# SPECIFICATION

## Wharf Electrical Upgrade – Calvert, NL

## Project No. F6142-140016

## ISSUED FOR TENDER


**DATE**

March 2015

PROVINCE OF NEWFOUNDLAND AND LABRADOR

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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
SPECIFICATION FOR
WHARF ELECTRICAL UPGRADE
CALVERT, NEWFOUNDLAND & LABRADOR

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WHARF ELECTRICAL UPGRADE
CALVERT, NEWFOUNDLAND & LABRADOR

**CLIENT**

| **DOC#** | **DRAWING TITLE** |
|---|---|
| E1 | Existing & New Site Plans |
| E2 | Electrical Details |

# PART 1 - GENERAL

## 1.1 SCOPE

.1 The scope of work for this project is the provision of construction activities to provide upgraded electrical at this existing site as is more specifically described in the Description of Work and the Drawings and Specifications. The work covered consists of the furnishing of all plant, labour, equipment and material for the construction of improvements at Calvert, Newfoundland and Labrador, in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of the Contract. Bidders are advised that opportunities and requirements may arise that may warrant changes to the work that are in keeping with this general scope of work. Such changes will be made through the Change Order processes as outlined in the contract documents.

## 1.2 DESCRIPTION

.1 In general, the work under this contract consists of, but will not necessarily be limited to, the following:

1. Removal of all existing electrical service equipment, lights, cables, and conduits.
2. Supply and installation of new electrical service, lights, distribution including new conductors and conduits.
3. Coordination with utility to provide new 120/208V 3 phase electrical service. Contractor responsible to pay for all contribution in aid of construction charges from the Utility. For Bidding purposes, assume this cost is $9,000 excluding taxes.
4. Trenching and concrete repair work to accommodate the new conduit installation in the existing concrete deck.
5. Installation of owner supplied light fixtures on wooden poles and Jib Crane.

## 1.3 SITE OF WORK

.1 Work will be carried out at Calvert, Newfoundland and Labrador in the location as shown on the accompanying drawings.

## 1.4 DATUM

.1 Bidders are advised to consult the Tide Tables issued by Fisheries and Oceans in order to make sure of the tidal conditions affecting work.

## 1.5 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders visit the site and its surroundings to review and verify the form, nature and extent of the work, materials necessary for the completion of the works, the means of access to the site, severity, exposure and uncertainty of weather, soil conditions, any accommodations they may require, and in general shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.

.2 Contractors, bidders or those they invite to site are to review specification Section 01 35 28 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.

## 1.6 CODES AND STANDARDS

.1 Perform work in accordance with the latest edition of the National Building Code of Canada, FCC Standard 373 - Standard for Piers and Wharves (http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/373/page00.shtml), and any other code of provincial or local application including all amendments up to project bid closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

.2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

## 1.7 SETTING OUT WORK

.1 Set grades and layout work in detail from control points and grades established by Departmental Representative.

.2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated or as directed by Departmental Representative.

.3 Provide devices needed to layout and construct work.

.4 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

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

## 1.8 COST BREAKDOWN

.1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. Departmental Representative will provide the required forms for application of

progress payment.

.2 Provide cost breakdown in same format as the numerical and subject title system used in this specification and thereafter sub-divided into major work components as directed by Departmental Representative.

.3 Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.

.4 All work items and costs not designated in the unit price table as a measurement for payment, are to be included in the lump sum arrangement, as noted on the Bid and Acceptance Form.

## 1.9 WORK SCHEDULE

.1 Submit within seven (7) working days of notification of acceptance of bid, a construction schedule showing commencement and completion of all work within the time stated on the bid and acceptance form and the date stated in the bid acceptance letter.

.2 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.3 As a minimum, work schedule to be prepared and submitted in the form of bar (GANTT) charts, indicating work activities, tasks and other project elements, their anticipated durations and planned dates for achieving key activities and major project milestones provided in sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time (e.g., show target dates for completion of each crib, if applicable). Breakdown the wharf elements to indicate target dates for completion of each element. Generally, bar charts derived from commercially available computerized project management systems are preferred but not mandatory.

.4 Submit schedule updates on a minimum monthly basis and more often, when requested by Departmental Representative, due to frequent changing project conditions. Provide a narrative explanation of necessary changes and schedule revisions at each update.

.5 The schedule, including all updates, shall be to the Departmental Representative's approval. Take necessary measures to complete work within approved time. Do not change schedule without Departmental Representative's approval.

.6 All work on the project will be completed within the time indicated on the Bid and Acceptance Form.

## 1.10 ABBREVIATIONS

.1 Following abbreviations of standard specifications have been used in this specification and on the drawings:

CGSB - Canadian Government Specifications Board
CSA - Canadian Standards Association
NLGA - National Lumber Grades Authority
ASTM - American Society for Testing and Materials

.2 Where these abbreviations and standards are used in this project, latest edition in effect on date of bid call will be considered applicable.

## 1.11 QUARRY AND EXPLOSIVES

.1 Make own arrangements with Provincial Authorities and Owners of properties, for the quarrying and transportation of rock and all materials and machinery necessary for work over their property, roads or streets as case may be.

## 1.12 SITE OPERATIONS

.1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials, etc. Exercise care so as not to obstruct or damage public or private property in area. Do not interfere with normal day-to-day operations in progress at site. All arrangements for space and access will be made by Contractor.

.2 Remove snow and ice, as required, to maintain safe access in a manner that does not damage existing structures or interfere with the operations of others.

## 1.13 PROJECT MEETINGS

.1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording minutes.

.2 Project meetings will take place on site of work unless so directed by Departmental Representative.

.3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at meetings.

.4 Have a responsible member of firm present at all Project Meetings.

## 1.14 PROTECTION

.1 Store all materials and equipment to be incorporated into work to prevent damage by any means.

.2 Repair and replace all materials or equipment damaged in transit or storage to the satisfaction of the Departmental Representative and at no cost to Canada.

## 1.15 EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to site operations, pedestrian, vehicular traffic, and tenant operations. Contractor is reminded that the wharf area is an active fish processing facility and will be active during construction.

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

.3 Submit schedule to and obtain approval from Departmental Representative for any shutdown or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.

.4 Provide temporary services to maintain critical facility systems.

.5 Provide adequate bridging over trenches which cross walkways or roads to permit normal traffic.

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

.7 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

## 1.16 DOCUMENTS REQUIRED

.1 Maintain at job site, one (1) copy each of the following:
- .1 Contract drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed shop drawings.
- .5 List of outstanding shop drawings.
- .6 Change Orders.
- .7 Other modifications to contract.
- .8 Field test reports.
- .9 Copy of approved work schedule.

.10 Site specific Health and Safety Plan and other safety related documents.
.11 Permits and Regulatory Approvals and Requirements.
.12 Other documents as stipulated elsewhere in the Contract Documents.

## 1.17 PERMITS

.1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other authorities.

.2 Provide appropriate notifications of project to Municipal and Provincial inspection authorities.

.3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.

.4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.

.5 Submit to Departmental Representative, copy of quarry permit, if applicable, prior to start of quarry operations.

.6 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.

## 1.18 CUTTING, FITTING AND PATCHING

.1 Execute cutting, including excavation, fitting and patching required to make work fit properly.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services.

.3 Do not cut, bore, or sleeve load-bearing members.

.4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

## 1.19 EXISTING SUB-SURFACE CONDITIONS

.1 Information pertaining to the existing sub-surface conditions may be available by contacting the Departmental Representative.

.2 Contractors are cautioned that any previous investigations that may be available for review, were intended to provide general site information only. Any interpolation and/or assumption made relative to any previous investigations is the Contractor's responsibility.

## 1.20 LOCATION OF EQUIPMENT

.1 Location of cleats, jib cranes, equipment, fixtures, lighting poles, power pedestals and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable. Obtain approval of Departmental Representative.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

## 1.21 FISH HABITAT

.1 This work is being conducted in an area where fish habitat may be affected. Perform work to conform with rules and regulations governing fish habitat and in accordance with authorization for work or undertakings affecting fish habitat.

.2 Contact the Department of Fisheries and Oceans (DFO) detachment at St. John's, NL at least 48 hours in advance of starting any work on site.

.3 Maintain on site a copy of DFO's Letter of Advice regarding this project, and abide by all stipulations, unless otherwise agreed in writing by Departmental Representative.

## 1.22 NOTICE TO SHIPPING/MARINERS

.1 Notify the Marine Communications and Traffic Services Centre of Fisheries and Oceans Canada, at (709) 772-2083, 10 days prior to commencement and upon completion of the work in order to allow for the issuances of Notice to Shipping/Mariners.

.2 During construction any vessels or barges utilized must be marked in accordance with the provisions of the Canada Shipping Act Collision Regulations.

## 1.23 ACCEPTANCE

.1 Prior to the issuance of the Certificate of Substantial Performance, in company with Departmental Representative, make a check of all work. Correct all discrepancies before final inspection and acceptance.

## 1.24 WORKS COORDINATION

.1 Responsible for coordinating the work of the various trades, where the work of such trades interfaces with each other.

.2 Convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required. Provide each trade with the plans and specifications of the interfacing trade, as required, to assist them in planning and carrying out their respective work.

.3 Canada will not be responsible for or held accountable for any extra costs incurred as a result of the failure to carry out coordination work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor and shall be resolved at no extra cost to Canada.

## 1.25 CONTRACTOR'S USE OF SITE

.1 Construction operations, including storage of materials, for this contract not to interfere with the fishing activity and/or the operations at this harbour facility. Maintain full vehicle and vessel access to adjacent wharves at all times during construction.

.2 Responsible for arranging the storage of materials on or off site and any materials stored at the site which interfere with any of the day-to-day activities at or near the site will be moved promptly at the Contractor's expense, upon request by the Departmental Representative.

.3 Contractor will take adequate precautions to protect existing concrete deck and asphalt when operating tracked equipment.

.4 Exercise care so as not to obstruct or damage public or private property in the area.

.5 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

## 1.26 WORK COMMENCEMENT

.1 Mobilization to project site is to commence immediately after acceptance of bid and submission of site specific Safety Plan, unless otherwise agreed by Departmental Representative.

.2 Project work on site is to commence as soon as possible with a continuous reasonable workforce unless otherwise agreed by Departmental Representative.

.3 Weather conditions, short construction season, delivery challenges and the location of the work site may require the use of longer working days and additional workforce to complete the project within the specified completion time.

.4 Make every effort to ensure that sufficient material and equipment is delivered to site at the earliest possible date after acceptance of bid and replenished as required.

## 1.27 FACILITY SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

## 1.28 INTERPRETATION OF DOCUMENTS

.1 Supplementary to the General Conditions, the Division 01 sections of the specifications take precedence over technical specification in other divisions of the specifications.

## 1.29 ASBESTOS DISCOVERY

.1 Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of work, stop work and notify Departmental Representative immediately. Do not proceed with relevant work until written instructions have been received from Departmental Representative.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 GENERAL

.1 Canada will supply certain materials in the Contract for installation and incorporation into the Work by the Contractor.

## 1.2 MATERIAL SUPPLIED

.1 Canada will supply the following material to the contract:

1. Site light fixtures and photocells

.2 The materials supplied by Canada are to be picked-up by the Contractor and delivered to the site. The location of all Canada supplied materials to be picked-up, is the DFO Storage Facility located on Glencoe Drive, Donovan's Industrial Park, Mount Pearl, NL. The contact person is Dion Upward (709-763-5689).

## 1.3 DELIVERY REQUIREMENTS

.1 Materials supplied by Canada will be available for pick-up following acceptance of Bid. Once turned over to the Contractor, the Contractor will be responsible for delivery to the work site.

.2 The Contractor will become responsible to supply all missing materials and repair or replace damaged items and missing parts discovered during transportation to site.

.3 Failure of the Contractor to make a complete check of the Canada-supplied material and to acknowledge receipt of same once picked up at the DFO storage facility in Mount Pearl, shall not relieve him of this contractual responsibility to replace or repair any item subsequently found to be missing or damaged.

.4 Departmental Representative will make final determination as to whether an item can be repaired or must be replaced.

## 1.4 CONTRACTOR'S DUTIES

.1 Pick-up Canada-supplied material, at the DFO Storage Facility located on Glencoe Drive, Donovan's Industrial Park, Mount Pearl, NL.

.2 Take possession of Canada-supplied material immediately upon pick-up and be responsible for transportation to site.

.3 Obtain and pay for services to load and transport to site.

.4 Unload and handle at site, including lifting, uncrating, etc.

.5 Store material on site at a location approved by Departmental Representative. Provide protection against inclement weather and site damage by use of appropriate covers.

.6 Be responsible for the protection of such material against damage, loss, theft and fire from date of receipt, during transportation, loading, unloading, temporary storage and until final installation of work is accepted by the Departmental Representative.

.7 Any damage or loss of such material shall result in the Contractor being responsible for replacement or repair of equipment at no cost to Canada.

.8 The decision as to whether damaged items may be repaired or must be replaced with new equipment shall be the Departmental Representative's decision.

.9 Install such material and incorporate into the work. Perform assembly and make all connections as required to make item functional.

.10 Dispose of containers, crating and protective covering off site as directed by the Departmental Representative.

## 1.5 MEASUREMENT FOR PAYMENT

.1 All cost associated with this specification will be considered included in the lump sum arrangement and will not be measured for payment.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Inspecting and testing by inspecting firms or testing laboratories designated by Departmental Representative.

## 1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

## 1.3 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint and pay for services of testing laboratory except for the following:
- .1 Inspection and testing required by orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Mill tests and certificates of compliance.
- .4 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .5 Tests requested by Departmental Representative to confirm material specifications when the applicable manufacturer's documentation or test results are unavailable.
- .6 Additional tests specified in the following paragraph.

.2 Where test or inspections by designated testing laboratory reveal work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

## 1.4 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:
- .1 Provide access to work to be inspected and tested.
- .2 Facilitate inspections and tests.
- .3 Make good work disturbed by inspection and test.
- .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

## PART 2 - PRODUCTS

Not applicable

## PART 3 - EXECUTION

Not applicable

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Shop drawings and product data.

.2 Samples.

.3 Certificates.

## 1.2 SUBMITTAL GENERAL REQUIREMENTS

.1 Submit to Departmental Representative for review submittals listed, including shop drawings, samples, certificates and other data, as specified in other sections of the Specifications.

.2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.

.3 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.

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

.5 Where items or information is not produced in SI Metric units, provide soft converted values.

.6 Review submittals prior to submission to Departmental Representative. Ensure during review that necessary requirements have been determined and verified, required field measurements or data have been taken, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.

.1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.

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

.8 Verify field measurements and affected adjacent work and coordinate.

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

.10 Contractor's responsibility for deviations in submission from requirements of

Contract Documents is not relieved by Departmental Representative's review.

.11 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.

.12 Make changes or revisions to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.

.13 Keep one reviewed copy of each submittal document on site for duration of Work.

## 1.3 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Number of Shop Drawings: submit sufficient copies of shop drawings which are required by the General Contractor and sub-contractors plus four (4) copies which will be retained by Departmental Representative. Ensure sufficient numbers are submitted to enable one complete set to be included in each of the maintenance manuals specified, if applicable.

.3 Shop Drawings Content and Format:

.1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work has been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.

.2 Shop Drawings Format:

.1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.

.2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.

.3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.

.3 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.

.4 Delete information not applicable to project on all submittals.

.4 Allow ten (10) calendar days for Departmental Representative's review of each submission.

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

.6 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.

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

.8 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and project 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 Cross references to particular details of contract drawings and specifications section number for which shop drawing submission addresses.
- .6 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 The review of shop drawings by the Departmental Representative or their delegated representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the 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 all requirements of the construction and Contract Documents. 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 all sub-trades.

## 1.4 SCHEDULES, PERMITS AND CERTIFICATES

.1 Upon acceptance of bid, submit to Departmental Representative copy of Work Schedule and various other schedules, permits, certification documents and project management plans as specified in other sections of the Specifications.

.2 Submit copy of permits, notices, compliance Certificates received from Regulatory Agencies having jurisdiction and as applicable to the Work.

.3 Submission of above documents to be in accordance with Submittal General Requirements procedures specified in this section.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Fire Safety Requirements

.2 Hot Work Permit

## 1.2 RELATED WORK

.1 Section 01 35 25 - Special Procedures on Lockout Requirements.

.2 Section 01 35 28 - Health and Safety Requirements

## 1.3 REFERENCES

.1 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:

.1 FCC No. 301-June 1982 Standard for Construction Operations (http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/301/page00.shtml).

.2 FCC No. 302-June1982 Standard for Welding and Cutting (http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/302/page00.shtml).

.3 FCC standards, may also be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

## 1.4 DEFINITIONS

.1 Hot Work defined as:

.1 Welding work

.2 Cutting of materials by use of torch or other open flame devices

.3 Grinding with equipment which produces sparks.

## 1.5 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of hot work permit to Departmental Representative for review, within 14 calendar days after notification of acceptance of bid.

.2 Submit in accordance with the Submittal General Requirements specified in Section 01 33 00.

## 1.6 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during work. Comply with following:
- .1 National Fire Code, latest edition
- .2 Fire Protection Standards FCC 301 and FCC 302.
- .3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in section 01 35 28.

.2 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.

## 1.7 HOT WORK AUTHORIZATION

.1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.

.2 To obtain authorization submit to Departmental Representative:
- .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
- .2 Description of the type and frequency of Hot Work required.
- .3 Sample Hot Work permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Departmental Representative will provide authorization to proceed as follows:
- .1 Issue one (1) written "Authorization to Proceed" covering the entire project for duration of work; or
- .2 Separate work, or segregate certain parts of work, into individual entities. Each entity requiring a separately written "Authorization to Proceed" from Departmental Representative. Follow Departmental Representative's directives in this regard.

.4 Requirement for individual authorization based on:
- .1 Nature or phasing of work;
- .2 Risk to Facility operations;
- .3 Quantity of various trades needing to perform hot work on project; or
- .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

.6 In tenant occupied facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed perform Hot

Work only during non-operative hours of Facility. Follow Departmental Representative's directives in this regard.

## 1.8 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Procedures to include:
- .1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 28.
- .2 Use of a Hot Work Permit system for each hot work event.
- .3 The step-by-step process of how to prepare and issue permit.
- .4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or sub-contractor to proceed with hot work.
- .5 Provision of a designated person to carry out a Fire Safety Watch for a minimum of 30 minutes immediately upon completion of the hot work.
- .6 Compliance with fire safety codes and standards specified herein and occupational health and safety regulations specified in Section 01 35 28.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.

.4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:
- .1 Worker(s).
- .2 Authorized person issuing the Hot Work Permit.
- .3 Fire Safety Watcher.
- .4 Sub-contractors and Contractor.

.5 Brief all workers and sub-contractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.
- .1 Failure to comply with the established procedures may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 28.

## 1.9 HOT WORK PERMIT

.1 Hot Work Permit to include, as a minimum, the following data:
- .1 Project name and project number;
- .2 Building name, address and specific floor, room or area where hot work will be performed;

.3 Date when permit issued;
.4 Description of hot work to be performed;
.5 Special precautions required, including type of fire extinguisher needed;
.6 Name and signature of person authorized issue the permit;
.7 Name of worker(s) (clearly printed) to whom the permit is being issued;
.8 Time duration that permit is valid (not to exceed 8 hours). Indicate "Start" time & date and "Completion" time & date;
.9 Worker signature with date and time upon hot work termination;
.10 Specified period of time requiring Safety Watch;
.11 Name and signature of person designated as Fire Safety Watcher, complete with time and date when safety watch terminated, certifying that the surrounding area was under continual surveillance and inspection during the full time period specified in permit and commenced immediately upon the completion of Hot Work.

.2 Permit to be in typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full and signed as follows:
.1 Authorized person issuing Permit before hot work commences;
.2 Worker(s) upon completion of Hot Work;
.3 Fire Safety Watcher upon termination of safety watch and;
.4 Returned to Contractor's Site Superintendent for safe keeping.

## 1.10 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and hazard assessment documentation on site for duration of work.

.2 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Procedures to isolate and lockout electrical facility or other equipment from energy source.

## 1.2 RELATED WORK

.1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.

.2 Section 01 35 28 - Health and Safety Requirements.

## 1.3 REFERENCES

.1 CSA C22.1-06 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.2 CAN/CSA C22.3 No. 1-06 - Overhead Systems.

.3 CAN/CSA C22.3 No. 7-06 - Underground Systems.

.4 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

## 1.4 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.

.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.

.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).

.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.

.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.

.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

## 1.5 COMPLIANCE REQUIREMENTS

.1 Perform lockouts in compliance with:
- .1 Canadian Electrical Code.
- .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 28.
- .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
- .4 Procedures specified herein.

.2 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.

## 1.6 SUBMITTALS

.1 Submit copy of proposed Lockout Procedures and sample form of lockout permit for review.

.2 Submit documentation within seven (7) calendar days of acceptance of bid. Do not proceed with work until submittal has been reviewed by Departmental Representative.

.3 Submit above documents in accordance with the submittal requirements specified in Section 01 33 00.

.4 Resubmit Lockout Procedures with noted revisions as may result from Departmental Representative's review.

## 1.7 ISOLATION OF EXISTING SERVICES

.1 Obtain Departmental Representative's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.

.2 To obtain authorization, submit to Departmental Representative following documentation:
- .1 Written Request for Isolation of the service or facility and;
- .2 Copy of Contractor's Lockout Procedures.

.3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, and as follows:
- .1 Fill-out standard forms in current use at the facility when so directed by Departmental Representative or;
- .2 Where no form exists at facility, make request in writing identifying:
  - .1 Identification of system or equipment to be isolated, including its location;
  - .2 Time duration, indicating start time and date and completion time and date when isolation will be in effect.
  - .3 Voltage of service feed to system or equipment being isolated.
  - .4 Name of person making the request.
- .3 Document to be in typewritten format.

.4 Do not proceed until receipt of written notification from Departmental Representative granting the isolation request and authorization to proceed with the isolation of designated equipment or facility. Departmental Representative may designate other individual at the facility as the person authorized to grant the isolation request.

.5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.

.6 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of facility operations.

.7 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require a Request for Isolation. Follow Departmental Representative's directives in this regard.

.8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard assessments to conform with requirements of Health and Safety Requirements Section 01 35 28.

## 1.8 LOCKOUTS

.1 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting work on such items.

.2 Develop and implement lockout procedures to be followed on site as an integral part of the work.

.3 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.4 Use industry standard lockout tags.

.5 Provide appropriate safety grounding and guards as required.

.6 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment.

.7 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:

- .1 Controlling issuance of permits or tags to workers.
- .2 Determining permit duration.
- .3 Maintaining record of permits and tags issued.
- .4 Submitting a Request for Isolation to Departmental Representative when required in accordance with Clause 1.7 above.
- .5 Designating a Safety Watcher, when one is required based on type of work.
- .6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.
- .7 Collecting and safekeeping lockout tags, returned by workers, as a record of the event.

.8 Clearly establish, describe and allocate, within procedures, the responsibilities of:

- .1 Workers.
- .2 Designated person controlling issuance of lockout tags/permits.
- .3 Safety Watcher.
- .4 Subcontractors and General Contractor.

.9 Procedures shall meet the requirements of Codes and Regulations specified in clause 1.5 above.

.10 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.

- .1 Incorporate site specific rules and procedures established by Facility Manager and in force at site. Obtain such procedures through

Departmental Representative.

.11 Procedures to be in typewritten format.

.12 Submit copy of Lockout Procedures to Departmental Representative, in accordance with submittal requirements of clause 1.6 herein, prior to commencement of work.

## 1.9 CONFORMANCE

.1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.

.2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.

.3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 28.

## 1.10 DOCUMENTS ON SITE

.1 Post Lockout Procedures on site in common location for viewing by workers.

.2 Keep copies of Request for Isolation submitted to Departmental Representative and lockout permits or tags issued to workers during the course of work for full project duration.

.3 Upon request, make such data available to Departmental Representative or to authorized safety representative for inspection.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 RELATED WORK

.1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.

.2 Section 01 35 25 - Special Procedures on Lockout Requirements.

## 1.2 SUBMITTALS

.1 Submit to Departmental Representative copies of the following documents, including updates:
- .1 Site Specific Health and Safety Plan.
- .2 Building Permit, compliance certificates and other permits obtained.
- .3 Reports or directions issued by Federal and Provincial inspectors or other Authority having jurisdiction.
- .4 Accident or Incident Reports.
- .5 MSDS data sheets.
- .6 Name of Contractor's Representative(s) designated to perform full time health and safety supervision on site.
- .7 Letter of Good Standing/Certificate of Clearance from the Provincial Worker's Compensation Board.

.2 Medical Surveillance: Obtain and maintain worker medical surveillance documentation for work posing a potential health hazard to workers as stipulated in Federal or Provincial Occupational Health and Safety Regulations. Upon request, submit copy of documentation to Departmental Representative.

.3 Upon request by Departmental Representative, submit reports and other documentation as stipulated to be produced and maintained by Federal and Provincial Occupational Health and Safety Regulations and as specified herein.

.4 Submit above documents in accordance with the submittal procedures specified in Section 01 33 00.

## 1.3 COMPLIANCE REQUIREMENTS

.1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health & Safety 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, latest edition, Part 8;
.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 a current letter of Good Standing to Departmental Representative when submitting site specific Health and Safety Plan and with each Request for Progress Payment.

## 1.4 RESPONSIBILITY

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

.2 Enforce compliance by all workers, subcontractors 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.

## 1.5 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 by use of appropriate means.
.2 Post notices and signage at entry points and at other strategic locations identifying that 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. Provide security guard where protection cannot be achieved by other means.

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

.1 Provide such PPE to authorized persons who require access to perform inspections or other approved purposes.

## 1.6 PROTECTION

.1 Carry out work placing emphasis on health and safety of 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.

.1 Erect fences, hoarding, protective barriers and temporary lighting as required. See Section 01 56 00 for minimum acceptable barricades.

.3 Should unforseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

## 1.7 PERMITS

.1 Obtain building permit licenses, compliance certificates and other permits as specified in Section 01 10 10 before and during progress of work. Post on site.

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

## 1.8 HAZARD ASSESSMENTS

.1 Conduct site specific health and safety hazard assessment before commencing project and during course of work identifying risks and hazards resulting from site conditions, weather conditions and work operations.
- .1 Perform on-going assessments addressing new risks and hazards as work progresses (including when new subtrade or sub-contractor arrives on site).
- .2 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.

## 1.9. PROJECT/SITE CONDITIONS

.1 The following are known or potential project related safety hazards at site:
- .1 Working in close proximity of water.
- .2 Use of water crafts and floating platforms.
- .3 Wet and slippery conditions.
- .4 Inclement weather.
- .5 Potential structural weaknesses of existing structures.
- .6 Heavy equipment activity in the area.
- .7 Heavy lifting.
- .8 Working from heights.
- .9 Cutting tools and other construction/power tools.
- .10 Overhead power/utility lines.
- .11 Risk of electric shock.
- .12 Vehicular/pedestrian traffic.
- .13 Confined Spaces

.2 Above lists 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.

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

## 1.10 HEALTH AND SAFETY MEETINGS

.1 Attend pre-construction health and safety meeting conducted by Departmental Representative. Have Contractor's Site Superintendent and Contractor's designated health and safety site supervisor in attendance. Departmental Representative will advise of date, time and location.

.2 Conduct health and safety meetings and tool box briefings on site. Hold on a regular and pre-scheduled basis during entire work in accordance with requirements and frequency as stipulated in provincial Occupational Health and Safety Regulations.
- .1 Keep workers informed of potential hazards and provide safe work practices and procedures to be followed.
- .2 Take written minutes and post on site.

.3 Conduct formal meetings on a minimum monthly basis.

## 1.11 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 seven (7) 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 sub-contractors.
    - .2 Federal and Provincial Departments as stipulated by laws and regulations of authorities having jurisdiction and local emergency resource organizations, as needed based on nature of emergency.
    - .3 Officials from PWGSC and site Facility Management. Departmental Representative will provide list.

.4 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.

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

| Column 1<br>Part 1<br>Identified<br>Hazard | Column 2<br>Part 2<br>Safety<br>Measures | Column 3<br>Part 3a/3b<br>Emergency Response &<br>Site Communications |
|---|---|---|

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

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

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

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

.8 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 or those which would otherwise be applicable to the site of the work.

## 1.12 SAFETY SUPERVISION AND INSPECTIONS

.1 Designate one (1) 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(s) 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 Conduct Formal Inspections on a minimum monthly basis.
- .1 Use standardized safety checklist forms.
- .2 Prepare written report for each inspection. Document deficiencies, remedial action needed and assign responsibility for rectification to appropriate subcontractor or worker.
- .3 Distribute monthly reports to subcontractors for their pursuance.
- .4 Follow-up and ensure appropriate action and corrective measures are taken.

.5 Cooperate with site's Health and Safety Site Coordinator responsible for the entire site, should one be designated by Departmental Representative.

.6 Keep inspection reports on site.

## 1.13 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 in site orientation session.

.2 Maintain evidence and records of worker training.

## 1.14 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 access:
- .1 Wear personal protective equipment (PPE) appropriate to function and task on site; the minimum requirements being hard hat, safety footwear and eye protection and for work on or near water, a personal flotation device.
- .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 the 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 sub-contractors 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.

## 1.15 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.
.3 Property damage in excess of $5,000.00.
.4 Interruption to Facility operations with potential loss to a Federal Department in excess of $5,000.00.
.5 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.

## 1.16 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.

## 1.17 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.

## 1.18 BLASTING

.1 Blasting or other use of explosives is not permitted without prior written instructions from Departmental Representative.

.2 Do blasting operations in accordance with local and provincial codes.

## 1.19 POWDER ACTUATED DEVICES

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

## 1.20 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.

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

.3 Provide and maintain equipment and PPE as required for the safety and emergency evacuation of persons entering confined spaces.

.4 Provide training to persons who will be entering and to those persons who will be

assisting in the confined space entry process. Training to be specialized instructions beyond basic confined space entry information as required to suit type and conditions of confined space.

.5 Safety for Inspectors:
- .1 Upon request, provide PPE and training to Departmental Representative and to other authorized persons, for the purpose of entering confined space to conduct inspections.
- .2 Be responsible for the efficacy of the equipment and safety of such persons during their entry and occupancy in the confined space.

## 1.21 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.

## 1.22 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, or authorized safety representative, for review. Provide copy when directed by Departmental Representative.

## 1.23 NON COMPLIANCE AND DISCIPLINARY MEASURES

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

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

.3 PWGSC uses a system of Non-Compliance Notifications and Disciplinary Measures on projects as follows:
- .1 A non-compliance notification is issued to the General Contractor, by the Departmental Representative, whenever there is a violation or non-compliance of the project's health and safety requirements and of those of Provincial and Federal regulations by any worker, sub-contractor or other person to whom the Contractor has granted access to the work site.
- .2 Non-compliance notifications are progressive in nature resulting in 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.

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

.5 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.

.6 Each non-compliance notification issued is given a numerical rating based on a three (3) level numbering system. Each level is progressive in nature to reflect:
- .1 The seriousness of the infraction as viewed by the Departmental Representative.
- .2 The degree of disciplinary action which will be taken by the Departmental Representative.

.7 Numerical ratings are as follows:
- .1 Non-compliance Notification-Level No. 1 Rating:
  - .1 Situation: occurrence of a first time infraction by a person or party on site.
  - .2 Action: verbal warning to General Contractor, documented in Departmental files and copy sent to the General Contractor.
- .2 Non-compliance Notification-Level No. 2 Rating:
  - .1 Situation:
    - .1 The second occurrence of a previous infraction by the same person or party on site; or
    - .2 Accumulation of several level-1 notifications for different infractions by the same person or party on site; or
    - .3 Non-action on the part of the Contractor or subcontractor to rectify non-compliance infractions previously identified in one or several level-1 notifications; or
    - .4 Violation or non-observance of a Federal or Provincial Safety Law or Regulation by sub-contractor or Contractor; or
    - .5 Negligence by a person or party resulting in injury or major property damage.
  - .2 Action: written notice to General Contractor complete with an order for immediate remedial action to be taken. Depending on the severity of the offense, the order may include request for the immediate removal of the offending person or party from site.
- .3 Non-compliance Notification-Level No. 3 Rating:
  - .1 Situation:

.1 Continued and repeated non-compliance with health and safety requirements by the General Contractor or by sub-contractor(s); or

.2 The occurrence of a serious accident on site resulting in serious bodily injury or death.

.2 Action:

.1 Formal letter issued to General Contractor with an order to "Immediately Stop Work" until so notified to proceed.

.2 Review of all non-compliance and/or accident occurrences in the project with possible investigation by the Department of PWGSC.

.3 Based on outcome of the review/investigation, work could be suspended or taken out of the Contractor's hands in accordance with the General Conditions.

.3 The term "serious accident" used herein shall have the same meaning as defined in the Canadian Dictionary of Safety Terms - 1987 issue from the Canadian Society of Safety Engineers (C.S.S.E.).

.8 Decision on which rating level to be placed on any given Non-Compliance Notification will be determined solely by Departmental Representative.

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

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

## 1.24 DIVING OPERATIONS

.1 All diving work to comply fully with the requirements of the latest editions of CSA Standard Z275.2 "Occupational Safety Code for Diving Operations", CSA Z275.4, "Competency Standards for Diving Operations", and CSA Z180.1, "Compressed Breathing Air and Systems".

.2 Dive personnel must meet the minimum competency requirements of the latest edition of CSA Z275.4 and all divers must possess a valid Category I Diving Certificate, or an unrestricted surface supply certificate.

.3 Diving in free-swim mode is not permitted at the work site.

.4 Divers must have a current (less than one year) validated medical examination certificate from a licensed diving physician in Newfoundland and Labrador, who is knowledgeable and competent in diving and hyperbaric medicine, for all dives.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 RELATED WORK

.1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## 1.2 DEFINITIONS

.1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals or plant life when released into the environment.

## 1.3 FIRES

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

## 1.4 DISPOSAL OF WASTES AND HAZARDOUS MATERIALS

.1 Do not bury rubbish and waste materials on site. Dispose at approved landfill sites as specified in Section 01 74 21.

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

.3 Store, handle and dispose of hazardous materials and hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

.4 Dispose of construction waste materials and demolition debris, resulting from work, at approved landfill sites only. Carry out such disposal in strict accordance with provincial and municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.

.5 Establish methods and undertake construction practices which will minimize waste and optimize use of construction materials. Separate at source all construction waste materials, demolition debris and product packaging and delivery containers into various recycling abilities of various materials and avoid disposal of debris at landfill site(s) in a "mixed state". Where recycling firms specializing in recycling of specific materials exist, transport such materials to the recycling facility and avoid disposal at landfill sites.

.6 Communicate with landfill operator prior to commencement of work, to determine what specific construction, demolition and renovation waste materials have been banned from disposal at the landfill and at transfer stations.

## 1.5 DRAINAGE

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

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

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.

.4 Pumped water must meet applicable federal, provincial and municipal standards before it can be discharged to a surface water body. If regulatory guidelines exceedences are noted, the Departmental Representative has the right to issue stop pumping instructions to the Contractor. Contractor will not be compensated for any delays associated with retrofitting equipment to meet guidelines.

.5 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

## 1.6 PERMITS

.1 All guidelines and instructions stated on permits must be strictly adhered to.

## 1.7 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial and federal environmental regulations.

.5 Do not skid logs or construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast within 100 m of spawning beds.

.8 Do not refuel any type of equipment within 100 m of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

## 1.8 POLLUTION CONTROL

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

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

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

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

.5 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began.

.6 Have emergency spill response equipment and rapid clean-up kit, appropriate to work, at site. Locate adjacent to work and where hazardous materials are stored. Provide personal protective equipment as required for clean-up.

.7 Report, to Federal and Provincial Department of the Environment, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment. Also notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

.8 Provide a floating debris containment boom whenever any of the Contractors methods of work allow for the potential of floating debris.

## 1.9 WILDLIFE PROTECTION

.1 Should nests of migratory birds in wetlands be encountered during work, immediately notify Departmental Representative for directives to be followed.
- .1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
- .2 Minimize work immediately adjacent to such areas until nesting is completed.
- .3 Protect these areas by following recommendations of Canadian Wildlife Service.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

.5 Equipment and system adjust and balance.

## 1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 78 00 - Closeout Submittals.

## 1.3 INSPECTION

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed. Pay costs to uncover and make good such Work.

.4 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

## 1.4 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative will engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.
- .6 Additional tests specified in Clause 1.4.2.

.2 Where tests or inspections by designated Testing Agency reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Departmental Representative may require to verify acceptability of corrected work.

.3 Employment of inspection and testing agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

## 1.5 ACCESS TO WORK

.1 Furnish labour and facility to provide access to the work being inspected and tested.

.2 Cooperate to facilitate such inspections and tests.

.3 Make good work disturbed by inspections and tests.

## 1.6 PROCEDURES

.1 Notify Departmental Representative sufficiently in advance of when work is ready for tests, in order for Departmental Representative to make attendance arrangements with Testing Agency. When directed by Departmental Representative, notify such Agency directly.

.2 Submit representative samples of materials specified to be tested. Deliver in required quantities to Testing Agency. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples on site. Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.

## 1.7 REJECTED WORK

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to existing or new work, including work of other Contracts, resulting from removal or replacement of defective work.

## 1.8 TESTING BY CONTRACTOR

.1 Provide all necessary instruments, equipment and qualified personnel to perform tests designated as Contractor's responsibilities herein or elsewhere in the Contract Documents.

.2 At completion of tests, turn over two (2) copies of fully documented test reports to Departmental Representative. Additionally, obtain other copies in sufficient quantities to enable one (1) complete set of test reports to be placed in each of the maintenance manuals specified in Section 01 78 00.

.3 Submit mill test certificates and other certificates as specified in various sections.

.4 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems specified in trade sections.

.5 Furnish test results and mix designs as specified in various sections.

## 1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in various trade sections. Include in each mock-up all related work components representative of final assembly.

.2 Construct in locations acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when directed by Departmental Representative unless approval is given to remain as part of Work.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 ACCESS

.1 Provide and maintain adequate access to project site.

.2 Maintain access roads for duration of contract and make good damage resulting from Contractor's use of roads.

## 1.2 CONTRACTOR'S SITE OFFICE

.1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.

## 1.3 SANITARY FACILITIES

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

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

## 1.4 POWER

.1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

.2 Supply and install all temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.

## 1.5 WATER SUPPLY

.1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

## 1.6 SCAFFOLDING

.1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CAN/CSA-S269.2-M87 (R2003).

.2 Erect scaffolding independent of walls. Remove when no longer required.

## 1.7 CONSTRUCTION SIGNS AND NOTICES

.1 Contractor or sub-contractor advertisement signboards are not permitted on site.

.2 Only notices of safety or instructions are permitted on site.

.3 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321-96 (R2001).

.4 Maintenance and Disposal of Site Signs:

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

## 1.8 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 SECTION INCLUDES

.1 Barriers.

.2 Traffic Controls.

## 1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

## 1.3 HOARDING

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

## 1.4 GUARD RAILS AND BARRICADES

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

.2 Provide barricades along wharf structure when wheelguard is removed.

.3 Provide as required by governing authorities.

## 1.5 ACCESS TO SITE

.1 Provide and maintain access to adjacent harbour facilities.

## 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 the 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.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within seven (7) days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:
- .1 name and address of manufacturer;
- .2 trade name, model and catalogue number;
- .3 performance, descriptive and test data;
- .4 manufacturer's installation or application instructions;
- .5 evidence of arrangements to procure.
- .6 evidence of manufacturer delivery problems or unforseen delays.

.3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

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

## 1.2 PRODUCT QUALITY AND REFERENCED STANDARDS

.1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.

.2 Final decision as to whether a product or system meets contract requirements rests solely with the Departmental Representative in accordance with the General Conditions.

## 1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

.1 Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.

.2 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders.

.3 Substitutions: After acceptance of bid, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

## 1.4 MANUFACTURERS INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturers instructions, so that Departmental Representative will designate which document is to be followed.

## 1.5 AVAILABILITY

.1 Immediately notify Departmental Representative in writing of unforseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.1.2 above.

## 1.6 WORKMANSHIP

.1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

.2 Remove unsuitable or incompetent workers from site as stipulated in General Conditions.

.3 Ensure cooperation or workers in laying out work. Maintain efficient and continuous supervision on site at all times.

.4 Coordinate work between trades and sub-contractors.

.5 Coordinate placement of openings, sleeves and accessories.

## 1.7 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.

.2 Space anchors within limits of load bearing or shear capacity and ensure that they

provide positive permanent anchorage. Wood or organic material plugs not acceptable.

.3 Keep exposed fastenings to minimum, space evenly and lay out neatly.

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

.5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See Section 01 35 28 on Health and Safety in this regard.

## 1.8 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.

.3 Bolts may not project more than one (1) diameter beyond nuts.

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

## 1.9 STORAGE, HANDLING AND PROTECTION

.1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.

.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 and 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 Immediately remove damaged or rejected materials from site.

.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.

## 1.10 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Departmental Representative that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order. Prevent oil and other contaminant leaks. Should any contaminant leak onto ground or into the water, take immediate and appropriate measures to contain, clean-up and dispose in an environmentally responsible manner.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

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

.3 Prevent accumulation of wastes which create hazardous conditions.

.4 Provide adequate ventilation during use of volatile or noxious substances.

## 1.2 MATERIALS

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

## 1.3 CLEANING DURING CONSTRUCTION

.1 Maintain project grounds, and public properties in a tidy condition, free from accumulation of waste materials and debris. Clean areas on a daily basis.

.2 Provide on site garbage containers for collection of waste materials and debris.

.3 Remove waste materials and debris from the site or building each day.

## 1.4 FINAL CLEANING

.1 In preparation for acceptance of the Work perform final cleaning.

.2 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.

.3 Broom clean exterior paved and concrete surfaces; rake clean other surfaces of grounds.

**END OF SECTION**

# PART 1 - GENERAL

## 1.1 RELATED SECTIONS

.1 Section 01 35 43 - Environmental Procedures.

.2 Section 02 41 16 - Sitework, Demolition and Removal.

.3 Section 03 30 00 - Cast-in-Place Concrete.

## 1.2 WASTE MANAGEMENT PLAN

.1 Prior to commencement of work, prepare waste Management Workplan.

.2 Workplan to include:
- .1 Waste audit.
- .2 Waste reduction practices.
- .3 Material source separation process.
- .4 Procedures for sending recyclables to recycling facilities.
- .5 Procedures for sending non-salvageable items and waste to approved waste processing facility or landfill site.
- .6 Training and supervising workforce on waste management at site.

.3 Workplan to incorporate waste management requirements specified herein and in other sections of the Specifications.

.4 Develop Workplan in collaboration with all subcontractors to ensure all waste management issues and opportunities are addressed.

.5 Submit copy of Workplan to Departmental Representative for review and approval.
- .1 Make revisions to Plan as directed by Departmental Representative.

.6 Implement and manage all aspects of Waste Management Workplan for duration of work.

.7 Revise Plan as work progresses addressing new opportunities for diversion of waste from landfill.

## 1.3 WASTE AUDIT

.1 At project start-up, conduct waste audit of:
- .1 Site conditions identifying salvageable and non-salvageable items and waste resulting from demolition and removal work.
- .2 Projected waste resulting from product packaging and from material leftover after installation work.

.2 Develop written list. Record type, composition and quantity of various salvageable items and waste anticipated, reasons for waste generation and operational factors which contribute to waste.

## 1.4 WASTE REDUCTION

.1 Based on waste audit, develop waste reduction program.

.2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.

.3 Identify materials and equipment to be:
- .1 Protected and turned over to Departmental Representative when indicated.
- .2 Salvaged for resale by Contractor.
- .3 Sent to recycling facility.
- .4 Sent to waste processing/landfill site for their recycling effort.
- .5 Disposed of in approved landfill site.

.4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
- .1 Use of a central cutting area to allow for easy access to off-cuts;
- .2 Use of off-cuts for blocking and bridging elsewhere.
- .3 Use of effective and strategically placed facilities on site for storage and staging of left-over or partially cut materials (such as gypsum board, plywood, ceiling tiles, insulation, etc.) to allow for easy incorporation into work whenever possible avoiding unnecessary waste.

.5 Develop other strategies and innovative procedures to reduce waste such as minimizing the extent of packaging used for delivery of materials to site, etc.

## 1.5 MATERIAL SOURCE SEPARATION PROCESS

.1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at site.

.2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
- .1 Use suitable containers for individual collection of items based on intended purpose.
- .2 Locate to facilitate deposit but without hindering daily operations of existing building tenants.

.3 Clearly mark containers and stockpiles as to purpose and use.

.3 Perform demolition and removal of existing structure components and equipment following a systematic deconstruction process.

.1 Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:

.1 Reinstallation into the work where indicated.

.2 Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site.

.3 Sending as many items as possible to locally available recycling facility.

.4 Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.

.4 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.

.5 Send leftover material resulting from installation work for recycling whenever possible.

.6 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course of work are properly isolated, stored on site and disposed of in accordance with applicable laws and regulations from authorities having jurisdiction.

.7 Isolate and store existing materials and equipment identified for re-incorporation into the Work. Protect against damage.

## 1.6 WORKER TRAINING AND SUPERVISION

.1 Provide adequate training to workforce, through meetings and demonstrations, to emphasize purpose and worker responsibilities in carrying out the Waste Management Plan.

.2 Waste Management Coordinator: designate full-time person on site, experienced in waste management and having knowledge of the purpose and content of Waste Management Plan to:

.1 Oversee and supervise waste management during work.

.2 Provide instructions and directions to all workers and subcontractors on waste reduction, source separation and disposal practices.

.3 Post a copy of Plan in a prominent location on site for review by workers.

## 1.7 CERTIFICATION OF MATERIAL DIVERSION

.1 Submit to Departmental Representative, copies of certified weigh bills from authorized waste processing sites and sale receipts from recycling/reuse facilities confirming receipt of building materials and quantity of waste diverted from landfill.

.2 Submit data at pre-determined project milestones as determined by Departmental Representative.

.3 Compare actual quantities diverted from landfill with projections made during waste audit.

## 1.8 DISPOSAL REQUIREMENTS

.1 Burying or burning of rubbish and waste materials is prohibited.

.2 Disposal of waste, volatile materials, mineral spirits, oil, paint, paint thinner or unused preservative material into waterways, storm, or sanitary sewers is prohibited.

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

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

.5 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.

.6 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

.7 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

.8 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.

.9 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.

.10 Sale of salvaged items by Contractor to other parties not permitted on site.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Project Record Documents as follows:
- .1 As-built drawings;
- .2 As-built specifications;
- .3 Reviewed shop drawings.

### 1.2 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide two (2) white print sets of contract drawings and two (2) copies of Specifications Manual specifically for "as-built" purposes.

.2 Maintain at site one (1) set of the contract drawings and specifications to record actual as-built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative at any time during construction.

.4 As-Built Drawings:
- .1 Record changes in red ink on the prints. Mark only on one (1) set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Departmental Representative. All drawings of both sets shall be stamped "As-built Drawings" and be signed and dated by Contractor.
- .2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
- .3 Record following information:
  - .1 Horizontal and vertical location of various elements in relation to Geodetic Datum.
  - .2 Field changes of dimension and detail.
  - .3 All design elevations, sections, and details dimensioned and marked-up to consistently report finished installation conditions.
  - .4 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document.
  - .5 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction,

including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Departmental Representative's discretion. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

## 1.3 REVIEWED SHOP DRAWINGS

.1 Compile two (2) full sets of all reviewed shop drawings.

## 1.4 OPERATIONS AND MAINTENANCE MANUALS

.1 Provide three (3) copies of operations and maintenance manuals for all equipment installed in the works as applicable.

**END OF SECTION**

## PART l - GENERAL

### 1.1 DESCRIPTION

.1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed .Section01 33 00-SubmittalProcedures.

.2 Demolition and removal will consist of, but not necessarily be limited to, the following:

.1 Demolition and removal of all existing electrical conduits and wiring, teck cables, light fixtures, receptacles, and existing electrical service as indicated on the drawings.

.2 Trenching through the existing concrete deck, to route new conduit to the jib crane and light poles as indicated on drawings.

Contractor responsible for determining an approved waste site for all demolished materials. Obtain permission from Service NL for the disposal of all materials. Note that an approved waste site may not be locate in close proximity to the project site.

### 1.2 GENERAL REQUIREMENTS

.1 A Notice to Shipping is to be issued prior to commencement and upon completion of work.

.2 During construction, any vessels or barges utilized must be marked in accordance with the provisions of the Canada Shipping Act Collision Regulations.

.3 Upon completion of the project, a written Notice to Mariners must be issued.

### 1.3 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 Canada .

.2 Place a floating boom around entire demolition site to prevent loss of any materials .

.3 Remove all floating debris from water on a routine and timely basis.

## PART 2- PRODUCTS

NOT APPLICABLE

## PART 3- EXECUTION

### 3.1 EXECUTION

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

.2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.

### 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.

### 3.3 DISPOSAL OF MATERIAL

.1 All demolished materials, except materials designated to be reused, will become property of contractor and will be removed from site and disposed of to satisfaction of Departmental Representative and in accordance with environmental guidelines. It is the sole responsibility of the contractor to dispose of all demolished materials at an approved disposal site. Ensure that disposal site is approved and willing to accommodate any materials disposed of from work site.

.2 Contractor shall obtain and pay for all necessary permits and disposal fees for use of an approved waste disposal site.

### 3.4 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.

# PART l - GENERAL

## 1.1 RELATED SECTIONS

.1 Section 03 30 00 – Cast-in-Place Concrete

## 1.2 REFERENCES

.1 American Concrete Institute (ACI)
- .1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure .

.2 American National Standards Institute/American Concrete Institute (ANSI/ACI)
- .1 ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement

.3 American Society for Testing and Materials International. (ASTM)
- .1 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 ASTM A497/A497M-07, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete .
- .3 ASTM-A123/Al23M-09, Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

.4 Canadian Standards Association (CSA)
- .1 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction .
- .2 CSA-A23.3-04(R2010), Design of Concrete Structures .
- .3 CAN/CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .4 CSA-G40. 20-04/G40. 21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CSA Wl86-Ml990 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

## 1.3 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of

Canada. ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

## 1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and the Waste Reduction Workplan.

# PART 2- PRODUCTS

## 2.1 MATERIALS

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

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

.3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-30. 18.

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

.5 Welded steel wire fabric: to CSA G30.5 . Provide in flat sheets only.

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

.7 Mechanical splices: subject to approval of Departmental Representative.

## 2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.l, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.

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

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA Wl86.

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

## 2.3 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to commencing reinforcing work .

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

# PART 3- EXECUTION

## 3.1 FIELD BENDING

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

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

.3 Replace bars which develop cracks or splits.

## 3.2 PLACING REINFORCEMENT

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

.2 Use approved type chairs to locate the reinforcing steel at the proper grade.

.3 Tie reinforcement where spacing in each direction is:
- .1 Less than 300 mm: tie at alternate intersections.
- .2 300 mm or more: tie at each intersection.

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

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

## 3.3 CLEANING

.1 Clean reinforcing before placing concrete to CAN/CSA-A23.l.

## PART l - GENERAL

### 1.1 DESCRIPTION

.1 This section specifies requirements for supply, placing, finishing, protecting and curing cast-in-place concrete for repairs to existing deck.

### 1.2 RELATED SECTIONS

**.1** Section 03 20 00 - Concrete Reinforcing

### 1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM Cl09/Cl09M-08, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens).
- .2 ASTM C260/260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
- .3 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51. 34-M86, Vapour Barrier, Polyethylene Sheet f6r Use in Building Construction.

.3 Canadian Standards Association (CSA)
- .1 CAN/CSA-A23.l-09, Concrete Materials and Methods of Concrete Construction.
- .2 CAN/CSA-A23. 2-09, Methods of Test for Concrete.
- .3 CSA-A283-06, Qualification Code for Concrete Testing Laboratories.
- .4 CAN/CSA-A3000-08, Cementitious Materials Compendium (consists of A3001, A3002, A3003, A3004 and A3005).

### 1.4 CERTIFICATES

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

.2 Minimum 2 weeks prior to starting concrete work submit to Departmental Representative manufacturer' s test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified

requirements:
.1 Portland cement.
.2 Blended hydraulic cement.
.3 Supplementary cementing materials.
.4 Grout.
.5 Admixtures.
.6 Aggregates.
.7 Water.
.8 Joint filler.
.9 Joint Sealant.

.3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

.4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

## 1.5 STORAGE OF MATERIALS

.1 Store materials to prevent contamination or deterioration.
.2 Provide adequate storage facilities for materials to ensure a continuous supply of these materials during batching operations.
.3 Store cement in weathertight facility.

## 1.6 QUALITY ASSURANCE

.1 Minimum 2 weeks prior to starting concrete work, submit proposed quality control procedures to Departmental Representative for the following items:
.1 Cold weather concrete.
.2 Curing.
.3 Finishes.
.4 Formwork removal.
.5 Joints.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Use trigger operated spray nozzles for water hoses.

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

.3 Carefully coordinate the specified concrete work with weather conditions.

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

.5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid

or solidify liquid with an inert, noncombustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

.6 Choose least harmful, appropriate cleaning method which will perform adequately.

## 1.8 MEASUREMENT FOR PAYMENT

.1 This portion of the work will not be measured for payment but will be included in the Lump Sum amount of the contract.

# PART 2- PRODUCTS

## 2.1 MATERIALS

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

.2 Supplementary cementing materials: to CAN/CSA-A3001 .

.3 Cementitious hydraulic slag: to CAN/CSA- A3001 .

.4 Water: to CAN/CSA-A23.1 .

.5 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density .

.6 Air entraining admixture: to ASTM C260 .

.7 Chemical admixtures: to ASTM C494/C494M.

Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing .

.8 Concrete retarders: to ASTM C494/C494M. Do not allow moisture of any kind to come in contact with the retarder film.

.9 Curing compound: curing compounds are not to be used .

.10 Premoulded joint fillers:
.1 Sponge rubber: to ASTM D1752, Type I, flexible grade.

## 2.2 MIXES

.1 Proportion concrete in accordance with CAN/CSA-A23.1, Clause 4.3 .

.2 Proportion concrete to comply with Alternate 1, Table 2 in CAN/CSA-A23.1 and following requirements:

.1 Cement:

.1 Type GU Portland cement.

.2 Minimum compressive strength: 35 MPa at 28 days.
.3 Class of exposure: Cl .
.4 Minimum cement content: 385 kg/$m^3$ of concrete.
.5 20 mm nominal size coarse aggregate.
.6 Air content 5% to 8% .
.7 Density of air-dry concrete in range of 2240 kg/$m^3$ to 2400 kg/$m^3$
.8 Slump at time and point of discharge 50 mm to 100 mm.

.3 When the Contractor wishes to purchase concrete from a ready mix concrete supplier, submit a letter from the supplier certifying the following:

.1 That plant and equipment is certified and all materials to be used in the concrete comply with the requirements of CAN/CSA-A23. 1.
.2 That the mix proportions selected will produce concrete of the specified quality and yield. Indicate mix proportions and sources of all materials.
.3 That the strengths will comply with the strengths specified herein.

.4 When the Contractor wishes to mix concrete on site, identify the source of aggregates and submit samples of fine and coarse aggregates to a testing laboratory for testing and trial mixes in order to determine a suitable mix design. The testing laboratory, at Contractor's cost, will test the trial mix for slump, air content, density and strength. The results of these tests will be submitted to the Departmental Representative to be reviewed for compliance with the specification. This review must be completed before permission to place concrete is given.

.1 The sand, gravel, water and air entraining agent should be mixed prior to the addition of cement and water reducer.

.5 Weigh aggregates, cement, water and admixture when batching. No alternative methods of measuring will be permitted.

.6 Do not use calcium chloride.

## PART 3- EXECUTION

### 3.1 PREPARATION

.1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Pumping of concrete is permitted only after approval of equipment and mix.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 Do not place load upon new concrete until authorized by Departmental Representative

## 3.2 CONSTRUCTION

.1 Comply with additional requirements of CAN/CSA-A23.1, Clause 4.1.1.5, for concrete exposed to seawater environments .

.2 Minimum concrete cover over reinforcing steel bars to be 75 mm.

.3 Place concrete in hot weather to CAN/CSA- A23. 1.

.4 Place concrete in cold weather to CAN/CSA- A23 .1.

.5 Keep concrete surfaces moist continually during protection stage.

.6 Place, consolidate, finish, cure and protect concrete to CAN/CSA-A23.1.

.7 Do not commence placing concrete until Departmental Representative has inspected and approved forms, foundations, reinforcing steel, joints, conveying, spreading, consolidation and finishing equipment and curing and protective methods.

## 3.3 FORMWORK

.1 Install and strip formwork to CAN/CSA- A23 .1.

## 3.4 INSERTS

.1 Position and secure anchor bolts in formwork to maintain line and grades.

## 3.5 CONTROL JOINTS

.1 Construct control joints in locations shown on drawings or directed by Departmental Representative .

.2 All joints will be centred over a support. Joints will be made in a perfectly straight line .

.3 Cut control joint when concrete has hardened.

.4 Fill saw cut with joint sealer as specified.

## 3.6 PLACING CONCRETE

.1 Place and consolidate concrete to CAN/CSA- A23 .1.

.2 Do not place concrete on or against frozen material .

.3 Place concrete continuously from joint to joint .

.4 Place concrete in a uniform heading, normal to the centreline. Limit rate of placing to that which can be finished before beginning of initial set.

## 3.7 STRIKE OFF AND CONSOLIDATION

.1 High speed internal poker vibrators shall be used to consolidate the concrete during placing. Final compaction of the surfaces shall be done by beam-type vibratory air screed as approved by Departmental Representative. A surcharge of approximately 65 mm of concrete will be maintained at the screed face during consolidation.

.2 Strikeoff and consolidation must be completed before excess water bleeds to the surface.

.3 Ensure that the concrete deck conforms to the elevations and slopes as shown on the drawings so that satisfactory drainage will result.

## 3.8 FINISHING

.1 Only ACI certified or other pre-approved concrete finishers are to be utilized in finishing all concrete works. All work is to be finished to CAN/CSA-A23.1, and as specified below.

.2 The surface will be brought to the specified level by means of darbying or bull floating which will be carried out immediately following screeding and must be completed before any bleed water is present on the surface. Surface tolerance to be 8 mm under a 3 metre straight edge.

.3 Provide slope as shown on the drawings to permit proper drainage of the concrete deck.

.4 Finish slabs to elevations indicated on drawings.

.5 Strike off the surface with a straight edge.

.6 Hand tamp low slump concrete with jitterbug.

.7 Darby or bull float the surface to smooth and level the concrete.

.8 Allow bleed water or sheen to disappear.

.9 Float the surface by means of power and/or hand float where the concrete has hardened enough for a man to leave only slight footprints on the surface.

.10 Do not bring water and fines to the surface by over floating. Where extra floating is required the floating operation shall be repeated after the time interval necessary for any sheen to disappear and for concrete to set further.

.11 Steel trowel the concrete surfaces by means of power and/or hand trowel. Do not leave any hard, smooth, polished or burnished surface area.

.12 Do not bring water and fines to the surface by overtrowelling .

.13 After slight interval necessary for concrete to further harden, repeat the trowelling operation.

.14 Lightly broom surface with a soft bristle broom obtaining a fine and even textured finish with a non-slip finish. All brush strokes to be parallel across paving.

.15 The surface shall be true and accurate to a maximum tolerance of 1 mm in 500 mm.

## 3.9 PROTECTION AND CURING

.1 Cure to CAN/CSA-A23.1.

.2 Cure concrete by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least 7 days after placement. After finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by whatever curing medium is applicable to local conditions and approved by the Departmental Representative. The edges of concrete slabs exposed by removal of forms shall be protected with continuous curing treatment equal to the method selected for curing the slab and curb surfaces. Cure to CAN/CSA-A23.1. Have the equipment needed for adequate curing at hand and ready to install before actual concrete placement begins.

.3 When air temperature is at or below 5°C or when there is a probability of its falling to that limit within 24 hours of placing (as forecast by the nearest official meteorological office) cold weather protection as per CAN/CSA-A23.1 will be provided and the following:

.1 Housing - Protect concrete by a windproof shelter of canvas or other material to allow free circulation of inside air around fresh touch formwork and provide

sufficient space for removal of formwork for finishing. Supply approved heating equipment capable of keepinginside air at a constant temperature sufficiently high to maintain concrete at following curing temperatures .

.1 For initial 3 days at a temperature of not less than l5°C nor more than 27°C at surface .

.2 Maintain concrete at 10°C for an extra 4 days plus the initial 3 days.

.3 In addition to the protective housing, the concrete must be cured as outlined in Clause 3.9.2 above.

## 3.10 TESTING

.1 Departmental Representative will appoint a concrete testing company to test all work under this section of specification as per CAN/CSA-A23.1.

.2 Cost of compressive strength tests shall be paid for by the Departmental Representative.

.3 Testing company shall issue reports to Departmental Representative on quality of test cylinders.

.4 Notify Departmental Representative at least 7 days prior to start of placing concrete. Provide for testing purposes an adequate quantity of approved test cylinders.

.5 At least 1 set of 3 cylinders each shall be taken from 25 $m^3$ or fraction thereof of each day's pour, whichever is less. 1 cylinder shall be tested at 7 days and other 2 tested at 28 days.

.6 Crate cylinders and deliver to the testing laboratory within 48 hours after casting in accordance with CAN/CSA-A23.1. Contractor will pay for crating and delivery of cylinders to the laboratory.

.7 If strength tests of test cylinder for any portion of the work falls below the specified compressive strength at 28 days, the Departmental Representative reserves the right to determine the acceptability of the concrete by performing additional field testing as outlined in CAN/CSA-A23 .1.

.8 If concrete does not conform to drawings or specifications, take measures as directed to correct the deficiency. All costs of correctional measures will be at the expense of the Contractor.

# PART 1 GENERAL

## 1.1 GENERAL

.1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1.

## 1.2 REFERENCES

.1 Canadian Standards Association (CSA)

- .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- .2 CAN/CSA-22.3 No. 1, Overhead Systems.
- .3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

## 1.3 MEASUREMENT FOR PAYMENT

All cost for each section of Division 26, Electrical Specifications, shall be included in the lump sum arrangement as noted on the bid and acceptance form.

## 1.4 CARE, OPERATION AND START-UP

.1 Instruct Department's Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

.2 Operating instructions to include following:

- .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
- .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
- .3 Safety precautions.
- .4 Procedures to be followed in event of equipment failure.
- .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

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

.4 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 all aspects of its care and operation.

## 1.5 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

## 1.6 SUBMITTALS

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.

.3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

.5 Quality Control: in accordance with Section 01 45 00 - Quality Control.

.1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.

.2 Submit test results of installed electrical systems and instrumentation.

.3 Submit, upon completion of Work, load balance report as described in PART 3 – LOAD BALANCE.

.4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Department’s Representative.

.6 Manufacturer's Field Reports: submit to Department’s Representative within 7 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

## 1.7 PERMITS, FEES AND INSPECTION

.1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Department's Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.

.4 Notify Department's Representative of changes required by Electrical Inspection Division prior to making changes.

.5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Department's Representative.

## 1.8 CO-ORDINATION

.1 Co-ordinate work with work of other divisions to avoid conflict.

.2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.

.3 Locate all existing underground services and make all parties aware of their existence and location.

.4 Where interference occurs, Department's Representative must approve relocation of equipment and materials regardless of installation order.

.5 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division. The Department's Representative shall decide the extent of relocation required.

## 1.9 CUTTING AND PATCHING

.1 Inform all other divisions in time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1. Obtain written approval of Structural engineer before drilling any beams or floors.

## 1.10 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark all live parts “LIVE 120 VOLTS”, or with appropriate voltage in English.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

## 1.11 RECORD DRAWINGS

.1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Have the white prints available for inspection at the site at all times and present for scrutiny at each job meeting.

.2 Show on the record drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and building.

.3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.

.4 Submit record drawings within 30 days prior to start of commissioning.

## 1.12 INSPECTION OF WORK

.1 The Department’s Representative will make periodic visits to the site during construction to ascertain reasonable conformity to plans and specifications but will not execute quality control. The Contractor shall be responsible for the execution of his work in conformity with the construction documents and with the requirements of the inspection authority.

## 1.13 SCHEDULING OF WORK

.1 Work shall be scheduled in phases as per other divisions of the architectural specifications.

.2 Become familiar with the phasing requirements for the work and comply with these conditions.

.3 No additional monies will be paid for contractor’s requirement to comply with work phasing conditions.

## 1.14 FIRE RATING OF PENETRATIONS

.1 Maintain fire ratings around conduits passing through floors, ceilings and fire rated walls.

.2 Use 3M brand or equal fire barrier products at each penetration.

.3 Acceptable products for fire barrier products shall be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.

.4 Acceptable manufacturers: Nelson, Fire Stop Systems, 3M or approved equal. Material of same manufacturer to be used throughout project.

# PART 2 PRODUCTS

## 2.1 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Supplier and installer responsibility is indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings, where applicable.

.2 Control wiring and conduit is specified in Division 26.

## 2.2 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division.

.3 Factory assemble control panels and component assemblies.

## 2.3 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.

.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

## 2.4 WARNING SIGNS

.1 As specified and to meet requirements of Electrical Inspection Department and Department's Representative.

.2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

## 2.5 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

## 2.6 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white core, mechanically attached with self tapping screws.

.2 Sizes as follows:

NAMEPLATE SIZES

| | | | |
|---|---|---|---|
| Size 1 | 10 x 50 mm | 1 line | 3 mm high letters |
| Size 2 | 12 x 70 mm | 1 line | 5 mm high letters |
| Size 3 | 12 x 70 mm | 2 lines | 3 mm high letters |
| Size 4 | 20 x 90 mm | 1 line | 8 mm high letters |
| Size 5 | 20 x 90 mm | 2 lines | 5 mm high letters |
| Size 6 | 25 x 100 mm | 1 line | 12 mm high letters |
| Size 7 | 25 x 100 mm | 2 lines | 6 mm high letters |

.2 Labels:

.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Department's Representative prior to manufacture.

.4 Allow for average of twenty-five (25) letters per nameplate and label.

.5 Identification to be English (and French where applicable).

.6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.

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

.8 Terminal cabinets and pull boxes: indicate system name and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages and transformer number.

## 2.7 WIRING IDENTIFICATION

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

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1, Canadian Electrical Code.

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

# PART 3 EXECUTION

## 3.1 NAMEPLATES AND LABELS

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

## 3.2 LOCATION OF OUTLETS

.1 Locate outlets in accordance with drawings.

## 3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

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

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

## 3.4 MOUNTING HEIGHTS

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

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

.3 Install electrical as indicated on drawings.

## 3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

## 3.6 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.

.3 Load Balance:

.1 Measure phase current to panelboard with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

.4 Conduct and pay for following tests:

.1 Power generation and distribution system including phasing, voltage, grounding and load balancing.

.2 Circuits originating from branch distribution panels.

.3 Lighting and its control.

.4 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.

.5 Systems: fire alarm system, communications.

.5 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.6 Insulation resistance testing.

.1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing and record value.

.7 Carry out tests in presence of Department's Representative.

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

## 3.7 CLEANING

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

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

**END OF SECTION**

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

.1 Materials and installation for wire and box connectors.

## 1.2 RELATED SECTIONS

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

## 1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2 No.65, Wire Connectors.

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

# PART 2 PRODUCTS

## 2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for copper bar.

.3 Stud clamp bolts.

.4 Bolts for copper bar.

.5 Sized for conductors and bars as indicated.

.4 Clamps or connectors for armoured cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

## 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. Replace insulating cap.

.3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 RELATED SECTIONS

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

.2 Refer to drawings for wiring type required under different applications.

## 1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.

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

# PART 2 PRODUCTS

## 2.1 BUILDING WIRES

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

.2 Copper: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated. Provide RWU90 XLPE rated cable for underground wiring. Related to new service entrance feeders and site lighting circuits. RWU90 XLPE not required under interior floor slabs.

.3 Copper conductors: size as indicated, with thermoplastic insulation type TWH rated at 600 V, typically used for insulated ground wires.

## 2.2 TECK Cable

.1 Cable: to CAN/CSA-C22.2 No. 131.

.2 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Cross-linked polyethylene XLPE, rating – 600 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: interlocking aluminum, compliant to applicable Building Code classification for this project.

.6 Overall covering: thermoplastic polyvinyl chloride material.

.7 Fastenings:

.1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 1500 mm centers.

.3 Threaded rods: 6 mm dia. to support suspended channels.

.8 Connectors:

.1 Watertight and/or type approved for TECK cable, as indicated.

## 2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Connectors: standard as required, complete with double split rings.

# PART 3 EXECUTION

## 3.1 FIELD QUALITY CONTROL

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

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

.3 Perform tests before energizing electrical system.

## 3.2 GENERAL CABLE INSTALLATION

.1 Install cable in trenches as per details on drawings.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.3 Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.

.4 Conductor length for parallel feeders to be identical.

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

## 3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34- Conduits, Fastenings and Fittings.

.2 In underground ducts in accordance with Section 26 05 43.01- Installation of Cables in Ducts.

.3 In trenches in accordance with Section 26 05 43.01- Installation of Cables in Trenches.

## 3.4 INSTALLATION OF TECK CABLE 0 -1000 V

.1 Install cables.

.1 Group cables wherever possible on channels.

.2 Install cable concealed, securely supported by straps and hangers.

## 3.5 INSTALLATION OF ARMOURED CABLES (AC-90)

.1 Group cables wherever possible.

.2 Use permitted only for work in movable partitions and vertical power supply drops to lighting fixtures.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 RELATED SECTIONS

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

.2 Grounding conductors for all distribution grounding to be insulated copper, uninsulated where in contact with earth. Copper conductors shall, at a minimum, be used in the following areas: grounding of transformer neutrals, service entrance switch ground of neutral, padmount transformer grounding, ground rider conductors from main ground station to sub-closets, telephone and data system grounds and circuits rated less than 60 amps.

## 1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA)

.1 CAN/CSA Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities, where applicable.

# PART 2 PRODUCTS

## 2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as indicated to electrically conductive underground water pipe.

.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.

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

.4 Plate electrodes: copper, surface area 0.2 $m^2$, 1.6 mm thick.

.5 Grounding conductors: bare stranded copper, soft annealed, size as indicated.

.6 Insulated grounding conductors: green, type TW.

.7 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

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

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors, as required by local authority having jurisdiction.

.4 Thermit welded type conductor connectors, as indicated.

.5 Bonding jumpers, straps.

.6 Pressure wire connectors.

## PART 3 EXECUTION

### 3.1 INSTALLATION GENERAL

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

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

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.

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

.6 Soldered joints not permitted.

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

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

.9 Install separate ground conductor to outdoor lighting standards.

.10 Connect building structural steel and metal siding to ground by welding copper to steel.

.11 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.12 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

.13 Ground secondary service pedestals.

## 3.2 ELECTRODES

.1 Make ground connections to continuously conductive underground water pipe on street side of water meter.

.2 Install water meter shunt.

.3 Install concrete encased electrodes in building foundation footings, with terminal connected to grounding network.

.4 Install rod, plate electrodes and make grounding connections.

.5 Bond separate, multiple electrodes together.

.6 Use size 6 AWG copper conductors for connections to electrodes as required by code.

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

## 3.3 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral of primary 600 V system, secondary 208 V system.

## 3.4 EQUIPMENT GROUNDING

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

## 3.5 GROUNDING BUS

.1 Install copper grounding bus mounted on insulated supports on wall of electrical room.

.2 Ground items of electrical equipment in electrical room to ground bus with individual bare stranded copper connections size as required by code.

## 3.6 PERMAFROST

.1 Bond non-current carrying metal parts together with size 3/0 AWG copper equipotential conductor. Run conductor from separate lug or service neutral bar to, but not necessarily limited to, following indoor systems and equipment:

.1 Hot water heating system.

.2 Main water pipe.

.3 Main building drain.

.4 Oil line.

.5 Telephone, radio/tv, emergency and fire alarm lead-in or service conduits, near panels.

.6 Make connections to pipes on building side of main valves and tanks. Connect jumpers across boilers to supply and return hot water heating pipes.

.2 Drive three -19 mm diam x 3 m copper clad ground rods at least 1.8 m apart in original undisturbed ground. If rods will not penetrate permafrost, drive at angle not more than $60^{o}$ from vertical, and in same direction. Rods must be driven, not trenched.

.3 Install ground wire from service neutral bar to rods and where buried use bare copper not smaller than size 1AWG7- strand or size 4AWG solid, and at least 460 mm below ground. Bond ground conductor, or short tap from it, to outside metal sheathing of building close to power service conduit. Use lug or cast clamp, with bronze or plated bolt, nut and washers (not sheet metal screw or wood screw). Remove paint from sheathing for good contact. Conduit is required only on outside wall of building. Indoors, run bare and fasten as specified for equipotential bonding wire.

.4 Install electrode interconnections where metal parts, circuits or grounding conductors and/or electrodes are in proximity to lightning rod conductors.

## 3.7 FIELD QUALITY CONTROL

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

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

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 REALTED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 26 05 00 – Common Work Results – Electrical.

## 1.2 SUBMITTALS

.1 Submit shop drawings and product data for cabinets.

.2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.

# PART 2 PRODUCTS

## 2.1 SPLITTERS

.1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.

.3 At least three spare terminals on each set of lugs in splitters less than 400 A.

## 2.2 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

## 2.3 CABINETS

.1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.

.2 Type T: sheet steel cabinet, with hinged door, latch, lock, 2 keys, containing 19 mm fir plywood backboard for surface flush mounting.

# PART 3 EXECUTION

## 3.1 SPLITTER INSTALLATION

.1 Install splitters and mount plumb, true and square to the building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

## 3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m 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 30 m of conduit run between pull boxes.

## 3.3 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.

.2 Install size 2 identification labels indicating system name voltage and phase.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 34 – Conduits, Conduit Fastenings and Fittings.

## 1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.1, Canadian Electrical Code, Part 1.

# PART 2 PRODUCTS

## 2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm 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.

.5 347 V outlet boxes for 347 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

## 2.2 GALVANIZED STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

## 2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

## 2.4 CONCRETE BOXES

.1 Electro-glavanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

## 2.5 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

## 2.6 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

.5 Double split rings for AC-90 terminations.

## 2.7 SERVICE FITTINGS

.1 'High tension' receptacle fitting made of 2 piece die-cast aluminum with brushed aluminum housing finish for 1 duplex receptacles. Bottom plate with two knockouts for centered or offset installation.

.2 Pedestal type 'low tension' fitting made of 2 piece die cast aluminum with brushed aluminum housing finish to accommodate two amphenol jack connectors.

## 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 debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.

.2 CSA C22.2 No. 45, Rigid Metal Conduit.

.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83, Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.

## 1.2 SUBMITTALS

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

.1 Submit cable manufacturing data.

.2 Quality assurance submittals:

.1 Test reports: submit certified test reports.

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

.3 Instructions: submit manufacturer's installation instructions.

# PART 2 PRODUCTS

## 2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.4 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

.6 Flexible PVC conduit: to CAN/CSA-C22.2 No. 227.3,

## 2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5 m oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

## 2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where $90^{o}$, $45^{o}$ or $22.5^{o}$ bends are required for 25 mm and larger conduits.

.3 Ensure conduit bends other than factory “ells” are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.

.4 Connectors and couplings for EMT. Steel set-screw type, size as required.

## 2.4 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.

## 2.5 FISH CORD

.1 Polypropylene.

## PART 3 EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

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

### 3.2 INSTALLATION

.1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the CSA/UL certification of these components.

.2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

.4 Surface mount conduits except in finished areas or as indicated.

.5 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.

.6 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.

.7 Use rigid PVC conduit underground and buried in or under concrete slab on grade.

.8 Use flexible metal conduit for connection to motors in dry areas connection to recessed incandescent fixtures without a prewired outlet box connection to surface or recessed fluorescent fixtures work in movable metal partitions.

.9 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.10 Use AC-90 for vertical power supply drops to light fixtures.

.11 Use explosion proof flexible connection for connection to explosion proof motors.

.12 Install conduit sealing fittings in hazardous areas. Fill with compound.

.13 Minimum conduit size for lighting and power circuits: 19 mm. 12 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.

.14 Install EMT conduit from computer room branch circuit panel to outlet boxes located in sub floor.

.15 Install EMT conduit from computer room branch circuit panel to junction box in sub-floor immediately below panel. Run flexible conduit from junction box to outlet boxes for each computer in sub-floor.

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

.17 Mechanically bend steel conduit over 19 mm dia.

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

.19 Install fish cord in empty conduits.

.20 Run 2 - 25 mm spare conduits up to ceiling space and 2 - 25 mm spare conduits down to ceiling space from each flush panel. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in flush concrete type box.

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

.22 Dry conduits out before installing wire.

## 3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

## 3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

## 3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one third of slab. Use rigid PVC conduit.

.2 Protect conduits from damage where they stub out of concrete. Use rigid steel conduit for stub-up and adapt to in floor rigid PVC conduit.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Do not place conduits is slabs in which slab thickness is less than 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

## 3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Run conduits 25 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

## 3.7 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

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

## 3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 RELATED SECTIONS

.1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

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

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

## 1.2 REFERENCES

.1 Canadian Standards Association, (CSA)

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

# PART 2 EXECUTION

## 2.1 DIRECT BURIAL OF CABLES

.1 After sand bed specified in Section 31 23 10 - Excavating, Trenching and Backfilling, is in place, lay cables maintaining 75 mm clearance from each side of trench to nearest cable. Do not pull cable into trench.

.2 Provide offsets for thermal action and minor earth movements. Offset cables 150 mm for each 60 m run, maintaining minimum cable separation and bending radius requirements.

.3 Make termination and splice only as indicated leaving 0.6 m of surplus cable in each direction.

.1 Make splices and terminations in accordance with manufacturer's instructions using approved splicing kits.

.4 Underground cable splices not acceptable.

.5 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.

.6 Cable separation:

.1 Maintain 75 mm minimum separation between cables of different circuits.

.2 Maintain 300 mm horizontal separation between low and high voltage cables.

.3 When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position.

.4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables.

.5 Maintain 300 mm minimum lateral and vertical separation for fire alarm and control cables when crossing other cables, with fire alarm and control cables in upper position.

.6 Install treated planks on lower cables 0.6 m in each direction at crossings.

.7 After sand protective cover is in place, install continuous row of 50mm wide yellow warning tape as indicated to cover length of run.

## 2.2 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.1 Do not pull spliced cables inside ducts.

.2 Install multiple cables in duct simultaneously.

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

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

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

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

## 2.3 FIELD QUALITY CONTROL

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

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

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

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

.5 Pre-acceptance tests.

.1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.

.2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

.6 Acceptance Tests

.1 Ensure that terminations and accessory equipment are disconnected.

.2 Ground shields, ground wires, metallic armour and conductors not under test.

.3 High Potential (Hipot) Testing.

.1 Conduct hipot testing at 100 % of original factory test voltage in accordance with manufacturer's recommendations.

.4 Leakage Current Testing.

.1 Raise voltage in steps from zero to maximum values as specified by manufacturer for type of cable being tested.

.2 Hold maximum voltage for specified time period by manufacturer.

.3 Record leakage current at each step.

.7 Provide Department’s Representative with list of test results showing location at which each test was made, circuit tested and result of each test. Include results in Commissioning Manual.

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

**END OF SECTION**

## PART 1 GENERAL

## PART 2 PRODUCTS

### 2.1 EQUIPMENTS

.1 Enclosed circuit breaker: to Section 26 28 16.02 - Moulded Case Circuit Breakers, rating as indicated.

.2 Panelboard breaker type: to Section 26 24 16.01 - Panelboards Breaker Type, rating as indicated.

.3 Cabinet type 'A' for utility revenue metering Junction box, Pull box, Splitter box: to Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets, size as indicated.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Install service equipment.

.2 Connect to incoming service.

.3 Connect to outgoing load circuits.

.4 Make grounding connections in accordance with Section 26 05 28 - Grounding - Secondary.

.5 Make provisions for power supply authority’s metering.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

.1 Materials and installation for standard and custom breaker type panelboards.

## 1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 05 00 – Common Work Results - Electrical.

.3 Section 26 28 16.02 - Moulded Case Circuit Breakers.

## 1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No.29, Panelboards and enclosed Panelboards.

## 1.4 SUBMITTALS

.1 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

# PART 2 PRODUCTS

## 2.1 PANELBOARDS

.1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 250 and 600 V panelboards: bus and breakers rated for 10,000 and 18,000 A (symmetrical) minimum interrupting capacity respectively or as indicated on electrical drawings.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Two keys for each panelboard and key panelboards alike.

.6 Tin plated aluminum bus with neutral of same ampere rating as mains.

.7 Mains: suitable for bolt-on breakers.

.8 Trim with concealed front bolts and hinges.

.9 Trim and door finish: baked grey enamel.

## 2.2 BREAKERS

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.3 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

.4 Lock-on devices for 10% of 15 to 30 A breakers installed as indicated. Turn over unused lock-on devices to Departmental Representative.

.5 Lock-on devices for receptacles, fire alarm clock outlet, emergency, door supervisory, intercom, stairway, exit and night light circuits as indicated.

## 2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.

.2 Nameplate for each panelboard size 4 engraved as indicated.

.3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.

.4 Complete circuit directory with typewritten legend showing location and load of each circuit.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Install surface mounted panelboards on plywood. Where practical, group panelboards on common backboard.

.3 Mount panelboards to height specified in Section 26 05 00 – Common Work Results - Electrical or as indicated.

.4 Connect loads to circuits.

.5 Connect neutral conductors to common neutral bus with respective neutral identified.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 26 05 01.

## PART 2 - PRODUCTS

### 2.1 PEDESTAL RECEPTACLES

.1 120 V, 20 amp, twist-lock, c/w watertight safety shroud and backbox.

.2 240 V, 20 amp twist-lock, c/w water proof cover and matching plug.

.3 240V, 30 amp twist-lock, c/w water proof cover and matching plug.

.4 240V, 50 amp welding receptacle, c/w water proof cover and matching plug.

.5 120V, 15 amp receptacle c/w water proof cover as per C.E.C.

.6 As per drawing layouts

### POLE RECEPTACLES

.1 120V, 15 amp receptacle c/w water proof cover as per C.E.C.

.2 120 V, 20 amp, twist-lock, c/w watertight safety shroud and backbox.

.3 125/250V, 30 amp twist-lock, c/w water proof cover and matching plug.

.4 As per drawing layouts

### 2.2 COVER PLATES

.1 Cover plates for each type of wiring device is to be the product of one manufacturer.

.2 Cover Plates for Receptacles: as noted on drawings.

### 2.3 IDENTIFICATION

.1 Panel, circuit number and voltage for each device is to be affixed to side of each receptacle at pedestals.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

.1 Receptacles:
- .1 Install receptacles pedestals c/w PVC box and weatherproof cover.
- .2 Mount receptacles at height as determined on site.

.2 Cover Plates:
- .1 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

### 3.2 DEVICE LOCATIONS

.1 The exact location of all wiring devices is to be coordinated with the Departmental Representative prior to installation.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 05 00 - Common Work Results – Electrical.

## 1.2 SUBMITTALS

.1 Include time-current characteristic curves for breakers with ampacity of 600 A and over or with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

# PART 2 PRODUCTS

## 2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common-trip breakers: with single handle for multi-pole applications.

.3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 Circuit breakers to have minimum of 10,000 A symmetrical rms interrupting capacity rating.

## 2.2 THERMAL MAGNETIC BREAKERS DESIGN A

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

## 2.3 SOLID STATE TRIP BREAKERS DESIGN C

.1 Moulded case circuit breaker to operate by means of a solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time short time, instantaneous tripping for phase and ground fault short circuit protection.

## 2.4 OPTIONAL FEATURES

.1 Include:

.1 shunt trip.

.2 auxiliary switch.

.3 motor-operated mechanism c/w time delay unit.

.4 under-voltage release.

.5 on-off locking device.

.6 handle mechanism.

## 2.5 ENCLOSURE

.1 Mounted in NEMA 1 type enclosure, sprinkler proof as indicated.

# PART 3 EXECUTION

## 3.1 INSTALLATION

.1 Install circuit breakers as indicated.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 PRODUCT DATA

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

## PART 2 - PRODUCTS

### 2.1 DISCONNECT SWITCHES

.1 Fusible disconnect switch in CSA Enclosure Type 1, size as indicated.

.2 Provision for padlocking in on-off switch position by three (3) locks.

.3 Mechanically interlocked door to prevent opening when handle in ON position.

.4 Fuses: size as indicated, to Section 26 28 14 - Fuses- Low Voltage.

.5 Fuseholders: re-locatable and suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indications on switch enclosure cover.

### 2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 01 - Electrical General Requirements.

.2 Indicate name of load controlling on size 4 nameplate.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

.1 Install disconnect switches complete with fuses.

**END OF SECTION**

# PART 1 GENERAL

## 1.1 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI C82.1, Specification for Flourescent Lamp Ballasts.

.2 ANSI C82.4, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.

.2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE C62.41, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.

.3 American Society for Testing and Materials (ASTM)

.1 ASTM F 1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.

.4 United States of America, Federal Communications Commission (FCC)

.1 FCC (CFR47) EM and RF Interference Suppression.

## 1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

.2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables.

.3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.4 Quality assurance submittals: provide the following in accordance with Section 01 45 00 – Testing and Quality Control.

.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and relamping schedule.

## 1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Disposal of old PCB filled ballasts.

## 1.4 ACCEPTABLE PRODUCTS

.1 Luminaires described in the Lighting Fixture Schedule identify quality, performance criteria and other parameters, as indicated for this project. Named fixtures are acceptable with modifications and accessories, as indicated.

.2 Fixtures from other manufacturers may be acceptable provided:

.1 Appearances and lighting performance are similar.

.2 Quality is equal or better.

.3 Lamp and ballast criteria remain the same.

.4 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.

.5 Approval in writing is obtained from the Departmental Representative to the supplier/manufacturer 5 days prior to tender closing date

# PART 2 PRODUCTS

## 2.1 LAMPS

.1 Incandescent lamps to be - clear, A19, 100 Watt with 1000 hour lamp life, rough-service rated; or as indicated.

.2 Tungsten halogen lamps to be - clear, T-3, 300 Watt, RSC base, 2000 hour lamp life, 5000 lumens; or as indicated.

.3 Fluorescent lamps to be - T8, 32 Watt, medium bi-pin, rapid or instant start to suit application, 4100 K, 30,000 hour lamp life, 2950 initial lumens, CRI 80; or as indicated.

.4 Metal halide lamps to be - clear, BT37, 400 Watt, mogul base, horizontal burn, 4100 K, 15,000 hour lamp life, 36,000 initial lumens, CRI65, open or enclosed type to suit the luminaire; or as indicated.

.5 Low pressure sodium lamps to be - clear, T21, 135 Watt, BY22d base, horizontal burn,16,000 hour lamp life, 22,000 initial lumens; or as indicated.

.6 High pressure sodium lamps to be - clear, ED18, 400 Watt, mogul base, 30,000 hour lamp life, 54,000 initial lumens; or as indicated.

.7 Compact fluorescent lamps to be - 18 Watt, G24q-2 base, 12,000 hour lamp life, 12,000 initial lumens, 4100 K, CRI 80; or as indicated.

## 2.2 BALLASTS

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.

.1 Rating: 120 V, 60Hz as indicated, for use with 2-32W, T8 octron imperial lamps.

.2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.

.3 Totally encased and designed for 40 C ambient temperature.

.4 Power factor: minimum 98 % with 98% of rated lamp lumens.

.5 Crest factor: 1.5 maximum current.

.6 Capacitor: thermally protected.

.7 Thermal protection: non-resettable on coil.

.8 Harmonics: 10 % maximum THD.

.9 Operating frequency of electronic ballast: 20khz minimum.

.10 Total Circuit Power: 62 Watts.

.11 Ballast Factor: greater than 0.90.

.12 Sound rated: Class A.

.13 Mounting: integral with luminaire.

.14 Be warranted by manufacturer for five years.

.2 Metal halide ballast: design B.

.1 Rating: 60Hz voltage as indicated, for use with metal halide lamp as required. Provide circuitry for standby light to provide light for starting and restart.

.2 Totally encased and designed for 40 C ambient temperature.

.3 Power factor: minimum 95 % with 95% of rated lamp lumens.

.4 Type: constant wattage auto-transformer solid state.

.5 Input voltage range: plus or minus 10% of nominal.

.6 Minimum starting temperature: minus 29 C at 90% line voltage.

.7 Mounting: outdoor integral with luminaire.

.8 Crest factor: 1.7 maximum current.

.3 High pressure sodium ballast: to ANSI C82.4 design C.

.1 Rating: 60Hz voltage as indicated, for use with high pressure sodium lamp.

.2 Totally encased and designed for 40 C ambient temperature.

.3 Power factor: minimum 95% with 95% of rated lamp lumens.

.4 Type: reactor or solid state with matching igniter as recommended by manufacturer.

.5 Input voltage range: plus 10% to minus 10% of nominal.

.6 Minimum starting temperature: minus 34 C at 90% line voltage.

.7 Mounting: outdoor integral with luminaire.

.8 Crest factor: 1.7 maximum current.

.4 Low pressure sodium ballast: design D.

.1 Rating: 60Hz voltage as indicated, for use with low pressure sodium lamp.

.2 Totally encased and designed for 40 C ambient temperature.

.3 Power factor: minimum 95 % with 95% of rated lamp lumens.

.4 Type: constant wattage.

.5 Input voltage range: plus or minus 20% of nominal.

.6 Minimum starting temperature: minus 34 C at 90% line voltage.

.7 Mounting: outdoor integral with luminaire.

## 2.3 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

## 2.4 LUMINAIRES

.1 As indicated in luminaire schedule on drawings. Provide 10% spare lamps of each type noted in luminaire schedule.

## 2.5 OPTICAL CONTROL DEVICES

.1 As indicated in luminaire schedule on drawings.

## PART 3 EXECUTION

### 3.1 INSTALLATION

.1 Locate and install luminaires as indicated. Install lamps in all fixtures.

.1 Provide adequate support to suit ceiling system.

### 3.2 WIRING

.1 Connect luminaires to lighting circuits:

.1 Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

### 3.3 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.

### 3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

### 3.5 FIELD QUALITY CONTROL

.1 Perform test in accordance with Section 26 05 00 – Common Work Requirements – Electrical.

**END OF SECTION**

## PART l - GENERAL

### 1.1 RELATED SECTIONS

.1 Section01 33 00-SubmittalProcedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal .

.3 Section 26 05 01 – Common Work Results - Electrical.

.4 Section 26 05 21 - Wire and Cables 0-1000v.

.5 Section 26 05 28-Grounding - Secondary.

.6 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

### 1.2 REFERENCES

.1 Canadian Standards Association (CSA)
.1 CAN/CSA-C83, Communication and Power Line Hardware.

### 1.3 REGULATORY REQUIREMENTS

.1 Co-ordinate and meet requirements of power supply authority. Ensure availability of power when required. All costs associated with contribution-in-aid of construction to Utility authority for provision of permanent power supply is the responsibility of this contractor. Include cost in tender price.

## PART 2- PRODUCTS

### 2.1 MATERIAL

.1 Service mast: epoxy coated inside and outside, rigid galvanized steel conduit, suitable for attachment of support clamps, insulator rack, weatherhead, service drop fittings.

.2 Service mast support devices: as indicated.

.3 Insulator rack: to CAN/CSA-C83, one, two, three or four wire, heavy duty, as indicated.

.4 Weatherhead: epoxy coated inside and outside, rigid galvanized steel conduit to

approval of supply authority.

.5 Epoxy coated inside and outside, rigid galvanized steel conduit, fittings: in accordance with Section 26 05 24 - Conduits, Conduit Fastenings and Conduit Fittings.

.6 Service drop conductors and supporting cable: in accordance with Section 26 05 21 - Wires and Cables (0-1000 V), copper, type RW90 XLPE, size and number of conductors as indicated.

.7 Weatherproof meter socket: To approval of Supply Authority.

## PART 3- EXECUTION

### 3.1 INSTALLATION

.1 Install service mast, insulator rack, weatherhead.

.2 Install meter socket and conduit.

.3 Install service drop conductors allowing sufficient conductor length for connection to service equipment.

.4 Allow sufficient conductor length for connection to supply by power supply authority.

.5 Allow sufficient conductor length for drip loops.

.6 Make grounding connections in accordance with Section 26 05 28 – Grounding – Secondary.

### 3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 01 – Common Work Results – Electrical.

.2 Perform additional tests as required by authority having jurisdiction.