROSS-SECTION - WEST PIER	
C-10	RESTORATION PLAN & CROSS-SECTION - WEST PIER	

C-11	SITE ACCESSS ROUTING PLAN
C-12	MCE BORROW SOURCE LOCATION PLAN
MA-01	EXISTING CONDITIONS AND REMOVALS
MA-02	WORK AREA 2 SEQUENCING OF CONSTRUCTION
MA-03	WORK AREA 2 SEQUENCING OF CONSTRUCTION
MA-04	WORK AREA 1 SEQUENCING OF CONSTRUCTION
MA-05	TYPICAL DETAILS (WORK AREAS 1 AND 2)

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and description of Work.

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 removal by means of excavation and off-site disposal of petroleum hydrocarbon impacted soil from within the groundwater table fluctuation zone (smear zone), backfilling the excavation works to re-instate grades and restoration work required to reinstate site conditions within the work areas located within the East Headlands and West Pier sections of the Port Stanley Harbour lands identified as PWGSC Project Number R.013137.006. The site is made up of two parts - the East Headlands and the West Pier located on either side of the Port Stanley Harbour in the Municipality of Central Elgin, Ontario. The respective work areas comprise discrete locations within the Port Stanley Harbour as identified on Drawing C-02.

1.4 WORK SCHEDULE

- .1 Provide schedule for completion of the site remediation and site restoration. All work under this contract is to be completed within forty working days of the Notice to Proceed start date.

1.5 COMBINED PRICE CONTRACT

- .1 "Bid and Acceptance Form - Combined Price" and the Unit Price Table.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.
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PWGSC Ontario
Region Project
Number:R.013137.006

SUMMARY OF WORK
FOR LNAPL REMEDIATION

Section 01 10 00
Page 2
2016-02-29

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END

PART 1 - GENERAL

1.1 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, O. Reg. 103/94, Industrial, Commercial and Institutional Source Separation Programs, O. Reg. 153-04, as amended, O. Reg. 347 as amended, and Ontario Water Resource Act, R.R.O.1990, Reg.903 as amended.
 - .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 Protection Act (New Substance Notification Regulations).
 - .6 Transportation of Dangerous Goods Act.
 - .7 Fisheries Act.
 - .8 Migratory Birds Convention Act.
 - .9 Migratory Birds Regulations.
 - .10 MOECC Table 1 Standards "Full Depth Background Condition Standards" under "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011 of the Ontario Regulation ("O. Reg.") 153/04 as amended.

1.2 AUTHORITIES HAVING JURISDICTION

- .1 Kettle Creek Conservation Authority is the authority having jurisdiction over this project with regards to work within the Kettle Creek Flood Plain.
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- .2 All work areas are within lands owned by MCE.
- .3 The Marine Engineer, working on behalf of the Crown, will provide inspection services as they relate to potential health and safety issues associated with the excavation and backfilling works of the of at the West Pier Areas 1 and 2 dockwall system.

1.3 ROAD LOAD RESTRICTIONS

- .1 Comply with posted restrictions. Acquire and submit to Departmental Representative copies of all necessary permits.
- .2 Access to the bridge on George St. is prohibited for all haulage vehicles and equipment floats for the duration of the project.

1.4 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.5 FEES, PERMITS, CERTIFICATES AND LETTERS

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 Furnish certificates, permits and letters when requested.
- .4 Departmental Representation to provide Contractor with a copy of the Kettle Creek Conservation Authority (KCCA) permit for the Work.
- .5 Comply with the terms and conditions of the KCCA permit.

1.6 EXAMINATION

- .1 Attend an on-Site kick off meeting with Departmental Representative.
 - .2 Examine existing conditions and determine conditions affecting work.
-

- .3 Notify Departmental Representatives in writing of any discrepancies between contract documents and site conditions.

1.7 DOCUMENTS

- .1 Keep on site one copy of each of the following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Amendments and addenda.
 - .4 Change orders.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Other modifications to Contract.
 - .7 Copy of approved Work schedule.
 - .8 Field test records.
 - .9 Inspection certificates.
 - .10 Manufacturer's certificates.
 - .11 Manufacturers' installation and application instructions.
 - .12 Labour conditions and wage schedules.
 - .13 Material Safety Data Sheets.
 - .14 Labour and Material Bonds.
 - .15 All applicable permits.
- .2 Specifications shall govern over drawings.
- .3 Maintain documents in clean, dry, legible condition.
- .4 Make documents available at all times for inspection by Departmental Representative.

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, 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.
 - .2 Comply with Section 1 33 00.
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1.9 CONTRACTOR'S AS-BUILT DRAWINGS, SPECIFICATIONS AND AERIAL PHOTOGRAPHS

- .1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.
 - .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, and specifications for as-built drawing and specification purposes.
 - .1 Drawings are in Autocad.
 - .2 Specifications are in MS Word.
 - .3 Amendments and addenda are in MS Word.
 - .4 Record following significant deviations:
 - .1 Depths or various elements and foundations.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension.
 - .5 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.
 - .6 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 and specifications over to Departmental Representative on completion of work.
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- .6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.10 CONSTRUCTION PHOTOGRAPHS

- .1 Submit electronic copy of colour digital photography in jpg format, standard 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) before the site construction commences, 2) at completion of excavation for soil remediation, and 3) at final reinstatement.
- .5 Photograph site works to demonstrate compliance with the mitigation measures as outlined in Appendices 2 and 3.

1.11 SHOP DRAWINGS

- .1 To Section 01 33 00.

1.12 PROOF OF CLEAN QUALITY OF THE BACKFILL MATERIAL

- .1 Backfill meeting the MOECC standards for a remediation site will be supplied by the Municipality of Central Elgin and the Departmental Representative will be responsible for quality assurance testing of this material (see Appendix 7). Clean Fill meeting the MOECC Table 1 Standards (April 15, 2011) under O.Reg.153/04 as amended will be used as surface cover material (500 mm clean fill cap) while material meeting the risk based standards may be used for material below the clean fill cap or as directed by the Departmental Representative.
 - .2 For instances where backfill is not supplied by the Municipality of Central Elgin submit proof of the source and quality of the clean backfill material to be used as clean soil within the remediation work areas on the Site. The clean backfill must meet MOECC Table 1 Standards (April
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15, 2011) under O.Reg.153/04 as amended in order to be considered as inert fill.

- .3 Pea gravel or clear stone, as may be used within Area 1 of the West Pier, will not require chemical testing but must be approved for use by the Departmental Representative prior to shipment to site.
- .4 Quality Assurance testing of all fill imported to site will be completed by the Departmental Representative.
- .5 With the exception of MCE supplied fill any fill not conforming to the project specifications will be removed and replaced at the Contractor's cost.

1.13 ADDITIONAL DRAWING/PHOTOGRAPHS

- .1 Departmental Representative may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.14 PROTECTION

- .1 Protect existing utilities and infrastructure from damage.
 - .2 Replace damaged existing work with material and finish to match original.
 - .3 Protect existing trees and plants on adjacent properties. On-site trees may be removed as directed by the Departmental Representative.
 - .4 Protect sections of the dockwall and dockwall deck that are not within the work area of the West Pier.
 - .5 Work adjacent to or within the dockwall will be done under the supervision of the Marine Engineer working for the Departmental Representative. Assist the Marine Engineer, as required, with the inspection of any dockwall structure within the West Pier work areas. Repair any damage to the dockwall resulting from the execution of the remediation program.
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1.15 EXISTING

- .1 Establish location, protect and maintain existing utility lines.
- .2 Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic.

1.16 OVERLOADING

- .1 No part of Work shall be loaded with load which will endanger its safety or will cause permanent deformation.
- .2 Repair to original condition any part of work damaged due to overloading at no additional cost to Contract.

1.17 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.
- .3 Departmental Representative will have access to temporary facilities as required (eg. Washroom).

1.18 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
 - .2 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 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.
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- .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.

1.19 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions 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.

1.20 ALTERATIONS TO EXISTING SITE

- .1 Remove and recycle, compost or dispose of:
 - .1 Trees, shrubs and other plant material as indicated.
 - .2 Site structures as indicated.
 - .2 Remove in good order, and store within the work area, as indicated:
 - .1 Dockwall deck structures impacted by the work (eg. cleats).
 - .2 Site furnishings, benches, planters, and garbage containers.
 - .3 Bollards.
 - .3 Remove, temporarily store, clean and reinstall, as required:
 - .1 Surficial soils from above the smear zone as indicated.
 - .2 Dockwall deck structures such as cleats.
 - .3 Site furnishings, benches, planters, and garbage containers.
 - .4 Bollards.
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1.21 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.
- .2 Complete a topographic survey of the site (East Headlands and West Pier work areas) and off-site MCE fill stockpile prior to the remediation program and as required to confirm the quantities of materials being managed on site and to confirm the reinstatement of grades as required.

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 Monday to Friday from 7 am to 6 pm. Weekend work can only be done with the approval of the Departmental Representative and must comply with local noise by-laws.

1.23 CLEANING

- .1 Maintain site free of accumulated waste and rubbish.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt and foreign matter from hard surfaces.

1.24 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.
 - .2 In the event of a spill notify the Departmental Representative immediately.
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1.25 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>.

1.26 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 working 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 working days after meetings and transmit to meeting participants and affected parties not in attendance.
 - .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 5 working 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 will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 2 working days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
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- .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 and samples.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, 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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

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

1.2 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 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.
- .4 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.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 06.
- .2 Submit to Departmental Representative within 10 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 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Remedial excavation in the East Headlands completed within 15 working days of the Notice to Proceed date.
 - .2 Backfill and grading in the East Headlands completed within 25 working days of the Notice to Proceed date.
 - .3 Remedial demolition and excavation in Work Area 1 of the West Pier completed within 5 working days of the Notice to Proceed date.
 - .4 Backfill and restoration of reinforced concrete dockwall deck in Work Area 1 of the West Pier
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- completed within 10 working days of the Notice to Proceed date.
- .5 Remedial excavation in Work Area 2 of the West Pier completed within 15 working days of the Notice to Proceed date.
 - .6 Backfill and grading in Work Area 2 of the West Pier completed within 20 working days of Notice to Proceed date.
 - .7 Certificate of Substantial Performance within 35 working days of Notice to Proceed date.

1.5 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 reviewed schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 2 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
 - .2 Ensure detailed Project Schedule includes as a minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Clearing and Grubbing.
 - .6 Site Demolition Works as required.
 - .7 Remedial Excavation split by Work Area.
 - .8 Backfill and Grading split by Work Area.
 - .9 Concrete Restoration work at West Pier.
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1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on daily 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.

1.8 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.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with Work affected by submittal until review is complete.
 - .3 Present shop drawings, product data and samples in SI Metric units.
 - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are co-ordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .10 Keep one reviewed copy of each submission on site.
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- .11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf files on CD or through email.

1.2 SHOP DRAWINGS

- .1 The term "shop drawings" means drawings, AND PRODUCT DATA diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.
 - .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow 5 working days for Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
 - .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
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- .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Submit three hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .11 Submit three hard copies and one 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.
 - .12 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
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- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .14 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .15 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .17 Delete information not applicable to project.
 - .18 Supplement standard information to provide details applicable to project.
 - .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission
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of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .20 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative 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 requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
 - .2 Deliver samples prepaid to Departmental Representative's business address.
 - .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
-

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

1.4 CERTIFICATES

- .1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.
- .2 Submit transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 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 Regulations including SOR/2011-210 (Amendment 10) and SOR/2011-239 (Amendment 8).
- .3 Canadian Council of Ministers of the Environment (CCME) Documentation.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 06 and to include an Environmental Protection Plan.
 - .2 Submit, prior to start of work, plan detailing management of wastes.
 - .3 Submittals for Progress Meetings: make submittals at least 48 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 areas.
 - .3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
 - .4 Copies of the completed underground locates.
 - .5 Daily logs documenting inspection of erosion and sediment controls.
 - .6 Information on borrow sources being used to supply backfill material.
 - .7 Other information required by Departmental Representative or relevant to agenda for upcoming progress meeting.
-

- .4 Complete the Remediation and Risk Management Checklist included in Appendix 2 and following the completion of the work submit a copy of the completed checklist to the Departmental Representative.

 - .5 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 Means of ingress, egress and temporary traffic control facilities. Refer to Section 01 56 00 for traffic control and comply with MCE bylaws.
 - .2 Equipment and material staging areas.
 - .3 Truck and vehicle routes, entrances and exits to the Work Sites are to be identified and documented prior to the initiation of construction work at the respective Work Areas.
 - .4 Soil stockpile areas and temporary demolition debris stockpile areas shall be confirmed before construction work begins and any proposed changes to the areas indicated on the enclosed contract drawings will be confirmed by the Departmental Representative. The locations of the stockpiles and debris management areas will be selected based on ability to control potential erosion and the migration of soil and dust. Stockpile locations shall be placed away from areas accessible to or frequented by the public and away from other environmentally sensitive areas. To the extent possible all impacted soils from within the smear zone will be directly loaded into haul trucks for offsite disposal unless otherwise instructed by the Departmental Representative. Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's site-specific Health and Safety Plan.
 - .5 Grading, including contours, required to construct temporary facilities.
 - .6 Wastewater storage tanks/areas in the event that petroleum hydrocarbon sheen or free product must be removed from the surface of groundwater within the remedial excavation.
-

1.3 REGULATORY REQUIREMENTS

- .1 Provide erosion and sediment control in accordance with federal, provincial and local 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 including the mitigation measures outlined in Appendix 3.
 - .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.

1.4 SEQUENCING AND SCHEDULING

- .1 The Work is to be completed following the sequencing outlined in the Master Plan as reviewed and approved by the Departmental Representative. The sequencing of the Work cannot be amended without the authorization of the Departmental Representative.

1.5 SOIL STOCKPILING FACILITIES

- .1 Provide, maintain, and operate storage/stockpiling facilities as required and as indicated. Develop procedures for stockpiling excavated soil from above the smear zone on-site to prevent erosion, transport and leaching.
- .2 At both the East Headlands and West Pier Work Areas install a non-woven geotextile material below proposed stockpile locations to prevent contact between stockpile material and ground. Equip facility with tarps capable of covering stockpiled material until the stockpiled material is reused as backfill on site.

1.6 IMPACTED WATER STORAGE TANK

- .1 Provide, operate, and maintain impacted water storage
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tanks to store groundwater identified as being impacted with petroleum hydrocarbon sheen or free product.

- .2 Discharges: comply with applicable discharge limitations and requirements; do not discharge impacted waters to site sewer systems and obtain Departmental Representative's approval prior to discharge of wastewater.
- .3 Provide pumps and piping to convey collected impacted waters to designated storage tank; provide a tank with minimum total live capacity of 5,000 L at each Work Area.
- .4 Install impacted water storage tanks in locations as directed by Departmental Representative.
- .5 Connect pumps, piping, miscellaneous items, and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping, and miscellaneous items from freezing.
- .6 Do not operate impacted water storage tanks until inspected and approved by Departmental Representative.
- .7 Notify Departmental Representative 72 hours minimum in advance of when impacted water 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 impacted waters based on sample analysis.
- .8 Transport and dispose of impacted waters at off-site disposal facility as identified by Contractor and approved by Departmental Representative.
- .9 Payment for transporting and disposing of impacted water to off-site disposal facility will be made on extra work basis in accordance with Contract Documents.

1.7 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.

1.8 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 remediation works and in accordance with Province of Ontario regulations.
 - .3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for 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.
 - .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 (may be done by others) indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels as set out by Ministry of Labour or other Authorities Having Jurisdiction.
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- .8 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures with Departmental Representative 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.

1.9 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 Authority having jurisdiction or interest in spill or release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
 - .2 Owner of pollutant, if known.
 - .3 Person having control over pollutant, if known.
 - .4 Departmental Representative.
 - .5 Ontario Ministry of Environment Spills Action Centre (1-800-268-6060).
 - .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.
 - .6 Provide spill response materials including, containers, adsorbent, 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.
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1.10 WATER CONTROL

- .1 Prevent surface water runoff from entering the excavation.
 - .2 Protect site from puddling or running water. Grade site to drain.
 - .3 Prevent surface water runoff from leaving work areas. During all stages of remediation, employ storm water runoff management measures to limit the amount of impacted runoff escaping from the Site. The Contractor shall take all necessary steps to control and prevent any degradation of storm water runoff from the Site. These measures may include the use of suitable geotextile within local catch basins for filtration, placement of tarps over exposed soil stockpiles and placement of silt fences along the dockwall coping wall at the water's edge in the West Pier work area. Consideration shall be given to storm water runoff management for after work periods and weekends.
 - .4 Groundwater management is not anticipated except where petroleum hydrocarbon sheen or free product is identified.
 - .5 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.
 - .6 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of work stoppage including at end of each working day and as directed by Departmental Representative.
 - .7 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
 - .8 Provide, operate, and maintain necessary equipment appropriately sized to manage any petroleum hydrocarbon impacted water (sheen or free product) within the work areas.
 - .9 Contain water from stockpiled materials. Transfer potentially contaminated surface waters to impacted water
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storage tanks as required.

- .10 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.
- .11 Contain and collect impacted waters and transfer such collected waters to an off-site disposal facility approved for use by the Departmental Representative.
- .12 Assist the Departmental Representative, as required, in the testing and classification of the impacted waters prior to discharge.

1.11 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, from stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.
 - .2 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.
 - .3 Provide and maintain temporary measures which may include, silt fences, hay or straw bales, geotextile 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 immediately adjacent the coping wall at the water's edge within Work Area 2 of the West Pier. Other methods, as approved by the Departmental Representative may be used at the East Headlands and Work Area 1 of the West Pier.
 - .4 Provide a silt curtain along the length of the West Pier Work Areas to ensure any silt migrating through the dockwall does not extend into Kettle Creek. The silt
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curtain is to be fastened in a manner acceptable to the Marine Engineer retained by the Departmental Representative to supervise this aspect of the Work.

- .5 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.
 - .6 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.
 - .7 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.
 - .8 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.
 - .9 Silt Curtain: assembled, ready to install unit consisting of geotextile attached to a floating system with anchor point.
 - .10 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.
 - .11 Installation:
 - .1 Construct temporary erosion control items as indicated. Actual alignment and/or location of various items as directed by Departmental Representative.
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- .2 Check erosion and sediment control measures weekly after each rainfall; during prolonged rainfall check daily.
- .3 Bales and/or silt fence may be removed at beginning of work day, replace at end of work day.
- .4 Silt curtain must be installed prior to and for the full duration of the remediation program within the West Pier work area.
- .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 remediation works, Departmental Representative may require installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, grading 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 Only as directed 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.

- .12 Periodically inspect earthwork (minimum of once per working day) to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- .13 If soil and debris from site accumulate in low areas, roadways or other areas where in Departmental Representative's determination it is undesirable, remove accumulation and restore area to original condition.

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

1.13 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 at no cost to Canada.

1.14 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.
 - .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.
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- .4 Impacted water removed from storage tank(s).
- .7 Dispose of materials in accordance with Section 01 35 43 or as directed by Departmental Representative.
- .8 Impacted water sample and analysis: Departmental Representative will perform sampling and analysis of stored impacted water for disposal purposes prior to removal from site. Results of analyses will determine appropriate methods of disposal, classification of the waste and used in the preparation of any waste manifests. 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.

1.15 RECORD KEEPING

- .1 Maintain adequate records to support information provided to Departmental Representative regarding exception reports.
- .2 Maintain bills of lading for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PWGSC Ontario	HEALTH AND SAFETY	Section 01 35 29
Region Project	REQUIREMENTS FOR	Page 1
Number: R.013137.006	LNAPL REMEDIATION	2016-02-29

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 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 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 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 06.
 - .2 Submit site-specific Health and Safety Plan: Within 5 working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
 - .4 Measures to manage risks related to work adjacent water bodies.
 - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 working days after receipt of plan. Revise plan as appropriate and resubmit plan to
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Departmental Representative within 2 working 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 two copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative daily.
- .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.

1.3 FILING OF NOTICE

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

1.4 WORK PERMIT

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

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.7 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.

1.8 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Silica in concrete within Work Area 1 of West Pier.
 - .2 Benzene or other petroleum product derivatives, VOC chlorinated solvents and metals associated with impacted soil and/or groundwater at all work areas.
- .2 Wear appropriate PPE, including safety glasses, long pants and long sleeves to block the direct contact pathway during remediation activities. Dust masks shall be worn during any concrete cutting work. Personal floatation devices must be worn as per regulation when working adjacent a water body.

1.9 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.
 - .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
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be submitted to Departmental Representative in writing.

1.10 COMPLIANCE REQUIREMENTS

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

1.11 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 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.

1.13 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 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee
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- members (if applicable).
- .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB "In Case of Injury At Work" poster.
 - .13 Location of toilet and cleanup facilities.

1.14 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.

1.15 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.16 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 Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.
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PWGSC Ontario
Region Project
Number: R.013137.006

HEALTH AND SAFETY
REQUIREMENTS FOR
LNAPL REMEDIATION

Section 01 35 29
Page 6
2016-02-29

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

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 humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.2 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 geosynthetic products used in relation to the Work and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
 - .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
 - .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
 - .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
 - .7 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
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- .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying 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 and EPA 832/R-92-005, Chapter 3.
 - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess 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.
 - .1 Plans to include measures to minimize amount of material 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.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .9 Spill Control Plan to include 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, are contained on project site.
 - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Impacted Water Management Plan identifying methods
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and procedures for management and disposal of impacted waters which are directly derived from excavation activities.

- .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.

1.3 FIRES

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

1.4 DISPOSAL OF WASTE

- .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 MOECC approved disposal facilities or approved transfer stations, including, but not limited to, the following:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Disposable PPE worn during remediation work.
 - .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 MOECC-approved disposal facility.
 - .6 Disposal/recycling of other waste generated during the project shall be done in compliance with Ontario Waste
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Regulations and the facilities used will be approved by the Departmental Representative.

1.5 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 travelling 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 Vehicles or equipment refueling to be conducted off-site whenever possible and spill prevention measures are to be implemented when on-site refueling is required.
- .5 Refueling 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.

1.6 EQUIPMENT DECONTAMINATION

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

- .2 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. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.
- .3 Each piece of equipment may 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.
- .4 Transfer soils to disposal transport vehicle.
- .5 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.
- .6 Decontamination of equipment shall be completed a minimum of 10 m away from any water body.

1.7 DRAINAGE

- .1 Develop and submit Erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include 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.

1.8 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 Groundwater found within the excavation to be impacted with a petroleum hydrocarbon sheen or free product shall
-

be transferred to a temporary storage tank as directed by the Department Representative.

1.9 SITE CLEARING AND PLANT PROTECTION

- .1 Protection of trees and plants on site is not required.
- .2 Protect trees and shrubs adjacent to work areas.
- .3 Minimize stripping of topsoil and vegetation.

1.10 VEGETATION

- .1 Protect vegetation that does not have to be removed by fencing/delineating work areas and or storage areas.
- .2 Operating construction machinery in a manner that minimizes damage to adjacent vegetation.

1.11 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use of waterway beds for borrow material is not permitted.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct sediment control structures to minimize erosion to waterways.

1.12 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 Implement dust abatement measures as required to control dust.
 - .3 Cover or wet down material stockpiles to prevent blowing dust. Provide dust control as required.
 - .4 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
-

- .5 Prevent concrete saw cutting mud and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative.

1.13 CONCRETE OPERATIONS

- .1 The following clauses are applicable to all work under Section 03 30 00.
 - .2 Employ measures to prevent entry of concrete wash water or leachate from uncured concrete into the water.
 - .3 Containment facilities shall be provided at the site for the wash-down water from concrete delivery trucks, concrete equipment, and other tools and equipment as required. Water used to wash concrete should not be allowed to enter directly into water bodies. The sediment should be allowed to settle out and reach neutral pH before the clarified water is released to the drain system or allowed to percolate into the ground.
 - .4 Concrete trucks and concrete equipment should be washed out in a designated area where runoff to the marine environment, adjacent waterways and storm drains can be prevented.
 - .5 Prior to placement of concrete, all forms shall be thoroughly inspected to ensure that formwork is fully secured and sealed to prevent the release of concrete or concrete contaminated water into the waterway.
 - .6 If escape of concrete is observed or detected, pumping shall be stopped and appropriate action taken to immediately rectify the situation.
 - .7 Contractor will measure and record baseline pH levels in the project area prior to commencement of work.
 - .8 Prior to the commencement of operations the Contractor is to demonstrate satisfactory knowledge and use of pH monitoring equipment to Departmental Representative.
 - .9 Monitor the pH levels frequently in the waterway
-

immediately downstream of isolated work site until completion of work. Emergency measures shall be taken if pH change more than 1.0 pH unit, measured to an accuracy of 0.2 pH units from the background level or is recorded to be below 6.0 or above 9.0 pH units.

- .10 The pH levels are to be maintained within the range of 6.5-8.5 as per Provincial Water Quality Objectives (PWQO).
- .11 Keep a carbon dioxide (CO₂) tank with regulator, hose and gas diffuser readily available during concrete work. Use it to release carbon dioxide gas into the affected area to neutralize pH levels should a spill occur. Train workers to use the tank.

1.14 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 by law must be notified immediately 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 worksite, or enter any: surface water, storm water, or sanitary sewers at or near the worksite.
 - .8 Equipment fuelling or lubricating shall occur in an area designated by the Departmental Representative with proper controls to prevent the release of deleterious substances,
-

and shall be conducted away from any surface water drains or collection points.

- .9 In accordance with the Fisheries Act, approval must be obtained from DFO for use of any paints, corrosion protective coatings, wood preservatives or any other hazardous material that will be applied to surfaces that will have contact with the marine environment.
- .10 Any equipment remaining on site overnight shall have appropriately placed drip pans.
- .11 Protect the roadways from tracking of mud, soil, and debris throughout the work.
- .12 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the marine environment. This includes, but is not limited to:
 - .1 Minimizing the washing of sand or gravel from new asphalt, debris from drilling or cutting or other materials into storm drains and the marine environment by sweeping.
 - .2 Application of fog seals, tack coats or other coatings, if required, during periods when rainfall is unlikely to occur during application.
 - .3 Cleaning equipment off site.
 - .4 Protection of drainage structures with filter fences if required.

1.15 NOISE

- .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 be restricted to daylight hours and 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.

1.16 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 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.
- .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 be notified immediately.
- .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 the Departmental Representative.

1.17 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, shall 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.

1.18 SPECIES AT RISK

- .1 Should a Species at Risk or its critical habitat be encountered, the Contractor shall stop work and contact the Departmental Representative for direction.

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.
 - .4 Employ auxiliary power units to power cab heating and air conditioning when a machine is unengaged.
 - .5 Replace, repower, or retrofit older engines with advanced emission control devices to reduce harmful pollutants.
 - .6 Control nuisance odours associated with diesel emissions from construction equipment.
 - .7 Maintain engines to meet original standards and train operators to run equipment efficiently.
 - .2 Water
 - .1 Minimize fresh water and potable water consumption and maximize use of non-potable water and water reuse during daily operations.
-

- .2 Prevent nutrient loading in nearby water bodies.
 - .3 Minimize runoff using open-space preservation methods such as duster development, reduced pavement widths, and shared transportation access.
 - .3 Air Emissions
 - .1 Reduce atmospheric release of toxic or priority pollutants and minimize dust export of contaminants.
 - .2 Consolidate onsite and offsite vehicular trips to reduce fuel consumption.
 - .3 Cover excavated areas with biodegradable fabric or with synthetic material that can be reused for other purposes.
 - .4 Secure and cover loose, excavated material in open trucks, and reuse with reuseable covers.
 - .5 Revegetate excavated areas as quickly as possible.
 - .6 Limit onsite vehicle speeds to 10 miles per hour.
 - .7 Retrofit machinery and heavy equipment for diesel-engine emission control and exhaust treatment technologies such as particulate filters and oxidation catalysts.
 - .8 Maintain engines of vehicles and machinery in accordance with manufacturer recommendations.
 - .9 Modify field operations through combined activity schedules, an idle reduction plan, and using machinery with automatic idle-shutdown devices.
 - .10 Replace conventional engines of existing vehicles and purchase new vehicles equipped for hybrid systems or alternative fuel.
 - .11 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.
 - .3 Segregate materials such as metals, concrete, and lumber for reuse or recycling.
 - .4 Screen and stockpile clean, excavated soil for potential onsite use as infill and minimize shipments to landfills.
 - .5 Select the closest waste receiver.
 - .6 Use products with recycled and bio-based content and recycling potential.
-

- .7 Salvage uncontaminated and pest- or disease-free organic debris for use as on-site or off-site infill, mulch, or compost.
 - .8 Salvage uncontaminated objects with potential recycle, resale, donation, or onsite infrastructure value such as steel, concrete, granite, and storage containers.
 - .9 Reuse or recycle recovered product from remedial activities.
 - .10 Salvage wood scraps for onsite landscaping use, mulch, and erosion control.
- .5 Land and Ecosystems
- .1 Establish efficient traffic patterns to minimize soil compaction in work areas.
 - .2 Ensure all equipment is clean prior to arrival on site to minimize potential of transporting invasive species.
 - .3 Minimize soil and habitat disturbance and reduce noise and lighting disturbance.
 - .4 Minimize bioavailability of contaminants through adequate contaminant source and plume controls.
 - .5 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.
 - .6 Use environmentally friendly lubricants for engine maintenance.
 - .7 Place decontamination station away from environmentally sensitive areas.
 - .8 Use secondary containment to avoid cross-contamination.

1.21 ENVIRONMENTAL MITIGATION MEASURES

- .1 Implement the mitigation measures as outlined in the Mitigation Measures Checklist presented in Appendix 3.
 - .2 Submit the completed checklist to the Departmental Representative once all related project activities have been completed.
-

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

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 BAS: benthic assessment of sediment.
.3 BH: borehole.
.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 electrical 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.
 - .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 HT: height.
 - .5 HYD: hydrant.

 - .9 I:
 - .1 ID: inside diameter.

 - .10 J:
 - .1 JT: joint.
-

- .11 L:
.1 LNAPL: Light non-aqueous phase liquid.
- .12 M:
.1 MAS: masonry.
.2 MAX: maximum.
.3 MCE: Municipality of Central Elgin.
.4 MET: metal.
.5 MH: maintenance hole.
.6 MIN: minimum.
.7 MW: monitoring well.
- .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.
.5 OPSS: Ontario Provincial Standard Specifications.
.6 OPSD: Ontario Provincial Standard Drawings.
- .15 P:
.1 PAH: polycyclic 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 chloride.
- .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 transmission class.
 - .10 STL PL: steel plate.
 - .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 insurance 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.
 - .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 Institute.
 - .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 - Plastics 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.
-

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENCIES

- .1 Departments, agencies and crown corporations.
 - .1 CEAA - Canadian Environmental Assessment Agency.
 - .2 CSC - Correctional Service Canada.
 - .3 CRA - Canada Revenue Agency.
 - .4 DND - Department of National Defence.
 - .5 DFO - Department of Fisheries and Oceans.
 - .6 EC - Environment Canada.
 - .7 FHBRO - Federal Heritage Buildings Review Office.
 - .8 HCD - Heritage Conservation Directorate.
 - .9 LC - Labour Canada.
 - .10 PC - Parks Canada.
 - .11 PWGSC - Public Works and Government Services Canada.
 - .12 RCMP - Royal Canadian Mounted Police.
 - .13 TBS - Treasury Board Secretariat.
 - .14 TC - Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPARTMENTS AND AGENCIES

- .1 MOECC - Ontario Ministry of Environment and Climate Change.
- .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/m³: kilogram per cubic metre.
 - .5 kN: kilonewton.
 - .6 kPa: kilopascals.
 - .7 kw: kilowatts.
 - .8 l/s: litre per second.
-

- .9 m: metre.
- .10 m³: cubic metre.
- .11 mg/kg: milligrams per kilogram.
- .12 mg/L: milligrams per litre.
- .13 mm: millimetres.
- .14 MPa: megapascal.
- .15 NTU: nephelometric turbidity unit.
- .16 ppm: parts per million.
- .17 ug/L: micrograms per litre.
- .18 ug/m³ 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: gauge.
 - .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.

PWGSC Ontario	TEMPORARY BARRIERS	Section 01 56 00
Region Project	AND ENCLOSURES FOR	Page 1
Number: R.013137.006	LNAPL REMEDIATION	2016-02-29

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 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 O121-08(R2013), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets for both the East Headlands and West Pier work areas. Equip gates with locks and keys. Maintain fence in good repair.
 - .2 Fencing is not required adjacent the water's edge within the West Pier work areas.
 - .3 Erect temporary hoarding as required to protect existing building adjacent West Pier Work Area 1. Maintain hoarding in good repair for the duration of the Work.
-

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails along work areas that border Kettle Creek in the West Pier work areas.
- .2 Provide as required by governing authorities.

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 finished building and dockwall deck finishes and equipment during performance of Work.
 - .2 Provide necessary screens, covers, and hoardings.
 - .3 Confirm with Departmental Representative locations and installation schedule three working 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.

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 75% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.
- .2 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.
 - .4 Steel.
 - .5 Asphalt pavement.
 - .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 and 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.

1.2 WASTE PROCESSING SITES

- .1 Province of: Ontario.
 - .1 Ministry of Environment, Public Information Centre, 2nd Floor - MacDonald Block, Suite M2-22 - 900 Bay Street, Toronto, ON, M7A 1N3.
 - .2 General Inquiry: 416-325-4000 or 1-800-565-4923 TTY (for persons who are deaf, deafened or hard of hearing).
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- .3 Telephone: 416-326-9236 or 1-800-515-2759.
- .4 Fax: 416-323-4682.

- .2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
 - .1 Telephone: 416-657-2797.
 - .2 Fax: 416-960-8053.
 - .3 Email: rco@rco.on.ca.
 - .4 Internet: <http://www.rco.on.ca/>.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not bury rubbish and waste materials on site.
 - .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner, into waterways, onto ground,
-

storm, or sanitary sewers, or in other location where it will pose health or environmental hazard.

- .3 All waste materials shall be disposed of in a legal manner at a site approved by Local Authorities.
 - .4 Provide acceptable containers for collection and disposal of waste materials, debris and rubbish.
 - .5 Do not allow deleterious substances to enter the waterway.
 - .6 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
 - .7 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
 - .8 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
 - .9 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .10 All waste materials including containers and waste fluids associated with vehicle maintenance shall be disposed of in a legal manner at a site approved by Local Authorities.
 - .11 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
 - .12 Fold up metal banding, flatten and place in designated area for recycling.
 - .13 Divert unused concrete materials form landfill to local quarry approved by Departmental Representative.
 - .14 Divert unused admixtures and additive materials from landfill to official hazardous material collections site as approved by Departmental Representative.
-

- .15 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .16 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.
 - .2 Provide instruction on disposal practices.
-

- .2 Divert unused paint/coating materials from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Government Chief Responsibility for the Environment.

Province	Address	General	Fax
		Inquiries	
Ontario	Ministry of Environment Public Information Centre 2nd Floor - MacDonald Block, Suite M2-22 900 Bay St., M7A 1N3	(416) 325-4000 (800) 565-4923 (416) 326-9236 (800) 515-2759	(416) 325-3159

PWGSC Ontario	DEMOLITION/	Section 02 41 15
Region Project	DECONSTRUCTION	Page 1
Number: R.013137.006		2016-02-29

1.1 DESCRIPTION OF WORK

- .1 Demolition of structures shall include all necessary labour, materials and equipment required for the demolition/deconstruction, removal and disposal as specified and as identified on the drawings.

1.2 MEASUREMENT PROCEDURES

- .1 Demolition, removals and disposal of existing concrete deck and concrete pad to limits indicated on the drawings will be measured on a square metre basis, as measured in the field, and shall include all labour, materials and equipment necessary to complete the work.
- .2 Concrete removal beyond limits specified will not be measured for payment. Make good all damages.
- .3 Excavation, stockpiling and placement of salvaged clear stone and miscellaneous material will be measured under Section 31 23 11.
- .4 Excavation, removal and disposal of LNAPL contaminated fill within Work Area 1 will be measured under Section 02 50 00.
- .5 Reinstatement of the concrete deck within the West Pier Work Area 1 will be measured under Section 03 30 00.

1.3 REFERENCES

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Sections 01 33 00 and Section 01 74 20.
 - .2 Submit copies of certified weigh bills from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
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1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 To Section 01 74 20.

1.6 WORK

- .1 Dispose legally off the site all demolished materials.

1.7 SAFETY CODE

- .1 Unless otherwise specified, carry out demolition work in accordance with CSA S350-M1980.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Inspect the site with the Departmental Representative and verify the extent and location of items designated for removal, demolition, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing the site in operating condition.

3.2 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent parts of existing structure to remain. Make good damage and be liable for injury caused by demolition and removal.

3.3 PREPARATION

- .1 Prior to demolition of existing concrete deck, locate and mark all existing tie rods within Work Area 1.
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- .2 Do not disrupt active power and service lines entering existing buildings and wharf outlets as per rules and regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve navigational equipment during period of demolition and removal.

3.4 DEMOLITION, REMOVALS AND DISPOSAL

- .1 Prior to demolition of existing concrete deck, locate and mark all existing tie rods within Work Area 1.
- .2 Neatly demolish and remove existing concrete deck and pad to limits indicated on drawings.
- .3 At end of each day's work, leave Work in safe and stable condition.
 - .1 Protect parts not to be demolished from exterior elements at all times.
- .4 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .5 Prevent demolition debris from entering the waterway.
- .6 Dispose of removed materials to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.5 CLEANING

- .1 Progress Cleaning: Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment off site.
- .4 Waste Management: in accordance with Section 01 74 20.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Work includes LNAPL contaminated soil removal and off-site disposal, placement of MCE sourced or imported backfill within the LNAPL smear zone, backcasting of site derived surficial materials, and construction of risk management measures by placement of a clean fill cap derived from on-site or imported materials as specified. Soil remediation and construction of risk management measures work includes:
 - .1 Remedial soil excavation, on-site management of soil and off-site disposal of petroleum hydrocarbon impacted soil from within the groundwater fluctuation zone (smear zone) from three areas on the site (East Headlands, West Pier Work Areas 1 and 2). The areas to be excavated are delineated and the depth and the inferred lateral extent of the excavations are defined and shown as indicated.
 - .2 Provide equipment required for soil remediation.
 - .3 Transportation of all equipment, staff, clean fill, contaminated materials, to and from site as required.
 - .4 Co-ordination, supervision and preparation for remediation of contaminated soil. Departmental Representative requires 1 week notice previous to the commencement of site work for provision of site supervision.
 - .5 Specification of final soil remediation design and facilities required.
 - .6 Provision and installation of materials and equipment necessary to remediate site.
 - .7 Preparation of soil and dockwall deck material storage areas and installation of associated equipment.
 - .8 Implementation of safety work zones, temporary barriers, site Health and Safety Plans and Emergency Response Plans and other plans as required.
 - .9 Management of contaminated soil.
 - .10 Backfilling of excavations with clean soil, compaction and covering with layer of soil meeting the site requirements (including the placement of non-woven geotextile beneath the clean fill cap at the West Pier Work Area 2 location) and grading of excavations as indicated.
 - .11 Survey work areas, as required, to confirm site conditions and quantities of material manage which are not measured by tonnage and provide the survey information to the Departmental Representative.
 - .2 The current program does not anticipate the need to remove impacted soils from beneath the Omstead building located adjacent the West Pier Work Area 1. Should it be determined
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remedial works beneath the building are required this work will be costed and executed separately from this contract.

1.2 MEASUREMENT PROCEDURES

- .1 Provide unit price per cubic metre (in-situ) to excavate, load, transport and stockpile surficial soil above the smear zone to a temporary on-site location as indicated. The estimated quantity of material to be removed is 5,355 m³ (3,355 m³ at the East Headlands and 2,000 m³ at the West Pier Work Area 2). Measurement shall be based on the survey of the site at the start of work and prior to the removal of soil from within the smear zone.
 - .2 Provide unit price per cubic metre (in-situ) to excavate, load, transport and stockpile surficial soil above the smear zone to a temporary on-site location as indicated. The estimated quantity of material to be removed is 375 m³ at the West Pier Work Area 1. Measurement shall be based on the survey of the site at the start of work and prior to the removal of soil from within the smear zone.
 - .3 Provide unit price per tonne to excavate, load, transport and dispose of LNAPL contaminated soil from the three work areas at a licensed MOECC disposal facility. The estimated tonnes of soil requiring removal and disposal from the respective work areas is 6,220 tonnes (4,220 tonnes at the East Headlands and 2,000 tonnes at the West Pier Work Area 2). Measurement shall be based on the net weight of contaminated soil delivered at the landfill sites and substantiated by certified weigh bills from the landfill sites.
 - .4 Provide unit price per tonne to excavate, load, transport and dispose of LNAPL contaminated soil from the three work areas at a licensed MOECC disposal facility. The estimated tonnes of soil requiring removal and disposal from the West Pier Work Area 1 is 300 tonnes. Measurement shall be based on the net weight of contaminated soil delivered at the landfill sites and substantiated by certified weigh bills from the landfill sites.
 - .5 Provide unit price per sample for rush analysis of the Toxicity Characteristic Leaching Procedure (TCLP) samples for landfill acceptance of the excavated soil. Three TCLP samples to be analyzed. Parameters analysed must conform to the requirements of the proposed soil receiving site and a copy of the results provided to the Departmental Representative.
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- .6 Provide unit price per cubic metre to mobilize/demobilize, excavate, relocate, place and compact MCE supplied fill to backfill the smear zone of the East Headlands and West Pier Work Area 2 work areas. The estimated quantity of material to be relocated and placed is 2,010 m³ at the East Headlands. Measurement shall be based on the survey of the site at the start of backfill work and prior to the placement of site derived fill.
 - .7 Provide unit price per tonne to supply, deliver, place and compact/tamp 600 tonnes of clear stone to be used as initial backfill within Work Area 2 of the West Pier. Measurement shall be based on the net weight of clear stone delivered to site and substantiated by certified weigh bills from the aggregate supplier.
 - .8 Provide unit price per cubic metre to relocate, deliver and place site derived fill previously placed in stockpiles on-site. The estimated quantity of material to be relocated and placed is 6,130 m³ (3,355 m³ at the East Headlands, 525 m³ at the West Pier Work Area 1 and 2,250 m³ at the West Pier Work Area 2). Measurement shall be based on the survey of the site at the start of backfill work once the smear zone has been backfilled.
 - .9 Provide unit price per tonne to supply, deliver, place and compact 310 tonnes of Granular A to be used as initial backfill within Work Area 2 of the West Pier. Measurement shall be based on the net weight of Granular A delivered to site and substantiated by certified weigh bills from the aggregate supplier.
 - .10 Provide unit price per tonne to supply, deliver, place, and compact 575 tonnes of Granular B to be used as initial backfill within Work Area 2 of the West Pier. Measurement shall be based on the net weight of Granular B delivered to site and substantiated by certified weigh bills from the aggregate supplier.
 - .11 Materials removed from beyond limits specified will be measure only when Departmental Representative authorizes additional excavation.
 - .12 Material placed beyond the limits indicated will not be measured for payment.
 - .13 Supply and management of impacted water storage tanks and associated equipment and materials shall be included in the Lump Sum arrangement and will not be measured separately for payment.
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- .1 Costs related to the disposal of any collected impacted water will be negotiated with the Departmental Representative.

- .14 Price shall include: preparatory work including obtaining the required permits and certificates; quality control/quality assurance; other required equipment; implementation of safety work zones; excavation; loading; required storage and delivery of contaminated soil to the landfill sites; grading; and making good all disturbed surfaces and all other work required to complete the project.

1.3 REFERENCES

- .1 Applicable environmental and health and safety laws and regulations for Province of Ontario, Municipal by-laws.

- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).

- .3 Canadian Standards Association (CSA International)
 - .1 CAN/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-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CAN/CSA-A3001-13, Cementitious Materials for Use in Concrete.

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

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.

 - .2 Quality Assurance and Quality Control Submittals:
 - .1 Provide quality assurance and quality control submittals in accordance with Section 01 33 00 as follows:
 - .1 Description of emergency plans in case of breakdown, spill or other problem.
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- .2 Waste management plan and complete list of wastes, including waste registration numbers as required by provincial regulations, for materials that will be generated by activities.
 - .3 Methods that will be used to restore site to its original condition and applicable site criteria as mandated by the province.
 - .4 Proof of the source and quality of the backfill material to be used after the excavation of the three LNAPL contaminated soil zones except for the MCE clean fill which will be tested prior to the work by the Departmental Representative.
- .3 Closeout Submittals:
- .1 Provide Closeout Submittals in accordance with Section 01 11 06 as follows:
 - .1 Provide written proof (weigh scale tickets) that contaminated soil has been sent to centre authorized by MOECC for Province of Ontario.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Identify members of project team including project manager. Define experience, education and training, qualifications, tasks and responsibilities of each team member.
 - .2 Regulatory Requirements:
 - .1 Perform work in accordance with:
 - .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 CCME (Canadian Council of Ministers of the Environment) Contaminated Sites, Contaminated Soil and Groundwater, and Remediation of Contaminated Sites most current publications.
 - .3 WHMIS.
 - .4 Canadian Environmental Protection Act (New Substance Notification Regulations).
 - .5 Transportation of Dangerous Goods Act.
 - .6 National Building Code of Canada 2010.
 - .7 National Fire Code of Canada 2010.
 - .8 The Fisheries Act.
 - .9 Migratory Birds Convention Act.
 - .10 Migratory Birds Regulations.
 - .11 Canadian Electrical Code 2015.
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.12 Ontario Electrical Safety Code 2015, and all bulletins (Ontario).

.3 Certifications:

.1 Analytical work must be conducted by a CALA or SCC certified laboratory and its QA/QC procedures must be explained in detail.

.4 Pre-proposal meeting:

.1 Attend site meetings and verify site conditions before submitting proposal.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 LNAPL Contaminated Soil:

.1 Load the excavated LNAPL contaminated soil from smear zone directly into dump trucks for off-Site disposal. If the excavated contaminated soil will be stored on Site, cover the contaminated soil with a tarp to minimize the generation of contaminated runoff and underlay contaminated soil with flexible membrane to minimize or prevent leaching losses. Analyze, transport and dispose of contaminated soil according to current provincial regulations.

.2 Store excavated non-LNAPL contaminated soil only in areas as indicated. Ensure no contact between non-LNAPL contaminated excavated soil and drainage or contaminated water or LNAPL contaminated soil.

.3 Segregate concrete and transport offsite to MOECC approved concrete recycling facility.

.4 Segregate granular materials for reuse in the final excavation.

.2 New Materials and Equipment:

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

.4 Store materials and equipment according to manufacturer's and supplier's instructions.

.5 Establish quality management system for materials and equipment.

1.7 PROJECT/SITE CONDITIONS

.1 Existing Conditions:

.1 Review the attached appendices and drawings.

1.8 MAINTENANCE OF ACCESS ROADS

- .1 Maintain access roads in accordance with Section 01 11 06 and as follows:
 - .1 Maintain and clean roads for duration of Work.
 - .2 Repair damage incurred from use of roads.
 - .3 Provide photographic documentation of roads used by construction vehicles before, during and after Work.

1.9 UTILITY LINES

- .1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Departmental Representative of findings.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
- .3 Record locations of maintained, re-routed and abandoned underground utility lines.
- .4 Make good damage to existing utility lines resulting from work.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Waste management in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Clean Fill: characterized to meet decontamination objectives. Proof of the source and the quality of the clean material to be provided by the Contractor except where the information is supplied by the Departmental Representative (eg the MCE sourced fill). The fill to be used to backfill the remediated areas to meet MOECC Table 1 Standards unless otherwise directed by the Departmental Representative to use material meeting the risk based standards established for the project.
 - .2 MCE Supplied Fill: characterized to meet decontamination objectives and used to backfill within the smear zone. The fill used to backfill the smear zone must meet the risk based standards established for the project.
 - .3 Clear Stone: characterized as 19.0 mm Type II, produced by crushing limestone bedrock and meeting the physical property requirements provided in Table 1 and the gradation requirements
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provided in Table 2 of OPSS.PROV 1004. Pea Gravel may be used as an alternate.

- .4 Granular A: Imported material meeting the OPSS.PROV 1004 specifications for this class of material. Gradation requirements are out outlined in Table 2 of OPSS.PROV 1004, maximum size 19.0 mm.
- .5 Granular B: Imported material meeting the OPSS.PROV 1004 specifications for this class of material. Gradation requirements are out outlined in Table 2 of OPSS.PROV 1004, maximum sized 26.5 mm.
- .6 LNAPL Contaminated Soil: excavate and remove daily as specified in paragraph 1.6.1.1.

2.2 EQUIPMENT

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.
- .2 Trucks:
 - .1 Clean meticulously between loads of contaminated soil and clean or MCE supplied fill.
 - .2 Clean meticulously at end of work day.
 - .3 Cover truck bodies with tarpaulins during transportation.
 - .4 Use watertight truck bodies for transporting contaminated soil.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Protection:
 - .1 Keep excavation sites water free throughout work except when working below the groundwater table and manage recovered water according to contamination level and federal, provincial, and municipal regulations.
 - .2 Protect excavations from rainwater and snow melt run off.
 - .3 Provide temporary structures to divert flow of surface waters from excavations.
 - .4 Provide safety measures to ensure worker and public safety.
 - .5 Consult Departmental Representative regarding potential site specific geotechnical considerations.
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- .6 Protect buried services that are required to remain undisturbed.
- .7 Protect existing structures and outfalls from damage during work. Make good of all damages at no additional costs to the Contract.
- .8 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

3.2 APPLICATION

- .1 Soil Management:
 - .1 Excavate, load, transport, and dispose of off-site LNAPL contaminated soil in accordance with applicable provincial standards, requirements and regulations.
 - .2 Do not dilute LNAPL contaminated soil with less contaminated soil.

3.3 METHOD OF REMEDIATION

- .1 The remediation of the LNAPL contaminated soil zones within the East Headlands will be completed by soil excavation to a depth of approximately 500 mm below the groundwater surface and off-Site disposal at a licensed landfill facility. The inferred extent of the remediation work area was delineated as indicated. The Departmental Representative will direct the depth and the lateral extent of the excavation. Given the nature of the LNAPL remediation program no soil verification samples will be collected from the excavation walls however the condition of the groundwater entering the excavation will be monitored by the Departmental Representative to confirm that LNAPL clean-up has been successfully completed (i.e. no sheen or free product on the groundwater surface). Upon confirmation backfilling shall be completed using MCE sourced fill to a minimum of 500 mm above the existing groundwater table. The balance of the excavation will be backfilled using site derived stockpiled soil to reinstate grades to match the surrounding areas. Remedial soil excavation shall be completed by Contractor and supervised by Departmental Representative. Be responsible for schedule of remedial excavation and for completion of the following:
 - .1 Excavate surficial soils down to within 500 mm of the existing groundwater surface (approximately 1 m below grade) and stockpile on-site in areas as indicated. Segregate site derived soils as directed by the Departmental Representative so as to separate clean (e.g. sands free of debris or contamination) from impacted soils
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- (e.g. soil with coal and/or petroleum hydrocarbons. Underlay stored soil with a non-woven geotextile (to Section 31 32 19.01)).
- .2 Remove contaminated soils down to 500 mm below the existing groundwater table (approximately 1.75 m below grade) as directed by Departmental Representative. Preferably the excavated soil to be directly loaded to dump trucks for off-Site disposal at a licensed disposal facility. Excavation taken below depths shown without Departmental Representative's written authorization to be filled with clean material at Contractor's expense.
 - .3 Any boulders, concrete, metal, or other waste materials to be separated from the soil, as LNAPL contaminated soil that is mixed with rock and/or debris will typically not be accepted for landfill disposal. Once separated from the LNAPL contaminated soil, concrete pieces and boulders (confirmed by the Departmental Representative to be free of petroleum hydrocarbon impacts) can be backfilled into the excavated area provided that they are placed in such a way as to ensure that they will not protrude from the ground surface once the areas are capped. Any other waste material, such as scrap metal and glass, to be separated and removed for off-Site disposal at an appropriate waste disposal or recycling facility.
 - .4 Departmental Representative requires a minimum of 1 weeks' notice from Contractor to conduct on-site supervision.
- .2 The remediation of the LNAPL contaminated soil zones within the West Pier Work Area 1 will be completed by removing the reinforced concrete deck, removing and stockpiling on-site the fill present within the dock structure to the depth of the groundwater table and removal of the LNAPL contaminated soil to a depth of approximately 500 mm below the groundwater surface and off-Site disposal of the LNAPL contaminated soil at a licensed landfill facility. The inferred extent of the remediation work area was delineated as indicated. The Departmental Representative will direct the depth and the lateral extent of the excavation. Given the nature of the LNAPL remediation program no soil verification samples will be collected from the excavation walls however the condition of the groundwater entering the excavation must be monitored by the Departmental Representative to confirm that LNAPL clean-up has been successfully completed (i.e. no sheen or free product on the groundwater surface). Upon confirmation backfilling shall be completed using site derived material previously stockpiled on-site. The reinstatement of the reinforced concrete deck (to Section 03 30 00) comprises the implementation of the risk management measures for this work area. Remedial soil excavation shall be completed by Contractor and supervised by a Marine Engineer retained by the Departmental
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Representative. Be responsible for schedule of remedial excavation and for completion of the following:

- .1 Remove reinforced concrete deck as outlined in Section 03 00 00 so as to access the underlying fill.
 - .2 Excavate dockwall backfill down to within 500 mm of the existing groundwater surface (approximately 1.95 m below grade) and stockpile on-site in areas as indicated. Underlay stored soil with a non-woven geotextile (to Section 31 32 19.01).
 - .3 Remove LNAPL contaminated materials down to 500 mm below the existing groundwater table (approximately 2.5 m below grade) as directed by Departmental Representative and/or the Marine Engineer working on behalf of the Departmental Representative. Excavation taken below depths shown without Departmental Representative's written authorization to be filled with clean material at Contractor's expense. Given the nature of the work it is anticipated this work may be completed using a soil vacuum vehicle so as to mitigate the potential for damage to the dockwall structure.
 - .4 Any boulders, metal, or other waste materials to be separated from the soil, as LNAPL contaminated soil that is mixed with rock and/or debris will typically not be accepted for landfill disposal. Once separated from the LNAPL contaminated soil, boulders (confirmed to be free of petroleum hydrocarbon impacts by the Departmental Representative) can be backfilled into the excavated area provided that they are placed in such a way as to ensure that they will not protrude from the ground surface once the areas are capped. Any other waste material, such as scrap metal and glass, to be separated and removed for off-Site disposal at an appropriate waste disposal or recycling facility.
 - .5 Departmental Representative requires a minimum of 1 weeks' notice from Contractor to conduct on-site supervision.
- .3 The remediation of the LNAPL contaminated soil zones within the West Pier Work Area 2 will be completed by soil excavation to a depth of approximately 500 mm below the groundwater surface and off-Site disposal at a licensed landfill facility. The inferred extent of the remediation work area was delineated as indicated. The work in this area will involve working around tie-back structures associated with the dockwall bordering Kettle Creek. Work at this location will be done under the supervision of a Marine Engineer retained by the Departmental Representative. The Departmental Representative will direct the depth and the lateral extent of the excavation. Given the nature of the LNAPL remediation program no soil verification samples will be collected from the excavation walls however the condition of the groundwater entering the excavation must
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be monitored by the Departmental Representative to confirm that LNAPL clean-up has been successfully completed (i.e. no sheen or free product on the groundwater surface). Upon confirmation backfilling shall be completed using clean stone to a minimum of 300 mm above the existing groundwater table and Granular A backfill as indicated. The balance of the excavation will be backfilled using site derived stockpiled soil and covered with a non-woven geotextile prior to the placement of either 500 mm of imported Granular B and/or site derived clean fill as part of the risk management measures implementation. Remedial soil excavation shall be completed by Contractor and supervised by Departmental Representative. Be responsible for schedule of remedial excavation and for completion of the following:

- .1 Excavate surficial soils down to within 500 mm of the existing groundwater surface (approximately 1.5 m below grade), as directed by the Marine Engineer, and stockpile on-site in areas as indicated. Underlay stored soil with a non-woven geotextile (to Section 31 32 19.01).
 - .2 Remove contaminated soils down to 0.50 m below the existing groundwater table (approximately 2.5 m below grade) as directed by the Marine Engineer and Departmental Representative. Preferably the excavated soil to be directly loaded to dump trucks for off-Site disposal at a licensed disposal facility. Excavation taken below depths shown without Departmental Representative's written authorization to be filled with clean material at Contractor's expense.
 - .3 Any boulders, metal, or other waste materials to be separated from the soil, as LNAPL contaminated soil that is mixed with rock and/or debris will typically not be accepted for landfill disposal. Once separated from the LNAPL contaminated soil, concrete pieces and boulders (confirmed to be free of petroleum hydrocarbon impacts by the Departmental Representative) can be backfilled into the excavated area provided that they are placed in such a way as to ensure that they will not protrude from the ground surface once the areas are capped. Any other waste material, such as scrap metal and glass, to be separated and removed for off-Site disposal at an appropriate waste disposal or recycling facility.
 - .4 Departmental Representative requires a minimum of 1 weeks' notice from Contractor to conduct on-site supervision.
- .4 Off-site disposal of contaminated soil.
- .1 Soil removal and off-site disposal shall be completed by Contractor and supervised by Departmental Representative. Be responsible for schedule of contaminated soil removal.
 - .2 Be responsible for finding a licensed waste disposal facility that will accept the LNAPL contaminated soil.
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A leachate (TCLP) test from each work area for disposal purposes is to be completed to facilitate the disposal of the soil at the Contactor's selected landfill. It is Contractor's responsibility to determine if additional TCLP testing is required and it will be Contractor's responsibility to fulfill these additional disposal requirements. Copies of the TCLP results and the disposal weight tickets to be provided to the Departmental Representative.

- .3 Removal and off-site disposal of LNAPL contaminated soils in accordance with applicable federal and provincial regulations.
- .5 Construction of risk management measures within the West Pier Work Area 2 - Soil caps with a minimum thickness of 500 mm shall be placed to match existing grade. The clean cap material shall be placed ovetop a layer of non-woven geotextile (to Section 31 32 19.01) in the excavated LNAPL contaminated soil zones as a risk management measure. The soil cap shall consist of either imported Granular B borrow material or site derived clean fill as directed by the Departmental Representative.
- .6 At the West Pier Work Area 1 the construction of the risk management measures will consist of reinstalling the reinforced concrete deck (deck thickness is >225 mm as required by the risk management measures). No soil cap is required at this location.
- .7 Risk management measures, as they relate to the soil cover at the East Headlands, will not be implemented as part of this contract.

3.4 GENERIC EXCAVATING

- .1 Excavate to elevations and dimensions indicated or required for construction of work.
 - .2 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act for the Province of Ontario.
 - .3 Make excavation to clean lines to minimize quantity of fill material required.
 - .4 Earth bottoms of excavations to be reasonably level, free from loose or organic matter.
 - .5 Do not undermine the existing concrete anchorwall during excavation activities.
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- .6 When complete have Departmental Representative inspect excavations to verify depths and dimensions.
- .7 Excavation exceeding that shown on the MA-Series drawings, if authorized in writing by Departmental Representative, will be paid as extra to Contract price in accordance with General Conditions. Quantities will be calculated in place, compaction included. Truck load measurements not acceptable.
- .8 Correct unauthorized excavation at no extra cost to Contract as directed by Departmental Representative.

3.5 GENERIC BACKFILLING

- .1 Do not commence backfilling until areas of work to be backfilled have been inspected and approved by Departmental Representative.
 - .2 Backfill all spaces excavated and not occupied by parts of the structure, or other permanent works, with specified material placed as shown on the MA-Series drawings.
 - .3 Areas backfilled to be free from debris, snow, ice, water or frozen ground.
 - .4 Do not backfill around newly placed concrete until concrete has been in place 14 days, test cylinders show strength to be at least twice the working stress used in design, and approval has been obtained from the Departmental Representative.
 - .5 Place and compact new granular and site derived fill materials in continuous horizontal layers not exceeding 150 mm loose depth. Use methods to prevent disturbing or damaging any part of the work. Make good any damage.
 - .6 Maintain optimum moisture content to enable compaction to attain specified density.
 - .7 Compact each layer to the granular B fill and site derived fill to 98% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.
 - .8 Compact each layer of granular A fill to 100% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.
-

3.6 SEQUENCING WITHIN WORK AREA 1

- .1 Sequence the work as per Drawings MA-01 and MA-04 to the limits shown on Drawing C-09.
- .2 Do demolition and excavation as specified.
- .3 Excavate and salvage fill from within the dock structure and miscellaneous materials to depth shown on the C-series and MA-Series drawings.
- .4 Transport salvaged fill and miscellaneous materials to stockpile for re-use and reinstallation.
- .5 Remove and dispose of LNAPL contaminated fill in accordance with Section 02 50 00 and to C-Series drawings.
- .6 Inform Departmental Representative upon completion of LNAPL contamination fill removal. Departmental Representative will confirm when the LNAPL remediation work in a particular Work Area has been completed.
- .7 Do backfilling as specified.
- .8 Place and backfilled excavated area with all salvaged clear stone and miscellaneous materials.
- .9 Continue backfilling remainder of excavated area with new clear stone fill upon completion of salvaged clear stone and miscellaneous material backfill.
- .10 Do cast-in-place concrete deck to Section 03 30 00.

3.7 SEQUENCING WITHIN WORK AREA 2

- .1 Sequence the work in accordance with the steps outlined on Drawings MA-01, MA-02 and MA-03 and to limits shown on the Drawings C-09.
 - .2 Excavation within Work Area 2 will be completed in two lifts.
 - .3 Excavate the first lift to depth of 1 m below existing grades and to limits indicated on drawings. Stockpile soil as indicated segregating gravel and crusher run materials from finer grained soils.
 - .4 Departmental Representative will confirm the elevation of the limits of the 2nd native fill lift excavation. Non contaminated fill will be stockpile as indicated. LNAPL contaminated fill will be removed and disposed as specified.
-

- .5 Upon completion of Work Area 2 Step 2, allow up to five (5) working days for the Municipality of Central Elgin to do any necessary repairs to the existing structures. Make no claim to the Contract for this delay. Additional compensation will be negotiated in accordance with the General Conditions if delay is more than five (5) working days.
- .6 Do remainder of sequencing as specified and to details indicated on the MA-Series drawings.
- .7 The Work Area 2 limits are inferred and may be adjusted by Departmental Representative during implementation based on site condition.
- .8 If the excavation distance from the facewall exceeds 10 m, the sequencing shown on the MA-Series drawings must be followed.
- .9 Inform Departmental Representative upon completion of LNAPL contaminated fill removal.
- .10 Do backfilling to Clause 3.4 Generic Backfilling and in manner detailed on the MA-Series drawings.
- .11 Install geosynthetic clay liners to Section 31 32 19.02 and to details indicated on drawings.
- .12 Install geotextile to Section 31 32 19.01 and to details indicated on drawings.

3.8 RESTORATION

- .1 For the East Headlands and West Pier Work Area 2 backfill the excavated remediated work areas under the supervision of the Departmental Representative and/or Marine Engineer, as required, with clean fill as described in the above section 3.3.
 - .1 Supply and place a geosynthetic clay liner (to Section 31 32 19.02) as indicated along the northern limit of the East Headlands work area and the western limit of the West Pier Work Area 2 excavation limit.
 - .2 Supply and place a non-woven geotextile as indicated (to Section 31 32 19.01) within the limit of the East Headlands and West Pier Work Area 2 work areas.
 - .3 Compaction: compact the backfill clean fill material using the excavator bucket and standard compaction equipment. For work below and up to 500 mm above the existing groundwater water table compact the fill using static methods. Vibrator compaction equipment shall be used during fill placement once the backfill is more than 500 mm above the groundwater table.
-

- .1 Proof-roll the subgrade material once a minimum of 500 mm above the groundwater table to identify any soft areas which may require improvement to provide suitable sub-base for the area.
- .2 Compaction work shall be supervised by the Departmental Representative and the Contractor is responsible to make good any deficiencies.
- .3 Backfill material shall be placed in loose lift of 300 mm (maximum) unless otherwise directed by the Departmental Representative.
- .4 Compaction to 98% of the Maximum Dry Density Standard Proctor Value is expected for this program for backfill placed above the groundwater table.
- .4 Grade the 500 mm clean fill cover to match existing grades or as directed by the Departmental Representative.
- .2 For the West Pier Work Area 1 backfill the excavation under the supervision of the Departmental Representative and Marine Engineer using site derived fill, previously stockpiled on site, and compact using vibrator equipment. Reinstate the reinforced concrete deck as outlined in Section 03 30 00 and as indicated.
- .3 Clean permanent access roads of contamination resulting from project activity at request of Departmental Representative.

3.9 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .1 Ensure leachate test (TCLP) results conform to provincial hazardous waste regulations.
 - .2 Remove and replace non-compliant materials.
 - .3 Departmental Representative shall complete compaction testing and visual inspection of the compaction work as required.

3.10 EQUIPMENT DECONTAMINATION

- .1 Decontaminate equipment used in work in the designated area approved by the Departmental Representative and remove from site at end of work.

3.11 ENVIRONMENTAL PROTECTION

- .1 To Section 01 35 43 Environmental Protection.

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Concrete deck will be measured in cubic metres based on the neat lines called for on the drawings or authorized in writing by the Departmental Representative, and shall include all labour, materials and equipment necessary to complete the work.
 - .1 Concrete placed beyond dimensions indicated will not be measured.
 - .2 No deductions will be made for volume of concrete displaced by reinforcing steel.
 - .3 Supply and installation of reinforcing steel, joint filler, joint sealer and backer rod will not be measured but considered incidental to work.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .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 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheet.
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1.4 QUALITY ASSURANCE

- .1 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .2 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .3 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Waste Management and disposal: per Section 01 74 20.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.
-

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Supplementary cementing materials: with maximum 25%, by mass of total cementitious materials to CSA A3001.
- .3 Water: to CSA A23.1/A23.2, potable and to Table 9.
- .4 Aggregates: to CSA A23.1/A23.2, maximum size 20.0 mm.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260/C260M.
 - .2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Curing compound: to CSA A23.1/A23.2 white and ASTM C309, Type 1-chlorinated rubber Typel-D with fugitive dye.
- .7 Reinforcing bars: to CSA G30.18, Grade 400R, minimum 30% recycled content.
- .8 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .9 Joint sealer: chemical curing, multi-component compound to CAN/CGSB-19.24-M90, Type 1.
- .10 Other concrete materials: to CSA A23.1/A23.2.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Workability: free of segregation.
-

- .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 age: 35 Mpa minimum.
 - .3 Aggregate size 19 mm maximum.
 - .4 Volume stability: acceptable volume change range due to shrinkage, creep and freeze thaw cycle.
Surface texture: non-skid finish.
- .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .5 Provide concrete supplier's certification.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 48 hours minimum notice prior to placing of concrete.
 - .2 Place reinforcing steel to details indicated.
 - .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
 - .4 Pumping of concrete will not be permitted.
 - .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
 - .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
 - .7 Protect previous Work from staining.
 - .8 Clean and remove stains prior to application for concrete finishes.
 - .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
 - .10 Do not place load upon new concrete until authorized by Departmental Representative.
-

3.2 INSTALLATION/APPLICATION

- .1 Prior to casting of new concrete deck, execute backfilling of new clear stone and salvaged clear stone and miscellaneous materials to Section 31 23 11.
- .2 Do cast-in-place concrete work to CSA A23.1/A23.2 and to details indicated.
- .3 Cast in reinforcement to details indicated on drawings.
- .4 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Broom sweep at exterior locations.
 - .3 Steel trowel to smooth dense surfaces elsewhere.
 - .4 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .5 Use curing compounds compatible with applied finish on concrete surfaces.

3.3 CONTROL JOINTS

- .1 Form control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

3.4 EXPANSION AND ISOLATION JOINTS

- .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

3.5 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.6 SITE TOLERANCES

- .1 Concrete deck finishing tolerance to CSA A23.1/A23.2.

3.7 FIELD QUALITY CONTROL

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.
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- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .5 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Waste Management: in accordance with Section 01 74 20.

PWGSC Ontario	EXCAVATING	Section 31 23 11
Region Project	LNAPL REMEDIATION PROGRAM	Page 1
Number: R.013137.006	AND BACKFILLING	2016-02-29

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Granular A fill will be measured in tonnes of materials placed and accepted in the work and shall include all labour, materials and equipment necessary to complete the work. Compaction is considered incidental to the work and will not be measured separately for payment.
- .2 Granular B fill will be measured in tonnes of material placed and accepted in the work and shall include all labour, materials and equipment necessary to complete the work. Compaction is considered incidental to the work and will not be measured separately for payment.
- .3 Supply and place 19 mm clear stone will be measured in tonnes of materials place and accepted in the work and shall include all labour, materials and equipment necessary to complete the work.
- .4 Excavation, stockpiling, reinstalling and compaction of native fill will be measured by the cubic metres of materials placed within Work Area 2 and shall include all labour, materials and equipment necessary to complete the work. Removal and disposal of all trees and vegetation is considered incidental and will not be measured separately for payment.
- .5 Excavation, stockpiling and reinstalling of salvaged clear stone and miscellaneous materials will be measured in cubic metres of materials placed within Work Area 1 and shall include all labour, materials and equipment necessary to complete the work.
- .6 Excavation, removal and disposal of LNAPL contaminate fill will be measured under Section 02 50 00.
- .7 Materials removed from beyond limits specified will be measured only when Departmental Representative authorizes additional excavation.
- .8 Material placed beyond the limits indicated will not be measured.

1.2 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
 - .1 OPSS.PROV 1004 November 2012, Ontario Provincial Standard Specification, Material Specification for Aggregates - Miscellaneous.
 - .2 OPSS.PROV 1010 April 2013, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
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1.3 UTILITY LINES

- .1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Departmental Representative of findings.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
- .3 Record locations of maintained, re-routed and abandoned underground utility lines.
- .4 Make good damage to existing utility lines resulting from work.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Waste management in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular material: to OPSS.PROV 1010:
 - .1 Granular A fill, maximum size 19.0 mm.
 - .2 Granular B fill, Type II, maximum size 26.5 mm.
- .2 Clear stone: to Ontario Provincial Standard Specification OPSS.PROV 1004, maximum size 19.0 mm, Type 2.
- .3 Native fill: excavated soil within Work Area 2, free from roots, rocks larger than 75 mm, debris and LNAPL contamination.
- .4 Salvaged clear stone and miscellaneous material: excavated materials within Work Area 1.
- .5 LNAPL contaminated fill: to Section 02 50 00.

PART 3 - EXECUTION

3.1 STOCKPILING

- .1 Stockpile native fill and salvaged clear stone and miscellaneous materials in Area 3 as indicated on the drawings. Stockpile materials in manner to prevent segregation.
 - .2 Stockpiling of all new materials will not be permitted on-site. Truck and transport materials as required for backfilling.
-

PWGSC Ontario	EXCAVATING	Section 31 23 11
Region Project	LNAPL REMEDIATION PROGRAM	Page 3
Number: R.013137.006	AND BACKFILLING	2016-02-29

3.2 PREPARATION/ PROTECTION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Protect existing structures and outfalls from damage during Work. Make good of all damages at no extra costs to Contract.
- .3 Protect excavated earth from freezing by approved method.

3.3 GENERIC EXCAVATING

- .1 Excavate to elevations and dimensions indicated or required for construction of work.
- .2 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act for the Province of Ontario.
- .3 Make excavation to clean lines to minimize quantity of fill material required.
- .4 Earth bottoms of excavations to be reasonably level, free from loose or organic matter.
- .5 Do not undermine the existing concrete anchorwall during excavation activities.
- .6 When complete have Departmental Representative inspect excavations to verify depths and dimensions.
- .7 Excavation exceeding that shown on the MA-Series drawings, if authorized in writing by Departmental Representative, will be paid as extra to Contract price in accordance with General Conditions. Quantities will be calculated in place, compaction included. Truck load measurements not acceptable.
- .8 Correct unauthorized excavation at no extra cost to Contract as directed by Departmental Representative.

3.4 GENERIC BACKFILLING

- .1 Do not commence backfilling until areas of work to be backfilled have been inspected and approved by Departmental Representative.
 - .2 Backfill all spaces excavated and not occupied by parts of the structure, or other permanent works, with specified material placed as shown on the MA-Series drawings.
 - .3 Areas backfilled to be free from debris, snow, ice, water or frozen
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PWGSC Ontario	EXCAVATING	Section 31 23 11
Region Project	LNAPL REMEDIATION PROGRAM	Page 4
Number: R.013137.006	AND BACKFILLING	2016-02-29

ground.

- .4 Do not backfill around newly placed concrete until concrete has been in place 14 days, test cylinders show strength to be at least twice the working stress used in design, and approval has been obtained from the Departmental Representative.
- .5 Place and compact new granular and native fill materials in continuous horizontal layers not exceeding 150 mm loose depth. Use methods to prevent disturbing or damaging any part of the work. Make good any damage.
- .6 Maintain optimum moisture content to enable compaction to attain specified density.
- .7 Compact each layer to the granular B fill and native fill to 98% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.
- .8 Compact each layer of granular A fill to 100% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.

3.5 SEQUENCING WITHIN WORK AREA 1

- .1 Do demolition and removal of concrete deck to Section 02 41 15 and to limits shown on the drawings.
 - .2 Do excavation to Clause 3.3 Generic Excavating and in manner detailed on the MA-Series drawings.
 - .3 Excavate and salvage clear stone and miscellaneous materials to depth shown on the MA-Series drawings.
 - .4 Transport salvaged clear stone and miscellaneous materials to stockpile Area 3 for re-use and reinstallation.
 - .5 Remove and dispose of LNAPL contaminated fill in accordance with Section 02 50 00 and to C-Series drawings.
 - .6 Inform Departmental Representative upon completion of LNAPL contamination fill removal.
 - .7 Do backfilling to Clause 3.4 Generic Backfilling and in manner detailed on the MA-Series drawings.
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PWGSC Ontario	EXCAVATING	Section 31 23 11
Region Project	LNAPL REMEDIATION PROGRAM	Page 5
Number: R.013137.006	AND BACKFILLING	2016-02-29

- .8 Place and backfilled excavated area with all salvaged clear stone and miscellaneous materials.
- .9 Continue backfilling remainder of excavated area with new clear stone fill upon completion of salvaged clear stone and miscellaneous material backfill.
- .10 Do cast-in-place concrete deck to Section 03 30 00.

3.6 SEQUENCING WITHIN WORK AREA 2

- .1 Do demolition and removal of concrete pad to Section 02 41 15 and to limits shown on the drawings.
 - .2 Remove and dispose all trees and vegetation within the limits of excavation.
 - .3 Excavation of native fill within Work Area 2 will be completed in two lifts.
 - .4 Excavate the first native fill lift to depth of 1 m below existing grades and to limits indicated on drawings. Stockpile native fill within Area 2 as indicated on drawings.
 - .5 Departmental Representative will confirm the elevation of the limits of the 2nd native fill lift excavation. Non contaminated fill will be stockpile within Area 3. Contaminated fill will be removed and disposed in accordance with Section 02 50 00.
 - .6 Do remainder of sequencing to Clause 3.3 Generic Excavation and to details indicated on the MA-Series drawings.
 - .7 The Work Area 2 limits are inferred and may be adjusted by Departmental Representative during implementation based on site condition.
 - .8 If the excavation distance from the facewall exceeds 10 m, the sequencing shown on the MA-Series drawings must be followed.
 - .9 Removal and dispose of LNAPL contaminated fill in accordance with Section 02 50 00 and to C-Series drawings.
 - .10 Inform Departmental Representative upon completion of LNAPL contaminated fill removal.
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PWGSC Ontario	EXCAVATING	Section 31 23 11
Region Project	LNAPL REMEDIATION PROGRAM	Page 6
Number: R.013137.006	AND BACKFILLING	2016-02-29

- .11 Do backfilling to Clause 3.4 Generic Backfilling and in manner detailed on the MA-Series drawings.
- .12 Install geosynthetic clay liners to Section 31 32 19.02 and to details indicated on drawings.
- .13 Install geotextile to Section 31 32 19.01 and to details indicated on drawings.

PART 1 - GENERAL

1.1 MEASUREMENT AND PAYMENT

- .1 Measure geotextiles in square metres of surface covered by material for work areas, as shown on Drawings C-05 and C-09, and to be covered by soil stockpiles. No allowance will be made for overlaps. Cost to include for the supply and placement of the material as well as its removal and disposal upon completion of the remediation works within the respective work areas.
- .2 Measure geotextiles in square metres of surface covered by material as part of the work area to be covered by a clean fill cap within West Pier Work Area 2. No allowance will be made for overlaps. Cost to include for the supply and placement of the material within the West Pier Work Area 2.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .2 ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 06.
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- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit following samples one week prior to beginning Work.
 - .1 Minimum length of 1 m of roll width of geotextile.
 - .2 Methods of joining.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store and protect geotextiles from direct sunlight and UV rays.
 - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Geotextile: non-woven synthetic fiber fabric, supplied in rolls.
 - .1 Width: 3.5 m minimum.
 - .2 Length: 200 m minimum.
 - .3 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
 - .2 Physical properties:
 - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 1 mm.
 - .2 Mass per unit area: to CAN/CGSB-148.1, No.2, minimum 64 g/m².
 - .3 Tensile strength and elongation (in any principal direction): to ASTM D4595.
 - .1 Tensile strength: minimum 175 N, wet condition.
 - .2 Elongation at break: minimum 70%.
 - .4 Grab tensile strength and elongation: to
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CAN/CGSB-148.1, No.7.3.

- .1 Breaking force: minimum 330 N, wet condition.
- .2 Elongation at future: minimum 70%.
- .5 Ball burst strength: to CAN/CGSB-4.2, No.11.2
minimum 1.1 MPa.
- .3 Hydraulic properties:
 - .1 Apparent opening size (AOS): to ASTM D4751, 50 to 150 micrometres.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material 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.

3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface within the proposed material stockpile areas at the various work areas, as indicated, in an orientation and manner that facilitates the work.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Overlap each successive strip of geotextile 500 mm over previously laid strip.
 - .4 No sewing or sealing of joins is required.
 - .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
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- .6 Only place enough geotextile to facilitate the work. The Crown will not be responsible for surplus material used without the written confirmation of the Departmental Representative.
- .7 Replace damaged or deteriorated geotextile to approval of the Departmental Representative.
- .8 For installation as part of temporary soil stockpiles place soil for future use in accordance with Section 02 50 00.
- .9 For installation as part of risk management measures place geotextile prior to placement of clean fill in accordance with Section 02 50 00.

3.3 CLEANING

- .1 Upon completion of the remediation program remove from the area of temporary soil stockpiles or site and dispose of off-site in accordance with federal, provincial and local regulations for this material.

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

PART 1 - GENERAL

1.1 MEASUREMENT AND PAYMENT

- .1 Geosynthetic clay liner will be measured in square metres of surface covered by material. No allowance will be made for overlaps. Cost to include for the supply and placement of the material as well as removal and disposal of surplus material upon completion of the remediation works within the respective work areas.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geosynthetic clay liner (GCL) and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit two weeks minimum before beginning Work samples as follows:
 - .1 Minimum 2 m length of standard width GCL.
- .4 Certificates:
 - .1 Submit two copies of manufacturer's mill test data four weeks minimum before beginning Work.
 - .2 Submit certificates, including test results two weeks before delivery to job site.

1.3 QUALITY ASSURANCE

- .1 Test quality of GCL in accordance with manufacturer's recommendations.

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
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manufacturer's name and address.

- .3 During delivery and storage, protect GCL from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- .4 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Geosynthetic Clay Liner: extruded synthetic sheet.
 - .1 Supplied in:
 - .1 Rolls of 4.7 m minimum width.
 - .2 Panel length of 45.7 m minimum.
 - .2 Composed of geosynthetic clay liner comprised of a uniform layer of granular sodium bentonite encapsulated between a slit-film woven geotextile and a virgin staple fiber nonwoven geotextile.
 - .2 Physical properties:
 - .1 Cap nonwoven mass/unit area: to ASTM D5261, minimum 200g/m².
 - .2 Woven Scrim mass/unit area: to ASTM D5261, minimum 105g/m².
 - .3 Bentonite Swell index: to ASTM D0890 24 mL/2g minimum.
 - .4 Bentonite Moisture Content: to ASTM D04643 12% maximum.
 - .5 Bentonite Fluid Loss: to ASTM D0891 18 mL maximum.
 - .6 Bentonite Mass per Unit Area: to ASTM D05993 4.34 kg/m².
 - .7 Grab strength and elongation at yield: to ASTM D04632.
 - .1 Grab strength: minimum 422 N.
 - .2 Grab elongation: average 150%.
 - .8 Peel Strength: to ASTM D04632 66 N.
 - .9 Permeability: to ASTM D05084 maximum of 5 x 10⁻⁹cm/sec..10 Index Flux: to ASTM D05887 maximum 1 x 10⁻⁸m³/m²/sec.
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PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for GCL 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.

3.2 PREPARATION

- .1 Review slopes of the remediation excavation where geosynthetic clay liner (GCL) is to be placed, as indicated, to confirm stability. Inform the Departmental Representative if there are any issues with the stability of the slope which may impact the placement of the GCL.
- .2 Remove any debris or other sharp materials from the exposed slope to be covered by the GCL.

3.3 INSTALLATION

- .1 Maintain area of installation free of obstructions.
 - .2 Prepare excessively soft supporting material as directed by Departmental Representative. Only commence panel placement once work area has been approved by Departmental Representative.
 - .3 Do not proceed with panel placement during precipitation, in presence of excessive moisture (i.e. fog, dew), nor in presence of high winds.
 - .4 Place and overlap panels in accordance with manufacturer's recommendations on graded surface in orientation and locations indicated. Minimize wrinkles, avoid scratches and crimps to GCL and avoid damage to supporting material.
-

- .5 Protect installed GCL from displacement, damage or deterioration before, during and after placement of material layers.
- .6 Replace damaged, torn or permanently twisted panels to approval of Departmental Representative. Remove rejected damaged panels from site.
- .7 Place backfill material as indicated to secure the GCL in place and anchor as indicated.

3.4 CLEANING

- .1 Upon completion of the remediation program remove any surplus or damaged/unused GCL from site and dispose of off-site in accordance with federal, provincial and local regulations for this material.

3.5 PROTECTION

- .1 Do not permit vehicular traffic directly on the GCL.

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PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Asphalt repairs: asphalt including delivery, placement and compacting, will be paid by the square metre for class indicated on the Unit Price Table. Work only applies to the East Headlands work area immediately adjacent the remedial excavation face. The estimated quantity assumes 75 mm of asphalt.
- .2 Granular A including compacting will be paid by tonne of material placed for class indicated on the Unit Price Table. The estimated quantity assumes 300 mm of compacted Granular A material.
- .3 Excavating, including removal and disposal will be measured in square metres for class indicated on the Unit Price Table. The Work will include any required saw cutting of the asphalt surface.

1.2 REFERENCES

- .1 OPS.PROV 1010, April 2013 for Granular A.
- .2 OPSS 1103, November 2012 for Rapid Setting Type Emulsified Asphalt.
- .3 OPSS 1150, November 2010 for Type HL4 Asphalt Base Course.

1.3 PROTECTION

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 h after placement.
 - .2 Provide access to parking lot as required.
 - .3 Protect roads, remedial area on site and adjacent property that may be damaged by paving machinery, equipment or personnel. Make good property damaged due to paving operations.
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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Granular base: to Ontario Provincial Standard Specification OPS.PROV 1010, for Granular A. Maximum size aggregate 19.0 mm.
- .2 Primer: emulsified asphalt to Ontario Provincial Standard Specification OPSS 1103, for rapid setting type.
- .3 Asphalt base course: to Ontario Provincial Standard Specification OPSS 1150, November 2010 for type HL 4. Maximum size aggregate 19.0 mm.

PART 3 - EXECUTION

3.1 ASPHALT REMOVAL

- .1 Verify in field with Departmental Representative areas designated for asphalt removal.
- .2 Saw cut pavement to full depth in neat lines around limits of asphalt removal areas to expose fresh vertical surfaces.
- .3 Remove asphalt and excavate to requirements as shown on the drawing.

3.2 GRANULAR BASE

- .1 Supply and place granular base to compacted thickness of 300 mm.

3.3 ASPHALT CONCRETE PAVING

- .1 Apply primer at rate of 0.5 L/m² to exposed edges of asphalt.
 - .2 Obtain approval of granular base and primer from Departmental Representative before placing asphalt.
 - .3 Place asphalt mix only when granular base is dry and air temperature is above 5°C.
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- .4 Place 75 mm of compacted asphaltic base in two approximately equal thickness lifts.
- .5 Minimum 120°C mix temperature required when spreading.
- .6 Maximum 160°C mix temperature permitted at any time.
- .7 Compact base course with roller as soon as it can support roller weight without undue cracking or displacement.
- .8 Roller, power driven, minimum mass of 7 tonnes, minimum wheel width 450 mm.
- .9 Roll until roller marks are eliminated. Compact to density not less than 96% laboratory density.
- .10 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .11 Moisten roller wheels with water to prevent mix adhesion.
- .12 Compact mix with hot tampers or other approved equipment in areas inaccessible to roller.
- .13 Finish surface smooth, true to grade and free from deviations exceeding 1:1000 when measured in any direction with a 3 m straight edge.
- .14 Carefully place and compact hot asphaltic material against joints.
- .15 Place base course flush to existing pavement surface.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 The section includes decommissioning of seven monitoring wells (East Headlands EHL MW11-10, EHL MW11-11, EHL MW11-12, West Pier BH1, BH3, BH09-09 and BH08-10) located in proximity to three areas to be excavated prior to the LNAPL remediation.
- .2 The wells to be decommissioned in accordance with the requirements outlined in O.Reg 903 as amended.

1.2 MEASUREMENT PROCEDURES

- .1 The unit price for decommissioning a well includes all work ie. Mobilization and demobilization, all equipment, labour, supply and disposal of all material and compaction for decommissioning and is to be included in the unit prices.
- .2 For all wells, measure well diameter, depth to bottom of well, depth to water from ground level, record on Abandonment Well Record and provide a copy to Departmental Representative.

1.3 DEFINITIONS

- .1 Annular space: space between well casing and borehole wall.
 - .2 Aquifer: part of formation or group of formations that is water bearing.
 - .3 Consolidated formation: a geologic formation of bedrock.
 - .4 Drawdown: difference in elevation, between static level and pumping level.
 - .5 Potable water: water that is safe for human consumption.
 - .6 Unconsolidated formation: geologic formation of sand, gravel or other soil strata.
 - .7 Well datum: top of outer casing or similar fixed point
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of well head with elevation tied to geodetic or suitable local datum.

- .8 O.Reg. 903 as amended - Ontario Water Resources Act - Wells

1.4 SUBMITTALS

- .1 To Section 01 33 00.
- .2 Prior to the award of this Contract, the Contractor must provide the Departmental Representative with a copy of the well contractor and technician licenses, as required by the O.Reg. 903 as amended.
- .3 On completion of Work, submit to Departmental Representative:
- .1 Water Well Record for each well abandoned, including Global Positioning System coordinates for well location.
- .4 Upon completion of work, Contractor shall distribute copies of completed well record to:
- .1 Director of the Ministry of Environment and Climate Change within 30 days of the abandonment of well.

1.5 QUALIFICATIONS

- .1 Well decommissioning work shall be undertaken by a MOECC licensed well drilling contractor under the supervision of a licensed well technician.
- .2 Provide a copy of valid license to the Departmental Representative at least five days prior to the start of work.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for off-site reuse, recycling or debris disposal as required.

1.7 WORK SCHEDULE

- .1 All wells must be decommissioned prior to the commencement of work within the respective work areas.
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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Well abandonment plug material to comply with the requirements outlined in O. Reg. 903 as amended.
- .2 Clean fill material to comply with O. Reg. 903 as amended - Wells.

PART 3 - EXECUTION

3.1 REVIEW OF AVAILABLE INFORMATION

- .1 Refer to the specification drawings for the locations of the wells within the work areas that require decommissioning.
- .2 Refer to Appendix 5 for information on the existing wells requiring decommissioning.

3.2 INSTALLATION

- .1 The well decommissioning work must be undertaken by a licensed well drilling contractor. Decommission the existing wells on site as per O. Reg. 903 as amended and as directed by Departmental Representative.
- .2 Contractor must coordinate the well decommissioning with Departmental Representative.
- .3 Plug wells with abandonment materials (i.e. sand).
- .4 Well tags, if present, shall be removed and safeguarded until required.
- .5 Remove and dispose of all equipment and debris in the well.

3.3 CLEAN UP

- .1 Contractor is responsible for ensuring that each property is left in equivalent or better condition upon completion of the Work at each property.