TABLE OF CONTENTS

SECTION	DESCRIPTION	NUMBER OF PAGES
GENERAL		
01 11 00	Summary of Work	8
01 14 00	Work Restrictions	2
01 29 00	Work Procedures	2
01 29 01	Measurement and Payment	4
01 31 19	Project Meetings	2
01 33 00	Submittal Procedures	4
01 35 29 06	Health and Safety Requirements	11
01 35 43	Environmental Procedures	7
01 41 00	Regulatory Requirements	2
01 45 00	Quality Control	3
01 51 00	Temporary Utilities	3
01 52 00	Construction Facilities	4
01 56 00	Temporary Barriers and Enclosures	2
01 61 00	Common Product Requirements	4
01 73 00	Execution	2
01 74 11	Cleaning Procedures	2
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	3
CIVIL		
33 11 00	Water Main	10
STRUCTURAL		
02 41 19	Selective Demolition	2
05 50 00	Metal Fabrication	3
09 97 19	Steel Coating	8

ELECTRICAL

26 05 00	Common Work Results	8
26 05 20	Wire and Box Connectors	2
26 05 21	Wires and Cables 1-1000V	3
26 05 29	Fastenings and Supports for Electrical Systems	3
26 05 31	Splitter, Junction, Pull Boxes and Cabinets	2
26 05 32	Outlet Boxes, Conduit Boxes and Fittings	2
26 05 34	Conduits, Conduit Fastenings and Conduit Fittings	2
26 05 36	Cable Trays for Electrical Systems	3
26 27 26	Wiring Devices	2
26 50 00	Lighting	3

APPENDIX A

Parks Canada Confined Space Program

WSP – Mold Investigation Citadel Hill Service Tunnel report dated October 14, 2016.

Part 1 General

1.1 REFERENCES

.1 Public Act (Nova Scotia), Pit and Quarry Guidelines, Asphalt Paving Plant Regulations, Environmental Construction Practice Specifications, Forest Improvement Act, National Parks Act and Regulations and Canadian Environmental Protection Act.

1.2 DESCRIPTION OF WORK

.1 The work will be carried out at the Halifax Citadel National Historic site in Halifax, NS.

.2 Work on this project consists generally, but not limited to the following:

- .1 The work area is identified as confined space and is mold contaminated, all Federal and Provincial regulations and guidelines are to be followed.
- .2 Supply and installation of a new 150 mm diameter watermain and connections to existing infrastructure, including notification and coordination of work with the alarm company.
- .3 Pressure Testing, chlorination and de-chlorination of new water system
- .4 Testing of existing sprinkler system to ensure functionality
- .5 Demolition of existing water line support brackets and supply and installation of new water line support brackets.
- .6 Repair of existing access ladder
- .7 Installation of new service tunnel wall coating
- .8 Replace storm sewer clevis hanger support bolts
- .9 Replace each existing luminaire and its backbox with new, heavy duty led luminaire, hubbell-killark vm4lb. Install new unit in same location and at same mounting height as original.
- .10 Reinstall cover on rigid pvc 'lb' fitting. Provide new fasteners and gaskets as required.
- .11 Replace existing steel 12" x 12" pull box with new rigid pvc unit of the same dimensions. Contractor to provide all fittings and bushings required. Coordinate any service interruptions required with Parks Canada representative prior to disconnecting any circuits or feeders.
- .12 Replace existing damaged rigid pvc junction box with two new 6" x 6" rigid pvc junction boxes, one for communications cabling and one for power. Coordinate with Parks Canada representative for rerouting of 3 water lines currently passing through existing junction box, these are not to be rerouted into new junction boxes.
- .13 Provide solid bonding connection at all entry points of bonding conductors into all cable trays. These connections shall consist of a properly sized bolted lug. Ensure mating surface with cable tray is clean and free of corrosion, dirt, grease, etc.

.14 Replace each existing receptacle and their backboxes with a new 5-15r, gfci-equipped receptacle complete with extra-duty, while-in-use coverplate and new cast aluminium backbox. In each location, replace existing conduit from luminaire to receptacle with new liquid-tight flexible conduit.

.15 Replace all remaining copper-clad cabling in tunnel with new liquid-tight flex conduit complete with wiring in quantities and gauge to match existing. Liquid-tight armoured cable (teck) is also acceptable. Provide all necessary liquid tight fittings. Remove all abandoned conduit and cabling back to their source of supply.

.16 Reattach drooping run of liquid-tight flex conduit installed by a previous contractor to ceiling of tunnel with appropriate fasteners. Ensure all new conduit and cabling is fastened properly.

.17 Replace all heavily or moderately corroded sections of cabletray throughout tunnel. Contractor to provide for approximately 30m of 2"d x 8"w cable tray.

.18 All cost and permits associated with working in confined space.

.19 All other incidentals required to complete the work outlined above.

.3 Protect from any damage due to construction activities on the site. Preservation of existing historic fabric shall be given the highest priority during construction related to the protection/repair of the assets. Any damage which occurs to adjacent assets or surfaces shall be repaired at the Contractor’s cost.

.4 The Contractor shall be deemed to have visited the site and examined all assets and to have become fully familiar with all conditions relative to carrying out the work. There shall be no consideration given to claims resulting from the Contractor's failure to carry out sufficient site investigations prior to tendering of the work.

1.3 WORK SCHEDULE

.1 The Contractor shall prepare and submit to the Departmental Representative within five days of notification of award of the Contract a copy of the proposed Construction Schedule for approval by Parks Canada Agency. All work of this contract is to be completed by March 17, 2017. Work can commence at any time but there shall be no breaks in the work schedule once work commences. Water system to be shut down for a maximum of 48 hours.

.2 After receiving the Contractor's plan and prior to start of construction, a meeting involving Contractor, Departmental Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work, methods of construction, and environment protection methods.

.3 The Contractor shall comply with the agreed schedule(s) at all times. If, for any reasons, the schedule is not followed, the Contractor is to immediately notify the Departmental Representative of the change and submit a revised Schedule for acceptance.

.4 Interim reviews of work progress based on work schedule will be conducted as decided by the Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

.5 No work will begin until the pre-construction meeting is held.

.6 If required, the Contractor shall increase manpower and equipment and make whatever adjustments are appropriate to ensure that the project is completed on schedule.

1.4 CODES AND STANDARDS

.1 All work to be carried out in accordance with applicable federal, provincial regulations for those agencies having jurisdiction for the work. The work is subject to the National Park Act and Regulations and the Canadian Environmental Protection Act.

.2 Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing and Materials (ASTM) and other standards organizations.

.3 All work shall be carried out in accordance with the Nova Scotia Occupational Health and Safety Act and the Canada Labour Code Part II, and the Canada Occupational Safety And Health Regulations made under Part II of the Canada Labour Code.

.4 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

.5 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

1.5 CONTRACTOR'S USE OF SITE

.1 The site is located within the Halifax Citadel National Historic Site. Use of the site shall be limited to the Citadel designated laydown area as defined in contract drawings. Access to the site will be by vehicle and Tunnel East Entrance. The Contractor shall liaise with Parks regarding acceptable times and usage of the site, roads, etc. It shall be the Contractor's responsibility to arrange for all required transportation of personnel, equipment and materials to the site. Contractor to take into consideration that there will be pedestrians and dogs adjacent the site area at Citadel Hill and that adjacent parking lots will remain in use.

.2 Parking lots adjacent the site are run privately and cannot be used for staging, material storage or equipment without written permission from the parking lot operator.

.3 Provide and maintain adequate access to project site. Use existing roads/paths for access to project site, storage areas or work areas, maintain such roads/paths for duration of contract and make good damage resulting from Contractor's use of roads/paths to Departmental Representative's satisfaction.

.4 Provide for pedestrian, cyclist and vehicular traffic at the adjacent parking lot and parking lot entrances.

.5 Make arrangements with authorities or owners of private properties for transporting materials and machinery over their properties and be responsible for obtaining and paying of fees, if required.

.6 Contractor shall accommodate and permit authorized Parks Canada (PC) employees and the Departmental Representative on the site. Contractor to provide all safety equipment

for confined space entry and for mold contaminated work area to accommodate up to 4 representatives at any given time.

.7 Do not unreasonably encumber site with materials or equipment.

.8 Move stored products or equipment which interfere with operations of Parks Canada.

.9 Obtain and pay for use of additional storage or work areas needed for operations.

.10 Provide all barriers, signs, enclosures, etc. to ensure safety of the public or other parties on the site. Signs and notices for safety and instruction in both official languages or commonly understood graphic symbols.

.11 Temporary storage parking areas and turn-a-round facilities for Contractor-related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.

.12 The Contractor shall maintain the site in a tidy condition free from the accumulation of waste products and debris. Upon substantial performance of the work, remove surplus products, tools, machinery and equipment from the site. Completion of clean-up is required for total performance of the work.

.13 Contractor to obtain all necessary permits to perform work and to comply with all permit requirements and conditions.

.14 Contractor is responsible for restoring any areas disturbed or damaged during work of this contract.

.15 Limit off-site tracking of material by equipment and vehicles. Contractor is responsible for keeping adjacent paved areas clean, including adjacent parking lots and streets. Cleaning operations must not impede traffic.

.16 There is to be no idling of vehicles onsite at any time.

.17 A maximum of three (3) vehicles are permitted on site at any given time and they must be parked in the designated fenced off area of work. One (1) parking space is to be reserved for the site inspector and the other two (2) spaces are to be reserved for the contractor. Other vehicles must be parked off site.

.18 Contractor is responsible for snow removal in designated work and laydown areas.

1.6 WORK SEQUENCE

.1 Contractor to provide a daily schedule of planned work.

.2 Pipe laying to commence at downstream end.

1.7 SPECIAL REQUIREMENTS

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

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

.3 Carry out noise generating work within time specified in the Halifax Regional Municipality noise by-law.

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of following:

.1 Contract drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 Change orders.
.6 Other modifications to Contract.
.7 Field Test Reports.
.8 Copy of Approved Work Schedule.
.9 Health and Safety Plan and Other Safety Related Documents.
.10 Manufacturer’s installation and application instructions.
.11 Construction Schedule.
.12 Record Drawings.
.13 Other Documents as Specified.

1.9 PRODUCTS

.1 Contractor's duties:

.1 Order products specified from designated suppliers. Order in quantities and at times compatible with construction schedule and site storage capacity.
.2 Transport, unload and handle at site.
.3 Promptly inspect delivered products, and give written report to the Departmental Representative on condition of all items received.
.4 Pay demurrage charges.
.5 Install, connect and finish products as specified.

1.10 DEPARTMENTAL REPRESENTATIVE

.1 The Departmental Representative for this work shall be designated once the tender has been awarded.

1.11 MEASUREMENT FOR PAYMENT

.1 The work of this contract is covered by unit price pay items and shall be measured and paid for as described in Section 01 29 01.

1.12 WASTE DISPOSAL

.1 All waste generated from this project will be disposed of outside of Park boundaries at a licensed facility.

1.13 SETTING OUT OF WORK

.1 Contractor shall assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Contractor shall supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Supply stakes and other survey markers required for laying out work.

.5 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative

1.14 EXISTING SERVICES

.1 The Contractor shall confirm all inverts and critical elevations in the field prior to construction.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.3 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.

.4 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties. The water connection and disconnection shall be completed after hours and must be coordinated with events onsite. Coordination is to be made with the Departmental Representative.

.6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.7 Record locations of maintained, re-routed and abandoned service lines.

.8 The Contractor shall ensure that they make provisions for safe working conditions while operating near live power and communication lines.

.9 Halifax Citadel is a historic site and no historically significant aspects shall be altered.

1.15 PROTECTION OF HISTORICAL OR ARCHEOLOGICAL ITEMS

.1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.

.2 An archaeologist, representing Parks Canada, may be present during excavation work. Archaeologist has authority to stop work when excavation uncovers archaeological resources.

.3 Give immediate notice to the Departmental Representative if evidence of archaeological finds are encountered during construction, and await his/her written instructions before proceeding with work in this area.

.4 Relics and antiquities and items of historical or scientific interest found on site, shall remain property of Parks Canada. Protect such articles and request directives from the Departmental Representative.

1.16 PROJECT MEETINGS

.1 Schedule and administer preconstruction meeting and weekly project meetings throughout the progress of the work at the call of Departmental Representative in accordance with Section 01 31 19 – Project Meetings.

1.17 TEMPORARY CONSTRUCTION FACILITIES

.1 Provide temporary controls and construction facilities in order to execute Work expeditiously. Remove from site all such work after use.

.2 Drawing showing proposed location and dimensions of Moduloc (or approved equivalent) fenced-in area, area for three (3) vehicles to park within the fenced-in area (one (1) site inspector vehicle and two (2) contractor vehicles) and a pipe laydown area provided in contract drawings.

.3 Indicate use of supplemental or other staging area.

.4 The contractor shall use Parks Canada sanitary facilities for site personnel at locations specified by the Departmental Representative.

1.18 TEMPORARY BARRIERS AND ENCLOSURES

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

.2 Drawing showing proposed location and dimensions of area to be fenced and used by Contractor is provided in contract drawings. Contractor shall use Moduloc fence or approved equivalent. Temporary fencing is to be installed around perimeter of entire active work area.

.3 Erect temporary site enclosure using 1.8 m high Modulock fence. Maintain fence in good repair.

.4 Provide one temporary lockable vehicle entrance at driveway entrance. Equip gate with locks and keys.

.5 Provide secure barricades around manhole in field area, if it is required to be opened at any point. The fenced area must be large enough for a rescue operation, if required.

.6 Temporary fencing is to be installed and maintained around perimeter of entire grassed area for duration of construction.

1.19 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

.3 Provide temporary barriers and enclosures, including site fence, in accordance with 1.17 – Temporary Barriers and Enclosures.

.4 Provide temporary dust screens, barriers, warning signs in locations where work is adjacent to areas used by public or government staff.

1.20 PROTECTION OF MATERIALS

.1 Store and protect all materials and equipment required in connection with the work until they have been placed in the work and accepted by the Departmental Representative. Immediately remove rejected materials from the site.

1.21 PERMITS/AUTHORITIES

.1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. The contractor shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Departmental Representative prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all changes in connection therewith.

1.22 EQUIPMENT RENTAL RATES

.1 Upon written request, the Contractor will supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the Nova Scotia Road Builders Association.

1.23 NATIONAL PARKS ACT

.1 Perform work in accordance with applicable sections of the National Parks Act. A copy of the Act is available online at http://laws-lois.justice.gc.ca/eng/acts/N-14.01/

1.24 CLEANING

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

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

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

END OF SECTION

Approved: 2010-12-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

1.2 ACCESS AND EGRESS

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

1.3 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

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

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

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

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.5 EXISTING SERVICES

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

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

.1 Water connection and disconnection to be completed after hours and must be coordinated with Departmental Representative and with Parks Canada Schedule.. Water system to be shut down of a maximum of 48hrs.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 SPECIAL REQUIREMENTS

.1 Coordinate with Departmental Representative hours designated for noise generating work.

.2 There is to be no work on the weekends when events are held at the Citadel.

.3 The Contractor shall not work onsite the following days: Remembrance Day, November 26-27, 2016 and from December 24th to January 3rd 2016.

.4 Contractor to have confined space entry equipment on-site and supply all required safety gear for the Departmental Representative and the Consultant. Contractor to be equipped for a minimum of four (4) people to enter the tunnel at any given time.

.5 If access manhole is left open at any point, the contractor is to secure the area with construction fencing (1.8m high Moduloc or equivalent). Fenced area shall be large enough to accommodate a rescue operation.

.6 Submit a daily work schedule ten (10) days in advance of commencement of work and update daily once work commences.

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

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

.9 Ingress and egress of Contractor vehicles at site is limited to three (3) vehicles (one contractor, one safety and one consultant vehicle).

.10 Vehicles are not permitted to idle on-site at any time.

1.7 SECURITY

.1 Parks Canada to provide security.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 REFERENCES

.1 Owner/Contractor Agreement.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Make applications for payment monthly as Work progresses.

.2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.

.3 Submit to The Engineer, at least 14 days before first application for payment. Schedule of values for parts of Work, aggregating total amount of Contract Price, to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

.1 Provide schedule of values supported by evidence as The Engineer may reasonably direct and when accepted by the Engineer, be used as basis for applications for payment.

.2 An unbalanced or front-end loaded schedule will not be acceptable.

.3 Include statement based on schedule of values with each application for payment.

.4 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as the Engineer may reasonably require to establish value and delivery of products.

1.4 PROGRESS PAYMENT

.1 The Engineer will issue to Parks Canada (PCA), no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as the Engineer determines to be due. If the Engineer amends application, the Engineer will give notification in writing giving reasons for amendment.

1.5 SUBSTANTIAL PERFORMANCE OF WORK

.1 Prepare and submit to the Engineer comprehensive list of items to be completed or corrected and apply for a review by the Engineer to establish Substantial Performance of Work. Failure to include items on list does not alter responsibility to complete Contract.

.2 No later than 10 days after receipt of list and application, the Engineer will review Work to verify validity of application, and no later than 7 days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.

.3 The Engineer will state date of Substantial Performance of Work or designated portion of Work in certificate.

.4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with the Engineer, establish reasonable date for finishing Work.

1.6 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

.1 After issuance of certificate of Substantial Performance of Work:

.1 Submit application for payment of holdback amount.

.2 Submit sworn statement that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which PCA might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.

.2 After receipt of application for payment and sworn statement, the Engineer will issue certificate for payment of holdback amount.

.3 Where holdback amount has not been placed in a separate holdback account, PCA shall, 10 days prior to expiry of holdback period stipulated in lien legislation applicable to Place of Work, place holdback amount in bank account in joint names of PCA and Contractor.

.4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work.

1.7 FINAL PAYMENT

.1 Submit application for final payment when Work is completed.

.2 The Engineer will, no later than 10 days after receipt of application for final payment, review Work to verify validity of application. The Engineer will give notification that application is valid or give reasons why it is not valid, no later than 7 days after reviewing Work.

.3 The Engineer will issue final certificate for payment when application for final payment is found valid.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

GENERAL

1. Unit prices are full compensation for the work necessary to complete each item in the Contract and in combination for all work necessary to complete the Work as a whole.

2. Unit prices are full compensation for the contractor to develop and implement a safe work plan and procedure for the Work, including but not limited to Mold Contamination, including all incidents.

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

.2) CCA82-2004 Mold Guidelines for Canadian Construction Industry.

.3) WSP – Mold Investigation Citadel Hill Service Tunnel report dated October 14, 2016.

3. Unit prices are full compensation for the contractor to develop and implement a safe work plan and procedure for the Work, including but not limited to Confined Space, including all incidents.

4. It is the intention to provide for a finished piece of work, complete in all essentials and details, including all items reasonably inferable from the drawings and specifications.

5. The aggregate of all unit prices and lump sum payments shall constitute full compensation for the entire work of the Contract, as shown, specified and intended, regardless of any omission in the tender documents of any items which are necessary for the completion of the work including temporary facilities, safety, etc.

6. Should there be any discrepancy regarding measurement between the Measurement and Payment Section and any other section in the specifications, the Measurement and Payment Section shall overrule the other specification section.

7. Unless otherwise specified, all materials necessary to complete the items listed in the Unit Price Table and the finished work are to be supplied by the Contractor and the cost of such material is to be included in the Contractor's prices. There will be no measurement for work not authorized, or for work beyond authorized limits as determined by the Departmental Representative.

8. All unit prices and lump sums shall include all costs applicable to the items, including labour, materials, equipment, transportation, ancillaries and all other applicable and relevant costs as intended and as required to complete the work to the full satisfaction of the Departmental Representative. The unit prices and lump sums indicated shall exclude HST.

9. All work including shoring, protection measures, etc. required to prevent damage/disturbance to existing structures of any areas damaged as a result of work or access are considered incidental to the work.

10. Disposal of excess excavated materials will not be measured but will be incidental to the work. All excess materials shall become property of the Contractor and shall be disposed of off-site at an environmentally approved disposal site.

11. The intent is to cover a range of required work as determined by the Departmental Representative on the site under established unit rates. Actual quantities may vary widely depending on the final scope of work and the condition of the various structures.

12. Shoring, bracing, cofferdams, underpinning and de-watering of excavation will not be measured separately for payment.

13. All measurement shall be along a horizontal plane unless otherwise indicated.

WATER MAIN SYSTEM

1. Pipe

   Unit of Measurement: Metre

   Method of Measurement: along centreline of pipe through fittings, valves and valve chambers.

   This item includes: pipe complete with all fittings, pressure testing, chlorination, de-chlorination and testing of existing sprinkler system.

2. Valves

   Unit of Measurement: Each

   This item includes: valves.

3. Connections to Existing Main

   Unit of Measurement: Each

   This item includes: locating existing main and supply and installation of pipe, nipples, valves, fittings and incidentals.

4. Remove Existing Water Main Supports

   Unit of Measurement: Lump Sum

   This item includes: removal and disposal of existing water main support brackets including all tools, labour, materials and equipment to complete the work.

STRUCTURAL

5. New Galvanized Water Main Support Brackets

   Unit of Measurement: Each

   This item includes: supply, delivery and installation, including all tools, labour, materials and equipment to complete the work ie. new galvanized steel brackets, bolts and other miscellaneous details.

6. Ladder Stringer Repair

   Unit of Measurement: Lump Sum

This item includes: furnishing of all surface preparation, materials, coating materials including all tools, labour, materials and equipment and all other items required to complete the work.

7. Angle Support Repair

Unit of Measurement: Each

Method of determination: angle supports needing repair will be determined by the Department Representative on site.

This item includes: furnishing of all surface preparation, materials, coating materials including all tools, labour, materials and equipment and all other items required to complete the work.

8. Service Tunnel Wall Coating

Unit of Measurement: Meters Squared (m^2)

Method of determination: measurement of service tunnel wall coating will be measured in square meters of repaired surface area as determined by the Department Representative on site. The repaired surface area is defined as the corroded wall area as measured prior to coating.

This item includes: furnishing of all surface preparation, materials, coating materials including all tools, labour, materials and equipment and all other items required to complete the work.

ELECTRICAL SYSTEM

1. Luminaire Replacement

Unit of Measurement: Each.

This item includes: removal of existing, supply and installation of new luminaire, mounting bracket, backbox, wiring, conduit and all associated hardware.

2. PVC LB Fitting Replacement

Unit of Measurement: Each.

This item includes: fittings, screws, connector, bushings, gaskets and all associated hardware, removal of existing.

3. Electrical Pullbox Replacement

Unit of Measurement: Each.

This item includes: pullbox, fittings, terminal blocks, associated hardware, wire disconnection and rerouting, coordination of interruptions, removal of existing.

4. Bonding of Cable Tray

Unit of Measurement: Each.

This item includes: new bolted lugs, mounting hardware and rerouting on bond conductor.

5. Replacement of Receptacles

   Unit of Measurement: Each.

   This item includes: receptacle, backbox, weatherproof coverplate, conduit, wiring and all associated hardware, removal of existing.

6. Replacement of Light Switch Backbox

   Unit of Measurement: Each.

   This item includes: receptacle, backbox, conduit, wiring and all associated hardware.

7. Replacement of Copper-Clad Wiring (Pyrotenax)

   Unit of Measurement: Metre

   This item includes: removal of existing, supply and installation of new liquid-tight conduit, new wiring, fittings, bushings, and all associated mounting hardware.

8. Reattachement of Existing Liquid Tight Conduit

   Unit of Measurement: Metre

   This item includes: required mounting hardware and installation.

9. Replacement of Corroded Sections of Cable Tray

   Unit of Measurement: Metre

   This item includes: removal of damaged cable tray, supply and installation of new cable tray, fittings and mounting hardware.

END OF SECTION

Part 1 General

1.1 TENDER-STAGE MEETING

1. All contractors bidding the project are to attend a site meeting coordinated with the Departmental Representative. Each contractor is to notify the Departmental Representative one (1) week in advance (by email) on how many people will be attending this meeting. The attendees' confined space tickets are to be sent in before the meeting. Parks Canada will coordinate with the consultant to have HSE onsite with the appropriate amount of safety gear to accommodate all bidders.

1.2 ADMINISTRATIVE

1. Weekly meetings will be held in the Cavalier Building boardroom located on the third floor at the Citadel. Site trailer will not be required by the contractor for meeting purposes.
2. Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

1. Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
2. Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
3. Establish time of meeting and notify parties concerned minimum 5 days before meeting.
4. Agenda to include:
   - .1 Appointment of official representative of participants in the Work.
   - .2 Schedule of Work: in bar (GANTT) Chart format.
   - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
   - .4 Requirements for temporary facilities, site sign, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
   - .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
   - .6 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
   - .7 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
   - .8 Monthly progress claims, administrative procedures, photographs, hold backs.
   - .9 Appointment of inspection and testing agencies or firms.
   - .10 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

1. During course of Work and one week prior to project completion, schedule progress meetings weekly.

2. Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
3. Notify parties minimum two days prior to meetings.
4. Consultant to complete meeting minutes.
5. Agenda to include the following:
   - .1 Review, approval of minutes of previous meeting.
   - .2 Review of Work progress since previous meeting.
   - .3 Field observations, problems, conflicts.
   - .4 Problems which impede construction schedule.
   - .5 Corrective measures and procedures to regain projected schedule.
   - .6 Revision to construction schedule.
   - .7 Progress schedule, during succeeding work period.
   - .8 Review submittal schedules: expedite as required.
   - .9 Maintenance of quality standards.
   - .10 Review proposed changes for affect on construction schedule and on completion date.
   - .11 Safety.
   - .12 Other business.
   - .13 Environmental.

Part 2 Products

2.1 NOT USED

1. Not Used.

Part 3 Execution

3.1 NOT USED

1. Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

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

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

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

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

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

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

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

.3 Check all shop drawings prior to submission. Determine and verify all field measurements, field construction criteria, materials, catalogue numbers and similar data and check and coordinate each shop drawing with the requirements of the Work and the

Contract Documents. Sign and date each shop drawing to confirm compliance with above requirements.

.4 Allow 5 days for Departmental Representative's review of each submission.

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

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

.7 Accompany submissions with transmittal letter, 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 include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

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

.10 Submit (1) electronic copy of shop drawings for shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

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

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within one year of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

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

.16 Submit electronic copies 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.

.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 the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

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

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

1.3 SAMPLES

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

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

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

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

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

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

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

1.4 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 COMPLIANCE REQUIREMENTS

.1 Comply with the Occupational Health and Safety Act for the Province of Nova Scotia, and the Occupational Health and Safety Act Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code Part II, and the Canada Occupational Safety and Health Regulations made under Part II of the Canada Labour Code.

.3 Observe and enforce construction safety measures required by:

.1 National Building Code of Canada;

.2 Provincial Worker's Compensation Board;

.3 Municipal statutes and ordinances.

.4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

.5 A copy of the Canada Labour Code Part II may be obtained by contacting:

Canadian Government Publishing

Public Works & Government Services Canada

Ottawa, Ontario, K1A 0S9

Tel: (819) 956-4800 (1-800-635-7943)

Publication No. L31-85/2000 E or F

.6 Maintain Workers Compensation Coverage for duration of Contract. Submit Letter of Good Standing to Departmental Representative upon request.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit to Departmental Representative copies of the following documents, including updates:

.1 Site Specific Health and Safety Plan. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.2 Name and qualifications of person to be retained full time as H&S Co-ordinator.

.3 Electronic copies of Contractor's authorized representative's work site health and safety inspection reports to authority having jurisdiction and Departmental Representative.

.4 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.5 Copies of incident and accident reports.

.6 Copies of Confined Space Entry tickets of all personnel entering the tunnel.

.7 All submissions as required by Parks Canada Confined Space Entry procedures.

.8 WHMIS MSDS - Material Safety Data Sheets.

.3 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.4 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within seven (7) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

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

1.3 FILING OF NOTICE

.1 File Notice of Project and any other required Notices with the Provincial Authorities (and Municipal Authorities if required) prior to commencement of the work. Provide the Departmental Representative with a copy of the filed Notice(s) prior to commencement of the work.

1.4 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. Have Contractor’s site safety supervisor in attendance. Departmental Representative will advise of time, date and location of the meeting and will be responsible for recording and distributing the minutes.

.2 Conduct site specific occupational health and safety meetings as required by the Nova Scotia Occupational Health and Safety Act, and the Regulations made pursuant to the Act for the duration of the work.

.3 Record and post minutes of all meetings in plain view on the work site. Make copies available to Departmental Representative upon request.

.4 Conduct an orientation meeting with all workers prior to start-up of the Work to ensure everyone is aware of the Health and Safety issues for this specific project. Each new worker to receive the same orientation briefing prior to performing any work on this project.

1.5 RESPONSIBILITY

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

.2 Enforce compliance by all workers, sub-contractors and other persons granted access to work site with safety requirements of Contract Documents, applicable Federal,

Provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 The Contractor is responsible to manage safety of the work site to ensure that any persons, including but not limited to, the general public circulating adjacent to the work operations are protected against harm due to the extent that they may be affected by conduct of the work.

.4 Prior to commencement of work, provide site safety orientation sessions for all workers and other authorized persons.

.5 The Contractor is responsible to ensure Contractor employees and sub-contractors accessing the work site are in possession of and wear appropriate personnel protective equipment (PPE).

.6 The Contractor is responsible for providing all safety gear (harness, gas meters, radios etc.) for the Engineer and Park's staff (a minimum of 4 people at any given time) to enter the tunnel.

1.6 PROTECTION

.1 Carry out work placing emphasis on health and safety of the Public, Facility personnel, construction workers and protection of the environment.

.2 Erect safety barricades, lights and signage on site to effectively delineate work areas, protect pedestrian and vehicular traffic around and adjacent to work and to create a safe working environment.

.3 Should unforeseen or peculiar safety related hazard or conditions become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.7 HAZARD ASSESSMENTS

.1 Conduct site specific health and safety hazard assessment before commencing project and during course of the work. Identify risks and hazards resulting from site conditions, weather conditions and work operations.

.1 Also, conduct assessment when the scope of work has been changed by Change Order and when potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety Representative.

.2 Record results in writing and address in Health and Safety Plan.

.3 Keep copy of all assessments on site.

1.8 PROJECT/SITE CONDITION

.1 The following are known or potential project related health, environmental and safety hazards at site which must be properly managed if encountered during course of work:

.2 Existing hazardous conditions are:

.1 Work adjacent to roadway and parking.

.2 Work adjacent to embankment with steep slopes.

.3 Confined Space.

.4 Mold Contamination in the area of the Work.

.3 Above list shall not be construed as being complete and inclusive of potential health, and safety hazards encountered during work. Include above items into hazard assessment process.

.4 Obtain from Departmental Representative, copy of MSDS Data sheets for existing hazardous products stored on site or used by Facility personnel.

1.9 SITE CONTROL AND ACCESS

.1 Control work site and entry points to construction areas.

.1 Delineate and isolate construction areas from other areas of site Facility by use of appropriate means.

.2 Post notices and signage at entry points and at other strategic locations identifying entrance onto site to be restricted to authorized persons only.

.3 Signage must be professionally made, bilingual in both official languages or display internationally understood graphic symbols.

.2 Approve and grant access to site only to workers and authorized persons.

.1 Immediately stop non-authorized persons from circulating in construction areas and remove from site.

.2 Provide site safety orientation to all persons before granting access. Advise of site conditions, hazards and mandatory safety rules to be observed on site.

.3 Secure site at night time to extent required to protect against unauthorized entry.

.4 Ensure persons granted access to site wear appropriate personal protective equipment (PPE) suitable to work and site conditions.

1.10 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with pavement rehabilitation projects completed with live traffic.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

.2 The Health and Safety Co-ordinator shall be required to conduct regularly scheduled safety inspections of the work site as follows:

.1 Informal inspections on a minimum daily basis noting deficiencies and remedial actions taken in a log book or diary. Make the log book and/or diary available for the Departmental Representative's viewing as requested.

.2 Formal inspections on a minimum weekly basis, and shall provide a written report to the Departmental Representative for each formal inspection, document deficiencies, remedial action needed and assign responsibility for rectification to the appropriate party.

1.11 HEALTH AND SAFETY MEETINGS

.1 Attend pre-construction health and safety meeting conducted by Departmental Representative. Have following persons in attendance:

.1 Site Superintendent.

.2 Contractor's designated Health and Safety Site Supervisor.

.3 Health & Safety Site Coordinator.

.4 Departmental Representative.

.5 Meeting times to be during and after construction meetings.

1.12 HEALTH AND SAFETY PLAN

.1 Develop written site-specific Project Health and Safety Plan, based on hazard assessments, prior to commencement of work.

.1 Submit copy to Departmental Representative within 5 calendar days of acceptance of bid.

.2 Submit updates as work progresses.

.2 Health and Safety Plan shall contain three (3) parts with following information:

.1 Part 1 - Hazards: List of individual health risks and safety hazards identified by hazard assessment process.

.2 Part 2 - Safety Measures: engineering controls, personal protective equipment and safe work practices used to mitigate hazards and risks listed in Part 1 of Plan.

.3 Part 3a - Emergency Response: standard operating procedures, evacuation measures and emergency response in the occurrence of an accident, incident or emergency.

.1 Include response to all hazards listed in Part 1 of Plan.

.2 Evacuation measures to complement the Facility's existing Emergency Response and Evacuation Plan. Obtain pertinent information from Departmental Representative.

.3 List names and telephone numbers of officials to contact including:

.1 General Contractor and all Subcontractors.

.2 Federal and Provincial Departments as stipulated by laws and regulations and local emergency resource organizations, as needed based on nature of emergency or accident.

.3 Officials from PCA and site Facility management. Departmental Representative will provide list.

.3 Part 3b - Site Communications:

.1 Procedures used on site to share work related safety issues between workers, subcontractors, and General Contractor.

.2 List of critical tasks and work activities, to be communicated with the Facility Manager, which has risk of affecting tenant operations, or endangering health and safety of Facility personnel and the general public. Develop list in consultation with the Departmental Representative.

.4 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

Column 1 Part 1 Identified Hazards	Column 2 Part 2 Safety Measures	Column 3 Part 3a/3b Emergency Response & Site Communications

.5 Develop Plan in collaboration with subcontractors. Address work activities of all trades. Revise and update Plan as Sub-contractors arrive on site.

.6 Implement and enforce compliance with requirements of Plan for full duration of work to final completion and demobilization from site.

.7 As work progresses, review and update Plan. Address additional health risks and safety hazards identified by on-going hazard assessments.

.8 Post copy of Plan, and updates, on site.

.9 Submission of the Health and Safety Plan, and updates, to the Departmental Representative is for review and information purposes only. Departmental Representative's receipt, review and any comments made of the Plan shall not be construed to imply approval in part or in whole of such Plan by Departmental Representative and shall not be interpreted as a warranty of being complete and accurate or as a confirmation that all health and safety requirements of the Work have been addressed and that it is legislative compliant. Furthermore, Departmental Representative's review of the Plan shall not relieve the Contractor of any of his legal obligations for Occupational Health and Safety provisions specified as part of the Work and those required by provincial legislation.

1.13 SAFETY SUPERVISION AND INSPECTIONS

.1 Designate one person to be present on site at all times, responsible for supervising health and safety of the Work.

.1 Person to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.

.2 Assign responsibility, obligation and authority to such designated person to stop work as deemed necessary for reasons of health and safety.

.3 Conduct regularly scheduled informal safety inspections of work site on a minimum bi-weekly basis.

.1 Note deficiencies and remedial action taken in a log book or diary.

.4 Keep inspection reports on site.

1.14 TRAINING

.1 Ensure that all workers and other persons granted access to site are competently trained and knowledgeable on:

.1 Safe use of tools and equipment.

.2 How to wear and use personal protective equipment (PPE).

.3 Safe work practices and procedures to be followed in carrying out work.

.4 Site conditions and minimum safety rules to be observed on site, as given at site orientation session.

.5 Confined space entry.

1.15 MINIMUM SITE SAFETY RULES

.1 Notwithstanding the requirement to abide by federal and provincial Health and safety regulations, the following safety rules shall be considered minimum requirements to be obeyed by all persons granted site access:

.1 Wear personnel protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear and eye protection.

.2 Immediately report unsafe activity or condition at site, near-miss accident, injury and damage.

.3 Maintain site in tidy condition.

.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules and on disciplinary measures to be taken by Departmental Representative for violation or non-compliance of such rules. Post rules on site.

.3 The following actions or conduct by Contractor, workers and subcontractors will be considered as non-conformance with the health and safety requirements of the contract for which a Non-Compliance Notification will be issued to the General Contractor by the Departmental Representative:

.1 Failure to follow the minimum site safety rules specified above.

.2 Negligence resulting in serious injury or major property damage.

.3 Deliberate non-compliance with Federal and Provincial Acts and Regulations.

.4 Falsification of information in Workers Compensation Reports, safety reports and other health and safety related documents submitted to Departmental Representative or to Authority having jurisdiction.

.5 Possession of firearms on site.

.6 Possession of non-prescriptive illegal drugs or alcohol.

.7 Action, or lack thereof, resulting in the issuance of Warnings, Fines or Stop Work Orders from a Provincial Authority having jurisdiction.

.8 Violation of other specified health and safety rules and requirements as determined by Departmental Representative.

.4 See elsewhere in this section for details on Non-Compliance Notifications and resulting disciplinary measures.

1.16 ACCIDENT REPORTING

.1 Investigate and report the following incidents and accidents:

.1 Those as required by Provincial Occupational Health and Safety Act and Regulations.

.2 Injury requiring medical aid as defined in the Canadian Dictionary of Safety Terms-1987, published by the Canadian Society of Safety Engineers (C.S.S.E.) as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.2 Property damage in excess of $5000.00.

.3 Interruption to Facility operations with potential loss to a Federal Dept. in excess of $5000.00.

.4 Those which require notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable law or regulations.

.2 Send written report to Departmental Representative for all above cases within 5 days of each occurrence.

1.17 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety violations and non-compliance issues.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

.4 Negligence or failure to follow occupational health and safety provisions specified in the Contract Documents and of those of applicable federal and provincial laws and regulations could result in disciplinary measures taken by the Departmental Representative against the Contractor.

.5 PCA uses a system of Non-Compliance Notifications and Disciplinary Measures on projects as follows:

.1 A non-compliance notification will be issued to the General Contractor, by the Departmental Representative, whenever there is a violation or failure to follow

any of the project's occupational health and safety requirements by a worker, subcontractor or any other person to whom the Contractor has granted access to the work site.

.2 Non-Compliance notifications are progressive in nature resulting in increased disciplinary measures imposed depending on the frequency, nature and severity of the infraction.

.3 Disciplinary measures could include:

.1 Removal of the offending person or party from site;

.2 Financial penalties in the form of progress payment reduction or holdback assessments made against the Contract and;

.3 Taking the Work Out of Contractor's Hands in accordance with the General Conditions.

.6 Departmental Representative will make final decision as to what constitutes a violation and when to issue a Non-Compliance Notification.

.7 Non-compliance Notifications issued by Departmental Representative shall not be construed as to overrule or disregard warnings, orders and fines levied against Contractor by a regulatory agency having jurisdiction.

.8 Details of the Non-Compliance Notification and Disciplinary Measures system will be provided by Departmental Representative upon acceptance of bid and prior to commencement of work.

.9 Further details on the disciplinary system will be provided at the pre-construction Health and Safety meeting.

.10 Be responsible to fully brief workers and subcontractors on the operation and importance of this system.

1.18 PERMITS

.1 Post on site permits, licenses, and compliance certificates.

.2 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify Departmental Representative in writing and obtain his/her approval to proceed before carrying out that portion of work.

1.19 POSTING OF DOCUMENTS

.1 Post on site safety documentation as stipulated by Authorities having jurisdiction and as specified herein. Place in a common visible location.

1.20 SITE RECORDS

.1 Maintain on site a copy of all health and safety documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.

.2 Upon request, make available to Departmental Representative and to other authorized safety representative for review. Provide copy when directed by Departmental Representative.

1.21 TOOLS AND EQUIPMENT SAFETY

.1 Routinely check and maintain tools, equipment and machinery for safe operation.

.2 Conduct checks as part of site safety inspections. When requested, submit proof that checks and maintenance have been carried out.

.3 Tag and immediately remove from site items found faulty or defective.

1.22 BLASTING

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

1.23 CONFINED SPACES

.1 Carry out work in confined spaces in compliance with:

.1 Provincial Occupational Health and Safety Regulations and;

.2 Canada Occupational Safety and Health Regulations (COSH) made under the Canada Labour Code - Part II.

.3 Parks Canada Confined Space Entry Policy (see attached).

.2 Conduct hazard assessment and address in Safety Plan before entering confined space.

.3 Contractor to supply all safety gear (harness, gas meter, radios, etc.) for the Consultant and Parks Canada staff (Departmental Representative and one maintenance person). Contractor to have enough gear for a minimum of four people to enter the tunnel at any given time.

1.24 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site. Post on site. Submit copy to Departmental Representative upon receipt.

1.25 SMOKING

.1 Smoking is not permitted on site.

1.26 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures

1.2 REFERENCE DOCUMENTS

.1 The following reference documents form a part of this specification and are available at the Nova Scotia Environment:

.1 Sulphide Bearing Material Disposal Regulations and Guidelines for Development on Slates in Nova Scotia.

.2 Nova Scotia Environment Pit and Quarry Guidelines.

.3 Nova Scotia Environment Construction and Demolition Debris Disposal Site Guidelines.

.4 Guidelines for the Application and Removal of Structural Steel Protective Coatings.

.5 Erosion and Sediment Control Handbook for Construction Sites.

.6 Activity Designation Regulations.

.7 Project Environmental Protection Plan (EPP) where applicable.

.8 ANSI A300-2008, Tree, Shrub and other Woody Plant Maintenance Tree Care Operations.

1.3 DEFINITIONS:

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

.2 Erosion: A combination of processes in which materials of the earth's surface are loosened, dissolved, or worn away, and transported from one place to another by natural agents.

.3 Sedimentation: The addition of soils to water bodies by natural and human related activities.

.4 Storm Water Runoff: Precipitation that does not soak into the ground or evaporate, but flows along the ground surface as runoff.

.5 Erosion and Sediment Control Plan: Plan identifying the applicable stabilization and structural strategies that shall be employed to limit sediment and erosion during construction.

.6 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water and air; biological and cultural resources; and includes management of visual aesthetics, noise, solid, chemical,

gaseous and liquid waste; radiant energy and radioactive material as well as other pollutants.

.7 Deleterious Substance: defined by the Fisheries Act as any substance that, if added to water, makes the water deleterious to fish or fish habitat or any water containing a substance in such quantity or concentration or has been changed by heat or other means, that if added to water makes that water deleterious to fish or fish habitat.

.8 Contaminant: means any solid, liquid, gas, micro-organism, odour, heat, sound, vibration, radiation or combination of any of them, present in the environment.

.9 Contaminants and Deleterious substances includes, but are not limited to: sediment or sediment-laden water, petroleum products, paints, thinners, heated water, concrete wash water, salt, heavy metals, wood preservatives, cleaning supplies, pesticides, wood and food waste, and fecal matter.

.10 Environmental incidents or emergencies include:

.1 Chemical or Petroleum spills;

.2 Poisonous or Caustic Gas Emission;

.3 Biological or Chemical Explosion;

.4 Hazardous Material Spill;

.5 Sewage Spill;

.6 Contaminated Water into Waterways;

.7 Explosion and Ammunition.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.

.3 Name and qualifications of person responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.6 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.8 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.9 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.10 Waste Water Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water and dewatering of ground water.

.11 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands. The plan shall be in accordance with the Basic Impact Assessment (BIA) and Cultural Resources Impact Assessment completed by Parks Canada for the project site.

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

1.5 FIRES

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

.2 Immediately report all fires to the Departmental Representative. The Contractor is held responsible to make all reasonable efforts to extinguish any fires on the site.

.3 The Contractor is required to comply with the Fire Protection Regulations of the National Parks Act.

.4 In accordance with these Regulations, the Park Superintendent may restrict activities, or access to work areas, in the interest of fire prevention.

.5 The Contractor's equipment must be in proper working condition, and be used in such a manner as to minimize the potential for ignition of vegetation.

.6 Vehicles and stationary equipment must be equipped with fire suppression equipment such as an operable fire extinguisher.

.7 If storage and/or operation of in-Park equipment during a high fire hazard season is of concern to the Park, the Contractor may be required to prepare and implement a Fire Suppression Contingency Plan.

1.6 DISPOSAL OF WASTES

.1 Littering is prohibited.

.2 Dispose of rubbish and waste materials at authorized site.

.3 Do not dispose of waste, volatile or deleterious materials into waterways, wetlands, storm or sanitary sewers.

.4 All refuse from demolition is the property of the Contractor and shall be removed and disposed of in a legal manner.

.5 All Hazardous materials shall be sealed as dictated by authorities having jurisdiction, and disposed of off-site, unless otherwise instructed by the Departmental Representative.

.6 Garbage must be collected and removed daily from the worksite to keep the site sanitary.

1.7 DRAINAGE

.1 Provide temporary drainage and pumping required to keep excavations and site free from water.

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

.1 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements, with use of siltation fences, sedimentation ponds, diversion ditches, silt curtains, sedimentation blankets, slope stabilization and other best management practices, all in accordance with required environmental regulations, permits or approvals.

1.8 POLLUTION CONTROL

.1 Prior to the commencement of construction activities, prepare an Environmental Protection Plan, which addresses procedures to follow in the event of a pollution incident and ensure all staff are aware of these procedures. Provide copy of contingency plan to the Departmental Representative.

.2 Immediately report any environmental emergency, such as a spill of a contaminant, to environmental emergencies at:

1-800-565-1633.

.3 Maintain temporary erosion and pollution control devices installed under this contract until the Work is completed as specified in the Project Documents.

.4 Remove temporary erosion and pollution control measures just prior to project completion unless directed otherwise. Control emissions from equipment to local emission requirements.

.5 Provide temporary enclosures to protect environment from effects of abrasive blasting.

.6 Do grading activities to minimize dusting. Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

.7 Keep paved surfaces clean, including adjacent parking lots and public street, in accordance with Section 01 74 11 – Cleaning,

1.9 PETROLEUM, OIL AND LUBRICANT STORAGE

.1 Take precautions to avoid contamination of the site from Petroleum, Oil and Lubricants (POL's).

.2 The management of POLs and chemicals must meet with the requirements of the Nova Scotia Dangerous Goods and Hazardous Wastes Management Criteria and all other appropriate provincial and federal regulations to include but not be limited to the following:

.1 Temporary POL storage sites are to be located a minimum 200 m from any watercourse or wetland.

.2 Fuel storage containers must be accompanied by impermeable structures that would provide containment of 125% of the container capacity in the event of a leak or spill.

.3 The Departmental Representative must be immediately contacted after a spill of more than 10 L of fuel or lubricant, and after any amount of other chemical products has escaped.

.4 Storage of large amounts of fuel (more than 900 L) in the Park is not permitted.

.5 Storage of hazardous material, including explosives, shall not be permitted within the Park, except for quantities which shall normally be expected to be utilized in a day of Work, and which are not permitted to stockpile.

1.10 REFUELING AND SPILL CONTAINMENT

.1 Take precautions to avoid contamination of the site from fuel. Keep and maintain hydrocarbon containment and cleanup materials on site for the duration of construction activities. Ensure that Contractor's personnel are trained in the proper use of such materials.

.2 Establish suitable fueling and maintenance areas and obtain approval from the Departmental Representative.

.3 Do not refuel or maintain equipment adjacent to or within 100 meters of any sensitive areas.

.4 Monitor on site vehicles for fluid leaks. Implement a preventative maintenance program to keep vehicles free from leaks.

.5 Refueling of on-line equipment from storage facilities located outside Park boundaries is strongly preferred. Storage of any fuel has to occur only in previously approved locations, and with Departmental Representative consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven (7) days prior to the start of the Work. The Contractor is expected to be prepared to effect the containment and cleanup of all spills related to the Work.

.6 Emulsion storage tanker and transfer of emulsion from tanker to spray vehicle are not permitted within National Park.

.7 Spill kits are required on site for duration of the project.

1.11 EQUIPMENT MOVEMENT AND MAINTENANCE

.1 Change oil and refuel away from rivers, streams and watercourses and wetlands.

.2 Waste oil and solvents are to be properly contained until they are removed from the site by qualified companies for recycling or disposal.

.3 Any leaking equipment must be taken out of service until repaired.

1.12 NOISE CONTROL

.1 Operate construction equipment to prevent excessive noise.

.2 Carry out noise generating work within time specified in the Halifax Regional Municipality noise by-law.

1.13 WILDLIFE

.1 Wildlife shall not be fed or harassed.

.2 All refuse shall be disposed of at an approved facility to avoid the attraction of nuisance animals.

.3 In case of persistent wildlife encounters, the Contractor shall inform the Departmental Representative, who will notify Parks Canada of the situation. Care shall be taken to avoid the animal.

1.14 UNFORESEEN SITE STOPPAGES

.1 If contaminated sites, heritage sites, archeological resources, or other unforeseen site conditions are encountered in the work site area, work will immediately cease until investigations are completed and permission to continue is granted from the Departmental Representative.

1.15 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Protect relics, antiquities and items of historical or scientific interest in accordance with Section 01 11 00 – Summary of Work, Subsection 1.15 – Protection of Historical or Archeological Items.

1.16 NOTIFICATION

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

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

.1 Take action only after receipt of written approval by Departmental Representative.

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

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

Part 2 Products

2.1 NOT USED.

Part 3 Execution

3.1 NOT USED.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

.2 Section 01 35 29 06.

.3 Section 01 35 43.

1.2 REFERENCES AND CODES

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

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 85 00.02 Mould Remediation - Maximum Precautions.

1.4 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

1.5 NATIONAL PARKS ACT

.1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-09-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

.2 Section 01 33 00.

1.2 INSPECTION

.1 Allow Departmental Representative and Parks Canada personnel/consultant 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 will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

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

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

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

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

1.4 ACCESS TO WORK

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

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

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

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

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

1.6 REJECTED WORK

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

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

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

1.7 REPORTS

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

.2 Provide copies to subcontractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

1.9 MILL TESTS

.1 Submit mill test certificates as requested.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 REFERENCES

.1 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 DEWATERING

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

1.5 WATER SUPPLY

.1 Provide, if required, continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

.3 Pay for utility charges at prevailing rates.

1.6 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.2 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.3 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.4 Maintain strict supervision of operation of ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.5 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

.3 Provide and maintain temporary lighting throughout project. Ensure level of illumination in tunnel is not less than 162 lx.

.4 Power supply is available from Parks Canada and will be provided for construction use at no cost. Connect to power supply in accordance with Canadian Electrical Code.

.5 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, lines, equipment necessary for own use.

1.9 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

.2 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

.1 Install temporary fencing of designated areas as shown on contract drawing with Moduloc (or approved equivalent), area for three vehicles to park (one safety, one contractor and one consultant vehicle), avenues of ingress/egress to fenced area and a pipe laydown area.

.2 Indicate use of supplemental or other staging area.

.3 Provide construction facilities in order to execute work expeditiously. There shall be no construction trailers onsite.

.4 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain ramps, ladders and platforms.

1.6 HOISTING

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

.2 Hoists to be operated by qualified operator.

1.7 ELEVATORS

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

1.8 SITE STORAGE/LOADING

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

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

1.9 CONSTRUCTION PARKING

.1 Parking will be permitted on site for one contractor vehicle, one safety vehicle and one consultant vehicle.

.2 Provide and maintain adequate access to project site.

.3 Clean area where used by Contractor's equipment.

1.10 OFFICES

.1 There shall be no construction offices onsite.

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

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

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

1.12 SANITARY FACILITIES

.1 Contractor to use Parks Canada sanitary facilities.

1.13 CONSTRUCTION SIGNAGE

.1 Parks Canada will provide signage.

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

.3 Locate project identification sign as directed by Departmental Representative.

.4 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.

.5 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.6 Maintain approved signs and notices in good condition for duration of project, and turn over signage to Departmental Representative at end of project.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

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

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

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

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

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

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

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

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

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

.10 Provide snow removal during period of Work.

1.15 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

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

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

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

.2 Section 01 14 00.

.3 Section 01 35 29 06

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.4 HOARDING

.1 Erect temporary site enclosure using new 1.8 m high Moduloc fence (or approved equivalent). Provide one lockable truck gate. Maintain fence in good repair.

1.5 ACCESS TO SITE

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

1.6 PUBLIC TRAFFIC FLOW

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

1.7 FIRE ROUTES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.9 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule days.

.4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.2 Within text of each specifications section, reference may be made to reference standards.

.3 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.4 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.5 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

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

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify

Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative’s satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

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

1.8 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.11 REMEDIAL WORK

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

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.13 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 PROTECTION OF WORK IN PROGRESS

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

1.16 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

.2 Section 01 33 00.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:

- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.3 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.4 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

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

1.5 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Dispose of waste materials and debris off site.

.6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

.9 Limit off-site tracking of material by equipment and vehicles. Contractor is responsible for keeping adjacent paved areas clean, including adjacent parking lots and streets. Cleaning operations must not impede traffic.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Sweep and wash clean paved areas.

.8 Clean adjacent private parking lots and public streets of dust or mud tracked from equipment.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING DURING CONSTRUCTION

.1 The Contractor shall ensure that adequate dust control is provided at all times during the Contract to avoid any hazardous situations and shall immediately implement any measures as directed by the Departmental Representative to control dust problems. Any damages or costs incurred as a result of excessive dust shall be paid for by the Contractor.

END OF SECTION

Approved: 2009-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 11 00.

.2 Section 01 29 00.

.3 Section 01 51 00.

.4 Section 01 52 00.

.5 Section 01 56 00.

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008, Stipulated Price Contract.

.2 Canadian Environmental Protection Act (CEPA)

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative’s inspection.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, and fully operational.

.4 Certificates required by Halifax Water submitted.

.5 Operation of systems: demonstrated to Owner's personnel.

.6 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative, one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.3 RECORD DRAWINGS

.1 The Engineer to provide two sets of white prints for record drawing purposes.

.2 Maintain project record drawings and record accurately deviations from Contract documents.

.3 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to the Departmental Representative.

.4 Record following information:

.1 Field changes of dimension, detail and elevation.

.2 Changes made by Change Order or Field Order.

.3 Other significant deviations which are concealed in construction and cannot be identified by visual inspection

.5 At completion of project and prior to final inspection, neatly transfer "as-recorded" records to second set of white prints using fine, red marker. Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each drawing title block note: "AS-RECORDED". Also, circle on List of Drawings each title and number of drawing marked with "as-recorded" records.

.6 Submit this set of "as-recorded" drawings to Departmental Representative.

.7 At the completion of construction the Contractor shall complete a topographic as-recorded survey of the project areas and submit the survey data in an acceptable form to the Departmental Representative.

.8 If project is completed without significant deviations from contract drawings, declare this in writing and submit to Departmental Representative in lieu of record drawings.

.9 The Departmental Representative will review the progress of the record drawings as part of each payment certificate authorization. Should the drawings not be properly updated, payment will be withheld for each payment certificate until the work is completed to the satisfaction of the Departmental Representative.

.10 Provide digital photos, if requested, for site records.

.11 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

1.4 MATERIALS AND FINISHES

.1 Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Additional requirements: as specified in individual specifications sections.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 This section specifies requirements for constructing water mains and services. Work includes supply, installation and testing of pipe, fittings and service connections, and disinfection.

1.2 RELATED SECTIONS

.1 Section 01 29 00 – Payment Procedures

.2 Section 01 33 00 – Submittal Procedures

.3 Section 01 15 43 – Environmental Procedures

.4 Section 02 41 19 – Selective Demolition

.5 Section 05 50 00 – Metal Fabrication

1.3 REFERENCE STANDARDS

.1 ANSI/ASME B16.1-2010, Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.

.2 ANSI/AWWA C104/A21.4-2013, Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.

.3 ANSI/AWWA C105/A21.5-2010, Polyethylene Encasement for Ductile-Iron Pipe Systems.

.4 ANSI/AWWA C110/A21.10-2012, Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., (75mm Through 1200mm) for Water and Other Liquids.

.5 ANSI/AWWA C111/A21.10-2012, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

.6 ANSI/AWWA C151/A21.51-2009, Ductile-Iron Pipe, Centrifugally Cast, for Water.

.7 ANSI/AWWA C153/A21.53-2011, Ductile-Iron Compact Fit-tings, 3 in. Through 24 in. (76mm Through 610mm) and 54 in. Through 64 in. (1400mm Through 1600mm) for Water Service.

.8 ANSI/AWWA C301-2014, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids.

.9 ANSI/AWWA C302-2011, Reinforced Concrete Pressure Pipe, Non-cylinder Type.

.10 ANSI/AWWA C303-2008, Reinforced Concrete Pressure Pipe, Steel Cylinder Type.

.11 ANSI/AWWA C502-2014, Dry-Barrel Fire Hydrants.

.12 ANSI/AWWA C504-2010, Rubber-Seated Butterfly Valves.

.13 ANSI/AWWA C515-2009, Reduced-Wall, Resilient- Seated Gate Valves for Water Supply Service.

.14 ANSI/AWWA C600-2010, Installation of Ductile Water Mains and Their Appurtenances.

.15 ANSI/AWWA C606-2011, Grooved and Shouldered Joints.

.16 ANSI/AWWA C651-2014, Disinfecting Water Mains.

.17 ANSI/AWWA C800-2012, Underground Service Line Valves and Fittings.

.18 ANSI/AWWA C900-2007, Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. (100mm) Through 12 in.(300mm), for Water Distribution.

.19 ANSI/AWWA C901-08, Polyethylene (PE) Pressure Pipe and Tubing, ½ in. (13mm) Through 3 in. (76mm), for Water Service.

.20 ANSI/AWWA C905-2010, Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 in. Through 36 in. (350mm Through 900mm) for Water Transmission.

.21 ANSI/AWWA C906-07 Polyethylene (PE) Pressure Pipe and Fittings, 4 in. (100mm) Through 63 in. (1,600mm), for Water Distribution and Transmission.

.22 ANSI/NSF 61-2013, Drinking Water System Components – Health Effects.

.23 ASME B18.2.1-2012, Square, Hex, Heavy Hex and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head and Lag Screws.

.24 ASTM A183-2014, Carbon Steel Track Bolts and Nuts.

.25 ASTM A276-2013A, Stainless and Heat-Resisting Steel Bars and Shapes.

.26 ASTM B62-2009, Composition Bronze or Ounce Metal Castings.

.27 ASTM B88-2014, Seamless Copper Water Tube.

.28 ASTM B418-2012, Standard Specification for Cast and Wrought Galvanic Zinc Anodes.

.29 AWWA B300-2011, Hypochlorites.

.30 AWWA B301-2010, Liquid Chlorine.

.31 AWWA C904-2006, Cross-linked Polyethylene (PEX) Pressure Pipe, ½" (12mm) Through

3" (76mm) for Water Service.

.32 AWWA C909-2009, Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe 4" (100mm) Through 18" (450mm) for Water Distribution.

.33 CAN/ULC S701-2011, Thermal Insulation, Polystyrene, Board and Pipe Coverings.

.34 CAN/CSA B137 Series-2013, Thermoplastic Pressure Piping Compendium.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures for items listed in Supplementary Specifications.

.2 For concrete pressure pipe and fittings submit tabulated materials list and drawings indicating internal pressure rating, maximum external load, type of joints and identification mark numbers.

1.5 CERTIFICATES

.1 Submit manufacturer's test data and certification that products and materials meet requirements of this Section in accordance with Section 01 33 00 for items listed in Supplementary Specifications.

1.6 HANDLING AND STORAGE

.1 Handle and store pipe, valves andfittings, in such manner as to avoid shock and damage. Do not use chains or cables passed through pipe bore. Do not damage coatings or linings. Store gaskets in cool location, out of direct sunlight, and away from petroleum products. Store hydrants and valves to prevent retention of water and damage by freezing.

1.7 SCHEDULING OF WORK

.1 Coordinate and organize work to minimize interruptions to existing services. The existing system is alarmed, therefore the security company shall be contacted to coordinate work.

.2 Notify Departmental Representative and building occupants a minimum of 24 hours in advance of planned interruptions in service.

.3 Do not interrupt water service except between 7:00 a.m. and 7:00 p.m. local time, unless otherwise authorized. Notify Fire Department of any planned or accidental interruption to water service. Coordinate with Departmental Representative for evening and weekend events.

.4 Installation and commissioning of the new waterline shall be performed on a weekend.

PART 2 – PRODUCTS

2.1 GENERAL

.1 Diameter, material and strength class of pipe and fittings: as indicated on tender drawings.

.2 Any material that comes in contact with drinking water must comply with NSF 61.

.3 Backflow preventers shall be installed on all pipes and hydrants.

2.2 DUCTILE IRON PIPE AND FITTINGS

.1 Pipe: to AWWA C151, cement mortar lined.

.2 Fittings: to AWWA C110 or C153, cement mortar lined, minimum pressure rating 1035 kPa for cast, 1720 for ductile iron.

.3 Cement Mortar Lining: to AWWA C104. Provide internal seal coat unless otherwise required by Project Documents.

.4 Joints: gasketted mechanical or push-on to AWWA C111; flanged where indicated, to AWWA C110 with Class 125 flanged ends to ANSI/ASME B16.1.

2.3 GASKETS AND BOLTS FOR FLANGES

.1 Gaskets: unless otherwise specified, supply full face one piece red virgin rubber gaskets of 3mm thickness for all flange joints.

.2 Bolts: unless otherwise specified, all steel bolts and nuts to be American Standard threads of the coarse thread series, conforming to ANSI B18.2.1. Bolts, heads and nuts to be hexagonal.
Length of any bolt to be such that it will not project beyond nut more than 10mm or less than 5mm and no bolt to be less than diameter of the hole in which it fits by more than 3mm. Bolts to be utilized for all flanged joints unless otherwise indicated. Studs or stub bolts may be used for certain connections only when approved by the Engineer.

2.4 COUPLINGS

.1 Mechanical joint sleeve type: to AWWA C110 for use on new ductile iron pipe. Provide spacer ring between pipe ends.

.2 Grooved and shoulder type: to AWWA C606 with malleable iron housing, halogenated butyl gasket and heat treated, plated carbon steel bolts and nuts to ASTM A183.

.3 Collar type: steel with minimum pressure rating 1035 kPa, appropriate to the type and size of pipe being joined, epoxy-coated with type 316 stainless steel bolts and nuts.

2.5 THRUST RESTRAINT

.1 Thrust blocks and anchors: 20 MPa concrete and 15 M, Grade 400 reinforcing steel where indicated.

.2 Mechanical joint restraint device: (100mm to 600mm) ductile iron follower gland to AWWA C153 and C111 with multiple wedge restraining mechanism, minimum pressure working rating 2410 kPa and minimum safety factor of 2:1. Lugs to have twist-off torque nuts.

2.6 DISINFECTANT

.1 Sodium hypochlorite or calcium hypochlorite: to AWWA B300.

.2 Liquid Chlorine: to AWWA B301.

2.7 REDUCING AGENT

.1 Hydrogen Peroxide, 35% by mass commercial grade.

2.8 INSULATION

.1 Insulation: to ULC S701, Type 4, extruded polystyrene.

2.9 MARKER STAKE

.1 Timber, 40mm x 90mm.

2.10 ANODE PACKS

.1 Zinc anodes, to ASTM B418 as directed.

2.11 PROTECTIVE COATING

.1 Anti-corrosion petrolatum paste, tape and mastic.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Inspect products for defects and remove defective products from site.

.2 Confirm pipe, fittings, valves and hydrants are clean before installation.

.3 Contractor to install and commission new waterline on a weekend.

.4 Coordinate any work on the

3.2 PIPE INSTALLATION

.1 Lay and join pipe, fittings, and valves as specified herein and according to manufacturer's published instructions.

.2 Lay pipe and fittings on prepared bed, true to line and grade indicated, within following tolerances:
Horizontal Alignment: 150mm
Vertical Alignment: 75mm

.3 Face bell ends in direction of laying. On grades of 5% or greater lay pipe up grade.

.4 Do not exceed maximum joint deflection recommended by manufacturer.

.5 Prevent entry of bedding material, water or other foreign matter into pipe. Use temporary watertight bulkheads when pipelaying is not in progress.

.6 Install gaskets in accordance with manufacturers published instructions. Use only lubricant supplied by manufacturer. During cold weather store gaskets in heated area to promote flexibility.

.7 Align pipes before joining.

.8 Support pipes as required to promote concentricity until joint is properly completed.

.9 Keep pipe joints free from mud, soil, gravel or other foreign materials.

.10 Avoid displacing gasket or contaminating with soil, petroleum products or other foreign material. Remove, clean, reinstall and lubricate gaskets so disturbed.

.11 Complete each joint before laying next length of pipe.

.12 Where deflection at joints is permitted, deflect only after spigot is fully inserted in bell.

.13 For concrete pressure pipe, install diapers and pour cement mortar into joint recess. Fill inside joint recess with stiff cement grout for pipe 600mm and larger.

.14 At structures provide flexible joint not more than 1 m from outside face of structure. Support pipe between structure wall and first joint with 20 MPa concrete.

.15 Cut pipe as required for fittings or closure pieces, square to centerline, and as recommended by manufacturer. Do not damage pipe lining or coating and leave smooth beveled edge.

.16 Provide concrete thrust blocks to undisturbed ground on all tees, bends, plugs and caps or as indicated on Project Documents. Construct as indicated and keep joints and couplings free of concrete.

.17 Install mechanical joint restraint to AWWA C111 and tighten lug nuts until all wedges are in firm contact with pipe surface. Continue to tighten alternating between bolts until lug nuts twist off.

.18 Install polyethylene tube or sheet on all ductile-iron pipe and fittings and install zinc anodes on all valves, hydrant bases, and copper service connections as indicated.

3.11 HYDROSTATIC AND LEAKAGE TESTING

.1 Provide labour, equipment and materials required to perform hydrostatic and leakage tests.

.2 Test after services and hydrants are installed.

.3 Backfill prior to testing.

.4 Notify Departmental Representative at least 24 hours in advance of all proposed tests. Perform tests in presence of Engineer.

.5 Open all valves in test section.

.6 Expel air from main by slowly filling with potable water. Install corporation stops at high points where no air vacuum release valves are installed. After testing, remove corporation stops and install plugs.

.7 Fill concrete pipe 24 hours before testing to allow for absorption.

.8 Apply test pressure of 1035 kPa or pressure equal to 1.5 times working pressure, whichever is greater, measured at lowest point in test section. Conduct the test over a full two (2) hour period, maintaining a constant test pressure. No leakage is permitted by the test process.

.9 Locate and repair defects if test fails. Retest.

.10 Repair visible leaks regardless of test results.

3.12 FLUSHING AND DISINFECTION

.1 Flush and disinfect water mains to AWWA C651 and as herein specified. Notify Engineer 24 hours in advance of flushing and disinfection.

.2 Flush water mains with potable water through available outlets with sufficient flow to produce minimum velocity in water main of 1.5 m/s, for 10 minutes. Flush until foreign materials have been removed and water is clear.

.3 Slowly open and close valves and hydrants to ensure thorough flushing.

.4 If satisfactory results cannot be achieved by flushing, swab pipes by approved methods and reflush.

.5 Disinfect water main upon completion of flushing using chlorine solution distributed throughout entire system.

.6 Inject 1% chlorine solution through a corporation cock in the top of newly laid pipe, at point close to where main is being filled and at rate proportional to filling rate. Prepare stock chlorine with concentration of 1% free chlorine by volume as follows:

Product	**Amount of Compound**	**Quantity of Water**
High test calcium hypochlorite (67-70% Cl)	1.0 kg	60 litres
Chlorinated lime (32-35% Cl)	1.0 kg	30 litres
Liquid bleach (5.25% Cl)	1.0 litre	3.5 litres
(10.5% Cl)	1.0 litre	7.0 litres

.7 Calcium hypochlorite and chlorinated lime are not to be used when water temperature is less than $5^{O}C$.

.8 The following table indicates the quantity of 1% chlorine stock solution required per 100 metre length of pipe.

Pipe Diameter (mm)	**1% Chlorine Stock Solution (litres)**
100	5
150	11
200	19
250	30
300	43
350	58
400	76
450	97
500	119
600	172
750	268

.9 Operate valves, hydrants and appurtenances while main contains chlorine solution.

.10 Take water samples at all hydrants and termination points, in suitable sequence, to test

chlorine residual.

.11 When tests indicate minimum chlorine residual of 50 mg/L, leave system charged with disinfectant solution for 24 hours and ensure minimum chlorine residual of 25 mg/L throughout system.

.12 Flush disinfectant solution from line after 24 hours. Add 1.0% Hydrogen Peroxide reducing agent to the disinfectant solution at point of discharge or within a retention facility such that the solution is disposed to the environment with a total chlorine residual no greater than 0.0 mg/L in accordance with the requirements of Nova Scotia Environment. Check chlorine residual before disposal and at regular intervals during disposal to ensure compliance. This dechlorination requirement can only be excluded with the written consent of Nova Scotia Environment.

.13 Dispose of dechlorinated disinfectant solution. Where disposing to the environment, disposal of the dechlorinated solution must be at least 100 m from the nearest watercourse.

.14 Where disinfectant solution is dechlorinated at point of discharge, inject stock reducing agent at a rate proportional to discharge rate. Injection and discharge rates must be monitored continuously to ensure proper proportioning.

.15 Prepare stock reducing agent by volume with concentration of 1% Hydrogen Peroxide (H_20_2) by mass, as follows:

Liquid Reducing Agent	Amount of Agent (litres)	Quantity of Water (litres)
Hydrogen Peroxide (35% H_20_2 by mass)	1.0	34

.16 The following table indicates quantity of 1% Hydrogen Peroxide required to reduce total chlorine residual of disinfectant solution contained per 100 metre length of pipe, from 50 mg/L to 0.0 mg/L.

Pipe Diameter (mm)	1% Hydrogen Peroxide Stock Solution (litres)
100	5
150	10
200	18
250	28
300	41
350	55
400	72
450	91
500	113
600	163
750	254

.17 Where total chlorine residual of disinfectant solution exceeds 50 mg/L, quantity of stock reducing agent for dechlorination can be increased in direct proportion to the quantity indicated in the above table.

.18 After the disinfection solution has been flushed from the new water main, assist Engineer in obtaining water samples to confirm adequate disinfection has taken place. The required procedure is:

.1 After disinfection and flushing is complete, take chlorine residuals throughout the portion of the system being tested. Do not collect bacteriological samples until such time as total chlorine residual is less than 0.5 mg/l unless the water used for flushing is from the distribution system in which case, do not collect the samples until such time as the total chlorine residual is equal or less than a value equal to the total chlorine residual in the water used for flushing plus 0.5 mg/l.

.2 After chlorine residuals have been reduced to the levels outlined in step 1, collect a minimum of two (2) samples for bacteriological analysis from representative points throughout the portion of the system being tested. Collect at least one (1) sample every 366 m of new water main, plus one (1) from the end and at least one (1) from each branch. The sample points do not include hydrants.

.3 At least 24 hours after collection of the first two samples, collect two additional samples for bacteriological analysis from representative points throughout the portion of the system being tested.

.4 Have the samples collected in steps 2 and 3 analyzed for total coliform bacteria. The sample bottles will contain a chlorine neutralizing agent. Sampling collection and preservation shall follow the procedure contained in Appendix A of the Nova Scotia Environment Guidelines for Monitoring Public Drinking Water Supplies. Sample analysis will be conducted by an independent laboratory acceptable to the Engineer following procedures defined in the latest edition of “Standard Methods for the Examination of Water and Wastewater”.

.5 Should the analysis results of any of the samples collected in steps 2 or 3 show the presence of total coliform bacteria, the disinfection procedure and sampling program will be repeated.

.6 Should any of the repeated samples outlined in step 5 show the presence of total coliform bacteria, an investigation to determine the cause of the contamination will be conducted and remediation steps taken to remove the source of contamination to the satisfaction of the Engineer prior to re-disinfection and re- sampling.

.7 The portion of the system being tested will be considered to have been adequately disinfected when the samples taken on two (2) consecutive days show the absence of total coliform.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

.1 Section 01 29 00 – Project Particulars and Measurement

.2 Section 01 35 43 - Environmental Procedures

1.2 Description

.1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed.

.2 Demolition and removal will consist of, but not necessarily be limited to, the following:
- .1 Remove existing waterline support brackets.
- .2 Remove existing electrical infrastructure as noted on Electrical Remediation drawings.
- .3 Remove existing 150 mm diameter water pipe.

1.3 Measurement and Payment Procedures

.1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.

.2 Any demolition and removal items not identified in Section 01 29 00 – Payment Procedures, shall be considered incidental to other payment items.

1.4 Protection

.1 Protect existing objects designated to remain. In event of damage, immediately replace or make repairs to approval of, and at no additional cost to, Departmental Representative.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Execution

.1 Inspect site and verify with Departmental Representative objects designated for removal.

3.2 Removal

.1 Remove in their entirety all materials and objects specified for removal.

.2 Do not disturb adjacent work designated to remain in place.

.3 Remove all existing waterline support brackets and associated bolts.

3.3 Safety Code

.1 Do demolition work in safe manner and according to applicable laws and regulations from authorities having jurisdiction.

.2 Blasting is not permitted.

3.4 Disposal of Material

.1 The Owner maintains the right of first refusal (at no cost) to demolished material except those designated for reuse.

.2 Upon refusal of demolished materials by the Owner, such materials become the property of the Contractor. Remove such materials from site and dispose at an approved facility.

3.5 Restoration

.1 Upon completion of work, remove debris, trim surfaces and leave work site in clean condition.

.2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

**** END OF SECTION ****

PART 1 - GENERAL

1.1 Steelwork Includes

.1 Waterline Support Brackets.

.2 Storm Sewer Bolt Replacement.

1.2 Related Sections

.1 Section 01 29 00 - Payment Procedures

.2 Section 01 33 00 - Submittal Procedures

.3 Section 01 35 43 - Environmental Procedures

1.3 Measurement and Payment Procedures

.1 The measurement and payment procedure for this section shall meet the requirements in Section 01 29 00 - Payment Procedures.

1.4 References

.1 CSA International:
- .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
- .2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA S6-06, Canadian Highway Bridge Design Code.
- .4 CSA S16-09, Design of Steel Structures.
- .5 CSA W59, Welded Steel Construction.

1.5 Action and Informational Submittals

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements, and Section 01 35 43 - Environmental Procedures.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by a Professional Engineer registered or licensed within the Province of Nova Scotia.
.2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
.3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

1.6 Delivery, Storage and Handling

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

.2 Storage and Handling Requirements:
.1 Provide protective blocking for lifting, transportation and storing.
.1 Exercise care during fabrication, transportation and erection of waterline support brackets.
.2 Do not cause excessive stresses.
.2 Mark mass on members weighing more than three (3) tonnes.
.3 Protect unpainted weathering steel, before erection, with waterproof covering.
.4 Ensure that no portion of steel comes into contact with ground.

1.7 Quality Assurance

.1 Pre-construction Testing:
.1 Provide suitable facilities and cooperate with the Departmental Representative in carrying out inspection and tests required.

PART 2 - PRODUCTS

2.1 Waterline Support Brackets, Storm Sewer Support Bolts

.1 All steel waterline support brackets and storm sewer support bolts shall be supplied, fabricated and installed in accordance with the design drawings.

.2 Structural Steel Angles: to CSA G40.21, Grade 300W galvanized.

.3 High Strength Bolts, Nuts and Washers: to ASTM A325M galvanized.

.4 Hot-Dip Galvanizing: to CSA G164, Table 1, minimum zinc coating of 600 g/m2.

.5 Welding: to CSA W59.

2.4 Miscellaneous Steel Work

.1 All other miscellaneous steel work shall be supplied, fabricated and installed in accordance with applicable CSA International Provisions.

2.5 Source Quality Control

.1 Steel Producer Qualifications: certified in accordance with CSA G40.21/G40.21.

PART 3 - EXECUTION

3.1 Examination

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.

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

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

3.2 Preparation

.1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.

.2 Prepare areas for field welding in accordance with CSA W59.

3.3 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave work area clean at end of each day.

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

*** END OF SECTION ***

PART 1 – GENERAL

1.1 Related Work

.1 Section 01 33 00 – Submittal Procedures

.2 Section 05 50 00 – Metal Fabrications

1.2 Measurement and Payment Procedures

.1 The measurement for payment procedure for this section shall meet the requirements in Section 01 29 00 – Payment Procedures.

1.3 References

.1 ASTM D269, Test Method for Insoluble Matter in Rosin and Rosin Derivatives.

.2 ASTM D4541, Test Method for Pull-Off Strength of Coatings Using Portable Adhesion-Testers.

.3 CGSB-GP-12C, Standard Paint Colours, Parts 1 of 3.

.4 CGSB 1-GP-171M, Coating, Inorganic Zinc.

.5 CGSB 1-GP-180Ma, Coating, Polyurethane, Two Package, General Purpose.

.6 CGSB 164-GP-IMP, Leachate Extraction Procedure.

.7 CSA-S269.2-M87, Access Scaffolding for Construction Purposes, the National Building Code of Canada.

.8 SSPC, (Steel Structure Painting Council), Steel Structures Painting Manuals – Volumes 1 and 2, “Good Painting Practice” and “Systems and Specifications”.

.9 SSPC PS 20.00, Zinc-Rich Primers.

.10 SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations.

.11 SSPC-Guide 7, Guide for the Disposal of Lead-Contaminated Surface Preparation Debris.

.12 NEPCOAT Qualified Products List A for Protective Coatings for New and 100% Bore Existing Steel for Bridges.

.13 CSA S6-14 Canadian Highway Bridge Design Code (CHBDC)

1.4 Shop Drawings

.1 Submit three (3) copies of the following shop drawings submittals in accordance with Section 01 33 00 – Submittal Procedures.
  .1 Abrasive to be utilized along with manufacturer's specifications.
  .2 Coating(s) to be utilized along with the manufacturer's specifications.
  .3 Material Safety Data Sheets for all products. MSDS must remain at the place of work at all times.

1.5 Delivery, Storage and Handling

.1 All coating materials shall be supplied in new condition. Two component coatings shall be packaged separately.

.2 Coating components shall be packaged in proportions that are consistent with the manufacturer's normal method of packaging.

.3 Each container shall bear a label which shall clearly show the manufacturer's name or brand of coating, the lot number and date of manufacture.

1.6 Quality Assurance

.1 All material and equipment furnished and work done, shall be subject to inspection by the Departmental Representative. An appointed inspector may be on site during all operations. Such inspection shall not relieve the Contractor of the responsibility for furnishing the qualified labour, equipment, staging, etc., necessary to meet the requirements of this specification, or the safe accessibility to the work for the purposes of inspection.

.2 The Contractor shall keep accurate records containing details such as weather, temperatures, dew points and times for the various coating applications and shall make these records available to the Departmental Representative upon request.

.3 All work shall be subject to inspection by the Departmental Representative or appointed representative, who shall be given at least 48 hours' notice prior to work commencing. The Contractor shall coordinate activities with the Departmental Representative to ensure that all aspects of the work are inspected. Defective work not conforming to this specification shall be repaired at no additional cost.

.4 Methods of inspection and inspection procedures shall be as directed by the Departmental Representative, who shall govern both methods and standards. All findings will be recorded and will become part of the Project's Quality Assurance Records.

.5 Coating inspection shall be performed in accordance with the procedures outlined in SSPC Manual, Volume 1, Chapter 5, "Inspection".

.6 Profile measurements shall be made on a random basis by use of replica tape and spring micrometer or by micrometer depth gauge.

.7 Dry film coating thickness readings shall be performed in accordance with SSPC-PA 2, "Measurement of Dry Paint Thickness with Magnetic Gages".

.8 When necessary, the testing of ambient and surface temperature and humidity shall be done by thermometer, surface thermometer and psychrometer with recognized psychrometric tables.

.9 Destructive testing may be required where inadequate adhesion of the coating(s) is suspected. Adhesion testing shall be done in accordance with ASTM D4541. The minimum adhesion of the coating under evaluation shall be 1.7 Mpa (250 psi). Coatings damaged as the result of destructive testing shall be repaired at no extra cost to the Contract. Repair procedures and materials shall be approved by the Departmental Representative prior to application.

PART 2 – PRODUCTS

2.1 Coating Systems

.1 Coatings applied to steel shall consist of:

.1 High build aluminum mastic paint. Acceptable Product: Ameron Amerlock 400 AL, colour light grey to match galvanizing.

2.2 Blast Media

.1 Abrasive blast media shall be clean and sharp silica sand, washed industrial sand, steel grit, or a slag material of suitable size, weight and angular shape to produce the degree of cleaning specified and anchor pattern/profile required. The blast media shall contain no more than 1% by weight of water soluble solids. There shall be less than 10ppm oil in the abrasive and no trace of salts or toxic material. When cleaning by air blasting with sand abrasives, adequate separators and traps shall be provided to remove detrimental amounts of water and oil from the compressed air before it reaches the nozzle.

.2 Materials unsuitable for use in the work shall be disposed of offsite in an approved manner at no additional cost to the Contract. Re-claimed abrasive material will not be acceptable with the exception of steel grit.

PART 3 – EXECUTION

3.1 General

.1 Coating systems shall be as detailed in these specifications. The manufacturer's data sheets are part of this specification. Should there be any conflict between these two specifications, the decision of the Departmental Representative shall prevail.

.2 All surfaces to be coated shall be free from contamination prior to any application. No coating work shall be done when the surface is less than 3°C above the dew point, nor when it is likely that there will be a change in the weather within four (4) hours of application that would be detrimental to the coating system. All coatings shall be uniformly applied without sags, foreign material, dust, contamination, cracks or other blemishes. Defects shall be removed and repaired to the satisfaction of the Departmental Representative.

.3 The Contractor shall arrange for site visits from the coating manufacturer's technical representative a minimum of one visit per month while the job is in progress. For projects scheduled for completion in less than one month, the manufacturer's representative shall arrange to visit the site at least once. After each visit, the manufacturer's representative shall provide a written report to the Departmental Representative within 5 working days.

.4 All coating work and systems for the purpose of this specification shall be considered a fully cured system prior to being accepted by the Departmental Representative. No accelerators for the purpose of force curing the coating system will be accepted without prior written approval. No coating shall be applied when the wind speed exceeds 15 km per hour unless the Contractor can demonstrate to the Departmental Representative that adequate precautions have been made available which are acceptable to the Departmental Representative. The decision of the Departmental Representative shall be final.

3.2 Surface Preparation

.1 Equipment: abrasive blast cleaning equipment shall be of a quality and size sufficient to perform the work within the time available in the contract. Blast equipment must have adequate in line "driers" to ensure moisture is completely removed during blasting operations. All spray and blasting equipment must be adequately grounded to avoid build-up of static electricity. Detrimental amounts of water and oil shall be removed from any compressed air supply used for blast cleaning by means of appropriate functional traps, separators and heaters before the airstream reaches the nozzles.

.2 All deposits of oil or greasy contamination shall be removed in accordance with SSPC-SP-1, "Solvent Cleaning" before commencing other surface preparation. Solvent wash solutions shall have prior approval.

.3 Field coated surfaces shall be cleaned using high pressure fresh water wash to remove all sand, dirt, carbonation, salt and other contaminants. Enclosure shall be provided at this time if necessary to prevent wash material from entering the environment. Wash water shall be filtered through an approved filter medium (e.g., non-woven geotextile, minimum tensile strength 600 N, permeability 0.22 cm/sec) prior to discharge into the environment. Total maximum chloride contamination of any surface shall not exceed 30 ppm as tested using a standard SCAT kit. The high pressure wash shall start at the top

and proceed down to the bottom of the steel. Special emphasis must be placed on corner and crevices where members are joined together. Solvent wash solutions shall have prior approval.

.4 All weld splatter, slag, rust, burrs, slivers etc., shall be removed prior to coating in accordance with the requirements of SSPC-SP 2 “Hand Tool Cleaning” and/or SSPC-SP 3 “Power Tool Cleaning”. Any sharp edges, not in accordance with Good Painting Practices, shall be ground to produce a minimum radius of 4 mm. Corners and edges of flanges, stiffeners and bracing shall be broken on items which are to be coated. This work shall be approved by the Departmental Representative prior to blast cleaning.

.5 All steel surfaces to be coated shall be abrasive blast cleaned in accordance with the requirements of SSPC-SP 10 “Near-White Blast Cleaning”.

.6 Steel surface profile requirements shall be a minimum of 20% of the total film thickness specified, or as recommended by the coating manufacturer to achieve good coating adhesion and coverage.

3.3 Field Disposal of Spent Abrasive

.1 Spent abrasive material shall remain dry at all times in accordance with SSPC Guide 7.

.2 Representative samples of the spent blasting medium containing coating chips and dust removed from the bridge will be taken by the Departmental Representative and submitted to a laboratory to be tested according to leachate test procedures in the CGSB provisional standard 164-GP-IMP. The abrasive must be kept in a water tight enclosure until the results of the tests are known in order to ensure that no contaminants are released in to the environment.

.3 If the leachate test results indicate the spent blasting medium is classified as a non-hazardous solid waste, then transport the medium from the project site to an approved waste disposal site at no additional cost to the Contract.

.4 If the leachate test results indicate the spent blasting medium is classified as a hazardous solid waste, then transport the medium to a temporary storage location that has a fenced storage compound as approved by the Departmental Representative. Required loading and transportation charges shall be included in the Contract Price. Ultimate disposal of the stored material would then become the responsibility of the Departmental Representative.

.5 Materials that qualify under the Dangerous Goods and Hazardous Wastes Management Act must be disposed of in a manner acceptable to the Newfoundland and Labrador Department of Environment and Conservation and as approved by the Departmental Representative.

.6 All blast abrasive material shall be weighed before being delivered to site. The spent abrasive shall be weighted as it is removed from the site. Provide a weight slip every two

(2) weeks for all abrasive delivered to and removed from the site. A minimum of 90% of the abrasive used in the work shall be recovered.

.7 No additional payment will be made due to delays in sampling and/or receiving leachate test results from the spent abrasive.

3.4 Repair of Defects

.1 Before application of any further coat of material, all damage and/or contamination to previous coats shall be repaired to the approval of the Departmental Representative. In the case of repair, the procedures shall be in an acceptable manner as approved by the Departmental Representative. In the case of removal, the work shall be replaced by work and materials which shall conform to the specification. This clause shall have full effect regardless of the fact that the defective work may not have been previously identified by the Departmental Representative.

3.5 Environmental and Safety Controls

.1 Protect and preserve the environment during the progress of the Work in conformance with the Guidelines for the “Application and Removal of Structural Steel Protective Coatings”.

.2 Provide protective enclosures and filters to contain dust or water in an effective manner and to minimize impacts from dust, water and coating particles entering the environment when washing or removing coating.

.3 Ensure that waste materials, i.e., used coatings, solvents and refuse will not be disposed of in the aquatic environment, elsewhere on the highway or adjacent the right-of-way. Such material shall be disposed of according with applicable legislation.

.4 All methods and materials for constructing the protective enclosure shall be in accordance with regulatory agency requirements having jurisdiction.

.5 Materials collected or accumulated within the enclosure shall be removed and contained so as to prevent their escape. The collected material shall be disposed of off the site as indicated in Clause 3.3 herein.

3.6 Platforms and Enclosures

.1 Platforms and enclosures shall be provided by the Contractor where environmental protection is required, i.e., to protect the work piece or work place from the environment, or the environment from the work being performed. This shall include, but not be limited to, tents, heating or ventilating, negative air pressure, dust collectors, enclosures, etc. These shall be provided at no additional cost to the Contract. For field operations, install

a full (total) enclosure surrounding all washing, coating and surface preparation activities. Refer to SSPC Guide 6.

.2 The plans and drawing for the enclosure, scaffolds and platforms shall be submitted for review as detailed in Clause 1.4. Construction shall not begin until all these documents have been reviewed. Drawings are to include, but not be limited to, the following detailed information:

.1 Method and schedule of construction
.2 Actual loads to be imposed on the structure.
.3 Details of proposed attachments to the structure.
.4 Size and shape of all platform components.
.5 Scaffold erection and dismantling diagrams.
.6 Material specifications and sources.
.7 Arrangement of access platforms, ladders and guardrail.

.3 At the conclusion of sandblasting and coating operations, the protective enclosure shall and removed from the site.

3.7 Coatings Applications

.1 All coatings shall be applied in accordance with the manufacturer's written instructions.

.2 All coatings shall be applied as per the specified minimum and maximum film thicknesses. The nominal rate of application for the coating systems shall have a minimum/maximum DFT of 250 – 400 µm. The inorganic zinc shall be applied at 75 +/- 25 µm, the aluminum epoxy mastic shall be applied at 150 +/- 25 µm DFT and the alphatic polyurethane shall be applied at 100 +/- 25 µm DFT.

.3 All measurements concerning DFT shall be measured by calibrating the Dry Film Gauge to read zero at the "top of the blasted profile". Measuring methods and equipment shall conform to SSPC-PA2.

.4 For coating system, all edges, corners, crevices, rivets, bolts, welds and sharp edges shall be stripe coated with the aluminum polyamide epoxy mastic prior to the steel receiving the final coat in accordance with the coating manufacturer's recommendations. Such striping shall be done with brushes, daubers, or mitts and extend a minimum of 2.5 cm from the edge being coated. Brushes and daubers shall be provided and used to work coatings into cracks, crevices and locations which cannot be adequately coated by spray application.

3.8 Extended Warranty

.1 During the 12 month warranty period, the Departmental Representative will inspect the coating system, and will advise the Contractor and Manufacturer, in writing, of any repairs that are required. Intermediate inspections may be made and warranty repairs

claimed and repaired by the Contractor and Manufacturer during the 12 month warranty period.

.2 Failure of the protective coating system may include but not be limited to:

.1 Any debonding or failure of adhesion of the coating either to the structural steel or other coatings.

.2 The appearance of any rust stains on the coated structure due to loss of coating or leaking from joints between structural members.

.3 Failure of the coating to resist chipping and abrasion from normal site conditions.

.4 Any loss of normal gloss or rapid colour change.

.3 Warranty repair will be completed within 45 days of notification.

.4 Repairs under warranty shall include all costs to supply material, labour and equipment necessary to restore the coating system to acceptable condition. Payment for warranty repairs will not be made separately, but will be considered included in the unit bid price for the fabricated steel plate girders.

*** END OF SECTION ***

PART 1 – GENERAL

1.1 GENERAL

.1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section. This section covers items common to all sections of Division 26.

1.2 ELECTRICAL WORK INCLUDED

.1 The specification complements the drawings in describing the supply and installation of a complete electrical system. This system shall include but not necessarily be limited to the following:

.1 Small power system including wiring devices, cable tray, wiring and conduit;
.2 Lighting system including luminaires and wiring;
.3 Demolition of existing as noted.

1.3 CONTRACT DRAWINGS

.1 The specification together with the drawings are intended to provide a description of a complete electrical system and therefore there shall be no omission of the items necessary or required to make a finished, workmanlike, first class installation, even though each and every item of labour and material may not be mentioned in the specification or shown on the drawings.

.2 Items indicated on floor plans and not on riser diagrams, or vice versa, shall be considered fully covered by both.

.3 Runs of conduit and outlet locations indicated on the drawings are diagrammatic and exact locations must be determined by this contract as the work proceeds, with due regard to the structure and the work of other trades. This contract shall make any changes dictated by structural requirements, or conflicts with other trades, without charge.

.4 Apparent errors or omissions shall be referred to the Engineer whose decision shall be final.

.5 Building dimensions shall not be scaled from the electrical drawings but shall be obtained from the site or civil/structural drawings. Any discrepancy between the drawings and work area shall be questioned before proceeding with the installation.

1.4 CODES AND STANDARDS

.1 As a minimum standard perform all work in accordance with the requirements of the Canadian Electrical Code C22.1-2015 Part 1. These standards together with all local or municipal rules, regulations, and ordinances shall be considered as the latest approved editions at the time of tender closing. In no instance, shall the standard established in these contract documents, be reduced by any codes.

.2 Do underground systems in accordance with CSA CAN-C22.3 No. 7-15.

.3 Abbreviations for electrical terms: to CSA Z85-1983.

.4 Comply with CSA Certification Standards and Electrical Bulletins in force at the time of tender submission.

1.5 INSPECTIONS, PERMITS AND FEES

.1 Obtain all inspections and permits required by all laws, ordinances, rules and regulations by the public authority having jurisdiction at the site for work of this Contract, and obtain certificates of such inspections and submit same and pay all charges in connection therewith. The final certificate of inspection shall be obtained before final payment for work shall be considered due.

.2 Electrical Permit

.1 Submit to the Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
.2 Pay associated fees.
.3 Furnish certificates of Acceptance from Inspection Department and AHJ on completion of work.

1.6 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 Submit shop drawings, product data and samples in accordance with Division 1. Provide all shop drawings within 30 days after contract has been awarded. Failure to do so will delay progress payments.

.2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.3 Where applicable, include wiring, single line and schematic diagrams.

.4 Include wiring drawings or diagrams showing interconnection with work of other Sections.

.5 Keep one copy of shop drawings and product data on site, available for reference at all times.

1.7 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for incorporation into Operation and Maintenance Manuals as specified in Division 1.

.2 Include in the operation and maintenance data:

.1 Details of design elements, construction features, component function, and maintenance requirements to permit effective start up, operation, maintenance, repair, modification, extension, and expansion of any portion or feature of installation.
.2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical description of items and parts lists. **Advertising or sales literature not acceptable.**
.3 Wiring and schematic diagrams and performance curves.
.4 Names and addresses of local suppliers for items included in maintenance manuals.
.5 Copy of reviewed shop drawings.
.6 Signed receipt for all spare parts.

.3 Approvals:

.1 Submit one draft of Operating and Maintenance Manual to Engineer for approval one month prior to estimated substantial completion date. Submission of individual data will not be accepted unless so directed by Engineer.
.2 Make any changes in submission as may be required and re-submit as directed.
.3 **Failure to do so will result in delay of progress payment.**
.4 Provide two (2) final bound copies of Operation and Maintenance Manuals to Owner and one (1) bound copy to Engineer.

1.8 PROJECT RECORD DOCUMENTS

.1 Provide Project Record Documents in accordance with Division 1.

.2 Submit record drawings to Departmental Representative showing changes of wire sizes, circuit numbering and location of raceways, fittings, fixtures, panels and equipment, and their sizes, the location of which has changed or deviated during the work.

.3 Submit sepia or reproducible of record drawings after record drawings have been approved by the Engineer. Originals shall be made available by the Departmental Representative for the making of sepia or reproducible of the contract drawings. All changes reflected on record drawings are to be indicated on these sepia or reproducible.

1.9 MAINTENANCE MATERIAL

.1 Provide maintenance materials in accordance with Division 1.

1.10 CARE, OPERATION AND START UP

.1 Instruct operating personnel in the operation, care and maintenance of the equipment.

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

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

1.11 VOLTAGE RATINGS

.1 Operating voltages to meet requirements of CAN3-C235.

.2 Motors, control and distribution equipment to operate satisfactorily at 60 Hz within normal operating limits established by the above standard. Equipment to operate in extreme operating conditions established in the above standard without damage to the equipment.

1.12 MATERIAL AND EQUIPMENT

.1 Provide materials and equipment in accordance with Division 1.

.2 Equipment and materials to be C.S.A. certified, and manufactured to standard quoted.

.3 Where there is no alternative to supplying equipment which is not C.S.A. certified, obtain special approval from C.S.A.

.4 Factory assemble control panels and component assemblies.

.5 For the purposes of uniformity similar materials shall be of one manufacturer (i.e. all panels; all motor control equipment; all fixtures in as much as is possible, etc.).

.6 To avoid the possibility of the work being delayed, order all materials as soon as the shop drawings are reviewed, and report at once to the Engineer any delays in the delivery of materials which would hold up the completion of the job.

1.13 GROUNDING

.1 All equipment and exposed non-current carrying metal, conduits and parts shall be permanently and effectively grounded to meet minimum requirements of the C.E.C. Section 10, and as indicated on the drawings and further specified. Standards set either by drawings or specifications which are above those covered by C.E.C. Section 10, shall not be reduced under any circumstances.

1.14 FINISHES

.1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint outdoor electrical equipment, "Equipment Green" finish to EEMAC Y1-1-1955.
.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

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

.3 Clean, prime and paint exposed hangers, racks, and fastenings to prevent rusting.

.4 Where wire guards are specified in other sections, they are to be constructed of stainless steel. Painted steel is not acceptable.

1.15 EQUIPMENT IDENTIFICATION

.1 All disconnect switches, receptacles, pushbuttons, control panels, etc., shall have "Lamacoid" nameplates mounted on or adjacent for identification which shall include the panel designation, voltage, phase, wires overcurrent protection, H.P., KW and amperage as applicable. The nameplates shall be affixed to metal equipment with metal type pop rivets, and to all other equipment with contact type cement applied to the entire nameplate backing.

.2 Size of identification shall be suitable for equipment and importance of information.

.3 All fused disconnect switches shall have lamacoid plates identifying the equipment they feed and a separate plate indicating maximum fuse size and type.

.4 Lettering shall be of sufficient size to be readable from normal viewing distance and the information required on the nameplates shall dictate the physical size of plates.

.5 Nameplates shall have **white lettering on black background** except for equipment connected to emergency power source, which shall have **white lettering on red background.**

.6 All "D" and "E" boxes 200mm x 200mm x 100mm or larger and "C" and "T" cabinets shall have lamacoid plates affixed indicating voltages and/or systems housed within.

.7 Nameplates:

.1 Lamicoid 3mm thick plastic engraving sheet on metal surfaces, 1.5mm where not applied to metals.

NAMEPLATE SIZES

Size 1	10mm x 50mm	1 line	5mm high letters
Size 2	13mm x 75mm	1 line	6mm high letters
Size 3	16mm x 75mm	2 lines	5mm high letters
Size 4	19mm x 91mm	1 line	10mm high letters
Size 5	38mm x 91mm	2 lines	12mm high letters
Size 6	25mm x 100mm	1 line	12mm high letters
Size 7	25mm x 100mm	2 lines	6mm high letters
Size 8	50mm x 150mm	2 lines	12mm high letters

.8 Labels:

.1 Embossed plastic labels with 6.5mm high letters unless specified otherwise.

.9 Wording on nameplates and labels to be approved by the Engineer prior to manufacture.

.10 Allow for average of forty (40) letters per nameplate and label.

.11 Identification to be English.

1.16 WIRING IDENTIFICATION

.1 Conductor insulation shall be colour coded as follows:

Phase A	-	Red
Phase B	-	Black
Phase C	-	Blue
Neutral	-	White/Grey
Ground /Bond	-	Green
Isolated Ground	-	Green w/Yellow stripe

This shall apply to all phase conductors up to and including #2AWG and all sizes of neutral, bond and ground conductors up to and including #3/0AWG.

.2 For conductors exceeding sizes as described above, identification of wiring with approved coloured plastic tapes shall be acceptable. Attach to both ends of all conductor runs a minimum of 12” from terminations, and in all junction and/or pull boxes.

.3 Maintain phase sequence and colour coding throughout.

.4 Colour code shall be as per Section 26 05 21.

.5 Use color coded wires in branch circuit wiring, systems wiring and communication cables.

1.17 WIRING TERMINATION

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors as indicated.

1.18 MANUFACTURERS AND CSA LABELS

.1 Manufacturers and CSA labels shall be visible and legible after equipment is installed.

1.19 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Division 1.

.2 Change location of outlets at no extra cost or credit providing distance does not exceed 3 metres and information is given before installation.

.3 Coordinate on site the location of outlets with other trades and equipment before work is to start.

1.20 MOUNTING HEIGHTS

.1 Mounting heights of equipment is from centreline of bottom of tunnel to centre line of equipment unless specified or indicated otherwise.

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

.3 Install electrical equipment at the following heights unless indicated otherwise.

.1 Local switches, to switch:	1200mm
.2 Wall receptacles:	as indicated on drawings
.3 Luminaires:	as indicated on drawings

1.21 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark live parts "LIVE 120 VOLTS" or with appropriate voltage in English.

1.22 TESTS

.1 Conduct and pay for tests of the following:

.1 Power distribution system including phasing, voltage, grounding and load balancing.
.2 Lighting and its controls.
.3 Polarity check on receptacles.

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

.3 The Engineer reserves the right to use any piece of electrical equipment, device, or material installed under this contract for such reasonable lengths of time and at such times as he may require in order to make a complete and thorough test of the same, before the final completion and acceptance of the work.

.4 Such tests shall not be construed as acceptance of any part of the work.

.5 Submit test results for Engineer's review.

1.23 INSULATION RESISTANCE TESTING

.1 Test all wiring, included in the work to ensure that no shorts and/or grounds are present on phase conductors for feeders or branch circuits and that insulation values are as required by the Canadian Electrical Code.

.2 All testing of conductors to be done prior to energization of conductors with 600 volt and 1000 volt meggers as required by the Canadian Electrical Code.

.3 Systems to be tested for capacitive leakage are as follows: 120/208V/3PH/4W.

.4 Check resistance to ground before energizing. Ensure resistance to ground is not less than 50 megohms.

.5 Submit test results for Engineer's review. Test results shall include time of test, feeder tested, and instrument readings.

1.24 CLEANING

.1 Do final cleaning in accordance with Division 1.

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

.3 On completion of work, remove debris resulting from work of this Division and leave the site neat and tidy. Equipment shall be checked for proper fitting and alignment, adjusted, cleaned, repainted where necessary, and left in first class condition.

.4 This section shall be responsible for the removal of spatters, droppings, soil, labels, and debris from finished surfaces and from surfaces to receive finishes, before the set up. Work and adjacent finished work shall be left in new condition.

.5 Only cleaning materials which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material shall be used.

.6 Immediately before and during finishing work shall be made "broom clean".

.7 Material at site cannot be burned or buried except where approved by Engineer. Removal shall be as often as required to avoid accumulation in order to ensure site is maintained clean.

.8 Volatile fluid wastes cannot be disposed of in storm or sanitary sewers or in open drain courses.

.9 Lowering of materials shall be controlled and shall not be dropped or thrown from above.

1.25 COORDINATION

.1 Cooperate and investigate with other trades to make maximum use of the spaces. Avoid conflicts with pipes, ducts, etc. Prepare shop drawings indicating the route of main conduits and ducts for submission to the Engineer for approval.

.2 Cooperate with other trades on the site and carry out the work, in such a way, as not to hinder or hold up the work of other trades.

.3 Consult with other trades, where their respective installations conflict and re-route conduits, ducts, outlets, equipment, etc., as required, subject to the approval of the Engineer.

- - END OF SECTION - -

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 18 - Clamps and connectors.

.2 CSA C22.2 No. 65 Wire Connectors.

1.2 RELATED WORK

.1 Not Applicable

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Not Applicable

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Joints required in branch wiring #10 AWG and smaller shall be made using fixture twist-on type connectors with current carrying parts made of copper.

.1 Standard of Acceptance: Marrette #31, #33 or #35 as required.

.2 Joints for wiring #8 AWG and larger shall be made using pressure type colour keyed compression connectors with current carrying parts made of copper using compression tools. A first layer of tape shall be compound type followed by a layer of Scotch #3 vinyl type.

.1 Standard of Acceptance: 54000 series.

.3 Bushing stud connectors are not acceptable.

.4 Clamps or connectors for armoured cable and flexible conduit as required.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.

.2 Install fixture type connectors and tighten with pliers or appropriate tool. Finger-tightening alone is not acceptable. Replace insulating cap.

.2 All connections shall be made electrically and mechanically secure. Sizes of connectors shall be according to manufacturer's recommendations for each wire size and combination of wires. Twist wires together before installing connectors. All stranded conductors shall be twisted together prior to connection around terminal.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 38 - Thermoset insulated Wires and Cables.

.2 CSA C22.2 No. 51 - Armoured cables.

.3 Wire and cable shall conform to the latest specification of the Canadian Standards Association (CSA), Electrical and Electronic Manufacturers Association of Canada (EEMAC), the Insulated Power Cable Engineers Association (IPCEA), and the American Society of Testing Materials (ASTM).

1.2 RELATED WORK

.1 Not Applicable

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit product data in accordance with Division 1.

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

PART 2 - PRODUCTS

2.1 WIRES

.1 Conductors: Copper, soft drawn stranded, at least 98% conductivity for #12 AWG and larger. Insulation shall be chemically cross-linked thermosetting polyethylene rated 600 volts on all RW90 conductors. Size as indicated on drawings and schedules. Conductor insulation shall be colour coded as follows:

Phase A	-	Red
Phase B	-	Black
Phase C	-	Blue
Neutral	-	White/Grey
Ground/Bond	-	Green

Approved color coded tape is acceptable for color coding phase conductors #1 AWG and larger and for neutral and ground conductors #4/0 and larger.

2.2 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: TECK90.

.3 Armour: interlocking type fabricated from aluminium strip, coated with PVC jacket.

.4 Connectors: to manufacturer's recommendations.

2.3 SYSTEM WIRING

.1 Wiring for auxiliary systems will be as indicated in specification or on drawings and/or as recommended by Manufacturer of the system.

2.4 MANUFACTURERS

.1 Standard of Acceptance: Nexans or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRES

.1 Install all wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34.

3.2 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.

.2 Flexible type conduit c/w RWU90 conductors sized as noted and/or flexible armoured cable (TECK90) complete with separate grounding conductor.

.3 Where application of armoured cables and/or other types of pliable cables are to be used, they shall be installed parallel or perpendicular to the tunnel lines unless otherwise noted.

3.3 INSTALLATION - GENERAL

.1 Where pulling wires and cables, the use of an approved lubricant only will be permitted. No wires or cables shall be pulled in conduits until such conduits are free from moisture and in no case shall wires be pulled until approval of the Engineer is obtained.

.2 All stranded conductors prior to terminating under device bolts such as circuit breakers, light switches, receptacles, etc., to be twisted together to form a single conductor to ensure a reliable mechanical connection.

.3 "Labelling" of all branch circuit wiring including phase conductors, neutrals, grounding and/or bonding conductors to be done on **both ends** of all circuit wires plus in any junction and/or pull boxes located in between using "Panduit" write-on, self laminating labels Nos. PDL-1 and PDL-2 as required.

.4 The following wiring methods are designed to enhance the ability to perform capacitive leakage tests:

.1 All circuit conductors are to be individually tie wrapped to their corresponding labelled neutral conductor in all panelboards, pullboxes and junction boxes. Enough slack conductor length should be left to enable the ability to clamp the ground detector around the individually tie-wrapped circuit conductor and its corresponding labelled neutral. This wiring method is to be neat and of good workmanship quality.

.2 The tie wrapping of the neutral with its respective phase conductors is to be made at the closest point of entry into panelboards, pullboxes and junction boxes.

.3 After all electrical wiring has been completed by the Electrical Sub-Contractor, he is to test the grounded electrical distribution system to ensure there are not ground shorts and capacitive leakage in the system.

.4 All feeders or branch circuits which do not have neutral conductors are to have their respective phase conductors tie-wrapped together in accordance to the methods described previously.

.5 Run all circuits so that the voltage drop in no case exceeds 3% of the line volts. The neutral wire, wherever it is run, shall be continuous with no fuses, switches, or breaks of any kind.

.6 For 15 amp, 120 volt circuits the following table shall be used to determine the minimum conductor sizes required to compensate for voltage drop (one way length from panelboard to load including vertical drops). In no case does this table allow a reduction in conductor size from that shown on the drawings or as specified elsewhere in the specifications. Voltage drop shall not exceed 3% in any instance:

.1	From	0.3m to 24m	#12 Wire
.2	From	24m to 37m	#10 Wire
.3	From	37m to 55m	#8 Wire

.7 Increased wire sizes where required shall not be decreased in size in any portion of length of run between panelboard and the wiring device itself.

.8 All wiring shall be colour coded as per Code requirements and/or as specified herein.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 Not Applicable

1.2 RELATED WORK

.1 Common Work Results Electrical: Section 26 05 00

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Division 1.

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

PART 2 - PRODUCTS

2.1 SUPPORT DEVICES

.1 U shape, size 41mm x 41mm, 2.5mm thick, surface mounted or suspended as required.

.2 Supply and install all necessary inserts, rods, channels, brackets, etc., to form a support system capable of carrying at least twice the weight of the equipment supported.

.3 All hanger rods shall be 10mm diameter continuous threaded rod cut to required lengths. Cut off excess to within 13mm of bottom of channel.

.4 All conduits not installed on Unistrut or approved equal type support channels to be supported as follows:

.1 13mm up to and including 35mm conduits - one hole galvanized steel straps.
.2 41mm and larger sizes - two hole galvanized steel straps.

.6 All suspended conduit runs containing horizontal or vertical elbows shall have one additional support rod installed at not more than 300mm from midpoint of all 90 degree bends.

.7 Beam clamps to secure conduit to exposed steel work.

.8 In no case will the use of tye-wraps for supporting purposes be acceptable unless explicitly approved for the purpose, such as for securing wiring in-place.

.8 All trays, wireways, and multiple conduits, shall be supported by a steel channel support system with all components, hangers, wall supports, cable clamps, etc., specifically manufactured and approved for their application.

.9 Fastening devices for cabinets, boxes, supports, etc., shall be nut and bolt, ramset, expansion shields, wedge anchors, or toggle bolts, size and number to suit the application or as detailed on the drawings.

.10 Fastening devices for outlet boxes shall be nut and bolt, ramset, expansion shields, wedge anchors or caddy clips, size and number to suit the application or as detailed on the drawings.

.11 Suspended outlet, pull and junction boxes shall be supported with minimum 10mm threaded rod, nuts and flat washers. Threaded rods shall be secured to boxes with one flat washer and nut installed on both sides of box. Threaded rods shall be installed as follows:

.1 One rod required for all types of boxes sized 150mmx150mm and smaller;
.2 Two rods required for all types of boxes sized larger than 150mmx150mm up to and including 300mmx300mm;
.3 Minimum of four rods required for all boxes larger than 300mmx300mm.

2.2 MANUFACTURERS

.1 Standard of Acceptance: Burndy.

.2 Other approved manufacturers: Erico, Electrovert, Pursley, Unistrut.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.2 Suspended support systems.

.1 Support individual cable or conduit runs with 10mm dia threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 10mm dia threaded rod hangers where direct fastening to building construction is impractical.

.3 For surface mounting of two or more conduits use channels at 1.5m on center spacing.

.4 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.5 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.6 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Engineer.

.7 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

.8 Coordinate the location of any insert to miss concrete reinforcement and obtain approval of Engineer prior to installing.

.9 Secure all equipment in a manner so as not to distort or cause undue stress on any components.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 40 - Junction and pull boxes.

1.2 RELATED WORK

.1 Not Applicable

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and products data for splitters and cabinets in accordance with Division 1.

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Pull and junction boxes, where larger than standard switch boxes, shall be sized according to C.E.C. Section 12-3038.

.2 Rigid PVC construction with screw-on flat covers for surface mounting.

.4 Junction boxes 150mm x 150mm and larger used in branch circuit wiring shall be complete with bonding terminal strips.

2.2 MANUFACTURERS

.1 Standard of Acceptance: IPEX Scepter

.2 Other approved manufactures: Royal, Carlon.

PART 3 - EXECUTION

3.1 JUNCTION, PULL BOXES AND CABINETS

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2000mm above finished floor.

.3 Install terminal block as indicated in Type "T" cabinets.

.4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 1000 ft. of conduit run between pull boxes.

.5 In **no case** shall a pull or junction box be installed in a space that is not considered accessible unless provision is made for access to the box as approved by Engineer.

.6 All branch conductors to be identified in all junction and/or pull boxes with "Panduit" write-on, self-laminating label Nos. PLD-1 and PLD-2 as required or approved equal by Thomas & Betts.

.7 All junction boxes containing six or more branch circuits shall be installed in type "E" box c/w terminal strip. **Minimum size** of box to be 300mm x 300mm x 100mm.

.8 Terminal strip(s) to be large enough to terminate all phase, neutral and bonding conductors as required plus size spare terminals.

.9 All "E" box coverplates to have "Lamicoid" nameplates identifying designated panel letter and/or number affixed via pop rivet method.

.10 All pull and junction boxes 150mm x 150mm and larger having auxiliary systems housed within shall be identified with "Lamicoid" nameplates permanently affixed.

3.2 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Install size 2 identification labels indicating system name, voltage, and phase.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 18 - Outlet boxes, conduit boxes and fittings.

1.2 RELATED WORK

.1 Not Applicable

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Not Applicable

1.4 OPERATION AND MAINTENANCE MANUAL

.1 Not Applicable

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with Canadian Electrical Code, Part 1.

.2 100mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with CSA approved barriers where outlets for more than one system are grouped.

2.2 CONDUIT BOXES

.1 Cast FS Aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

.2 Metal type “FS” device plates to be used on all type “FS” boxes unless noted otherwise.

2.3 RIGID CONDUIT BOXES

.1 Cast FS or FD feraloy **rigid conduit boxes** with factory-threaded hubs and mounting feet for surface wiring where rigid conduit other than "EMT" is used.

2.4 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of foreign materials.

.3 Conduit outlet bodies for conduit up to 32mm and pull boxes for larger conduits.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material. Remove filling material at completion of project.

.3 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers not allowed.

.4 All flexible conduit fixture feeds shall originate from the side of the outlet box and not from the box cover.

.5 In locating outlets, take care to allow for pipes, ducts, etc., and for the variation in arrangement and thickness of finishes, etc. Failure to comply with this will not relieve Electrical Contractor from the cost of necessary alterations.

.6 Allow for the relocation of an outlet up to a dimension of 3m from that indicated on drawings, provided notice is given before roughing-in has been completed.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)

- .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
- .2 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .3 CSA C22.2 No. 211, Rigid PVC (Unplasticized) Conduit.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with local requirements.

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

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

.4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 CONDUITS

.1 Liquid tight flexible metal conduit, size as indicated.

.2 Rigid PVC conduit, size as indicated.

2.2 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.3 FISHCORD

.1 6.5 mm standard nylon pull rope with tensile strength of 5 kN.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Use rigid PVC conduit underground and in corrosive areas. Thin-wall (DB2) rigid PVC shall be permitted only where encased in concrete.

.3 Use liquid tight flexible metal conduit (minimum 3/8" internal diameter) for connection to motors or vibrating equipment in all locations, including controls and related devices

.4 Minimum conduit size for lighting and power circuits: 19 mm.

.5 Bend conduit cold. Replace conduit if kinked or flattened more than $1/10^{th}$ of its original diameter.

.6 Install fish cord in empty conduits.

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

.8 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to tunnel lines.

.2 Run conduits in flanged portion of structural steel.

.3 Group conduits wherever possible on surface channels.

.4 Do not pass conduits through structural members except as indicated.

.5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

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

END OF SECTION

PART 1 - GENERAL

1.1 LOCATION

.1 Drawings indicating cable trays are in diagrammatic form only. Review exact locations of existing cable trays on site.

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Division 1.

.2 Submit complete information on the product, c/w all accessories, including:
- .1 Cable Tray.
- .2 Barrier, barrier splice strips, horizontal bends, barrier clips, etc.
- .3 Connecting hardware, connecting assemblies, etc.
- .4 Grounding clamps.
- .5 Cable tray clamps.
- .6 Blind End Sections.
- .7 Bonding jumpers.

PART 2 - PRODUCTS

2.1 CABLE TRAY

.1 General Distribution
- .1 Cable Trays and fittings: to EEMAC F5-1-1977.
- .2 Channel type, to CSA C22.2 NO. 126.1-09
- .3 Galvanized steel trays, sized to match existing.
- .4 Expansion joints and reducers where required. Fittings: manufactured accessories for the cable tray supplied.
- .5 Adjustable vertical and horizontal splice plates where changes in direction preclude the use of standard fittings. Always use manufactured fittings. Do not use field modified fittings.
- .6 Dead ends of cable trays shall be closed by the use of manufacturer fabricated blind end sections.

.2 Manufacturers

- .2 Acceptable Manufacturers to the requirements above:
  - .1 B-Line
  - .2 CFRP Comtray.
  - .3 ElectroTray.
  - .4 Pilgrim.
  - .5 Canadian Electrical Raceways.
  - .6 Thomas and Betts.

.7 Legrand/Cablofil

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Prior to ordering cable tray the electrical contractor shall prepare a detailed sketch illustrating the following:
- .1 Proposed method of installation.
- .2 Proposed hanger type and dimensions.
- .3 Proposed method of grounding cable tray.
- .4 Proposed routing of cable tray.

.2 Support cable tray on both sides, using trapeze support kits where installed from hangers.

.3 Install cable tray clamps on each side of every support strut.

.4 Wall mounted cable tray to be supported with angle brackets.

.5 Remove sharp burrs or projections to prevent damage to cables or injury to personnel.

3.2 CONTINUITY OF CABLE TRAY

.1 The entire run of cable tray is to be continuous. Include all required fittings, vertical splices, horizontal splices, offsets, etc., to allow for changes in elevation, direction, etc.

.2 Always use manufactured fittings. Do not use field modified fittings. Where changes in direction preclude the use of standard fittings use adjustable vertical and horizontal splice plates.

3.3 COORDINATION WITH OTHER TRADES

.1 Coordinate installation with other services and equipment. Reroute cable tray as necessary to avoid conflict with the work of other trades.

.2 Minimum clearances for cable trays shall be **in strict accordance** with CEC Rule 12-2200.

3.4 BONDING

.1 Install a minimum continuous #6 bare bonding conductor in all runs of cable tray. Connect each section of cable tray to the bonding conductor using bolted clamps or a similar approved fitting.

3.5 SUPPORTS

.1 Provide trapeze and cantilever supports at 3 metre (10 foot) intervals.

.2 Cut off excess rod within 13 mm (1/2 inch) of channel bottom.

.3 Minimum sized threaded rods to be 9.5 mm (3/8 inch).

.4 Sandwich channel between nuts and washers located on both upper and lower surfaces.

.5 Provide hold down clips to secure tray to strut.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 111 – General Use Switches.

.2 CSA C22.2 No. 42 – General Use Receptacles, Attachment Plugs and Similar Wiring Devices.

1.2 RELATED WORK

.1 Not Applicable.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Division 1.

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

PART 2 - PRODUCTS

2.1 SWITCHES

.1 All switches shall be from one manufacturer throughout.

2.2 RECEPTACLES

.1 Unless specified otherwise, all receptacles are duplex type, complete with GFCI protection.

.2 All receptacles shall be from one manufacturer throughout, CSA Type, commercial specification grade and suitable for back wiring of #10AWG conductors.

2.3 COVER PLATES

.1 Cover plates from one manufacturer throughout project and required for all devices.

.2 Weatherproof cover plates to be lockable, extra-duty, “While In Use” cover plates.

2.4 MANUFACTURERS

.1 Standard of Acceptance: Hubbell, Leviton, Cooper.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Switches:

.1 Mount toggle switches at height specified in Section 26 05 00 or as indicated.

.2 All switches and their wall plates shall be installed plumb, with switch handle in the "up" position when switch is closed.

.2 Receptacles:

.1 Mount receptacles at height specified in Section 26 05 00 or as indicated. Horizontally mounted 120V receptacles shall be installed with their neutral termination bolts located on the top side.

.2 Install a green insulated ground conductor, between the grounding terminal of the receptacle and the grounding screw and stud of the outlet box. Minimum size of ground and/or bonding cables are to be #12 AWG.

.3 "Pig-tail" type leads shall be installed on conductors in all device or outlet boxes where feeding through to other receptacles. "Daisy-chaining" of receptacles is not acceptable. Provide separate pig-tail conductor leads for final termination to each receptacle for phase, neutral and bond conductors.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

.1 CSA C22.2 No. 9-1968 – General Requirements for Luminaires.

.2 CSA C22.2 No. 8 - Radio interference suppressor. Electromagnetic Interference (EMI) Filters.

.3 CSA C22.2 No. 250.13-12 - Light emitting diode (LED) equipment for lighting applications

1.2 RELATED WORK

.1 Common Work Results Electrical: Section 26 05 00

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Division 1.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified or requested for approval by Engineer.

1.4 OPERATION AND MAINTENANCE DATA

.1 Not Applicable

1.5 GUARANTEE

.1 Replace LED drivers that fail within 12 months of takeover.

PART 2 - PRODUCTS

2.1 LUMINAIRE DETAILS

.1 Provide fixtures as shown on drawings.

.2 Provide supporting devices, surface mounted junction boxes and outlet boxes where required.

.3 Stamped steel Laminar bodies not to be less than 1 mm thick cold rolled steel. Reflective steel plates of minimum 0.8 mm thick metal.

.4 Lenses or diffusers shall be of glass or acrylic material, as indicated.

.5 Include finishes to Section 26 05 00 and as indicated.

.6 Provide gasketing, stops and barriers to form light traps to prevent light leaks.

2.2 LUMINAIRE MANUFACTURERS

.1 Supply luminaires as noted on the drawings.

2.3 LUMINAIRE SUPPORTS

.1 Provide supports for suspended fixtures as recommended by manufacturer

2.4 ACCEPTABLE MANUFACTURERS

.1 Equivalents acceptable as noted on the drawings.

.2 Approved equals shall be submitted to engineer prior to tender closing in accordance with Division 1 to be reviewed as an equivalent to that specified.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 This work shall include the supplying and installation and connection of all lighting units and associated equipment as specified hereinafter and on the drawings as well as the receiving, storing and testing of same.

.2 Locate fixtures as indicated on drawings.

.3 Catalogue references numbers given for individual fixtures may not necessarily be correct but are intended as a guide when read with the description and may not agree with the type of fixture finally supplied; therefore the catalogue reference shall be verified with the description and co-ordinated with the installation conditions with particular regard to ceiling construction details, type and finish before ordering the fixtures.

3.2 WIRING

.1 Connect fixtures to lighting circuits as indicated.

3.3 FIXTURE SUPPORTS

.1 Provide luminaire supports required to mount fixtures as specified.

.2 Hang all light fixtures in such a manner that their attachment shall be secure in all respects.

3.4 DEFECTIVE OR DAMAGED FIXTURES

.1 Check fixtures and replace all defective ballasts and accessories on any fixtures that have been damaged or scratched during construction.

3.5 TESTS

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

3.6 SITE TAKEOVER

.1 All fixtures shall be operable, undamaged, and as specified at the time of takeover.

.2 All lamps shall be new and operating at the time of takeover. All fixtures shall be clean and like new condition, at the time of takeover.

END OF SECTION