

PWGSC Ontario	PROJECT TITLE PAGE	Section 00 01 01
Region Project		
Number R.074203.001		2015-07-24

<u>PROJECT TITLE</u>	LEAMINGTON, ONTARIO POINT PELEE NATIONAL PARK NORTHWEST BEACH IMPROVEMENTS PHASE 1
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<u>PROJECT NUMBER</u>	R.074203.001
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<u>PROJECT DATE</u>	2015-07-24
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REFERENCE MATERIAL

1. CENTRAL COMFORT STATION HAZARDOUS BUILDING MATERIALS ASSESSMENT
2. NORTH COMFORT STATION HAZARDOUS BUILDING MATERIALS ASSESSMENT
3. NORTHWEST BEACH RENEWAL - BASIC IMPACT ANALYSIS DRAFT - AUG 21

ARCHITECTURAL DRAWINGS

A010	OVERALL DEMOLITION SITE PLAN
A015	ENLARGED DEMOLITION SITE PLAN
A100	ENLARGED SITE PLAN

CIVIL DRAWINGS

C 1	SITE PLAN
C 2	DEMOLITION AND REMOVAL
C 3	GRADING AND SERVICING
C 4	PARKING LOT AND CURB LAYOUT
C 5	PLAN, PROFILE CROSS SECTION
C 6	DETAILS AND CROSS SECTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and description of Work.
- .2 Contract Method.
- .3 Work sequence.
- .4 Contractor use of premises.

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 designated substance abatement general deconstruction/demolition of buildings indicated and construction of road and parking lot, located at Leamington, Ontario, Point Pelee National Park, North Beach; and further identified as Project Number R.074203.001.

1.4 CONTRACT METHOD

- .1 Construct work under lump sum contract.

1.5 COST BREAKDOWN

- .1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.
- .2 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.6 WORK SEQUENCE

- .1 Coordinate Progress Schedule and coordinate with Owner Occupancy of site during construction.
- .2 Maintain fire access/control.

1.7 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of site until Substantial Performance.
- .2 Coordinate use of premises under direction of Departmental Representative.

1.8 ALTERATIONS TO EXISTING SITE

- .1 Remove and recycle, compost, anaerobically digest, sell material for reuse or dispose of items as indicated.

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 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of site. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Where security is reduced by work provide temporary means to maintain security.
- .3 Provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.

1.3 EXISTING SERVICES

- .1 Notify Departmental Representative, utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00.

1.4 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including endangered species, safety, fire, traffic and security regulations.

- .3 Keep within limits of work and avenues of ingress and egress.
- .4 Ingress and egress of Contractor vehicles at site is limited to hours as instructed by Departmental Representative.

1.5 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 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 4 days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to Departmental Representative, 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.

1.2 PRECONSTRUCTION MEETING

- .1 Within 5 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 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.
 - .3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.

- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00.
- .5 Site security in accordance with Section 01 56 00.
- .6 Health and safety in accordance with Section 01 35 29.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner provided products.
- .9 Record drawings and specifications in accordance with Sections 01 33 00 and 01 78 00.
- .10 Maintenance manuals in accordance with Section 01 78 00.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 3 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Corrective measures and procedures to regain projected schedule.
 - .6 Revision to construction schedule.
 - .7 Progress schedule, during succeeding work period.
 - .8 Review submittal schedules: expedite as required.
 - .9 Maintenance of quality standards.
 - .10 Review proposed changes for affect on construction schedule and on completion date.
 - .11 Other business.

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 monitoring of project work in relation to established milestones.

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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 10 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 33 00.
- .2 Submit to Departmental Representative within 3 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 3 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Demolition completed within 20 working days of Award of Contract date.
 - .2 Excavation completed within 30 working days of Award of Contract date.
 - .3 Granular base, sub-base, paving and line painting completed within 60 working days of Award of Contract date.
 - .4 Certificate of Substantial Performance within 60 working days of Award of Contract 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 revised schedules within 3 working days.

- .3 Revise impractical schedule and resubmit within 3 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 minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Demolition.
 - .6 Excavation.
 - .7 Backfill and grading.
 - .8 Paving and line painting.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, 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.

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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, samples and mock-ups 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.
- .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, NMSEdit Professional spp, MS Word, MS Excel, and Autocad dwg files on USB compatible with PWGSC encryption requirements or through

email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 PRODUCT DATA

- .1 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.
- .2 Allow 3 working days for Departmental Representative's review of each submission.
- .3 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .4 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.
- .5 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .6 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.
- .7 After Departmental Representative's review, distribute copies.
- .8 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.
- .9 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .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.
- .10 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.
- .11 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 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 of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 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 PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting 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 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic and hard copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.

- .3 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: weekly as directed by Departmental Representative.
 - .1 Upon completion of: demolition, excavation, concrete, paving and line painting and as directed by Departmental Representative.

1.5 CERTIFICATES AND TRANSCRIPTS

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

1.6 FEES, PERMITS AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits.

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 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.
- .5 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010
<http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316>

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within 5 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.
- .3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work.
- .4 Contractor's and Sub-contractors' Safety Communication Plan.
- .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented

during emergency situations.

- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
- .7 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.
- .8 Submit names of personnel and alternates responsible for site safety and health.
- .9 Submit records of Contractor's Health and Safety meetings when requested.
- .10 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, weekly.
- .11 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
- .12 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .13 Submit copies of incident and accident reports.
- .14 Submit Material Safety Data Sheets (MSDS).
- .15 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 demolition 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 refer to the: **Hazardous Building Materials Assessment**

- .1 Work at site will involve contact with:
 - .1 Silica in concrete, concrete block, concrete brick, stucco, ceramic tile, masonry, slate, stone, asphalt.
 - .2 Mercury in fluorescent light tubes.
 - .3 Asbestos in transite panels and caulking.
 - .4 Lead in paint, flashing, ceramic tile glaze, solder in electronic equipment, solder caulking in ball fittings of cast iron pipes, lead acid batteries, vent and pipe flashings, and solder used on domestic water lines
 - .5 Benzene in paints and adhesives.
 - .6 Guano.

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 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, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 UNFORESEEN 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 HEALTH AND SAFETY COORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 Have working knowledge of occupational safety and health regulations.
 - .2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .4 Be on site during execution of Work.

1.14 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 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.

1.15 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.

1.16 BLASTING

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

1.17 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.18 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.

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 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 SILT CURTAIN and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
- .3 Before commencing demolition or construction activities or delivery of materials to site, submit Environmental Protection Plan for review 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.
- .6 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.
 - .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, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.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 Waste Water Management Plan identifying methods and procedures for management or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

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

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

1.3 FIRES

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

1.4 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 General Construction Permit.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
 - .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
 - .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
 - .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.6 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.

- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Blasting is allowed only above water and 100 m minimum from indicated spawning beds.

1.7 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.8 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 onsite 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.

1.9 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written 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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 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 in accordance with Section 01 74 11.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .5 Washing and cleaning of the equipment: Dispose of waste materials and debris off site, including all of waste water.

PART 1 - GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.

1.3 SITE SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

1.4 NATIONAL PARKS ACT

- .1 For projects located within boundaries of National Park, perform Work in accordance with National Parks Act.

1.5 RELICS AND ANTIQUITIES

- .1 Relics and antiquities, and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on site shall remain the property of Parks Canada. Protect such articles and request directives from Departmental Representative.
- .2 Should historic objects be uncovered during excavating, stop work immediately and notify the Departmental Representative. Do not resume work until directed to by the Departmental Representative.
- .3 Archaeology staff from Parks Canada will monitor the project work and may require temporary stop of work to carry out site

investigations.

- .4 Protect subsurface historic features, profiles and ground, at the location indicated as archaeological find on Drawing L-1.

1.6 ACCESSIBLE DESIGN

- .1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

1.7 TAXES

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

1.8 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.

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 AB: anchor bolt.
.2 AC: acoustic.
.3 AC PAN: acoustic panel.
.4 ACU: acoustic unit ceiling.
.5 AFF: above finished floor.
.6 AC PLAS: acoustic plaster.
.7 ACT: acoustic tile.
.8 ACR CU LVR: acrylic cube louvre.
.9 ADH: adhesive.
.10 ADJ: adjustable.
.11 A/C: air conditioner.
.12 AHU: air handling unit.
.13 AL: aluminum.
.14 ANOD: anodized.
.15 APPROX: approximate.
.16 ARCH: architecture.
.17 ARCH BLK: architectural block.
.18 AVB: air vapour barrier.
- .2 B:
.1 B: base.
.2 BEAST: benthic assessment of sediment.
.3 BH: bore hole.
.4 BHP: brake horse power.
.5 BL: bottom layer.
.6 BLK: block.
.7 BLKD: bulkhead.
.8 BM: beam.
.9 BOT: bottom.
.10 BMP: best management practice.
.11 B PL: base plate.
.12 BRG: bearing.
.13 BRK: brick.
.14 BSMT: basement.
.15 BTEX: benzene, toluene, ethylbenzene and xylenes.
.16 BUR: built-up roof.
- .3 C:
.1 CAL: caliper.

- .2 CANTIL: cantilever.
- .3 CB: catch basin.
- .4 CC: centre to centre.
- .5 CCN: contemplated change notice.
- .6 CDF: controlled density fill.
- .7 CEC: Canadian Electrical Code.
- .8 CF: chair fabric.
- .9 CHAN: channel.
- .10 CHS: Canadian hydrographic service.
- .11 CJ: construction joint.
- .12 CL: centreline.
- .13 CK: cork.
- .14 CLG: ceiling.
- .15 CLR: clear.
- .16 COL: column.
- .17 CONC: concrete.
- .18 CONC BLK: concrete block.
- .19 CONC BRK: concrete brick.
- .20 CONT: continuos.
- .21 CONT J: control joint.
- .22 COMPL: complete.
- .23 CM: centimetre. (Nursery stock).
- .24 CP: circulating pump.
- .25 CPL: cement plaster.
- .26 CPM: critical path method.
- .27 CPT: carpet.
- .28 CPTT: carpet tile.
- .29 CT: ceramic tile.
- .30 CTE: connect to existing.
- .31 CV: control valve.
- .32 CVT: conductive vinyl tile.
- .33 C/W: complete with.
- .4 D:
 - .1 D: deep.
 - .2 dB: decibels.
 - .3 DB: dry-bulb.
 - .4 DD: dutch door.
 - .5 DEG: degree.
 - .6 DF: drinking fountain.
 - .7 DIA: diameter.
 - .8 DIM: dimension.
 - .9 DL: dead load.
 - .10 DMNT: demountable.
 - .11 DP: dampproofing.
 - .12 DR: door.
 - .13 DRP: drapery.
 - .14 DWL: dowel.
- .5 E:
 - .1 EA: each.

- .2 EC: epoxy coating.
 - .3 ECF: engineered containment facility.
 - .4 EE: each end.
 - .5 EF: each face (architectural/structural).
 - .6 EF: exhaust fan (mechanical/electrical).
 - .7 EL: elevation.
 - .8 ELEC: electric.
 - .9 ELEV: elevator.
 - .10 EM: expanded metal.
 - .11 ENCL: enclosure.
 - .12 EQ: equal.
 - .13 ET: expansion tank.
 - .14 EXH: exhaust.
 - .15 EXIST: existing.
 - .16 EXPJ: expansion joint.
 - .17 EXP STRUCT: exposed structure.
 - .18 EXT: exterior.
 - .19 EW: each way.
 - .20 EWT: entering water temperature.
- .6 F:
- .1 FC: fuel contributed.
 - .2 FD: floor drain.
 - .3 FDN: foundation.
 - .4 FEAT W: feature wall.
 - .5 FEXT: fire extinguisher.
 - .6 FH: fire hose.
 - .7 FHC: fire hose cabinet.
 - .8 FHR: fire hose rack.
 - .9 FIN: finish.
 - .10 FIP: federal identity program.
 - .11 FL: floor.
 - .12 FLD: field.
 - .13 FLUOR: fluorescent.
 - .14 FR: frame.
 - .15 FRR: fire resistance rating.
 - .16 FTG: footing.
- .7 G:
- .1 GALV: galvanized steel.
 - .2 GB: grab bar.
 - .3 GBD: gypsum board.
 - .4 GC: General Conditions.
 - .5 GF: ground floor.
 - .6 GFCI: ground fault circuit interrupter.
 - .7 GL: glass or glazing.
 - .8 GL BLK: glass block.
 - .9 GPC: gypsum plaster ceiling.
 - .10 GPW: gypsum plaster wall.
 - .11 GT: glass tile.

- .8 H:
 - .1 HB: hose bib.
 - .2 HC: hollow core.
 - .3 HCWD: hollow core wood door.
 - .4 HD: hand dryer.
 - .5 HDW: hardware.
 - .6 HDWD: hardwood.
 - .7 HEX: heat exchanger.
 - .8 HM: hollow metal.
 - .9 HOR: horizontal.
 - .10 HOR EF: horizontal each face.
 - .11 HP: hydro pole.
 - .12 HPA: Hamilton Port Authority.
 - .13 HR: hour.
 - .14 HRV: heat recovery ventilator.
 - .15 HT: height.
 - .16 HTR: heater.
 - .17 HUM: humidifier.
 - .18 HWT: hot water tank.
 - .19 HYD: hydrant.
 - .20 HZ: Hertz frequency, cycles per second.
- .9 I:
 - .1 ICF: insulated concrete formwork.
 - .2 ID: inside diameter.
 - .3 INS: insulation.
 - .4 INTLK: interlock.
- .10 J:
 - .1 JT: joint.
- .11 K:
 - .1 KPL: kick plate.
- .12 L:
 - .1 LAT: leaving air temperature.
 - .2 LAV: lavatory.
 - .3 LDG: landing.
 - .4 LG: long.
 - .5 LINO: linoleum.
 - .6 LL: live load.
 - .7 LT: light.
 - .8 LWT: leaving water temperature.
- .13 M:
 - .1 MAS: masonry.
 - .2 MAS FL: masonry flashing.
 - .3 MAX: maximum.
 - .4 MBG: metal bar grating.
 - .5 MCL: metal cube louvre.
 - .6 MECH: mechanical.

- .7 MET: metal.
 - .8 MET DK: metal deck.
 - .9 MET FL: metal flashing.
 - .10 MET GRID CLG: metal grid ceiling.
 - .11 MET GRTG: metal grating.
 - .12 MET LIN CLG: metal linear ceiling.
 - .13 MET T PTN: metal toilet partition.
 - .14 MH: maintenance hole.
 - .15 MIN: minimum.
 - .16 MLP: metal lath and plaster.
 - .17 MO: masonry opening.
 - .18 MR: marble.
 - .19 MT: metal threshold.
 - .20 MWP: membrane waterproofing.
- .14 N:
- .1 NBC: national building code.
 - .2 NC: normally closed.
 - .3 NF: near face.
 - .4 NFC: national fire code.
 - .5 NIC: not in contract.
 - .6 NO: number.
 - .7 NRC: noise reduction coefficient.
 - .8 NRP: non removable pin.
 - .9 NTS: not to scale.
- .15 O:
- .1 OA: outside air.
 - .2 OBC: Ontario building code.
 - .3 OC: on centre.
 - .4 OD: outside diameter.
 - .5 OPNG: opening.
 - .6 OPR: operator.
 - .7 OVHD: overhead.
 - .8 OWSJ: open web steel joist.
- .16 P:
- .1 P: prefinished.
 - .2 PAH: polynuclear aromatic hydrocarbons.
 - .3 PARG: parging.
 - .4 PCC: precast concrete.
 - .5 PCT: porcelain ceramic tile.
 - .6 PED ACS FLG: pedestal access flooring.
 - .7 PF: panel fabric.
 - .8 PH: phase.
 - .9 PL: plate.
 - .10 PLAM: plastic laminate.
 - .11 PLAS: plaster.
 - .12 PLYWD: plywood.
 - .13 PR: pair.
 - .14 PREFAB: prefabricated.

- .15 PREFIN: prefinished.
- .16 PRESS: pressure.
- .17 PRFL: profile.
- .18 PRV: pressure regulating valve.
- .19 PT: paint.
- .20 PTD: paper towel dispenser.
- .21 PTN: partition.
- .22 PVC: polyvinyl chloride.

- .17 Q:
 - .1 QTB: quarry tile base.
 - .2 QTF: quarry tile floor.
 - .3 QTR: quarry tile roof.

- .18 R:
 - .1 R: radius.
 - .2 RA: return air.
 - .3 RAD: return air damper.
 - .4 RB: resilient base.
 - .5 RC: reinforced concrete.
 - .6 RCPT: receptacle.
 - .7 RD: roof drain.
 - .8 REINF: reinforced/reinforcing.
 - .9 REQD: required.
 - .10 REQT: requirement.
 - .11 RFT: rubber floor tile.
 - .12 RM: room.
 - .13 RO: rough opening.
 - .14 RP: radiant panel.
 - .15 RRS: recycled rubber sheet.
 - .16 RRT: recycled rubber tile.
 - .17 RSD: rolling steel door.
 - .18 RSF: rubber sheet flooring.
 - .19 RT: rubber tile.
 - .20 RTU: roof top unit.
 - .21 RWL: rain water leader.

- .19 S:
 - .1 SA: supply air.
 - .2 SAN SEW: sanitary sewer.
 - .3 SCHED: schedule.
 - .4 SC: solid core.
 - .5 SCRN: screen.
 - .6 SCWD: solid core wood door.
 - .7 SD: smoke developed.
 - .8 SDT: static dissipative tile.
 - .9 SECT: section.
 - .10 SH: sill height.
 - .11 SIM: similar.
 - .12 SL: sliding.
 - .13 SLR: sealer.

- .14 SPEC: specification.
 - .15 SS: stainless steel.
 - .16 STD: standard.
 - .17 STL: steel.
 - .18 STL BM: steel beam.
 - .19 STC: sound transmission class.
 - .20 STL FL DK: steel floor deck.
 - .21 STL PL: steel plate.
 - .22 STN: stone.
 - .23 STR: structure or structural.
 - .24 ST SEW: storm sewer.
 - .25 S&U: stain and urethane.
 - .26 S&V: stain and varnish.
 - .27 SVT: solid vinyl tile.
- .20 T:
- .1 T: top.
 - .2 T&B: top and bottom.
 - .3 TCB: turbidity control plan.
 - .4 TEL: telephone.
 - .5 TER: terrazzo.
 - .6 TERT: terrazzo tile.
 - .7 THKNS: thickness.
 - .8 THR: threshold.
 - .9 TMPD: tempered.
 - .10 TOPG: topping.
 - .11 TRANSV: transverse.
 - .12 TYP: typical.
- .21 U:
- .1 U: urethane.
 - .2 U/C: undercut.
 - .3 UGRD: underground.
 - .4 UNO: unless noted otherwise.
 - .5 UOS: unless otherwise specified.
 - .6 U/S: underside.
 - .7 UR: urinal.
- .22 V:
- .1 V: volt.
 - .2 VCF: vinyl coated fabric.
 - .3 VCT: vinyl composition tile.
 - .4 VEL: velocity.
 - .5 VERT: vertical.
 - .6 VERT B: vertical blinds.
 - .7 VERT EF: vertical each face.
 - .8 VSF: vinyl sheet flooring.
 - .9 VPT: vinyl plank flooring.
 - .10 VT: vinyl tile.
 - .11 VWC: vinyl wall covering.

- .23 W:
- .1 WB: wet-bulb.
 - .2 WC: water closet.
 - .3 W-C: wall connectors.
 - .4 WD: wood.
 - .5 WDV: wood veneer.
 - .6 WG: water gauge.
 - .7 WH: wall hydrant.
 - .8 WHMIS: workplace hazardous materials information system.
 - .9 WP: waterproofing.
 - .10 WR: washroom.
 - .11 WSIB: workplace safety and insurance board.
 - .12 WT: weight.
 - .13 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 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.
 - .7 AWPAA - American Wood Preservers' Association.
 - .8 AWWA - American Water Works Association.
 - .9 BHMA - Builders Hardware Manufacturers Association.
 - .10 CCDC - Canadian Construction Documents Committee.
 - .11 CCMPA - Canadian Concrete Masonry Producers Association.
 - .12 CGSB - Canadian General Standards Board.
 - .13 CNTA - Canadian Nursery Trades Association.
 - .14 CPCA - Canadian Painting Contractors Association.
 - .15 CRCA - Canadian Roofing Contractors Association.
 - .16 CSA - Canadian Standards Association.
 - .17 CSC - Construction Specifications Canada.
 - .18 CSDMA - Canadian Steel Door Manufacturers Association.
 - .19 CSI - Construction Specifications Institute.
 - .20 CSSBI - Canadian Sheet Steel Building Institute.
 - .21 CRCA - Canadian Roofing Contractors Association.
 - .22 DHI - Door and Hardware Institute.
 - .23 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
 - .24 ESA - Electrical Safety Authority.
 - .25 FCC - Fire Commissioner of Canada.
 - .26 FSC - Forest Stewardship Council.
 - .27 GANA - Glass Association of North America.
 - .28 HMMA - Hollow Metal Manufacturers Association.
 - .29 IEEE - Institute of Electrical and Electronics Engineers Inc.

- .30 ISO - International Organization for Standardization.
- .31 IWFA - International Window Film Association.
- .32 LEED - LEED Canada, Leadership in Energy and Environmental Design.
- .33 MPI - Master Painters Institute.
- .34 NAAMM - National Association of Architectural Metal Manufacturers.
- .35 NCPI - National Clay Pipe Institute.
- .36 NEMA - National Electrical Manufacturers Association.
- .37 NFPA - National Fire Protection Association.
- .38 OPSD - Ontario Provincial Standard Drawings.
- .39 OPSS - Ontario Provincial Standard Specifications.
- .40 PPI - Plastics Pipe Institute.
- .41 SDI - Steel Door Institute.
- .42 SCAQMD - South Coast Air Quality Management District.
- .43 TIA - Telecommunications Industry Association.
- .44 TIAC - Thermal Insulation Association of Canada.
- .45 TTMAC - Terrazzo Tile and Marble Association of Canada.
- .46 UL - Underwriters Laboratories.
- .47 ULC - Underwriters Laboratories of Canada.
- .48 US EPA - United States Environmental Protection Agency.
- .49 WH - Warnock Hersey.

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 Defense.
- .5 EC - Environment Canada.
- .6 FHBRO - Federal Heritage Buildings Review Office.
- .7 HC - Health Canada.
- .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 MOEE - Ontario Ministry of Environment and Energy.
- .2 MOL - Ontario Ministry of Labour.
- .3 MTO and MOT - Ontario Ministry of Transportation.

- .4 TSSA - Technical Standards and Safety Authority.

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 BTU: British thermal units.
 - .2 CFM: cubic feet per minute.
 - .3 F: Fahrenheit.
 - .4 ft: foot/feet.
 - .5 FPI: fins per inch.
 - .6 FPM: feet per minute.
 - .7 ga: gauge.
 - .8 gpm: gallons per minute.
 - .9 in: inches.
 - .10 lbs: pounds.
 - .11 NTU: nephelometric turbidity unit.

- .12 psi: pounds-force per square inch.
- .13 PSIG: PSI gauge.
- .14 ppm: parts per million.
- .15 RPM: revolutions per minute.

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 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.

1.2 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Temporary utilities.

1.2 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
.1 EPA 833-R-06-004, May 2007, Developing Your Stormwater
Pollution Prevention Plan - A Guide for Construction Sites.

1.4 SUBMITTALS

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

1.5 INSTALLATION AND REMOVAL

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

1.6 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.7 WATER SUPPLY

- .1 Maintain continuous supply of potable water for construction use.

1.8 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10°C in areas where construction is in progress.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Pay costs for maintaining temporary heat, when using permanent heating system.
- .7 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.09 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent areas, according to requirements sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification.

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 International)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA 0121-08(R2013), Douglas Fir Plywood.
 - .3 CSA Z797-09(R2014), Code of practice for Access Scaffold.
 - .4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

1.3 SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be graveled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.5 SCAFFOLDING

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms as required.

1.6 HOISTING

- .1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists/cranes shall be operated by qualified operator.

1.7 SITE STORAGE/LOADING

- .1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.8 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.
- .4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.9 SECURITY

- .1 Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.10 OFFICES

- .1 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .2 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 CONSTRUCTION SIGNAGE

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.

- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.15 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 833-R-06-004 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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 new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m o.c. Provide at least one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 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.

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 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Existing facilities.

1.2 REFERENCES

- .1 Within text of specifications, reference may be made to reference standards.
- .2 Conform to these standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.
- .6 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>.

1.3 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.

- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Amount or Contract Time.

1.5 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
- .3 Claims for exemptions from use of metric sized products shall be 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.

- .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.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Store sheet materials, lumber and on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .6 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .7 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Amount or Contract Time.

1.9 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.10 CO-ORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.12 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.14 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.15 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.16 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

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 SECTION INCLUDES

- .1 Field engineering survey services to measure and stake site.
- .2 Survey services to establish and confirm inverts for Work.
- .3 Recording of subsurface conditions found.

1.2 REFERENCES

- .1 Owner's identification of existing survey control points and property limits.

1.3 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

- .1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil.
- .4 Stake slopes and berms.
- .5 Stake batter boards for concrete curbs.

1.6 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.9 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

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 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse, recycling composting and anaerobic digestion in accordance with Section 01 74 20.

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 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.
- .7 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .8 Dispose of waste materials and debris off site, including all of cleaning and waste water.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed, remove surplus products, tools,

- construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
 - .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
 - .4 Remove waste products and debris other than that caused by Owner or other Contractors.
 - .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
 - .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
 - .7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
 - .8 Sweep and wash clean paved areas.
 - .9 Remove snow and ice from access paths.

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 60% 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, not including painted or treated wood or laminated wood.
 - .4 Gypsum board, unpainted.
 - .5 Steel.
- .3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 - .1 Indicate how material being removed from the site will be reused, recycled, composted or anaerobically digested using a Deconstruction and Waste Products Workplan Summary.
- .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 and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
 - .2 Telephone: 800-565-4923 or 416-323-4321.
 - .3 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/>.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Government Chief Responsibility for the Environment.

Ontario Ministry of Environment and Energy
135 St Clair Avenue West
Toronto, ON
M4V 1P5

General Inquiries (416) 323-4321 (800) 565-4923
Fax (416) 323-4682

Environment Canada (416) 734-4494
Toronto, ON

PART 1 - GENERAL

1.1 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for final inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

1.2 CLEANING

- .1 In accordance with Section 01 74 11.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

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CLOSEOUT PROCEDURES

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PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Product data, materials and finishes, and related information.

1.2 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with Departmental Representative's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of maintenance manuals and commissioning documentation in.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .7 Pay costs of transportation.

1.3 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Text: Manufacturer's printed data, or typewritten data.
- .5 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- .6 Provide CAD files in dwg format. Forward pdf, MS Word, MS Excel, and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names,
 - .2 Addresses, and telephone numbers of Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.

1.5 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Amendments and addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.
- .6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit 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.
- .7 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".

1.6 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Amendments and change orders.

- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.

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 Standards Association (CSA)
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Fire Code of Canada 2010.
- .3 Comply with National Building Code of Canada 2010, Division B, Part 8, "Safety Measures at Construction and Demolition Sites", and Provincial requirements.
- .4 Federal Legislation
 - .1 Canadian Environmental Assessment Act (CEAA) 2012.
 - .2 Canadian Environmental Protection Act (CEPA) 1999.
 - .3 Transportation of Dangerous Goods Act (TDGA) 1992.
 - .4 Occupational Health and Safety Act.

1.2 DEFINITIONS

- .1 Deconstruction: the systematic dismantling of a structure to salvage materials for reuse. What cannot be reused is considered subsequently for recycling. The ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been a significant portion of the waste system.
- .2 Demolition: rapid destruction of a building with or without prior removal of designated/ hazardous substances. Recyclable materials may be pulled out from the resulting demolition debris.
- .3 Salvage: removal of structural and non- structural components during a deconstruction project for the purpose of reuse.
- .4 Reuse: the use of a material in its original form and function(i.e. without drastic alteration by melting, shredding, pulverizing, etc.).
- .5 Recycling: the use of a material which has been processed in some way for use in a form and function which is different from its original form and function.
- .6 Waste Management Coordinator (WMC): a person or organization appointed to be responsible for supervising all waste management activities as well as coordinating all related, required submittal and reporting requirements.

- .7 Designated and Regulated Substances: designated substances are substances that are known for their adverse effect on human health and the environment. These include but are not limited to asbestos, lead, mercury, arsenic, silicate, coke oven emissions, acrylonitrile, benzene, ethylene oxide, isocyanates, and vinyl chloride. Regulated substances include fuels, refrigeration and fire suppression fluids, and PCBs.
- .8 Hazardous Materials: dangerous substances, chemicals and goods such as biological contaminants, poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or any other material that, if handled improperly, can endanger human health or well being or the environment.
- .9 Alternate Disposal: disposal at other than a landfill or an incineration plant. Alternate disposal includes salvage and delivery for reuse or delivery to an authorized facility for recycling.
- .10 Departmental Representative: throughout this section, the term "Departmental Representative" shall refer to the on-site representative of the Project Management body.

1.3 QUALIFICATIONS

- .1 Contractor shall be specialized in performing the work of this section with documented experience in similar types of deconstruction projects.
- .2 Contractor shall provide a qualified and competent supervisor with previous experience in deconstruction work who shall be present at all times during the deconstruction activities and who shall direct all work. Designate a person on site who would be responsible for worker and general public safety and who will maintain project site safety procedures and requirements.
- .3 Ensure workers and subcontractors employed on the project are trained periodically briefed on the job to carry out work in accordance with the appropriate deconstruction techniques.

1.4 REGULATORY REQUIREMENTS

- .1 Conform to applicable codes and regulations for deconstruction of buildings, safety of adjacent structures, noise and dust control, removal of common and hazardous waste and disposal. Refer also to Clause 1.7 of this section.
- .2 Complete all deconstruction work according to the requirements of the Canadian Construction Safety Code, Provincial Labour and Workers' Compensation Board Regulations and Waste Management regulations.

- .3 Obtain required authorization, certificates and permits from authorities having jurisdiction. Acquire adequate insurance for potential liabilities related to material pickup from the project site, as applicable.
- .4 Notify Departmental Representative and affected utility companies before starting work, and comply with their requirements.
- .5 Do not close or obstruct hydrants, parking or storage areas without prior approval of Departmental Representative.
- .6 Conform to applicable regulatory procedures when discovering hazardous or contaminated materials that were not previously documented.
- .7 Only those resale/brokerage, storage, recycling, transfer and/or disposal facilities which comply with the provincial and municipal regulations and by-laws shall be used by the contractor for the disposal of materials generated at the deconstruction project.

1.5 PERFORMANCE REQUIREMENTS

- .1 Complete the waste reduction workplan to indicate the proposed deconstruction product types, percent salvageable, recyclable and/or waste components, proposed action for waste reduction and diversion from landfill. A similar table will be used for performance monitoring during progress of the deconstruction and demolition activities.
- .2 Salvage materials from the structures and segregate unsalvageables for recycling to achieve maximum diversion of waste that otherwise would be destined for landfill disposal.

1.6 SUBMITTALS

- .1 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of deconstruction work and supporting structures and underpinning.
- .2 Submit plans stamped and signed by qualified professional engineer registered or licensed in the Province of Ontario, Canada.
- .3 Submit a verified list of certified/authorized equipment dismantlers, material haulers, receivers and/or end users of salvaged materials, recycling facilities, and waste disposal facilities.
- .4 Submit copies of certified weigh bills, bills of lading, used building material receipts, from authorized disposal sites and reuse and recycling facilities for all material removed from site to

- Departmental Representative on a bi-weekly basis. Written authorization from Departmental Representative is required to deviate from the haulers, facilities, and receiving organizations, listed in the above submission Clause 1.5.1.
- .5 With regards to documentation of materials removal, include but not limited to the five items listed below. This information must be submitted to Departmental Representative in a tabulated format on a bi-weekly basis or on specific time periods specified by Departmental Representative.
- .1 Description of materials.
 - .2 Time and date of removal.
 - .3 Weight, volume or quantity of material.
 - .4 Breakdown of reuse, recycling and landfill percentages or quantities.
 - .5 End destination of materials.
- .6 Workers, haulers and subcontractors shall possess applicable, current licenses, Certificates of Approval, and/or permits to remove, handle, transport and dispose of materials provincially, municipally, and/ or federally categorized as designated, hazardous or otherwise regulated substances. Upon written request, submit proof of compliance to Departmental Representative within 24 hours.

1.7 QUALITY ASSURANCE

- .1 Ensure work is performed in compliance with all applicable federal legislation including CEPA, CEAA, TDGA, MVSA and all applicable provincial regulations and municipal bylaws.
- .2 Document work activities and produce evidence of compliance immediately upon request by Departmental Representative or respective regulatory body.

1.8 SITE CONDITIONS

- .1 Contractor shall visit the site at his own expense prior to the submission of bids to ascertain existing site conditions and surrounding features related to the proposed deconstruction, and satisfy himself that conditions are suitable for execution of the work.
- .2 Contractor shall accept the site as it exists and will be responsible for all deconstruction work as required.
- .3 Prior to start of work arrange for a site visit together with Departmental Representative, to examine existing exterior and interior site conditions and adjacent structures. Where applicable, the contractor at his expense shall be responsible for taking pictures

- of any existing damage to adjacent structures and record same in writing to avoid any disputes at a later date.
- .4 Where materials or conditions revealed appear to be other than those normally expected or indicated in the Contract documents, the contractor shall immediately inform the Departmental Representative, should such variance of conditions or materials result in a contemplated change to the cost of the work. Should an alternate method of deconstruction or change of materials be appropriate, the Departmental Representative shall immediately give his decision before the work proceeds.
- .1 If material resembling spray or trowel applied asbestos or any other designated, or listed as hazardous substance be encountered in course of deconstruction, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.
- .2 Ensure compliance with the handling, transportation and disposal requirements of fuels, PCBs, halocarbons and other regulated substances that are likely to be encountered during removal, disassembly or dismantling of mechanical and electrical equipment.
- .3 Prior to dismantling and removal of equipment specified for salvage, clearly label all parts/components of mechanical to facilitate re-assembly, as applicable.
- .4 Appropriately label and package all components and parts of mechanical and electrical materials specified for salvage to prevent damage or loss.
- .5 Protection:
- .1 Prevent movement, settlement or damage of adjacent services, paving, trees, and/or adjacent ground grades. Provide bracing, shoring, and/or as required. Repair damage caused by deconstruction as directed by Departmental Representative.
- .2 Support affected structures and, if safety of structure being deconstructed or adjacent structures or services appears to be endangered, take preventative measures, cease operations and immediately notify Departmental Representative.
- .3 Prevent debris from blocking emergency exit routes, surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

1.9 ENVIRONMENTAL PROTECTION

- .1 Do work in accordance with Section 01 35 43.

1.10 SCHEDULING

- .1 Ensure project timelines are met without compromising specified minimum rates of material salvage, recovery or diversion. Notify

Departmental Representative in writing of delays.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Employ equipment and techniques to maximize material salvage potential and segregate all recyclable materials.
- .2 Equipment and heavy machinery used during course of demolition shall meet or exceed all applicable emission requirements, operate in compliance with EPA CFR 86.098-10, Emission Standards for 1998 and Later Model Year Otto-Cycle Heavy Duty Engines and Vehicles and EPA CFR 86.098-11, Emission Standards for 1998 and Later Model Year Diesel Heavy Duty Engines and Vehicles and MVSA.
- .3 Leave equipment and machinery running only while in use, except where extreme cold temperatures prohibit shutting down.
- .4 Use water misting or water efficient wetting equipment/trucks/attachments for dust suppression.
- .5 Demonstrate that all equipment and tools are being used in a manner, which allows for the salvage of materials in best condition possible.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Disconnect and re-route electrical, telephone and communication service lines entering buildings to be deconstructed. Post warning signs on electrical lines and equipment, which must remain energized to serve other installations during period of deconstruction.
- .2 Locate and protect utility lines. Do not disrupt active or energized utilities designated to remain undisturbed.
- .3 Disconnect and cap all mechanical services.
 - .1 Sewer and waterlines: remove in accordance with requirements of authority having jurisdiction as directed by Departmental Representative.
 - .2 Underground septic tanks: remove and/or dispose of in accordance with directions of Departmental Representative.
- .4 Remove trees and shrubs only when necessary and with Departmental Representative's written approval. Where practically possible, remove trees and shrubs and temporarily store in a manner and condition for re-planting on-site or elsewhere.
- .5 Post signs in visible locations and appropriate languages to alert workers, subcontractors, haulers, and public to the job site hazards, travel routes, location of processing and stockpiling of each material, material storage bin location and use, e.g. "CLEAN WOOD ONLY".

3.2 PROTECTION

- .1 Carry out work with minimum or no interference to public or private accesses. Maintain protected egress and access at all times.
- .2 Ensure that deconstruction work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties. Control runoff or disposal of water containing suspended materials or other harmful substances in accordance with local authorities.

- .5 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .6 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during deconstruction activities.
- .7 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust and mud tracking on all temporary roads.
- .8 Stop work immediately if adjacent installations appear to be in danger. Notify Departmental Representative. Do not resume work until directed by Departmental Representative.
- .9 Provide, install and maintain all necessary and/or legally required railings, guards and warning signs during execution of the work to fully protect all persons from loss, damage, death or injury.
- .10 It is the Contractor's responsibility to ensure that the methods, equipment and/or techniques used during the deconstruction activities do not jeopardize the overall safety of the operation.
- .11 It is the responsibility of the Contractor to design, provide, install and maintain an adequate temporary shoring and/or bracing that may be required during the deconstruction activities.
- .12 Protect existing structures, equipment and machinery, which are not to be dismantled or salvaged. Protect from damage all property and site improvements in the immediate surroundings of the project area. Make good all damages to property and improvements that may be damaged during execution of the deconstruction work.
- .13 Prevent debris from blocking surface drainage systems, exits, travel routes, mechanical and electrical systems, that are to remain in operation.
- .14 It is the Contractor's responsibility to design, provide, install and maintain all necessary lighting and temporary fire protection requirements.

3.3 REMOVAL OF DESIGNATED/ HAZARDOUS WASTES

- .1 Prior to start of deconstruction work identify and remove all designated and hazardous substances listed and other materials contaminated by such substances as specified. Handle in a safe manner and transport in accordance with TDGA and provincial/regional regulations/by-laws and dispose of at facilities authorized to receive the respective materials in accordance with the applicable regulatory requirements.

3.4 DISASSEMBLY

- .1 Materials removed from structures are property of Contractor.
- .2 Throughout the course of deconstruction, pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to salvageable materials and equipment.
- .3 Deconstruct in accordance with CSA S350 and all other applicable safety regulations, codes, guidelines and standards.
- .4 Workers must utilize adequate fall protection and certified harness and belay systems where necessary.
- .5 Maintain structural integrity of structure at all times.
- .6 Systematically remove all finishes, furnishings, mechanical and electrical equipment.
- .7 Carefully remove all windows and doors from structure.
- .8 Disassemble all non-loadbearing interior partitions and remove materials from structure.
- .9 Disassemble in sequence: roof, interior loadbearing partitions, exterior walls, floors, and foundations.
- .10 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take all appropriate measures to ensure safety.
- .11 Carefully and methodically separate and segregate materials into reusable, recycleable and waste streams.
- .12 At end of each day's work, leave work in safe and stable condition.
- .13 Do not backfill excavations or below grade cavities until inspected by Departmental Representative.
- .14 Completely remove all foundation walls, footings and concrete floor slab and backfill the remaining cavity with imported soils that are free of chemical and aesthetic contamination and are readily compactable to at least 98% Standard Proctor Density.
- .15 Completely remove all foundation walls, footings and concrete floor slab and backfill the remaining.
- .16 Apply a layer of about 300 mm to 600 mm of screened topsoil across the backfilled area and grade to match surrounding ground contours.

The topsoil must be certified as free of chemical and aesthetic contamination and must not inhibit seed germination and growth of landscaping vegetation.

3.5 PROCESSING

- .1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.
- .2 De-nail, strip, separate, stock materials in manner which ensures best possible condition of salvaged materials.
- .3 Keep processing area clean, organized and free of debris.
- .4 Separate and prepare processed materials into organized piles for proper handling and storage or transportation. In accordance with Section 01 74 20

3.6 STORAGE AND STOCKPILING

- .1 Store salvaged materials in designated secure areas and protect from the elements. Clearly label all stockpiles, indicating material type and quantity.
- .2 Employ reasonable means necessary to protect salvaged materials from vandalism, theft, adverse weather or inadvertent damage by heavy machinery. Designate a worker, hire security, erect temporary fencing, acquire insurance as necessary.
- .3 Stockpile materials designated for off-site destinations in locations which facilitate removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
- .4 Maximum permitted duration of material storage on site is between commencement and completion dates stipulated in the project contract documents.

3.7 TRANSPORTATION AND DISPOSAL

- .1 Load, transport salvaged material and unload at destination so that material is delivered in condition that is acceptable to the end user.
- .2 Transport recyclable materials in appropriate containers and in

accordance with applicable provincial/territorial and municipal requirements.

- .3 Transport solid waste, contaminated materials and/or hazardous materials/waste in accordance with TDGA and related provincial/territorial and municipal regulations and by-laws. Contaminated materials and waste must be transported by appropriately licensed/authorized haulers.
- .4 Salvaged reusable materials, recyclables, waste, and contaminated or hazardous materials removed from the project site shall be transported by and delivered to appropriately licensed or authorized haulers, facilities or receiving organizations listed in waste reduction workplan. Do not deviate from haulers, facilities or receiving organizations listed in waste reduction workplan without prior written authorization from Departmental Representative.
- .5 Recyclable materials, solid waste, contaminated or hazardous materials removed from the site shall be disposed of at appropriately licensed or authorized facilities only. Contractor shall provide legal evidence of appropriate disposal to the Departmental Representative.
- .6 Individuals or organizations receiving salvaged reusable materials must forever indemnify the owner and the project team against all claims arising from handling, transportation, and use of the materials. The Contractor is responsible to obtain such legal indemnification to the Departmental Representative's satisfaction.

3.8 CLEANING AND RESTORATION

- .1 Keep site clean and organized throughout deconstruction activities.
- .2 Upon completion of project, remove debris, trim surfaces and leave work site clean.
- .3 Fires and burning of waste or materials is not permitted on-site and is strongly discouraged off-site.
- .4 Do not bury material on-site unless the activity is authorized by the Departmental Representative in writing and the material is processed for use as fill and meets all applicable regulations and codes.
- .5 Upon completion of project, reinstate adjacent areas or structures affected by Work in condition ready for restoration to match adjacent, undisturbed areas.

PART 1 - GENERAL

1.1 GENERAL AND RELATED WORK

- .1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.
- .2 Related Work Specified Elsewhere

Division 2, Section 02 84 16 Mercury Packaging and Disposal
- .3 The site conditions and outline of work below identify the location of all known asbestos-containing materials (ACM) to be removed from both buildings involved in the demolition project. In accordance with Ontario Regulation 278/05 all ACM must be removed prior to demolition of the building. The following buildings are included in the project and included in this specification:
 - .1 North Comfort Stations, Point Pelee National Park, 407 Monarch Lane, Leamington, Ontario
 - .2 Central Comfort Stations, Point Pelee National Park, 407 Monarch Lane, Leamington, Ontario
- .4 The Hazardous Building Materials Reports for the site were prepared by Pinchin Limited and are listed below. These reports form part of the Site Conditions for this project. It is the intention of these specifications that all of the materials identified in the Pinchin reports will be removed prior to building demolition.
 - .1 "Hazardous Building Materials Assessment, Point Pelee National Park, North Comfort Station, 407 Monarch Lane, Leamington, ON" dated June 11, 2015.

- .2 "Hazardous Building Materials Assessment, Point Pelee National Park, Central Comfort Station, 407 Monarch Lane, Leamington, ON" dated June 10, 2015.
- .5 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this section. The specification fulfils the requirements of the report required by Ontario Regulation 278/05.
- .6 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 SITE CONDITIONS

- .1 Asbestos caulking, containing chrysotile asbestos, is present in the following locations within the Central Comfort Station Building:
 - .1 Grey caulking present on the exterior doors
 - .2 Brown caulking present on the steel flashing of the roof
- .2 Asbestos cement panels (Transite), containing chrysotile asbestos, are present in the following locations:
 - .1 North Comfort Station Building - Ceiling tiles located in the Men's Change Room (Location 4) and the Women's Change Room (Location 7)
 - .2 Central Comfort Station Building - Ceiling tiles located on the exterior overhang of the building as well as in the Life Guard Room (Location 3), Women's Change Room (Location 5), Women's Washroom (Location 6), Men's Washroom (Location 7) and in the Men's Change Room (Location 8).

1.3 OUTLINE OF WORK

- .1 Use Type 1 procedures to remove and dispose of the following:
 - .1 Remove asbestos caulking, containing chrysotile asbestos, present in the following locations within the Central Comfort Station Building (approximately 60 linear feet):
 - .1 Grey caulking present on the exterior doors
 - .2 Brown caulking present on the steel flashing of the roof
 - .2 Remove asbestos cement panels (Transite), containing chrysotile asbestos, present in the following locations:
 - .1 North Comfort Station Building - Ceiling tiles located in the Men's Change Room (Location 4) and the Women's Change Room (Location 7). The total quantity in these locations is approximately 500 square feet.
 - .2 Central Comfort Station Building - Ceiling tiles located on the exterior overhang of the building as well as in the Life Guard Room (Location 3), Women's Change Room (Location 5), Women's Washroom (Location 6), Men's Washroom (Location 7) and in the Men's Change Room (Location 8). The total quantity in these locations is approximately 2880 square feet.

1.4 SCHEDULE

- .1 Work hours should be in accordance with hours provided within the Parks Canada tender package.
- .2 Packaging and removal of light fixtures and lamps to be completed prior to commencement of specified Type 1 asbestos abatement work.
- .3 Work schedule to comply with the Parks Canada tender package

1.5 DEFINITIONS

- .1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.
- .5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.
- .6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.
- .7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .8 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.
- .9 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .10 PCM: Phase Contrast Microscopy.

- .11 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.
- .12 Occupied Area: Any area of the building outside the Asbestos Work Area.
- .13 Personnel: All contractors' employees, sub-contractors employees, supervisors.
- .14 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .15 TEM: Transmission Electron Microscopy.

1.6 SUBMITTALS

- .1 Submit prior to starting work:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.
 - .2 Insurance certificates.
 - .3 Copy of Company Health and Safety Policy and applicable Programs.
 - .4 Copy of Certificate of Approval for transportation of asbestos waste and location of landfill.
 - .5 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.
- .2 Submit the following information regarding personnel prior to starting work:
 - .1 Resumes of the supervisory personnel.

- .2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal (2 day minimum duration) or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.
- .3 WHMIS training certificates for all personnel.
- .4 Written statement that personnel have had instruction on hazards of asbestos exposure, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.
- .5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
- .3 Submit performance data on HEPA filtered vacuums including HEPA challenge integrity leak tests no more than 3 months old prior to isolating the work area or commencing asbestos abatement.
- .4 Submit the following prior to isolating the work area:
 - .1 Written statement that the Ground Fault Interrupter Panels use CSA approved parts and have been inspected by the Electrical Safety Authority.
 - .2 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.
- .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.7 REGULATIONS

- .1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:

- .2 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.
- .3 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.
- .4 Ministry of the Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 SUPERVISION

- .1 Provide on site, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.
- .2 The supervisor must be on site at all times during work at risk of disturbing ACM. Failure to comply with this requirement may result in a stoppage of work, at no cost to Parks Canada.
- .3 Provide a minimum of one supervisor for every 10 workers.
- .4 Replace supervisory personnel, with approved replacements, within 3 working days of a written request from the Asbestos Abatement Consultant. Asbestos Abatement Consultant reserves the right to request replacement of supervisory personnel without explanation.
- .5 Do not replace supervisory personnel without written approval from the Asbestos Abatement Consultant.

1.9 QUALITY ASSURANCE

- .1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

- .2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.
- .3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.
- .4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 NOTIFICATION

- .1 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.
- .2 Inform all sub trades of the presence of ACM identified in the contract documents.
- .3 Notify Parks Canada or Owners Representative, the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if friable materials not identified in the contract documents are discovered during the course of the

work. Stop work in these areas immediately.

1.11 INSURANCE

- .1 Maintain a Commercial General Liability Policy with an insurance company acceptable to PARKS CANADA. The intent of this policy is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to PARKS CANADA. The intent of these policies is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to PARKS CANADA. The intent of this policy is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations including asbestos abatement.
- .4 Forward all certificates to PARKS CANADA before work is commenced, showing PARKS CANADA as additional insured as their interest may appear.

.5 PARKS CANADA may request a certified true copy of the policies.

.6 The limits will not be less than:

.1 Commercial General Liability \$5,000,000.00

.2 Automobile \$2,000,000.00

.3 Pollution Policy (Asbestos Liability) \$2,000,000.00

1.12 INSTRUCTION AND TRAINING

.1 Provide instruction and training to all workers including the following:

.1 Hazards of asbestos.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section.

.2 Instruction and training must be provided by a competent person.

1.13 PERSONAL PROTECTION

.1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.

.2 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.

- .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .6 Repaired or have damaged or deteriorated parts replaced.
 - .7 Stored in a clean and sanitary location.
 - .8 Provided with new filters as necessary, according to manufacturer's instructions.
- .3 Personnel must have respirators fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.
- .1 Personnel shall wear and use the respirator provided.
- .4 As per the requirements of Regulation 278/05, when requested by personnel, provide protective clothing which:
- .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Is replaced or repaired if torn or ripped.
- .5 Decontaminate clothing or protective clothing by using a HEPA Vacuum, or by damp wiping prior to leaving the Asbestos Work Area:
- .1 Dispose of as ACM.

- .6 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area.
- .7 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area.
- .8 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.14 AUTHORIZED VISITOR PROTECTION

- .1 Provide clean protective clothing and equipment, and approved respirators to Authorized Visitors.
- .2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.15 AIR MONITORING

- .1 Air monitoring may be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).
- .2 Co-operate with the Asbestos Abatement Consultant in collection of air samples, including providing workers to wear sampling pumps for up to full-shift periods. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment. Parks Canada reserves the right to back-charge the Asbestos Abatement Contractor for further collection of samples damaged by tampering or abuse. In addition, the Asbestos Abatement Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Asbestos Abatement Contractor's forces.
- .3 Results of air monitoring of 0.05 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:

- .1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.
- .2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.
- .3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.
- .4 Cost of additional inspection and sampling performed as a result of elevated fibre levels may be charged to the Asbestos Abatement Contractor at Parks Canada's discretion.

1.16 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant may be present periodically on site both inside and outside the Asbestos Work Area.
- .2 Inspection of the Asbestos Work Area will be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements, which have not been approved in writing, may result in a stoppage of work at no additional cost to Parks Canada.
- .3 If the Asbestos Work Area is found unacceptable by the standards specified or required by governing authorities, the remedial work required to meet these standards and obtain consent to proceed from the Asbestos Abatement Consultant, shall be performed at no additional cost to Parks Canada.
- .4 The following Milestone Inspections may take place, at Parks Canada's cost:
 - .1 Milestone Inspection A - Clean Site Preparation

- .1 Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.
- .2 Milestone Inspection D - Visual Clearance
 - .1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.
- .5 The Asbestos Abatement Consultant is empowered by Parks Canada to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

PART 2

PRODUCTS AND FACILITIES

2.1 MATERIALS AND EQUIPMENT

- .1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.
- .2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.
- .4 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:
 - .1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a second clear 6 mil (0.15 mm) sealed polyethylene bag.
 - .2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to

prevent perforation of the container during filling,
transportation and disposal.

- .3 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.
- .5 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.
 - .2 Interrupters to have a 5 mA ground fault protection.
 - .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
 - .4 Openings sealed to prevent moisture or dust penetration.
 - .5 Inspected by the Electrical Safety Authority.
 - .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
- .6 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.
- .7 Hose: Leak-proof, minimum busting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .8 OSB: Oriented Strand Board.
- .9 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.

- .10 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .11 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Dupont Tyvek or Kimberly Clark Kleenguard.
- .12 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.
- .13 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .14 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .15 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 SIGNAGE

- .1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area and on hoarding walls as follows:
 - .1 CAUTION.
 - .2 Asbestos Dust Hazard Area.
 - .3 Unauthorized Entry Prohibited.

- .4 Wear Assigned Protective Equipment.
- .5 Breathing Asbestos Dust May Cause Serious Bodily Harm.
- .2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word "CAUTION" in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 SITE PREPARATION

- .1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.
- .2 Remove stored or non-fixed items from the Asbestos Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .3 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .4 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

- .5 Install one layer of 6 mil polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Asbestos Work Area.
- .6 Install one layer of rip-proofing polyethylene sheeting over one layer of 6 mil polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Asbestos Work Area.
- .7 Install polyethylene drop sheets below areas of work.
- .8 Install polyethylene sheeting on openings in walls and floors (as required) and seal.
- .9 Isolate, at panel, and disconnect existing power supply to Asbestos Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Asbestos Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .10 Shut down HVAC systems serving the Asbestos Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Asbestos Work Area.
- .11 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.12 Provide power from ground fault interrupt circuits as follows:

.1 Provide one specified ground fault electrical panel for each 500 square metres of Asbestos Work Area. All electrical apparatus including temporary heating equipment shall be supplied from a ground fault system. Ensure safe installation of electrical lines and equipment by skilled tradesmen.

.1 Ground Fault Interrupter Panel to use CSA approved equipment and be inspected by the Electrical Safety Authority.

.2 Ensure safe installation by licensed electricians.

.3 Connect to building power at electrical panel outside Asbestos Work Area.

.4 Cable to be completely jacketed with no defects. Tag/mark cable as Live.

.2 All electrical equipment used during work shall be supplied power from a Ground Fault Panel.

3.2 MAINTENANCE OF ASBESTOS WORK AREA

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.

.3 Maintain Asbestos Work Area in tidy condition.

.4 Remove any standing water on polyethylene/floor at the end of every shift.

.5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

3.3 ASBESTOS REMOVAL - GENERAL

- .1 Do not use powered tools or non-hand held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.
- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 ASBESTOS REMOVAL - REMOVAL -TRANSITE PANELS & CAULKING MATERIALS

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.5 WASTE AND MATERIAL HANDLING

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins must be locked and covered when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.
- .4 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.
- .5 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.
- .6 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.
- .7 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.
- .8 Removal of waste containers and decontaminated tools and materials from the Asbestos Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of the non-porous or sealable item being removed from the Asbestos Work Area. If the item can be cleaned, remove it from the site. If it cannot be cleaned thoroughly, place it in an Asbestos Waste Container.
 - .2 Place waste or item in Asbestos Waste Container and seal closed.
 - .3 Wet wipe outside of Asbestos Waste Container.
 - .4 At entrance to Asbestos Work Area, place in second Asbestos Waste Container. Seal closed.

- .5 Remove the item from the Asbestos Work Area.
- .9 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .10 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.
- .11 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with Parks Canada's operations.
- .12 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.
- .13 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to Parks Canada.

3.6 ASBESTOS WORK AREA DISMANTLING

- .1 Wash or HEPA vacuum equipment used in Asbestos Work Area, seal vacuum hoses and fittings.
- .2 Place tools and equipment used in contaminated work site but not cleaned in 6 mil polyethylene bags prior to removal from Asbestos Work Area.
- .3 Carefully roll polyethylene sheeting on floors or drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .4 Remove remaining polyethylene sheeting.
- .5 Remove seals, tape, signage etc.
- .6 Seal openings in HEPA vacuums.

- .7 Remove ground fault panels.
- .8 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .9 Rigid portable enclosures and rigid barriers that are to be reused shall be cleaned thoroughly.

3.7 RE-ESTABLISHMENT OF ITEMS

- .1 Upon completion of work:
 - .1 Move items that were removed from Asbestos Work Area prior to work, back into same location within Asbestos Work Area.
 - .2 Remove tags and locks from electrical panels and re-energize equipment and items.
 - .3 Clean, mop and vacuum Asbestos Work Area.
 - .4 Enable building air handling systems.

END OF SECTION 02 82 10

PART 1 GENERAL

1.1 GENERAL AND RELATED WORK

- .1 Perform the following work practices for the handling, packaging, and transfer of Mercury Materials and Waste.
- .2 The site conditions and outline of work below identify the location of all known mercury-containing materials to be removed from both buildings involved in the demolition project. The following buildings are included in the project and included in this specification:
 - .1 North Comfort Stations, Point Pelee National Park, 407 Monarch Lane, Leamington, Ontario
 - .2 Central Comfort Stations, Point Pelee National Park, 407 Monarch Lane, Leamington, Ontario
- .3 The Hazardous Building Materials Reports for the sites were prepared by Pinchin Limited and are listed below. These reports form part of the Site Conditions for this project. It is the intention of these specifications that all of the materials identified in the Pinchin reports will be removed prior to building demolition.
 - .1 "Hazardous Building Materials Assessment, Point Pelee National Park, North Comfort Station, 407 Monarch Lane, Leamington, ON" dated June 11, 2015.
 - .2 "Hazardous Building Materials Assessment, Point Pelee National Park, Central Comfort Station, 407 Monarch Lane, Leamington, ON" dated June 10, 2015.
- .4 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all mercury-containing materials and all materials which have been contaminated by mercury either during or prior to work of this section.

1.2 SITE CONDITIONS

- .1 Mercury vapour is present in fluorescent lamps throughout the building. (approximately 12 units)

1.3 OUTLINE OF WORK

- .1 Remove fluorescent lamps.

1.4 SCHEDULE

- .1 Work hours should be in accordance with hours provided within the Parks Canada tender package.
- .2 Packaging and removal of light fixtures and lamps to be completed prior to commencement of specified Type 1 asbestos abatement work.
- .3 Work schedule to comply with the Parks Canada tender package

1.5 DEFINITIONS

- .1 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with the Occupational Health and Safety Act and Environmental Protection Act, has knowledge of the potential or actual danger to health and safety in the work.
- .2 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.
- .3 Polyethylene: Either polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required providing a continuous polyethylene membrane to protect underlying surfaces from damage.
- .4 Personnel: All contractors' employees, sub-contractors employees, supervisors.
- .5 Work Area: Area of building from which mercury containing items are being removed.

1.6 SUBMITTALS

- .1 Prior to starting work, the Contractor performing work of this section shall submit:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.
 - .2 Insurance certificates.
 - .3 Company Health and Safety Policy.
 - .4 Certificate of Approval for transportation of mercury waste and location of recycling facility.
- .2 Prior to starting work, submit the following information regarding personnel:
 - .1 WHMIS training certificates for all personnel.
 - .2 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.
- .3 Submit the following upon completion of the work.
 - .1 Manifests, waybills, certificate of destruction/recycling etc. as applicable for each type of waste.

1.7 REGULATIONS

- .1 Perform work in accordance with current applicable environmental and occupational health regulations and codes including but not limited to:
 - .1 Regulation 347, General Waste, as amended.
 - .2 R.R.O. Regulation Mercury R.R.O. 1990, Regulation 844, Amended to O. Reg. 110/04, Designated Substance – Mercury.

1.8 SUPERVISION

- .1 Provide on site, a supervisor, with authority to oversee aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.
- .2 A minimum of one supervisor for every 10 workers is required.

- .3 Replace supervisory personnel, with approved replacements, within 3 working days of a written request.

1.9 QUALITY ASSURANCE

- .1 Ensure the removal and handling of Mercury is performed by persons experienced in the methods, procedures and industry practices.
- .2 Complete work so that at no time does mercury contaminate the building or environment.

1.10 INSURANCE

- .1 Maintain a Comprehensive General Liability Policy with an insurance company acceptable to PARKS CANADA. The intent of this policy is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period, even though a claim may not be presented for many years.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to PARKS CANADA. The intent of these policies is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy or specific coverage under the CGL for Mercury, with an insurance company acceptable to PARKS CANADA. The intent of this policy is to hold PARKS CANADA harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period, even though a claim may not be presented for many years. Without limiting the generality of the foregoing, the policy shall insure the operations of the work and shall not contain any

environmental and/or health hazard exclusions relating to remediation operations.

- .4 All certificates must be forwarded to PARKS CANADA before work is commenced, showing PARKS CANADA as additional insured as their interest may appear.
- .5 PARKS CANADA may request a certified true copy of the policies if he deems it necessary.
- .6 The limits will not be less than:
 - .1 Commercial General Liability \$5,000,000.00
 - .2 Automobile \$2,000,000.00
 - .3 Pollution Policy \$2,000,000.00
- .7 PARKS CANADA reserves the right to ask for higher limits of liability if the exposure so warrants. It is recommended that the policies in question be written with the same company.

1.11 INSTRUCTION AND TRAINING

- .1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:
 - .1 Hazards of Mercury.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.

- .5 Instruction and training must be provided by a competent, qualified person.

1.12 PERSONAL PROTECTION

- .1 During work involving mercury, personnel are to wear the following additional personal protective equipment:
 - .1 Non-powered half-face respirators with mercury vapour cartridges with life span indicators in the cartridge.
 - .2 Protective coveralls.
 - .3 Protective eyewear/face shield.
 - .4 Chemical resistant gloves and apron.
- .2 Respiratory protection shall be certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
- .3 Respirators shall be:
 - .1 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter the Work Area has facial hair which affects the seal between respirator and face.
 - .2 Assigned to a worker for his exclusive use.
 - .3 Maintained in accordance with manufacturer's specifications.
 - .4 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .5 Repaired or have damaged or deteriorated parts replaced.
 - .6 Stored in a clean and sanitary location.
- .4 Replace filters as necessary.
- .5 Personnel must have respirators fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.
- .6 Personnel shall wear and use the respirator provided.

- .7 Protective clothing shall be replaced or repaired if torn or ripped.
- .8 Prior to leaving the Work Area, personnel shall decontaminate their clothing or protective clothing by using a HEPA Vacuum, or by damp wiping.
- .9 Dispose of protective clothing not to be reused as Mercury waste.
- .10 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area.
- .11 Prohibit smoking, eating, drinking, chewing in the Work Area.
- .12 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, chemical resistant gasket, and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel.
- .2 Drum liners: clear polyethylene bag, 36" x 60", 6 mils thick. Open one 36" end.
- .3 Mercury Sponge: A plated metal-wool pad for the pick-up of mercury spills.
- .4 Mercury Vacuum: Nilfisk VT Mercury Vacuum or equal. Vacuum used to collect liquid mercury and granular mercury compounds with an internal HEPA filter and an activated carbon adsorbent filter to purify exhaust air of mercury vapours.

- .5 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.
- .6 Protective Coveralls: Disposable full body coveralls to prevent splashes to clothing, complete with hoods. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Tyvek.
- .7 Vermiculite: pre-packed, Industrial grade 3, containing no asbestos.

PART 3 EXECUTION

3.1 MERCURY PACKAGING

- .1 Wear personal protection at all times when disturbing lamps, equipment and items that contain mercury.
- .2 Do not drop mercury-containing materials.
- .3 Do not contaminate building surfaces with mercury.
- .4 Protect work area by installing polyethylene drop sheets or sealed polyethylene sheeting below, and at surrounding work area.
- .5 Isolate, at panel, and disconnect existing power supply to electrical equipment. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc. as required.
- .6 Remove and package entire mercury containing components (i.e. boiler flow valve, thermostat etc.) for recycling. Do not drain mercury.
- .7 Package lamps in cardboard boxes designed for lamps of that size. Do not break lamps.
- .8 Place other mercury materials into containment drums. Insert drum liner. When full:

- .1 Seal liner bag with duct tape.
- .2 Seal drum with lid, gasket and compression ring.
- .3 Affix label.
- .4 Do not leave liner bags or drums open overnight.
- .9 As filled drums accumulate, transfer to temporary storage area.

3.2 TRANSPORTATION AND REPORTING

- .1 Transport materials following Transportation of Dangerous Goods Act.
 - .1 Transport Mercury Materials and Waste to approved site for recycling, including mercury vapour in lamps, and ensure materials are recycled.
- .2 The facility used to process and recycle the mercury shall be approved by the Ministry of the Environment, or local jurisdictional authority, and shall have valid Certificates of Approval to carry out the work outlined herein.
 - .1 The facility must issue a Certificate of Recycling identifying types and quantities of materials generated from the project. The facility must also provide a Certificate of Recycling for the mercury generated from the project. Any mercury contaminated materials not recycled are to be identified by a manifest.
- .3 A typed and signed transfer document for each transfer of mercury is to be submitted to Owner's representative, giving following:
 - .1 Number of drums or boxes.
 - .2 Contents and approximate quantities.
 - .3 Approximate net weight of contents.
 - .4 Dates removal begun and completed (for each lot).
 - .5 Date transferred.
- .4 Submit certificate(s) of certificate of recycling and waste manifests from ALL transfer points. Submit the above for waste REGARDLESS of single transport or as blended waste.

3.3 RE-ESTABLISHMENT OF ITEMS

.1 Upon completion of work:

.1 Remove tags and locks from electrical panels and re-energize equipment and items.

.2 Clean, mop and vacuum the Work Area.

END OF SECTION 02 84 16

PART 1 - GENERAL

1.1 ACTION AND INFORMATION SUBMITTALS

- .1 Provide testing and inspection results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

1.2 ENVIRONMENTAL CHOICE PROGRAM

- .1 Provide sealant and polyethylene products bearing the 'Ecologo' of the Environmental Choice Program, Department of the Environment, Canadian Environmental Protection Act, Certification Criteria Document CCD-045-95 Sealants and Caulking Compounds, and CCD-126-95 Plastic Film Products.
- .2 Submit two copies of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the CCD to the Departmental Representative in accordance with Sections 01 33 00 and 01 45 00. Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement. For primers and sealants, indicate VOC in g/l during application and curing.

1.3 ACRONYMS AND TYPES

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
 - .1 Type GU or GUb - General use cement.
 - .2 Type MS or MSb - Moderate sulphate-resistant cement.
 - .3 Type MH or MHb - Moderate heat of hydration cement.
 - .4 Type HE or Heb - High early-strength cement.
 - .5 Type LH or LHb - Low heat of hydration cement.
 - .6 Type HS or HSb - High sulphate-resistant cement.
- .2 Fly ash:
 - .1 Type F - with CaO content less than 8%.
 - .2 Type CI - with CaO content ranging from 8 to 20%.
 - .3 Type CH - with CaO greater than 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete: mix proportion method Alternative 1 to CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction.
 - .1 Cement: to CAN/CSA-A3000-13, type GU.
 - .2 Compressive strength: 30 MPa at 28 days.
 - .3 Exposure class: F-1 to CSA A23.1-14/A23.2-14.
 - .4 Aggregate size: 20 mm maximum size to CSA A23.1-14/A23.2-14.
 - .5 Slump: 70 mm+/-20 mm at time of deposit.
 - .6 Air content: Table 4, Category 1, 6%.
 - .7 Admixtures: air entraining to ASTM C233/C233M-14 Standard Test Method for Air-Entraining Admixtures for Concrete. Calcium chloride or compounds containing calcium chloride not permitted.
 - .8 Water: potable, to Table 9.

PART 3 - EXECUTION

3.1 PLACING AND INSTALLATION

- .1 Do concrete work in accordance with CSA A23.1-14/A23.2-14.
- .2 Provide 25 mm chamfer on exposed corners.
- .3 Build-in items supplied by other Sections.
- .4 Grout structural steel base plates in place.
- .5 Place colour/texture finish in accordance with CSA B651-12 Accessible Design for the Built Environment, assembly type 1 in pairs, spaced approximately 33 mm apart, to overall width as indicated.
- .6 Install concrete foundations for parking signage posts. Set galvanized steel post in concrete.

3.2 FINISHING

- .1 Finish concrete in accordance with CSA A23.1-14/A23.2-14.
- .2 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1-14/ A23.2-14.

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- .3 Equipment pads: smooth trowelled surface; in accordance with CSA A23.1-14/A23.2-14 Table 21, finish classification Class D.
- .4 Pavements, walks, curbs and exposed site concrete: screed to plane surfaces and float using aluminum, magnesium, or wood floats in accordance with CSA A23.1-14/A23.2-14, Table 21, finish classification Class A. Round edges and provide joint spacings using standard tools. Trowel smooth followed by lightly brushed non-slip finish to CSA B651-12.

3.3 CURING

- .1 Cure concrete in accordance with CSA A23.1-14/A23.2-14, Clause 7.7 Table 19, type 1

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 ASTM D422-63(2007e2), Standard Test Method for Particle-Size Analysis of Soils.
- .3 ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
- .4 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .5 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .6 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .7 CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
- .8 OPSS 514, April 2008, Ontario Provincial Standard Specification, Construction Specification for Trenching, Backfilling, and Compacting.
- .9 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.2 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m³.

- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
- .6 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136/C136M : Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>% Passing</u>
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
0.005 mm	0-45

- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .7 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 SAMPLES

- .2 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill and unshrinkable fill materials and provide access for sampling.

1.4 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing excavation work, notify applicable owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing.
 - .6 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

1.5 SHORING, BRACING AND UNDERPINNING

- .1 Protect existing features in accordance with Section 01 35 29 and applicable local regulations.
- .2 Engage services of qualified professional engineer who is registered or licensed in province of Ontario, Canada to design and inspect cofferdams, shoring, bracing and underpinning required for work.
- .3 Submit design and supporting data at least 2 weeks prior to commencing work.
- .4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in province of Ontario, Canada.

1.6 EXCAVATION AND BACKFILLING REQUIRED BY OTHER SECTIONS

- .1 Excavation and backfilling for site services, and electrical work is included in this Section and shall be carried out in accordance with provisions specified herein and as indicated on drawings. This work to be laid out and supervised by trade concerned.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 fill: to Ontario Provincial Standard Specification OPSS.PROV 1010, for Granular A aggregate. Maximum size 19.0mm.
- .3 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .4 Crushed rock screenings: to Ontario Provincial Standard Specification OPSS.PROV 1010, for Granular M. Maximum size 4.75.
- .5 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum Portland cement content of 25 kg/m³.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: to CSA A23.1/A23.2.
 - .5 Portland cement: Type GU.
 - .6 Slump: 160 to 200 mm.
- .6 Shearmat: honeycomb type bio-degradable cardboard 100 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated

within limits indicated.

- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 STRIPPING OF TOPSOIL

- .1 Commence topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush, weeds, and grasses and removed from site.
- .2 Strip topsoil to depths as directed by Departmental Representative. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.
- .4 Dispose of unused topsoil as directed by Departmental Representative.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.4 SHORING, BRACING AND UNDERPINNING

- .1 Obtain permit from authority having jurisdiction for temporary diversion of water course.
- .2 Construct temporary works to depths, heights and locations as directed by Departmental Representative.
- .3 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Departmental Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
- .4 When sheeting is required to remain in place, cut off tops at

elevations as indicated.

- .5 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore water courses as indicated and as directed by Departmental Representative.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Departmental Representative's approval details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in manner not detrimental to public and private property, or any portion of work completed or under construction.

3.6 EXCAVATION

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.
- .3 Remove paving, walks and rubble and other obstructions encountered during excavation in accordance with Section 01 74 20.
- .4 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .5 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more

than 15 m at end of day's operation.

- .7 Dispose of surplus and unsuitable excavated material location on site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Notify Departmental Representative when bottom of excavation is reached.
- .11 Obtain Departmental Representative's approval of completed excavation.
- .12 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.
- .13 Correct unauthorized over-excavation as follows:
 - .1 Fill under other areas with Type 1 fill compacted to not less than 95% of Standard Proctor Density to ASTM D698.
- .14 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.7 FILL TYPES AND COMPACTION

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 Standard Proctor Density.
 - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95%.
 - .2 Within building area: use Type 1 to underside of base course for floor slabs. Compact to 98%.
 - .4 Retaining walls: use Type 1 fill to subgrade level on high side for minimum 500 mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.
 - .5 Place unshrinkable fill in areas as indicated.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.9 BACKFILLING

- .1 Vibratory compaction equipment: plate tamper, hoe pack.
- .2 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfill around installations.
- .7 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 h after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed work to equalize loading.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative or:
 - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.
- .8 Install drainage system in backfill as indicated.

3.10 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as directed by Departmental Representative.
- .3 Clean and reinstate areas affected by work as directed by Departmental Representative.
- .4 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.

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PART 1 - GENERAL

1.1 PROTECTION

- .1 Protect landscaping, roads, driveways, trees and shrubs on site that may be damaged by paving machinery, equipment or personnel. Make good property damaged due to paving operations.
- .2 Take necessary precautions to protect workmen and public from hazards of paving operations.
- .3 Keep vehicular traffic off newly paved areas until paving properly cured.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Asphalt base course: to Ontario Provincial Standard Specification OPSS 1150, November 2010 for type HL 8. Maximum size aggregate 26.5 mm.
- .2 Asphalt surface course: to Ontario Provincial Standard Specification OPSS 1150, November 2010 for type HL 3. Maximum size aggregate 9.5 mm.
- .3 Primer: emulsified asphalt to Ontario Provincial Standard Specification OPSS 1103, November 2007 for rapid setting type.
- .4 Granular base: to Ontario Provincial Standard Specification OPSS 1010, April 2013 for Granular A. Maximum size 19.0 mm.
- .5 Granular sub-base: to Ontario Provincial Standard Specification OPSS 1010, April 2013 for Granular B. Maximum size 26.5 mm.
- .6 Crushed rock screenings: to Ontario Provincial Standard Specification OPSS 1010, April 2013 for Granular M. Maximum size 4.75 mm.
- .7 Paint: to CAN/CGSB-1.74-2001, alkyd traffic paint. Colour yellow & white.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Remove dust, contaminants, loose and foreign materials, oil and grease in designated areas.
- .2 Use rotary power brooms supplemented by hand brooming as required.
- .3 Where directed, remove to existing pavement level, sealing compound which has protruded excessively and dispose of removed material as directed.
- .4 Keep drainage system clear of loose and waste materials.

3.2 EXCAVATING

- .1 Excavate to elevations and dimensions indicated or required for construction of work.
- .2 Make excavation to clean lines to minimize quantity of fill material required.
- .3 Earth bottoms of excavations to be dry undisturbed soil, reasonably level, free from loose or organic matter.

3.3 INSPECTION

- .1 Check graded subgrade for conformity with elevations and cross-sections before placing granular sub-base and granular base material.
- .2 Proof-roll subgrade, sub-base and base surface with mass and type of roller approved by Departmental Representative.
 - .1 Check for unstable areas.
 - .2 Check for areas requiring additional compaction.
- .3 Notify Departmental Representative of unsatisfactory conditions.
- .4 Do not begin paving work until such conditions have been corrected and are ready to receive paving.
- .5 When complete, have Departmental Representative inspect excavations to verify soil bearing capacity, depths and dimensions.
- .6 Excavation, beyond limits shown on drawings, if authorized in writing by Departmental Representative, will be paid for as extra to Contract price in accordance with General Conditions. Quantities will be calculated in place, compaction included. Truck load measurements

not acceptable.

- .7 Correct unauthorized excavation at no extra cost by filling with Granular A material.

3.4 GRANULAR SUB- AND GRANULAR BASE

- .1 Place 300 mm compacted thickness of granular A base.
- .2 Place in layers not exceeding 100 mm compacted thickness. Compact each layer to 100% Standard Proctor Density.

3.5 ASPHALT COURSE

- .1 Apply primer at approximately 0.5 L/m².
- .2 Place 50 mm of compacted asphaltic concrete HL8 base course.
- .3 Place 40 mm of compacted asphaltic concrete HL3 surface course.
- .4 Minimum 7°C air temperature when placing mixture.
- .5 Minimum 118°C mixture temperature when spread.
- .6 Maximum 149°C mixture temperature at any time.
- .7 Compact each course with roller when it can support roller mass without undue cracking or displacement.
- .8 Roller, power driven, minimum mass 9 tonnes, minimum wheel width 600 mm.
- .9 Roll until roller marks are eliminated. Compact to 96% laboratory density.
- .10 Keep roller speed slow enough to avoid mixture displacement.
- .11 Moisten roller wheels to prevent mixture adhesion.
- .12 Compact mixture with hot tampers in areas inaccessible to roller.
- .13 Finish surface true to grade and free from deviations exceeding 1:1000 when measured in any direction with a 3 m straight edge.

3.6 JOINTS

- .1 Cut back bituminous course to full depth in straight or curved lines as required to expose fresh vertical surfaces. Remove any broken

- or loose material.
- .2 Paint exposed edge of asphaltic joints, edges of manholes and catchbasin frames, curbs and similar items with asphalt primer prior to placing asphalt courses.
 - .3 Where paving comprises two courses overlap longitudinal joints not less than 600 mm.
 - .4 Carefully place and compact hot asphaltic material against joints.

3.7 PAVEMENT MARKING

- .1 Premark lines in an approved manner.
- .2 Width of paint mark 125 mm.
- .3 Apply paint with an approved pressure type distributor that will ensure uniform application and a positive means of shut-off.
- .4 Evenly apply paint at the rate of 4.5 L/10m².

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 10: Excavating and backfilling.
- .2 Section 33 44 01: Storm sewers.
- .3 Section 33 34 01: Sanitary sewers and forcemains.

1.2 SOURCE QUALITY CONTROL

- .1 Departmental Representative will inspect material at fabricating plant and construction site.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Cement: to CAN/CSA-A3001-13. Cementitious Material Compendium.
- .2 Water, aggregates, admixtures: to CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
- .3 Frames, gratings, covers: to following requirements for designated materials:
 - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 - .2 Maintenance hole frames and covers: cover cast with perforations and complete with two 25 mm square lifting holes to OPSD 401.010 Nov. 2013, Cast Iron, Square Frame with Circular Closed or Open Cover for Maintenance Holes Type A.
 - .3 Catch basin frames and covers: to OPSD 400.010 Nov. 2013, Cast Iron, Square Frame with Square Overflow Type Dished Grate for Catch Basins, Herring Bone Openings, City of Toronto standard flat.
- .4 Precast maintenance holes: to ASTM C478M-15. Circular Precast Reinforced Concrete Manhole Sections (Metric)

- .5 Ladder rungs: to OPSD 405.010 Nov. 2013, Maintenance Hole Steps, Hollow.
- .6 Mortar:
 - .1 Aggregate: to CSA A179-14.
 - .2 Cement: to CAN/CSA-A3002-13.
- .7 Brick: to CAN/CSA-A82-14, Grade SW, Type FBS.
- .8 Adjustment rings: precast concrete to ASTM C478M.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

- .1 Excavation and backfill to Section 31 23 10.
- .2 Excavation requires approval prior to installing maintenance holes or catch basins.

3.2 CONCRETE WORK

- .1 Do concrete work to CSA A23.1/A23.2.
- .2 Position metal inserts to dimensions and details shown or required.

3.3 INSTALLATION

- .1 Construct units to details indicated, plumb and true to alignment and grade.
- .2 Complete maintenance holes as pipe laying progresses. Maximum of 3 maintenance holes behind point of pipe laying will be allowed.
- .3 Pump maintenance hole excavation dry and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete slab on 150mm minimum of well compacted granular A material.
- .5 Set bottom section of precast unit in place. Make each successive joint watertight with approved rubber ring gaskets, mastic joint filler, cement mortar, or combination thereof.

- .6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .7 Plug lifting holes with precast concrete plugs set in cement mortar or compound.
- .8 For sanitary sewers:
 - .1 Place stub outlets and bulkheads at elevations and in positions indicated.
 - .2 Bench to provide a smooth U-shaped channel. Side height of channel to be full diameter of sewer. Adjacent floor to be sloped at 75 mm/m. Channels to be curved smoothly. Slope invert to establish sewer grade. For pipes smaller than 150mm use standard fittings, breaking out upper half of fitting upon completion of maintenance hole.
- .9 Installing units in existing systems:
 - .1 Where new unit is within existing run of pipe, carefully remove existing pipe to dimensions required and install new unit as specified.
 - .2 Make joints watertight between new unit and existing pipe.
 - .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready to be put into operation, complete the installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or any other necessary work.
- .11 Place frame and cover on top section to elevation indicated. If adjustment required use concrete ring.
- .12 Clean units of debris and foreign materials; remove fins or sharp protuberances.

3.4 ADJUSTING TOPS EXISTING UNITS

- .1 Remove existing gratings, and frames, and of store for re-use at locations designated by Departmental Representative.
- .2 Sectional units:
 - .1 Raise or lower straight walled sectional units by adding or removing precast sections as required.
 - .2 Raise or lower tapered units by removing cone section, adding, removing, or substituting riser sections to obtain required elevation, then replace cone section.
- .3 Monolithic units:
 - .1 Raise monolithic units by roughening existing top to ensure proper bond and extend to required elevation with:
 - .1 Mortared brick course for 150mm or less alteration.

- .2 Cast-in-place concrete.
- .2 Lower monolithic units with straight wall by removing concrete to elevation indicated for rebuilding.
- .3 When monolithic units with tapered upper section are to be lowered more than 150mm remove concrete for entire depth of taper plus as much straight wall as necessary, then rebuild upper section to required elevation with cast-in-place concrete.
- .4 Install additional maintenance hole ladder rungs in adjusted portion of units as required.
- .5 Re-use existing gratings, frames.
- .7 Re-set gratings and frames to required elevation on full bed of cement mortar, parge and trowel smooth.

3.5 SEALING OVER EXISTING UNITS

- .2 Fill with cast-in-place concrete.

PART 1 - GENERAL

1.1 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.

1.2 OPERATING AND MAINTENANCE DATA

- .1 Provide record drawings and specifications, including directions for operating valves, list of equipment required to operate valves, maintenance and operating instructions in accordance with Section 01 78 00.

1.3 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval by Departmental Representative and adhere to interruption schedule as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 PIPE, JOINTS AND FITTINGS

- .1 Polyvinyl chloride pressure pipe and fittings: to CAN/CSA-B137.3-13 Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications, PVC series 160, 1.1 MPa elastomeric gasket coupling.
- .2 Polyethylene pressure pipe and fittings: to CAN/CSA-B137.1-13 Polyethylene (PE) Pipe, Tubing and Fittings for Cold Water Pressure Services, type PE series 160.
 - .1 Polyethylene to polyethylene joints: to be thermal butt fusion welded.
- .3 Construction Specification for Watermain Installation in Open Cut: to OPSS 441 CONSTRUCTION SPECIFICATION FOR WATERMAIN INSTALLATION IN OPEN CUT , November 2014.

2.2 CURB STOP AND SERVICE BOX

- .1 Curb stop to be minimum 19mm Ball Valve CJxCJ with drain, cast brass, working pressure up to 300 psi.
- .2 Comply with:
 - .1 ANSI/AWWA C800-05, Underground Service Line Valves and Fittings,
 - .2 ASTM B62-09, Composition Bronze or Ounce Metal Castings,
 - .3 ASTM B584-11, Copper Alloy Sand Castings for General Applications.
- .3 Service Box to be slide type service box with upper and lower section. Stainless steel Operating Rod #9, Brass or Stainless steel cotter pin.

2.3 PIPE BEDDING MATERIALS

- .1 Granular material to following requirements:
 - .1 Crushed or screened stone, gravel or sand free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 - .2 To OPSS 1010 MATERIAL SPECIFICATION FOR AGGREGATES - BASE, SUBBASE, SELECT SUBGRADE, AND BACKFILL MATERIAL, November 2013, Granular M aggregate, maximum size 19 mm.
- .2 Concrete required for cradles, encasement, supports and thrust blocks: 25 MPa.

2.4 PIPE DISINFECTION

- .1 Sodium hypochlorite or calcium hypochlorite to ANSI/AWWA B300-10 to disinfect water mains.

2.5 TOOLS AND EQUIPMENT

- .1 Provide 1 service post wrench for curb stops.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation. Carefully inspect materials for defects. Remove defective materials from site.

3.2 TRENCHING AND BACKFILLING

- .1 Do trenching and backfilling work required to install water main and service connections.
- .2 Trench depth to provide cover over pipe of not less than 1.7 m from finished grade.
- .3 Do not backfill trenches until installed work has been checked and accepted by Departmental Representative and hydrostatic and leakage test results are within limits specified.
- .4 Backfill to existing grade with excavated material. Remove excess material from site.

3.3 GRANULAR BEDDING

- .1 Place 150 mm granular bedding materials under pipe.
- .2 Shape bed true to grade to provide continuous uniform bearing surface for pipe exterior.
- .3 Shape transverse depressions in bedding as required to make joints.
- .4 Compact full width of bed to at least 95% of Standard Proctor density.
- .5 Place minimum 150 mm thickness of granular bedding material around sides of pipe and over top of pipe and compact as for bedding.

3.4 PIPE INSTALLATION

- .1 Lay and join pipes to manufacturer's standard instructions and specifications.
- .2 Handle pipe by approved methods. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
- .3 Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe which is not in true alignment or grade or pipe which shows undue settlement after installation.
- .4 Face socket ends of pipe in direction of laying. For mains on a grade of 2% or greater, face socket ends up-grade.
- .5 Do not exceed permissible deflection at joints as recommended by

pipe manufacturer.

- .6 Keep jointing materials and installed pipe free of dirt and water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .7 Position and join pipes with equipment and methods approved by Departmental Representative.
- .8 Cut pipes in an approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .9 Align pipes carefully before jointing.
- .10 Install gaskets to manufacturer's recommendations. Support pipes with hand slings as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
- .11 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again.
- .12 Complete each joint before laying next length of pipe.
- .13 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Departmental Representative.
- .14 Do not lay pipe on frozen bedding.
- .15 Leave joints and fittings exposed for hydrostatic and leakage testing unless otherwise approved by Departmental Representative.

3.5 SERVICE CONNECTION

- .1 Terminate building service at location indicated opposite point of connection to main. Install coupling necessary for connection to building plumbing. If plumbing is already installed, make connection, otherwise cap or seal end of pipe and place temporary marker to locate pipe end.
- .2 Do not install service connections until satisfactory completion of hydrostatic and leakage tests of water main.
- .3 Construct service connections at right angles to watermain unless otherwise directed. Locate curb stops 300 mm inside service connection.

- .4 Tappings on PVC pipe to be either PVC valve tees or bronze type service clamps, strap type with "O" ring seal cemented in place.
- .5 Tappings for PE pipe shall be PE tapping tees or multi-saddle tees.
- .6 Tap main at 2:00 o'clock or 10:00 o'clock position only; not closer to a joint nor closer to adjacent service connections than recommended by manufacturer, or 1 m, whichever is greater.
- .7 Install rigid stainless steel liners in small diameter plastic pipes with compression fittings.
- .8 Install curb stop with corporation box on services NPS 2 or less in diameter. Set box plumb over stop and adjust top flush with final grade elevation. Leave curb stop valves fully closed.

3.6 THRUST BLOCKS

- .1 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground to suit pipe manufacturer's recommendations.
- .2 Keep joints and couplings free of concrete.
- .3 Do not backfill over concrete within 24 h after placing.

3.7 HYDROSTATIC AND LEAKAGE TESTING

- .1 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
- .2 Notify Departmental Representative at least 24 h in advance of all proposed tests. Perform tests in presence of Departmental Representative.
- .3 Where any section of system is provided with concrete thrust blocks, do not conduct tests until at least 2 days after placing concrete.
- .4 Apply hydrostatic test pressure of kPa based on elevation of lowest point in main and corrected to elevation of test gauge, for a period of 1 h.
- .5 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
- .6 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.

- .7 Repeat hydrostatic test until all defects have been corrected.
- .8 Apply a leakage test pressure of 1034 kPa after complete backfilling of trench, based on elevation of lowest point in main and corrected to elevation of gauge, for period of 2 h.
- .9 Define leakage as amount of water supplied from water storage tank in order to maintain test pressure for 2 h.
- .10 Do not exceed allowable leakage of 0.03 L/mm diameter per 300 m of pipe, including lateral connections, per hour.
- .11 Locate and repair defects if leakage is greater than amount specified.
- .12 Repeat test until leakage is within specified allowance for full length of watermain.

3.8 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations shall be witnessed by Departmental Representative. Notify Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will commence.
- .2 Flush water mains through available outlets with a sufficient flow to produce a velocity of 1.5 m/s, within pipe for 10 min, or until foreign materials have been removed and flushed water is clear.
- .3 Flushing flows shall be as follows:

<u>Pipe Size NPS</u>	<u>Flow (L/s) Minimum</u>
6 and below	38
- .4 Provide connections and pumps as required.
- .5 Open and close valves, hydrants and service connections to ensure thorough flushing.
- .6 When flushing has been completed to satisfaction of Departmental Representative, introduce a strong solution of chlorine into watermain and ensure that it is distributed throughout entire system.
- .7 Rate of chlorine application shall be proportional to rate of water entering pipe.
- .8 Chlorine application to be close to point of filling water main and to occur at same time.

- .9 Operate valves, hydrants and appurtenances while main contains chlorine solution.
- .10 Flush line to remove chlorine solution after 24 h.
- .11 Measure chlorine residuals at extreme end of pipe-line being tested.
- .12 Perform bacteriological tests on water main, after chlorine solution has been flushed out. Take samples daily for minimum of two days. Should contamination remain or recur during this period, repeat disinfecting procedure. Specialist contractor shall submit certified copy of test results.
- .13 Take water samples at service connections, in suitable sequence, to test for chlorine residual.
- .14 After adequate chlorine residual not less than 50 ppm has been obtained leave system charged with chlorine solution for 24 h. Further samples shall be taken to ensure that there is still not less than 10 ppm of chlorine residual remaining throughout system.

PART 1 - GENERAL

1.1 MATERIAL CERTIFICATION

- .1 At least 2 weeks prior to commencing work, submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.2 AS-BUILT DRAWINGS

- .1 Provide As-Built drawings on project completion. Give directions and list equipment required to open and close valves, details of pipe material, location of cleanouts, maintenance and operating instructions, in accordance with Section 01 78 00.

1.3 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions and adhere to approved schedule.
- .3 Notify occupants a minimum of 24 hours in advance of any interruption in service.

1.4 MANUFACTURER'S INSTRUCTIONS

- .1 Make available 1 copy of manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Polyvinyl chloride pipe: to CAN/CSA-B137.3-13 Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications.
 - .1 Size as indicated.
 - .2 SDR 25.
 - .3 Series 100.
 - .4 Gasket bell end.
 - .5 Pipe joints: bell and spigot with rubber gaskets solvent welded joints or mechanical joints with transition gaskets to pipe

manufacturer's specifications.

.6 Rubber gaskets: to AWWA C111-12 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.7 Cast iron fittings: to AWWA C110-12 Ductile-Iron and Gray-Iron Fittings or AWWA C110-12 for pipe diameters longer than NPS 4 cement mortar lined.

.2 Polyethylene pressure pipe: to OPSS 441 CONSTRUCTION SPECIFICATION FOR WATERMAIN INSTALLATION IN OPEN CUT, November 2014

.1 Size as indicated.

.2 Pressure class: 1034kPa.

.3 Dimension ratio: 25.

.4 Joints: to AWWA C207-13 Steel Pipe Flanges for Waterworks Service, flanged with steel backed flanges.

.5 Polyethylene fittings: to CAN/CSA-B137.1-13 Polyethylene (PE) Pipe, Tubing and Fittings for Cold Water Pressure Services for pipe sizes 100 mm and less.

2.2 PIPE BEDDING MATERIALS

.1 Granular material:

.1 Bedding sand: natural sand or crushed rock screenings to following grading requirements:

MTC Sieve Size	Percent Passing
4.75 mm	95 - 100
2.36 mm	80 - 100
1.18 mm	50 - 85
600 micrometres	25 - 60
150 micrometres	0 - 10

.2 Bedding stone: crushed stone or crushed gravel to following grading requirements:

MTC Sieve Size	Percent Passing
22.40 mm	100
16.00 mm	75 - 100
13.2 mm	65 - 90
4.75 mm	35 - 55
1.18 mm	15 - 45
300 micrometres	5 - 22
75 micrometres	0 - 8

PART 3 - EXECUTION

3.1 PREPARATION

.1 Clean pipes and fittings of debris and water before installation. Carefully inspect materials for defects before installing. Remove

defective materials from site.

3.2 TRENCHING AND BACKFILLING

- .1 Do trenching and backfilling in accordance with Section 31 23 10.
- .2 Trench alignment and depth require approval prior to placing bedding material or pipe.
- .3 Do not backfill trenches between joints until pipe slope and alignment have been checked and accepted. Do not backfill at joints and valves until pressure and leakage test results are within limits specified.

3.3 BEDDING

- .1 Place bedding material to details indicated and compact to minimum 95% Standard Proctor Density.
- .2 Use bedding stone in lieu of sand bedding material when directed.

3.4 INSTALLATION

- .1 Lay pipes in accordance with AWWA C600-10 for cast iron pipe and ductile iron pipe manufacturer's recommendations. Do not use blocks to support pipe.
- .3 Avoid damage to machined ends of pipes in handling and moving pipe.
- .4 Maintain grade and alignment of pipes.
- .5 Align pipes carefully before jointing.
- .6 Do not exceed maximum joint deflection recommended by pipe manufacturer unless directed in writing by Departmental Representative. Use special bends where necessary to avoid joint deflection.
- .7 Support pipe firmly over entire length, except for clearance necessary at couplings.
- .8 Keep pipe and pipe joints free from foreign material.
- .9 Avoid bumping gasket and knocking it out of position, or contaminating with dirt or other foreign material. Gaskets so disturbed to be removed, cleaned, lubricated and replaced before jointing is attempted.

- .10 Support pipes by means of hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
- .11 Apply sufficient pressure in making joint to ensure that joint is complete to manufacturer's recommendations.
- .12 Apply restraint to force main to ensure that joints when completed are held in place, by tamping fill material under and alongside pipe, or otherwise as approved by Departmental Representative.
- .13 Block pipe as directed when any stoppage of work occurs to prevent creep during downtime.

3.5 THRUST BLOCKS

- .1 Place concrete thrust blocks between bends, tees and fittings and undisturbed ground.
- .2 Keep pipe couplings free of concrete.
- .3 Bearing area of thrust blocks as indicated.

3.6 FIELD TESTING OF FORCE MAIN

- .1 Carry out testing of force main under Force supervision of Departmental Representative.
- .2 Before testing, bed and cover pipe between joints to prevent movement of force main when test pressure is applied.
- .3 Leave joints and fittings exposed.
- .4 Strut and brace caps, bends and tees, to prevent movement when test pressure is applied.
- .5 Expel air from force main, by slowly filling main with water. High points to be drilled and tapped and suitable cocks installed to vent air and to be shut when pressure is applied. Remove cocks after satisfactory completion of test and seal holes with tight fitting plugs.
- .6 Apply a hydrostatic test pressure of 1034 kPa based on elevation of lowest point in line and corrected to elevation of test gauge for hydrostatic test and 1034 kPa for leakage test.
- .7 Apply pressure for 1 hour for pressure test and 2 hours for leakage test.

- .8 Examine exposed pipe, joints and fittings while system is under pressure.
- .9 Remove defective joints, pipe and fittings and replace with new sound material.
- .10 Make leaking joints watertight.
- .11 Define leakage as amount of water supplied in order to maintain test pressure for 2 hours.
- .12 Do not exceed allowable leakage as defined in ANSI/AWWA C600-10.
- .13 Locate and repair defects if leakage is greater than amount allowed.
- .14 Repeat test until leakage is within specified allowance for full length of force main.
- .15 Complete backfill.
- .16 Repeat test after completing backfill.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 33 05 14: Maintenance holes.

1.2 MATERIAL CERTIFICATION

- .1 At least 2 weeks prior to commencing work submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.3 AS BUILT DRAWINGS, OPERATING AND MAINTENANCE DATA

- .1 Provide as built drawings of sewers in accordance with Section 01 78 00 on project completion. Give details of pipe material, location of cleanouts, directions and list of equipment to operate valves, other maintenance and operating instructions.

1.4 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Maintain existing sewage flows during construction.
- .3 Submit schedule of expected interruptions for approval and adhere to approved schedule.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

- .1 Gravity sewer pipe and fittings: Type PSM Poly (Vinyl Chloride): to ASTM D3034-14a Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - .1 Standard Dimension Ratio (SDR): 35.
 - .2 Locked-in gasket and integral bell system.
 - .3 Nominal lengths: 4 m.

- .2 Forcemain sewer:
 - .1 Polyvinyl Chloride (PVC) pipe and fittings:
 - .1 Conform to CSA B137.3-13 Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications.
 - .2 SDR: 18.
 - .3 Pressure class: 1 MPa.
 - .4 Gasket bell end.
 - .5 Rubber gaskets: to AWWA C111-12 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - .2 Polyethylene pressure pipes and fittings:
 - .1 Conform to CSA B137.1-13 Polyethylene (PE) Pipe, Tubing and Fittings for Cold Water Pressure Services.
 - .2 Type: 3507.
 - .3 Series: 160.
 - .4 Joints: to AWWA C207-13, thermal butt fusion.
 - .5 Polyethylene fittings: to CSA B137.

2.2 SERVICE CONNECTIONS

- .1 Cast iron pipe: to CAN/CSA-B70-12 Cast iron soil pipe, fittings, and means of joining; with rubber gasket push-on joints to AWWA C111-12 Fittings: to CAN/CSA-B70.
- .2 Cast iron service saddles: with oil resistant gaskets, stainless steel clamp and oil resistant "O" rings in branch end.

2.3 PIPE BEDDING MATERIALS

- .1 Granular material to following requirements:
 - .1 Crushed or screened stone, gravel or sand free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
 - .2 Granular 'M': to OPSS.PROV 1010 MATERIAL SPECIFICATION FOR AGGREGATES - BASE, SUBBASE, SELECT SUBGRADE, AND BACKFILL MATERIAL, April 2013, maximum size 19 mm.
- .2 Concrete required for thrust blocks to be 20 MPa.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Inspect materials for defects before installing. Remove defective materials from site.

3.2 TRENCHING AND BACKFILL

- .1 Carry out trenching work as required to install sewers to lines and grades indicated.
- .2 Do not allow contents of any sewer or sewer connection to flow into trench.
- .3 Trench line require approval prior to placing bedding material and pipe.
- .4 Do not backfill trenches between joints until pipe grade and alignment have been checked and accepted by Departmental Representative. Do not backfill at joints until pressure and leakage test results are within limits specified unless otherwise approved by Departmental Representative. Protect pipe from freezing if tested at temperatures lower than 5°C.
- .5 Remove excess excavated material from the site.

3.3 INSTALLATION

- .1 Place 150 mm granular bedding materials under piping.
- .2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.
- .4 Compact full width of bed to at least 95% Standard Proctor density.
- .5 Lay and join pipes in accordance with manufacturer's recommendations.
- .6 Handle pipe carefully with equipment recommended by manufacturer.
- .7 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .8 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .9 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .10 Do not allow water to flow through pipe during construction, except as may be permitted by Departmental Representative.

- .11 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .12 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.
- .13 Install PVC pipe and fittings in accordance with CSA B1800-15 Thermoplastic non-pressure piping compendium.
- .14 Pipe jointing:
 - .1 Install gaskets in accordance with manufacturer's recommendations.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .15 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .16 Make watertight connections to maintenance holes. Use non-shrink grout when suitable gaskets are not available.
- .17 Place concrete thrust blocks between bends, tees and fittings and undisturbed ground for forcemain lines. Keep pipe couplings free of concrete.
- .18 Upon completion of pipe laying and after Departmental Representative has inspected pipe joints, place minimum 150 mm granular bedding material around and over top of pipes and compact as for bedding material. Backfill remainder of trench with excavated material.
- .19 Install 3 service connections to main sewer of standard Tee or Wye fittings at locations indicated unless directed otherwise by Departmental Representative.

- .20 Plug service laterals with water tight caps or plugs as approved by Departmental Representative.
- .21 Place location marker at ends of plugged or capped unconnected sewer lines.

3.4 FIELD TESTING

- .1 Test force main in presence of Departmental Representative.
- .2 Brace caps, bends and tees to prevent movement during tests.
- .3 Expel air from main by slowly filling with water. High points to be drilled and tapped and suitable cocks installed to vent air and to be shut when pressure is applied. Remove cocks after satisfactory testing and seal holes with tight fitting plugs.
- .4 Apply hydrostatic test pressure of 690 kPa based on lowest point in line and corrected to elevation of test gauge for hydrostatic test and 345 kPa for leakage test.
- .5 Apply pressures for 1 h for pressure test and 2 h for leakage test.
- .6 Remove defective joints, pipe and fittings where found and replace with new sound material.
- .7 Define leakage as amount of water from source tank in order to maintain test pressure for 2 h. Allowable leakage to be as defined in AWWA C600-10.
- .8 Repeat testing until test results fall within accepted allowances.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 23 10: Excavating, Trenching and Backfilling.
- .2 Section 33 05 14: Maintenance holes and catch basins.

1.2 MATERIAL CERTIFICATION

- .1 At least 2 weeks prior to commencing work, submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.3 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Maintain existing flow during construction.
- .3 Submit schedule of expected interruptions for review and adhere to approved schedule.

1.4 MANUFACTURER'S INSTRUCTIONS

- .1 Make available 1 copy of manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE

- .1 Non-reinforced circular concrete pipe and fittings: to CSA A257 Series-14 Standards for concrete pipe and manhole sections, designed for mortar joints, flexible rubber gasket joints to CSA A257 Series-14.
- .2 Reinforced circular concrete pipe and fittings: to CSA A257 Series-14, designed for mortar joints flexible rubber gasket joints to CSA A257 Series-14.

- .3 Lifting holes:
 - .1 Pipe 900 mm and less in diameter; no lift holes.
 - .2 Pipe greater than 900 mm in diameter; lift holes not to exceed two in a piece of pipe.
 - .3 Provide pre-fabricated plugs to effectively seal lift holes after installation of pipe.

2.2 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CAN/CSA-G401-14 Corrugated steel pipe products.

2.3 PIPE BEDDING MATERIALS

- .1 Granular material:
 - .1 Bedding sand: natural sand or crushed rock screenings to following grading requirements:

OPSS Sieve Size	Percent Passing
4.75 mm	95 - 100
2.36 mm	80 - 100
1.18 mm	50 - 85
600 micrometres	25 - 60
150 micrometres	0 - 10
 - .2 Bedding stone: crushed stone or crushed gravel to following grading requirements:

OPSS Sieve Size	Percent Passing
22.40 mm	100
16.00 mm	75 - 100
13.2 mm	65 - 90
4.75 mm	35 - 55
1.18 mm	15 - 45
300 micrometres	5 - 22
75 micrometres	0 - 8

2.4 JOINT MORTAR

- .1 Portland cement: to CAN/CSA-A3001-13 Cementitious materials compendium, Type GU.
- .2 Mortar to consist of one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.

3.2 TRENCHING AND BACKFILLING

- .1 Do trenching and backfilling in accordance with Section 31 23 10.
- .2 Trench line and depth require approval prior to placing bedding material and pipe.
- .3 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by Departmental Representative.

3.3 CONCRETE AND ENCASEMENT

- .1 Place concrete to details indicated or Bedding directed.
- .2 Pipe may be positioned on concrete blocks to facilitate placing of concrete. When necessary rigidly anchor or weight pipe to prevent flotation when concrete is placed.
- .3 Do not backfill over concrete within 24 hours after placing.

3.4 GRANULAR BEDDING

- .1 Place granular bedding materials to details indicated or directed.
- .2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.
- .4 Compact full width of bed to at least 95% Standard Proctor Density.
- .5 Use bedding stone in lieu of sand bedding material when directed.
- .6 Fill excavation below bottom of specified bedding adjacent to maintenance holes or catch basins with bedding material or common backfill as directed.

3.5 INSTALLATION

- .1 Lay and join pipe in accordance with manufacturer's recommendations.
- .2 Handle pipe by approved methods. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .3 Lay pipes on prepared bed, true to line and grade with pipe invert smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .4 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.
- .7 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.
- .8 Joints:
 - .1 Corrugated steel pipe:
 - .1 Install flexible sealing rings where called for.
 - .2 Match corrugations or indentations of coupler band with pipe sections before tightening.
 - .3 Tap coupler firmly while tightening, to take up slack and ensure a snug fit.
 - .4 Ensure bolts are inserted and tightened.
 - .2 Concrete pipe:
 - .1 Install gaskets as recommended by manufacturer.
 - .2 Support pipe with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

- .3 Mortared joints:
 - .1 Pipe interior: Circular pipes 700 mm in diameter and larger shall have interior gap between ends of adjacent pipes filled with mortar. Apply mortar a minimum 7 days after backfilling has been completed to allow pipe settlement to occur. Finish interior surface of joints smooth.
 - .2 Pipe exterior: For bell and spigot pipe, mortar to be used for caulking outside of joints. Press and caulk mortar into place. Allow mortar to set minimum of one hour before backfilling.
- .9 When any stoppage of work occurs, block pipes as directed to prevent "creep" during down time.
- .10 Plug lifting holes with approved prefabricated plugs set in non-shrink grout.
- .11 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave a smooth end at right angles to axis of pipe.
- .12 Make watertight connections to maintenance holes and catch basins. Use non-shrink grout when suitable gaskets are not available.
- .13 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.
- .14 Plug open upstream ends of pipes with removable watertight concrete, steel or wooden bulkheads.

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PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 211.1-06(R2011), Rigid Types EBI and DB2/ES2 PVC Conduit.
 - .2 CSA C22.2 No. 211.3-[96(R2000), Reinforced Thermosetting Resin Conduit (RTRC) and Fittings (Bi-national standard, with UL 1684).

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health and Welfare Canada for solvent cement. Indicate VOC content.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 20.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 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.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Do not dispose of preservative treated wood through incineration.
- .7 Do not dispose of preservative treated wood with other materials destined for recycling or reuse. Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill as approved by Departmental Representative.

- .8 Dispose of unused wood preservative material at official hazardous material collections site. Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.
- .9 Dispose of unused solvent cement at an official hazardous material collections sites as approved by Departmental Representative. Do not dispose of unused solvent cement into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: to CSA C22.2 No. 211.1, Type DB2/ES2, with fabricated fittings, for direct burial expanded flange ends, Trade size 6. Nominal length: 6 m plus or minus 12 mm.
- .2 Rigid PVC split ducts.
- .3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .4 Rigid PVC 90° and 45° bends.
- .5 Rigid PVC 5° angle couplings.
- .6 Expansion joints as required.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

- .1 6 mm stranded nylon pull rope tensile strength 5 kN.

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PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install duct in accordance with Detail No. 9 in drawing package.
- .2 Clean inside of ducts before laying.
- .3 Ensure full, even support every 1.5 m throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 During construction, cap ends of ducts to prevent entrance of foreign materials.
- .6 Pull through each duct steel mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.