PROJECT TITLE

Bath Institution
5775 Bath Road, Bath Ontario

New Parking Lot Extension

PROJECT NUMBER

R.033192.001
Specifications

PROJECT DATE

2014-04-23

END OF SECTION

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises general construction of a new parking area and modifications to the existing site, located at; Bath Institution, Bath, Ontario.

.2 All contract work is to be completed as follows:
.1 Complete removals and site preparation, as well as installation of luminaires, ditches/swales, and all underground work. Placement of sub-base and granular's to design grades.
.2 Paving to design grades, pavement markings and topsoil/sod reinstatement.

1.2 CONTRACT METHOD

.1 Construct Work under Combined Price Contract.
.1 Rock Removal: $/$m^3$
.2 Granular 'A': $/tonne
.3 Granular 'B': $/tonne
.4 Hot mix Asphalt (HL-3 at 50 mm): $/tonne
.5 1200 mm Ø Storm Maintenance Hole: $/vertical m
.6 1200 mm Ø Sanitary Maintenance Hole: $/vertical m
.7 600x1400 mm Ditch Inlet: $/vertical m
.8 525 mm Ø Storm Sewer Pipe: $/linear m
.9 600 mm Ø Storm Sewer Pipe: $/linear m
.10 525 mm Ø Sanitary Sewer Pipe: $/linear m
.11 600 mm Ø CSP culvert: $/linear m
.12 Geotextile and Rip-Rap: $/$m^2$
.13 Topsoil: $/$m^2$
.14 Hydraulic Seeding: $/$m^2$
.15 Concrete Jersey Barrier: $/each

1.3 CONTRACTOR USE OF PREMISE

.1 Co-ordinate use of premises under direction of Departmental Representative.

.2 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.

.3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.4 Existing parking to remain for owner's use. Contractor may not use or restrict existing parking area unless approved by Departmental Representative.

1.4 OWNER OCCUPANCY

.1 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 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 governing authorities with minimum disturbance to pedestrian vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel pedestrian 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 adequate bridging over trenches which cross walkways or roadways to permit normal traffic.

.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.

1.6 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.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 and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Phase work so that work areas are deliniated with barriers and maintain existing access and use of owner's parking. Make arrangements with Departmental Representative to facilitate work as stated.

.2 If any parking stalls are restricted by construction activities temporary parking stalls must be provided.

.3 Maintain existing services to buildings and provide for personnel and vehicle access.

.4 Contractor to submit a phasing plan for approval.

.5 Where security is reduced by work provide temporary means to maintain security.

.6 Closures: protect work temporarily until permanent enclosures are completed.

1.3 EXISTING SERVICES

.1 Notify, Departmental Representative utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00.

1.4 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work Monday to Friday in accordance with the Loyalist Township by-laws.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

1.5 SECURITY

.1 Personnel employed on this project may be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

.1 Personnel may be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.6 BUILDING SMOKING ENVIRONMENT

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

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

.2 Prepare agenda for meetings.

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

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

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

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

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

1.2 PRECONSTRUCTION MEETING

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

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

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

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

.5 Agenda to include:
.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work:
.3 Schedule of submission of shop drawings, samples. Submit submittals in accordance with Section 01 33 00
.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00
.5 Site security in accordance with Section 01 56 00
.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
.7 Record drawings in accordance with Section 01 33 00
.8 Monthly progress claims, administrative procedures, photographs, hold backs.
.9 Appointment of inspection and testing agencies or firms.
.10 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

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

.2 Contractor involved in Work and Departmental Representative and Owner are to be in attendance.

.3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 days after meeting.

.4 Agenda to include the following:
.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting.
.3 Field observations, problems, conflicts.
.4 Problems which impede construction schedule.
.5 Review of off-site fabrication delivery schedules.
.6 Corrective measures and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

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, product data, samples and mock-ups in SI Metric units.

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

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

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

.7 Verify field measurements and affected adjacent Work are co-ordinated.

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

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

.10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 10 working days for Departmental Representative's review of each submission.

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

.5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate, containing:
.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

.7 Submissions shall include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:
.1 Fabrication.
.2 Layout, showing dimensions, including identified field dimensions, and clearances.
.3 Setting or erection details.
.4 Capacities.
.5 Performance characteristics.
.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

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

.9 Submit two hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

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

.11 Submit two hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.12 Submit two hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.13 Delete information not applicable to project.

.14 Supplement standard information to provide details applicable to project.

.15 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.16 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

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

.2 Deliver samples prepaid to Departmental Representative's business addressin Kingston.

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

.4 Where colour, pattern or texture is criterion, submit full range of samples.

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

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

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

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 2 locations.
.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: as directed by Departmental Representative.
.1 Upon completion of: Work, and as directed by Departmental Representative.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Safty and Insurance Board Experience Report.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

1 PURPOSE

.1 To ensure that both the construction project and the security operations may proceed without undue disruption or hindrance and that security is maintained at all times.

2 DEFINITIONS

.1 "Contraband" means:

.1 An intoxicant, including alcoholic beverages, drugs and narcotics.

.2 Tobacco or associated tobacco products.

.3 An igniting device, lighter or matches.

.4 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.

.5 An explosive or a bomb or a component thereof.

.6 Currency over any applicable prescribed limit, $50 when possessed by an inmate without prior authorization.

.7 Any item not described in paragraphs 2.1.1 to 2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.

.2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.

.3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.

.4 "CSC" means Correctional Service Canada.

.5 "Director" means Director, Warden or Superintendent of the Institution as applicable.

.6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.

.7 "Departmental Representative" means the project manager from Public Works and Government Services Canada.

.8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.

.9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work". This area may or may not be isolated from the security area of the Institution.

3 PRELIMINARY PROCEEDINGS

.1 Prior to the commencement of work, the Contractor shall meet with the Director or his/her representative to:
.1 Discuss the nature and extent of all activities involved in the Project.
.2 Establish mutually acceptable security procedures in accordance with this instruction and particular requirements.

.2 Contractor shall:
.1 Ensure that all Construction Employees are aware of the security requirements.
.2 Ensure that a copy of the security requirements is always prominently on display at the job site.
.3 Co-operate with CSC personnel in ensuring that security requirements are observed by all Construction Employees.

4 CONSTRUCTION EMPLOYEES

.1 Submit to the Director a list of the names with date of birth of all Construction Employees to be employed on the construction site and a security clearance form for each employee.

.2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid.

.3 The Director may require that facial photographs may be taken of Construction Employees and these photographs may be displayed at appropriate locations or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all Construction Employees. ID cards will then be left at the designated entrance to be picked upon arrival and shall be displayed prominently on the Construction Employees' clothing at all time while Construction Employees are on the property.

.4 Entry to CSC Property will be refused to any person there may be reason to believe may be a security risk.

.5 Any person employed on the construction site will be subject to immediate removal from the Property if they:
.1 Appear to be under the influence of alcohol, drugs or narcotics.
.2 Behave in an unusual or disorderly manner.
.3 Are in possession of contraband.

.6 Smoking is prohibited anywhere on CSC property.

5 VEHICLES

.1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle. Lockable gas caps on all vehicles and motorized equipment may be required.

.2 The Director may limit at any time the number and type of vehicles allowed on the property.

.3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle ison the property. The Director may require that these vehicles be escorted by Staff or Commissionaires while in the Institution.

6 PARKING

.1 Parking area(s) to be used by Construction Employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

7 SHIPMENTS

.1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the CSC's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.

8 TELEPHONES

.1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the property unless prior approval of the Director is received.

.2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.

9 WORK HOURS

.1 Work hours are: Monday to Friday 07:00 a.m. to 5:00 p.m.

.2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

10 OVERTIME WORK

.1 No overtime work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the Contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to the Crown for such events may be attributed to the Contractor.

.2 When overtime work, weekend, or statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his/her designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

11 TOOLS AND EQUIPMENT

.1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.

.2 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.

.3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.

.4 Store all tools and equipment in approved secure locations.

.5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.

.6 All missing or lost tools or equipment shall be reported immediately to the Director.

.7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
.1 At the beginning and conclusion of every construction project.
.2 Weekly, when the construction project extends longer than a one week period.
.3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.

.8 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The Contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.

.9 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the Contractor supervise the construction site during non-working hours.

.10 If torches or grinders are required tools to perform Work, Contractor must complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institutional Fire Chief.

12 SMOKING RESTRICTIONS

.1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.

.2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the property.

.3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.

13 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on CSC Property.

.2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.

.3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the CSC property for the duration of the construction.

.4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

14 SEARCHES

.1 All vehicles and persons entering CSC property may be subject to search.

.2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched.

.3 All employees entering the CSC property may be subject to screening of personal effects for traces of Contraband drug residue.

15 ACCESS TO AND REMOVAL FROM INSTITIUION PROPERTY

.1 Construction personnel and commercial vehicles will not be admitted on the property after normal working hours, unless approved by the Director.

16 MOVEMENT OF VEHICLES

.1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:
.1 07:45 a.m. 07:45 hrs. to 11:00 a.m. 11:00 hrs.
.2 1:00 p.m. 13:00 hrs. to 3:30 p.m. 15:30 hrs.

.2 Construction vehicles shall not leave the Institution until an inmate count is completed.

.3 The Contractor shall advise the Director twenty four (24) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.

.4 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.

.5 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.

.6 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.

.7 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the permission of the Director.

.8 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.

.9 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

17 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

.1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.

.2 However, notwithstanding paragraph above, the Director may:
.1 Prohibit or restrict access to any part of the property.
.2 Require that in certain areas of the property, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.

.3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

18 SURVEILLANCE AND INSPECTION

.1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.

.2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

19 STOPPAGE OF WORK

.1 The Director may request at any time that the Contractor, his/her employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation. The Contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.

.2 The Contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

20 CONTACT WITH INMATES

.1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his/her security clearance revoked.

.2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the property other than those required as part of this Contract.

21 COMPLETION OF CONSTRUCTION PROJECT

.1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain on the property as part of the construction contract.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

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

.3 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.

1.2 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 commencement of Work. Health and Safety Plan must include:
.1 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.

.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.

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

.5 Submit one copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction.

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

.7 Submit copies of incident and accident reports.

.8 Submit Material Safety Data Sheets (MSDS).

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

1.3 FILING OF NOTICE

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

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

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

1.7 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 COMPLIANCE REQUIREMENTS

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

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

1.9 UNFORSEEN HAZARDS

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

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

1.10 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Address and phone number of nearest Ministry of Labour office.
.8 Material Safety Data Sheets.
.9 Written Emeregency Response Plan.
.10 Site Specific Safety Plan.
.11 Valid certificate of first aider on duty.
.12 WSIB "In Case of Injury At Work" poster.
.13 Location of toilet and cleanup facilities.

1.11 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.

1.12 BLASTING

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

1.13 POWDER ACTUATED DEVICES

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

1.14 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 DEFINITIONS

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

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

1.2 SUBMITTALS

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

.2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

1.3 FIRES

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

1.4 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.

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

1.5 EROSION AND SEDIMENT CONTROL (ESC)

.1 Prevent the loss of soil during construction by receiving streams during construction.

.2 Prevent air pollution from dust and particulate matter during construction activities.

.3 The Contractor is to designate an individual to be responsible for all aspects of ESC work.

1.6 DRAINAGE AND DEWATERING SYSTEM

.1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, into waterways, sewer, drainage systems.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

1.7 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties not identified for removal.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.8 WORK ADJACENT TO WATERWAYS

.1 Do not dump excavated fill, waste material or debris within 5 m of waterways.

1.9 POLLUTION CONTROL

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

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

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.

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

1.10 NOTIFICATION

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

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

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

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

PART 2 - PRODUCTS

2.1 SILT FENCE FABRIC

.1 Fabric to be woven and comply with OPSS 1860.07.05.03.

PART 3 - EXECUTION

3.1 EXAMINATION AND MITIGATION

.1 Site verification of conditions and mitigation measures.
.1 Follow guidelines presented in Table 5: Environmental Effects Analysis - Mitigation Measures and Residual Effects (Appendix A)
.2 Confirm accessibility of site for equipment.

3.2 SITE-WIDE PRACTICES

.1 Keep the main entrance road clear of any mud or earth tracked from vehicles.

.2 Dust Control
.1 Dust Control measures are to be as per OPSS 306.
.2 Dust suppressants other than water or calcium chloride (flake or solution) require prior approval.

3.3 INSTALLATION OF ESC MEASURES

.1 Installation of the ESC measures is to be conducted in such a way that downstream measures (those measures closest to water course to be protected) are to be installed prior to upstream measures.

.2 Temporary Stabilization Measures:
.1 Be aware that any contamination of stockpiled material or of graded surfaces by temporary stabilization method is to be resolved at the Contractor's expense.

.3 Sedimentation Prevention Measures:
.1 Catch Basin Lid Filter Cloth .1 All catch basins and catch basin manholes are to have a double layer of geotextile placed under their lids to prevent sedimentation of the storm sewer system.
.2 Ditch Inlet Protection:
.1 All ditch inlets are to be protected by a straw bale flow check immediately upstream of the ditch inlet, until all areas draining into the ditch inlet have been permanently stabilized.
.2 All ditch inlets are to have a double layer of geotextile placed under their lids to prevent sedimentation of the storm sewer system.
.3 Construction activities are to minimize disturbance to grassed areas. Any grassed areas to be used for construction activities are to be cleared and stripped and topsoil is to be stockpiled. Areas are to be stabilized after construction activities are complete.

3.4 INSPECTION OF ESC MEASURES

.1 Once a week, or immediately after any rainfall event of at least 12 mm, each ESC measure onsite is to be inspected in its entirety. All ESC measures are to be maintained in good working order.

.2 Inspection of Structural Measures:
.1 Silt fence:
.1 Silt fence is to be inspected for: depth of embedment, tears or holes, erosion around or under the fence, sagging or collapse.
.2 Sediment accumulation reaching 1/3 fence height is to be removed and relocated to areas onsite of low erosion potential.

.3 All seeded or planted areas are to be inspected to ensure vegetative growth. Where vegetation has washed away, or died off, additional seeding is to be applied. Ensure area has sufficient water to promote growth.

3.5 ESC MEASURE REMOVAL

.1 After all of the upstream construction work has been completed, including the removal of upstream ESC measures, all areas have been permanently stabilized according to the Landscape Drawings, and if approved by the Departmental Representative, the ESC measure may be removed.

.2 All accumulated sediment at the ESC measure is to be removed.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.

1.2 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal bylaws.

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 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.3 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.

1.4 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.6 REPORTS

.1 Submit 4 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

1.8 MILL TESTS

.1 Submit mill test certificates as required of specification Sections.

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

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

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

.2 Canadian Standards Association (CSA International)
.1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA 0121, Douglas Fir Plywood.
.3 CAN/CSA S269.2-M87(R2008), Access Scaffolding for Construction Purposes.
.4 CAN/CSA Z321-96(R2006), Signs and Symbols for the Occupational Environment.

1.2 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.

1.3 SITE STORAGE/LOADING

.1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 CONSTRUCTION PARKING

.1 Parking will be permitted on site within a designated area for designated number of vehicles by Departmental Representative.

.2 Provide and maintain adequate access to project site.

.3 Provide snow removal within designated parking area during period of Work.

1.5 SANITARY FACILITIES

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

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

1.6 CONSTRUCTION SIGNAGE

.1 Locate project identification sign as directed by Departmental Representative and construct as follows:
.1 Build concrete foundation, erect framework, and attach signboard to framing.
.2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

.2 Direct requests for approval to erect a Departmental Representative signboard to Departmental Representative. For consideration general appearance of Departmental Representative signboard must conform to project identification site sign. Wording shall be in both official languages.

.3 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321.

.4 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

.5 No other signs or sdvertisments, other than warning signs are permitted on site.

1.7 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.2 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

.3 Protect travelling public from damage to person and property.

.4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.7 Dust control: adequate to ensure safe operation at all times.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

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

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 All temporary barriers and enclosures required for work to be included in balance of project.

.2 Measure new precast concrete jersey barriers per unit installed.

1.3 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.4 HOARDING

.1 Erect temporary site enclosure using 1.2m high, snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m o.c. Provide one lockable truck gate. Maintain fence in good repair.

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

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations.

.2 Provide as required by governing authorities.

1.6 ACCESS TO SITE

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

1.7 PUBLIC TRAFFIC FLOW

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

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

PART 2 - PRODUCTS

2.1 CONCRETE JERSEY BARRIERS

.1 Temporary Concrete Barrier: As per OPSS 740. Precast units and connections to match existing concrete barriers.

PART 3 - EXECUTION

3.1 CONCRETE JERSEY BARRIERS

.1 Place temporary concrete barriers to lines indicated on contract drawings. Coordinate final layout with Departmental Representative and reuse existing concrete jersey barriers as available.

END OF SECTION

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from construction/demolition waste destined for landfill to maximum extent possible.

.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.

.6 Asphalt and granular materials.

.3 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.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Methods for removal of existing asphalt pavement.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 20.

.2 Divert unused asphalt materials from landfill to local facility.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.2 PROTECTION

.1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Remove existing asphalt pavement to lines and grades as indicated.

.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.3 Sawcut along lines designated on contract drawings to provide a clean true edge on existing ashpalt.

.4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.5 Provide for suppression of dust generated by removal process.

3.4 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.5 SWEEPING

.1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

.2 Section 02 41 13.14 Asphalt Paving Removal

1.2 MEASUREMENT PROCEDURES

.1 All clearing & grubing and tree removal is to be included in balance of project.

.2 Payment for disposal, excavating, backfilling and restoration will be included in above removal items.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

1.4 QUALITY ASSURANCE

.1 Site Meetings.
.1 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work to determine extents of removal.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Perform Work in accordance with Section 01 35 43.

.2 Waste Management and Disposal.
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

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 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

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.

3.2 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Clear & grub vegetation and remove as many trees as required during demolition.
.1 Obtain approval of Departmental Representative prior to removal of trees.

.4 Disposal of Material.
.1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative.
.2 Trim disposal areas to approval of Departmental Representative.

.5 Backfill.
.1 Backfill in areas as indicated and in accordance with Section 31 23 10.
.2 For removal of transite pipe, work is to comply with Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects And In Buildings And Repair Operations made under Occupational Health and Safety Act R.R.O. 1990 as amended and local requirements pertaining to asbestos, provided that in case of conflict with these specifications, the more stringent requirements shall apply.

3.3 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.4 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved haulers listed in Waste Reduction Workplan and in accordance with applicable regulations.
.1 Written authorization from Departmental Representative is required to deviate from haulers listed in Waste Reduction Workplan.

.4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
.1 Disposal Facilities: approved and listed in Waste Reduction Workplan.
.2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

3.5 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.

3.6 CLEANING

.1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.

.2 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.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Cast-in-Plce Concrete: Section 03 30 00.

1.2 REFERENCES

.1 American Concrete Institute (ACI)
.1 SP-66-04, ACI Detailing Manual 2004.
.1 ACI 315-99, Details and Detailing of Concrete Reinforcement.
.2 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.

.2 ASTM International
.1 ASTM A 775/A 775M - 07b, Standard Specification for Epoxy Coated Reinforcing Steel Bars.

.3 CSA International
.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CSA-A23.3-04, Design of Concrete Structures.

.4 Reinforcing Steel Institute of Canada (RSIC)
.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 QUALITY ASSURANCE

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.1 Mill Test Report: upon request, provide Deparmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

1.5 MEASUREMENT AND PAYMENT PROCEDURES

.1 Included in the balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Deparmental Representative.

.2 Reinforcing steel: billet steel, grade 400, epoxy coated deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M.

.4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.5 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain Deparmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
.1 Ship epoxy coated bars in accordance with ASTM A 775A/A 775M.

PART 3 - EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Deparmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Prior to placing concrete, obtain Deparmental Representative's approval of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

.4 Protect epoxy and paint coated portions of bars with covering during transportation and handling.

3.3 FIELD TOUCH -UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 26 56 19 - Roadway Lighting.

1.2 REFERENCES

.1 ASTM International
.1 ASTM A 185/A 185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
.2 ASTM D 260-86(2001), Standard Specification for Boiled Linseed Oil.
.3 ASTM D 1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

.3 CSA International
.1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Verify project requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.5 QUALITY ASSURANCE

.1 Provide to Departmental Representative weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.

.2 Sustainability Standards Certification:

.1 Construction Waste Management: provide copy of plan.

.2 Recycled Content:

.1 Provide listing of recycled content products used.

.2 When Supplementary Cementing Materials (SCMs) are used, provide evidence to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative DCC Representative Consultant and concrete producer as described in CSA A23.1/A23.2.

.2 Deviations to be submitted for review by the Departmental Representative DCC RepresentativeCons ultant.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.7 MEASUREMENT AND PAYMENT PROCEDURES

.1 Included in balance of the project.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

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

2.2 MATERIALS

.1 Cement: to CSA A3001, Type GU.

.2 Blended hydraulic cement: Type GUb to CSA A3001.

.3 Water: to CSA A23.1/A23.2.

.4 Premoulded joint filler:
.1 Bituminous impregnated fibreboard: to ASTM D 1751.

.5 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.

.6 Curing Compound; to CSA. A23.1/A23.2 white and ASTM C209, Type 1 chlorinated rubber or Type 1 D with fugative dye

.7 Other concrete materials: to CSA A23.1/A23.2.

2.3 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
.2 Provide concrete mix to meet following plastic state requirements:
.1 Proportion normal density concrete in accordance with CAN/CSA A23.1-04 Table 5. Alternative. Provide a minimum of 25% Supplementary Cementing Materials.
.2 Cement Tables 6 and 7 CAN/CSA A23.1-04
.3 Minimum 28 day compressive strength - 35 MPa
.4 Class of Exposure - C-1
.5 Slump at Dischartge - 60 to 80mm (curb machine 25-45mm)
.6 Air content - 4% to 7%
.7 Maximum aggregrate size - 19mm

PART 3 - EXECUTION

3.1 PREPARATION

.1 Provide Departmental Representative 24 hours notice before each concrete pour.

.2 During concreting operations:
.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.

.3 Protect previous Work from staining.

.4 Clean and remove stains prior to application of concrete finishes.

3.2 INSTALLATION/ APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Sleeves and inserts:
.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
.2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative DCC Representative Consultant.

3.3 FINISHES

.1 Equipment pads: provide smooth trowelled surface.

3.4 CURING

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

3.5 SEALING APPLICATION

.1 After curing is complete, apply poly-siloxane resin blend sealer at 4 m^2 /L.

3.6 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative. Accelerated test methods will apply.

3.7 CLEANING

.1 Use trigger operated spray nozzles for water hoses.

.2 Designate cleaning area for tools to limit water use and runoff.

.3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal 01 35 20 - Construction/Demolition Waste Mangement and Disposal

.1 Divert unused concrete materials from landfill to local quarry after receipt of written approval from Departmental Representative.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA-C22.1-12, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations.
.2 CAN3-C235-83(R2006), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
.3 Do underground systems in accordance with CSA C22.3 No.7-10, Underground Systems, except where specified otherwise.

.2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
.1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

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

.4 The Ontario Electrical Safety Code 2012, and all bulletins (Ontario).

.5 Hydro requirements and local applicable codes and regulations.

1.2 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates for control items in English.

1.3 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS in accordance with Section 01 35 29.

.3 Shop drawings:
.1 Submit drawings within 3 weeks of Award of Contract.

.2 Submit electronic copies of 190 x 279 mm minimum size drawings and product data to inspection authorities.
.3 If changes are required, notify Departmental Representative of these changes before they are made.

.4 Quality Control: in accordance with Section 01 45 00.
.1 Provide CSA certified equipment and material.
.2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
.3 Submit test results of installed electrical systems and instrumentation.
.4 Permits and fees: in accordance with General Conditions of contract. Pay associated fees. Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
.5 Submit, upon completion of Work, load balance report as described in PART 3 - Load Balance.
.6 Submit certificate of acceptance from Electrical Inspection Department authority having jurisdiction upon completion of Work to Departmental Representative.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Work to be included in the balance of the project.

1.5 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

.2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

1.7 SYSTEM STARTUP

.1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - Submittals.

.2 Factory assemble control panels and component assemblies.

2.2 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of inspection authorities and Departmental Representative.

.2 Decal signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for copper conductors.

2.4 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Lamicoid 3mm thick plastic engraving sheet red face, white core, mechanically attached with self tapping screws for essential (Emergency) power.

.3 Sizes as follows:

.1 Size 1: 1 line 3mm high letters
.2 Size 2: 1 line 5mm high letters
.3 Size 3: 1 line 3mm high letters
.4 Size 4: 2 lines 8mm high letters

.2 Wording on nameplates to be approved by Departmental Representative prior to manufacture.

.3 Allow for minimum of twenty-five (25) letters per nameplate.

.4 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.5 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.6 Terminal cabinets and pull boxes: indicate system and voltage.

.7 Transformers: indicate capacity, primary and secondary voltages.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA-C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.6 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
.1 Paint outdoor electrical equipment "equipment green".
.2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA-C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.
.1 Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

.1 Load Balance:
.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
.2 Provide upon completion of work, load balance report as directed in PART 1 - Submittals: phase and neutral currents on panelboards, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00:
.1 Lighting and its control.

.3 Carry out tests in presence of Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.7 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

.3 At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dust and dirt.

.4 Remove construction materials from wiring devices, coverplates, outlets, cabinets, enclosures, tubs, etc.

3.8 POWER SHUTDOWN

.1 Power shutdown shall be kept to a minimum. Schedule shutdowns well in advance with Department Representative stating time(s) and duration(s). Maintain all electrical services to the occupied areas of the buildings. Power shutdowns will be allowed during normal working hours and has to be approved by the institution. Shutdowns to be 4 hours maximum.

.2 Provide temporary services, equipment and wiring as necessary to maintain continuity of services throughout, during construction of this project.

.3 Ensure all services, ie. security, fire alarm, telephone, LAN, normal and essential power, etc. remain operational during construction.

3.9 REMOVALS

.1 Remove existing electrical equipment, wiring, conduit and other devices.

.2 Maintain continuity of power, lighting, fire alarm and communication circuits as required.

.3 Turn over all removed material to the Departmental Representative as described.

.4 Remove all existing redundant wiring associated with all devices.

.5 Any material the Departmental Representative does not want shall be removed from the site by this contractor.

3.10 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for incorporation into operation and maintenance manuals.

.2 Include in operation and maintenance data:
.1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
.2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.
.3 Wiring and schematic diagrams and performance curves.

.4 Names and addresses of local suppliers for items included in maintenance manuals.
.5 Copy of reviewed shop drawings.

.3 Provide two distinct manuals, one for operational personnel and one for maintenance personnel. Provide a simplified operation instruction sheet for each system.

3.11 AS-BUILT RECORDS

.1 As work progresses, maintain accurate records to show deviations from contract drawings. The Department Representative will provide a set of clean white prints for this purpose.

3.12 MAINTENANCE SCHEDULE

.1 Provide information for a computerized maintenance schedule indicating regular maintenance checks, procedures and results for insertion into a computerized maintenance program at the institution by institution personnel.

ie. Equipment Number:
Manufacturer:
Voltage:
Phase:
Model:
Serial No.:
Etc.

END OF SECTION

PART 1 - GENERAL

1.1 PRODUCT DATA .1 Not Used.

1.2 REFERENCES .1 CSA C22.2 No .0.3-09, Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131-07, Type TECK 90 Cable.

1.3 MEASUREMENT AND PAYMENT PROCEDURES .1 Work to be included in the balance of the project.

1.4 PRODUCT DATA .1 Provide product data in accordance with Section 01 33 00.

1.5 DELIVERY, STORAGE AND HANDLING .1 Packaging Waste Management: remove for reuse and return of pallets, crates, paddling and packaging materials.

PART 2 - PRODUCTS

2.1 LIGHTING WIRES .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE, Non Jacketted.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL .1 Perform tests in accordance with Section 26 05 00.

.2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Lay cable in cable trays in accordance with Section 26 05 43.01.

.2 Terminate cables in accordance with Section 26 05 43.01.

.3 Cable Colour Coding: to Section 26 05 00.

.4 Conductor length for parallel feeders to be identical.

.5 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.6 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.7 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.8 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:
.1 In conduit systems in accordance with Section 26 05 34.
.2 In underground ducts in accordance with Section 26 05 43.01.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - For Electrical.

1.2 REFERENCES

.1 Grounding equipment based on CSA C22.2 No. 41-07.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Work to be included in the balance of the project.

PART 2 - PRODUCTS

2.1 EQUIPMENT .

.1 Rod electrodes: copper clad steel 19 mm dia by 3 m long.

.2 Plate electrodes: copper, surface area 0.2 square meters, 1.6 mm thick.

.3 Grounding conductors: bare stranded copper, soft annealed, size as indicated. Minimum #6 AWG.

.4 Insulated grounding conductors: green, type RWU90.

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Thermit welded type conductor connectors.
.5 Bonding jumpers, straps.
.6 Pressure wire connectors.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where PVC, flexible conduit and EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to electrodes, using copper or inspectable wrought copper compression connectors to ANSI/IEEE 837.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Install bonding wire for flexible conduit, connected at both one ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.8 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

.9 Install separate ground conductor to outdoor lighting standards.

.10 Make grounding connections in radial configuration only, with connections terminating at single grounding point street side of water pipe. Avoid loop connections.

3.2 ELECTRODES

.1 Install rod, electrodes and make grounding connections.

.2 Bond separate, multiple electrodes together.

.3 Use size 3/0 AWG copper conductors for connections to electrodes.

.4 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting.

3.4 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA-C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
.2 CAN/CSA-C22.2 NO. 18.1-04 (R2009), Metallic Outlet Boxes.
.3 CAN/CSA-C22.2 NO. 18.2-06, Nonmetallic Outlet Boxes.
.4 CSA C22.2 No. 45-M1981(R2008), Rigid Metal Conduit.
.5 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
.6 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.
.7 CSA C22.2 No. 211.2-06, Rigid PVC (Unplasticized) Conduit.

1.2 SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
.1 Submit cable manufacturing data.

.3 Quality assurance submittals:
.1 Test reports: submit certified test reports.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Instructions: submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Work to be included in the balance of the project.

PART 2 - PRODUCTS

2.1 CONDUITS

.1 Rigid pvc conduit: to CSA C22.2 No. 211.2.

2.2 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for NPS 1 27 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.
.1 Set-screws are not acceptable.

2.3 FISH CORD

.1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Use rigid pvc conduit underground.

.2 Minimum conduit size for lighting and power circuits: NPS 3/4 21 mm.

.3 Bend conduit cold:
.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.4 Mechanically bend steel conduit over 21 mm diameter.

.5 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.6 Install fish cord in empty conduits.

.7 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.

.8 Dry conduits out before installing wire.

3.3 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

3.4 CLEANING

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

.2 Insulated Cable Engineers Association, Inc. (ICEA)

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.5 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

.6 Do not dispose of preservative treated wood through incineration.

.7 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.

.8 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Departmental Representative.

.9 Fold up metal banding, flatten and place in designated area for recycling.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Work to be included in the balance of the project.

PART 3 - EXECUTION

3.1 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

.6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

.7 After installation of cables, seal duct ends with duct sealing compound.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

.5 Pre-acceptance tests.
.1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
.2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

.6 Acceptance Tests

.1 Ensure that terminations and accessory equipment are disconnected.
.2 Ground shields, ground wires, metallic armour and conductors not under test.
.3 High Potential (Hipot) Testing.
.1 Conduct hipot testing at 100% of original factory test voltage in accordance with manufacturer's ICEA recommendations.

.7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.

.8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 Submittal Procedures.

.2 Section 01 74 20 - Construction/Demolition Waste Management and Disposal.

.3 Section 26 05 00 - Common Work Results - Electrical.

.4 Section 03 20 00 - Concrete Reinforcing.

.5 Section 03 30 00.01 - Cast-In-Place Concrete.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA A14-00, Concrete Poles.
.2 CSA C22.2 No.206-M1987(R1999), Lighting Poles.
.3 CAN/CSA-O15-90(R1999, Wood Utility Poles and Reinforcing Stubs.
.4 CSA O80 Series-97, Wood Preservation.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Work to be included in the balance of the project.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20 - Construction/Demolition Waste Management And Disposal.

PART 2 - PRODUCTS

2.1 ALUMINUM POLES

.1 Aluminum poles: to CSA C22.2 No.206 designed for underground wiring and:
.1 Mounting on concrete anchor base.
.2 Style: Monotube, round tapered aluminum, wall thickness 4.5 mm.

.3 Straight for one or two luminaire mounting brackets.
.4 Access handhole 300mm above pole base for wiring connections, with welded-on reinforcing frames bolted-on cover.
.5 Size: As indicated.
.6 Anchor bolts: 20mm x 75mm steel with shims, nuts, washers and covers.
.7 Finish: semi-lustrous satin by rotary sand process.
.8 Grounding lug.
.9 Length is 7.6m (25 feet). Diameter is 125mm(5 inches).

2.2 CONCRETE POLE BASE

.1 Concrete pole bases and reinforcement as indicted on contract drawings.

.2 Concrete work and reinforcing in accordance with Section 03 20 00 and Section 03 30 00.

2.3 LUMINAIRE MOUNTING BRACKETS

.1 Mounting brackets aluminum for specified luminaires:
.1 Single and double brackets as indicated.
.2 Arm extension length: As indicated.
.3 Single and double davit type.

2.4 LUMINAIRES

.1 Exterior Luminaires:
.1 Enclosure: One piece diecast, with internal cooling, solid barrier walls seperating optical and electrical compartment. Single diecast aluminum cam-latch providing positive locking and sealing of driver chamber, one peice vulcanised silicon gasket separate LED driver tray and compartment for maximum heat dissipation IP66 Rating.
.2 Support Arm: heavy cast, powder coated with stainless steel mounting for specified pole mounting.
.3 Lamp, Housing specifications as follows:
.1 Type II, 120-277V, 53 W, LED, 4800 lumens, 99% projected lumen maintenance factor at 50000 hours, 5 year warranty on luminaire and driver. Type II light distribution.
.4 Mounting configuration as identified on Drawings:
.1 All fixtures and poles to be finished with Platinum Silver colour.
.5 LED fixtures must be DLC compliant.

.6 LED's to be LM79 and LM80 compliant.
.7 Fixture manufacturer must have been in business for at least 5 years.
.8 Suitable fixutres are:
.1 Cree XSPA-0-2-G-A-U-S
.2 Cooper Lighting Lumark NAV-AE-01-E-UNV-T2-IP66-AP
.3 Lithonia Lighting D-Series DSX1 LED-1-30B530/40K-SR2-MVOLT-RPA-DNAXD

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install concrete pole base as indicated on contract drawings.

.2 Install poles true and plumb, complete with brackets in accordance with manufacturer's instructions.

.3 Install luminaires on pole davits and install lamps.

.4 Check luminaire orientation, level and tilt.

.5 Connect luminaire to lighting circuit.

.6 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.7 Provide underground duct banks and conduits as indicated on drawings.

.8 Scan existing underground circuits and relocate existing wiring to lighting standards as indicated on drawings.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 DEFINITIONS .1 Rock: any solid material in excess of 0.25 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

1.3 MEASUREMENT AND PAYMENT PROCEDURES .1 Measure rock removal in plan cubic meters (m^3) removed. Measurement to be verfied with Departmental Representative. All additional work is to be included in balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Not used.

PART 3 - EXECUTION

3.1 PROTECTION .1 Prevent damage to surroundings and injury to persons by erecting appropriate protective barriers to the approval of a Department Representative.

3.2 ROCK REMOVAL .1 Remove rock to alignments, profiles, and cross sections as indicated.

.2 Rock shall be removed by mechanical means.

.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 Prepare rock surfaces which are to bond to concrete, by scaling, pressure washing and broom cleaning surfaces.

.6 Excavate trenches to lines and grades as indicated on contract drawings. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.

.7 Cut trenches to widths as indicated.

.8 Remove boulders and fragments which may slide or roll into excavated areas.

.9 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 33.01.

3.3 ROCK DISPOSAL

.1 Dispose of surplus removed rock off site in accordance with section 01 74 20.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 16.26.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM C117-13, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D422-63(2007)e1, Standard Test Method for Particle-Size Analysis of Soils.
.4 ASTM D698-12ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ^{3}) (600 kN-m/m ^{3}).
.5 ASTM D1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ^{3}) (2,700 kN-m/m ^{3}).
.6 ASTM D4318-10e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)
.1 CAN/CSA-A3000-08, Cementitious Materials Compendium.
.2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation. Refer to Section 31 23 16.26.
.1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation, including asphalt, concrete, shrubs, roots, stones, topsoil, etc.

.2 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.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.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:
.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318-10e1, and gradation within limits specified when tested to ASTM D422-63(2007)e1 and ASTM C136-06.

.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.

1.4 SUBMITTALS

.1 Quality Control:
.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
.2 Submit for review by Department Representative proposed dewatering and sediment control methods as described in PART 3 of this Section.
.3 Submit to Department Representative plan for stockpiling, material storage, and staging area.

.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 and clearance record from utility authority.

1.5 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure Granular 'A' included in work in tonnes. All additional work is to be done in balance of project.

.2 Measure Granular 'B' included in work in tonnes. All additional work is to be done in balance of project.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

1.7 EXISTING CONDITIONS

.1 Buried services:
.1 Before commencing work verify location of buried services on and adjacent to site. Utility locates by owner of the utility or authorities having jurisdiction are required prior to commencement of work.
.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 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
.6 Where utility lines or structures exist in area of excavation, obtain direction of Department Representative before removing or re-routing. Costs for such Work to be paid by Owner.
.7 Record location of maintained, re-routed and abandoned underground lines.

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular A material as per OPSS 1010.

.2 Granular B material, Type II as per OPSS 1010.

.3 Select sub-grade material as per OPSS 1010.

.4 Unshrinkable fill: proportioned and mixed to provide:
.1 Maximum compressive strength of 0.4 MPa at 28 days.
.2 Maximum cement content of 25 kg/m ^{3} with 40 % by volume fly ash replacement: to CSA-A3001, Type GU.
.3 Minimum strength of 0.07 MPa at 24 h.
.4 Concrete aggregates: to CSA-A23.1/A23.2.
.5 Cement: Type GU.
.6 Slump: 160 to 200 mm.

PART 3 - EXECUTION

3.1 GEOTECHNICAL REPORT

.1 Refer to Appendix B: Soils Investigation Report (Inspec-sol, 2014) for site specific information.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings and Environmental Protection specification.

.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.

3.3 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

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

3.4 PREPARATION/ PROTECTION

.1 Protect existing features as required.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Department Representative's approval.

.4 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.

.5 Protect buried services that are required to remain undisturbed.

3.5 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas after area has been cleared of brush and weeds and removed off site.

.2 Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Department Representative.
.1 Stockpile height not to exceed 2 m and should be protected from erosion.

3.6 STOCKPILING

.1 Stockpile fill materials in areas designated by Department Representative.
.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

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

3.7 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Department Representative approval details of proposed dewatering or heave prevention methods, including well points (if applicable).

.3 Protect open excavations against flooding and damage due to surface run-off.

.4 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits as required.

3.8 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation under this item.

.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 Department 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 Excavated catchbasins, pipes, frames, concrete, etc. to be disposed off site.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Department Representative.

.12 Correct unauthorized over-excavation as follows:
.1 Fill under bearing surfaces and footings with granular A compacted to not less than 100 % of corrected Standard Proctor maximum dry density.
.2 Fill under other areas with granular A fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.

.13 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.

14. Excavated topsoil and subgrade not to reused for reinstatement, to be disposed off site. Coordinate with Department Representative.

3.9 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698ASTM D 1557.

3.10 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular "A" material for bedding and surround of underground services as per detail drawings. Cover material to extend to 300 mm above pipe obvert.

.2 Place bedding and surround material in unfrozen condition.

3.11 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:
.1 Department Representative has inspected and approved installations.
.2 Department Representative has inspected and approved of construction below finish grade.
.3 Inspection, testing, approval, and recording location of underground utilities.
.4 Removal of concrete formwork.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 200 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:
.1 Place bedding and surround material as specified elsewhere.
.2 Place layers simultaneously on both sides of installed Work to equalize loading.

3.12 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 Department Representative.

.2 Replace all disturbed topsoil as specified and to the satisfaction of the Department Representative.

.3 Reinstate lawns to elevation which existed before excavation (or as indicated).

.4 Reinstate pavements disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by the Department Representative.

.6 Protect newly graded areas from traffic and maintain free of trash or debris.

END OF SECTION

PART 1 - GENERAL

1.1 DELIVERY AND STORAGE

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 All additional Geotextile placement is to be included in the balance of project.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.

.2 Seams: sewn or lapped in accordance with manufacturer's recommendations.

.3 Thread for sewn seams: equal or better resistance to chemical and biological degration than geotextile.

.4 Physical properties:
.1 Thickness: to CAN/CGSB-148.1-M85, number 3 minimum 3.5 mm.
.2 Mass per unit area: to CAN/CGSB-148.1-M85, number 2, minimum 375 g/m.
.3 Tensile strength and elongation (in any principal direction): to CAN/CGSB-4.2-90, method 9.2.
.1 Tensile strength: minimum 690 N, wet condition.
.2 Seam strength: equal to or greater than tensile strength of fabric.
.3 Mullen burst strength: to CAN/CGSB-4.2-M88, method 11.1, minimum 2.2 kPa, wet condition.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Place geotextile material along the side of existing shoreline as indicated on the drawing.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Overlap each successive strip of geotextile 500 mm over previously laid strip.

.4 Join successive strips of geotextile by sewing.

.5 Protect geotextile material from displacement and damage during placement of filter stone material.

.6 Replace damaged or deteriorated geotextile.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure Rip-rap included in work in square meters (m²). All additional work is to be included in balance of project.

PART 2 - PRODUCTS

2.1 STONE

.1 Hard, dense with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects, to meet the following size distribution for use intended as per OPSS 1004 R-10:
.1 Remaining percentage of total volume to have uniform distribution of stones between 5 and 15 dm3.

.2 Rip rap shall be irregular stone having a minimum dimension not less than 100mm in any one direction to meet size requirements as indicated on Drawings and in accordance to OPSS 1004.

2.2 GEOTEXTILE FILTER

.1 Geotextile: to section 31 32 21.

PART 3 - EXECUTION

3.1 PLACING

.1 Place rip-rap as indicated on Drawing C1.2.

.2 Where rip-rap is to be placed on slopes, excavate a trench at toe of slope to dimensions indicated or directed.

.3 Fine grade area to be rip-rapped to a uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.

.4 Place geotextile on prepared surface in accordance with Section 31 32 21 - Geotextiles, and as indicated on Drawings. Place rip rap on geotextile so as to avoid puncturing geotextile.

.5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place large stones at bottom of slopes.

.6 Rip rap shall be placed such that the larger rocks are uniformly distributed and the smaller rocks serve to fill the spaces between the larger rocks in such manner as will result in a stable, densely placed layer of uniform thickness and regular surface. Hand placing will be required only to the extent necessary to secure the surfaces.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International).
.1 CSA G30.5, Welded Steel Wire Fabric for Concrete Reinforcement.

.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).

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

1.3 QUALITY ASSURANCE

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

1.4 MEASUREMEMT AND PAYMENT PROCEDURES

.1 All work to be included in the balance of the project.

PART 3 - EXECUTION

2.1 IDENTIFICATION AND PROTECTION

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

.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.

.4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an aborist or Canadian Certified Horticultural Technician (CCHT) as approved by Departmental Representative.

.5 Tree barrier 1.5m from drip line or 7.3m from the base of the trees.

2.2 ROOT CURTAIN SYSTEM

.1 Identify limits for required construction excavation as approved by Departmental Representative.

.2 Prior to construction excavation, hand dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.

.3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.

.4 Install wooden posts recycled composite plastic posts and welded wire fabric against construction edge of trench.

.5 Securely attach Type 2 filter fabric on plant side of wire mesh.

.6 Prepare homogeneous mixture of fertilizer, parent material and organic matter.
.1 Add organic matter to mixture to achieve 7-9 % organic matter content by weight.
.2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5 kg/m^3.

.7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85 % Standard Proctor Density.

.8 Protect root curtain from damage during construction operations.

.9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.

.10 Protect Remove root curtain before during backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

2.3 AIR LAYERING SYSTEM

.1 Aerate the root system using deep root fertilization in the spring and in the fall with vertical mulching of the soil

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 11 23 - Agregate Base Courses Section
Section 32 12 16.01 - Asphalt Paving

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)
.1 ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
.2 ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
.3 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.4 ASTM D 422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.
.5 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).
.6 ASTM D 1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).
.7 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
.8 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.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.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure Granular 'A' included in work in tonnes. All additional work to be included in the balance of the project.

.2 Measure Granular 'B' included in work in tonnes. All additional work to be included in the balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular sub-base material: in accordance with following requirements:
.1 Crushed, pit run or screened stone, gravel or sand.
.2 Granulars to OPSS 1010

PART 3 - EXECUTION

3.1 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 98% maximum dry density in accordance with ASTM D 1557.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.4 PROTECTION

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 11 16.01 - Granular Sub-base.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.74-2001, Alkyd Traffic Paint.

.3 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS 302-November 2007, Construction Specification for Primary Granular Base.
.2 OPSS 310-November 2012, Construction Specification for Hot Mixed Asphalt.
.3 OPSS 314-November 2013, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
.4 OPSS 1010-November 2013, MateriaNl Specification for Aggregates, Subbase, Select Subgrade, and backfill material.
.5 OPSS 1103-November 2012, Material SNpecification for Emulsified Asphalt.
.6 OPSS 1150-November 2010, Material Specification for Hot Mixed, Hot Laid Asphalt Concrete.

1.3 SAMPLES

.1 Submit to Department Representative, the asphalt mix design at least 2 weeks before paving work.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure Granular 'A' included in work in tonnes. All additional work to be included in the balance of the project.

.2 Measure Granular 'B' included in work in tonnes. All additional work to be included in the balance of the project.

.3 Measure Hotmix Asphalt (HL-3 at 50mm) included in work in tonnes placed. All additional work to be included in the balance of the project.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aggregates to: OPSS 1010.
.1 Granular A.
.2 Granular B Type II.
.3 Select subgrade.

.2 Prime coat: SS-1 to OPSS 1103.

.3 Asphalt concrete: HL-3 to OPSS 1150.

.4 Asphaltic joint sealent between existing and new asphalt: to ASTM D6690.

.5 The performace grade of asphalt as per Appendix B, Table A-1 OPSS 1101.

.6 Traffic paint: Alkyd yellow (505-308) and white(513-301) to CAN/CGSB-1.74 and OPSS 1712.

.7 Paint thinner: to CAN/CGSB-1.5.

PART 3 - EXECUTION

3.1 PAVEMENT THICKNESS

.1 As per cross section on detail drawing.

3.2 PAVEMENT CONSTRUCTION

.1 Application of tack coat: OPSS 1103. Apply only on clean and dry surface. Paint contact surfaces of curbs, gutters, manholes and like structures with thin, uniform coat of asphalt tack coat material.

.2 Construction of asphalt concrete: OPSS 310.

3.3 ASPHALT MARKINGS

.1 Paint stop lines, centre lines and other pavement markings in accordance with manufacturers recommendations and as indicated.

.2 Review layout with Department Representative prior to application.

.3 Use paint thinner in accordance with manufacturer's requirements.

.4 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

.5 Air temperature to be above 10°C, wind speed less than 60 km/h and no rain in forecast within next 4 hours.

.6 Paint lines to be of uniform colour and density with sharp edges.

.7 Remove incorrect markings as directed by Department Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS .1 Section 01 74 20.

1.2 REFERENCES .1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-15.1-92, Calcium Chloride, type S.

1.3 MEASUREMENT AND PAYMENT PROCEDURES .1 Included in Balance of Project.

1.4 DELIVERY STORAGE AND HANDLING .1 Supply calcium chloride in quantities and at times as directed by Department Representative.

PART 2 - PRODUCTS

2.1 MATERIALS .1 Calcium chloride, Calcium Chloride solid Grade 1, Class A s per OPSS 2501.

PART 3 - EXECUTION

3.1 APPLICATION .1 Apply calcium chloride and water with equipment approved by , and, when directed by Department Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

1.2 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 .1 OPSS 2501
.1 OPSS 802

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure topsoil included in work in cubic meters (m^2). All additional work is to be included in balance of project.

1.4 WASTE MANAGEMENT AND Waste DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 TOPSOIL

.1 Topsoil for sodded areas as per OPSS 802.

.2 All topsoil will be screened prior to placement. Topsoil will pass through a 25mm screen.

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 Sand: washed coarse silica sand, medium to course textured.

.3 Organic matter: compost in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.4 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.

.5 Limestone:
.1 Ground agricultural limestone.

.6 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 Department Representative of sources of topsoil to be utilized with sufficient lead time for testing.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan.

.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 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas after area has been cleared of brush weeds and grasses and removed from site.

.2 When stripping topsoil, avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.
.1 If discrepancies occur, notify Department Representative and do not commence work until instructed by Department Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 25 mm diameter and other deleterious materials.
.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
.2 Remove debris which protrudes more than 75 mm above surface.
.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Department Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 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 a Department Representative.
.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

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

3.7 SURPLUS MATERIAL

.1 Dispose of surplus material off site.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 20.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 SUBMITTALS

.1 Product Data.
.1 Submit product data in accordance with Section 01 33 00.
.2 Provide product data for:
.1 Seed.
.2 Mulch.
.3 Tackifier.
.4 Fertilizer.

1.3 SCHEDULING

.1 Schedule hydraulic seeding to coincide with preparation of soil surface.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure hydraulic seeding included in work in square meters (m^2). All additional work is to be included in balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
.1 Grass mixture: "Certified", "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".

.2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
.1 Type II mulch:
.1 Made from newsprint, raw cotton fibre and straw, processed to produce fibre lengths of 15 mm minimum and 25 mm maximum. Greater proportions of ingredients to be straw.

.3 Tackifier: water dilutable, liquid dispersion.

.4 Water: free of impurities that would inhibit germination and growth.

.5 Fertilizer:
.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
.2 Commercial Grade (10-10-10)

PART 3 - EXECUTION

3.1 WORKMANSHIP

.1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.

.2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.

.3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.

.4 Protect seeded areas from trespass until plants are established.

3.2 PREPARATION OF SURFACES

.1 Preparation of soil as per Section 32 91 19.13.

3.3 SLURRY APPLICATION

.1 Hydraulic seeding equipment:
.1 Slurry tank.
.2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.

.2 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
.1 Using correct nozzle for application.
.2 Using hoses for surfaces difficult to reach and to control application.

.3 Blend application 500 mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.

.4 Re-apply where application is not uniform.

.5 Remove slurry from items and areas not designated to be sprayed.

.6 Protect seeded areas from trespass.

.7 Remove protection devices as directed by Departmental Representative.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of seed application until acceptance by Departmental Representative.

.2 Grass Mixture:
.1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
.2 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
.3 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.5 ACCEPTANCE

.1 Seeded areas will be accepted by Departmental Representative provided that:
.1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.

.2 Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 33.01: Excavating, Trenching and Backfilling.

.2 Section 33 44 01: Storm Sewers.

.3 Section 33 34 02: Sanitary Sewers.

1.2 SOURCE QUALITY CONTROL

.1 Departmental Representative will inspect material at construction site.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure 1200mmØ Storm Maintenance Holes in vertical metres measured from lowest invert to finished grade on frame and cover. All additional work is to be included in the balance of the project.

.2 Measure 1200mmØ Sanitary Maintenance Holes in vertical metres measured from lowest invert to finished grade on the frame and cover. All additional work is to be included in the balance of the project.

.3 Measure 600x1400mm Ditch Inlet included in work in vertical metres measured from lowest invert to finished grade on frame and cover. All Additional work is to be included in the balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Cement: to CAN/CSA-A3001-08, Type GU.

.2 Water, aggregates, admixtures: to CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.

.3 Frames, gratings, covers: to plan dimensions and to following requirements for designated materials:
.1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.

2.1 MATERIALS (Cont'd)

.3 (Cont'd)
.2 Sanitary maintenance hole frames and covers: cover cast without perforations and complete with two 25 mm square lifting holes to OPSD 401.010 Nov. 2007, Type A.
.3 Storm maintenance hole frames and covers: cover cast with perforations and complete with two 25mm lifting hole to OPSD 401.010 Nov.2007 Type B. Frames to be provided with four 25mm holes to accomodate anchor bolts for fastening frame to concrete manhole. Holes to be configured by manufactuer. Fastenings to consist of 4-10mm dia. Stainless Steel adhesive anchors embedded 50mm and laid out as indicated.
.4 Catch basin frames and covers: to OPSD 400.020 Nov. 2007. Complete with bolt holes to secure, as indicated.
.5 All openings are to be lockabel.

.4 Precast maintenance holes: to ASTM C478M-09, OPSD 701.011.

.5 Ladder rungs: to OPSS 1351.

.6 Mortar:
.1 Aggregate: to CSA A179-04(R2009).
.2 Cement: to CAN/CSA-A3002-08.

.7 Adjustment rings: precast concrete to ASTM C478M-09.

.8 Perforated Drains: For every storm maintenance hole and catchbasin provide two (2) 100mm Ø flexible perforated pipe drains.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

.1 Excavation and backfill to Section 31 23 33.01.

.2 Excavation requires approval prior to installing maintenance holes or catch basins.

3.2 CONCRETE WORK

.1 Do concrete work to CSA-A23.1-09/A23.2-09.

.2 Position metal inserts to dimensions and details shown or required.

3.3 INSTALLATION

.1 Construct units to details indicated, plumb and true to alignment and grade.

.2 Complete maintenance holes as pipe laying progresses. Maximum of 3 maintenance holes behind point of pipe laying will be allowed.

.3 Pump maintenance hole excavation dry and remove soft and foreign material before placing concrete base.

.4 Set precast concrete slab on 300mm minimum of well compacted granular A material.

.5 Set bottom section of precast unit in place. Make each successive joint watertight with approved rubber ring gaskets, mastic joint filler, cement mortar, or combination thereof.

.6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.

.7 Plug lifting holes with precast concrete plugs set in cement mortar or compound.

.8 For sanitary sewers:
.1 Place stub outlets and bulkheads at elevations and in positions indicated.
.2 Bench to provide a smooth U-shaped channel. Side height of channel to be half diameter of sewer. Adjacent floor to be sloped at 75 mm/m. Channels to be curved smoothly. Slope invert to establish sewer grade. For pipes smaller than 150 use standard fittings, breaking out upper half of fitting upon completion of maintenance hole.

.9 Ensure top risers are parged with hydraulic cement to stop infiltration.

.10 Installing units in existing systems:
.1 Where new unit is within existing run of pipe, carefully remove existing pipe to dimensions required and install new unit as specified.
.2 Make joints watertight between new unit and existing pipe.
.3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready to be put into operation, complete the installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or any other necessary work.

3.3 INSTALLATION (Cont'd)

.11 Set frame and cover to required elevation, parge and make smooth and watertight.

.12 All manhole and catch basin security components will need to be verified and replaced when deemed defective following the Departmental Representative's review and approval.

.13 Place frame and cover on top section to elevation indicated. If adjustment required use concrete ring.

.14 Clean units of debris and foreign materials; remove fins or sharp protuberances.

3.4 ADJUSTING TOPS EXISTING UNITS

.1 Remove existing gratings, and frames, and store for re-use at locations designated by Departmental Representative.

.2 Sectional units:
.1 Raise or lower straight walled sectional units by adding or removing precast sections as required.
.2 Raise or lower tapered units by removing cone section, adding, removing, or substituting riser sections to obtain required elevation, then replace cone section.

.3 Monolithic units:
.1 Raise monolithic units by roughening existing top to ensure proper bond and extend to required elevation with:
.1 Mortared brick course for 150 mm or less alteration.
.2 Cast-in-place concrete.
.2 Lower monolithic units with straight wall by removing concrete to elevation indicated for rebuilding.
.3 When monolithic units with tapered upper section are to be lowered more than 150 mm remove concrete for entire depth of taper plus as much straight wall as necessary, then rebuild upper section to required elevation with cast-in-place concrete.
.4 Install additional maintenance hole ladder rungs in adjusted portion of units as required.
.5 Re-use existing gratings, frames.
.6 Re-set gratings and frames to required elevation on full bed of cement mortar, parge and trowel smooth.

3.5 SEALING OVER EXISTING UNITS

.1 Cut galvanized iron sheet to extend 50 mm beyond opening of existing maintenance hole or catch basin grating. Center iron sheet over existing grating and spot or stitchweld to grating.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 33 05 14: Maintenance holes and catch basins.

1.2 MATERIAL CERTIFICATION

.1 Contractor shall verify pipe diameter, pipe outside dimension and pipe type prior to ordering new material for installation.

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

1.3 AS BUILT DRAWINGS, OPERATING AND MAINTENANCE DATA

.1 Provide as built drawings of sewers upon project completion. Give details of pipe material, location of cleanouts, directions and list of equipment to operate valves, other maintenance and operating instructions.

1.4 SCHEDULING OF WORK

.1 Schedule work to minimize interruptions to existing services.

.2 Maintain existing sewage flows during construction and provide pumping as required.

.3 Submit schedule of expected interruptions for approval and adhere to approved schedule.

1.5 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measurement for the Sanitary Sewer Pipe included in work in linear meters. All additional work is to be included in balance of project.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

.1 Gravity sewer pipe and fittings: Type PSM Poly (Vinyl Chloride): to ASTM D3034-08.
- .1 Standard Dimension Ratio (SDR): 28.
- .2 Locked-in gasket and integral bell system.
- .3 Nominal lengths: 4 m.

2.2 PIPE BEDDING MATERIALS

.1 Granular material to following requirements:
.1 Crushed or screened stone, gravel or sand free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
.2 Granular 'A': to OPSS 1010.

.2 Concrete required for thrust blocks to be 20 MPa.

2.3 INSULATION

.1 HI-40 DOW rigid insulation, or approved equivalent, 50mm thick insulation boards installed as per manufacturer's specifications.

2.4 COUPLER

.1 An appropriate size pipe coupler will be utilized to connect existing pipe to new pipe.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 TRENCHING AND BACKFILL

.1 Carry out trenching work as required to install sewers to lines and grades indicated.

.2 Do not allow contents of any sewer or sewer connection to flow into trench.

.3 Trench line require approval prior to placing bedding material and pipe.

.4 Do not backfill trenches between joints until pipe grade and alignment have been checked and accepted by Departmental Representative. Do not backfill at joints until pressure and leakage test results are within limits specified unless otherwise approved by Departmental Representative. Protect pipe from freezing if tested at temperatures lower than 5°C.

.5 Remove excess excavated material from the site.

.6 If cover of 1.5m is not maintained, insulation must be used.

3.3 INSTALLATION

.1 Place 150 mm granular bedding materials under piping.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.

.3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.

.4 Compact full width of bed to at least 95% Standard Proctor density.

.5 Lay and join pipes in accordance with manufacturer's recommendations.

.6 Handle pipe carefully with equipment recommended by manufacturer.

.7 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.8 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.9 Do not exceed maximum joint deflection recommended by pipe manufacturer.

.10 Do not allow water to flow through pipe during construction, except as may be permitted by Departmental Representative.

.11 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.12 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.

.13 Install PVC pipe and fittings in accordance with CAN/CSA-B1800 Series-06.

.14 Pipe jointing:
.1 Install gaskets in accordance with manufacturer's recommendations.
.2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
.3 Align pipes carefully before joining.

.4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
.5 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced before joining is attempted.
.6 Complete each joint before laying next length of pipe.
.7 Minimize joint deflection after joint has been made to avoid joint damage.
.8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

.15 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.16 Make watertight connections to maintenance holes. Use non-shrink grout when suitable gaskets are not available.

.17 Upon completion of pipe laying and after Departmental Representative has inspected pipe joints, place minimum 150 mm granular bedding material around and over top of pipes and compact as for bedding material. Backfill remainder of trench with excavated material.

.18 Plug service laterals with water tight caps or plugs as approved by Departmental Representative.

.19 Place location marker at ends of plugged or capped unconnected sewer lines.

3.4 FIELD TESTING

.1 Test force main in presence of Departmental Representative.

.2 Brace caps, bends and tees to prevent movement during tests.

.3 Expel air from main by slowly filling with water. High points to be drilled and tapped and suitable cocks installed to vent air and to be shut when pressure is applied. Remove cocks after satisfactory testing and seal holes with tight fitting plugs.

.4 Apply hydrostatic test pressure of 690 kPa based on lowest point in line and corrected to elevation of test gauge for hydrostatic test and 345 kPa for leakage test.

.5 Apply pressures for 1 h for pressure test and 2 h for leakage test.

.6 Remove defective joints, pipe and fittings where found and replace with new sound material.

.7 Define leakage as amount of water from source tank in order to maintain test pressure for 2 h. Allowable leakage to be as defined in AMSI/AWWA C600-10.

.8 Repeat testing until test results fall within accepted allowances.

.9 Upon the approval of the Departmental Representative CCTV inspection shall be considered an approved alternative to the testing outlined above. Contractor to submit copies of video inspections and reports to Departmentanl Representative for review and approval.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 ATSM International
.1 ASTM F667-[06], Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.

.2 CSA International
.1 CAN/CSA-G401-[07], Corrugated Steel Pipe Products.

.3 U.S. Environmental Protection Agency (EPA) / Office of Water
.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure 300mmØ CSP Culvert included in work in linear metres. All additional work is to be included in balance of project.

1.3 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 pipes and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

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

PART 2 - PRODUCTS

2.1 CORRUGATED STEEL PIPE

.1 Corrugated steel pipe: to CAN/CSA-G401, as per OPSS 1801 galvanized, profile 68x13mm x 1.6mm thick.

2.2 CORRUGATED POLYETHYLENE PIPE AND FITTINGS

.1 Polyethylene resin: to ASTM D1248, grade W9.

.2 Weathering resistance: to ASTM D1248.

2.3 GRANULAR BEDDING AND BACKFILL

.1 Granular bedding and backfill material to 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 pipe culvert installation in accordance with manufacturer's written instructions.

3.2 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01.

.2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.3 BEDDING

.1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.

.2 Place bedding as indicated on contract drawings.

.3 Place bedding in unfrozen condition.

3.4 LAYING CORRUGATED STEEL PIPE CULVERTS

.1 Begin pipe placing at downstream end.

.2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.

.3 Lay pipe with outside circumferential laps facing upstream.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section [01 74 11].

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 33.01: Excavating, Trenching and Backfilling.

.2 Section 33 05 14: Maintenance Holes and Catch Basins.

1.2 MATERIAL CERTIFICATION

.1 Contractor shall verify material type and size prior to ordering/installing new storm sewer.

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

1.3 SCHEDULING OF WORK

.1 Schedule work to minimize interruptions to existing services.

.2 Maintain existing flow during construction and provide pumping as required.

.3 Submit schedule of expected interruptions for review and adhere to approved schedule.

1.4 MANUFACTURER'S INSTRUCTIONS

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

1.5 MEASUREMENT AND PAYMENT PROCEDURES
ART 2 - PRODUCTS

.1 Measure 525mmØ Storm Sewer Pipe in linear metres. All additional work is to be included in balance of project.

.2 Measure 300mmØ Storm Sewer Pipe in metres. All additonal work is to be included in balance of project.

2.1 PLASTIC PIPE

.1 Gravity sewer pipe and fittings: Type PSM Poly (Vinyl Chloride): to ASTM D3034-08.
.1 Standard Dimension Ratio (SDR): 35.
.2 Locked-in gasket and integral bell system.
.3 Nominal lengths: 4 m.

2.2 PIPE BEDDING MATERIALS

.1 Granular material: Granular A as per OPSS 1010.

2.3 INSULATION

.1 HI-40 DOW rigid insulation, or approved equivalent, 50mm thick insulation boards installed as per manufacturer's specifications.

2.4 COUPLER

.1 Use appropriate sized pipe coupler will to join existing to new storm sewer.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 TRENCHING AND BACKFILLING

.1 Do trenching and backfilling in accordance with Section 31 23 33.01.

.2 Trench line and depth require approval prior to placing bedding material and pipe.

.3 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by Departmental Representative.

.4 If cover of 1.5 meters is not maintained, insulation must be used.

3.3 GRANULAR BEDDING

.1 Place granular bedding materials to details indicated or directed.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.

.3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.

.4 Compact full width of bed to at least 100% Standard Proctor Density.

.5 Use bedding stone in lieu of sand bedding material when directed.

.6 Fill excavation below bottom of specified bedding adjacent to maintenance holes or catch basins with bedding material or common backfill as directed.

3.4 INSTALLATION

.1 Lay and join pipe in accordance with manufacturer's recommendations.

.2 Handle pipe by approved methods. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.

.3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.4 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.5 Do not exceed maximum joint deflection recommended by pipe manufacturer.

.6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.

.7 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.

.8 Joints:
.1 Install gaskets in accordance with manufacturer's recommendations.
.2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
.3 Align pipes carefully before joining.
.4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
.5 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced before joining is attempted.
.6 Complete each joint before laying next length of pipe.

.7 Minimize joint deflection after joint has been made to avoid joint damage.

.8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

.9 When any stoppage of work occurs, block pipes as directed to prevent "creep" during down time.

.10 Plug lifting holes with approved prefabricated plugs set in non-shrink grout.

.11 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave a smooth end at right angles to axis of pipe.

.12 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes. Joint to be structurally sound and watertight.

.13 Plug open upstream ends of pipes with removable watertight concrete, steel or wooden bulkheads.

END OF SECTION

APPENDIX A
Mitigation and Residual Effects Summary

Table 5: Environmental Effects Analysis – Mitigation Measures and Residual Effects

Valued Ecosystem Component (VEC)/ Valued Social Component (VSC)	Description of Potential Project Interaction with VEC/VSC	Mitigation Measures[22]	Residual Effects[23]	Significance of Residual effects[24]	Further Study or Follow up
Air Quality	Potential for fumes and air emissions from construction materials and vehicle/machinery to degrade air quality during site preparation and parking lot installation.	Vehicles/machinery to be in good repair, equipped with emission controls as applicable and operated within regulatory requirements. Vehicles and machinery should not be left idling while not in use. Minimize vehicle traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Undertake misting, create localized wind barriers or implement other methods particularly during dry, dusty conditions to avoid generating airborne or surface dust and particulates. Stabilize areas of stockpiled or exposed soils. Avoid activities with potential to release airborne particulates during windy and prolonged dry periods.	Minimal potential for the degradation of local air quality from construction activitie4s. Impacts would not be significant as they would: result in small increase compared to background; be reversible over time; be located only in immediate area of project; take place for less than 2 months; and even though they would occur continuously during site preparation and parking lot installation.	-1	No

[22] Although some of the pertinent legislation, regulations, guidelines and policies are noted in the mitigation, the information is not considered necessarily complete. Furthermore, it is to be expected that new, amended, modified or otherwise updated legislation, regulations, guidelines and policies will come available over time. The Contractor is responsible to ensure that all applicable legislation, regulations, guidelines and policies are adhered to.

[23] Residual Effects and Significance of Residual Effects evaluated in accordance with criteria in Table 4.**Error! Reference source not found.**

[24] Significance of Residual Effects rated as follows:

0 = None, 1 = Not significant, 2 = Significant, 3 = Unknown, Positive (+), Negative (-)

Valued Ecosystem Component (VEC)/ Valued Social Component (VSC)	Description of Potential Project Interaction with VEC/VSC	Mitigation Measures[22]	Residual Effects[23]	Significance of Residual effects[24]	Further Study or Follow up
		Keep the main entrance road clear of any mud or earth tracked from vehicles. Keep asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.			
Surface Water	Potential for debris and other materials (e.g. concrete, petroleum products or other deleterious substances) during construction, and operational activities to enter drainage ditches and ultimately into Millhaven Creek or Lake Ontario.	All activities including maintenance procedures should be controlled to prevent the entry of concrete, petroleum products, or other deleterious substances into the water. Construction machinery and equipment is to arrive on-site in a clean condition and be maintained free of fluid leaks. Maintenance of vehicles and equipment to be carried out on pre-designated location more than 30 m from any wetlands or water bodies. Ensure site drainage conditions are accounted for in site development plans. An erosion and sediment control plan should be developed by the contractor to mitigate potential effects on water quality, and appropriate measures should be adopted to minimize any impacts of accidental spills during construction. Plan shall be in place prior to conducting work. Sediment and erosion control plan should consider the following: • Implement temporary erosion and sediment control measures to	Minimal/remote potential for sediments, dust or contaminants (concrete, lead, fuel, waste water) to enter Millhaven Creek or Lake Ontario since they are more than 1 km away from project site. Impacts would not be significant as they would: result in small increase compared to background; be reversible over time; be located only in immediate area of project; take place for less than 2 months; and occur infrequently during construction and operation.	-1	No

Valued Ecosystem Component (VEC)/ Valued Social Component (VSC)	Description of Potential Project Interaction with VEC/VSC	Mitigation Measures[22]	Residual Effects[23]	Significance of Residual effects[24]	Further Study or Follow up
		prevent erosion/runoff from impacting adjacent wetland area. Maintain these measures until the site has stabilized. • Inlet protection at all existing catch basins/storm drains/outfalls (that is, those which are not being immediately replaced) should be installed prior to the commencement of construction and will remain functional until construction completion. • Control measures should be inspected daily to ensure they are functioning and are maintained as required. If the control measures are not functioning properly, no further work will occur until the problem is resolved. • Restore disturbed areas as soon as possible to minimize the duration of soil exposure. Restoration should be to a pre-disturbed state or better.			
Vegetation	Potential for vegetation to be disturbed and removed during the site preparation and parking lot installation.	Minimize damage and removal of vegetation to the extent possible including consideration of minimal road re-routing and restore vegetation where feasible. Vegetation selected for removal or protection will be identified and specific protection barriers will be installed where required prior to construction. If possible, trees that are removed from the site will be replanted on the CSC property.	Minimal potential for impacts to vegetation as the project only involves limited removals. Impacts would not be significant as they would: result in small removal of vegetation compared to the entire site; be reversible over time	-1	No

Valued Ecosystem Component (VEC)/ Valued Social Component (VSC)	Description of Potential Project Interaction with VEC/VSC	Mitigation Measures[22]	Residual Effects[23]	Significance of Residual effects[24]	Further Study or Follow up
		Establish staging areas and site access routes away from existing trees/naturalized vegetation to the extent possible. All exposed soils shall be stabilized and re-vegetated as soon as possible (during the growing season) and in conjunction with planting works. Vegetation will be restored upon completion of construction using native species, non-invasive species typical of the locality and soils to restore pre-construction conditions. Construction activities are to minimize disturbance to grassed areas. Any grassed areas to be used for construction activities are to be cleared and stripped and topsoil is to be stockpiled. Areas are to be stabilized after construction activities are complete.	(potential for replanting elsewhere); be located only in immediate area of project; take place for less than 2 months; and occur infrequently during construction.		
Groundwater Quality	Potential contamination of groundwater during construction and operations through accidental spills.	Designated fuelling area(s) will be established. A Spills Management and Emergency Response Plan will be developed and implemented. All workers should be fully aware of the spill prevention and response procedures including notification of the CSC and MOE Spills Action Centre at 1-800-268-6060. Spill kits shall be kept on-site during all project phases. Disposal of waste generated by a spill will	All significance criteria are rated low except geographic extent and duration as the potential for groundwater contamination through accidental spills will continue through operations as there are always vehicles on site. No significant adverse effect on Groundwater Quality anticipated.	-1	No

Valued Ecosystem Component (VEC)/ Valued Social Component (VSC)	Description of Potential Project Interaction with VEC/VSC	Mitigation Measures[22]	Residual Effects[23]	Significance of Residual effects[24]	Further Study or Follow up
		be done in compliance with Ontario Waste Regulations and at an MOE-approved disposal facility.			

Soil	Potential contamination and disturbance of soil during construction and operations through vehicle movement and accidental spills.	Avoid the movement of heavy machinery in areas of sensitive slopes, use wooden planks if necessary. Avoid using heavy machinery on land during wet weather. Reduce soil compaction by restricting large machinery to the designated staging area. To minimize land disturbance, the construction envelope will be clearly demarcated and kept as small as possible. Develop and implement an erosion control plan to re-vegetate or otherwise stabilize any loose soils after construction to prevent erosion and transport (e.g., erosion blanket seeded with native non-invasive species). See mitigation measures for Groundwater Quality.	All significance criteria are rated low except duration as the potential for soil contamination through accidental spills and vehicle movement will continue through operations as there are always vehicles on site. No significant adverse effect on Soil anticipated.	-1	No
Birds and Wildlife	Potential disturbances to the birds and wildlife in the area from construction activities (i.e. generation of noise and dust).	Should wildlife (mammals, reptiles, amphibians, birds, etc.) be encountered at any time during the project, measures are to be implemented to avoid destruction, injury, or interference with the species, wait for the individual to flee the site for alternative cover. All work is to be undertaken in compliance with Migratory Birds Convention Act and with local noise bylaws. If a migratory bird is found to be using the construction area for breeding or nesting, the contractor will halt work. Environment Canada must be contacted for further guidance prior to work commencing.	Minimal potential for dust and generation of noise to disturb birds and wildlife due to small magnitude, limited geographical extent, and duration of construction activities.	-1	No

		Minimize duration and extent of disturbance to existing vegetation and natural areas serving as habitat. Minimize the frequency of dust-generating construction activities during prolonged periods of dry weather. Restore disturbed areas with native vegetation upon completion of construction to promote long term naturalization to original condition. In areas adjacent to sensitive wildlife areas or corridors, restrict operation to daylight hours to the extent practicable to avoid disturbance during prime periods for wildlife movement (i.e. dawn and dusk).			
Species at Risk	Potential disturbance of species at risk or destruction of their habitat.	Each day prior to commencement of work, a search of the work site shall be conducted to ensure that there are no SAR present at the work site. Should a species or its critical habitat be encountered, measures are to be implemented to avoid destruction, injury or interference with the species, its residence and/or its habitat (e.g., through sighting, timing or design changes). If the foregoing cannot be avoided the Contractor should cease work and contact Environment Canada for advice regarding mitigation measures. In the event that it is determined that the project likely may have unexpected adverse effects on species at risk (SAR), the respective competent Minister (i.e., Environment Canada for migratory birds) SAR should be immediately notified. Install perimeter silt fencing to prevent	The magnitude, geographic extent and ecological context are rated low as there is no critical SAR habitat located in the footprint of the parking area. The duration, frequency, permanence and ecological context are low. The minimal vegetation/potential habitat to be removed is already adjacent to disturbed areas with low likelihood of providing habitat for SAR. No significant adverse effect on SAR species or critical habitat of SAR species anticipated.	-1	No.

		SAR from entering the construction zone (frogs, turtles and snakes). To the extent possible, vegetation clearing should occur before or after monarch migration to avoid impacts to this species. This species typically resides in Ontario between May and September and may be encountered in various life stages on host vegetation (milkweed). To the extent possible, vegetation clearing will be undertaken outside of the breeding season for birds. Clearing is to be avoided from April 15 to July 31.			

CSC Bath Institution – New Parking Lot Extension
Bath, Ontario
PWGSC Project No. R.067955.001

The purpose of this record is to monitor the implementation of mitigation measures and best management practices identified in the Environmental Effects Evaluation. It is the responsibility of the Project Manager to ensure that this record is completed over the duration of the project. This environmental Mitigation Monitoring Report form must be completed in full. Specify in the table below whether the mitigation measures and best management practices set out in the environmental assessment have been applied. If a mitigation measure has not been applied, specify the reason(s) why this was not done.

Furthermore although some of the pertinent legislation, regulations, guidelines and policies are noted in the mitigation, the information is not considered necessarily complete. It is to be expected that new, amended, modified or otherwise updated legislation, regulations, guidelines and policies will come available over time. The contractor is responsible to ensure that all applicable legislation, regulations, guidelines and policies are adhered to.

Environmental Mitigation Measure	**Implementation Schedule/Date**	**Person/Title/ Firm Responsible**	**Compliance (Task Complete – Yes or No/Date) If No, provide reason**
Air Quality			
Vehicles/machinery to be in good repair, equipped with emission controls as applicable and operated within regulatory requirements. Vehicles and machinery should not be left idling while not in use. Minimize vehicle traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads. Undertake misting, create localized wind barriers or implement other methods particularly during dry, dusty conditions to avoid generating airborne or			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
surface dust and particulates. Stabilize areas of stockpiled or exposed soils. Avoid activities with potential to release airborne particulates during windy and prolonged dry periods. Keep the main entrance road clear of any mud or earth tracked from vehicles. Keep asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.			
Surface Water			
All activities including maintenance procedures should be controlled to prevent the entry of concrete, petroleum products, or other deleterious substances into the water. Construction machinery and equipment is to arrive on-site in a clean condition and be maintained free of fluid leaks. Maintenance of vehicles and equipment to be carried out on pre-designated location more than 30 m from any wetlands or water bodies. Ensure site drainage conditions are accounted for in site development plans. An erosion and sediment control plan should be developed to mitigate potential effects on water quality, and appropriate measures should be adopted to minimize any impacts of accidental spills during construction. Plan shall be in place prior to conducting work.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
Implement temporary erosion and sediment control measures to prevent erosion/runoff from impacting adjacent wetland area. Maintain these measures until the site has stabilized. Inlet protection at all existing catch basins/storm drains/outfalls (that is, those which are not being immediately replaced) should be installed prior to the commencement of construction and will remain functional until construction completion. Control measures should be inspected daily to ensure they are functioning and are maintained as required. If the control measures are not functioning properly, no further work will occur until the problem is resolved. Restore disturbed areas as soon as possible to minimize the duration of soil exposure. Restoration should be to a pre-disturbed state or better.			
Vegetation			
Minimize damage and removal of vegetation to the extent possible including consideration of minimal road re-routing and restore vegetation where feasible. Vegetation selected for removal or protection will be identified and specific protection barriers will be installed where required prior to construction. If possible, trees that are removed from the site will be replanted on the CSC property. Establish staging areas and site access routes away from existing trees/naturalized vegetation to the extent possible.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
All exposed soils shall be stabilized and re-vegetated as soon as possible (during the growing season) and in conjunction with planting works. Vegetation will be restored upon completion of construction using native species, non-invasive species typical of the locality and soils to restore pre-construction conditions. Construction activities are to minimize disturbance to grassed areas. Any grassed areas to be used for construction activities are to be cleared and stripped and topsoil is to be stockpiled. Areas are to be stabilized after construction activities are complete.			
Groundwater			
Designated fuelling area(s) will be established. A Spills Management and Emergency Response Plan will be developed and implemented. All workers should be fully aware of the spill prevention and response procedures including notification of the CSC and MOE Spills Action Centre at 1-800-268-6060. Spill kits shall be kept on-site during all project phases. Disposal of waste generated by a spill will be done in compliance with Ontario Waste Regulations and at an MOE-approved disposal facility.			
Soil			
Avoid the movement of heavy machinery in areas of sensitive slopes, use wooden planks if necessary. Avoid using heavy machinery on land during wet weather.			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
Reduce soil compaction by restricting large machinery to the designated staging area. To minimize land disturbance, the construction envelope will be clearly demarcated and kept as small as possible. Develop and implement an erosion control plan to re-vegetate or otherwise stabilize any loose soils after construction to prevent erosion and transport (e.g., erosion blanket seeded with native non-invasive species).			
Birds and Wildlife			
Should wildlife (mammals, reptiles, amphibians, birds, etc.) be encountered at any time during the project, measures are to be implemented to avoid destruction, injury, or interference with the species, wait for the individual to flee the site for alternative cover. All work is to be undertaken in compliance with Migratory Birds Convention Act and with local noise bylaws. If a migratory bird is found to be using the construction area for breeding or nesting, the contractor will halt work. Environment Canada must be contacted for further guidance prior to work commencing. Minimize duration and extent of disturbance to existing vegetation and natural areas serving as habitat. Minimize the frequency of dust-generating construction activities during prolonged periods of			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
dry weather. Restore disturbed areas with native vegetation upon completion of construction to promote long term naturalization to original condition. In areas adjacent to sensitive wildlife areas or corridors, restrict operation to daylight hours to the extent practicable to avoid disturbance during prime periods for wildlife movement (i.e. dawn and dusk).			
Species at Risk			
Each day prior to commencement of work, a search of the work site shall be conducted to ensure that there are no SAR present at the work site Should a species or its critical habitat be encountered, measures are to be implemented to avoid destruction, injury or interference with the species, its residence and/or its habitat (e.g., through sighting, timing or design changes). If the foregoing cannot be avoided the Contractor should cease work and contact Environment Canada for advice regarding mitigation measures. In the event that it is determined that the project likely may have unexpected adverse effects on species at risk (SAR), the respective competent Minister (i.e., Environment Canada for migratory birds) SAR should be immediately notified. Install perimeter silt fencing to prevent SAR from entering the construction zone (frogs, turtles and snakes). To the extent possible, vegetation clearing should occur before or after monarch migration to avoid impacts to this species. This species typically			

Environmental Mitigation Measure	Implementation Schedule/Date	Person/Title/ Firm Responsible	Compliance (Task Complete – Yes or No/Date) If No, provide reason
resides in Ontario between May and September and may be encountered in various life stages on host vegetation (milkweed). To the extent possible, vegetation clearing will be undertaken outside of the breeding season for birds. Clearing is to be avoided from April 15 to July 31.			

NOTES: _____
_____
_____
_____
_____

Environmental Assessment Mitigation Monitoring Report Form Completed By:

Name: _____ Title: _____

Company: _____ Phone No.: _____

Signature: _____ Date: _____

APPENDIX B
Geotechnical Investigation

Project No.: T031061-A1

Kingston, May 2, 2014

PWGSC
c/o Mr. Matt Morkem, P.Eng.
WSP
201-1224 Gardiners Road
Kingston, ON K7P 0G2

Subject: Soils Investigation Report
Parking Lot Expansion
Bath Institution
Millhaven, Ontario

Dear Mr. Morkem:

Inspec-Sol Inc. (**Inspec-Sol**) was retained by PWGSC (Client) c/o WSP (WSP), to undertake a Soils Investigation for proposed new parking areas to be constructed at Bath Institution in Bath, ON (Site). The authorization to proceed with this study was provided by WSP on February 27, 2014, who were acting on behalf of the client.

The purpose of the investigation was to evaluate the subsoil stratigraphy in the area of the proposed new parking areas and based upon the data; provide recommendations for the construction of the new parking lot and possible new sewers. The proposed areas are adjacent to existing paved areas.

The Site is located on the west side of Bath Institution, in Bath, Ontario and consists of an open field area located directly to the west of the existing parking lot, which is to the west of the main institution buildings. The location of the Site is shown on the Site Location Plan, attached as Dwg. No. T031061-A1-1. The topography in the area of the boreholes is relatively flat and the site has scrub, bush and occasional tree vegetation cover.

The fieldwork program was completed on March 27, 2014 and consisted of the advancement of three (3) boreholes to 1.5m or practical refusal in the locations proposed by WSP. **Inspec-Sol** retained a drilling subcontractor (G.E.T Drilling) to carry out the work, which was monitored by **Inspec-Sol** technical field staff. Boreholes were drilled using a truck-mounted CME-55 drill rig, equipped with continuous flight auger equipment. Standard Penetration Tests (SPTs) were performed at regular intervals using a 50mm split-barrel sampler and a 63.5kg hammer, free falling from a distance of 760mm, in order to collect soil samples. The number or drops required to drive the sampler 0.3m is recorded as the “N” value.

The boreholes were laid out by **Inspec-Sol** personnel. The locations of the boreholes are shown on the Borehole Location Plan, Drawing No. T031061-A1-2. Each borehole was assigned an arbitrary elevation of 100.00m.

In general, soils encountered at the borehole locations consisted of a layer of sand and gravel fill in BH1, or topsoil overlying a native sandy clay and silty clay in BH2 and BH3. Practical refusal was encountered at depths of 1.88m, 1.14m and 0.68m bgs in boreholes BH1, BH2, and BH3 respectively.

There were no monitoring wells installed as part of the field program, and no groundwater was observed in the open boreholes upon completion of drilling.

Detailed descriptions of the subsurface conditions are shown on the attached *Borehole Logs*, as *Enclosure Nos: 1 to 3* at the end of this letter. *Notes on Borehole and Test Pit Logs* are provided as *Appendix A*, at the end of this report.

Based on our understanding of the project, the subsurface conditions encountered in the boreholes, and assuming them to be representative of the subsurface conditions across the Site, the following comments and recommendations are provided.

- Site Preparation: Any scrub, brush, and trees should be grubbed and cleared. Cover materials including topsoil and root systems (BH2 & BH3), existing asphalt and sand and gravel fill (BH1) should be stripped from proposed pavement areas, in order to expose native sandy clay or silty clay subgrade. The exposed subgrade should be proof-rolled under heavy construction equipment to identify localized areas of weakness. Proof rolling would typically involve running a loaded dump truck (or similar) over the subgrade under the supervision of qualified geotechnical personnel. Any identified weak areas should be subsequently removed and replaced with suitable granular fill materials. Excavated sand and gravel fill from BH1 may be used as subgrade material but would require review during construction by qualified geotechnical personnel.

- Excavation: Based on the results of the Geotechnical Investigation, the soil excavation profile would be considered Type 2 soil conditions for the shallow excavations (i.e. < 1.0 - 2.0m) expected at this site. Bedrock quality conditions were not recorded during the Geotechnical Investigation. Excavations into the overburden material should be relatively straightforward with conventional excavation equipment. If new sewers are planned however, bedrock excavation will be necessary and contractors should ensure

rock breaking and rock moving equipment is available if it becomes necessary. Blasting or hoe ramming methods are the likely bedrock refusal techniques. These methods will impose vibration that may affect existing nearby surface or subsurface structures, pre-construction condition surveys are recommended.

- Bedding and Trench Backfill: If new sewers are planned, bedding, spring-line, and cover should conform in size and type to local requirements of the institution. The following are recommendations for service trench bedding and cover materials in place of any other specific requirements:
    - Bedding for buried utilities should be OPSS Granular 'A' or 'B' Type II as applicable, and placed in accordance with pertinent Ontario Provincial Standard Drawings (OPSD);
    - Use of clear 19 mm stone is not recommended for use as bedding. The voids in the stone may result in a low gradient water flow and infiltration of fines from the surrounding soils and cover materials, causing settlement and loss of support to pipes and structures;
    - The cover material should be a sand material or Granular 'A' and the dimensions should comply with pertinent OPSD standards;
    - The bedding material and cover materials should be compacted as per OPSS and to at least 95% of its Standard Proctor Maximum Dry Density (SPMDD); and
    - Compaction equipment should be used in such a way that the utility pipes are not damaged during construction.

- Backfill above the cover for buried utilities should be in accordance with the following recommendations:
    - For service trenches under pavement areas, the backfill should be placed and compacted in uniform thickness compatible with the selected compaction equipment and not thicker than 200 mm. Each lift should be compacted to a minimum of 95% SPMDD;
    - The backfill placed in the upper 300 mm below a pavement subgrade elevation should be compacted to a minimum of 100% SPMDD;
    - To reduce the potential for differential settlement and frost heave, the selected backfill materials should reasonably match the existing soil profile within the frost penetration zone (1.5 m below finished grade). Alternatively, if imported backfill, including granular materials, are used then the excavation sides should have frost tapers as per OPSD 800 series which essentially indicates that there should be a backslope of 10:1 (H:V) within the frost zone;

- If the native excavated soils are used as backfill, this material should be protected from moisture increases during construction. The native excavated soils may should be assessed and approved by a Geotechnical Engineer prior to placement; and
- Excavated soils that are too wet (i.e. greater than 5% above the optimum moisture content based upon a Standard Proctor Test) will become problematic to compact and may not perform properly during construction period. If such conditions occur, the options include drying of the soils; compacting and leaving the area untraveled for a period of time; importation of more suitable material; or a combination of above and the use of geotextiles at the base and possibly additional layers within the pavement structure's granular base courses. The appropriate measures will need to be discussed during construction period and be such to achieve adequate performance from the pavement structure.
- If excavated rock shatter is to be considered for backfill, we recommend it be well graded with a maximum nominal size of 150mm. It should be excavated and stockpiled separately from the overburden soils. The stockpiled materials should be examined by the clients Engineer or geotechnical technical personnel for verification of its approval for re-use. If it is to be re-used then it is recommended that it be placed on the cover material and if required, suitable overburden be placed above the approved shatter rock fill. The shatter rock fill, if used, should be placed in 0.3 m lifts and compacted with approved equipment. Compaction verification of shatter rock should be done by visual means by experienced technical personnel as it will not be possible to practically carry out any physical testing. The final surface should have the voids chinked and a filter cloth (Terrafix 600R or equivalent non-woven geotextile) placed once the surface is approved.

- Pavement Sections
  - All parking areas should be prepared as stated earlier.
  - In the new parking lot area, the exposed final subgrade surfaces should be proof-rolled under heavy construction equipment (typically with a loaded tri-axle dump truck) in order to identify any localized weak areas in the subgrade. Any identified weak areas should be sub-excavated to suitable material and backfilled with Engineered Fill. All proof-rolling activities should be performed under the supervision of qualified geotechnical personnel.

- For the new parking area, the asphalt pavement section is recommended to be as per Table 1. Pavement materials and workmanship should conform to the appropriate Ontario Provincial Standard Specifications (OPSS):

Table 1: Minimum Pavement Sections

Pavement Layer	Light Duty (Automobile Parking)	Heavy Duty (Travelled Roadways)
HL3 Asphalt Surface[1]	50 mm	40 mm
HL8 Asphalt Binder	N/R	40 mm
Granular A Base	150 mm	150 mm
Granular B Type II Sub-base	250 mm[2]	300 mm[2]

[1]HL1 in truck turning areas.

[2]May be reduced to 150 mm if subgrade is approved rock shatter.

- The performance grade of asphalt should be as per Appendix A, Table A-1 OPSS 1101, using Zone 3.
- The asphalt materials should be compacted to a minimum of 92.0% of the Marshall Maximum Relative Density as per OPSS 310, Table 10.
- The Granular A and B should be compacted to 100% SPMDD.
- Drainage of the pavement layers is important, and the top of the subgrade and each layer of the pavement section should be provided with suitable 2% crossfall towards the lateral limits in order to prevent water from pooling on the pavement surface, and beneath the pavement layers. Subdrains should be utilized to improve drainage, or as a minimum, limited length subdrain leads should extend out from catch basins.
- All granular base course materials should be compacted to 100% SPMDD.
- The long-term performance of the pavement will be dependent upon good construction practice, well-designed and constructed frost tapers, and proper drainage.

The recommendations provided in this report are based on an adequate level of construction monitoring being conducted during construction phase of the utility upgrades. Due to the nature of the proposed project, an adequate level of construction monitoring is considered to be as follows:

- Exposed subgrades should be examined by a Geotechnical Engineer or a qualified Technologist acting under the supervision of a Geotechnical Engineer, to assess whether the subgrade conditions correspond to those encountered in the boreholes, and that the recommendations provided in this report have been implemented.
- Compaction testing of granular materials (i.e. granular base and sub-base, pipe bedding, surround, cover) should be conducted by a qualified Technologist to ensure that specified compaction is achieved and materials are properly consolidated.
- Approval of all materials to be used.

We trust that this letter meets with your requirements. Please do not hesitate to contact us, should any questions arise.

Yours truly,
INSPEC-SOL INC.

Matt Storms
Project Manager

Joseph B. Bennett, P.Eng.
Vice President

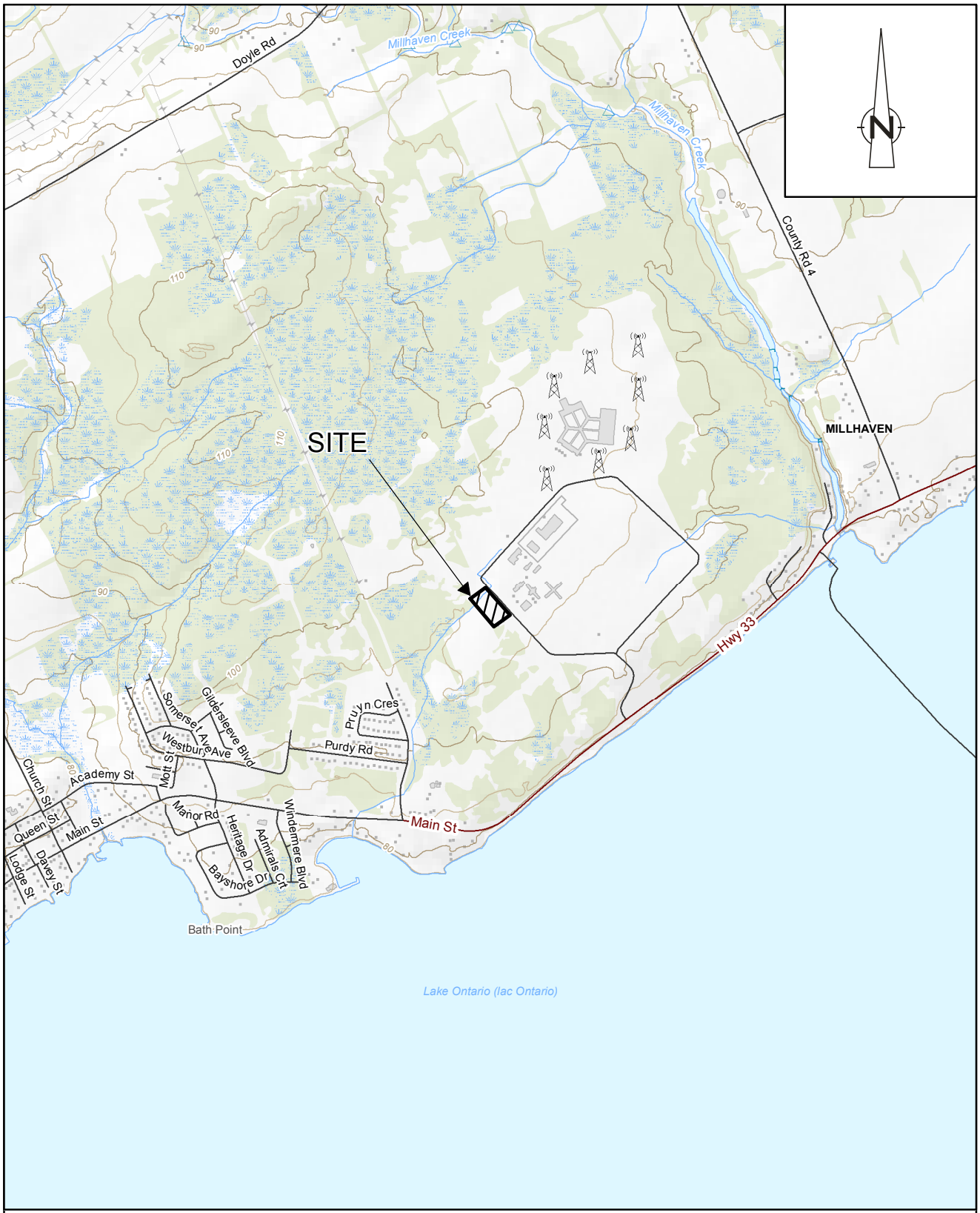
Enclosures: Dwg T031061-A1-1, Dwg T031061-A1-2
Borehole Logs BH1-BH3
Appendix A: Notes of Borehole and Testpit Logs

MS/nc

Dist via email: Matt Morkem, WSP, Matt.Morkem@wspgroup.com

Enclosures

- Site Location Plan – T031061-A1-1
- Borehole Location Plan – T031061-A1-2
- Borehole Logs – BH1-BH3



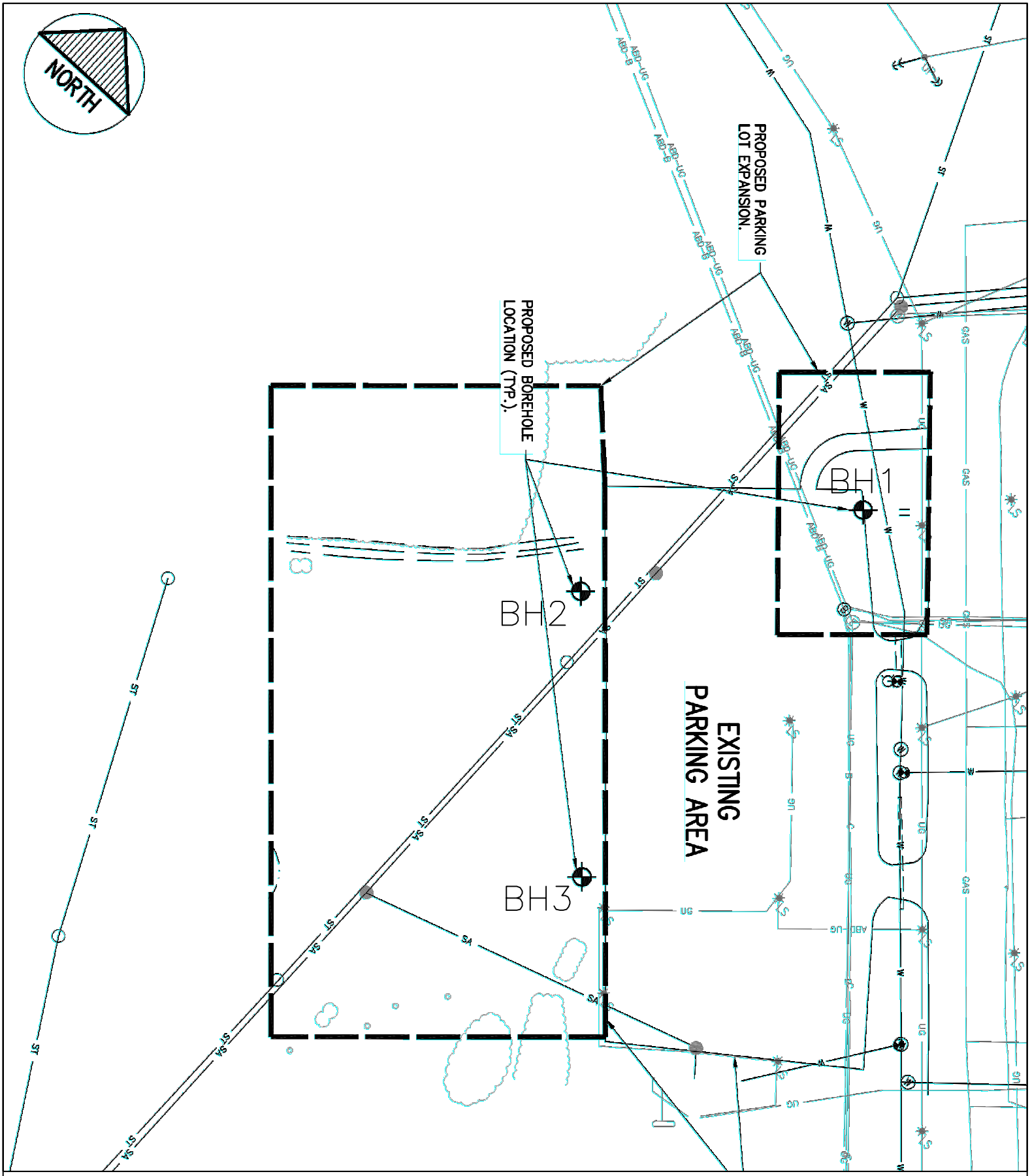
Source: MNR NRVIS, 2011. Produced by CRA under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2011;
Coordinate System: NAD 1983 UTM Zone 18N

SITE LOCATION MAP

GEOTECHNICAL INVESTIGATION
BATH INSTITUTION PARKING LOT
BATH, ON
PWGSC C/O WSP GROUP
Dwg. No. T031061-A1-1

iNSPEC•SOL

T031061-A1(001)GIS-OT001 April 23, 2014



BOREHOLE LOCATION PLAN
GEOTECHNICAL INVESTIGATION
BATH INSTITUTION PARKING LOT
BATH, ONTARIO
PWGSC c/o WSP GROUP
Dwg. No. T031061-A1-2

INSPEC•SOL

REFERENCE No.: T031061-A1 ENCLOSURE No.: 1

INSPEC·SOL

BOREHOLE No.: BH1

ELEVATION: 100.00 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Public Works and Government Services Canada c/o WSP Group

PROJECT: Geotechnical Investigation

LOCATION: Bath Institution Parking Lot

DESCRIBED BY: J. Poisson CHECKED BY: M. Storms

DATE (START): March 27, 2014 DATE (FINISH): March 27, 2014

LEGEND

- SS Split Spoon, GS Grab Sample
- ST Shelby Tube, ODEX
- RC Rock Core
- Water Level
- ○ Water content (%)
- Atterberg limits (%)
- ● N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa (10 20 30 40 50 60 70 80 90)
meters	100.00					%	ppm	N	
	99.95		**ASPHALT** - 50mm						
			FILL - sand and gravel, brown, damp, loose to compact		SS1	75		43	●
0.5									
1.0	99.01		**SILTY CLAY** - trace sand, brown, moist, hard		SS2	50		9	● >>▲
1.5					SS3	100		R	>>▲
	98.12		Borehole terminated with auger refusal at 1.88m						
2.0									
2.5									
3.0									

NOTES:

BOREHOLE LOG T031061-A1 BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 5/1/14

REFERENCE No.: T031061-A1 ENCLOSURE No.: 2

INSPEC·SOL

BOREHOLE No.: BH2

ELEVATION: 100.00 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Public Works and Government Services Canada c/o WSP Group

PROJECT: Geotechnical Investigation

LOCATION: Bath Institution Parking Lot

DESCRIBED BY: J. Poisson CHECKED BY: M. Storms

DATE (START): March 27, 2014 DATE (FINISH): March 27, 2014

LEGEND

- SS Split Spoon, GS Grab Sample
- ST Shelby Tube, ODEX
- RC Rock Core
- Water Level
- ○ Water content (%)
- Atterberg limits (%)
- ● N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
meters	100.00					%	ppm	N	10 20 30 40 50 60 70 80 90
			TOPSOIL - 200mm						
	99.80		**SANDY CLAY** - trace organics, dark brown, moist, very stiff		SS1	50		6	● ▲
0.5									
	99.24		**SILTY CLAY** - trace sand, brown, moist, very stiff		SS2	50		R	▲
1.0			Trace gravel						▲
	98.86		Borehole terminated with auger refusal at 1.14m						
1.5									
2.0									
2.5									
3.0									

NOTES:

BOREHOLE LOG T031061-A1 BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 5/1/14

REFERENCE No.: T031061-A1 ENCLOSURE No.: 3

INSPEC·SOL

BOREHOLE No.: BH3

ELEVATION: 100.00 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Public Works and Government Services Canada c/o WSP Group

PROJECT: Geotechnical Investigation

LOCATION: Bath Institution Parking Lot

DESCRIBED BY: J. Poisson CHECKED BY: M. Storms

DATE (START): March 27, 2014 DATE (FINISH): March 27, 2014

LEGEND

- SS Split Spoon, GS Grab Sample
- ST Shelby Tube, ODEX
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- ● N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
meters	100.00					%	ppm	N	10 20 30 40 50 60 70 80 90
			TOPSOIL - 150mm						
	99.85		**SILTY CLAY** - trace sand, trace rootlets, brown, moist, very stiff		SS1	50		5	▲ ●
0.5			Trace gravel						▲
	99.31		Borehole terminated with auger refusal at 0.68m						
1.0									
1.5									
2.0									
2.5									
3.0									

NOTES:

BOREHOLE LOG T031061-A1 BOREHOLE LOGS.GPJ INSPEC_SOL.GDT 5/1/14

Appendix A

- Notes of Borehole and Test Pit Logs

INSPEC•SOL

NOTES ON BOREHOLE AND TEST PIT REPORTS

SOIL DESCRIPTION:

Each subsoil stratum is described using the following terminology. The relative density of granular soils is determined by the standard penetration index ("N" value), while the consistency of clayey soils is measured by the value of the undrained shear strength (Cu).

CLASSIFICATION (UNIFIED SYSTEM)

Clay	< 0,002mm		
Silt	0,002 to 0,075mm		
Sand	0,075 to 4,75mm	fine	0,075 to 0,425mm
		medium	0,425mm to 2,0mm
		coarse	2,0 to 4,75mm
Gravel	4,75 to 75mm	fine	4,75mm to 19mm
		coarse	19 to 75mm
Cobbles	75 to 300mm		
Boulders	> 300mm		

TERMINOLOGY

"traces"	1 - 10%
"some"	10 - 20%
adjective (silty, sandy)	20 - 35%
"and"	35 - 50%

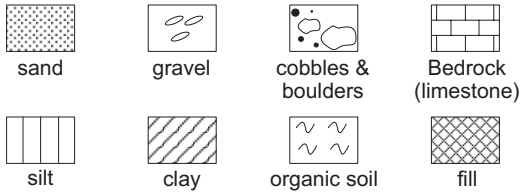
RELATIVE DENSITY OF GRANULAR SOILS	STANDARD PENETRATION INDEX "N" VALUE (BLOWS/ft - 300mm)
Very loose	0 - 4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very dense	> 50

CONSISTANCY OF COHESIVE SOILS	UNDRAINED SHEAR STRENGTH (Cu) (P.S.F.)	(kPa)
Very soft	< 250	< 12
Soft	250 - 500	12 - 25
Firm	500 - 1000	25 - 50
Stiff	1000 - 2000	50 - 100
Very stiff	2000 - 4000	100 - 200
Hard	> 4000	> 200

ROCK QUALITY DESIGNATION

"RQD" (%) VALUE	QUALITATIVE
< 25	very poor
25 - 50	poor
50 - 75	fair
75 - 90	good
> 90	excellent

STRATIGRAPHIC LEGEND



SAMPLES:

TYPE AND NUMBER

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon
SSE, GSE, AGE: Environmental sampling
ST: Shelby tube
PS: Piston sample (Osterberg)
AG: Auger
RC: Rock core
GS: Grab sample

RECOVERY

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil.

RQD

The "Rock Quality Designation" or "RQD" value, expressed as a percentage, is the ratio of the total length of all core fragments of 4 inches (10cm) or more to the total length of the run.

IN-SITU TESTS:

N: Standard penetration index
R: Refusal to penetration
N_C: Dynamic cone penetration index
Cu: Undrained shear strength
Pr: Pressuremeter
k: Permeability
ABS: Absorption (Packer test)

LABORATORY TESTS:

I_P: Plasticity index
W_l: Liquid limit
W_P: Plastic limit
H: Hydrometer analysis
GSA: Grain size analysis
A: Atterberg limits
w: Water content
γ: Unit weight
C: Consolidation
CS: Swedish fall cone
CHEM: Chemical analysis
O.V.: Organic vapor