

Project Title:

DECOMMISSIONING OF SIOUX LOOKOUT ZONE HOSPITAL

Selective Demolition and Sewer and Water Modifications

Project Number: R.084070.001

Date: 2017-10-04

END OF SECTION

Professional Seal:



Professional Seal:



END OF SECTION

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END OF SECTION

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract generally comprises the following tasks:
 - .1 Work of this Contract comprises of selective demolition and sewer and water modifications.

1.2 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .3 Maintain fire access/control.

1.3 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for storage, and for Work, to allow:
 - .1 Owner occupancy.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.6 EXISTING SERVICES

- .1 Notify, Departmental Representative and 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' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by Departmental Representative with minimum disturbance to vehicular traffic and tenant operations.
- .3 Provide alternative routes for personnel and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .9 Record locations of maintained, re-routed and abandoned service lines.
- .10 Construct barriers in accordance with Section 01 56 00.

1.7 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda and Amendments.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant federal, municipal, provincial and other regulations.
- .2 Maintain access, including barrier free access to the Dental Building during regular working hours in the Dental Building. Make arrangements with Departmental Representative to facilitate work.

Provide vehicle access, including emergency vehicle access, to all buildings at all times.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to buildings and provide for personnel and vehicle access to all buildings.
- .3 Contractor parking and staging areas will be assigned by Departmental Representative.
- .4 Where security is reduced by work provide temporary means to maintain security.
- .5 Departmental Representative will assign sanitary facilities in the old zone hospital for use by Contractor's personnel. Keep facilities clean. Access doors to zone hospital are to remain locked when not in use and to be checked at the end of each day to ensure they are locked.
- .6 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission 48 hours in advance.
- .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 pedestrian and vehicular traffic to and from buildings.
- .4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

- .1 Carry out noise generating Work inside buildings Monday to Friday from 18:00 to 07:00 hours and on Sundays and Saturdays.
- .2 Submit schedule in accordance with Section 01 32 16.07.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at site is to be coordinated with Departmental Representative.
- .6 Deliver materials in coordination with Departmental Representative to avoid deliveries during peak traffic hours.

1.6 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.Products

1.7 NOT USED

- .1 Not Used.Execution

1.8 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings (conference call) throughout the progress of the work at the request of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting three days in advance of meeting date to Departmental Representative.
- .4 Preside at meetings.
- .5 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .6 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, Departmental Representative.
- .7 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 Consultant, Departmental Representative, Senior representatives of, Contractor, major Subcontractors, field inspectors will be in attendance or in a conference call.
- .3 Establish time and location of meeting and notify parties concerned minimum 3 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:
 - .3 Schedule of submission of shop drawings. 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 Delivery schedule of specified equipment.
 - .6 Site security in accordance with Section 01 56 00.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .8 Record drawings in accordance with Section 01 33 00.
 - .9 Maintenance manuals in accordance with Section 01 78 00.

- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 Bi-weekly during course of Work.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative, Owner, and Consultant are to be in attendance via conference call.
- .3 Notify parties minimum 3 days in advance
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days
- .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 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 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.

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, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Water distribution piping installed but not commissioned within 30 working days of Award of Contract date.
 - .2 Sanitary sewer piping installed but not commissioned within 30 working days of Award of Contract date.
 - .3 Trailers disassembled and removed from site within 20 working days of Award of Contract date.
 - .4 Interim Certificate (Substantial Completion) within 35 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 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 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 Excavation.
 - .6 Sewer and water piping.
 - .7 Backfill.
 - .8 Removal of trailers
 - .9 Removal of trees
 - .10 Removal of stumps.
 - .11 Testing and Commissioning.
 - .12 Supplied equipment long delivery items.

.13 Engineer supplied equipment required dates.

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, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

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 and product data 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Ontario
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c.0.1, as amended and O. Reg. 213/91 as amended- Updated 2005.

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 Submit weekly to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance Section 02 81 00.
- .7 Submit Workplace Safety and Insurance Board (WSIB) Experience Rating Report.
- .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days.
- .9 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.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
 - .1 Consider Owner's existing procedures.

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Asbestos.
 - .2 Sanitary Sewage.

1.7 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.

1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

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

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with Asbestos abatement
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

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

1.13 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.

1.14 BLASTING

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

1.15 POWDER ACTUATED DEVICES

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

1.16 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 2016.
- .2 Canada Labour Code, Canada Occupational Safety and Health Regulations 2016.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan, within 7 days after date of Notice to Proceed and prior to mobilization to site. Address following items:
 - .3 Safety and health risk or hazard analysis for each site task and operation.
 - .4 Develop checklist for items to be inspected on a daily basis. Document actions taken.
 - .5 Personnel training requirements including:
 - .1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.
 - .2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan.
 - .6 Personal protective equipment (PPE) program addressing:
 - .1 Donning and doffing procedures.
 - .2 PPE selection based upon site hazards.
 - .3 PPE use and limitations of equipment.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Medical surveillance requirements for personnel assigned to work at site.
 - .9 Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.
 - .10 Site control measures employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.
 - .11 Decontamination procedures for both personnel and equipment.
 - .12 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition

and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

- .13 Written respiratory protection program for project activities.
- .14 Procedures dealing with heat and/or cold stress.
- .15 Spill containment program if drummed waste material is generated, excavated, stored, or managed on site.
- .7 Medical Surveillance: submit certification of medical surveillance for site personnel, within 7 days after date of Notice to Proceed and prior to mobilization to site. Submit additional certifications as personnel are sent to site.
- .8 Respirator Fit Testing: submit proof of respirator fit testing for site personnel, within 7 days after date of Notice to Proceed and prior to mobilization to site.
- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .10 Off-site Contingency and Emergency Response Plan:
 - .1 Prior to commencing Work involving handling of hazardous materials, develop off-site Contingency and Emergency Response Plan.
 - .2 Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from site.

1.3 REGULATORY REQUIREMENTS

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

1.4 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan prior to commencing site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Ensure Health and Safety guidelines provide for safe and minimal risk working environment for site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.
- .3 Relief from or substitution for portion or provision of minimum Health and Safety Guidelines specified or reviewed site-specific Health and Safety Plan must submitted to Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.

1.5 RESPONSIBILITY

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

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

1.6 HAZARD COMMUNICATION REQUIREMENTS

- .1 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulation, R.R.O.
- .2 Comply with Information on Controlled Products Regulation, O.C.
- .3 Comply with Occupational Health and Safety Regulations, Part XXII Controlled Products - Workplace Hazardous Materials Information System.
- .4 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulations, O.I.C.
- .5 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.
- .6 Provide Departmental Representative with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site.

1.7 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

1.8 UNFORESEEN HAZARDS

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

1.9 HEALTH AND SAFETY OFFICER AND REGISTERED OCCUPATIONAL HYGIENIST / CERTIFIED INDUSTRIAL HYGIENIST

- .1 Assign a representative as Health and Safety Adviser. Health and Safety Adviser must:
 - .1 Be responsible for ensuring that only properly trained personnel are permitted to enter the Exclusion Zone or Contaminant Reduction Zone.
 - .2 Be responsible for implementing, enforcing daily and monitoring site-specific Health and Safety Plan.
 - .3 Be on site during execution of Work.

1.10 PERSONNEL HEALTH, SAFETY, AND HYGIENE

- .1 Medical Surveillance:
 - .1 Conduct medical surveillance of personnel as required by specified regulations.

- .2 Training: ensure personnel entering site are trained in accordance with site specific health and safety plan.
- .3 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.
- .4 Personal Protective Equipment:
 - .1 Furnish site personnel with appropriate PPE. Ensure that safety equipment and protective clothing is kept clean and maintained.
- .5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:
 - .1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.
 - .2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.
 - .3 Dispose of or decontaminate PPE worn on site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.
 - .6 Ensure facial hair does not interfere with proper respirator fit.
- .6 Respiratory Protection:
 - .1 Monitor, evaluate, and provide respiratory protection for site personnel.
 - .2 Ensure appropriate respiratory protection during work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.
 - .3 Assess ability for site personnel to wear respiratory protection.
 - .4 Ensure site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.
- .7 Heat Stress/Cold Stress: implement monitoring program as applicable and include in site-specific Health and Safety Plan.
- .8 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
- .9 Emergency and First-Aid Equipment:
 - .1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.
 - .2 2 self-contained breathing apparatus units; blankets and towels; stretcher; and 1 hand-held emergency siren.
 - .3 As minimum, provide 1 certified first-aid technician on site at all times when work activities are in progress.
- .10 Site Communications:

- .1 Post emergency numbers near site telephones.
- .2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.
- .3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
- .4 Furnish selected personnel with 2-way radios.
- .5 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

1.2 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Include in Environmental Protection Plan:
 - .1 Drawings indicating locations of proposed temporary excavations or embankments, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .2 Traffic Control Plans.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .3 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.
 - .4 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .5 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .6 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .7 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.

1.4 FIRES

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

1.5 DRAINAGE

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

1.6 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.
- .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.

1.7 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment 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.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Ensure storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .4 Waste Management:

- .1 Remove containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 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.
- .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 will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.2 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.

1.3 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 orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA S269.2-16, Access Scaffolding for Construction Purposes.
 - .3 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submittals:
 - .1 Submit erosion and sedimentation control plan.

1.3 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 gravelled 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.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CSA-S269.2.
- .2 Provide and maintain ramps, scaffolding, temporary stairs, and platforms as required for access.

1.5 HOISTING

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

1.6 SITE STORAGE/LOADING

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

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work and Owner's parking.
- .2 Provide and maintain adequate access to project site.

1.8 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.10 SANITARY FACILITIES

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

1.11 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 Provide necessary signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

- .10 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 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 not in construction facilities.

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 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.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA O121-08 (R2013), Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

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

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door, tops of shafts and other openings in floors and roofs.
- .2 Design enclosures to withstand wind pressure and snow loading.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and runways as may be required for access to Work and buildings.

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 public.

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule 3days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling 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.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Conform to the reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3 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.

1.2 QUALITY

- .1 Refer to Contract.
- .2 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .3 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .4 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.
- .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .7 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.

1.3 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 sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 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.
- .6 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .7 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.4 TRANSPORTATION

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

1.5 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 will establish course of action.

1.6 QUALITY OF WORK

- .1 Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 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.

1.7 CO-ORDINATION

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

1.8 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.

1.9 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate 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.

1.10 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.

1.11 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.

1.12 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.13 PROTECTION OF WORK IN PROGRESS

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

1.14 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 and/or building occupants.
- .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.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL 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 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 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with fire stopping material to the full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling 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.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by 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 garbage bins.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 20.
- .7 Dispose of waste materials and debris off site in proper landfill site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 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 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .15 Clean roofs, downspouts, and drainage systems.
- .16 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .17 Remove snow and ice from access to building.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling 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.

END OF SECTION

1 General

1.01 CONSTRUCTION & DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Reuse, recycle, 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.
- .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.

1.02 WASTE PROCESSING SITES

- .1 Province of: Ontario.
 - .2 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
 - .3 Telephone: 800-565-4923 or 416-323-4321.
 - .4 Fax: 416-323-4682.
- .1 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
 - .1 Telephone: 416-657-2797 or 1-888-501-9637.
 - .2 Fax: 416-960-8053.
 - .3 Email: rco@rco.on.ca.
 - .4 Internet: <http://www.rco.on.ca/>.

2 Products

2.01 NOT USED

- .1 Not Used.

3 Execution

3.01 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

| Government Chief Responsibility for the Environment. Province | Address | General |
|---|---------|---------|
|---|---------|---------|

Fax Inquiries

| | | |
|---------|---|--|
| Ontario | Ministry of (416) (416) Environment 323-4321 323-4682 and Energy (800) 135 St Clair 565-4923 Avenue West Toronto, ON M4V 1P5 Environment (416) Canada 734-4494 Toronto, ON | |
|---------|---|--|

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: conduct 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 submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative's Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, balanced, adjusted and fully operational.
 - .4 Operation of systems: demonstrated to Owner's personnel.
 - .5 Commissioning of mechanical systems completed.
 - .6 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Final Payment:
 - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

1.3 FINAL CLEANING

.1 Clean Site.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .2 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .3 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.

- .2 Addresses, and telephone numbers of Consultant and 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 and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda and Amendments.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, provided by Consultant.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Provide digital photos, if requested, for site records.

1.7 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.

- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.8 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Except for items put into use with Departmental Representative permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .5 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .6 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.2 DEFINITIONS

- .1 Demolition: rapid destruction of building following removal of hazardous materials.
- .2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or environment if handled improperly.
- .3 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .4 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Hazardous Materials:
 - .1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
- .3 Waste Reduction Workplan:
 - .1 Prior to beginning of Work on site submit detailed Waste Reduction Workplan and indicate:
 - .1 Descriptions of and anticipated quantities of materials to be salvaged reused, recycled and landfilled.
 - .2 Schedule of selective demolition.
 - .3 Number and location of dumpsters.
 - .4 Anticipated frequency of tippage.

- .5 Name and address of waste facilities.
- .4 Certificates:
 - .1 Submit certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site.
 - .2 Written authorization from Departmental Representative is required to deviate from receiving organizations listed in Waste Reduction Workplan.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Section 01 35 43.
- .2 Storage and Protection.
 - .1 Protect existing items designated to remain and items designated for salvage.
 - .2 Remove and store materials to be salvaged, in manner to prevent damage.
 - .3 Store and protect in accordance with requirements for maximum preservation of material.
 - .4 Handle salvaged materials as new materials.

1.6 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Perform work in accordance with Section 01 35 43.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .1 Ensure proper disposal procedures are maintained throughout the project.
 - .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .5 Protect trees, plants and foliage on site and adjacent properties.

Part 2 Products

2.1 EQUIPMENT

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

Part 3 Execution

3.1 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect and Cap Mechanical Services.
 - .1 Sewer and Water Lines: remove in accordance with authority having jurisdiction and securely plug to form watertight seal.

3.2 REMOVAL OF HAZARDOUS WASTES

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Remove designated tree stumps during demolition.
 - .1 Grind, chip, or shred other vegetation for mulching and composting.
- .4 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site, at authorized facilities approved in Waste Reduction Workplan.
 - .2 Trim disposal areas to approval of Departmental Representative.
- .5 Backfill:
 - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01.

3.4 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management:
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 82 00.01.

1.2 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .2 Department of Justice Canada (Jus)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
 - .2 GS-36-00, Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC)
 - .1 National Fire Code of Canada 2015 (NFC).

1.3 DEFINITIONS

- .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into environment.
- .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

1.4 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 hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 43 and 01 35 29.06 to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

- .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.
- .4 Hazardous waste classification: identify waste codes applicable to each hazardous waste material based on applicable federal and provincial acts, regulations, and guidelines. Waste profiles, analyses, and classification submitted to contract offices for review and approval.
- .5 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 % of construction wastes were recycled or salvaged
- .6 Low-Emitting Materials: submit listing of paints and coatings adhesives and sealants used in building, comply with VOC and chemical component limits or restrictions requirements.
- .7 Spill response: establish spill response procedures. Comply with applicable requirements according to classification of waste material. Designate an emergency coordinator and emergency contacts for comprehensive emergency response and incident mitigation.
- .8 Record keeping: contractor is responsible for maintaining adequate records of handling, storing, and shipping of hazardous materials.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

- .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
- .7 Solvents or cleaning agents: non-flammable or have flash point above 38 degrees C.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 When hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.
 - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

- .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
 - .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.
- .5 Develop Waste Reduction Workplan related to Work of this Section.

Part 2 Products

2.1 MATERIALS

- .1 Description:
- .1 Bring on site only quantities hazardous material required to perform Work.
 - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
 - .3 Spill Response Materials: provide spill response materials which can be used for absorbing/shoveling and containing hazardous materials.
 - .4 Provide personal protective equipment.

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 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 20.
- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
 - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removing asbestos-containing material in the two mobile trailers prior to their removal from site. The material to be removed in each trailer consists of a heat shield in a light fixture in the hallways and the caulking around the sink in the kitchens.

1.2 REFERENCE STANDARDS

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.3 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with nonionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Departmental Representative, Consultants or designated representatives, and representatives of regulatory agencies.
- .6 Competent worker person: in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the federal and provincial laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 Friable material: means material that:
 - .1 When dry, can be crumbled, pulverized or powdered by hand pressure, or
 - .2 is crumbled, pulverized or powdered.
- .8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.

- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.
- .2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
- .3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.
- .4 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
- .5 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
- .6 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
- .2 Health and Safety:
 - .1 Perform construction occupational health and safety in accordance with Section 01 35 29.06.
 - .2 Safety Requirements: worker protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The

respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

- .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.
- .2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.
- .5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing are located in the Zone Hospital. Contact Departmental Representative to schedule access.
- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 20.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .5 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6mils bags or leak proof drums. Label containers with appropriate warning labels.

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

1.7 EXISTING CONDITIONS

- .1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are bound into this specification immediately after this Section.
- .2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

1.8 PERSONNEL TRAINING

- .1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

Part 2 Products

2.1 MATERIALS

- .1 Drop Sheets:
 - .1 Polyethylene: 0.15 mm thick.
 - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.
- .4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

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

Part 3 Execution

3.1 PROCEDURES

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06.
- .2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
 - .1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
- .4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low - velocity fine - mist sprayer.
 - .2 Perform Work to reduce dust creation to lowest levels practicable.
 - .3 Work will be subject to visual inspection and air monitoring.
 - .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .5 Frequently and at regular intervals during Work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.
- .6 Cleanup:
 - .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
 - .3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous

nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.

- .4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

Part 1 General

1.1 MEASUREMENT

- .1 Measurement Procedures:
 - .1 Departmental Representative will survey the rock surface before and after rock excavation. Quantities will be taken from cross section showing original rock surface and actual grade line set by Departmental Representative, except that minimum depth of rock required to be excavated to be considered as 300 mm.

1.2 DEFINITIONS

- .1 Rock: any solid material in excess of 0.25 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 QUALITY ASSURANCE

- .1 Pre-Excavation Survey:
 - .1 Departmental Representative will visit property holders and tenants of adjacent buildings and structures with the contractor. The contractor to document existing conditions and describe excavation operations to the property owners and tenants.

Part 2 Products

2.1 MATERIALS

- .1 Not used.

Part 3 Execution

3.1 ROCK REMOVAL

- .1 Co-ordinate this Section with Section 01 35 29.06.
- .2 Remove rock to alignments, profiles, and cross sections as indicated.
- .3 Explosive blasting is not permitted.
- .4 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.
- .5 Excavate rock to horizontal surfaces with slope not to exceed 1H : 2V.

- .6 Excavate trenches to lines and grades to minimum of 300 mm below pipe invert indicated.
- .7 Remove boulders and fragments which may slide or roll into excavated areas.
- .8 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 33.01.

3.2 CLEANING

- .1 Clean in accordance with Section 01 74 11.
- .2 Rock Disposal:
 - .1 Dispose of surplus removed rock off site.
 - .2 Do not dispose removed rock into landfill. Send material to appropriate location as approved by Departmental Representative.

3.3 PROTECTION

- .1 Prevent damage to surroundings and injury to persons in accordance with Section 01 56 00.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .2 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
- .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .3 Occupational Health and Safety Act of Ontario, Regulation 213/91 Construction Projects.
- .4 Ontario Provincial Standard Specification
 - .1 OPSS.MUNI 1010 November 2013, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material.
 - .2 OPSS.MUNI 1004 November 2013, Material Specification for Aggregates – Miscellaneous.

1.2 DEFINITIONS

- .1 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .4 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .5 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
- .6 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field.

1.4 QUALITY ASSURANCE

- .1 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06.

1.5 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable authorities having jurisdiction establish location and state of use of buried utilities and structures.
 - .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .7 Record location of maintained, re-routed and abandoned underground lines.
 - .8 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
 - .2 Where required for excavation, cut roots or branches in accordance with Section 32 01 90.33.

Part 2 Products

2.1 Materials

- .1 Backfill materials to OPSS 1010 or OPSS 1004. Reclaimed Asphalt Materials (RAP) and Reclaimed Concrete Materials (RCM) are not permitted.

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Saw cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13.

3.2 PREPARATION/PROTECTION

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .3 Protect buried services that are required to remain undisturbed.

Perform all trenching work in accordance with the Occupational Health and Safety Act of Ontario, Regulation 213/91 Construction Projects.

3.3 STRIPPING OF TOPSOIL

- .1 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.Dispose of unused topsoil as directed by Departmental Representative.

3.4 STOCKPILING

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

Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

- .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water in accordance with Section 01 35 43 and in a manner not detrimental to public and private property, or portion of Work completed or under construction.
Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.6 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.
- .2 Remove obstructions encountered during excavation in accordance with Section 02 41 13.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 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.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free of soft or organic matter.
- .10 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Granular B Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Granular B Type 2 fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.
- .11 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

3.7 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557 or ASTM D698.
 - .1 Exterior side of perimeter walls: use Granular Type 3 fill to subgrade level. Compact to 95 % of corrected maximum dry density.
 - .2 Within building area: use Type [2] to underside of base course for floor slabs. Compact to [100] % of corrected maximum dry density.

- .3 Under concrete slabs and asphalt pavement: provide 150 mm compacted thickness base course of Granular A to underside of slab. Compact base course to 100 %.

3.8 BACKFILLING

- .1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .2 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .3 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.

3.9 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 20, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as directed by Departmental Representative.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A1064/A1064M-13, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 Health Canada - Pest Management Regulatory Agency (PMRA)
 - .1 National Standard for Pesticide Education, Training and Certification in Canada (1995).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Obtain approval from Departmental Representative of schedule indicating beginning of Work.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions 01 61 00.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 Products

2.1 MATERIALS

- .1 Wood posts Recycled composite plastic posts: 38 x 89 x 2400 mm length, untreated wood.
- .2 Board Cladding: to consist of 50 x 100 mm lumber secured around the perimeter of tree trunks with plastic strapping or other means which will not damage the tree.
- .3 Tree Barriers: steel T-rail posts 40 x 40 x 5 x 2440 mm, at 1800 mm o.c., with wood slat snow fencing attached to posts with 9 gauge wire, 13 per post.

Part 3 Execution

3.1 IDENTIFICATION AND PROTECTION

- .1 Tree protection to be installed prior to the start of any on site work.
- .2 Identify plants and limits of root systems to be preserved as approved by Departmental Representative.
- .3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Departmental Representative.

3.2 TRUNK PROTECTION

- .1 Install board cladding vertically around the perimeter of designated deciduous trees within the active work zone.

3.3 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

- .1 Centre line location and limits of trench/tunnel excavation to be approved by Departmental Representative prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.
- .2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.
- .3 Protect root curtain from damage during construction operations.
- .4 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.
- .5 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

END OF SECTION

Part 1 - General

1.1 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 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.
- .4 Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Standards for Nursery Stock, 8th Edition, 2006.

1.2 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 50), and contain no toxic or growth inhibiting contaminants.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
- .2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 - Products

2.1 TOPSOIL

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Contain no toxic elements or growth inhibiting materials.
 - .2 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .3 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Fertility: major soil nutrients present in following amounts:
 - .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
 - .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
 - .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .6 Ph value: 6.5 to 8.0.
- .2 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil to be utilized.
- .2 Contractor is responsible for amendments to supply topsoil as specified.

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.
- .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.

3.2 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.
- .3 Spread topsoil to following minimum depths after settlement.
 - .1 150 mm for seeded areas.
- .4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.3 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.4 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

Part 1 - General

1.1 SECTION INCLUDES

- .1 Materials and installation for constructing precast maintenance holes.

1.2 RELATED SECTIONS

- .1 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.4 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A48/A48M-03(2016), Standard Specification for Gray Iron Castings.
 - .2 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM C139-17, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .5 ASTM C478M-15a, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
 - .6 ASTM C618-15, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - .7 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft² (600 kN-m/m²)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium. Includes:
 - .2 CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
 - .3 CSA A165 Series-14, CSA Standards on Concrete Masonry Units.
 - .4 CSA G30.18-09(R2014), Carbon steel bars for concrete reinforcement.
- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS.MUNI 1010 Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material, November 2013.
 - .2 OPSS.MUNI 1004 Material Specification for Aggregates – Miscellaneous.

- .3 OPSS 407-November 2015, Construction Specification For Maintenance Hole, Catch Basin, Ditch Inlet And Valve Chamber Installation.
- .4 OPSD 701.100-November 2010, Frost Strap Installation.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 20.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .3 Divert unused concrete materials from landfill to local quarry as approved by Departmental Representative.
- .4 Divert unused aggregate materials from landfill to quarry for reuse as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 - Products

2.1 MATERIALS

- .1 Precast maintenance hole units: to ASTM C478M, 1200 mm diameter circular. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation. Monolithic bases to be approved by Departmental Representative and set on concrete slabs cast in place.
- .2 Joints: to be made watertight using rubber rings, bituminous compound, or epoxy resin cement.
- .3 Ladder rungs: to CSA G30.18, No.25M billet steel deformed bars, hot dipped galvanized to ASTM A123/A123M. Rungs to be safety pattern (drop step type).
- .4 Adjusting rings: to ASTM C478M.
- .5 Drop maintenance hole pipe: to be same as sewer pipe.
- .6 Galvanized iron sheet: to be approximately 2 mm thick.
- .7 Frost straps to be provided per OPSD 701.100 standard.
- .8 Steel gratings, I-beams and fasteners: as indicated.

- .9 Frames, gratings, covers to dimensions as indicated and following requirements:
 - .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 Gray iron castings: to ASTM A48/A48M, strength class 30B.
 - .3 Maintenance hole frames and covers: cover cast without perforations and complete with two 25 mm square lifting holes to OPSS 407.
 - .4 Size: 762 mm clear diameter.

- .10 Granular bedding and backfill:
 - .1 Granular A Gravel to OPSS.MUNI 1010.
 - .2 Bedding sand to OPSS.MUNI 1004.

Part 3 - Execution

3.1 EXCAVATION AND BACKFILL

- .1 Obtain approval of Departmental Representative before installing maintenance holes or catch basins.

3.2 INSTALLATION

- .1 Install as indicated, plumb and true to alignment and grade.
- .2 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% maximum density to ASTM D698.
- .3 Precast units:
 - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with Departmental Representative approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination thereof. of cement mortar and bond to concrete slab or
 - .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
 - .3 Plug lifting holes with concrete plugs set in cement mortar or mastic compound.
- .4 For 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 0.75 times diameter of sewer. Slope adjacent floor at 1 in 20. Curve channels smoothly. Slope invert to establish sewer grade.
 - .3 Provide internal drop structure where inlet pipe invert is more than 600 mm above bottom of manhole benching.
- .5 Compact granular backfill to 95% maximum density to ASTM D698.
- .6 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
- .7 Install frost straps in accordance with OPSD 701.100 for continuous height of manhole joining all manhole sections.
- .8 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.

END OF SECTION

Part 1 - General

1.1 REFERENCES

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA B300-10, Standard for Hypochlorites.
 - .2 ANSI/AWWA B301-10, Standard for Liquid Chlorine.
 - .3 ANSI/AWWA B303-10, Standard for Sodium Chlorite.
 - .4 ANSI/AWWA C500-09, Standard for Metal-Seated Gate Valves for Water Supply Service.
 - .5 ANSI/AWWA C651-2014, Standard for Disinfecting Water Mains.
 - .6 ANSI/AWWA C800-2014, Standard for Underground Service Line Valves and Fittings.

- .2 ASTM International (ASTM)
 - .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 - .3 ASTM B88M-16, Standard Specification for Seamless Copper Water Tube Metric.
 - .4 ASTM C117-13, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .5 ASTM C136/C136M-14, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .6 ASTM D698-12e2, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft² (600 kN-m/m²)).
 - .7 ASTM D2657-07, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
 - ASTM F714-13, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .3 CGSB 41-GP-25M-77, Pipe, Polyethylene, for the Transport of Liquids.

- .4 CSA International (CSA)
 - .1 CAN/CSA-B137 Series-17, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
 - .1 CAN/CSA-B137.1-17, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
 - .2 CAN/CSA-B137.3-17, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.

- .5 Ontario Provincial Standard Specification
 - .1 OPSS.MUNI 1010 Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material, November 2013.
 - .2 OPSS.MUNI 1004 Material Specification for Aggregates – Miscellaneous.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00.
- .2 Submit record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material.
 - .1 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, valve chambers and hydrants.
- .3 Operation and Maintenance Data: submit operation and maintenance data for pipe, valves, valve boxes, valve chambers and hydrants for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.

1.5 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Departmental Representative.
- .3 Notify Departmental Representative minimum of 48 hours in advance of interruption in service.
- .4 Do not interrupt water service for more than 3 hours and confine this period to after 1:00 pm and before 5:00 pm unless otherwise authorized.
- .5 Notify fire department of planned or accidental interruption of water supply to hydrants.

Part 2 - Products

2.1 PIPE, JOINTS AND FITTINGS

- .1 Polyethylene pressure pipe:
 - .1 NPS 1/2 to NPS 6: to CAN/CSA-B137.1 type, series 160. Avoid buried joints to the extent

possible.

- .2 Polyethylene to polyethylene joints: to be thermal butt fusion joined, to ASTM D2657.

2.2 VALVES AND VALVE BOXES

- .1 Valves to open counter clockwise.
- .2 Gate valves: to ANSI/AWWA C500, standard iron body, valves with non-rising stems, suitable for 1 Pa.
- .3 Cast iron valve boxes: three piece sliding type adjustable over minimum of 450 mm complete with valve operating extension rod, 30 mm minimum diameter, 25 x 25 mm cross section, of such length that when set on valve operating nut top of rod will not be more than 150 mm below cover.
 - .1 Base to be large round type with minimum diameter of 300 mm.

2.3 SERVICE CONNECTIONS

- .1 Copper tubing: to ASTM B88M type K, annealed.
- .2 Polyethylene pressure pipe:
 - .1 To CAN/CSA-B137.1, type PE, series 160.
- .3 Copper tubing joints: compression type suitable for 1 MPa working pressure.
- .4 Polyethylene pipe joints: thermal butt fusion welded.
- .5 Tee connections: for services above NPS 1. Tee connections to be fabricated of same material and to same standards as specified pipe fittings and to have ends matching pipe to which they are joined.

2.4 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular bedding sand to OPSS.MUNI 1004 type Winter Sand.

2.5 BACKFILL MATERIAL

- .1 Type 3 in accordance with Section 31 23 33.01.

Part 3 - Execution

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.

3.3 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 33.01.
- .2 Ensure trench depth allows coverage over pipe of 2 m minimum from finished grade or as indicated.
- .3 Trench alignment and depth require Departmental Representative's approval prior to placing bedding material and pipe.

3.4 GRANULAR BEDDING

- .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 300 mm below bottom of pipe.
- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to suit joints.
- .5 Compact each layer full width of bed to 95% maximum density to ASTM D698.
- .6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 with compacted bedding material.

3.5 PIPE INSTALLATION

- .1 Position and join pipes with equipment and methods approved by Departmental Representative.
- .2 Cut pipes in 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.
- .3 Do not lay pipe on frozen bedding.
- .4 Do hydrostatic and leakage test and have results approved by Departmental Representative before surrounding and covering joints and fittings with granular material.
- .5 Backfill remainder of trench.

3.6 VALVE INSTALLATION

- .1 Install valves to manufacturer's recommendations at locations as indicated.
- .2 Support valves located in valve boxes or valve chambers by means of bedding same as adjacent pipe. Maximum length of pipe on each end of valve shall be 1 m. Valves not to be supported by pipe.

3.7 SERVICE CONNECTIONS

- .1 Terminate building water service 1 m outside building wall opposite point of connection to main.
 - .1 Install coupling necessary for connection to building plumbing.
 - .2 Make connection.
- .2 Do not install service connections until satisfactory completion of hydrostatic and leakage tests of water main.
- .3 Tappings on PVC pipe to be either PVC valve tees or bronze type service clamps, strap type with "O" ring seal cemented in place.
- .4 Employ only competent workmen equipped with suitable tools to carry out tapping of mains, cutting and flaring of pipes.

3.8 HYDROSTATIC AND LEAKAGE TESTING

- .1 Do tests in accordance with ANSI/AWWA C600.
- .2 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.
- .3 Notify Departmental Representative at least 24 hours in advance of proposed tests.
 - .1 Perform tests in presence of Departmental Representative.
- .4 Strut and brace caps, bends, tees, and valves, to prevent movement when test pressure is applied.

- .5 Open valves.
- .6 Expel air from main by slowly filling main with potable water.
- .7 Thoroughly examine exposed parts and correct for leakage as necessary.
- .8 Apply hydrostatic test pressure of 100 psig minimum for period of 3 hour.
- .9 Examine exposed pipe, joints, fittings and appurtenances while system is under pressure.
- .10 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
- .11 Repeat hydrostatic test until defects have been corrected.

3.9 PIPE SURROUND

- .1 Upon completion of pipe laying and after Departmental Representative has inspected Work in place, surround and cover pipes as indicated.
- .2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .3 Place layers uniformly and simultaneously on each side of pipe.
- .4 Do not place material in frozen condition.
- .5 Compact each layer to underside of backfill to at least 90% maximum density to ASTM D698.

3.10 BACKFILL

- .1 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .2 Do not place backfill in frozen condition.
- .3 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698.
 - .1 In other areas, compact to at least 90% maximum density to ASTM D698.

3.11 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations:
 - .1 Notify Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will begin.
- .2 Flush water mains through available outlets with a sufficient flow of potable water to produce velocity of 1.5 m/s, within pipe for minimum 10 minutes, or until foreign materials have been

removed and flushed water is clear.

- .3 Open and close valves, hydrants and service connections to ensure thorough flushing.
- .4 When flushing has been completed to Departmental Representative approval, introduce strong solution of chlorine as approved by Departmental Representative into water main and ensure that it is distributed throughout entire system.
- .5 Rate of chlorine application to be proportional to rate of water entering pipe.
- .6 Chlorine application to be close to point of filling water main and to occur at same time.
- .7 Operate valves, hydrants and appurtenances while main contains chlorine solution.
- .8 Flush line to remove chlorine solution after 24 hours.

3.12 SURFACE RESTORATION

- .1 After installing and backfilling over water mains, restore surface to original condition as directed by Departmental Representative.

3.13 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .3 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.

END OF SECTION

Part 1 - General

1.1 SECTION INCLUDES

- .1 Materials and installation for gravity sewers.

1.2 RELATED SECTIONS

- .1 Section 31 23 10 - Excavating Trenching and Backfilling.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C117-17, Standard Test Method for Material Finer Than 75 μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698-12e2, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft³-lbf/ft³ (600 kN-m/m³)).
 - .4 ASTM D2680-01(2014), Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
 - .5 ASTM D3034-16, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - .6 ASTM D3350-14, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 CSA International
 - .1 CAN/CSA-B1800-15, Thermoplastic Non-pressure Pipe Compendium.
 - .1 CSA B182.1-15, Plastic Drain and Sewer Pipe and Pipe Fittings.
 - .2 CSA B182.2-15, PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings.
 - .3 CSA B182.6-15, Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications.
 - .4 CSA B182.11-15, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
- .4 Ontario Provincial Standard Specifications
 - .1 OPSS.MUNI 1004 November 2013, Material Specification for Aggregates - Miscellaneous.
 - .2 OPSS.MUNI 1010 November 2013, Material Specification for Aggregates – Base, Subbase,

Select Subgrade, and Backfill Material.

- .5 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
- .3 Notify Departmental Representative 48 hours minimum in advance of any interruption in service.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.

Part 2 - Products

2.1 PLASTIC PIPE

- .1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.
 - .1 Standard Dimensional Ratio (SDR): 28.

2.2 SERVICE CONNECTIONS

- .1 Type PSM Poly (Vinyl) Chloride: to CSA B182.2.
- .2 Plastic pipe: to CSA B182.1, with push-on joints.

2.3 PIPE BEDDING AND SURROUND MATERIALS

- .1 Granular material: to OPSS.PROV 1010, Granular A, maximum size 19 mm.
- .2 Sand: clean, washed to OPSS.PROV 1004.05.07 type Winter Sand.

- .3 Granular material to following requirements:
 - .1 Crushed or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136/C136M and ASTM C117.
 - .3 Sieve sizes to CAN/CGSB-8.1.

2.8 BACKFILL MATERIAL

- .1 Type 3, in accordance with Section 31 23 33.01.

Part 3 - Execution

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.
- .2 Clean and dry pipes and fittings before installation.
- .3 Obtain Departmental Representative's approval of pipes and fittings prior to installation.

3.3 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01.
- .2 Protect trench from contents of sewer or sewer connection.
- .3 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.

3.4 GRANULAR BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth of 300 mm.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipe.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

3.5 INSTALLATION

- .1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Handle pipe using methods approved by Departmental Representative.
 - .1 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.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .5 Joint deflection permitted within limits recommended by pipe manufacturer.
- .6 Water to flow through pipe during construction, only as permitted by Departmental Representative.
- .7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .8 Install plastic pipe and fittings in accordance with CSA B182.11.
- .9 Pipe jointing:
 - .1 Install gaskets in accordance with manufacturer's written 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 before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to 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 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
- .9 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .10 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.
- .11 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .12 Make watertight connections to manholes.
 - .1 Use shrinkage compensating grout when suitable gaskets are not available.
- .13 Use prefabricated saddles or field connections approved by Departmental Representative, for connecting pipes to existing sewer pipes.
 - .1 Joints to be structurally sound and watertight.

3.6 PIPE SURROUND

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.
 - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
 - .1 Do not dump material within 2 m of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 95% maximum density to ASTM D698.
- .6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.
- .7 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.7 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

- .3 Under paving and walks, compact backfill to at least 95% maximum density to ASTM D698.
 - .1 In other areas, compact to at least 90% maximum density to ASTM D698.

3.8 SERVICE CONNECTIONS

- .1 Install pipe to CSA B182.11 and manufacturer's instructions and specifications.
- .2 Service connections to main sewer: standard Wye fittings.
- .3 Service connection pipe: not to extend into interior of main sewer.
- .4 Make up required horizontal and vertical bends from 45 degrees bends or less, separated by straight section of pipe with minimum length of 4 pipe diameters.
 - .1 Use long sweep bends where applicable.

3.9 FIELD TESTING

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Departmental Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.
- .4 Perform infiltration and exfiltration testing as soon as practicable after jointing and bedding are complete, and service connections have been installed.
- .5 Do infiltration and exfiltration test to ASTM C828.
- .6 Do infiltration and exfiltration testing as specified herein and as directed by Departmental Representative.
 - .1 Perform tests in presence of Departmental Representative.
 - .2 Notify Departmental Representative 24 hours minimum in advance of proposed tests.
- .7 Carry out tests on each section of sewer between successive manholes including service connections.
- .8 Install watertight bulkheads in suitable manner to isolate test section from rest of pipeline.
- .9 Exfiltration test:
 - .1 Fill test section with water to displace air in line. Maintain under nominal head for 24 hours to ensure absorption in pipe wall is complete before test measurements are begun.
 - .2 Immediately prior to test period add water to pipeline until there is head of 1 m over interior crown of pipe measured at highest point of test section or water in manhole is 1 m above static ground water level, whichever is greater.
 - .3 Duration of exfiltration test: 2 hours.
 - .4 Water loss at end of test period: not to exceed maximum allowable exfiltration over any section of pipe between manholes.
- .10 Infiltration test:
 - .1 Conduct infiltration test in lieu of exfiltration test where static ground water level is 750 mm

or more above top of pipe measured at highest point in line to be used.

- .2 Do not interpolate a head greater than 750 mm to obtain an increase in allowable infiltration rate.
 - .3 Install watertight plug at upstream end of pipeline test section.
 - .4 Discontinue pumping operations for at least 3 days before test measurements are to begin and during this time, keep thoroughly wet at least one third of pipe invert perimeter.
 - .5 Prevent damage to pipe and bedding material due to flotation and erosion.
 - .6 Place 90 degrees V-notch weir, or other measuring device approved by Departmental Representative in invert of sewer at each manhole.
 - .7 Measure rate of flow over minimum of 1 hour, with recorded flows for each 5 min interval.
- .11 Infiltration and exfiltration: not to exceed following limits in L per hour per 100 m of pipe, including service connections.

| Nominal Pipe diameter in mm | Plastic pipe |
|--------------------------------|--------------|
| 100 | 3.88 |
| 125 | 4.62 |
| 150 | 5.51 |
| 200 | 7.45 |
| 250 | 9.39 |

- .12 Repair and retest sewer line as required, until test results are within limits specified.
- .13 Repair visible leaks regardless of test results.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .3 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.

APPENDIX

A SITE PHOTOS





Photo 1 – Three Sheds – Exterior



Photo 2 – Two Trailers – Exterior



Photo 3 – Tree Stump – Typical



Photo 4 – Five Plex (Far) and Dental (Near)



WSP Project No.: 161-07910-01
PWGSC/PSPC Project No.: R.084070.001

January 09, 2017

Ms. Elizabeth Ohi, OAA, LEED AP.
Public Works & Government Services Canada
4900 Yonge Street, 11th Floor
Toronto, Ontario M2N 6A6

Re: Designated Substance Survey Overview Summary and Hazardous Material Abatement Cost Estimate for Sioux Lookout Hospital Zone located at 84 7th Avenue North, Sioux Lookout, Ontario

Dear Ms. Ohi:

This letter provides an overview of the WSP's Designated Substances & Hazardous Materials Survey (DSS) conducted for the Sioux Lookout Hospital Zone located at 84 7th Avenue North, in Sioux Lookout, Ontario (the subject property), as well as, an outline on the estimated costs required to handle asbestos-containing materials and other hazardous materials identified on site.

WSP completed the original DSS from December 6 to 8, 2016. The subject buildings considered in WSP's DSS survey of the subject property included:

Table 1 - Buildings/Structures Surveyed at the Sioux Lookout Hospital Zone

| Building Name | Building Description |
|-------------------------|--|
| Administration Building | <p>One-storey slab-on-grade structure with vinyl siding façade, mixed flat-top & sloped shingled roof. Interior walls generally consist of drywall with joint compound. Flooring generally consists of vinyl sheet flooring and carpet overlying concrete. False ceilings generally consist of lay-in ceiling tiles with a concealed drywall with joint compound ceiling above. Piping and ductwork were observed to be uninsulated or insulated with non-asbestos fiberglass.</p> <p>At the time of the site visit, the building was occupied by office space for hospital administration staff.</p> |
| Maintenance Garage | <p>One-storey slab-on-grade structure with vinyl siding façade, and slightly sloped flat-top roof. Interior walls generally consist of drywall with joint compound. Flooring generally consists of vinyl sheet flooring and concrete. False ceilings generally consist of lay-in ceiling tiles. Piping and ductwork were observed to be uninsulated or insulated with non-asbestos fiberglass.</p> <p>At the time of the site visit, the boiler system at the hospital was being utilized to heat the hospital, the hostel and the maintenance garage. The underground tunnels to the hostel and maintenance garage were inaccessible to the surveyor, however it is expected that asbestos-containing pipe insulation is present throughout these tunnels.</p> <p>At the time of the site visit, the building was occupied by maintenance storage & workshop space as well as office space for hospital administration staff.</p> |
| Hospital | <p>Two-storey structure with a full basement, asbestos-containing Transite™ cement siding façade, a flat-top roof with rooftop penthouse, and a concrete block chimney. Interior walls generally consist of concrete, concrete block, drywall with joint compound, plaster and ceramic. Flooring generally consists of vinyl sheet flooring, vinyl floor tiles, terrazzo, carpet overlying concrete or wood, ceramic and concrete. False ceilings generally consist of lay-in ceiling tiles, glue-on ceiling tiles, drywall with joint compound and plaster. Piping was</p> |

| Building Name | Building Description |
|------------------------------|---|
| | <p>observed to be uninsulated, insulated with non-asbestos fiberglass, or insulated with various types of asbestos-containing insulation.</p> <p>At the time of the site visit, the boiler system at the hospital was being utilized to heat the hospital, the hostel and the maintenance garage. The underground tunnels to the hostel and maintenance garage were inaccessible to the surveyor, however it is expected that asbestos-containing pipe insulation is present throughout these tunnels.</p> <p>At the time of the site visit, the 1st and 2nd floors, along with a large portion of the basement, were vacant. A section of the basement was being used as a shipping & receiving center and storage.</p> |
| Hostel | <p>Two-storey structure with a full basement, asbestos-containing Transite™ cement siding façade, and a flat-top roof. Interior walls generally consist of concrete block, drywall with joint compound, and ceramic. Flooring generally consists of vinyl sheet flooring, vinyl floor tiles, carpet overlying concrete or wood, ceramic and concrete. False ceilings generally consist of lay-in ceiling tiles, glue-on ceiling tiles, and drywall with joint compound. Piping was observed to be uninsulated, insulated with non-asbestos fiberglass, or insulated with various types of asbestos-containing insulation.</p> <p>At the time of the site visit, the boiler system at the hospital was being utilized to heat the hospital, the hostel and the maintenance garage. The underground tunnels to the hostel and maintenance garage were inaccessible to the surveyor, however it is expected that asbestos-containing pipe insulation is present throughout these tunnels.</p> <p>At the time of the site visit, the building was vacant.</p> |
| House on the Hill and Garage | <p>The house on the hill is a two-storey structure with a full basement, asbestos-containing Transite™ cement siding façade, and a flat-top roof. Interior walls generally consist of drywall with joint compound. Flooring generally consists of vinyl sheet flooring, vinyl floor tiles, wood and concrete. False ceilings generally consist of drywall with joint compound. Piping and ductwork were observed to be uninsulated or insulated with non-asbestos fiberglass.</p> <p>The garage is a one-storey slab-on-grade structure with vinyl siding façade and a sloped shingled roof. The garage structure consists of wood; building finishes are not present on the interior.</p> <p>At the time of the site visit, the house on the hill was occupied by hospital administration staff and the garage was used as a storage space.</p> |
| Dental Building Entrance | <p>The dental building is a one-storey slab-on-grade structure with vinyl siding façade and a sloped shingled roof. The entrance has an exterior wooden ramp. The interior entrance area has drywall with joint compound walls and ceilings, and vinyl sheet flooring.</p> <p>At the time of the site visit, the dental building was occupied by a dental office with examination/procedure rooms.</p> |
| Sheds | <p>Includes three (3) sheds. All three (3) sheds are constructed of wood with sloped shingled roofs.</p> <p>At the time of the site visit, the three (3) sheds were being utilized for storage.</p> |
| Trailers | <p>Includes two (2) pre-fabricated trailers: the Maintenance Trailer (MT) and Dental Trailer (DT). The trailers have a wood structure with metal cladding exterior and sloped shingled roofs. Interior walls and ceilings generally consist of pre-fabricated vinyl boards. Flooring generally consists of vinyl sheet flooring and overlying carpeting.</p> <p>At the time of the site visit, the two (2) trailers were being utilized for storage.</p> |

Designated Substances Surveys of the Hospital and Hostel were previously conducted in 2013. This DSS completed by WSP relies on information contained in both of these past reports and should be read in conjunction with them (*Report Reference: Hazardous Materials Assessment, Hospital Building, Sioux Lookout Zone Hospital, 2013, AMEC Project No.: WX17071 & Hazardous Materials Assessment, Hostel Building, Sioux Lookout Zone Hospital, 2013, AMEC Project No.: WX17071*).

Asbestos-Containing Materials

WSP's Designated Substance and Hazardous Materials Survey identified a number of asbestos-containing materials throughout the buildings and structures on the subject site. Table 2 summarizes the location, approximate quantity of material, the suggested abatement method, and the estimated abatement costs involved for the removal and handling of these materials (including findings from previous reports). The roofing structures of all surveyed buildings have been sampled and analyzed for asbestos content. The analytical results are presented separately from each building.

The estimated abatement costs have been formulated based on the removal, handling and disposal of these materials under "normal circumstances" (i.e. if the site was readily accessible and not remotely located). However, due to the remote nature of the site and the challenges which exist in accessing the site, WSP believes there may be additional costs for hauling of all generated wastes (hazardous and non-hazardous) to the nearest suitable waste disposal location. The additional costs associated with the transportation of waste have not been factored in to this cost estimate.

At the time of the survey no asbestos-containing materials were identified in the Administration Building and Dental Building Entrance.

Table 2 – Asbestos Containing Materials Survey Findings and Approximate Abatement Costs

| Building | Material Location | Material Description | Asbestos (%) | Approx. Quantity | Abatement Procedure | Approx. Cost/Unit | Approx. Cost |
|---------------|-------------------|--------------------------------------|-----------------------------------|---------------------|---------------------|-------------------|--------------|
| Maint. Garage | Exterior | Exterior White Window Glazing | 3.3% Chrysotile | 30 lf | Type 1 | | |
| | Exterior | Exterior Tar Duct Insulation | 10% Chrysotile | 30 ft ² | Type 1 | | |
| Hospital | B. Loc. B3 | Gold Sink Acoustic | 1.8% Chrysotile | 10 ea. | Type 1 | | |
| | B. Loc. B1 | 24" Pipe Insulation | 30% Chrysotile | 60 lf | Type 2 (glovebag) | | |
| | B. Loc. 31 | Black Sink Acoustic | 2.1% Chrysotile | 10 ea. | Type 1 | | |
| | Exterior | Off White Caulking | 1.1% Chrysotile | 650 lf | Type 1 | | |
| | Exterior | White Window Glazing | 1.5% Chrysotile | 600 lf | Type 1 | | |
| | B. Loc. 19 | 9"x9" VFT Black | 1.4% Chrysotile | 15 ft ² | Type 1 | | |
| | Rooftop Penthouse | Asbestos Paper | 40% Chrysotile | 600 ft ² | Type 3 | | |
| | B & 1F | Pipe Fitting Insulation | 30 - 75% Chrysotile 2% Amosite | 720 fittings | Type 2 (glovebag) | | |
| | B & 1F | 3" Pipe Insulation | 80% Chrysotile | 1,350 lf | Type 2 (glovebag) | | |
| | B & 1F | 4" Pipe Insulation | 80% Chrysotile | 630 lf | Type 2 (glovebag) | | |
| | B | 6" Pipe Insulation | 80% Chrysotile | 720 lf | Type 2 (glovebag) | | |
| | B & 1F | 8" Pipe Insulation (Layer 1 – Brown) | 2% Chrysotile | 1,100 lf | Type 2 (glovebag) | | |
| | | 8" Pipe Insulation (Layer 2 – Grey) | 65% Chrysotile | | | | |

| Building | Material Location | Material Description | Asbestos (%) | Approx. Quantity | Abatement Procedure | Approx. Cost/ Unit | Approx. Cost |
|---------------------|--|--|-------------------------------|------------------------|---------------------|--------------------|--------------|
| | B & 1F | Black/Yellow Mastic (for Vinyl Roll Flooring, Blue Speckled) | 3% Chrysotile | 1,910 ft ² | Type 1 | | |
| | B & 1F | Black/Yellow Mastic (for Vinyl Roll Flooring, Brown with Dark Speck) | 3% Chrysotile | 3,400 ft ² | Type 1 | | |
| | B. Loc. 1-15 B. Loc. 17 B. Loc. 18 | 9"x9" VFT Brown with Dark Brown | 15% Chrysotile | 3,200 ft ² | Type 1 | | |
| | | Black Mastic | 8% Chrysotile | | | | |
| | B & 1F | Black/Yellow Mastic (for Vinyl Roll Flooring, Blue Fleck) | 3% Chrysotile | 700 ft ² | Type 1 | | |
| | B. Loc. 33 | 12"x12" VFT Light Green/Green/Peach/Cream | 3% Chrysotile | 450 ft ² | Type 1 | | |
| | B. Loc. 34 | 9"x9" VFT Beige | 3% Chrysotile | 50 ft ² | Type 1 | | |
| | B. Loc. 37 1F. Loc. 128 | 12"x12" VFT Grey Streaks | 3% Chrysotile | 610 ft ² | Type 1 | | |
| | | Black/Yellow Mastic | 3% Chrysotile | | | | |
| | 1F. Loc. 84 1F. Loc. 96 1F. Loc. 108 | Vinyl Roll Flooring, Cream with Flecks | 3% Chrysotile | 200 ft ² | Type 1 | | |
| | 1F. Loc. 81 1F. Loc. 83 1F. Loc. 127 | Vinyl Roll Flooring, Beige Mosaic Pattern | 15% Chrysotile | 70 ft ² | Type 1 | | |
| | | Brown Mastic | 3% Chrysotile | | | | |
| | 1F. Loc. 100 1F. Loc. 101 | Vinyl Roll Flooring, Cream and Grey (Layer 3) | 15% Chrysotile | 220 ft ² | Type 1 | | |
| | | Tan Mastic (Layer 4) | 2% Chrysotile | | | | |
| | B. Boiler Room | Parging, Off White/Green/Tan | 20% Chrysotile 10% Amosite | 25 ft ² | Type 3 | | |
| | B. Loc. 13 B. Loc. 22 B. Loc. 23 | Transite™ Cementitious Board Ceiling Tiles | 12% Chrysotile | 640 ft ² | Type 1 | | |
| | Ext. 1F. NE Wall | Transite™ Cementitious Siding (building exterior) | 15% Chrysotile | 74,500 ft ² | Type 1 | | |
| | B. Boiler Room | Boilers | Presumed ² | 200 ft ² | Type 3 | | |
| | Service Tunnel | Pipe Insulation | Presumed ³ | 600 lf | Type 2 (glovebag) | | |
| Hostel ¹ | 1F. Loc. 24 | Black Sink Acoustic | 2.1% Chrysotile | 2 ea. | Type 1 | | |
| | 2F. Stair B | Black Window Glazing | 5.3% Chrysotile | 240 lf | Type 1 | | |
| | Throughout | Pipe Fitting Insulation | 15 - 30% Chrysotile | 390 fittings | Type 2 (glovebag) | | |
| | Throughout | 3 - 6" Pipe Insulation | 80 - 90% Chrysotile | 1,300 lf | Type 2 (glovebag) | | |
| | B. Loc. 5 | Tank Insulation | 30% Chrysotile | 50 ft ² | Type 3 | | |
| | Throughout | Gypsum Board Joint Compound | 2-3% Chrysotile | 38,400 ft ² | Type 2 | | |
| | 1F. Loc. 24 | Vinyl Roll Flooring, Beige and Brown (Layer 2) | 15% Chrysotile | 150 ft ² | Type 1 | | |
| | | Beige Mastic (Layer 3) | 4% Chrysotile | | | | |
| | Ext. Lobby. | Transite™ Cementitious | 15% | 6,500 ft ² | Type 1 | | |

| Building | Material Location | Material Description | Asbestos (%) | Approx. Quantity | Abatement Procedure | Approx. Cost/Unit | Approx. Cost |
|--|-------------------|---|-----------------|-----------------------|---------------------|-------------------|--------------|
| | East | Siding (building exterior) | Chrysotile | | | | |
| House on the Hill and Garage | Throughout | Drywall Joint Compound | 2.8% Chrysotile | 7,250 ft ² | Type 2 | | |
| | Exterior | Transite™ Cementitious Siding (building exterior) | 15% Chrysotile | 3,750 ft ² | Type 1 | | |
| | B. Bathroom | 9"x9" VFT Red with White Streaks | 1.3% Chrysotile | 25 ft ² | Type 1 | | |
| | B. | Asbestos Paper | 60% Chrysotile | 25 ft ² | Type 3 | | |
| | Throughout | Heat Shield in Light Fixture | 50% Chrysotile | 3 ea. | Type 1 | | |
| | Kitchen | Black Sink Acoustic | 10% Chrysotile | 1 ea. | Type 1 | | |
| Maint. Trailer | Kitchen | Black Sink Acoustic | 7.1% Chrysotile | 2 ea. | Type 1 | | |
| | Hallway | Heat Shield in Light Fixture | 60% Chrysotile | 1 ea. | Type 1 | | |
| Dental Trailer | Kitchen | Black Sink Acoustic | 7.1% Chrysotile | 2 ea. | Type 1 | | |
| | Hallway | Heat Shield in Light Fixture | 60% Chrysotile | 1 ea. | Type 1 | | |
| Roofing | Hospital | Roof Caulking/Tar on Flashing | 10% Chrysotile | 840 lf | Type 1 | | |
| APPROXIMATE TOTAL COST | | | | | | | |
| <ol style="list-style-type: none"> Cost estimations for ACM in this section are based on the materials identified and re-quantified by WSP at the time of the survey in conjunction with the AMEC reports titled <i>Hazardous Materials Assessment, Hospital Building, Sioux Lookout Zone Hospital, 2013, AMEC Project No.: WX17071</i> and <i>Hazardous Materials Assessment, Hostel Building, Sioux Lookout Zone Hospital, 2013, AMEC Project No.: WX17071</i>. Material within boiler is presumed to be ACM (the exterior was not insulated). In estimating the asbestos removal costs, all materials within the two boilers were suspected to contain asbestos materials. Material is presumed to be ACM. Quantification is based on both AMEC and WSP site observations. | | | | | | | |

In addition to the above confirmed asbestos-containing materials, a **visually confirmed** asbestos-contaminated material has been identified during WSP's DSS of the Hospital conducted on December 6, 2016. An open bag of "Zonolite" Vermiculite was found in the Hospital Basement (B2 – Boiler Room). Historically, this product has been used on attic floors and within concrete block walls, with the majority of the vermiculite originating from a mine in Libby, Montana. During the survey WSP surveyors investigated some of the open concrete block walls but did not observe any vermiculite to be present within, however, the open bag of "Zonolite" suggests that the material may have been used in select locations. Parties involved in renovation and/or demolition activities are to be made aware of this finding and should anticipate encountering some of this material during their operations. WSP highly recommends that this open bag of "Zonolite" Vermiculite be handled, transferred and disposed of off-site by a licensed contractor.

Lead-Containing Materials

Based on laboratory analysis from WSP and AMEC surveys, twenty-four (24) of the thirty-five (35) samples collected were found to have lead concentrations in excess of 90 ppm, and as such, are considered "lead-containing" in accordance with the *Federal Surface Coating Materials Regulation (SOR/2005-109)*. Laboratory analysis of the sampled paints determined that the lead concentrations at the site ranged from 180 ppm up to 21,000 ppm.

The appropriate procedures for handling and/or removal of these lead-containing paints will depend on the rehabilitation and/or demolition plans. In general the following procedures are recommended when handling lead-containing materials, coatings and paint applications:

- Follow Type 1 – if the coating is removed with a chemical gel or paste;



- Follow Type 2a – if the coating is to be removed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted building components by striking with sledgehammer or other similar tool;
- Follow Type 3a – if the coating is to be removed using conventional power tools; and
- Follow Type 3b – if the coating is to be removed by abrasive blasting.

Lead is also expected to be present in the following building components:

- in lead acid batteries in emergency lighting throughout the buildings;
- as a component in ceramic building products such as tiles and bricks;
- as a component of the solder on sweated joints between copper pipe and fittings;
- as a component of the solder on wire connections of electric components;
- as a component of solder used to seal the bell fitting of cast iron rain water leader pipes; and
- as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.

As a result of the site visit, it is anticipated that a recommendation for demolition will be made, and such work would proceed with minimal need for cutting/drilling/grinding of lead-containing materials. Deconstruction of these buildings and components will likely be achieved mainly through the use of heavy equipment and machinery, thereby reducing the likelihood of occupational exposures to lead dust (i.e. demolition following Type 2a procedures using heavy equipment), however basic precautions will still be necessary including the use of appropriate PPE.

The demolition contractor will need to ensure that waste generated from the demolition of building materials, with lead coatings applied, does not exceed the limits (i.e. lead) imposed by the General – Waste Management Regulation, R.R.O. 1990 Regulation 347. Added costs to dispose of waste which does exceed these limits (i.e. lead), may be incurred, but they cannot be reasonably determined at this time. Costs for evaluating, handling and removing lead-containing materials have not been included in this cost estimate.

Other Designated Substances and Hazardous Materials

The following table summarizes other Designated Substances and hazardous materials which were also included in the survey. Identification of these materials and substances were based on visual observations only, and where appropriate, recommendations and necessary actions have been provided.

Table 3 - Summary of Other Designated Substances and Hazardous Materials

| Material | Description | Action |
|----------|--|---|
| Benzene | Benzene is widely used in the chemical industry as a starting material and solvent. Benzene occurs naturally in crude oil and is present in all gasoline products, automobile emissions and cigarette smoke. Benzene is highly volatile, and will release into the atmosphere over a short time. | Benzene is not expected to be present in the buildings. |

| Material | Description | Action |
|----------|--|--|
| Mercury | <p>Mercury is used in thermometers, laboratory manometers, batteries and some electrical switches. It is also used in dental fillings and in latex paint to protect against fungal attack and mildew. Mercury vapour is also present as a vapour in fluorescent lights, metal halide lights and mercury vapour lights.</p> | <p>Although no samples were analyzed for mercury, it is presumed to be present in the following building components:</p> <ul style="list-style-type: none"> • in liquid filled reservoirs in thermostats; • as a gas in fluorescent light tubes; and • as a bactericide or stabilizer in paints and caulking. <p>The presence of mercury within assembled units (e.g. fluorescent light bulbs, thermostat bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. In addition, minute amounts of mercury may be present within paints and caulking throughout the building.</p> <p>Avoid direct skin contact with mercury and avoid inhalation of mercury vapour/dust. Coring, sawing, or breaking up the materials containing mercury should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions. Dispose of mercury-containing assembled units following applicable legislative requirements.</p> |
| PCBs | <p>The federal government has published Regulation SOR/2008-273 (September 5, 2008), which states that any solid material containing 50 parts per million (ppm) or more of PCBs must be handled as a PCB-containing material in accordance with all applicable regulations. The Regulation phases in a ban on the use of all PCB-containing equipment (other than light ballasts or pole-mounted transformers) containing more than 500 mg/kg PCB and applies to equipment containing 50-500 mg/kg PCBs including, light ballasts and pole-mounted transformers (with the exceptions noted below) by December 31, 2025. Equipment containing 50-500 mg/kg PCBs (except for light ballasts and pole mount transformers) cannot be used or stored at or within 100 m of a drinking water treatment plant or a food or feed processing plant, child care facility, preschool, primary school, secondary school, hospital, or senior citizens' care facility. In addition, the Regulation provides labeling requirements for PCB equipment in use (except for equipment that is too small to bear a standard PCB label such light ballasts) or storage and requires all PCBs (including those in light ballasts) to be stored no longer than 30 days of being taken out of use before being sent to an authorized destruction facility. The Regulation also prescribes PCB storage site and reporting requirements and the conditions under which an applicant may apply for extensions of certain sections of the Regulation.</p> | <p>Although all fluorescent light ballast labels inspected indicated "No-PCBs", all ballasts should be inspected for PCB content prior to removal. For ballasts which do not have a "No PCBs" indicator on the label, manufacturer's codes should be compared with Environment Canada's Identification of Lamp Ballasts Containing PCBs EPS 2/CC/2 (revised). If encountered, removal of PCB-containing materials (e.g. ballasts) must be completed using health and safety procedures that will protect workers against exposure to PCBs (i.e. to avoid ingestion or inhalation of the material). The handling of PCB-containing materials must be completed in a manner to prevent release to the environment. The disposal of PCB-containing materials must be completed in accordance with Federal and Provincial regulations.</p> |
| ODS | <p>In buildings, Ozone-Depleting Substances (ODS) are commonly found in refrigeration systems, halon fire extinguishers and air conditioning units.</p> <p>It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The MOE has issued Regulation 356 regarding the use, disposal and recycling of ODS's. Recapturing of ODS's during</p> | <p>The HVAC and air handling units observed on the exteriors of buildings (roof-mounted, window-mounted, exterior wall-mounted, etc.) contain ODSs (i.e. R-22).</p> <p>In the event of removal, the units should be recycled following Ontario Regulation 189/94, Refrigerants (O. Reg. 189/94), as amended. All equipment containing ODSs must be serviced by an individual holding a valid Ozone Depletion Prevention (ODP)</p> |

| Material | Description | Action |
|---------------------------------|---|--|
| | servicing must be done by licensed personnel. | Card, issued by the MOE and the refrigerant drained from the unit and collected for recycling or disposal in accordance with all applicable legislation. |
| Silica | Silica, or silicon dioxide (SiO ₂), is the basic component of sand, quartz and granite rock. Crystalline Silica (the designated substance) is encountered in industry in three forms: quartz, tridymite, and cristobalite. | <p>Crystalline Silica should be assumed to be present in brick, concrete, asphalt, cement and mortar.</p> <p>The Occupational Health & Safety Act (Ontario Regulation 490/09) regarding silica as a designated substance applies to areas where airborne silica is present and where workers are likely to inhale, ingest or absorb silica. Every precaution and procedure should be taken during demolition or renovation activities to control the time-weighted exposure of a worker to airborne silica and exposure should not exceed 0.05 milligrams Cristobalite per cubic meters of air, or 0.1 milligrams Quartz or Tripoli per cubic meters of air.</p> <p>Coring, sawing, or breaking up the materials containing silica should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the MOL Guidance document and in the Occupational Health and Safety Act.</p> <p>The Ministry of Labour (MOL) has published a Guideline for Silica on Construction Projects, dated September 2004 (as amended). This document is available online and should be referenced prior to initiating any work where exposure to airborne silica is anticipated.</p> |
| Mould / Biological Hazards | Extensive water damaged and/or mould-contaminated building materials were observed within the Hospital, Hostel and administration buildings at the time of the survey. Significant water damage was observed on ceiling tiles within the Hospital first and second floor hallways and the Hostel basement. Water damaged drywall was also observed within the second floor hallway. Additionally, evidence of past flooding was observed within the Hostel basement. Furthermore, potential mould growth was observed on the drywall ceiling above the lay-in ceiling tiles within the Administration Building. | Mould-contaminated materials should be removed/handled in accordance with the Canadian Construction Association document CCA 82/2004. Contractors should be warned of the presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould. |
| Radioactive Materials | Smoke/heat detector devices and tritium exit signs may contain a radioactive power source. Atomic Energy Control Board (AECB) guidelines state that smoke detectors containing more than 5 µCi of Am-241 or any amount of Radium -226 must be disposed of at a AECB licensed waste facility or an appropriate waste transfer facility. | Smoke/heat detectors and tritium exit signs were observed in various locations throughout the buildings. The current AECB guidelines allow for the disposal of smoke detectors with an Am-241 isotope source of less than 5.0 µCi to a regular landfill site. Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package. |
| Man-Made Mineral Fibres (MMMMF) | Man-made mineral fibres are known to irritate the eyes, skin and respiratory tract. | <p>Fibreglass insulation was observed on mechanical piping and ductwork throughout the buildings.</p> <p>Special precautions including respiratory protection should be used when handling and disposing these MMMFs.</p> |

Closure

The following table summarizes all the estimated costs associated with the management, removal and disposal of Designated Substances and Hazardous Materials identified on site (excluding costs associated with the removal and disposal of lead-containing materials):

Table 4 - Summary of Estimated Costs Relating to the Abatement of Designated Substances and Hazardous Materials at Sioux Lookout Hospital Zone

| Item | Description | Estimated Costs |
|--------------------|---|-----------------|
| 1 | Removal and Disposal of Asbestos-Containing Materials (as per materials and quantities described in Table 2 of this summary report) | |
| 2 | Management of other Designated Substances and Hazardous Materials (not including transportation of wastes) | |
| 3 | Consultancy Project Management & Supervision Services <i>Based on a 90-days asbestos removal program</i> | |
| GRAND TOTAL | | |

The estimated amount of **XXXXXXXXXX** is based on a single mobilization fee. The estimated fees can vary greatly in the event the asbestos removal contractor executes the work in several (and separate) phases.

Please do not hesitate to contact us if you have any questions.

Yours truly,
WSP Canada Inc.



Hassan Ktaech, MCIWM
Project Manager – Environment