END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Title and description of Work.

.2 Contract Method.

.3 Work by others.

.4 Work sequence.

.5 Contractor use of premises.

.6 Partial Owner occupancy.

.7 Alterations to existing site.

1.2 PRECEDENCE

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

1.3 SITE LOCATION

.1 Work of this Contract comprises BURLINGTON CANAL VERTICAL LIFT, BRIDGE-REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES located at 1157 Beach Blvd., Hamilton, ON L8H 6Z9. Burlington Canal Lift Bridge is located on Beach Boulevard, between the City of Burlington and the City of Hamilton, Ontario. It is parallel to the Burlington Skyway and provides an alternative year-round vehicular and pedestrian route to Skyway traffic. When the Skyway is open, the Lift Bridge is used primarily by local pedestrians and vehicles. The Lift Bridge is part of provincial Highway No. 20 (Eastport Drive). In addition to providing a canal crossing link for local pedestrians and vehicles, it also facilitates during the navigation season all types of vessels entering and leaving Hamilton Harbour including vessels moving through the St. Lawrence Seaway System. Each year, 6,500 vessels, including more than 1,000 ships that are carrying cargo, rely on the Burlington Lift Bridge to reach their final destination.

1.4 CONTRACT METHOD

.1 Construct work under combined price contract.

1.5 EXAMINATION OF THE SITE

.1 Bidders visiting the site and accessing the towers shall have:
.1 Proof of Fall Protection training.
.2 Harness with a chest "D" ring.

.2 Pay particular attention to clearance between bridge and water conditions, size of lanes, areas affected by winter snow and ice, and decking.

.3 Be completely familiar with every detail and intent of this Specification and scope of work to be performed, and regulatory requirements governing this Work.

1.6 COST BREAKDOWN

.1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.

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

1.7 WORK BY OTHERS

.1 The Contractor shall for the purpose of the Ontario Occupational Health and Safety Act and Regulations for Construction Projects, and for the duration of the Work of the Contract:
.1 Assume the role of Constructor in accordance with the Authority Having Jurisdictions.
.2 Agree, in the event of two or more Contractors working at the same time and space at the work site, without limiting the General Conditions GC3.7, to the Departmental Representative's order to:
.1 Assume, as the Constructor, the responsibility for the Departmental Representative's other Contractors.
.3 Other contractors and consultants may be working in adjacent areas of the bridge site shall be separated by time or space and the Contractor shall fully cooperate with other entities and as directed.

1.8 WORK SEQUENCE

.1 Construct Work in two phases to accommodate Owner's continued use of premises during construction.

.2 Coordinate Progress Schedule and coordinate with Owner Occupancy during construction.

.3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage. Schedule Work in accordance with Section 01 32 16.

.4 Phase I Completion: Work comprises the replacement of controls, drives and overhead cables including but not limited to the testing and commissioning of the bridge and carrying out all necessary pre-operational works as specified and ensuring that the bridge is made ready for operation to service the public as intended. Refer to paragraph 1.4.1.

.5 Phase II Completion: Provide technical and professional support to PWGSC Operating staff during the sixty (60) day trial period of the navigation season and as required for the adequate bridge operation. The successful conclusion of the trial period will be considered as the Phase II completion.

.6 Substantial Completion: At the successful conclusion of Phase II Completion, the Substantial Performance will be considered as achieved. Contractor shall apply for, and the Departmental Representative will issue the Certificate of Substantial Completion.

.7 Final Completion: Following substantial completion and after completion of any deficiencies in the work, the Contractor will be entitled to apply for the Certificate of Completion.

.8 Maintain fire access/control.

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY)

.1 The project construction phase will begin with the Contractor submitting the project Health and Safety Plan, Environmental Protection Plan, detailed critical path construction schedule, shop drawings, equipment and material data sheets, factory testing procedures, field testing procedures, traffic maintenance plans, commissioning plans, and MTO (Ministry of

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.1 (Cont'd) Transportation of Ontario) permit application(s).

.2 The project Contract Documents require the Contractor to begin the MTO permit application(s) as early as possible because it is a long lead item. The project Contract Documents require the Contractor to define their traffic maintenance plan, and obtain permits in Compliance with MTO Book 7 for one or more lane closures, and for complete roadway closures if necessary. The Contract Documents restrict complete roadway closures to March and April 2015 if they are longer than one hour (Mandatory).

.3 Coordinate all lane closures and restrictions with MTO and its Contractors for Skyway Bridge construction projects occurring at the same time as this project (Mandatory).

.4 The project Contract Documents require the Contractor to define their plans and methods to handle existing lead paint while performing structural work and steel work.

.5 The project Contract Documents require the Contractor to conclude all work in a manner that is complete and "made good." This requirement of the specification defines the finished product, does not allow any equipment or material to be abandoned in place except where specified, and will require that all holes be filled and painted to match except where doing so will obscure or mask a structural or mechanical defect (Mandatory).

.6 On-site construction activities can begin in August 2014. On site construction activities prior to August 2014 may occur with prior authorization from the Departmental Representative.

.7 Responsible for storing and protecting all equipment.

.8 Initial on-site activities include mobilization, and staging materials and equipment.

.9 Provide a complete external cleaning of the Bridge structure prior to starting other activities. The purpose is to remove debris and accumulated bird waste.

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.10 Measure the balance condition of the Bridge in accordance with the Contract Documents to establish the baseline condition prior to construction (Mandatory). The project Contract Documents require the Contractor to repeat the span balance testing near the completion of construction to verify the balance is unchanged (Mandatory).

.11 The project design allows for the new cable and conduit systems to be installed in parallel with the existing to the greatest extent possible. The existing operating systems and equipment will not be taken out of service until the winter closure beginning January 1, 2015.

.12 Place the new drive motors, drive control equipment, motor control centres and the automatic transfer switch in the tower machinery rooms at prescribed locations identified in the Contract Documents to be readily available for the winter Closure of 2015. The Contractor's approved traffic maintenance plans will be utilized when the roadway is needed for access to the machinery rooms, and if the Contractor ever needs to close the roadway for an extended period. Canal navigation shall never be impeded except during the 2015 winter closure. The project Contract Documents require the Contractor to obtain all necessary MTO permits for their traffic maintenance plan.

.13 Install motor control centres in their permanent location adjacent to the existing motor control centres. This will allow a substantial amount of field wiring to be installed prior to the winter closure of 2015.

.14 The following activities can be substantially completed by the Contractor prior to the winter closure of 2015:

.1 Conduit, raceway, junction boxes, pull boxes, marshalling cabinets, cables and networks.

.2 East side aerial cable between the north and south towers.

.3 Traffic gates, pedestrian gates, traffic barriers, traffic signals and pedestrian don't walk sign, and associated sidewalk repairs and section replacements and sidewalk detours.

.4 Traffic control system- hardwired relays:

.1 Traffic control systems will operate utilizing hardwired relay controls. The traffic control operator console and navigation control console will be

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.14 (Cont'd)

.4 (Cont'd)

.1 (Cont'd)

refurbished and made operational during this period. It will be necessary for the Contractor to use rolling stock (attenuator trucks or equal) and flaggers during the transition from existing traffic control to new hardwired traffic control.

.5 The winter closure of 2015, beginning January 1, consists of construction crews working around the clock on a seven-day work week until construction is complete. Work shall be performed on both towers simultaneously.

.1 The existing span drive operating systems and controls will be removed and the new operating system including the Bridge control system programmable logic controller and the main control console will be installed and made operational.

.2 Install west side aerial cables.

.3 The existing span lock systems and CCTV systems will be interfaced with the new Bridge control system.

.4 The new motor control centres, remote input/output control cabinets, and span drive cabinets will already be installed in the machinery rooms. Power, control, and network wiring will be connected to the greatest extent possible for control systems.

.5 The existing Programmable Logic Controller (PLC) control system equipment and cabinet will be removed and the new Bridge control system PLC processors input/output modules in their new cabinets will be installed.

.6 The project commissioning phase will begin once all conductors are terminated, continuity tests performed, loop checks are completed, and preoperational tests are completed.

.7 The final span balancing will be verified during the initial start-up, functional testing, commissioning phase of the work. Functional testing and commissioning must be completed by March 20, 2015.

.8 Operator training, as-built documentation, and operations and maintenance manuals shall occur during the commissioning and operational trial period.

.15 Field verify all dimensions prior to the start of any and all Work.

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.16 Shop drawings, work plans, and test procedures to be reviewed and dispositioned by the Departmental Representative prior to ordering materials or the fabrication of any equipment (Mandatory).

.17 All equipment to be fabricated, shop tested, and staged prior to Bridge shutdown.

.18 Construction tools, grout, paint, lubricants, and miscellaneous equipment to be staged at the jobsite prior to the start of on-site demolition or installation.

.19 Access platforms, safety netting, temporary structural supports, and material handling equipment to be installed prior to starting on-site demolition or installation.

.20 Gearbox pedestals, motor pedestals, brakes, brake wheels, and couplings may be staged in the motor room as indicated on the structural plans prior to starting on-site demolition or installation.

.21 Mechanical equipment demolition and installation shall be done with the Bridge shall be fully lowered and the span locks locked. Span locks shall be electrically locked out and tagged out to prevent accidental operation.

.22 Mechanical equipment demolition and installation shall be done after releasing all existing brakes to allow the drive machinery to relax and dissipate any residual torque in the system. Manually rotate motor shafts with strap wrench or similar tool to achieve backlash on both sides of gear teeth in primary gear set to insure no potential energy remains in the drive system (Mandatory).

.23 Remove existing mechanical equipment as indicated on the mechanical demolition plan.

.24 Measure floating shafts to be reused and have keys and gear couplings finish machined to match.

.25 Prepare the motor room and sheave room floors for the new equipment in accordance with the structural plans.

.26 Perform initial installation and alignment of mechanical equipment using undersized mounting

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.26 (Cont'd)
holes and fasteners. Equipment to be installed in the following order:
.1 Gearbox pedestal.
.2 Gearbox.
.3 Floating shaft coupling assemblies.
.4 Machinery brakes.
.5 Motor pedestals.
.6 Motors.
.7 Motor brakes.

.27 Perform final alignment of mechanical equipment working backwards from floating shaft couplings (Mandatory).

.28 Final drill and ream mounting holes.

.29 Pour grout pad under motor pedestals.

.30 Final tension mounting fasteners.

.31 Mount auxiliary drive motor.

.32 Lubricate all equipment.

.33 Perform static field inspection and testing.

.34 Perform dynamic field inspection and testing.

.35 Repair motor room and sheave room floor in accordance with structural plans.

.36 Remove temporary access platforms, safety netting, temporary structural supports, and material handling equipment.

.37 Submit as-built documentation.

.38 Submit operation, inspection, and maintenance manuals.

.39 Perform training.

.40 Prior to on-site commissioning, it will be necessary for all equipment and control systems to be completely tested and verified operational at the factory prior to shipment. Factory testing shall comply with the approved written procedures established for the project.

.41 Mechanical and electromechanical devices will be tested on the factory floor.

.42 Control system functionality and network communications will be verified on the factory

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.42 (Cont'd) floor as a complete integrated assembly including all control panels and cabinets, the motor control centres, motors, and the Bridge control system programmable logic controllers.

.43 Factory testing of the Bridge control system will include all alarms and alarm messaging.

.44 All cable conduit and conductors will be installed in the field. Prior to their termination, the conductor insulation resistance will be tested (megger tested) by the Contractor. Once terminated, continuity checks will be performed by the Contractor to verify the correct terminations.

.45 Following continuity testing, each control circuit will be tested for functionality one loop at a time utilizing the reviewed shop drawing schematics and loop diagrams for the project.

.46 Pre-dynamic field verification will include the following (Mandatory):
.1 Conductor continuity of field wiring.
.2 PLC input and output connections.
.3 Drive wiring and drive control loops.
.4 Continuity between drives and Bridge control system.
.5 Motor control centre (MCC) field wiring.
.6 Control system redundant network connections and function.
.7 Control system control loop and circuit function.

.47 Traffic control and signal systems will be a hybrid system using hardwired relays and PLC control. The hardwired system will be commissioned and made functional prior to the winter closure on January 1, 2015.

.48 Bridge control system logic will be verified one interlock at a time (Mandatory).

.49 The Bridge control system and motor control centres will be functionally tested in the field as an integrated unit following individual loop tests.

.50 Electromechanical equipment will be static tested in the field and then "bumped" to verify correct rotation prior to coupling motors to machinery prior to dynamic testing. The main

1.9 SUGGESTED CONSTRUCTION SEQUENCE (UNLESS NOTED MANDATORY) (Cont'd)

.50 (Cont'd)
drive motors will be operated under no-load conditions to check phases (Mandatory).

.51 Set and adjust brakes.

.52 Install drive shaft couplings.

.53 Test the operation of the auxiliary drive systems including controls and instrumentation.

.54 Test the operation of the PLC data logging operator interface console and graphics screen.

.55 Test the operation of the new UPS system.

.56 Test the operation of new automatic transfer switch in the north machinery room, including new circuit breakers in existing switchgear.

.57 Test the operation of the reconnected controls for the existing 600kW emergency generator and load bank.

.58 Following the control system functionality tests in the field, the Bridge operating system will begin dynamic testing. Dynamic testing will include establishing the final settings for limit switches, span drive tuning parameters, operating speeds and final alarms and messaging on the operator interface stations.

1.10 CONTRACTOR USE OF PREMISES

.1 Contractor has unrestricted use of site until Substantial Performance, and access to allow;
.1 Partial owner occupancy during entire construction period.
.2 Public usage.

.2 Coordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Departmental Representative will issue direction indicating the extent of the Contractor's access to the premises for each of the five periods.

1.10 CONTRACTOR USE OF PREMISES (Cont'd)

.5 Access during the Navigation Periods, Period #1 and Period #3:

.1 During these two periods, the Owner will continue to have possession of the Bridge Site except for those pre-approved areas on the site allocated to the Contractor.

.2 The Owner will continue to conduct the normal bridge operation and maintenance as required.

.3 The Contractor shall be afforded site access to pre-determined portions of the Bridge grounds and Bridge facilities subject to the prior approval of the Departmental Representative.

.6 Access During Period #2:

.1 The Owner will continue to maintain the bridge and continue to maintain the site, the traffic, and snow removal.

.2 The Owner will require ten (10) calendar day's full and dedicated access to the North Tower and Control Building for maintenance purposes and subsequently will require an additional ten (10) calendar days for the South Tower for similar requirements.

.3 During the balance of the duration of the Navigation Shut-Down Period, the Contractor will be afforded full and uninterrupted access to the North and South Towers and Control Building and the full bridge facilities.

.7 Access During Period #4:

.1 During this period and unless otherwise directed, the bridge will be fully shutdown and consequently the Owner will not require access to conduct any maintenance. The Contractor shall have full access to the whole Bridge site and facilities and shall be responsible to maintain the site and snow removal.

.8 Access During Period #5 (Trial Period):

.1 During this 60-day Trial Period, the Owner will take over the Bridge facilities as a whole and undertake the operation and maintenance of the bridge as intended.

.2 However, during this period, the Contractor shall provide operational, technical and professional support for the Owners Staff to the extent required as directed to ensure safe and adequate operation of the Bridge facilities as required.

.9 Conduct work so as to ensure safety and convenience of the general public and ensure no delays in shipping without prior approval.

1.10 CONTRACTOR USE OF PREMISES (Cont'd)

.10 Regulate operations at all times to protect the public on Crown lands adjacent to the work site.

1.11 OWNER OCCUPANCY

.1 Owner will occupy premises during construction period for execution of normal seasonal operations.

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner's usage.
.1 Operating season - March 21th to December 31st.
.2 Non-operating season - January 1st to March 20th.

1.12 PARTIAL OWNER OCCUPANCY

.1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Certificate of Substantial Performance of entire Work.

.2 Complete training specified in Sections 01 32 16 and 01 79 00 prior to the sixty day(60) trial period.

1.13 ALTERATIONS TO EXISTING BUILDING AND STRUCTURE

.1 Remove and recycle, compost, anaerobic digest, sell material for reuse or dispose of Structural, Mechanical and Electrical items indicated on drawings.

.2 Remove in good order, turn over to Department, and store within project site where designated by Departmental Representative Mechanical items indicated on drawings.

.3 Remove, temporarily store, clean, alter to suit and reinstall items indicated on drawings.

.4 Remove, temporarily store and turn over to other sections for building in items indicated on drawings.

.5 Provide new openings required in existing construction.

.6 Block in openings where items removed with material and finish to match existing and joining construction.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END

PART 1 - GENERAL

1.1 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 Imperial and Metric units.

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

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

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

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

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

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

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

.11 Submit five hard copies for each type and format of submittal and also submit in

1.1 ADMINISTRATIVE (Cont'd)

.11 (Cont'd) electronic format as pdf files, unless specified otherwise. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.

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

.4 Allow 30 working days for Departmental Representative's review of each submission.

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

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested. Work shall not proceed until comments are resolved.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.7 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.

.8 Submissions shall include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Specification section, page or drawing number of the Contract documents to which the submission applies.
.5 Part number, item number or catalog number of the items being supplied clearly identified.
.6 Contractor Movable Bridge Construction Specialist's stamp, signed certifying approval of submission, verification of coordination among the Structural, Control, Electrical, and Mechanical components to be supplied.
.7 Contractor Control Systems Engineer's stamp, signed certifying approval of submission, verification of Electrical and Control systems.
.8 Contractor Systems Integrator's stamp, signed certifying approval of submission, verification of coordination among the Control, Electrical, and Mechanical components to be supplied.
.9 Heavy Machinery Specialist's stamp, signed certifying approval of submission, coordination verification of shop and working drawings for the proper assembly of the various machinery components prior to submission for review. When corrections or revisions are required, the Heavy Machinery Specialist shall resubmit shop drawings for review.
.10 Coordinate the Work of machinery component manufacturers where components interface.
.11 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.12 Individual shop drawings must be submitted for components requiring left-hand or right-hand orientation. Drawing one component and labeling others as opposite hand will not be acceptable.
.13 Partial or incomplete shop drawing submittals will not be accepted for review.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.8 Submissions shall include:(Cont'd)

.14 Submit shop drawings for complete systems, shop testing procedures, field testing procedures and related or interconnected equipment together.

.15 Submit shop drawings for all equipment, complete systems, and materials proposed for purchase or being fabricated.

.16 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.

.11 Complete systems and related or interconnected equipment together.

.12 Mechanical

.1 State grade and extent of finish machining, with all tolerances and allowances, for each part for which a specific fit is required. Finished surfaces shall be as defined by the ANSI/ASME B46.1-2009; and fits shall be as defined by the ANSI/ASME B4.1-1967 (R1999), unless otherwise stated herein, ANSI/ASME B4.1-1967 (R1999) shall also apply to fits for non-cylindrical parts.

.2 Indicate required tension, method of tensioning, and all other pertinent information for all machinery connection bolts.

.3 Show manufactured components in outline on drawings, with sufficient dimensions and data to determine the clearances required for installation and operation.

.4 Manufacturer's certified dimension prints shall state Project title and number; pertinent ratings of the equipment; and shall indicate, where applicable, the provisions for adding, draining, and checking the level of lubricant; the method of lubrication and type of fittings; and the location of inspection openings.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.8 Submissions shall include:(Cont'd)

.16 (Cont'd)

.12 (Cont'd)

.5 Fabrication and shop testing procedures shall be submitted. Specific steps shall be outlined in sequence.

.6 Clearly indicate heat treatment, stress relieving, normalizing, tempering, and all other processes.

.7 Weld types and joint sizes shall be shown on the shop drawings. Welding procedures shall be submitted in accordance with AASHTO/AWS D1.5M/D1.5-2002 and shall include:

.1 Temporary welds, tack welds, jigs and other temporary measures required for construction of the elements shall be shown.

.2 All weld processes, including pre-qualified and contractor proposed welding procedures.

.3 Detailed welding drawings, weld sequencing plan, including proposed inspection plans, repair procedures, and welder qualifications.

.4 Procedures for controlling distortion of elements.

.5 Disposition rates, preheat and inter pass temperatures, sequencing, inspection controls by the contractor and other related items for the control of welding.

.8 Complete data regarding the design and construction of all manufactured items to be furnished as part of the machinery under this Contract, including material specifications, cross-sectional assembly drawings, detail drawings of component parts, characteristic curves, the dimensions of principal elements and calculations demonstrating compliance with the contract documents.

.9 Shop bill of materials for all machinery parts. If the bill of materials are not indicated on working drawings, submit prints of the bill of materials for review in the same manner as specified for the drawings.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.8 Submissions shall include:(Cont'd)

.16 (Cont'd)

.12 (Cont'd)

State the weight of each piece of machinery on the shop drawing upon which it is detailed or billed.

.10 Complete assembly and erection drawings. Provide identifying marks and essential dimensions for locating each part or assembled unit with respect to the bridge or foundation.

.11 The manufacturer shall submit for approval a certified print of each gearbox showing at a minimum the following:

.1 All external mounting dimensions including shaft sizes, bores, and keyways.

.2 Internal plans showing each gearbox component with part numbers.

.3 The ratings that will appear on the nameplate.

.4 Lifting points.

.5 Location of all lubricant connections.

.6 Lubricant recommendations.

.12 Submit detailed field and shop testing procedures for approval prior to testing. The testing procedures shall be supplemented with drawings, photographs, calculations, and catalog cuts as appropriate. The procedures shall include drawings of the testing configuration, detailed step-by-step procedures, details on the testing instrumentation and methods of recording measured data, and applicable pass/fail criteria.

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.11 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Reports signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
.2 Testing must have been within 3 years of date of contract award for project.

.12 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.13 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.14 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

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

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

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

.20 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

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

.2 Deliver samples prepaid to Departmental Representative's business address.

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

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

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

1.3 SAMPLES (Cont'd)

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

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

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic and hard copy of colour digital photography in jpg format, fine resolution monthly with progress statement and as directed by Departmental Representative.

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

.3 Number of viewpoints: 4 locations.
.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: weekly and as directed by Departmental Representative.
.1 Existing conditions.
.2 Upon completion of: mechanical, electrical, control and structural Work identified in the Contract documents as project milestones, and as directed by Departmental Representative.

1.5 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mill tests.

.4 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

.1 Division 26 - Electrical.

.2 Section 34 81 23 - Lift Bridge Machinery.

1.3 QUALITY CONTROL

.1 Develop a quality control program for the project to include but not limited to the following:

.1 Workers Welding Certificates.
.2 Master Electrician Certificates.
.3 QA/QC programs for individual fabricators.
.4 Work Plan.
.5 Shop and Factory Testing Procedures.
.6 Functional Testing Procedures.
.7 Material Test Reports.
.8 Test Results for the mechanical, electrical and control elements.

1.4 TOTAL QUALITY ASSURANCE PROGRAM (TQA)

.1 Prepare a total quality assurance (TQA) program for the project for all bridge work. All TQA program documentation must be submitted for review. TQA documentation to be submitted includes but is not limited to the following:

.1 Workers Welding Certificates.
.2 Master Electrician Certificates.
.3 QA/QC programs for individual fabricators.
.4 Work Plan.
.5 Shop and Factory Testing Procedures.
.6 Functional Testing Procedures.
.7 Material Test Reports.
.8 Test Results for the mechanical, electrical and control elements.

1.5 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, 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.

1.6 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.

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

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

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

1.7 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Cooperate to provide reasonable facilities for such access.

1.8 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.

1.9 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.

1.10 REPORTS

.1 Submit four (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 to the Departmental Representative.

1.11 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.

1.12 MILL TESTS

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

1.13 EQUIPMENT AND SYSTEMS

.1 Submit testing, adjusting and balancing reports for mechanical, control and electrical systems.

.2 Submit Commissioning Documentation in accordance with Section 01 91 00.

.3 Refer to Section 34 81 23 and Division 26 for definitive requirements.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

1.2 REFERENCES

.1 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 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.
.3 CSA Z797-09, Code of practice for access scaffolding.

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

1.3 SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be 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.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CSA Z797.

.2 Provide and maintain scaffolding, ramps, ladders, swing stagging, platforms, and temporary stairs.

1.6 HOISTING

.1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists/cranes shall be operated by qualified operator.

1.7 ELEVATORS

.1 Designated existing and permanent elevators may be used by construction personnel and transporting of materials. Co-ordinate use with Departmental Representative.

.2 Provide protective coverings for finish surfaces of cars and entrances.

1.8 SITE STORAGE/LOADING

.1 The Contractor must store materials in a secure offsite facility.

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

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

1.9 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work, coordinate with Departmental Representative.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

.4 If authorized to use existing roads for access to project site, maintain such roads for

1.9 CONSTRUCTION PARKING (Cont'd)

.4 (Cont'd) duration of Contract and make good damage resulting from Contractors' use of roads.

.5 Clean construction runways and taxi areas where used by Contractor's equipment.

1.10 OFFICES

.1 Provide office heated to 22°C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

.4 Departmental Representative's Site office.

.1 Provide temporary office for Departmental Representative.

.2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4 - 50% opening windows and one lockable door.

.3 Insulate building and provide heating system to maintain 22° C inside temperature at -20° C outside temperature.

.4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10% upward light component.

.6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.

.7 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.

.8 Maintain in clean condition.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

.3 Submit their plans for review for material staging areas including obtaining warehousing facilities near the bridge site to facilitate staging.

1.12 SANITARY FACILITIES

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

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

1.13 CONSTRUCTION SIGNAGE

.1 No other signs or advertisements, other than warning signs, are permitted on site.

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

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

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

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

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

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC (Cont'd)

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

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

.6 Verify adequacy of existing roads and allowable load limit on these roads.

.7 Responsible for repair of damage to roads caused by construction operations.

.8 Construct access and haul roads necessary.

.9 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

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

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

.12 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative .

.13 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.14 Provide snow removal during period of Work.

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

1.15 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.
.1 Obtain permission from land owners as required.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 SUMMARY

.1 Comply with requirements of this Section when performing following work:
.1 Removing non-friable asbestos-containing vinyl composition tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated at locations indicated on drawings.
.2 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.
.3 Removing and handling of cables with asbestos-containing insulating sheathing.

1.2 SECTION INCLUDES

.1 Requirements and procedures for asbestos abatement of non-friable asbestos-containing materials, including vinyl composition tiles and electrical cable insulating sheathing.

1.3 MEASUREMENT PROCEDURES

.1 Measure asbestos abatement of vinyl floor tiles in square metres of asbestos-containing material removed.

.2 Measure asbestos abatement of cable in kilograms removed.

1.4 REFERENCES

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

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

.3 O. Reg. 278/05, Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.

.4 O. Reg. 490/09, Designated Substances.

.5 A Guide to the Regulations respecting Asbestos on Construction Projects and in Buildings and Repair Operations released in November 2007,

1.4 REFERENCES (Cont'd)

.5 (Cont'd) http://www.labour.gov.on.ca/english/hs/asbestos/index.html.

1.5 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Amended Water: water with nonionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.

.4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.

.5 Authorized Visitors: Engineers, Consultants or designated representatives, and representatives of regulatory agencies.

.6 Competent worker person: in relation to specific work, means a worker who:
.1 Is qualified because of knowledge, training and experience to perform the work.
.2 Is familiar with the provincial and federal laws and with the provisions of the regulations that apply to the work.
.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Friable material: means material that:
.1 When dry, can be crumbled, pulverized or powdered by hand pressure, or
.2 is crumbled, pulverized or powdered.

.8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.

.10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and

1.5 DEFINITIONS (Cont'd)

.10 Polyethylene:(Cont'd) tears, and elsewhere as required to provide protection and isolation.

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

1.6 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

.2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.4 Submit proof of Contractor's Asbestos Liability Insurance.

.5 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.

.6 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.7 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.

1.7 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:

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

.2 Safety Requirements: worker protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres.Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include

1.7 QUALITY ASSURANCE (Cont'd)

.2 Health and Safety:(Cont'd)

.2 Safety Requirements:(Cont'd)

.1 (Cont'd)

suitable footwear, and to be repaired or replaced if torn.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.

.5 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.8 WASTE MANAGEMENT AND DISPOSAL

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

.2 Remove from site and dispose of 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 Separate for reuse and recycling and place in designated containers waste in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

1.8 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

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

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

.8 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 0.15 mm thick (6 mil) bags or leak proof drums. Label containers with appropriate warning labels.

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

1.9 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project bound to this specification. Refer to Appendix A.

.2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Departmental Representative.

1.10 OWNER'S INSTRUCTIONS

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, following minimum requirements:
.1 Fitting of equipment.
.2 Inspection and maintenance of equipment.
.3 Disinfecting of equipment.
.4 Limitations of equipment.

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Drop Sheets:
.1 Polyethylene: 6 mil (0.15 mm) thick.
.2 FR polyethylene: 6 mil (0.15 mm) thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: contain waste in two separate containers.
.1 Inner container: 6 mil (0.15 mm) thick sealable polyethylene waste bag.
.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 6 mil (0.15 mm) thick sealable polyethylene bag.
.3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

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

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

PART 3 - EXECUTION

3.1 PROCEDURES

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

.2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.
.1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

3.1 PROCEDURES (Cont'd)

.2 (Cont'd)

.2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.

.3 Do not use compressed air to clean up or remove dust from any surface.

.3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

.4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.

.1 Use garden reservoir type low - velocity fine - mist sprayer.

.2 Perform Work to reduce dust creation to lowest levels practicable.

.3 Work will be subject to visual inspection and air monitoring.

.4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.5 Frequently and at regular intervals during Work and immediately on completion of work:

.1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and

.2 Drop sheets to be wetted and placed in a waste container as soon as practicable.

.6 Cleanup:

.1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.

.2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.

.3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and

3.1 PROCEDURES (Cont'd)

.6 Cleanup:(Cont'd)

.3 (Cont'd)

that the appropriate guidelines and regulations for asbestos disposal are followed.

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

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Title and description of Work.

.2 Contract Method.

.3 Contractor use of premises.

.4 Owner occupancy.

1.2 REFERENCES

.1 American Conference of Governmental Industrial Hygienists (ACGIH), Bioaerosols Assessment and Control 1999.

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

.3 Canadian Standards Association (CSA International).
.1 CAN/CSA-Z94.4-02 Selection, Use and Care of Respirators.

.4 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario RSO 1990, Chapter O.1 as amended, O. Reg. 278/05.

.5 Canada Labour Code 1985 Canada Occupational Safety and Health Regulations.

.6 Environmental Protection Act RRO 1990, O. Reg. 347 as amended.

.7 Environmental Abatement Contractors of Ontario (EACO) Mould Abatement Guidelines, 2004, Appendix B - Procedures for Clean Up of Bird and Bat Droppings.

1.3 OUTLINE OF WORK

.1 Work of this Contract comprises of removal of bird and animal guano on the two towers of the Burlington Lift Bridge in Burlington, Ontario.

.2 The work will be conducted in the open space, below the machine rooms on both towers, extended to below the high voltage wire raceway and the catwalk but will also include the vertical surfaces of the side walls protecting this area and any surfaces within this described area.

1.3 OUTLINE OF WORK (Cont'd)

.3 There are nesting Falcons on the North Tower Bridge and considerations for the protection of these birds and for the protection of the workers from these birds will be included.

.4 Cleanup surfaces and decontaminate.

.5 Remove and dispose of existing insulation materials.

.6 Removal of guano shall follow the Type 3 asbestos removal process in accordance with Ontario Regulation 278/05 under the Occupational Health and Safety Act as modified in this Section.

.7 Cable inspections by a qualified electrician must be conducted after dry removal of guano and prior to wet cleaning of cables to ensure integrity of cables.

.8 Removal, disposal and cleanup must proceed slowly and carefully in a systematic manner.

1.4 EXISTING CONDITIONS

.1 Reports and information pertaining to Guano to be handled, removed, or otherwise disturbed and disposed of during this project are bound into this specification. Refer to Appendix A.

1.5 MEASUREMENT PROCEDURES

.1 Work will not be measured separately for payment.

1.6 DEFINITIONS

.1 Airlock: a system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least 6-1/2 feet (2 m) apart.

.2 Amended water: water with a non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of guano.

.3 Authorized visitor: the Departmental Representative or designated representative, Clerk-of-Works, and persons representing regulatory agencies.

.4 Competent person: individuals who can demonstrate that remediation training has been

1.6 DEFINITIONS (Cont'd)

.4 Competent person:(Cont'd) obtained, is capable of identifying existing microbial hazards in workplace and selecting appropriate control strategy for microbial exposure.

.5 Contaminated Work Area (CWA): specific area or location where actual work is being performed or such other area of facility which it has been determined may be hazardous to public health as result of remediation.

.6 Contractor: remediation contractor providing demolition and removal services as defined in specifications.

.7 Critical barrier or enclosure: minimum of two separate layers of 6 mil (0.15 mm) fibre reinforced polyethylene sheeting (FRPS) taped securely and separately over openings between work area and uncontaminated areas outside of work area.

.8 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows: Place two overlapping sheets (minimum overlap of 1 metre or width of doorway) of FRPS over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway and securing vertical edge of other sheet along opposite vertical side of doorway. Reinforce free edges of FRPS with fibre reinforced adhesive tape and weight bottom edge to ensure proper closing. Space curtained doorways minimum of 6-1/2 feet (2 metres) apart.

.9 Decontamination Room: enclosure located between Contaminated Work Area and uncontaminated area for decontamination of equipment and workers, typically consisting of two curtained doorways at least 6-1/2 feet (2 metres apart).

.10 DOP Test: a testing method used to determine the integrity of the Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.

.11 Disinfectant solution: Wide spectrum disinfectant solution.

.12 Fibre Reinforced Polyethylene Sheet (FRPS): rip proof polyethylene sheeting with fibre reinforced adhesive tape added along edges.

1.6 DEFINITIONS (Cont'd)

.13 HEPA vacuum: a high efficiency particulate air filtered vacuum equipment with filter system capable of collecting and retaining particles greater than 0.3 microns at 99.97 percent efficiency.

.14 Negative pressure: maintain decontamination area at negative pressure relative to surrounding space to prevent contaminants from leaving contaminated area. Use exhaust fan with HEPA filter to maintain at lower pressure than surrounding areas.

.15 Polyethylene sheeting: polyethylene sheeting with tape seals along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of spores through sheeting into clean areas.

.16 Occupied Area: areas of building or work site that are outside Contaminated Work Area.

.17 PPE: Personnel Protective Equipment.

.18 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray; with minimum of six litres capacity for work.

1.7 REGULATORY AGENCIES

.1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these specifications the more stringent requirement shall apply.

1.8 SUBMITTALS

.1 Before commencing work:

.1 Obtain from the appropriate agency and submit to Departmental Representative all necessary permits for transporting and disposal of waste. Ensure that dump operator is fully aware of hazardous nature of material being dumped, and proper methods of disposal. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of waste. In Ontario, this means that the wastes shall be handled and disposed of under the requirements of Ontario Regulation 347.

1.8 SUBMITTALS (Cont'd)

.1 (Cont'd)

.2 Submit proof satisfactory to Departmental Representative that all employees have had instruction on the hazards of the work, respirator use, dress, use of showers, entry and exit from work areas, and all aspects of work procedures and protective measures. The Contractor's Superintendent shall have attended an asbestos abatement course, of not less than two days duration, approved by the Departmental Representative Submit proof of attendance in the form of a certificate.

.3 Submit layout of proposed enclosures and decontamination facilities to Departmental Representative for review.

.2 Work must be carried out by an experienced removal company that is familiar with the hazard controls required for such an operation. Submit an outline of experience.

1.9 WORKER PROTECTION

.1 Instructions: Before commencing work instruct workers in use of respirators, dress, showers, entry and exit from work areas, and all aspects of work procedures and protective measures.

.2 Respirators: Provide workers with personally issued and marked respiratory equipment. Equipment must be powered air purifying positive pressure dust respirators with HEPA filters. This equipment must be worn at all times. Filters must be replaced daily. All respiratory protective devices shall be acceptable to the Occupational Health Branch of Ministry of Labour. No supervisor, worker or authorized visitor shall wear facial hair which affects seal between respirator and face.

.3 Protective Clothing: Provide workers with full body coveralls including head covers. Once coveralls are worn in the work area, they must be treated as contaminated waste and disposed of. Provide safety shoes and other protective apparel required by Ministry of Labour construction regulations.

.4 Each worker shall:

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, and clean coveralls before entering Equipment and Access Rooms or work area. If reusable protective clothing is used

1.9 WORKER PROTECTION (Cont'd)

.4 Each worker shall:(Cont'd)

.1 (Cont'd)
each worker shall don respirator only before entering Equipment and Access Rooms where clothing is stored. All street clothes, uncontaminated footwear, towels, and similar uncontaminated articles shall be stored in clean change room.

.2 Remove gross contamination from clothing before leaving work area then proceed to Sheave Room and remove all clothing except respirators. Place contaminated worksuits in receptacles for disposal with other contaminated materials. Leave reusable items except respirator in Equipment and Access trailer. Still wearing the respirator, don clean coveralls and footwear, proceed to shower located in Bldg C-4 as indicated on the drawings. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in the container provided for the purpose; and wash and rinse the inside of the respirator. When not in use in the work area, store work footwear in Equipment and Access Room. Upon completion of work, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.

.3 Following showering and drying off, proceed to clean change room and dress in street clothes at the end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in 5.4.1 above.

.4 Enter the unloading room from outside dressed in clean coveralls to remove waste containers and equipment from the Holding Room of the Container and Equipment Decontamination Enclosure system. No worker shall use this system as a means to leave or enter the work area.

.5 Workers shall not eat, drink, smoke or chew gum or tobacco at the work site except in established clean room.

.5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in 1.9 of this section.

1.10 VISITOR PROTECTION

.1 Provide protective clothing and approved respirators to authorized visitors to Contaminated Work Area.

.2 Instruct authorized visitors in proper use of protective clothing, respirators and procedures.

.3 Instruct authorized visitors proper procedures to be followed in entering into and exiting from Contaminated Work Area.

1.11 NOTIFICATION

.1 Not later than ten (10) days before commencing work on this project notify the following in writing:
.1 The appropriate Regional or Zone Director of Medical Services Branch, Health and Welfare Canada.
.2 Regional Office of Labour Canada.
.3 Provincial Department of Labour.
.4 Disposal Authority.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Drop Sheets: fibre reinforced polyethylene 6 mil (0.15 mm), thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Fibre reinforced adhesive tape: used in sealing joints of fibre reinforced polyethylene sheets and for attachment of fibre reinforced polyethylene sheet to finished and unfinished surfaces. Fibre reinforced adhesive tape must be capable of adhering under both dry and wet conditions.

.3 Provide materials such as polyethylene sheeting, lumber, nails and other hardware necessary to construct and dismantle decontamination enclosures and barriers that isolate Work Area as appropriate for work.

.4 Disposal bags: dust-tight 6 mil (0.15 mm) clear polyethylene waste bags.

.5 Disinfectant Solution: for misting guano material.

.6 Receptors: Receptors for the disposal of waste materials contaminated with guano shall comply with Section 14 of Ministry of Environment

2.1 MATERIALS (Cont'd)

.6 Receptors:(Cont'd) Regulation 309. Use a "double bagging" system with the first container consisting of minimum 6 mil (0.15 mm) thick sealable polyethylene bag; second container to be rigid sealable metal or fibre drum with tightly fitting cover and 6 mil (0.15 mm) thickness sealable, polyethylene liner or a rigid, sealable, impermeable cardboard box. Containers must be acceptable to disposal site selected and Ministry of the Environment. Labelling shall refer to "Pigeon Guano" rather than "Asbestos".

.7 Sprayer: garden reservoir type, low velocity, capable of producing mist or fine spray.

2.2 TOOLS AND EQUIPMENT

.1 Tools and equipment: suitable for use with microbial contamination and must be able to withstand de-contamination.

.2 Personnel protective equipment (protective clothing, personal respiratory filter cartridges, HEPA air filters, etc.) provide in sufficient quantities for duration of project.

.3 Vacuum cleaners: HEPA filters.

.4 Ladders and/or scaffolds: adequate length, strength and sufficient quantity to support work schedule.

.5 Safety Harnesses and associated equipment for working at heights.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Contaminated Working Area (CWA) and areas adjacent and around: unoccupied. Vacating is required for persons having undergone recent surgery, immune suppressed people or people with chronic inflammatory lung diseases.

.2 One supervisor for every ten trained remediation workers is required.

.3 Approved supervisor must remain within CWA during disturbance, removal, or other handling of contaminated materials.

3.1 PREPARATION (Cont'd)

.4 Prior to work in the vicinity of the high voltage wires, electricity to these wires may have to be locked out or isolated by the Contractor. The Contractor shall not proceed with any work in such areas until the completion of the isolation has been verified by a qualified electrician.

.5 If power to the cables is locked out cables will be inspected by a qualified electrician for any damage caused by the remediation prior to being reenergized.

.6 Power lockouts will affect bridge operation, traffic lights, navigation lights, bridge span lights, elevators and power to the Towers. Locking out of power, if required, should be limited to agreed upon conditions with the Bridge Operator. Any power outages must not impede shipping and the Contractor must be prepared to re-energize all electrical systems in short order (15 minutes notice) as to not delay shipping traffic.

.7 If during the remediation activities, the bridge is required to be operational, any equipment (including drop cloths) that would interfere with the operation of the bridge, shall be removed. No remediation personnel will be present below the Machine House in the remediation area during the operation of the bridge.

.8 Suspend and secure a safety canopy below and/or around the work area, as necessary, in order to prevent tools, guano, contaminated water and/or any other material disturbed during the remediation work from falling to the ground or otherwise escaping from the CWA into the surrounding environment. Canopy must be lined with FRP sheeting that can be disposed of as contaminated waste at the end of the job.

.9 All tools will be double secured to prevent the tools from falling.

.10 Do not use compressed air to clean up or remove residue from surfaces.

.11 Build worker Decontamination Room at exits from work areas, within the Machine House.

.12 Put negative pressure system in operation in the decontamination area and operate continuously from time first fibre reinforced

3.1 PREPARATION (Cont'd)

.12 (Cont'd) polyethylene is installed to seal openings until final completion of work including final clean-up.

.13 Before beginning remediation work, at each access to Contaminated Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION BIOHAZARD AREA (1 inch)(25 mm) / NO UNAUTHORIZED ENTRY (1 inch)(25 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (3/4 inch)(19 mm) / BREATHING GUANO OR MOULD DUST MAY CAUSE SERIOUS BODILY HARM (1/4 inch)(6 mm).

3.2 PREPARATION OF WORKER DECONTAMINATION ENCLOSURE SYSTEM

.1 Establish worker decontamination enclosure system between Contaminated Work Area and uncontaminated area in Machine House. Access to Contaminated work area through this enclosure.

.2 Access to Decontamination Room through double flap curtained openings.

.3 Decontamination Room: build Decontamination Room between Contaminated Work Area, with two curtained doorways, one to Contaminated Work Area and one to uncontaminated area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be reworn in Decontamination Room. Decontamination Room: large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change clothes comfortably. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

.4 No personnel permitted to leave Decontamination Room unless first decontaminated by changing, wet cleaning or HEPA vacuuming to remove dust or other residue. No contaminated materials or persons to enter uncontaminated area.

3.3 MAINTENANCE OF ENCLOSURE

.1 Maintain enclosures in tidy condition.

.2 Ensure that barriers and fibre reinforced polyethylene linings are effectively sealed with duct tape at beginning of each working period.

3.3 MAINTENANCE OF ENCLOSURE (Cont'd)

.2 (Cont'd)
Repair damaged barriers and remedy defects immediately upon discovery.

3.4 MICROBIAL REMEDIATION WORK AREAS

.1 Commence guano remediation work when:
.1 Contaminated Work Area and decontamination enclosure are effectively segregated from parts of building required to remain in use. Enclosures are to be inspected by Departmental Representative.
.2 Tools, equipment and materials waste containers are on site.
.3 Warning signs as specified are displayed where access to contaminated areas is possible.
.4 Notifications have been completed and preparatory steps have been taken.
.5 Authorized supervisor employed by contractor and qualified in microbial contamination remediation to be on job site to ensure establishment and maintenance of negative pressure enclosure and proper work practices throughout project.
.6 Do not begin remediation work until authorized by Departmental Representative.
.7 Perform an initial shoveling to remove as much of the guano residue as possible.
.8 Dry HEPA vacuum all surfaces (vertical, horizontal and angled) to remove as much of the residue as possible.
.9 Prior to disinfectant application, a full cable inspection by a qualified electrician will be undertaken to ensure there is no damage to the cable jackets prior to spraying the disinfectant solution.
.10 After HEPA vacuuming, apply disinfectant solution to all surfaces (vertical, horizontal, angled). Apply with garden sprayer set for droplet (versus mist) spraying. Lightly brush to ensure uniform wetting and contact through to the underlying surface. Apply additional disinfectant as necessary to maintain the area wet for the contact time specified by the manufacturer.
.11 Clean the areas of residue with suitable tools and HEPA vacuum. Lightly mist with water to reduce dust formation.
.12 After surfaces have been cleaned of all residue, apply a second application of disinfectant, maintaining contact for the period recommended by the manufacturer.

3.5 REPAIR AND CLEAN-UP

.1 During remediation and immediately after completion of remediation, clean work area starting at the top and working down. Clean both work area and Decontamination Room using HEPA vacuum and/or by damp mopping with cleaning solution.

.2 HEPA vacuum inside layer of polyethylene sheeting within work area and on safety canopy and damp wipe prior to removal and disposal. Removal of this layer to occur after removal and decontamination activities are completed and work area inspected by Departmental Representative.

.3 Remove inside layer of fibre reinforced polyethylene sheeting by rolling it away from walls to centre of work area. Vacuum visible debris during cleanup, immediately, using HEPA vacuum.

.4 Include Decontamination Room in similar clean-up.

.5 Remove non-essential fibre reinforced polyethylene sheetings and visible accumulations of material and debris.

.6 Dispose of used fibre reinforced polyethylene sheets, used fibre reinforced adhesive tape, cleaning material, clothing, and contaminated waste.

.7 Include sealed waste containers and equipment used in Contaminated Work Area in cleanup and removed from work area via Decontamination Room.

.8 Carry out final visual inspection check to ensure that no guano residue remains on surfaces as result of dismantling operations.

.9 Remove remaining critical barriers including final safety canopy at the end of the work.

3.6 WASTE DISPOSAL

.1 Place debris and microbial infected waste in doubled-bagged dust-tight 6 mil (0.15 mm) clear polyethylene waste bags. Treat drop sheets and disposable protective clothing as waste; fold these items to contain dust, and place in plastic bags. Securely seal bags and place in waste containers for transport.

3.6 WASTE DISPOSAL (Cont'd)

.2 Clean outside of bags and/or waste containers with damp cloth and cleaning solution or HEPA vacuumed prior to their transport to uncontaminated areas of building.

.3 Remove waste bags and/or containers from site and dispose. There are no special requirements for disposal of guano material; as such they can be disposed of in MOE certified landfill in accordance with O.Reg. 347 and Section 01 74 20.

3.7 RE-ESTABLISHMENT OF SYSTEMS

.1 Advise Bridge Operator to re-establish electrical systems to proper working condition.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International:
.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
.2 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.3 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement.
.4 ASTM 185/185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.2 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 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
.4 CSA-G40.20-04(R2009)/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.5 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Prepare reinforcement bar schedules in accordance with RSIC Manual of Standard Practice and SP-66.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.1 Indicate placing of reinforcement and:
.1 Bar bending details.
.2 Lists.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Shop Drawings:(Cont'd)
.1 (Cont'd)
.1 (Cont'd)
.3 Quantities of reinforcement.
.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
.2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Storage and Handling Requirements: .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.1 Replaced defective or damaged materials with new.

1.4 MEASUREMENT PROCEDURES

.1 Measure reinforcement steel in kilograms.

PART 2 - PRODUCTS

2.1 MATERIALS

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

.2 Reinforcing steel: billet steel, grade, deformed bars to CSA-G30.18, unless indicated otherwise, minimum 30% recycled content, all reinforcing steel galvanized.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18, minimum 30% recycled content.

.4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M, minimum 30% recycled content.

2.1 MATERIALS (Cont'd)

.5 Welded deformed steel wire fabric: to ASTM A82/A82M, minimum 30% recycled content.
.1 Provide in flat sheets only.

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

.7 Mechanical couplers galvanized steel, locknut pipe coupler, capable of developing 125% yield of 400MPa rebar.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 SP-66 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

PART 3 - EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental 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 Departmental Representative's approval of reinforcing material and placement.

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

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

3.3 FIELD TOUCH-UP .1 Touch up damaged and cut ends of galvanized reinforcing steel with compatible finish to provide continuous coating.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 05 41 00: Load bearing metal stud system.

.2 Section 09 91 00: Painting.

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Sections 01 33 00 and 01 78 00.

.2 Shop drawings shall bear the stamp of a Registered Professional Engineer, registered in the Province of Ontario.

.3 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

1.3 MEASUREMENT PROCEDURES

.1 Payment for steel installed shall be measured in kilograms and shall include expansion anchors and adhesive anchors as required for steel connections.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Structural steel including base, cap plates and anchor bolts: to CSA G40.20-04(R2009)/G40.21-04(R2009), Grade 300W, minimum 30% total recycled content.

.2 Hollow structural sections: to CSA-G40.20-04 (R2009)/G40.21-04(R2009), Grade 350W, Class H, BOF minimum 30% total recycled content.

.3 Shop paint primer: CAN/CGSB-1.181-99 zinc rich primer.

.4 Zinc rich primer for galvanized surfaces: zinc rich, readymix to CAN/CGSB-1.181-99, Ecologo certified.

2.2 FABRICATION

.1 Fabricate to CSA S16-09.

.2 Weld to CSA W59-03(R2008).

.3 Provide and reinforce holes required.

.4 Provide required connectors.

.5 Surface preparation: clean surfaces to receive primer using SSPC-SP 7, Brush-Off Blast Cleaning to provide an appearance after cleaning of SSPC-SP 6, Commercial Blast Cleaning to provide an appearance after cleaning of "BSA2" as determined from SSPC-VIS 1-89, Visual Standard for Abrasive Blast Cleaned Steel.

.6 Apply primer to steel surfaces providing a minimum dry film thickness of 70 um as determined in accordance with CGSB 85-GP-14M.

PART 3 - EXECUTION

3.1 ERECTION

.1 Erect in accordance with CSA S16-09.

.2 Tolerance: 1:500.

.3 Supply other sections with base plates and anchors for building in.

.4 Connect with high tensile bolts.

.5 Restore damaged surfaces to appearance Grade BSA2 using mechanical cleaning methods as required.

.6 Touch up connections, scratches and burns with primer.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI):
.1 ANSI/NAAMM MBG 531-09, Metal Bar Grating Manual.
.2 ASTM A53/A53M-10, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
.3 ASTM A307-10, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 American Society for Testing and Materials International, (ASTM):
.1 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM A786-05(2009)/A786M-05(2009), Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
.3 ASTM A1011/A1011M-12, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
.4 ASTM B36/B36M-08a, Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar.

.3 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating

.4 Canadian Standards Association (CSA):
.1 CSA G40.20-04(2009)/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CAN/CSA-S16.1-09, Limit States Design of Steel Structures.
.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
.5 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding) (Imperial Version).

.5 The Environmental Choice Program
.1 CCD-047a-98, Paints, Surface Coatings.
.2 CCD-048-98, Surface Coatings - Recycled Water-borne.

1.2 MEASUREMENT PROCEDURES

.1 Payment for Pipe Rail installed shall be measured in kg, and shall include Expansion Anchors and Adhesive Anchors as required.

1.3 SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets - Safety Requirements. Indicate VOC's:
.1 For finishes, coatings, primers and paints.

.2 Shop Drawings
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Indicate materials, core thicknesses, finishes, connections, joints, methods of anchorage, number of anchors, supports, reinforcement, details, and accessories.
.3 Shop Drawings to bear stamp of a Professional Engineer registered in Ontario.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading: Deliver, store, handle and protect materials in accordance with Section 01 61 00-Common Product Requirements.

1.5 WASTE MANAGMENT AND DISPOSAL

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Steel shapes to CAN/CSA-G40.20/G40.21, Grade 350W.

.3 Steel pipe: to ASTM A53/A53M Schedule 40.

.4 Welding materials: to CSA W59

.5 Welding electrodes: to CSA W48 Series.

.6 High Strength Bolts: to ASTM A325M-00.

.7 Bolts and anchor bolts: to ASTM A307-00.

.8 Grout: non-shrink, non-metallic, flowable, 35MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600g/m2 to CAN/CSA-G164.

.2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.4 PIPE RAILINGS

.1 Steel pipe: sized as indicated on shop drawings outside diameter, formed to shapes and sizes as indicated.

.2 Finish: Hot Dipped galvanized, after fabrication.

PART 3 - EXECUTION

3.1 ERECTION

.1 Do welding work in accordance with CSA W59-03 (R2008) unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16.1-09, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 PIPE RAILINGS

.1 Install pipe railings as indicated on drawings and shop drawings.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

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

END

PART 1 - GENERAL

1.1 GENERAL

.1 This section refers to the Preformed Steel Siding assembly and insulated metal wall panels including all accessories and steel doors and frames including all accessories and hardware.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A 167-99(2004), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
.2 ASTM A 240/A 240M-05a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
.3 ASTM A 480/A 480M-05, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
.4 ASTM D 523-89(R1999), Standard Test Method for Specular Gloss.
.5 ASTM D 822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.2 Canadian Standards Association(CSA International)
.1 CSA-S136-01 (R2007) North American Specification for the Design of Cold Formed Steel Structural Members.

.3 National Building Code of Canada 2010.

1.3 MEASUREMENT PROCEDURES

.1 Payment for Siding and Composite Wall shall include complete installation for respective wall system including Expansion Anchors or Adhesive Anchors as required.
.1 Measure siding per square metre of siding installed.
.2 Measure Composite Wall per square metre of Composite Wall installed.

.2 Work for steel doors and frames including all accessories and hardware will not be measured separately for payment.

1.4 QUALITY ASSURANCE

.1 Supplier shall design, supply and fabricate work of this Section.

.2 Supplier/installer shall have a minimum of 10 years proven experience and must have completed at least 5 major wall panel projects.

1.5 DESIGN REQUIREMENTS

.1 Design, fabricate and erect wall system to meet the following requirements:

.1 Rain penetration: prevent rain penetration through wall system.

.2 Design system based on Rainscreen System based on guidelines published by the National Research Council. Incorporate means of draining moisture to the exterior. Testing on reasonably comparable systems will be considered acceptable.

.3 Design system based on "Rain Screen Principle" by the National Research Council. Incorporate means of draining moisture to the exterior.

.4 Wind Load: Design wall system to resist wind loads, positive and negative expected in this geographical region, without causing rattling, vibration or excessive deflection of panels, overstressing of fastener clips or other detrimental effects on wall systems.

.5 Structural and thermal movement: Accommodate movement of supporting structural framing and movement caused by thermal expansion and contraction of system component parts without causing bowing buckling, delamination, oil canning failure of joint seals, excessive stress on fasteners, or any other detrimental effects.

1.6 PRODUCT DATA

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

.2 Submit product data sheets for cladding, metal wall panels, and steel doors system materials. Include product characteristics, performance criteria, limitations and colours.

.3 Provide maintenance data for cleaning and maintenance of panel finishes. This information is to be in format for O+M Manuals.

1.7 SHOP DRAWINGS

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

.2 Indicate dimensions and thickness of panels, siding assembly, and steel doors, fastening and anchoring methods, detail and location of joints and gaskets, thermal movement provision, wall openings, head, jamb and sill details, materials and finish, compliance with design criteria and requirements of related work.

.3 Indicate elevations, profiles, dimensions and thickness of panels.

.4 Indicate location and detail of joints including joints necessary to accommodate thermal movement.

.5 Indicate attachment clips, joint extrusion system and installation details.

.6 Show fastening and anchoring details.

.7 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the metal panels assembly to withstand the specified loads.

.8 Panels shall be identified on the shop drawings as to building location to facilitate panel removal and replacement.

1.8 SAMPLES

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

.2 Submit duplicate 600 x 600mm samples of wall system, representative of materials.

.3 Submit duplicate 76 x 127mm samples to illustrate colour and finish.

.4 Submit 1 litre sealed can of touch-up paint, properly identified for panel colour provided. Submit instructions for touch-up, repair and removal of panels.

1.9 EXISTING CONDITIONS

.1 Visit site to verify existing materials steel siding assembly, insulated metal wall panels, and steel doors and frames are all to be matched to existing conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel siding: 22GA (0.71mm) A653/A653M-07, Z275 zinc coating designation or ASTM A792/A792M -08, Commercial Steel CS Type A, Forming Steel FS type, Grade 230, AZ180 aluminum-zinc coating designation, prefinished to CSSBI Technical Bulletin No. 7, October 1979, 10000 Series paint system, Green colour selected by Departmental Representative to match existing and profile 38mm deep x 935mm (or to match existing) wide panel coverage x 3658mm high. New profile shall not exceed depth of existing profile. Steel minimum 30% recycled content.

.1 Profile to match: 'CL7040' manufactured by Vicwest 905-825-2252 www.vicwest.com.

.2 Steel liner: 1.2mm thick to match existing galvanized steel with ZF075 zinc coating designation, prefinished, colour to match existing and as selected by Departmental Representative.

.3 Steel eave panels: 1.22mm thick steel to ASTM A653/A653M-07, Z275 zinc coating designation or ASTM A792/A792M-08, Commercial Steel CS type A, Forming Steel FS Type, Grade 230, AZ180 aluminum-zinc coating designation, prefinished to CSSBI Technical Bulletin No. 7, October 1979, 10000 Series paint system, White colour selected by Departmental Representative to match existing profile and dimensions. Steel minimum 30% recycled content.

.4 Z-bars or sub-girts, drip closures and notched steel closures: 1.26mm thick galvanized steel to ASTM A653/A653M-07, Z275 zinc coating designation.

.5 Thermal clip: triangular, galvanized steel.

.6 Soffit, flashing and accessories: exposed trim, metal closures, cap pieces, etc. of same material and colour as siding.

.7 Fasteners: self tapping and self drilling screws, zinc coated steel, prepainted head colour to match siding, neoprene washers.

.8 Composite metal wall panels including accessories to match existing insulated wallpanels.

2.1 MATERIALS (Cont'd)

.8 (Cont'd)

9. Steel doors, frames, and hardware to match existing daybar insulated doors. Verify on site.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Attach sub-girts to structural supports as indicated.

.2 Install starter strips, inside corners, continuous outside corners, edgings, soffits and drip, cap and sill flashings.

.3 Install siding and attachments sequentially from starter strips up, to manufacturer's instructions.

.4 Install eaves panel facing on soffit where indicated.

.5 Install exterior corners, fillers and closure strips with individually formed and profiled work using concealed fasteners.

.6 Maintain joints in exterior sheets, true to line, tight fitting.

.7 Apply sealant where detailed, at junction with other materials, around door and window perimeters, at metal flashings and perimeter of mechanical and electrical work.

.8 Wash down surfaces with mild detergent.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions and data sheets.

.2 Follow manufacturer's instructions for steel siding assembly, insulated composite wall assembly, and insulated steel doors and frames including all accessories and hardware.

3.3 CLEANING

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

END

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:
.1 Material and installation of site applied paint finishes including site painting of shop primed surfaces.
.2 Sustainable requirements for construction and verification.

1.2 MEASUREMENT PROCEDURES

.1 Measure per square metre of surface painted.

1.3 REFERENCES

.1 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33

.2 Environmental Protection Agency (EPA)
.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).

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

.4 Master Painters Institute (MPI)
.1 MPI Architectural Painting Specifications Manual, 2004.

.5 National Fire Code of Canada - 1995

.6 Society for Protective Coatings (SSPC)
.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

.7 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.4 QUALITY ASSURANCE

.1 Qualifications:
.1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and

1.4 QUALITY ASSURANCE (Cont'd)

.1 Qualifications:(Cont'd)
.1 (Cont'd)
location, specifying authority, and project manager.

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

1.5 SCHEDULING

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

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

.3 Schedule painting operations to prevent disruption.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit product data and instructions for each paint and coating product to be used.
.2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.

.3 Samples:
.1 Submit full range colour sample chips to indicate where colour availability is restricted.
.2 Submit duplicate 8 x 12 inch (200 x 300 mm) sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
.1 1/8 inch (3 mm) plate steel for finishes over metal surfaces.
.2 2 inch (50 mm) concrete block for finishes over concrete or concrete masonry surfaces.
.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

1.6 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Samples:(Cont'd)

.4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.

.2 Mercury: presence of and amounts.

.3 Organochlorines and PCBs: presence of and amounts.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions:

.1 Submit manufacturer's installation and application instructions.

.7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 MPI Environmentally Friendly classification system rating.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.

.2 Acceptance at Site:

.1 Identify products and materials with labels indicating:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.4 Storage and Protection:(Cont'd)
.3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 Fire Safety Requirements:
.1 Provide one 19.85 lbs (9 kg) Type ABC dry chemical fire extinguisher adjacent to storage area.
.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.9 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 - Construction/Demolition Waste Management and Disposal.
.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
.3 Place materials defined as hazardous or toxic in designated containers.
.4 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
.5 Ensure emptied containers are sealed and stored safely.
.6 Unused paint materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
.7 Paint finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.9 Waste Management and Disposal:(Cont'd)

.8 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

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

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

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

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

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

1.8 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Provide continuous ventilation for seven days after completion of application of paint.

.4 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.

.5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.6 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Perform no painting when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

1.8 SITE CONDITIONS (Cont'd)

.2 (Cont'd)

.1 Perform no painting when:(Cont'd)

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

.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

.4 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.5 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.

.2 Perform painting work when maximum moisture content of the substrate is below:

.1 Allow new concrete and masonry to cure minimum of 28 days.

.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".

.4 Test concrete surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

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

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Additional interior application requirements:

.1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Only qualified products with E2 E3 "Environmentally Friendly" rating are acceptable for use on this project.

.4 Conform to latest MPI requirements for painting work including preparation and priming.

.5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

.6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

2.2 COLOURS

.1 Departmental Representative will provide Colour Schedule after Contract award.

.2 Where specific products are available in restricted range of colours, selection based on limited range.

.3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 PAINTING SYSTEMS

.1 Concrete horizontal surfaces: floors:
.1 INT 3.2C - Epoxy finish to match existing.

.2 Structural steel and metal fabrications:
.1 EXT 5.1D - Alkyd semi-gloss finish. Colour to match existing.

.3 Galvanized Metal: not chromate passivated.
.1 EXT 5.3B - Alkyd semi-gloss finish.

PART 3 - EXECUTION

3.1 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:
.1 Concrete: 12%.

3.3 PREPARATION

.1 Protection:
.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.
.4 Protect passing pedestrians, building occupants and general public in and about the building.

.2 Surface Preparation:
.1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

3.3 PREPARATION (Cont'd)

.2 Surface Preparation:(Cont'd)

.2 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 39.4 inches (1000 mm).

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.7 Touch up of shop primers with primer as specified.

3.3 PREPARATION (Cont'd)

.8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.4 APPLICATION

.1 Method of application to be as approved by Departmental Representative. Apply paint by brush roller air sprayer airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

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

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

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

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

3.5 FIELD QUALITY CONTROL

.1 Field inspection of painting operations to be carried out be independent inspection firm as designated by Departmental Representative.

.2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Cooperate with inspection firm and provide access to areas of work.

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

3.6 RESTORATION

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

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

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

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

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

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Work of this Section includes raceway for electrical system comprising of, all supports and hardware necessary for complete conduit system, supplying all labour, materials, tools, equipment, and appurtenances necessary to supply, prepare and install all items as indicated in the Contract Documents including materials and labour which are not shown in the Contract Documents and as required by CSA C22.1-2012, but which are required to complete the installation. Includes partial demolition of raceway.

1.2 REFERENCES

.1 CSA International.
.1 CSA C22.2 No.40-M1989(R2009), Cutout, Junction and Pull Boxes.
.2 CSA C22.1-2012, Canadian Electrical Code.

1.3 MEASUREMENT PROCEDURES

.1 Work will not be measured separately for payment.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for raceway and boxes and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

.2 Operation and Maintenance Data: submit operation and maintenance data for raceway and boxes for incorporation into manual.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground, indoors, and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect raceway and boxes from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 CONDUIT AND RACEWAYS

.1 Conduit inside the Control Buildings shall be rigid hot dipped galvanized steel. The conduit shall be hot dipped galvanized inside and out, and ULC listed. The minimum size shall be 3/4 inch (19 mm) unless noted.
.1 Fittings: Galvanized malleable iron or non-corrosive alloy compatible with galvanized conduit.

.2 Conduit on the vertical lift span and exposed shall be PVC coated rigid hot dipped galvanized steel.
.1 All PVC coated, hot dipped galvanized rigid steel conduit shall be PVC coated inside and out. The outside PVC coating shall be a minimum of 40 mils. The inside PVC coating shall be a minimum of 2 mils.
.2 All rigid steel conduit fittings shall be hot dip galvanized after fabrication in accordance with ASTM requirements and PVC coated inside and out.

.3 Minimum Size: 3/4 inch (19 mm) minimum trade size unless otherwise specified.

.4 No non-metallic flexible conduit is allowed.

2.1 CONDUIT AND RACEWAYS (Cont'd)

.5 Liquidtight Flexible Stainless Steel Metal Conduit: Interlocked Stainless Steel construction with PVC jacket.
.1 All fittings shall be ANSI/NEMA FB 1.

.6 ULC listed schedule 80 PVC conduit meeting the requirements of NEMA TC 2 and fittings and Conduit Bodies meeting the requirements of NEMA TC 3.

.7 Conduit under the sidewalk and embedded in concrete shall be Schedule 80 PVC.

.8 Provide suitable cover and fittings to open raceway to prevent accumulation of bird droppings and nesting.

.9 Provide both ends of each conduit run with a brass tag having a number stamped thereon in accordance with the conduit diagrams.

.10 Provide expansion/deflection fittings.

.11 Provide suitable pull string in each empty conduit except sleeves and nipples.

.12 Use suitable caps to protect installed conduit against entrance of dirt and moisture.

.13 Conduits shall be supported on strut fabricated from type 316 stainless steel.

.14 All conduit mounting hardware shall be type 316 stainless steel. Provide isolation materials, bushings and washers as needed to separate dissimilar metals.

.15 Conduit sections shall be connected to each other with threaded couplings.

.16 Support conduit using stainless steel straps, lay-in adjustable hangers, clevis hangers, and split hangers.

.17 Grounding bushings or hubs shall be used for all conduits entering electrical enclosures, and boxes.

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 raceway and boxes installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Conduits mounted externally on parts of the steel work shall be set not less than 1-1/2 inches (38 mm) clear from the supporting structure to prevent accumulation of dirt. Parallel horizontal conduit shall be spaced 1 inch (25 mm) apart and they shall be securely supported to prevent rattling and wear.

.2 Conduit supports and anchors shall be installed at maximum spacings of 5 feet (1524 mm).

.3 Fasten brass tags securely and permanently to the conduit ends with bare copper wire.

.4 Arrange conduit to maintain headroom and present neat appearance. Route exposed conduit parallel and perpendicular to walls. Route conduit in and under slab from point-to-point.

.5 Install expansion/deflection fittings at any point where a conduit crosses an expansion joint, or where movement between adjacent sections of conduit can be expected.

.6 All conduits shall be carefully cleaned, both before and after installation. Upon completion of the conduit installation, clear each conduit with a tube cleaner equipped with a mandrel of a diameter not less than eighty percent (80%) of the nominal inside diameter of the conduit, and shall then draw in the conductors.

3.2 INSTALLATION (Cont'd)

.7 All conduits shall be installed so that they will drain properly and drainage tees shall be provided at low points where required.

.8 All field bends shall be long sweep, free from kinks, and of such easy curvatures as to facilitate the drawing in of conductors without injury. Conduit runs shall be made with as few couplings as standard lengths will permit. There shall be no more than four bends between pulling points and total angle of all bends between any two boxes shall not exceed 360 degrees. Long running threads will not be permitted.

.9 Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch (51 mm) size.

.10 Where conduits pass through the floors of the tender house the openings shall be sealed with RTV silicon medium density foam.

.11 Pull boxes shall be used wherever necessary to facilitate the installation of the conductors. Condulets shall not be used for pulling more than ten conductors or for making such turns in conduit runs or for branching conductors, except for indoor wiring to lighting fixtures and receptacles.

.12 Exposed raceway runs shall be straight and shall be parallel or at right angles to the general structure lines. Conduits shall change elevation when changing direction to avoid blocking the path of other conduits.

.13 Conduits shall be installed to be continuous and watertight between boxes or equipment.

.14 Conduits shall be protected at all times from the entrance of water and other foreign matter by being capped or well plugged overnight and when the Work is temporarily suspended. Duck tape is not an acceptable method.

.15 The use of liquidtight flexible stainless steel metal conduit is allowed only for the connection of motors, limit switches, and other devices that must be periodically adjusted in position.

.16 Make connections between the rigid galvanized steel PVC coated conduit system and all movable motors, and movable limit switches with flexible conduit with couplings and threaded terminal

3.2 INSTALLATION (Cont'd)

.16 (Cont'd) fittings. The flexible conduit shall be fully interlocked.

.17 Flexible conduit extensions not to exceed 36 inches (914 mm) in length and to be equipped with bonding jumpers.

.18 Provide separate conduits for control (up to 120 V a.c.) conductors and power conductors.

.19 All Work shall be performed by personnel who are trained by the manufacturer, using only tools provided by the PVC coated conduit manufacturer.

.20 Running thread or set screw type fittings are not permitted.

.21 To prevent dissimilar metal corrosion isolation bushings or washers shall be provided where stainless steel comes into contact with other metals.

.22 Group related conduits; support using conduit rack. Construct rack using stainless steel strut; provide space on each for 25 percent additional conduits.

.23 Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

.24 Install conduit in accordance with NECA 1-2010.

.25 Use pull boxes wherever necessary to facilitate the installation of the conductors. Do not use condulets for pulling more than ten conductors or for making such turns in conduit runs or for branching conductors, except for indoor wiring to lighting fixtures and receptacles.

.26 Conduit drawings: Before the initial start of construction, submit a scaled full size drawing showing all conduit runs between all pieces of equipment for review.

3.3 CLEANING

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

.1 Leave Work area clean at end of each day.

3.3 CLEANING (Cont'd)

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

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

3.4 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00.

END

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Geotechnical report included in Appendix D Report No. SM135013-G April 23, 2013 by Soil-Mat Engineers and Consultants Ltd.

1.2 REFERENCES

.1 ASTM International
.1 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600kN-m/m^3).

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

.3 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS 1004-05, Material Specification for Aggregates-Miscellaneous.
.2 OPSS SP 110F13-03, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

.4 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with EPA 832/R92-005.
.2 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.3 Showing, sheeting, bracing submit design for excavation bracing as required. Design shall bear the stamp of a Registered Professional Engineer in Ontario. Design shoring for loading in soils report.

1.4 MEASUREMENT PROCEDURES

.1 Excavation - cubic metres.

.2 Backfill - cubic metres.

.3 Excavation shoring - square metres.

.4 Grading and restoration - square metres.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular B to OPSS SP 110F13. Sand to OPSS 1004.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:
.1 Examine soil report included in Appendix.
.2 Before commencing work establish locations of buried services on and adjacent to site.

.2 Evaluation and Assessment:
.1 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
.2 Testing of materials and compaction of backfill, and fill will be carried out by testing laboratory designated by Departmental Representative.
.3 Not later than 1 week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill fill materials proposed for use.
.4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative so that compaction tests can be carried out by designated testing agency.
.5 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Use 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, in accordance with sediment and erosion control plan, specific to site, to EPA 832/R-92-005 and requirements of authorities having jurisdiction..

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Protection of in-place conditions:

.1 Protect excavations from freezing.

.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 Departmental 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 to remain undisturbed.

.3 Removal:

.1 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

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

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

.4 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.

.5 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

3.3 EXCAVATION

.1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.

.2 Topsoil stripping:
.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
.2 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
.3 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
.4 Stockpile in locations as directed by Departmental Representative .
.5 Dispose of excess topsoil off site.

.3 Excavate as required to carry out work, in all materials met.
.1 Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete.
.2 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
.3 Fill excavation taken below depths shown without written authorization with concrete of same strength as for footings.
.4 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
.5 Obtain Departmental Representative approval of completed excavation.

.4 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

.5 Excavate for slabs and paving to subgrade levels.
.1 Remove topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.4 SITE QUALITY CONTROL

.1 Fill material and spaces to be filled to be inspected and approved by Departmental Representative.

3.5 BACKFILLING

.1 Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from Departmental Representative.

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

.3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

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

.5 Placing:
.1 Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.
.2 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.

.6 Compaction: compact each layer of material to following densities for material to ASTM D 698:
.1 To underside of basecourses: 100%.
.2 Basecourses: 100%.
.3 Elsewhere: 90%.

.7 In trenches:
.1 Up to 300 mm above pipe or conduit: sand placed by hand.
.2 Over 300 mm above pipe or conduit: native material approved by Departmental Representative.

.8 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.9 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.6 GRADING

.1 Grade to ensure that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative. Grade to be gradual between finished spot elevations as indicated.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Dispose of cleared and grubbed material off site daily.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 20 - Construction/Demolition Waste Management and Disposal comply with all MOE requirements for disposal of excavated material. See soils report.

3.8 RESTORATION

.1 Upon completion of work, remove waste materials and debris in accordance to Section 01 74 20 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defect as directed by Departmental Representative.

.2 Replace topsoil as directed by Departmental Representative.

.3 Reinstate lawns to elevation which existed before excavation.

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

.5 Clean and reinstate areas affected by work as directed by Departmental Representative.

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

END

PART 1 - GENERAL

1.1 SAMPLES

.1 Make samples of materials available to the Departmental Representative.

1.2 MEASUREMENT PROCEDURES

.1 Steel W-beam guide rail will be measured in metres installed in the work.

.2 Terminal sections, timber posts, timber offset blocks considered included in this item and will not be measured separately for payment.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel beams, terminal sections, timber posts and offset blocks to:
.1 OPSD 912.101, November 2010, Guide Rail System, Steel Beam Rail Component.
.2 OPSD 912.130, November 2008, Guide Rail System, Steel Beam With Wooden Offset Block Assembly Installation - Single Rail.
.3 OPSD 912.140, November 2010, Guide Rail System, Steel Beam Wood Post Assembly Installation - Single Rail.
.4 OPSD 912.401, November 2010, Guide Rail System, Steel Beam Structure Connection - Rail and Channel.
.5 OPSD 912.430, November 2010, Guide Rail System, Steel Beam Structure Connection.
.6 OPSD 912.532, November 2008, Guide Rail System, Steel Beam Barricade Installation.
.7 OPSD 2265.01, April 1985, Grounding For Steal Beam Guide Rail.

.2 Steel beams and terminal sections: to Ontario Provincial Standard Specification 1504, November 2010, Steel Beam Guide Rail.

.3 Timber posts and offset blocks: to CAN/CSA-Z809-08, Sustainable Forestry Initiative (SFI) or Forestry Stewardship Council (FSC) certified.
.1 Well seasoned, straight and sound, free from loose knots or other defects, and dressed four sides to Ontario Provincial Standard Specification 1504, November 2010, Steel Beam Guide Rail.

PART 3 - EXECUTION

3.1 ERECTION

.1 Erect posts to depths and at locations shown on drawings or as directed by the Departmental Representative.

.2 Auger holes and compact bottom to provide firm foundation. Set post plumb and square in augered hole, backfill in 150 mm thoroughly compacted layers.

.3 Accurately cut off tops of set posts to established elevations as shown on the drawings.

.4 Treat cut tops with 2 soaking coats of the same type of wood preservative used to pressure treat post.

.5 Erect rail components as shown on drawings. Lap all joints in the direction of traffic, tighten all fittings to 100 N.m, and field cut bolts as required to maintain a maximum protrusion of 10 mm beyond nut.

END