Floating Wharves and Parking Lot, Petit-Rocher, NB

Structural Specifications:

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APPROVED DATE

END OF SECTION

END OF SECTION

MARINE STRUCTURAL

Drawings No.	Title	Date
C1	Existing Site Plan and Section	May 2022
C2	Plan of New Work and Section	May 2022
C3	Sections and Details	May 2022
C4	Sections and Details	May 2022
C5	Sections and Details	May 2022
C6	Test Pit Records	May 2022

ELECTRICAL

Drawings No.	Title	Date
E1	Electrical-Existing Site Plan and Legend	May 2022
E2	Electrical-New Site Plan, Panel 'E', Enclosure and Details	May 2022
E3	Electrical-Existing/New Single Line Power Riser Diagram	May 2022
E4	Electrical-Light Pole, Shroud, Bollard, & Lighting Control Details	May 2022

END OF SECTION

1 GENERAL

1.01 DESCRIPTION OF WORK

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

.1 The work under this contract involves the construction of anchor blocks and strong arm assemblies, installation of floating docks and gangways, electrical services, and the construction of a new parking area for the users of the floating docks.

.2 The work will be performed at the Petit-Rocher Public Wharf, Petit-Rocher, NB.

1.02 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

1.03 CODES AND STANDARDS

.1 Perform work in accordance with the National Building Code of Canada (NBC) 2015 and National Fire Code of Canada (NFC) 2015 and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.

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

1.04 INTERPRETATION OF DOCUMENTS

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

1.05 TERM ENGINEER

.1 Unless specifically stated otherwise, the term Engineer where used on the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.06 SETTING OUT WORK

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

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

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

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

1.07 COST BREAKDOWN

.1 Before submitting first progress claim submit breakdown of Contract Lump Sum items in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.

.2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.

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

1.08 DOCUMENTS REQUIRED

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

.1 Contract Drawings.

.2 Specifications.

.3 Addenda and amendments.

.4 Reviewed Shop Drawings.

.5 List of outstanding shop drawings.

.6 Change Orders.

.7 Other modifications to Contract.

.8 Field Test Reports.

.9 Copy of Approved Work Schedule.

.10 Health and Safety Plan and other safety related documents.

.11 Other documents as stipulated elsewhere in the Contract Documents.

1.09 PERMITS

.1 In accordance with the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal 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 forms and approval documents received from above referenced authorities.

1.10 EXISTING SERVICES

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

.2 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to wharf operational areas. Adhere to approved schedule and provide notice to affected parties.

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

.4 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.

.5 Be aware that harbour facilities must be kept operational for the full duration of Work of this Contract. Services to areas used by the public, fishers and harbour users must be maintained at all times.

1.11 CONTRACTOR'S USE OF SITE

.1 Cooperate with Harbour Authority and users of existing facilities. All work taking place will be coordinated and agreed to so that there will be minimal impact to the daily ongoing activities of the harbour.

.2 Should interferences occur, take directions from Departmental Representative.

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

.4 Move stored products or equipment which interfere with operations of Departmental Representative or other Contractors.

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

.6 Comply with all regulations and authorities having jurisdiction over the work, whether on land or on water.

.7 Ensure no damage occurs to existing structures as a result of operations. Any said damage will be repaired at Contractor's expense

.8 Provide temporary barriers and warning signs in location where work is adjacent to areas used by public.

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

.1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:

.1 Work Schedule as specified herein.

.2 Shop Drawing Submittal Schedule specified in Section 01 33 00.

.3 Waste Management Plan specified in Section 01 74 21.

.4 Environmental Plan specified in Section 01 35 44.

.5 Health and Safety Plan specified in Section 01 35 29.

1.02 WORK SCHEDULE

.1 Upon acceptance of bid, submit:

.1 Work schedule within 5 calendar days of contract award.

.2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.3 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.

.4 Work schedule content to include as a minimum the following:

.1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with:

.1 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.

.6 Schedule work in cooperation with the Departmental Representative. Incorporate within updated Work Schedule, items identified by Departmental Representative during review of schedule.

.7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.

.9 Schedule Updates:

.1 Submit on a monthly basis and when requested by Departmental

Representative.

.2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.

.3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.11 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.03 OPERATIONAL RESTRICTIONS

.1 The Contractor must recognize that harbour users will be affected by implementation of this Contract. The Contractor must perform the work with utmost regard to the safety and convenience of harbour users. All work activities must be planned and scheduled with this in mind.

.2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.

.3 Facility circulation maintained:

.1 Ensure that access to the wharf and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire work.

1.04 SAFETY SIGNAGE

.1 Provide on-site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and harbour users of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility.

.2 Signage to be professionally printed and mounted on wooden backing, colored and to express messages as directed by the Departmental Representative.

.3 Generally, maximum size of sign should be in the order of 1.0 square meter. Number of signs required will be dependent on number of areas in facility under renovation at any one time.

.4 Include costs for the supply and installation of these signs in the

bid amount.

1.05 PROJECT MEETINGS

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

.2 All project meetings will take place on site of work unless otherwise directed by the Departmental Representative.

.3 The Contractor's superintendent and project manager are to be present at all project meetings.

1.06 WORK COORDINATION

.1 General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.

.1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.

.2 Work Cooperation:

.1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.

.3 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the 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 to be resolved at own cost.

END OF SECTION

1 GENERAL

1.01 PROJECT PARTICULARS

.1 The work under this contract involves the construction of anchor blocks and strong-arm assemblies, installation of floating docks and gangways, electrical services, and the construction of a new parking area for the users of the floating docks.

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

.1 Salvage of granular layers adjacent to rock protection, for reuse in new work.

.2 Reconfiguration of dredged materials in the containment cell.

.3 Construction and installation strong arm assemblies and new precast concrete anchor blocks for the gangways.

.4 Reconfigure armour rock protection to install new concrete blocks at gangway.

.5 New electrical service and lighting to the Concrete blocks at the gangway.

.6 Supply and installation of geotechnical fabrics and granular layers.

.7 Fabrication of concrete anchor blocks. (to secure floating wharves)

.8 Supply of chains, shackles and master links. (for floating wharves)

.9 Installation of floating docks and gangways.

.10 Reinstallation of armour rock protection around the Concrete blocks.

.11 The floating docks and gangway will be supplied by Others.

1.02 PROJECT MEASUREMENT

.1 This section details the measurement method to be used for payment purposes. Incidental items covered in the various sections of the Specification are to be allowed for in the pricing of each pay item.

.2 Measurement for payment:

.1 **LUMP SUM ITEMS:** The following items are to be measured separately for costing purposes, then combined and submitted as one item under Lump Sum items in the tender Documents.

Division 02

.1 **Section 02 41 13 - Construction, Demolition, Mobilization, Demobilization:** Costs associated with the removal, the storage of materials to be reused, temporary facilities, access roads

including all labour, plant, equipment and necessary materials, will constitute a lump sum price.

Division 3

.1 **Section 03 41 00 Installation of Precast Concrete Anchor Blocks** (for Gangway/Strongarm): Costs associated with the installation of Anchor Block for Gangway/Strongarm will constitute a lump sum price.

Division 5

.1 **Section 05 50 00 Galvanized Guard Rails**: Galvanized guard rail will be measured as a lump sum for all railings as shown installed in the work, including galvanizing.

Division 26

.1 **Section 26 05 00 Electrical:** Costs associated with the installation of electrical improvements will constitute a lump sum price.

Division 35

.1 **Section 35 51 23 Floating Wharves and Gangway Installation:** Costs associated with the installation of the Floating Wharves and Gangways (both supplied by others) will constitute a lump sum price.

.2 **UNIT PRICE ITEMS**: The following items outline the unit of measurement for unit price items as indicated in the tender documents:

Division 03

.1 **Precast Concrete Anchor Block for Gangway and Strongarm**:: Measure precast anchor block (to secure gangway and strong arm) in units fabricated, supplied and delivered to the site.

.2 **Section 03 41 00 Precast Floating Dock Anchor Blocks**: Measure precast anchor block to secure floating docks in each unit supplied.

Division 05

.1 **Section 05 50 00 Galvanized Strong Arms**: Strong arm assembly as shown, complete with plates, brackets and fasteners will be measured by the unit supplied and acceptably installed in the work.

Division 31

.1 **Section 31 32 20 Biaxal Grid**: The supply and installation of biaxal grid will be measured in square metres installed in the work.

.2 **Section 31 32 21 Filter Fabric**: The supply and installation of filter fabric will be measured in square metres installed in the work.

.3 **Random Rip-Rap (R-5)**: Random Rip-Rap (R-5) to be measured in metric tonnes, (Tonnes), of material supplied and acceptably placed in the work to the lines and grades specified.

Division 32

.1 **Section 32 11 16 Granular Sub-Base 75mm**: Granular Sub-Base to be measured in metric tonnes, of material supplied and acceptably placed in the works to the lines and grades specified.

.2 **Section 32 11 16 Granular Base 31.5**: to be measured in metric tonnes, (Tonnes), of material supplied and acceptably placed in the works to the lines and grades specified.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 78 00: Closeout Submittals.

1.02 SUBMITTAL GENERAL REQUIREMENTS

.1 Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.

.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 have been reviewed.

.4 Present shop drawings, product data sheets, 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. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and coordinated 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 Verify field measurements and affected adjacent Work are coordinated.

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

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

.10 Submittal format:

.1 Submit 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.

.2 Submit in electronic format as pdf files. Forward pdf and in the native program format, and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

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

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

1.03 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports, installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.

.2 Shop Drawing Submittal Schedule:

.1 Submit within 10 working days of acceptance of bid a schedule listing all shop drawings to be submitted for project.

.2 Schedule shall be in format acceptable to Departmental Representative and indicate proposed submission date for each item, status of review and anticipated product delivery date to site. Track all submissions for entire project.

.3 Revise schedule as work progresses. Identify items which have been reviewed and finalized and indicating those outstanding.

.4 Update schedule at stipulated dates or project time intervals predetermined and agreed upon with Departmental Representative at commencement of Work.

.3 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.

.4 Shop Drawings Content:

.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 have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.

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

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

.5 Allow 14 calendar days for Departmental Representative's review of each submission.

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

.7 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.

.8 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.

.9 Accompany each submissions with transmittal letter, in duplicate, 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.

.10 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.

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

.12 The review of shop drawings by the Departmental Representative or by an authorized Consultant or designate is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Departmental Representative 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 coordination of Work of all sub-trades.

1.04 SAMPLES

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

.2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site except for pre-approved circumstances previously approved by Departmental Representative.

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

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

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount. If adjustments will result in a cost increase to the Contract notify Departmental Representative in writing prior to proceeding with Work.

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

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

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

.1 Fire Safety Requirements.

.2 Hot Work Permit.

.3 Existing Fire Protection and Alarm Systems.

1.02 RELATED SECTIONS

.1 Section 01 35 29: Health and Safety Requirements.

1.03 REFERENCES

.1 National Fire Code 2015

.2 National Building Code 2015

.3 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes.

.4 Applicable OHS legislation

1.04 DEFINITIONS

.1 Hot Work - applies to hot works involving open flames or producing heat or sparks, including, without being limited to, cutting, welding, soldering, brazing, grinding, adhesive bonding, thermal spraying and thawing pipes.

1.05 SUBMITTALS

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

.2 Submit in accordance with section 01 33 00.

1.06 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code 2015.

.2 National Building Code 2015.

.3 Provincial OHS Acts and Regulations.

.4 CAN/CSA-W117.2, "Safety in Welding, Cutting and Allied Processes."

.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.

1.07 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 and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:

.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;

.2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.

.4 Requirement for individual authorization will be 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 the Facility. Follow Departmental Representative's directives in this regard.

.7 Hot works shall be performed only by personnel trained in the safe use of equipment in conformance with this Section.

1.08 HOT WORK EQUIPMENT

.1 Maintenance:

.1 Hot work equipment shall be maintained in good operating condition.

.2 Inspection:

.1 Hot work equipment shall be examined for leakage or defects prior to each use.

.2 Leaks or defects found in hot work equipment shall be repaired prior to use.

.3 Equipment Not in Use

.1 All valves shall be closed and gas lines bled when Class 2 gas hot work equipment is not in use.

.2 Electric hot work equipment shall be de-energized when not in use.

.4 Compressed Gas Equipment

.1 The design and installation of oxygen-fuel gas equipment shall conform to NFPA 51, "Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes."

.2 Unalloyed copper piping shall not be used for acetylene gas.

.3 Oil or grease shall not be used with equipment for oxygen.

.4 Cylinders of Class 2 gases shall conform to Part 3.

1.09 PREVENTION OF FIRES

.1 Location of Operations

.1 Except as provided in Sentence (2), hot work shall be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of *noncombustible construction* or lined with noncombustible materials.

.2 When it is not practicable to undertake hot work in an area described in Sentence (1):

.1 combustible and flammable materials within a 15 m distance from the hot work shall be protected against ignition in conformance with Article 4 below

.2 a fire watch shall be provided during the hot work and for a period of not less than 60 min after its completion.

.3 a final inspection of the hot work area shall be conducted 4 h after completion of work.

.3 When there is a possibility of sparks leaking onto combustible materials in areas adjacent to the area where hot work is carried out,

.1 openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas, or

.2 Sentence (2) shall apply to such adjacent areas.

.4 Protection of Combustible and Flammable Materials

.1 Any combustible and flammable material, dust or residue shall be:

.1 removed from the area where hot work is carried out, or

.2 protected against ignition by the use of noncombustible materials.

.5 Combustible materials or building surfaces that cannot be removed or protected against ignition as required in Sentence (1) shall be thoroughly wetted where hot work is carried out. Any process or activity that produces flammable gases or vapours, combustible dusts or combustible fibres in quantities sufficient to create a fire or explosion hazard shall be interrupted and the hazardous conditions shall be removed before any hot work is carried out.

1.10 HOT WORK PROCEDURES

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

.2 Hot Work Procedures to include:

.1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29. Make a hazard assessment for each hot works.

.2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.

.3 Permit required for each Hot Work event.

.4 Designation of a competent person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.

.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.

.6 Site specific rules and procedures in force at the site as provided by the Facility Manager.

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

.4 Procedures shall clearly establish responsibilities of:

.1 Worker performing hot work,

.2 Person issuing the Hot Work Permit,

.3 Fire Safety Watcher,

.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.11 HOT WORK PERMIT

.1 Hot Work Permit to include the following:

.1 Project name and project number.

.2 Building name and specific room or area where hot work will be

performed.

.3 Date of issue.

.4 Description of hot work type needed.

.5 Special precautions to be followed, including type of fire extinguisher needed.

.6 Name and signature of permit issuer.

.7 Name of worker to which the permit is issued.

.8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.

.9 Worker's signature with time/date of hot work completion.

.10 60 minute – minimum time period of fire watch.

.11 Fire Safety Watcher’s signature with time/date.

.2 Permit to be 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, signed and returned to Contractor's Superintendent for safe keeping on site.

1.12 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut-off, unless approved by Departmental Representative.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.13 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

1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED SECTIONS

.1 Section 01 35 29 – Health and Safety Requirements

1.03 REFERENCES

.1 CSA C22.1:21, Canadian Electrical Code,

.2 CSA-C22.3 No.1:20, Overhead Systems.

.3 CSA C22.3 No.7:20, Underground Systems.

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

1.04 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 has been 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.

1.05 COMPLIANCE REQUIREMENTS

.1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:

.1 Canadian Electrical Code.

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.

.4 Procedures specified herein.

.5 CSA Z 460:20 Control of Hazardous Energy – Lockout and other methods.

.6 CSA Z 462:21 Workplace Electrical Safety

.2 In event of conflict between any provisions noted above, the most stringent provision will apply.

1.06 SUBMITTALS

.1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00. Submit within 14 calendar days of acceptance of bid.

1.07 ISOLATION OF EXISTING SERVICES

.1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

.2 To obtain authorization, submit to Departmental Representative the following documentation:

.1 Written request to isolate the particular 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, as follows:

.1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;

.2 Where no form exist, make written request indicating:

.1 The equipment, system or service to be isolated and it's location;

.2 Duration of isolation period (ie: start time & date and completion time & date).

.3 Voltage of service feed to system or equipment being isolated.

.4 Name of person making the request.

.4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing

to proceed with the Work.

.1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.

.5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.

.6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

.7 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. Follow Departmental Representative's directives in this regard. Provide temporary power to other equipment that needs to be remain operational if a shutdown is not possible.

.8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.

.9 When entire sections of the facility need to be locked-out to do full demolition a separate temporary construction power distribution is to be provided for this purpose.

1.08 LOCKOUTS

.1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.

.2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.

.3 Prepare typewritten Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.

.4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.

.1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.

.2 Duties of person managing the permit system to include:

.1 Issuance of permits and lockout tags to workers.

.2 Determining permit duration.

.3 Maintaining record of permits and tags issued.

.4 Making a Request for Isolation to Departmental Representative when required as specified above.

.5 Designating a Safety Watcher, when one is required based on type of work.

.6 Ensuring equipment or facility has been properly isolated.

.7 Collecting and safekeeping lockout tags returned by workers as a record of the event.

.5 Clearly establish, describe and allocate responsibilities of:

.1 Workers.

.2 Person managing the lockout permit system.

.3 Safety Watcher.

.4 Subcontractor(s) and General Contractor.

.6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.

.1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.

.2 Clearly label the document as being the Lockout procedures applicable to work of this contract.

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

.8 Use industry standard lockout tags.

.9 Provide appropriate safety grounding and guards as required.

1.09 CONFORMANCE

.1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

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 forms and lockout permits and tags issued to workers on site for full duration of Work.

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

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

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

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

.3 PSPC Policy on Occupational Health and Safety https://masource-mysource.spac-pspc.gc.ca/eng/services/rh-hr/santesecuritetravail-occupationalhealthsafety/normes-documents-standards/Pages/default.aspx

.4 PSPC Directive on Construction Occupational Health and Safety https://masource-mysource.spac-pspc.gc.ca/eng/services/rh-hr/santesecuritetravail-occupationalhealthsafety/normes-documents-standards/Pages/default.aspx

.5 PSPC Standard on Construction Occupational Health and Safety https://masource-mysource.spac-pspc.gc.ca/eng/services/rh-hr/santesecuritetravail-occupationalhealthsafety/normes-documents-standards/Pages/securite-construction-security.aspx

1.02 DEFINITIONS

.1 Competent Person: means a person who is:

.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;

.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;

.3 Knowledgeable about potential or actual danger to health and safety associated with the Work.

.2 Medical Aid Injury: any 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 PPE: personal protective equipment.

.4 Work Site: where used in this section shall mean areas, located at the premise where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

.5 Incident - occurrence, condition, or situation arising in the course of work that resulted in or could have resulted in injury, illness, property damage, environmental issues or fatality.

1.03 SUBMITTALS

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

.2 Submit Site-Specific Health and Safety Plan prior to commencement of Work.

.1 Submit within five (5) work days of notification of Bid Acceptance.

Allow for 5-10 days for Department review and recommendations prior to the commencement of work. Provide 3 copies.

.2 Departmental Representative will review Health and Safety Plan and provide comments.

.3 Revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.

.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.

.5 Submit revisions and updates made to the Plan during the course of Work.

.3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit building permit, compliance certificates and other permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other Department of Labour organization.

.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

.6 Submit copies of reports or directions issued by Federal or Provincial authorities within 24 hours after the visit to the Departmental Representative.

.7 Submit copies of incident reports (incident, accident, injury, near-miss, fire, explosion, chemical spill or damage to property occurring at the work site) 24 hours after the event to the Departmental Representative.

.8 Submit documented plans as prescribed through Public Health requirements, directions, orders and declarations. Include industry best practices when preparing the plan and revise/update accordingly and in a timely manner as per Public Health requirements and recommended industry best practices.

1.04 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act for Province of New Brunswick, and General Regulations made pursuant to the Act.

.2 Comply with Provincial/Federal Public Health requirements, directions, and declarations. Prepare documented plans as prescribed by Public Health and/or industry best practices in consultation with the Departmental Representative.

.3 Canadian Standards Association (CSA):

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.4 Observe construction safety measures of:

.1 NBC, Division B, Part 8;

.2 NFC;

.3 Municipal by-laws and ordinances.

.5 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.6 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.7 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.05 RESPONSIBILITY

.1 The contractor shall:

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

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.06 SITE CONTROL AND ACCESS

.1 The contractor shall:

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Departmental Representative will provide names of those persons authorized to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site. However, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.

.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 for minimum acceptable requirements.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site. Maintain records of such orientation on site

for review and audit by the Departmental Representative or their authorized inspector.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.

1.07 PROTECTION

.1 The contractor shall:

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

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

1.08 FILING OF NOTICE

.1 The contractor shall:

.1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work. Departmental Representative will assist in locating address if needed.

1.09 PERMITS

.1 The Contractor:

.1 Is responsible to pay all fees to obtain all permits required to conduct the work.

.2 Is responsible to provide authorities with plans and information for acceptance certificates and the costs arising from same.

.3 Is responsible to provide inspections certificates as evidence that work conforms to requirements of Authorities Having Jurisdiction (AHJ)

.4 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.

.5 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 HAZARD ASSESSMENTS

.1 The Contractor shall:

.1 Perform a documented site specific Project hazard assessment for the Work. Include any site issues / hazards / concerns identified arising from the site visit that must be considered.

.2 Carryout initial assessment prior to commencement of Work with further assessments completed and documented as needed during progress of

work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Share information and controls identified from original and updated Project hazard assessments with project workers. Record this information sharing complete with names and dates. Keep documentation on site for entire duration of the Work.

1.11 PROJECT/SITE CONDITIONS

.1 The following are potential health, environmental and safety hazards at the site for which Work may involve contact with:

.1 Existing hazardous and controlled products stored on site:

.1 Gasoline dispensing station.

.2 Waste oil storage tank.

.2 Existing hazardous substances or contaminated [building] materials:

.1 Creosote treated timber.

.3 Known latent site and environmental conditions:

.1 Work above and in tidal waters.

.2 Site exposed to waves

.3 Site exposed to marine storms.

.4 Cold weather, freezing rain and snow.

.5 Ice in harbour and ice covered surfaces, materials and equipment.

.4 Facility on-going operations:

.1 Pedestrian and vehicular traffic adjacent to the Work.

.2 Continued use of Wharf and facilities by harbour users.

.3 Marine navigation and mooring.

.2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.3 Include above items in the hazard assessment of the Work.

.4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.12 MEETINGS

.1 The Contractor shall:

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:

.1 Superintendent of Work.

.2 Designated Health & Safety Site Representative.

.3 Subcontractors.

.2 Conduct pre shift tool box talks with the crew and conduct regularly scheduled (minimum bi-weekly) safety meetings during the Work.

.3 Keep documents on site for review by Departmental Representative or their authorized representative.

1.13 HEALTH AND SAFETY PLAN

.1 The Contractor shall:

.1 Prior to commencement of Work, develop a written Site Specific Safety Plan for the Project. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.1 Items to include in the Site Specific Safety Plan:

a) Name of the designated Site Safety Representative showing proof of his/her competence and reporting relationship in Contractor's company. This person is expected to be on site during all work execution;

b) A copy of a current WCB Letter of Good Standing;

c) Details as to how WHMIS / GHS will be managed on site;

d) Details as to how the Project work areas will be delineated/protected from other areas of the premises.(fences, signs). Must be project specific;

e) Details as to how Safety orientations will be managed. Include a summary of what topics are covered in the safety orientation described in this section;

f) A copy of the Notice of Project that was sent to the Provincial OHS regulator;

g) Project site specific hazard assessment;

h) Details as to how tool box and safety meetings will be held and recorded;

i) An organizational chart illustrating supervision and subcontractors (if available) that are assigned to this Project;

j) On-site Emergency Response Plans that cover all potential emergency situations that could arise. The Plans should harmonize with the facility if possible. Emergency Contacts: name and telephone number of officials from:

.1 General Contractor and subcontractor’s key personnel;

.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction;

.3 Local emergency resource organizations.

k) List of critical work activities which have a risk of endangering health and safety of Facility users and/or others;

l) Details as to how the subcontractor's documented safety program will be reviewed and managed prior to allowing them to work on site;

m) Details as to how the site safety inspection program will be managed. Include frequency, assignment of responsibility as well as standard inspection form to be used;

n) Basic PPE requirements as well as specialized PPE requirements; minimum being hard hat, safety footwear, safety glasses and high visibility vest;

o) General safety rules as well as the disciplinary protocols to be taken for noncompliance;

p) Details as to how Incident investigations will be managed. Include procedure and incident form.

.2 Post copy of the Plan, and updates, prominently on Work Site.

1.14 SAFETY SUPERVISION

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:

.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work

.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.

.3 Conduct site safety orientation session to persons granted access to Work Site.

.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.

.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health & Safety Site Representative must:

.1 Be qualified and competent person in occupational health and safety.

.2 Have site-related working experience specific to activities of the Work.

.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled safety inspections of the Work on a minimum weekly basis. Record deficiencies and remedial action taken.

.2 Follow-up and ensure corrective measures are taken.

.3 Share inspection reports with crews / subcontractors.

.6 Cooperate with the Facility's and / or the PSPC Occupational Health and Safety representative.

.7 Keep inspection reports and supervision related documentation on site.

1.15 TRAINING

.1 Use only skilled workers on Work Site who are deemed competent and are trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers. Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

.3 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

.4 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.16 MINIMUM SITE SAFETY RULES

.1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; the company shall establish rules to govern the conduct and actions of their employees. These rules should leave no room for discretion and argument. The rules must be enforced and action should be taken every time a rule is violated.

.2 Brief persons of the documented disciplinary protocols to be taken for noncompliance. Post rules on site.

1.17 CORRECTION OF NON-COMPLIANCE

.1 The Contractor shall:

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

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

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.18 INCIDENT REPORTING

.1 Investigate and report all incidents to Departmental Representative.

.2 Notify the Departmental representative as soon as reasonably practicable following the incident.

.3 Ensure the Authority having Jurisdiction is notified as prescribed by applicable legislation.

.4 Submit report in writing.

1.19 HAZARDOUS PRODUCTS

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

.2 Keep MSDS data sheets for all products delivered to site.

.1 Post on site.

.2 Submit copy to Departmental Representative.

1.20 BLASTING

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

1.21 POWDER ACTUATED DEVICES

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

1.22 CONFINED SPACES

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

1.23 SITE RECORDS

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.24 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in a conspicuous location on the Work Site in accordance with Acts and Regulations of Province. See local legislation for specifics.

.2 Post other documents as specified herein, including:

.1 Site specific Health and Safety Plan.

.2 WHMIS data sheets.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

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

1.02 REFERENCE STANDARD

.1 Contractor to Submit methods, means, and sequences for compliance with: applicable permits, certificates, approvals, or any other form of authorizations; other federal, provincial, or municipal requirements; and in accordance with the Contract.

.2 Generally, provincial, territorial and municipal laws, regulations, bylaws and other requirements do not apply to federal lands, works or undertakings. Soil, sediment, water or other materials that are removed from federal lands may become subject to provincial, territorial or municipal laws and regulations.

.3 Provincial, territorial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term "standards" is used in this part in order to maintain consistency in terminology throughout this document, and does not imply that standards contained in provincial, territorial or municipal laws and regulations apply on Federal lands, activities or undertakings.

1.03 DEFINITIONS

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

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

.3 Environmental Protection Plan: plan developed by the Contractor to ensure Environmental Protection and prevent Environmental Pollution and Damage identifying all environmental risks and mitigation measures, including: personnel requirements, emergency contacts, Environmental Protection methods, procedures, and equipment, and emergency response including a Spill Control Plan.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for environmental protection and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 29 - Health and Safety Requirements.

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

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

.5 Address topics at level of detail commensurate with environmental issues and required construction tasks.

.6 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

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

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

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

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

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

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

.13 Wastewater Management Plan identifying methods and procedures for management and discharge of wastewaters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

.14 Historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources, and wetlands.

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

1.05 FIRES

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

1.06 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

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

.4 Manage disposal or runoff of water in accordance with local authority requirements.

1.07 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

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

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

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

1.08 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only.

.2 Use waterway beds for borrow material only after written receipt of approval from *Departmental Representative*.

.3 Waterways to be kept free of excavated fill, waste material, and debris.

.4 Design and construct temporary crossings to minimize the potential for erosion and prevent equipment from entering waterways.

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

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

.7 Blasting is not permitted on site.

1.09 POLLUTION CONTROL

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

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures where directed by Departmental Representative.

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

1.10 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and

protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

.2 Plan must include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.11 NOTIFICATION OF NON-COMPLIANCE

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

.2 After receipt of such notice, the Contractor must inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

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

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

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

PART 2 – PRODUCT

.1 Not applicable

PART 3 EXECUTION

3.01 CLEANING

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

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

.2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

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

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

END OF SECTION

1 GENERAL

1.01 INSPECTION

.1 Refer to GC 2.3.

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

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

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

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

1.02 INDEPENDENT INSPECTION AGENCIES

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

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

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

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

1.03 ACCESS TO WORK

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

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

1.04 PROCEDURES

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

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

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

1.05 REJECTED WORK

.1 Refer to GC 2.4

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

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

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

1.06 REPORTS

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

1.07 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

1.08 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations as specified and acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.

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

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

.6 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.

.7 Mock-ups may remain as part of Work.

1.09 MILL TESTS

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

END OF SECTION

1 GENERAL

1.01 SITE ACCESS AND PARKING

.1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.

.2 The Contractor is advised that while parking facilities for his workers and subcontractors will be on property, such parking facilities may be remote from the actual site of the work. In any case, follow all instructions from the Departmental Representative in regards to parking facilities.

.3 Maintain existing roads and parking areas at site, where used by Contractor, for duration of contract.

.1 Keep clean and free of mud and dirt by washing on a regular basis.

.2 Provide snow removal in areas located within construction site or enclosed by work.

.3 Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.

1.02 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 approved by Departmental Representative.

1.03 MATERIAL STORAGE

.1 Locate site storage trailers where approved by Departmental Representative. Place in location of least interference with existing Facility operations.

.2 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

1.04 SITE ENCLOSURES

.1 Provide temporary fence where approved by Departmental Representative to enclose various construction areas of work site.

.2 Erect plastic mesh fence constructed as follows:

.1 1200 mm height, constructed of high density polyethylene mesh fence fabric, orange in color.

.2 Supported by steel T-bar posts or other similar framing, of sufficient quantity, adequate spacing and set firmly in ground to secure fence against sags.

.3 Inspect fence regularly, repairing sags and damaged sections.

.4 Incorporate within fence one operable truck gate.

.3 Make all gates lockable and provide keyed padlocks.

.4 Obtain Departmental Representative's approval beforehand of location and layout of all temporary fence enclosures.

.5 Provide battery powered lanterns around the perimeter of the site enclosure to clearly mark its location at night.

.6 Provide warning signs affixed to all fenced areas, identifying those enclosed areas as "Construction Zones" with access restricted to only those persons so authorized by General Contractor.

1.05 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.

1.06 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, meter socket, underground cables, etc. as required and to approval of local power supply authority.

.3 Provide and pay all costs to supply and install temporary cabling, panelboards, switching devices and other equipment as required to connect into power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Perform work and make all connections in accordance with the CSA C22.1 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in section 01 35 29 and to lockout requirements specified in section 01 35 25.

.4 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than 162 lx in all locations.

1.07 WATER SUPPLY

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

1.08 SCAFFOLDING

.1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797-09, Code of Practice for Access Scaffold.

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

1.09 HEATING AND VENTILATING

.1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.

.2 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work.

.2 Protect work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

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

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

.3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.

.4 Ventilating:

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

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

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

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

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

.5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.6 Submit bid assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

.7 Upon acceptance of bid, Departmental Representative may permit use of permanent system providing agreement can be reached on:

.1 Conditions of use, special equipment, protection and maintenance.

.2 Saving on Contract price.

.3 Provisions relating to warranties on equipment.

1.10 CONSTRUCTION SIGN AND NOTICES

.1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.

.2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in size complete with required wood framing at 400 mm o.c and support posts.

.3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.

.4 Contractor or subcontractor advertisement signboards are not permitted on site.

.5 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321.

.6 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.

1.11 REMOVAL OF TEMPORARY FACILITIES

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

END OF SECTION

1 GENERAL

1.01 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 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 Compliance to specified standards.

.5 Manufacturer's installation or application instructions.

.6 Evidence of arrangements to procure.

.7 Evidence of manufacturer delivery problems or unforeseen 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.

1.02 PRODUCT QUALITY

.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 rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

1.03 ACCEPTABLE MATERIALS AND ALTERNATIVES

.1 Acceptable Materials: When materials specified include trade names or trademarks 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 contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.04 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 manufacturer’s instructions, so that Departmental Representative will designate which document is to be followed.

1.05 AVAILABILITY OF PRODUCTS

.1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.01.2 above.

1.06 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 the General Conditions of the Contract.

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

.4 Coordinate work between trades and subcontractors. See section 01 14 10 in this regard.

.5 Coordinate placement of openings, sleeves and accessories.

1.07 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 on Health and Safety Requirements in this regard.

1.08 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 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.

1.09 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.

END OF SECTION

1 GENERAL

1.01 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.1 Structural integrity of elements of project.

.2 Integrity of weather-exposed or moisture-resistant elements.

.3 Efficiency, maintenance, or safety of operational elements.

.4 Visual qualities of sight-exposed elements.

.5 Work of Departmental Representative or separate contractor.

.3 Include in request:

.1 Identification of project.

.2 Location and description of affected Work.

.3 Statement on necessity for cutting or alteration.

.4 Description of proposed Work, and products to be used.

.5 Alternatives to cutting and patching.

.6 Effect on Work of Departmental Representative or separate contractor.

.7 Written permission of affected separate contractor.

.8 Date and time work will be executed.

1.02 MATERIALS

.1 Required for original installation.

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

1.03 PREPARATION

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

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

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

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

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

1.04 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

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

.3 Uncover Work to install ill-timed Work.

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

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

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

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

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

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

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

END OF SECTION

1 GENERAL

1.01 REFERENCE STANDARDS

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2020, Stipulated Price Contract.

1.02 PROJECT CLEANLINESS

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

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

.3 Clear snow and ice from access to worksite.

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

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

.6 Provide and use marked separate bins for recycling. Refer to 01 74 21 – Construction & Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

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

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

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

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces.

1.03 FINAL CLEANING

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

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

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

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

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

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

.7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.8 Remove dirt and other disfiguration from exterior surfaces.

.9 Sweep and wash clean paved areas.

.10 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.11 Remove snow and ice from access to worksite.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse (Where specified) and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management And Disposal.

END OF SECTION

1 GENERAL

1.01 DEFINITIONS

.1 Demolition Waste Audit (DWA): Relates to actual waste generated from project.

.2 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.3 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.4 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.5 Recycling: Process of sorting, cleaning, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.6 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodeling projects before demolition stage for resale, reuse on current project or as storage for use on a future project.

.2 Returning reusable items including pallets or unused products to vendors.

.7 Salvage: Removal of structural and non-structural materials from deconstruction and disassembly projects for the purpose of reuse or recycling.

.8 Separate Condition: Refers to waste sorted into individual types.

.9 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

1.02 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Authorities Having Jurisdiction.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site and transport off-site, salvaged materials in separate condition and transport to recycling facility.

1.03 STORAGE, HANDLING AND PROTECTION

.1 Unless specified otherwise, materials for removal become the Contractor's property.

.2 Protect, stockpile, store and catalogue salvaged items.

.3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to approved local facility.

.4 Protect structural components not removed for demolition from movement or damage.

.5 Support affected structures. If safety of facility is endangered, cease operations and immediately notify the Departmental Representative and Authorities Having Jurisdiction.

.6 Protect surface drainage, mechanical and electrical from damage and blockage.

.7 Separate and store materials produced during dismantling of structures in designated areas.

.8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities. On-site source separation is recommended.

1.04 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of any waste into waterways, storm or sanitary sewers.

.3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.05 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Provide security measures which are to be approved by Departmental Representative.

1.06 SCHEDULING

.1 Coordinate Work with other activities on site to ensure timely and orderly progress of Work.

2 PRODUCT

2.01 PRODUCTS

.1 Not Applicable.

3 EXECUTION

3.01 APPLICATION

.1 Handle waste materials not reused, salvaged or recycled in accordance with applicable acts, regulations and codes.

3.02 CLEANING

.1 Remove tools and waste materials at completion of Work and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused or recycled into specified sort areas.

3.03 DIVERSION OF MATERIALS

.1 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative and consistent with applicable fire regulations and as follows, at a minimum:

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.3 On-site sale or distribution of salvaged materials to third parties will not be permitted.

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

.1 Administrative procedures preceding inspection and acceptance of Work by Departmental Representative.

1.02 RELATED SECTIONS

.1 Section 01 78 00 - Closeout Submittals.

1.03 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.

.1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.

.2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.

.1 Address defects, faults and outstanding items of work identified by such inspections.

.2 Advise Departmental Representative when all deficiencies identified have been rectified.

.3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the Work until such time that Contractor performs following work and turns over the specified documents:

.1 Project record as-built documents;

.2 Final Operations and Maintenance manuals;

.4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

END OF SECTION

1 GENERAL

1.01 SECTION INCLUDES

.1 Project Record Documents.

.2 Operations and Maintenance data.

1.02 RELATED SECTIONS

.1 Section 01 77 00: Closeout procedures.

1.03 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide 2 white print sets of contract drawings specifically for "As-Built" purposes.

.2 Maintain at site one 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 upon request.

.4 As-Built Drawings:

.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).

.2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.

.3 Stamp all drawings with "As-Built". Label and place Contractor's signature and date.

.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings.

.5 Record following information:

.1 Depths of various elements of foundation in relation to survey datum.

.2 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.

.3 Horizontal and vertical location of various elements in relation to Geodetic Datum;

.4 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;

.5 Field changes of dimension and detail;

.6 Location of all capped or terminated services and utilities.

.7 Chases for mechanical, electrical and other services;

.8 All structural steel (or other) installations to be fully dimensioned;

.9 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;

.10 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

.11 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.

.12 Provide "as built" cross sections of any excavation, dredging or fill work.

.5 Maintain As-Built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. 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.

.6 Submit on paper and in electronic format as pdf files. Forward pdf and in the native program format, Autocad dwg and photograph jpg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.04 REVIEWED SHOP DRAWINGS

.1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.

.2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

1.05 OPERATIONS & MAINTENANCE MANUAL

.1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in both English and French languages.

.3 Number of copies required:

.1 Upon review and acceptance by Departmental Representative, submit 4 final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.

.5 Binding:

.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.

.2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.

.3 Where multiple binders are needed, correlate data into related consistent groupings.

.4 Identify contents of each binder on spine.

.5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.

.6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.

.7 Type lists and notes. Do not hand write.

.8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.6 Manual Contents:

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location and project number.

.3 Names and addresses of Contractor, and all Sub-Contractors.

.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.

.3 List of maintenance materials.

.4 List of spare parts.

.5 List of special tools.

.6 Original or certified copy of warranties and product guarantees.

.7 Copy of approval documents and certificates issued by Inspection Authorities.

.8 Copy of reports and test results performed by Contractor as specified.

.9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:

.1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.

.3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.7 Shop drawings:

.1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.

.2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.

.3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.

1.06 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Where applicable, provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

.3 Provide items of same manufacture and quality as items in Work.

.4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.

.5 Clearly mark as to contents indicating:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions or intended use as applicable.

.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

END OF SECTION

1 GENERAL

1.01 DESCRIPTION

.1 This section specifies requirements for the removal, temporary storage of materials, reinstatement of materials to be reused and the disposal of construction waste materials at an approved disposal site or for storage on site as directed by the Departmental Representative. Include mobilization, health and safety measures and security in this section.

1.02 RELATED WORK

.1 Section 01 29 00 - Project Particulars and Measurements

1.03 PROTECTION

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

1.04 REQUIREMENT OF REGULATORY AGENCIES

.1 Adhere to Federal and Provincial requirements relating to safety and protection of workmen.

.2 Respect applicable environmental regulations pertaining to demolition.

1.05 MEASUREMENT

.1 Refer to Section 01 29 10 - Project Particulars and Measurements.

.2 **Construction, Demolition, Mobilization, Demobilization**: Costs associated with the removal, the storage of materials to be reused, temporary facilities, access roads including all labour, plant, equipment and necessary materials, will constitute a lump sum price, (LS), and shall consist of, but not be limited to, the following:

.1 Removal and Salvage:

.1 Removal of granular base materials from the existing access road, and its reinstatement into the new work.

.2 Remove and reinstall armour stone as shown under this section.

.2 Site Work:

.1 Excavation of fill and dredged materials from within the footprint of the parking lot and roadbed expansion.

.2 Removal, protection, and reinstallation of the water line.

.3 Shaping and grading existing of the containment cell.

.4 Removal ad reinstallation of rock protection to complete the work.

.5 Reinstallation of armour stone barricades along approach road.

.3 There will not be any separate item for payment for the construction of temporary roads to access the site. Include the cost for this work in the above item 1.05.1 for payment.

.4 Temporary Facilities: There will not be any separate item for payment for the provision and maintenance of a temporary office for the Departmental Representative, Contractor's on-site office, equipment storage facility, portable toilets, etc. Include the cost for this work in the above item 1.05.1 for payment.

.5 Barriers/Security Devices: There will not be any separate item for payment for the provision and maintenance of barriers and security devices. Include the cost for this work in the above item 1.05.1 for payment.

.6 There will not be any separate method for payment for snow and ice removal. Include the cost of this work in the above item 1.05.1 for payment.

2 PRODUCTS

2.01 Not Applicable

3 EXECUTION

3.01 PREPARATION

.1 Inspect site and verify with the Departmental Representative materials to be salvaged and materials designated for removal.

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

3.02 REMOVAL

.1 Remove in their entirety all materials and objects specified for removal including all fastenings. Carefully remove materials designated to be reused.

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

.3 Verify with Departmental Representative items to be reused in the work.

.4 Remove existing concrete in a manner that will not crack or damage adjacent items to remain in place. Contain all concrete rubble from falling into harbour.

3.03 SALVAGE

.1 Carefully dismantle objects containing materials designated for salvage and stockpile salvaged materials at locations designated.

3.04 DISPOSAL

.1 All demolished materials, except materials designated to be reused or saved, will become property of Contractor and will be removed from site and disposed of as stated herein.

3.05 STORAGE

.1 Obtain the Departmental Representatives approval for the use of storage space for the items to be reused in the work and for the temporary storage of items for disposal.

.2 Any re-usable material that is turned over to the Harbour Authority must be stored at an approved location.

3.06 REINSTALLATION

.1 Reinstall those items that were removed to permit the completion of the work.

.2 Augment reinstallation of items with new equipment where required.

3.07 RESTORATION

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

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

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 03 41 00 - Precast Structural Concrete.

1.02 DESCRIPTION

.1 This section covers materials for wood formwork, ribbed formwork and tubular formwork, tie rods and formwork liners, form release agents, as well as the construction, erection and dismantling of formwork, as well as the repair or reshoring of works.

1.03 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section. Include costs in items of concrete work for which formwork is required.

1.04 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA O86:19, Engineering Design in Wood.

.3 CSA O121-17, Douglas Fir Plywood.

.4 CSA O151-17, Canadian Softwood Plywood.

.5 CSA O153:19, Poplar Plywood.

.6 CSA S269.1-16 (R2021), Falsework and Formwork.

1.05 SUBMITTALS

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

.2 Submit shop drawings for formwork and falsework.

.1 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of New Brunswick.

.3 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, anchorages, and locations of temporary embedded parts. Comply with CSA S269.1 for falsework and formwork drawings.

.4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

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

.3 Divert wood materials from landfill to a recycling facility.

.4 Divert plastic materials from landfill to a recycling facility.

.5 Divert unused form release material from landfill to an official hazardous material collections site.

2 PRODUCTS

2.01 MATERIALS

.1 Formwork and falsework materials:

.1 To CSA A23.1/A23.2 and CSA S269.1.

.2 Wood and wood product formwork materials to be to CSA O86, CSA O121 and CSA O153.

.2 Form ties:

.1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

.3 Form release agent: non-toxic, biodegradable.

.4 Form stripping agent: colourless mineral oil, non-toxic, and biodegradable.

3 EXECUTION

3.01 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Fabricate and erect formwork/falsework in accordance with CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.

.3 Align form joints and make watertight.

.1 Keep form joints to minimum.

.4 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections.

.5 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

3.02 FORMWORK REMOVAL

.1 Leave formwork in place for following minimum periods of time after placing concrete.

.1 7 days for anchor blocks, sides of cast-in-place concrete cap beam and concrete slab edge.

.2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later.

.3 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

.4 All holes from form ties and rods to be plugged with mortar to requirements of CSA A23.1.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 03 10 00 - Concrete Forming and Accessories.

.2 Section 03 41 00 - Precast Structural Concrete.

.3 Section 05 50 00 - Metal Fabrications.

1.02 DESCRIPTION

.1 This section specifies concrete reinforcing materials, their fabrication and placing.

1.03 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.

1.04 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A1064/A1064M-18a, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 Canadian Standards Association (CSA)

.1 CSA A23.1:19/CSA A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A23.3-19, Design of Concrete Structures.

.3 CSA G30.18:21, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA W186:21, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.05 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, and locations of reinforcement with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.3 Detail lap lengths and bar development lengths to CSA A23.3, unless otherwise indicated. Provide Class B tension lap splices unless otherwise indicated.

.4 Each shop drawing submitted to bear the stamp and signature of a qualified Professional Engineer registered in the Province of New Brunswick.

1.06 STORAGE

.1 Store reinforcing steel on racks or sills that will permit easy access for identification and handling and prevent it from becoming coated with material which would adversely affect bond.

.2 Do not store reinforcing steel in direct contact with the ground.

2 PRODUCTS

2.01 MATERIALS

.1 Any replacement of reinforcing bars with bars of different sizes must be authorized, in writing, by the Departmental Representative.

.2 Reinforcing bars: unless otherwise indicated, high-adhesion bars, made of weldable carbon steel, having a yield strength of 400 MPa, in accordance with CSA G30.18.

.3 Binding wire: annealed cold drawn steel wire, to ASTM A1064/A1064M.

.4 Chairs, spacers, bar supports and support wedges: to CSA A23.1/CSA A23.2. Chairs should be plastic.

2.02 FABRICATION

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

.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 W186.

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

2.03 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

3 EXECUTION

3.01 FIELD BENDING AND WELDING

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

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

.3 Replace bars, which develop cracks or splits.

3.02 PLACING REINFORCEMENT

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

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

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

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 29 10 - Project Particulars and Measurements

.2 Section 03 10 00 - Concrete Forming and Accessories

.3 Section 03 20 00 - Concrete Reinforcing

.4 Section 05 50 00 - Metal Fabrications

.5 Section 35 51 23 - Floating Wharves and Gangway Installation

1.02 DESCRIPTION

.1 The work under this section includes the supply and fabrication of the precast reinforced concrete wall panels, complete with transportation to the site, storage and installation.

1.03 MEASUREMENT PROCEDURES

.1 **Precast Concrete Anchor Block for Gangway and Strongarm**:: Measure precast anchor block (to secure gangway and strong arm) in units fabricated, supplied and delivered to the site.

.2 **Installation of Precast Concrete Anchor Blocks** (for Gangway/Strongarm): Costs associated with the installation of Anchor Block for Gangway/Strongarm will constitute a lump sum price.

.3 **Precast Floating Dock Anchor Blocks:** Measure precast anchor block (to secure floating docks) as each unit supplied.

.4 Lean concrete used to place the precast concrete anchor blocks for Gangway/Strong arms will be incidental to the cost of installation.

.5 Install precast concrete blocks for floating wharves under Section 35 51 23 - Floating Wharves and Gangway Installation.

1.04 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

- .1 ASTM A1064/A1064M-18a, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 ASTM C260/C260M-10a (2016), Standard Specification for Air-Entraining Admixtures for Concrete.
- .3 ASTM C494/C494M-19, Standard Specification for Chemical Admixtures for Concrete.

.2 Canadian Standards Association (CSA)

- .1 CSA A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA A23.4-16 (R2021), Precast Concrete - Materials and Construction.
- .3 CSA A3000-18, Cementitious Materials Compendium.

.1 CSA-A3001-13, Cementitious Materials for Use in Concrete.

.4 CSA G30.18:21, Carbon Steel Bars for Concrete Reinforcement.

1.05 CONSTRUCTION QUALITY CONTROL

.1 Minimum two (2) weeks prior to starting concrete work, proposed quality control procedures shall be submitted for Departmental Representative's approval, which shall include, but not limited to, the following items:

.1 Chairs and spacers for support of reinforcing.

.2 Curing and protection of concrete.

.3 Finishes.

.4 Formwork removal.

.2 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CSA A23.1 and Section 01 45 00 - Quality Control.

.3 Non-destructive Methods for Testing Concrete shall be in accordance with CSA A23.2.

1.06 QUALITY ASSURANCE

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

.2 Convene pre-pour meeting one week prior to beginning of concrete work.

.1 Ensure key personnel, site supervisor, Departmental Representative, and representative from testing laboratories attend.

.2 Proposed quality control procedures shall be submitted prior to the pre-installation meeting.

.3 Provide certification indicating the concrete supplier is certified in accordance with the Atlantic Provinces Ready Mix Concrete Association Program or equivalent.

.1 Only concrete supplied from such certified plants shall be acceptable to the Departmental Representative.

.2 Plant certification shall be maintained for the duration of the fabrication and erection until the warranty period expires.

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

.5 Provide mix design in compliance with CSA A23.1 to provide concrete of quality, yield and strength as specified under 2.02 Mix Design. Mix design to be prepared by and stamped by a Professional Engineer licensed to practice in the Province of New Brunswick.

.6 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 Admixtures.

.5 Aggregates.

.6 Water.

1.07 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements to CSA A23.4, Section 12.

.2 Length of precast elements not to vary from dimensions indicated by more than plus or minus 10 mm.

.3 Cross sectional dimensions of precast elements not to vary from design dimensions by more than plus or minus 5 mm.

.4 Deviations from straight lines not to exceed 6 mm in 3.0 m.

.5 Precast elements not to vary by more than plus or minus 6 mm from true overall cross-sectional shape as measured by difference in diagonal dimensions.

1.08 QUALIFICATIONS

.1 Precast concrete elements to be fabricated and erected by Contractor who has proven experience in work of this nature and plant shall be compliant with the requirements of CSA A23.4.

.2 All precast fabrication, curing and protection shall be to the approval of the Departmental Representative.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

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

.3 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, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.

1.11 WARRANTY

.1 Contractor hereby warrants that precast elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with subsection GC32.1 of General Conditions "C".

2 PRODUCTS

2.01 MATERIALS

.1 Cement, aggregates, water, admixtures: to CSA A23.1 and CSA A23.4.

.2 Reinforcing steel: as per Section 03 20 00 - Concrete Reinforcing.

.3 Portland Cement and Supplementary Cementing Materials (SCM's) to CSA A3000.

.4 Aggregates: to CSA A23.1. Coarse aggregates to be normal density.

.5 Air Entraining Admixture: to ASTM C260.

.6 Chemical Admixtures: to ASTM C494/C494M.

.7 Hardware and miscellaneous materials: to CSA A23.1.

.8 Forms: to CSA A23.4.

.9 Pipe Sleeve Drains: purpose made plastic of diameter indicated on plans.

.10 Galvanized Ladder Assemblies and handrails: as per Section 05 50 00 - Metal Fabrications.

2.02 MIX DESIGN

.1 The Contractor shall be responsible for the concrete mix design.

.2 It shall be the responsibility of the Contractor to ensure that the mixture proportions shall be properly batched, mixed, placed and cured such that the concrete conforms to the specifications.

.3 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1, to give following properties:

.1 Cement: use Type GU-F-SF.

.2 Minimum compressive strength at 28 days: 35 MPa.

.3 Minimum cement content: 400 kg/m^3 of concrete.

.4 Class of exposure: C-1

.5 Maximum silica fume not to exceed 10% of the total cementitious content.

.6 Nominal size of coarse aggregate: 19 mm.

.7 Maximum water cement ratio: 0.40.

.8 Air content: 4 to 7%.

.9 Chloride ion penetrability: less than 1500 coulombs within 91 days.

.4 Lean concrete mixture is 15 MPa concrete but, for simplicity, use the mixture above.

2.03 MANUFACTURED UNITS

.1 Manufacture units in accordance with CSA A23.4.

.2 Provide hardware suitable for handling elements.

.3 Support of reinforcing shall be by hanging from top. No chairs to be used that will be exposed on formed face of wall panels.

.4 The Contractor has the option to either include the concrete base for the pole as part of the precast work, or construct the base as cast-in-place, at no extra cost.

2.04 FINISHES

.1 Finish surface of units to Finish Grade B to CSA-A23.4, Clause 26.2.4.

2.05 CURING

.1 Curing and protection shall be in accordance with CSA A23.4 and as noted below.

.2 Precast elements shall be wet cured for a minimum period of 7 days. Concrete shall be kept in a surface damp condition for this period. Ambient temperature to be maintained above 5°C.

2.06 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CSA A23.4.

.2 Provide records from in-house quality control program to Departmental Representative for inspection and review.

.3 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.4 Contractor shall keep complete records of supply source of concrete material, and steel reinforcement to Departmental Representative, for review upon request.

3 EXECUTION

3.01 PREPARATION

.1 Obtain Departmental Representative’s approval before placing concrete.

.2 Provide 24 hours’ notice prior to placing of concrete.

3.02 ERECTION

.1 Do precast concrete work in accordance with CSA A23.3 and CSA A23.4.

.2 Install precast elements as specified and as indicated on plans.

3.03 QUALITY ASSURANCE

.1 In addition to Contractor's Source Quality Control, inspection and testing of concrete and concrete materials may be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CSA A23.1 and CSA A23.4.

.2 Inspection and testing by Departmental Representative will not augment or replace Contractor's quality control nor relieve him of his contractual responsibility.

3.04 CLEANING

.1 Submit to Departmental Representative for review, proposed cleaning methods before cleaning soiled precast concrete surfaces.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 03 41 00 - Precast Structural Concrete.

1.02 DESCRIPTION

.1 The work under this section covers the supply and installation of all metal fabrication items including, but not limited to:

.1 Fabrication of the galvanized strong arms, embedded steel connectors, guard rail, gangway brackets, and miscellaneous steel including stainless steel bar for concrete anchor block and pile sleeve for the waterline.

1.03 MEASUREMENT PROCEDURES

.1 **Galvanized Strong Arms:** Strong arm assembly as shown, complete with plates, brackets and fasteners will be measured by the unit supplied to the site.

.2 **Galvanized Guard Rails**: Galvanized guard rail will be measured as a lump sum for all railings as shown installed in the work.

.3 Miscellaneous anchors, rods, bolts, nuts, washers, clips, plates, sleeves, angles and fasteners will not be measured separately for payment but will be considered as incidental to the work for which they are supplied. This includes all welding, cutting, drilling and other work necessary to complete the project.

1.04 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A53 Carbon Steel Seamless Pipe

.2 ASTM A108-18, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

.3 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.4 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.5 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

.6 ASTM A615/A615M-20, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

.7 ASTM F1554-20, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

.8 ASTM F2620 -13 Standard Practice for Heat Fusion Joining Of Polyethylene Pipe And Fittings.

.9 ASTM F3125/F3125M-19e2, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 803 MPa and 1040 MPa Minimum Tensile Strength.

.2 Canadian Standards Association (CSA)

.1 CSA G40.20/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S16:19, Design of Steel Structures.

.3 CSA W47.1:19, Certification of Companies for Fusion Welding of Steel.

.4 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W55.3-08 (R2018), Certification of Companies for Resistance Welding of Steel and Aluminum.

.6 CSA W59-18, Welded Steel Construction.

1.05 SOURCE QUALITY CONTROL

.1 The Contractor is to provide written documentation from the Canadian Welding Bureau certifying that all welders used for this work are qualified to the requirements of CSA W47.1, Division 1 or 2.1 or CSA W47.2.

.2 Provide written procedures to Departmental Representative for review and approval indicating methods to be used for all welding on this project.

.3 Provide evidence to the Department Representative of current qualifications of welders.

1.06 SHOP DRAWINGS

.1 Submit fabrication and erection documents and material lists in accordance with Section 01 33 00 - Submittal Procedures.

.2 It is the responsibility of this Contractor to field confirm the exact locations and construction of related work to which work under this section connects to, or is supported on.

.3 Each drawing submission shall bear signature and stamp of qualified Professional Engineer registered or licensed to practice in the Province of New Brunswick, for all assemblies, components, details and connections not shown on the drawings.

.4 Review of procedure and erection drawings will extend to general design concept only. This review does not relieve the Contractor of the responsibility for accuracy of the detail dimensions, general fit-up of parts to be assembled, adequacy of proposed methods and procedures or for errors or defects contained in the details.

1.07 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Provide manufacturer's product specifications and written instructions for cleaning, surface preparation and application for field touch-up of all galvanized steel supplied under this section.

1.08 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused metal materials from landfill to an approved metal recycling facility approved by Departmental Representative.

2 PRODUCTS

2.01 MATERIALS

.1 Steel angles, plates, C shape sections, and rods to CSA G40.20/G40.21, Grade 300W.

.2 HSS sections to CSA G40.20/G40.21, Grade 350W, class C.

.3 Welding Electrodes (above water): to CSA W48 Series.

.4 Structural Bolts, nuts and washers: to ASTM F3125, grade A325, type 1.

.5 Anchor rods, nuts and washers: to ASTM A307.

.6 Machine Bolts: Refer to Section 06 30 00 - Treated Dimension Timber.

.7 Stainless steel rod for concrete dock anchor blocks to ASTM A240/A240M or ASTM A276/A276M, of Type UNS S31603 (316)

.8 Adhesive anchors: Refer to Section 03 30 00 - Cast-in-Place Concrete.

.9 Galvanizing: Hot Dip to ASTM A123/A123M for all fabricated assemblies; ASTM A153/A153M for all hardware. Minimum average coatings thicknesses as per standards.

.10 Galvanizing Touch-Up/Repair:

.1 Touch-up galvanizing for repair to damaged galvanized surfaces shall be with a purpose-made cold-applied film galvanizing system consisting of zinc powder, aromatic hydrocarbon and binder. Coating system to meet the following minimum requirements:

.1 Dry film content 96% by weight with zinc purity of 99.995% to ISO 3549.

.2 Recognized for use as repair coating for hot-dip galvanizing.

.3 Dry film non-toxic to AS/NSZ 4020.

.4 UV resistant.

.11 Pipe: to be to ASTM A53, grade 240, standard weight (SCH. 40).

.12 Rubber Units for Inter-float Connectors: 178 mm x 254 mm x 200 mm marine engineered rubber meeting the following fender section minimum performance requirements: Weight: 57.3 kg/m; Reaction: 119 tonne/m; Energy: 4.5 tonne/m; Minimum tensile strength to be 13 MPa, when tested to ASTM-D2240.

.13 Foam: solid polystyrene round foam cylinders that fit snugly inside and fully fill the plastic pipe, or a 2 part expandable foam that will be injected inside the pipe to fully fill the inside cavity. Minimum buoyancy 8.6 kN/m^3, (55 lb/ft^3).

.14 Smooth High Density Polyethylene (HDPE): to CSA-B182.6.

.1 Rigidité des tuyaux de 180 kPa.

.2 Classe d'égout.

.3 Système de couplage par fusion (sans joint).

.4 Longueur continue telle que spécifiée aux dessins.

.5 Fournir des embouts sur mesure de 12,7 mm d'épaisseur, DR1.

2.02 FABRICATION-GENERAL

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

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

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

.4 Provide adequate drainage at low points of all closed sections. Indicate drain hole locations on shop drawings.

.5 All heat fusion welding of the HDPE end caps to the HDPE pipe pontoons shall be performed by an experienced HDPE product manufacturer's certified installer. The HDPE product manufacturer must have written welding and certification guidelines that are the basis for training and certification. All pontoon fabrication and welding shall conform to these guidelines.

.6 Heat fusion welding procedures to be in accordance with ASTM-F2620.

3 EXECUTION

3.01 GENERAL

.1 Do steel work in accordance with CSA S16.

.2 Do welding work in accordance with CSA W47.1 or CSA W47.2 unless specified otherwise.

.3 Erect metal work square, plumb, square, and true, accurately fitted, with tight joints and intersections.

.4 Take necessary care in the handling of all galvanized steel parts to prevent damage to the galvanized coating. Evidence of damage shall be cause for rejection. Damage may be touched-up if approved by Departmental Representative.

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

3.02 TOUCH-UP OF GALVANIZED SURFACE

.1 Touch up all damaged, scratched or exposed steel at welds of galvanized components in field with cold applied film galvanizing system.

.2 Prepare all surfaces to be touched-up by de-greasing and cleaning to SSPC-SP12.

.3 Refer to manufacturers written instructions for additional cleaning, surface preparation and application requirements.

3.03 WELDING INSPECTION

.1 The Contractor is responsible to assure that materials, fabrication, and examination procedures for all welding conforms to CSA W59 or W59.2.

.2 Quality assurance inspection and testing of welds will be carried out by a Testing Agency designated by Departmental Representative.

.3 Provide safe access and working areas for inspection and testing on site, as required by Testing Agency and as authorized by Departmental Representative.

.4 Inspection or testing by Departmental Representative will not augment or replace Contractor's quality control nor relieve him of his contractual responsibility.

END OF SECTION

1 GENERAL

1.01 RELATED WORK

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 26 24 17 – Panelboards, Breaker Type

1.02 DESCRIPTION

.1 This section specifies the requirements for the supply of treated timbers, installation of treated dimension timber and their fasteners.

1.03 PRICE AND PAYMENT PROCEDURES

.1 Treated timber for Panel "E" backboard is included in the lump sum price for Electrical Improvements.

1.04 REFERENCE STANDARDS

.1 ASTM International (ASTM)

.1 ASTM A307-12, Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod, 60 000 PSI Tensile Strength.

.2 ASTM A123/A123M-17, Standard Specification for Zinc, (Hot-Dip Galvanized) Coatings on Iron and Steel Product.

.2 American Wood Protection Association (AWPA)

.1 AWPA M2-19, Standard for Inspection of Wood Products Treated with Preservatives for Industrial Use.

.2 AWPA M4-21, Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative Treated Wood Products.

.3 Canadian Standards Association (CSA)

.1 CSA O80 Series:21, Wood Preservation

.2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.

.3 CSA 0141:05 (R2019), Softwood Lumber

.4 CSA O15-15 (R2019), Wood Utility Poles and Reinforcing Stubs.

.4 National Lumber Grading Authority (NLGA)

.1 2017 Standard Grading Rules for Canadian Lumber.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Quality assurance submittals:

.1 The Contractor shall submit, for approval to the Departmental Representative, the location of the Wood Preservation Plant at which the dimension timber is to be treated. This submission shall be within seven, (7), days of award of contract.

1.06 QUALITY ASSURANCE

.1 Plant:

.1 Wood Preservation Plant shall:

.1 Follow the requirements for quality control procedures outlined in CSA-080.

.2 Carry out inspection of all treated timber to AWPA M2 and supplementary requirements as per Clause 7 of CSA-080.

.2 The Contractor shall facilitate the inspection of the process by the Departmental Representative and, notwithstanding the Contractor's notice of treatment and whether or not the process is inspected by a representative of the Departmental Representative at the time and place of treatment, the Departmental Representative reserves the right to reject, at the point of delivery, any or all timber that does not meet the requirements of the specification.

.3 Ordering of material is to follow the requirements of the contract such that field cutting of treated materials is essentially avoided and is used as a last resort and only if authorized by the Departmental Representative.

.2 Lumber:

.1 By grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 For all products treated with preservatives by pressure impregnation, reports shall be provided to the Departmental Representative, at no cost, containing all applicable information outlined in Part 7 of AWPA M2.

.1 Results of treatment of each and every charge is required.

.2 Retention analysis shall be by the assay method.

.3 When timber is pressure treated a second time, results of both treatments are required.

.4 All reports shall be:

.1 Certified by an authorized officer of the treatment plant.

.2 In the format and the order presented in Part 7 of AWPA M2.

.3 In metric (S.I.) units.

.3 No treated timber shall be incorporated into the work until all results meet or exceed the requirements specified. No payment will be made for material incorporated into the work until the results are received and approved by the Departmental Representative.

1.07 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with AWPA M4 and with manufacturer's written instructions.

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

1.08 WASTE MANAGEMENT AND DISPOSAL:

.1 Collect all treated cutting, wood pieces and sawdust for disposal at landfill.

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

.3 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

.4 Store separated reusable treated wood waste convenient to cutting station and work areas.

2 PRODUCTS

2.01 MATERIALS

.1 Dimensioned Timber:

.1 To CSA 0141, S-dry moisture content 19% or less to meet requirements of Wood Preserving Plant, grade stamped in accordance with NLGA and scheduled for coastal use.

.2 Species: Eastern or Western Hemlock, Douglas fir, white or red spruce.

.3 Grade: No.1/No.2 grade.

.4 Dry all dimension timber to max. 25% moisture content after treatment.

.5 All dimension timber will be dressed all four sides to dimensions indicated on drawing.

.2 Preservative Treatment

.1 Posts: Treat to CSA 080 Series for in ground or freshwater contact, Category UC4.2.

.2 Backboards, Treat to CSA 080 Series for above ground construction with uncoated wood products or poor run off of water; Category UC3.2

.3 Fasteners:

.1 Use 12.5mm galvanised lag bolts or equivalent structural screw. Use galvanized washers.

.4 Field Treatment Preservatives:

.1 The field treatment preservatives shall be a copper naphthenate prepared using a solvent that meets the requirements of AWPA P36 and contains at least 2%copper as metal.

.1 To obtain a solution containing 2% copper as metal, a preservative solution containing approximately 17% copper naphthenate is needed.

3 EXECUTION

3.01 PREPARATION

.1 Application of Preservative:

.1 Treat to CSA 080 Series using CCA Preservative to obtain minimum net retention specified.

.2 Application Field Treatment:

.1 Comply with AWPA M4 and revisions specified in Field Treatment CSA 080 Series, Supplementary Requirements to AWPA M2.

.2 Field cuts, if authorized by the Departmental Representative, are to receive three (3) liberal coats of the applicable preservative applied to dry wood on each application.

3.02 INSTALLATION

.1 Install wood members true to line, levels and elevations, square and plumb.

.2 Construct using single pieces, no splicing.

.3 Install and secure as indicated on plans using galvanized bolts, screws and washers.

.4 Predrill panel boards 75% diameter of fastener diameter. Treat predrilled hole with preservative.

3.03 FIELD QUALITY

.1 Timber which contains rot, splits exposing untreated wood, excessive wane, or timbers which cannot be fastened in the work so as to be structurally sound or if, in the opinion of the Departmental Representative, will not last the life of the unit, are unacceptable.

.2 The Departmental Representative reserves the right to carry out field testing of treated timber for penetration and retention of preservative. Timber not meeting the requirements of the specification may be rejected for use under the contract.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

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

.2 Section 32 11 16 - Granular Sub-Base

.3 Section 32 11 23 - Granular Base

1.02 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section. Include costs in items of work that require aggregate.

1.03 SOURCE APPROVAL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least four (4) weeks prior to commencing production.

.2 If, in the opinion of the Departmental Representative, material from proposed source do not meet, or cannot reasonably be processed to meet specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Should a change of material source be proposed during work, advise Departmental Representative four (4) weeks in advance of proposed change to allow sampling and testing.

.4 Acceptance of a material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.

1.04 PRODUCTION SAMPLING

.1 Aggregate will be subject to continual sampling by Departmental Representative during production.

.2 Provide Departmental Representative with ready access to source and processed material for purpose of sampling and testing.

.3 Install adequate sampling facilities at discharge end of production conveyor to allow Departmental Representative to safely obtain representative samples of materials being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross-section sampling.

.4 Bear the cost of sampling and testing of aggregates which fail to meet specified requirements.

2 PRODUCTS

2.01 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.

.2 Flat and elongated particles are those whose greatest dimension exceeds four times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

- .1 Natural sand.
- .2 Manufactured sand.
- .3 Screening produced in crushing of quarried rock, boulders or gravel.

.4 Coarse aggregates satisfying requirements of applicable section shall be one, or a blend of following:

- .1 Crushed rock.
- .2 Gravel and crushed gravel composed of naturally formed particles of stone.

.5 Particles having at least one fractured face are considered to be crushed particles.

3 EXECUTION

3.01 AGGREGATE SOURCE

.1 Sources to be supplied by Contractor.

3.02 PROCESSING

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use approved methods and equipment.

.3 Wash aggregates, if required, to meet specifications. Use only equipment approved by Departmental Representative.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.03 HANDLING

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.04 STOCKPILING

.1 Stockpile aggregates off site. Do not unload delivered aggregate on completed concrete surfaces where damage to concrete may result.

.2 Stockpile aggregates in sufficient quantities to meet project schedule.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 02 41 13 Site Work, Preparation and Removal.

.2 Section 31 05 16 Aggregates – General.

.3 Section 31 32 21 Geotextiles.

.4 Section 31 36 19 Dense Rock Fill

1.02 DESCRIPTION

.1 Work under this section consists of all operations and materials related to excavation and backfilling for Work.

1.03 MEASUREMENT PROCEDURES

.1 Include excavation costs and handling of excavated materials in Construction, Demolition, Mobilization, Demobilization pay item of Section 02 41 13 - Site Work, Preparation and Removal.

.2 Include all other backfilling costs in the respective material sections.

.3 Include excavation and subgrade backfill costs for trenching in the cost items requiring trenching.

.4 Temporary construction sheeting to be considered incidental to the work and will not be measured separately.

1.04 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-17, Standard Test Method for Materials Finer than 75-µm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.5 ASTM D1557-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.6 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.05 DEFINITIONS

.1 Unclassified excavation: excavation of deposits of whatever character encountered in Work. This includes concrete foundations, rubble, wood debris and other obstructions encountered during excavation.

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

.3 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136.

.2 Sieve sizes to CAN/CGSB-8.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

1.06 EXISTING CONDITIONS

.1 Existing surface features:

.1 Conduct, with Departmental Representative, condition survey of existing plants, service poles, wires, site features, asphalt pavement, concrete slab, survey bench marks and monuments which may be affected by work.

.2 Protect existing surface features from damage while work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

.2 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify Departmental Representative and Authorities having jurisdiction. Establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, electric, telephone and other utilities and structures encountered.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing structures, catch basins, drains, service poles, wires, survey bench marks and monuments which may be affected by Work.

.2 Protect existing surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

1.07 SUBMITTALS

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

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

.1 Submit condition survey of existing conditions as described in article 1.06 Existing Conditions, of this Section.

.2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.

.3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.

.4 Submit to Departmental Representative a written notice when bottom of excavation is reached.

.5 Submit to Departmental Representative testing inspection results and report as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, and location plan of relocated and abandoned services, as required.

.4 Samples:

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

.2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill specified, if requested by the Departmental Representative, including representative samples of excavated material.

.4 Ship samples prepaid to Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.08 QUALITY ASSURANCE

.1 Do not use backfill materials until written report of soil test results are reviewed by Departmental Representative.

.2 Health and Safety Requirements:

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

1.09 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

.2 Divert excess materials from landfill to local quarry for reuse as directed by Departmental Representative.

2 PRODUCTS

2.01 MATERIALS

.1 Random Riprap Fill (R5): Random Riprap Fill for the reconstruction of the breakwater berm and parking barricade is to be material meeting all the requirements as specified for rip rap under Section 31 36 19 – Dense Rock Fill.

.2 Filter fabric: As specified under Section 31 32 21 - Geotextiles.

.3 Granular Sub-base: As specified under Section 32 11 16 - Granular Sub-Base.

.4 Granular Base: As specified under Section 32 11 23 - Granular Base.

3 EXECUTION

3.01 SITE PREPARATION

.1 Set out pertinent lines, grades and levels required for excavation and backfill work. Maintain accuracy of line and grade stakes during Work.

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

.3 Strip and dispose of excavated materials as indicated on plans and as required to complete the Work.

3.02 TEMPORARY EROSION AND SEDIMENT CONTROL

.1 If requested by the Departmental Representative, provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent

properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

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

3.03 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 10 10 - General Instructions, and applicable local regulations.

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

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

.4 Protect natural and man-made features required to remain undisturbed.

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

3.04 STOCKPILING

.1 Stockpile fill materials in areas approved by Departmental Representative. Stockpile granular materials in manner to prevent segregation.

.2 Excavated wet materials to be stockpiled on site for a minimum period of 2 months, unless otherwise instructed by the Departmental Representative. Location of stockpile to be determined at the time of construction with Departmental Representative.

3.05 SHEETING, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29 - Health and Safety Requirements and Health and Safety Act for the Province of New Brunswick.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 600 mm above toe of sheeting.

.3 Upon completion of substructure construction:

.1 Remove shoring and bracing.

.2 Remove excess materials from site.

3.06 DEWATERING

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

.2 Provide details of proposed dewatering methods for Departmental Representative's review.

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

.4 Dispose of water in runoff areas and in manner not detrimental to property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage and other diversions outside of excavation limits.

3.07 EXCAVATION

.1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.3 Dry materials may be used for backfill only with prior approval from Departmental Representative. Dry material not reused to be immediately disposed of at an approved disposal site. Boat haulout materials, to be separate from any concrete, wood, steel and rocks, and wet materials to be stockpiled on site for a minimum period of 2 months, unless otherwise instructed by the Departmental Representative. Once deemed acceptable by Departmental Representative, wet materials to be disposed at an approved disposal site.

.4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.5 Keep excavated and stockpiled materials safe distance away from edge of trench.

.6 Restrict vehicle operations directly adjacent to open trenches.

.7 Dispose of surplus and unsuitable excavated material as indicated in Section 02 41 13 - Site Work, Preparation and Removal.

.8 Do not obstruct flow of surface drainage or natural watercourses.

.9 Notify Departmental Representative when bottom of excavation is reached.

.10 Obtain Departmental Representative's approval of completed excavation.

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

.12 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.13 Install filter fabric in accordance with Section 31 32 21 - Geotextiles.

3.08 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified in related sections. Compaction densities are percentages of maximum densities obtained from ASTM D698.

.2 Placement and compaction of crushed rock to be in accordance with their respective section or drawings.

3.09 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Departmental Representative has inspected and approved of construction below finish grade.

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

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

.4 Refer to related sections or drawings for additional backfilling and compaction requirements.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified in related sections.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 600 mm.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval is obtained from Departmental representative.

.2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental representative.

3.10 RESTORATION

.1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

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

3.11 QUALITY ASSURANCE INSPECTION AND TESTING

.1 Testing of materials and compaction will be carried out by Testing Agency designated by Departmental Representative. Frequency of tests will be determined by Departmental Representative.

.2 Departmental Representative will pay for services of testing laboratory.

.3 Inspection and testing by the Soil Testing Agency and/or Departmental Representative will not augment or replace Contractor quality control nor relieve the Contractor of contractual responsibilities.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 29 10 - Project Particulars and Measurements

.2 Section 31 32 21 - Geotextiles.

.3 Section 31 23 10 - Excavation and Backfill.

.4 Section 32 11 16 - Granular Sub-Base.

1.02 MEASUREMENT PROCEDURES

.1 **Biaxal Grid:** The supply and installation of biaxal grid will be measured in square metres installed into the work.

1.03 REFERENCES

.1 Tensar TriAx (TX) and Biaxial (BX) Geogrid Installation Guide.

.2 ASTM D6637-10 Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

.3 ASTM D7737-11 Standard Test Method for Individual Geogrid Junction Strength

.4 Resistance to bending force determined in accordance with ASTM D7748/D7748M-14 Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles, and Related Products

.5 ASTM D7864/D7864M-15 Standard Test Method for Determining the Aperture Stability Modulus of Geogrids.

1.04 SUBMITTALS

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

.2 Submit to the Departmental Representative the following samples at least 2 weeks prior to commencing work: manufacturer’s specifications on the geogrid proposed to be used.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Store Geogrid rolls in a manner that prevents excessive mud, wet concrete, epoxy or other deleterious materials from coming in contact with and affixing to the geogrid.

.2 Store geogrids above –29°C and avoid handling below –10°C (the glass-transition temperature for polypropylene used in Geogrids).

.3 Geogrid may be stored uncovered for up to six months in direct exposure to sunlight without any loss in certifiable structural properties. Geogrid may be stored vertically (rolls stood on end) or, typically, horizontally in stacks not exceeding five rolls high.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 MATERIALS

.1 Biaxal Geogrid: polypropylene grid with the following properties:

.1 Geogrid properties:

.1 Aperture Dimensions 25mm
.2 Rib Thickness 0.76mm
.3 Tensile Strength @ 2% Strain 4.1 kN/m
.4 Tensile Strength @ 5% Strain 8.5 kN/m
.5 Ultimate Tensile Strength 12.4 kN/m

3 EXECUTION

3.01 INSTALLATION

.1 Geogrid shall be placed to the lines and grades shown on the drawings and as per manufacturer's recommendations.

.2 Overlap Geogrid in the direction of the fill. Overlaps shall be 600 mm.

.3 Anchor the Geogrid with small piles of structural fill, a washer and pin, or large heavy-gauge staples to maintain alignment.

.4 Align Geogrid and pull geogrid taut to remove wrinkles. Laydown slack areas with hand tension and secure in place. Use additional shoveled piles of structural fill, pins, or staples to hold the geogrid in place prior to placement of the structural fill.

.5 During the placement of structural fill, care is to be taken not to create a "wave" in the sheet of geogrid ahead of the advancing fill. If significant waving occurs, the pins or shoveled material shall be removed to allow the waves to dissipate at the ends and edges of the roll.

3.02 PROTECTION

.1 Do not drive tracked equipment directly on Geogrid. Ensure at least 300 mm of structural fill is spread between the geogrid and tracked equipment.

.2 Care should be taken not to catch the forward blade of any fill placing equipment on Geogrid. Dozer blades should be raised gradually as each lift is pushed out over the geogrid. The desired effect is fill that cascades onto the geogrid, rather than being pushed into it.

3.01 REPAIRS

.1 Repair damaged Geogrid by patching the area. Remove fill from the surface of the damaged geogrid and clear a 900 mm area around the damage. The geogrid patch shall cover the damaged area and extend 900 mm beyond it in all directions.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 29 10 - Project Particulars and Measurements

.2 Section 31 32 20 - Geogrids

.3 Section 31 23 10 - Excavation and Backfill

.4 Section 32 11 16 - Granular Sub-Base

1.02 DESCRIPTION

.1 This section specifies requirements for:

.1 The supply and installation of synthetic non-woven filter fabric and polyethylene biaxial grids to be used in backfilling operations, as indicated on drawings.

1.03 MEASUREMENT PROCEDURES

.1 **Filter Fabric**: The supply and installation of filter fabric will be measured in square metres installed into the work.

.2 Damaged material shall be replaced at no cost to the owner.

1.04 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D4101-17e1, Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials.

.2 ASTM D4491-21, Standard Test Methods for Water Permeability of Geotextiles by Permitivity.

.3 ASTM D4595-17, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.4 ASTM D4751-21a, Standard Test Methods for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 4.2 No. 11.2-M89 (R2013), Textile Test Methods - Bursting Strength - Ball Burst Test.

.2 CAN/CGSB-148.1, Methods of Testing Geosynthetics.

1.05 SUBMITTALS

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

.2 Submit to the Departmental Representative the following samples at least 2 weeks prior to commencing work: manufacturer’s specifications on the filter fabric, curtain proposed to be used.

1.06 DELIVERY, STORAGE AND HANDLING

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

1.07 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 MATERIALS

.1 Filter Fabric to be synthetic fiber and be rot proof, unaffected by action of oil or salt water and not subject to attack by marine life, insects, or rodents. Filter fabric to be of non-woven construction supplied in rolls of minimum 3.0 metres width.

.1 Filter fabric for the reconstruction of the wharf structure to have the following properties:

.1 Mass(g/m^2) 380

.2 Tear (N) 500

.3 Tensile Strength (N) 1,200

.4 Elongation at Break (%) 50

.5 Opening Size (um) 50 to 250

.6 Permeability (K cm s-1) 1.0 to 2.5x10-1.

3 EXECUTION

3.01 FILTER FABRIC INSTALLATION

.1 Place geotextile material by unrolling in orientation, manner and locations indicated and retain in position with securing pins and washers, weights or other method as approved by Departmental representative.

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

.3 Overlap each successive strip of geotextile minimum of 600 mm over previously laid strip.

.4 Pin successive strips of geotextile with securing pins or fasteners as recommended by manufacturer.

.5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.

.6 After installation, cover with overlying layer within 4 hrs of placement.

.7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.02 PROTECTION

.1 Vehicular traffic is not permitted directly on geotextile.

END OF SECTION

1 GENERAL

1.01 RELATED WORK

.1 Section 01 29 10 Project Particulars and Measurements

.2 Section 31 23 10 Excavation and Backfill

.3 Section 31 32 21 Geotextiles.

1.02 PRICE AND PAYMENT PROCEDURES

.1 **Random Rip-Rap (R-5):** Random Rip-Rap (R-5) to be measured in metric tonnes, (Tonnes), of material supplied and acceptably placed in the work to the lines and grades specified.

.2 Mobilization/demobilization of equipment will not be measured separately for payment.

.3 Construction and maintenance of haul roads will not be measured separately for payment.

.4 Weighing will not be measured separately for payment, but will be considered as incidental to the work of this section.

1.03 REFERENCE STANDARDS

.1 New Brunswick Department of Transportation and Infrastructure (NBDTI) 2015 standard Specifications.

.2 American Society for Testing and Materials (ASTM).

.1 ASTM C88-18, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

.2 ASTM C127-15, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.3 ASTM C535-16, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit rock material samples for testing to testing laboratory approved by the Departmental Representative prior to commencement of quarry production. Allow sufficient lead time to perform and report tests before start of production.

.2 Contractor will be responsible for procurement of samples for testing and arrange and pay for shipment of samples to testing laboratory.

.3 Departmental Representative will pay for costs associated with laboratory testing. The cost of re-testing due to samples failing to meet the requirements of the contract will be borne by the Contractor.

.4 Only materials satisfactorily tested and approved by the Departmental Representative will placed in the work.

2 PRODUCTS

2.01 MATERIALS

.1 Random Rip-Rap (R-5): Clean, hard, dense durable quarried stone.

.1 To consist of R-5 material and to be in strict accordance with the material requirements as per the January 2019 Edition of the NBDTI Standard Specifications, Item: 608, Random Rip Rap. Gradation to be to R-5 grading limits as per Table 608-1 of NBDTI Specifications.

Table 608 – 1 (Partial Table)
Random Rip Rap Grading Limits

Mass	Size (Note 1)	R-5
(kg)	(mm)	
15	220	100
10	190	70 - 90
5	150	40 - 55
2.5	120	
0.5	70	0 - 15
Thickness (mm) (Note 3)		300

.1 Note 1 Approximate diameter

.2 Note 3 measured perpendicular to the surface

.2 Geotextile: in accordance with Section 31 32 21 Geotextiles.

3 EXECUTION

3.01 PREPARATION

.1 Remove individual armour stones and filter layer rocks to the base of the dense rock fill, with stabile slopes. Store rock for reinstallation to protect anchor block foundations.

.2 Excess pieces of rock to remain on site at edge of parking lot to containment cell.

.3 Confirm with Departmental Representative that excavated area is adequate for placement of dense rock fill.

.4 Grade areas to be backfilled with stone to create uniform, even surfaces. Compact to provide firm bed.

3.02 PLACEMENT

.1 If indicated, line bottom and sides of areas to be filled with R5 before placing filter fabric on prepared surfaces, in accordance with Section 31 32 21 Geotextiles. Place rip-rap on filter fabric so as to avoid puncturing filter fabric. Do not drive vehicles directly on filter fabric.

.2 Place stone to thickness and details as indicated.

.3 Place stone in manner approved by Departmental Representative to create a firm compacted, very dense stable mass.

.4 Finish surface evenly, free of loose areas and neat in appearance.

.5 Mechanically place the stone. No end dumping will be permitted.

3.04 TOLERANCES

.1 Prepared surfaces to have a tolerance of 50mm.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 01 29 10 - Project Particulars and Measurements

.2 Section 31 05 16 - Aggregates - General

.3 Section 31 23 10 - Excavation and Backfill

.4 Section 31 32 20 - Geogrid

.5 Section 32 11 23 - Granular Base

1.02 MEASUREMENT PROCEDURES

.1 **Granular Sub-Base 75mm**: Granular Sub-Base to be measured in metric tonnes, of material supplied and acceptably placed in the works to the lines and grades specified.

.2 Mobilization/demobilization of equipment will not be measured separately for payment.

.3 Construction and maintenance of haul road will not be measured separately for payment.

.4 Weighing will not be measured separately for payment, but will be considered as incidental to the work of this section.

1.03 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C88/C88M-18, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

.2 ASTM C117-17, Standard Test Method for Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C131-20, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.4 ASTM C136-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.5 ASTM D422-63 (2007)e2, Standard Test Method for Particle-Size Analysis of Soils.

.6 ASTM D698-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).

.7 ASTM D1557-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³ (2,700 kN-m/m³)).

.8 ASTM D1883-21, Standard Test Method for California Bearing Ration (CBR) of Laboratory-Compacted Soils.

.9 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

2 PRODUCTS

2.01 MATERIALS

.1 Random R5

.2 Granular sub-base: to Section 31 05 16 - Aggregates - General and following requirements:

.1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations to be within following limits when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on a semi-log grading chart. Sieve sizes to CAN/CGSB-8.1.

SIEVE DESIGNATION	ASTM % PASSING BY WEIGHT
90.0 mm	100
75.0 mm	95 – 100
63.0 mm	85 – 100
50.0 mm	73 – 95
37.5 mm	58 – 87
19.0 mm	35 – 69
9.5 mm	25 – 54
4.75 mm	17 – 43
2.36 mm	12 – 35
1.18 mm	8 – 28
0.300 mm	4 – 16
0.075 mm	0 - 9

.3 Liquid Limit: to ASTM D4318 Maximum 25.

.4 Plasticity Index: to ASTM D4318 Maximum 6.

.5 Los Angeles Abrasion: to ASTM C131, Gradation 'A' Max. % loss by weight: 35.

.6 Crushed particles: at least 60% of particles by mass retained on the 4.75 mm sieve to have at least one freshly fractured face.

.7 Petrographic Number (maximum) 135.

.8 Magnesium Sulphate Soundness to ASTM C88, max. % by mass:15.

.9 Flat and elongated particles: maximum % by mass: 15.

3 EXECUTION

3.01 INSPECTION OF SUBGRADE SURFACE

.1 Do not place granular sub-base until finished sub-grade is inspected and approved by Departmental Representative.

3.02 PLACING

.1 Ensure no frozen material is placed in work.

.2 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow or ice.

.3 Grade the granular sub base over Geogrid as directed in Section 31 32 20 - Geogrid.

.4 Begin spreading sub-base material on crown line or high side of one-way slopes.

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

.6 Place material to full width in uniform layers not exceeding 300mm uncompacted thickness.

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

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

3.03 COMPACTION EQUIPMENT

.1 Compaction equipment must be capable of obtaining required densities in materials used in the Work.

.2 Compaction equipment is to be hand operated within 2.0 metres of concrete structures.

3.04 COMPACTING

.1 Compact to a density not less than 95% in accordance with ASTM D698, (Standard Proctor).

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.3 Apply water as necessary during compaction to obtain specified density. If sub-base is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

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

3.05 FINISH TOLERANCES

.1 Finished compacted surface to be within plus or minus 20 mm of established grade, but not uniformly high or low.

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

3.06 MAINTENANCE

.1 Maintain finished sub-base in a condition conforming to this section until succeeding base is constructed.

END OF SECTION

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 31 05 16 - Aggregates - General

.2 Section 31 23 10 - Excavation and Backfill

.3 Section 32 11 16 - Granular Sub-base

1.02 MEASUREMENT PROCEDURES

.1 **Granular Base**: to be measured in metric tonnes, (Tonnes), of material supplied and acceptably placed in the works to the lines and grades specified.

.2 Mobilization/demobilization of equipment will not be measured separately for payment.

.3 Construction and maintenance of haul roads will not be measured separately for payment.

.4 Weighing will not be measured separately for payment, but will be considered as incidental to the work of this section.

1.03 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C88/C88M-18, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

.2 ASTM C117-17, Standard Test Method for Material Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C131-20, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.4 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.5 ASTM D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.

.6 ASTM D698-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))

.7 ASTM D1557-12(2021), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.8 ASTM D1883-21, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.

.9 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

2 PRODUCTS

2.01 MATERIALS

.1 Granular base material: to Section 31 05 16 Aggregates - General and following requirements:

.1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations to be within following limits when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on a semi-log grading chart. Sieve sizes to CAN/CGSB-8.1.

SIEVE DESIGNATION	PASSING BY WEIGHT
37.5 mm	100
31.5 mm	95 - 100
25.0 mm	81 – 100
19.0 mm	66 - 90
12.5 mm	50 - 77
9.5 mm	41 – 70
4.75 mm	27 – 54
2.36 mm	17 – 43
1.18 mm	11 – 32
300 µm	4 – 19
75 µm	0 - 8

.3 Liquid Limit: to ASTM D4318 Maximum 25.

.4 Max. % loss by weight: 35.

.5 Crushed particles: at least 60% of particles by mass retained on the 4.75 mm sieve to have at least two freshly fractured face.

.6 Petrographic Number (maximum) 135.

.7 Magnesium Sulphate Soundness to ASTM C88, max. % by mass: 15.

.8 Flat and elongated particles: maximum % by mass: 15.

3 EXECUTION

3.01 INSPECTION OF UNDERLYING SUBGRADE SURFACE

.1 Do not place granular base until finished granular sub-base is inspected and approved by Departmental Representative.

3.02 PLACING

.1 Ensure no frozen or blended recycled asphalt product is placed with granular base material.

.2 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow or ice.

.3 Begin spreading base material on crown line or high side of one-way slopes.

.4 Place granular base materials using methods which do not lead to segregation or degradation of aggregate.

.5 Place granular base immediately upon approval of granular sub-base placement.

.6 Place material to full width in uniform layers not exceeding 200 mm compacted thickness.

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

.8 Remove and replace portion of a layer in which material becomes segregated during spreading.

3.03 COMPACTION EQUIPMENT

.1 Compact to a density not less than 100% in accordance with ASTM D698, (Standard Proctor).

.2 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.

.3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

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

3.04 FINISH TOLERANCES

.1 Finished base surface shall be within plus or minus 10 mm of established grade, but not uniformly high or low.

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

END OF SECTION

1 GENERAL

1.01 RELATED WORK

.1 Section 01 29 10 - Project Particulars and Measurement

.2 Section 05 50 00 - Metals Fabrications.

1.02 PRICE AND PAYMENT PROCEDURES

.1 **Floating Wharves and Gangway Installation:** Costs associated with the installation of the Floating Wharves and Gangways (both supplied by others) will constitute a lump sum price, (LS), and shall consist of, but not be limited to, the following:

.1 Placing floating wharf in water.

.2 Supply and installation chains, shackles, links and connectors.

.3 Design, supply and installation of Zinc anodes to chains.

.4 Installation of concrete anchor blocks.

.5 Installation of strong-Arm assembly.

.6 Installation of gangway.

.7 Installation of Teflon skid pad.

1.03 REFERENCE STANDARDS

.2 Harbour Accommodations Guidelines for Small Craft Harbours Branch, Fisheries and Oceans Canada, 2019-01-03

.3 ASTM A391/A391M-01 Standard Specification for Grade 80 Alloy Steel Chain.

.4 ASTM A952/A952M-02(2022)Standard Specification for Forged Grade 80 and Grade 100 Steel Lifting Components and Welded Attachment Links.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Chain, links and shackles specifications.

.3 Submit a hoisting, positioning, sinking plan, describing details of lifting points, equipment, outrigger positions, structure loading, installation sequencing, alignment control and schedule of each operation.

1.05 QUALITY ASSURANCE

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

.2 Health and Safety Requirements: do construction work while following occupational health and safety measures in accordance with Section 01 35 29 - Health and Safety Requirements.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic, including wood cuttings and sawdust, in designated containers.

.3 Ensure emptied containers are sealed and stored safely.

2 PRODUCT

2.01 MATERIALS

.1 Chain: Grade 80 Alloy Chain, working load 11.2 tonnes, chain diameter 19mm.

.2 Master link, Suitable for grade 100 or Grade 80, working loads 14 tonnes, 16mm.

.3 Alloy Connecting Link-Hammer lock: Locking system that provides for simple assembly and disassembly, meets ASTM A-952-96 standards for Grade 80 or Grade 100 chain, working load 11.2 tonnes or greater, link dia to match chain.

.4 Shackles: Grade 8, Alloy Bolt type, stainless Cotter pin.

.5 Master Link: Allow steel, sized to chain to prevent point loading, 19 dia.

.6 Mooring Chain anodes, sacrificial zinc, one each 3.0 lineal metre of chain.

3 EXECUTION

3.01 PREPARATION

3.02 INSTALLATION FLOATING WHARVES

.1 Relocate floating wharf sections from storage and install in the water, as indicated, ensuring that no damage is done to the structure or floating wharves.

.2 Align wharves, strong arm and gangway as shown on plan. The series of floating wharves to be straight and perpendicular with structures.

.3 Concrete anchor blocks to be installed below harbour bottom with the use of compressed air. Verify depth upon placement to ensure blocks sink below grade and have not tilted to become a navigational hazard.

.4 The use of the floating wharves to place concrete blocks is acceptable. Be responsible for any damage to floating wharves during installation.

.5 Supply and install sacrificial mooring chain anodes on floating wharf chains.

.6 Connect chains complete with shackles to the floating wharves.

.7 Install the Teflon sheet underside of the gangways skid plate.

3.03 TOLERANCES

.1 Arrange to place the concrete blocks within 300mm of their intended position

END OF SECTION

Part 1 GENERAL

1.1 THIS SECTION COVERS ITEMS COMMON TO SECTIONS OF DIVISION 26. THIS SECTION SUPPLEMENTS REQUIREMENTS OF DIVISION 01.

1.2 Description of Work

Work to be completed under this Contract includes the following:

.1 Supply, install and connect new service from metered service MS1 underground to new Panel 'E' enclosure c/w tel/data service.

.2 Supply, install and connect new Panel 'E' enclosure, Panel 'E', lighting control and framing support.

.3 Supply, install and connect feeder from Panel 'E' to Harbour Authority Building c/w tel/data service.

.4 Supply, install and connect branch circuit wire and conduits from Panel 'E' to pole/shroud 1 and 2.

.5 At each pole/shroud, supply, install and connect shroud c/w 6-20A 120V receptacles c/w GFI module.

.6 At each pole/shroud, supply, install and connect 10.7 meter galvanized steel light pole - 3 unit bullhorn and 2-409W LED floodlights and 1 357W LED floodlight.

.7 Provide electrical work on existing underground conduits from land side power source along the parking lot area, under the location of the Harbour Authority Building and across the floating wharf access road to the haul out where the existing power is routed to the existing wharf and existing concrete electrical building.

.8 Electrical Contractor testing and commissioning, as-built drawings and O&M manuals.

.9 Electrical Contractor to turn over all existing removed light fixtures and wood poles to the Harbour Authority.

1.3 Codes and Standards

.1 Do complete installation in accordance with CSA C22.1:21 except where specified otherwise.

.2 Comply with CSA Certification Standards and Electrical Bulletins in force at time of tender submission.

.3 Do overhead and underground systems in accordance with CSA C22.3 No. 1M except where specified otherwise.

.4 Abbreviations for electrical terms: to CSA Z85.

1.4 Care, Operation and Start-Up

.1 Instruct PSPC Departmental Representative and operating personnel in the operation, care and maintenance of equipment.

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

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

1.5 Voltage Ratings

.1 Operating voltages: to CAN3-C235-83.

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

1.6 Permits, Fees and Inspections

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

.2 Pay associated fees.

.3 PSPC Departmental Representative will provide drawings and specifications required by Electrical Inspection - Department and Supply Authority at no cost.

.4 Notify PSPC Departmental Representative of changes required by Electrical Inspection Department prior to making changes.

1.7 Materials and Equipment

.1 Provide materials and equipment in accordance with Division 01.

.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 Department.

.3 Factory assembly control panels and component assemblies..

1.8 Electric Motors, Equipment and Controls

.1 Supplier, installer and wiring responsibility is indicated on electrical drawings.

.2 Coordinate final connection to all equipment and controls.

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

.3 Clean, prime and paint exposed painted non-galvanized hangers, racks and fastenings to prevent rusting..

1.10 Equipment Identification

.1 Identify electrical equipment with nameplates as follows:

.2 Nameplates:

.1 Lamicoid 3mm thick plastic engraving sheet, white face, black core, mechanically attached unless specified otherwise.

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

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

.4 Allow for average of twenty-five (25) letters per nameplate/language.

.5 Identification to be English and French.

.6 All switchboards, panels, disconnect switches, transformers, control panels, magnetic starters, and time clocks are to be provided with ‘lamicoid’ nameplates. Nameplates are to be affixed to all metal surfaces with metal type “pop-rivets” if possible.

.7 Nameplates are to be affixed to other surfaces with contact type cement. Contact type cement is to be applied to complete backside of plate, as opposed to several points or locations on same.

.8 Nameplates are to be affixed to building exterior surfaces with nylon inserts and self-tapping screws unless specifically indicated otherwise.

.9 Lamicoid nameplates installed on distribution panelboards, motor control centres, splitter troughs, transformers, shall indicate the following:

.1 Designated name of equipment;

.2 Overcurrent protection device rating;

.3 Voltages, number of phases and wires;

.4 Designation of power source.

Example:

PANEL N - 150A
120/208V - 3PH - 4W
FED FROM MAIN SWITCHBOARD #CDP-A

.10 All junction and/or pull boxes shall be marked with an indelible ink marker to designate the circuit number of enclosed wiring, the designated panel name and electrical characteristics where applicable.

.11 Install an additional 'Lamicoid' nameplate on all, or any piece of electrical equipment, or apparatus, ie. Main Switchboard, CDP panels, panelboards, motor control centres, and fusible switches, etc. that may contain overcurrent devices, i.e. circuit breakers and/or fuses, that have been designed for, and incorporate an interrupting capacity sized "larger" than 10kAIC.

Examples:

Minimum interrupting capacity of breakers installed in this panel is to be not less than 22 kAIC.

Minimum interrupting capacity of fuses installed in this MCC is to be not less than 100 kAIC.

1.11 Wiring Identification

.1 Identify feeder and branch circuit wiring including neutral conductors at both ends, including in all junction and outlet boxes located in between, with permanent indelible identifying markings, indicating panel and circuit number. (i.e. A1-25).

.2 Maintain phase sequence and colour coding throughout. (Red, black, blue, white). No colour taping of wires is allowed.

.3 Colour code: to CSA C22.1:21.

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

1.12 Conduit and Cable Identification

.1 Colour code conduits and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall or floor, and at 15m intervals.

.3 Colours to be 25mm wide prime colour and 20mm wide auxiliary colour.

	Prime	Auxiliary
up to 250V	yellow	
up to 600V	yellow	green
Telephone	white	

1.13 Device Identification

.1 All receptacles, light poles, welder/winch and shore power outlets are to have its panel and circuit identified with a lamicoid nameplate. White letters on black background, 6mm high x 25mm long (i.e. A-3 or A-2,4,6). Nameplates to be properly secured to outlet box with screws. Receptacle number, light pole number, shore power and welder/winch number to also be identified (i.e. Recept. #1, Light #1, Shore Power #1, Welder/Winch #1).

1.14 Wiring Terminations

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

1.15 Manufacturers and CSA Labels

.1 Visible and legible after equipment is installed.

1.16 Warning Signs

.1 As specified and to meet requirements of Inspection Department and PSPC Departmental Representative.

.2 Use decal signs, minimum 175 x 250mm size.

.3 “DANGER HIGH VOLTAGE” signs to be installed on each of the new electrical service shrouds and on the door to the electrical building.

1.17 Location of Outlets

.1 Change location of outlets at no extra cost or credit, providing distance does not exceed 3.0m, and information is given before installation.

.2 Locate light switches on latch side of doors.

1.18 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 indicated, verify before proceeding with installation.

.3 Install electrical equipment at the following heights unless indicated otherwise.

.1 Receptacles:

.1 General: in shrouds as detailed.

.2 Panelboards: fit in new enclosure.

.4 Generally, masonry outlet boxes are to be installed in bottom of concrete blocks to approximate heights indicated.

.5 Refer to all detail drawings and confirm mounting of outlet boxes prior to roughing-in.

1.19 Load Balance

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

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

.3 Submit, at completion of work a report listing all phase and neutral currents on panelboards operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.20 Conduit and Cable Installation

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

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

1.21 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 apprentice program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specified tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specified duties. The work of this division to be carried out by a contractor who holds a valid Electrical contractor license as issued by the Province of New Brunswick.

.2 Conduct and pay for tests of the following:

.1 Power 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 operation of systems where applicable.

.5 Systems: communications, etc.

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

.4 Insulation resistance testing:

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

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

.3 Check resistance to ground before energizing.

.5 Notify PSPC Departmental Representative three (3) days in advance, of equipment and system testing and verification. Carry out tests in presence of PSPC Departmental Representative.

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

.7 Submit test results for PSPC Departmental Representative's review.

1.22 Coordination of Protective Devices

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

1.23 Site Visit

.1 Contractor to visit the site and familiarize himself with the job and all conditions which may affect his costs. Ignorance of existing conditions will not be considered as basis for extra claims.

1.24 As-Built Documents

.1 At completion of project and prior to final inspection, the electrical contractor, at his own expense, shall mark all changes in red on blueprint record drawings and submit the as-built sets to PSPC Departmental Representative.

1.25 Shop Drawings, Product Data and Samples

.1 Submit shop drawings, product data and samples in electronic format (PDF) in accordance with Division 01 33 00.

.2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.3 Where applicable, include wiring, single line and schematic diagrams.

.4 Include wiring drawings or diagrams showing interconnection with work of other Sections.

1.26 Operation and Maintenance Data

.1 Provide operation and maintenance data for electrical work for incorporation into maintenance manual specified in Division 01 78 00 – Closeout Submittals.

.2 Include in operations and maintenance data:

.1 Details with respect to design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

.2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature not acceptable.

.3 Wiring and schematic diagrams and performance curves.

.4 Names and addresses of local suppliers for all items included in maintenance manual.

1.27 Maintenance Materials

.1 Provide maintenance materials in accordance with Division 01 - General Requirements.

1.28 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 & French.

1.29 Cleaning

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

1.30 Coordination with Other Trades

.1 The Electrical Contractor shall totally review all architectural, structural and mechanical drawings and specifications to coordinate and determine work associated with electrical work prior to submitting tender price. Also, review all Addendums associated with all trades.

.2 After review of all documents associated with other trades, forward any questions and obtain answers by Addendum, prior to tender submission.

.3 Submission of tender by Electrical Contractor acknowledges coordination with other trades as part of these contract documents.

1.31 Project Waste Management

.1 Contractor must adhere to project waste management guidelines as detailed in Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

1.32 Project Record Documents

.1 Provide Project Record Documents to Division 01 - General Requirements.

1.33 Schedule

.1 Overtime work and work outside normal work hours as deemed necessary to accomplish scheduling are the responsibility of the contractor and must meet the requirements of the Department of Labour. All costs resulting from such overtime must be included in the contractor’s estimated total tender price.

1.34 Coordination of Existing and New

.1 In order to install new services while maintaining existing, coordination between old and new must be provided. This may restrict installation of new services and how the work is carried out.

.2 All costs for this coordination must be included in the total tendered price.

1.35 Measurement for Payment

.1 Measurement for payment for Division 26 is lump sum.

1.36 Single Line Electrical Diagrams

.1 Provide single line electrical power riser diagram in metal frame with clear polycarbonate glazing as follows:

.1 Electrical distribution systems: locate in main electrical room.

.2 Drawings: 600 x 600mm minimum size.

1.37 Electrical Construction Red Seal Certification

.1 The electrical contractor bidding this project must have industrial electrical experience on at least three previous wharf projects and must have at least three industrial electrician personnel who have been with the company for the past three years and who have a CANB Red Seal Certification in the Electrical trade.

.2 No more than one apprentice electrician shall work on the project site for every journeyman electrician working on the project site at any time.

END OF SECTION

Part 1 GENERAL

1.1 Description of System

.1 In general, work of this Section consists of the complete removal of all existing electrical equipment and materials on the wharf to be renovated.

1.2 Related Work

.1 Electrical General Provisions: Section 26 05 00.

.2 Wharf Removals.

1.3 Site Survey

.1 Prior to Tender submission, visit the site and survey the extent of the removals/modifications required for this contract and include for all costs in the total tendered price. Any existing conditions information indicated on the drawings is for general guidance only.

.2 In conjunction with site visit, review structural, mechanical and electrical drawings and include all costs due to existing conditions in total tendered price.

1.4 Reference Standards

.1 All removal or modification work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.5 Protection

.1 Be responsible for any damages to existing structure as a result of the work.

1.6 Salvage Material

.1 Materials and equipment identified on the drawing as being reused are to be taken down, stored, reinstalled, etc. as required to allow for new construction.

.2 Contractor must identify any damaged equipment or materials intended for reuse prior to demolition and point out deficiencies to the PSPC Departmental Representative at that time.

1.7 Disposal

.1 Prior to demolition PSPC Departmental Representative will identify any items of electrical equipment which are to be set aside as directed for future use by PSPC Departmental Representative (mainly existing light fixture and pole on Wharf 406).

.2 All other materials and equipment removed under work of this Section becomes the property of the Contractor for disposal off of property.

.3 Comply with all municipal, provincial and federal bylaws and standards when disposing of waste.

1.8 Schedule

.1 The Contractor is to note that the PSPC Departmental Representative intends to carry on business as usual and work activities must be coordinated to maintain electrical services in occupied areas. Provide any required temporary work.

.2 Overtime work and work outside normal work hours as deemed necessary to accomplish this scheduling are the responsibility of the Contractor and must meet the requirements of the Department of Labour. All costs resulting from such overtime must be included in the Contractor's Estimated Total Tender Price.

.3 Coordinate with NB Power to remove all equipment, poles, lines, services, etc. from the site.

Part 2 PRODUCTS

2.1 N/A

Part 3 EXECUTION

3.1 General Removals

.1 Remove all existing electrical services including exposed wire and conduit, except those designated for reuse.

.2 Remove electrical services associated with existing systems.

.3 Coordinate work of this Section with other trades.

.4 Schedule all removal work with the PSPC Departmental Representative. Do not disrupt operations except as permitted by the Schedule.

3.2 Cutting

.1 Cutting required for removals and alterations to be to the approval of the PSPC Departmental Representative and performed with appropriate power tools.

3.3 Cleaning

.1 Reused existing equipment to be cleaned in accordance with 26 05 00.

END OF SECTION

Part 1 GENERAL

1.1 N/A

Part 2 PRODUCTS

2.1 Materials

.1 Pressure-type wire connectors: with current-carrying parts of copper sized to fit copper conductors as required. Use twist-on connectors for #14 and smaller.

.2 In-line insulated compression connectors for #12 conductors and larger.

.3 Steel clamps or connectors for flexible conduit, as required.

.4 Crimp style wire connectors, nylon insulated with current carrying parts of copper alloy, for connecting solid to stranded conductors.

.5 Heavy wall shrinkable tubing with 600V insulation: “Cold Shrink Splice” or approved equal on all splices and wrapped with waterproof electrical tape.

.6 Use in-line insulated compression connectors for splices in junction boxes and panelboards to reduce from oversize conductors (due to voltage drop) to smaller conductors that will fit on circuit breakers.

.7 Use watertight electrical tape over all electrical connections if shrinkable tubing is not used.

Part 3 EXECUTION

3.1 Installation

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.

.2 Install fixture type connectors and tighten.

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

3.2 Restriction

.1 No splices are allowed in underground cables or panelboards (distribution, lighting and power) or in equipment enclosures, unless indicated otherwise.

END OF SECTION

Part 1 GENERAL

1.1 Product Data

.1 Submit product data in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Building Wires

.1 Conductors: minimum size 12 AWG (solid) for power and lighting; stranded for size 8 AWG and larger except as noted.

.2 Copper conductors sized as indicated with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 for all work.

2.2 TECK Cable

.1 Conductors:

.1 Grounding conductor: copper

.2 Circuit conductors: copper size as indicated.

.2 Insulation:

.1 Chemically cross-linked thermosetting polyethylene rated type RW90 1000V.

.3 Inner jacket: polyvinyl chloride material.

.4 Armour: flat interlocking aluminium.

.5 Overall covering: thermoplastic polyvinyl chloride material, FT4 rated.

.6 Fastenings:

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

.7 Connectors:

.1 Watertight, approved for TECK cable.

2.3 Fixture Wiring

.1 Temperature rating of fixture wiring entering ballast compartment of fixtures to meet manufacturer's recommendations.

.1 For 90°C, use R90

.2 For 105°C, use TEW

.3 For 125°C, use GTF

2.4 Colour Coding

.1 All conductors to be colour coded in accordance with Section 26 05 00.1.11.

2.5 Pole Wiring

.1 Wiring from pole handhole connection to top of light pole to be 5#12 + GND copper SOW heavy-duty service cord.

Part 3 EXECUTION

3.1 Installation of Building Wires

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34.

.2 In underground ducts in accordance with Section 26 05 44.

.3 In trenches in accordance with Section 26 05 41.

.4 In surface and lighting fixture raceways in accordance with Section 26 50 00.

.5 In wireways and auxiliary gutters in accordance with Section 26 50 00.

3.2 Installation of TECK Cable 0-1000V

.1 Install cables as indicated.

.2 Group cables wherever possible on channels.

.3 Install cables in trenches in accordance with Section 26 05 41.

.4 Terminate cables in accordance with Section 26 05 20.

3.3 Wire and Conduit Methods

.1 Use standard building wire and PVC conduits or TECK cables for all branch circuits.

.2 All wire shall be #12 minimum from panel.

3.4 Site Lighting

.1 Install conductors on light poles in PVC conduit from base to top of pole.

.2 Fasten at top of pole using suitable wire grip.

.3 Install conductors from junction box to luminaire as indicated. Use appropriate connectors and secure in place.

3.5 Installation of Fixture Wire

.1 Fixture wire to be installed to ballast compartment unless indicated otherwise where required for temperature rating.

END OF SECTION

Part 1 GENERAL

1.1 Standards

.1 All grounding and bonding requirements shall be in accordance with the Canadian Electrical Code, Part 1.

Part 2 PRODUCTS

2.1 Equipment

.1 System and circuit, equipment, grounding conductors, bare stranded copper, untinned, soft annealed, size as indicated.

.2 Insulated grounding conductors: green, to Section 26 05 21.

.3 Non-corroding 316 grade stainless steel accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings

.2 Protective type clamps

.3 Bolted type conductor connectors

.4 Thermit welded type conductor connectors

.5 Bonding jumpers, straps

.6 Pressure wire connectors

.4 Clamps for grounding of conductor, size as required to electrically conductive aluminum shroud or galvanized steel.

Part 3 EXECUTION

3.1 Installation - General

.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including electrodes, conductors, connectors, accessories, as indicated, to conform to requirements of PSPC Departmental Representative and local authority having jurisdiction over installation.

.2 Install connectors to 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 an integral bonding wire in all flexible conduit connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.

.8 Install separate ground conductor, to outdoor lighting standards, shrouds and winches.

.9 Connect building structural steel to ground by welding copper to steel.

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

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

3.2 System and Circuit Grounding

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

3.3 Equipment Grounding

.1 Install grounding connections to typical equipment included in, but not necessarily limited to, the following list: Service equipment, duct systems, control panels, steel work, distribution panels, outdoor lighting.

3.4 Field Quality Control

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

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

.3 Perform tests before energizing electrical system.

END OF SECTION

Part 1 GENERAL

1.1 N/A

Part 2 PRODUCTS

2.1 Support Channels

.1 U shape, size 41 x 41mm, 2.5mm thick, stainless steel, surface mounted, suspended as required.

2.2 Channel Finish

.1 All support and fastening devices to be 316 grade stainless steel.

2.3 Specified Purpose Supports

.1 Specified purpose stainless, spring steel fasteners for interior support of boxes, conduit and cable from main structures and channels.

Part 3 EXECUTION

3.1 Installation

.1 Secure equipment to poured concrete with expandable inserts.

.2 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.3 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole stainless steel straps to secure surface conduits and cables 53mm and smaller.

.2 Two-hole stainless steel straps for conduits and cables larger than 53mm.

.4 Provide stainless steel metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.5 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.6 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trades and approval of PSPC Departmental Representative.

.7 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendation.

.8 For surface mounting of two or more conduits, use channels at 1.5m oc spacing.

.9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

END OF SECTION

Part 1 GENERAL

1.1 Shop Drawings and Product Data

.1 Submit shop drawings and product data for cabinets in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Junction and Pull Boxes

.1 PVC waterproof construction with screw-on overlapping covers, complete with gasket, for surface mounting. Use stainless steel screws/bolts for mounting.

.2 Stainless steel type 316 junction box as indicated complete with stainless screws/bolts for mounting.

2.2 Electrical Shrouds at Light Pole

.1 Aluminium shroud 6mm thick on front and back, 9mm thick on sides and top and 13mm thick on bottom with dimensions as detailed on drawing, made from ASTM 6061-T6 salt water marine rated aluminum with all seams fully sealed and welded with 4mm fillet welds on inside corners and 4mm joint welds on outside corners. A 6mm x 1032mm x 550mm door c/w stainless steel piano hinge full length on one side and 3-point latch on the other side. A 13mm rubber mat (type SBR-60) is to be installed between concrete deck and shroud and 2 x 13 mm thick rubber pad (type SBR-60) is to be installed between the shroud and concrete pole base. Use high strength waterproof bonding adhesive to fasten pad to concrete and aluminum. Provide 16mm dia. galvanized steel anchors embedded 200mm into 19mm drilled holes in the concrete filled with epoxy grout. Install with neoprene gasket, 6mm galvanized washers and galvanized nuts.

2.3 Panel ‘E’ Aluminum Enclosure

.1 NEMA type 4X, 9mm thick ASTM 6061 salt water rated aluminum enclosure with all seams fully sealed and welded with 4mm fillet welds on inside corners and 4mm joint welds on outside corners, S/S piano hinged door and return flange overlapping sides, handle and latch, painted white steel inner panel for surface mounting, complete with heavy-duty padlock and two (2) keys. Provide aluminium metal transition between conduit termination in bottom of enclosure and wires entering bottom of Panel ‘E’ so that RW90 wires are behind metal transition. Fasten metal to enclosure and panel.

.2 Cabinet to be 2271mm (H) x 1200mm (W) x 305mm (D).

2.4 Bollards

.1 Bollards to be 178mm inside diameter and 194mm outside diameter. Schedule 40 steel pipe 1435mm long welded with 6mm fillet weld to 19mm thick by 350mm square steel base plates. Baseplate to have 4-22mm diameter bolt holes as detailed on drawing.

.2 Bollard and baseplate to be galvanized after fabrication.

.3 Bollard to be filled with concrete after installation c/w domed concrete top. Provide yellow 6mm thick PVC cover over entire length of bollard with domed top.

.4 Bollard to be fastened to concrete deck with 4-19mm diameter galvanized anchor rods 200mm long c/w 6mm thick washer and nut. Drill 22mm diameter hole in concrete deck, fill with epoxy grout and insert anchor bolt.

2.5 Manufacturers

.1 Electrical shrouds and bollards to be manufactured by metal fabrication companies having 10 years-experience constructing similar components.

Part 3 EXECUTION

3.1 Junction, Pull Boxes and Cabinets Installation

.1 Install pull boxes in inconspicuous but accessible locations. Location must be coordinated with other trades.

.2 Size and install cabinets to CEC requirements.

.3 Only main junction and pull boxes are indicated. Provide pull boxes so as not to exceed 30.0 m of conduit run between pull boxes.

3.2 Identification

.1 Provide equipment identification in accordance with Section 26 05 00.

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

3.3 Shrouds and Bollards

.1 Install electrical shroud as detailed on drawings.

.2 Install bollard as detailed on drawings.

END OF SECTION

Part 1 GENERAL

1.1 Product Data

.1 Submit product data in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Outlet and Conduit Boxes - General

.1 Size boxes in accordance with CSA C22.1:21.

.2 PVC (150 x 150 x 100) mm and (200 x 200 x 100) mm and (300 x 300 x 200) mm outlet boxes, or sized as required, for special devices and requirements.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

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

2.2 Conduit Boxes

.1 Cast FD high impact thermoplastic boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

.2 20A 1P, 30A 2P, and 50A 2P receptacles to be installed in marine grade yellow FD conduit boxes made of high-impact thermoplastic material c/w 19mm NPT and 25mm NPT threaded hub options respectively, external mounted feet for #10 stainless-steel screws and stainless-steel mounting/grounding bracket.

2.3 Fittings - General

.1 PVC bushing and connectors (watertight).

.2 Knockout fillers to prevent entry of foreign materials or water.

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

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

.5 Set-screw type steel bushings and connectors for EMT fittings unless indicated otherwise. Nylon insulated throats for 25mm conduits and larger.

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 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers not allowed.

END OF SECTION

Part 1 GENERAL

1.1 Location of Conduit

.1 Drawings show all conduits in diagrammatic form only.

Part 2 PRODUCTS

2.1 Conduits

.1 Rigid PVC conduit: size as indicated.

.2 Rigid steel conduit, hot dipped galvanized after fabrication.

.3 Electrical metallic tubing (EMT), with steel set screw couplings and connectors.

.4 Flexible metal conduit and liquid-tight flexible metal conduit.

2.2 Conduit Fastenings

.1 One-hole rigid PVC straps to secure surface conduits 50mm and smaller. Two-hole rigid PVC straps for conduits larger than 50mm. Use stainless steel screws/bolts for mounting hardware.

.2 Channel type supports for two or more conduits at 1.2 meters on centre.

.3 13mm diameter threaded rods to support suspended channels. Drill 3mm larger hole in concrete to a 200mm depth and fill with approved epoxy grout.

2.3 Conduit Fittings

.1 Fittings manufactured for use with conduit specified. Coating: same as conduit. "O" ring expansion joints and watertight junction box adapters/couplings. Provide rigid PVC expansion joints at all locations where PVC conduit exits underground, sized to fit conduit.

.2 Factory "ells" where 90-degree bends are required for conduits larger than 40mm.

.3 Steel set screw connectors and couplings for EMT unless indicated otherwise.

.4 Steel watertight connectors and couplings for EMT where indicated.

2.4 Fish Cord

.1 6mm diameter with tensile strength of 5 kN.

Part 3 EXECUTION

3.1 Installation

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

.2 Use rigid PVC conduit under ground floor slab and in poured concrete unless indicated otherwise. Install an integral ground wire in all rigid PVC conduit.

.3 Use liquid tight flexible metal conduit for connections to exterior light fixtures unless indicated otherwise and to equipment in damp or wet locations.

.4 Install in each empty conduit a 6mm stranded nylon pull rope with tensile strength of 5 kN continuous throughout each duct run with 3m spare at each end.

.5 Where conduits become blocked, remove and replace blocked section.

.6 Dry conduits out before installing wire.

.7 Conduit sizing, where indicated, is based on copper conductors and rigid PVC conduit. NUAL is not to be used.

.8 Use rigid steel conduit for exterior exposed above grade work.

.9 Use EMT for interior feeders and branch circuit work except in poured concrete, underground and where subject to mechanical damage, unless indicated otherwise. When used for panel feeders, install a separate integral ground wire sized in accordance with the CEC.

.10 Use flexible metal conduit for connection to motors in dry areas and interior light fixtures.

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

.12 Mechanically bend steel conduit over 19mm diameter.

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

3.2 Surface Conduits

.1 Run parallel or perpendicular to construction lines.

.2 Run conduits in center portion of concrete wharf deck.

.3 Group conduits wherever possible.

.4 Do not pass conduits through structural members.

3.3 Conduits in Cast-in-Place Concrete

.1 Locate to suit reinforcing steel. Install in centre one-half of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Where conduits pass through waterproof membrane, provide oversized sleeve before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Encase conduits completely in concrete.

3.4 Conduits in Cast-in-Place Slabs on Grade

.1 Run conduits 25mm and larger below slab. Provide 50mm of sand over conduits below floor slab.

3.5 Conduits Underground

.1 Slope conduits to provide drainage.

.2 Conduits rising up from below grade to penetrate the floor/wharf at 90° angles. Slanted conduits not permitted.

3.6 Conduit Sealant

.1 All conduit terminations entering buildings or enclosures, to be sealed to prevent entrance of water and condensation.

.2 Sealant to be a two-part polyurethane conduit, sealing compound installed as per manufacturer's instructions.

END OF SECTION

Part 1 GENERAL

1.1 Description of Work

.1 Work included in this section consists of the excavating, backfilling and trenching required to install cables and ducts by general contractor and supply and installation of ducts, spacers and marker tape by Division 26.

1.2 Related Work

.1 Concrete-encased underground cable duct banks: Section 26 05 41.

1.3 Protection

.1 Protect excavated earth to be reused from freezing by approved method.

.2 Grade around excavations to prevent surface water runoff into excavated area.

1.4 Inspection & Testing

.1 Testing of materials and compaction will be carried out by testing laboratory designated by PSPC Departmental Representative.

.2 PSPC Departmental Representative will pay costs for inspection and testing.

1.5 Utility Lines

.1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify PSPC Departmental Representative of findings.

.2 Make good damage to existing utility lines resulting from work.

1.6 Permits, Fees & Inspections

.1 Obtain prior approval from the Municipality/PSPC Departmental Representative for street cuts. Pay any fees required.

.2 Repairs to meet Municipality/PSPC Departmental Representative standards and approval.

Part 2 PRODUCTS

2.1 Backfill Materials

.1 Backfill materials to Section 31 23 10 for Type 1 and Type 2 gravels.

2.2 Cable Marker Sheet

.1 Polyethylene marker sheet: to be 150mm wide for burial 300mm below grade directly over buried cable.

.2 Marker sheet to be orange in colour with the following words printed in large black block letters: "CAUTION CAUTION CAUTION - BURIED ELECTRIC LINE BELOW".

.3 The above-described message is to be printed every 914mm minimum of marker sheet.

Part 3 EXECUTION

3.1 Excavations

.1 Excavate to lines, grades, elevations and dimensions as indicated on drawings or as directed.

.2 Cut edges of asphalt pavement with suitable cutting wheel or jack hammer and saw cut reinforced concrete deck prior to excavation. Cut only to width required to install services.

.3 Remove unsuitable material from trench bottom to extent and depth directed by PSPC Departmental Representative.

.4 Stockpile suitable excavated materials required for trench backfill in approved location.

.5 Dispose of surplus and unsuitable excavation material off site.

.6 Where required due to removal of unsuitable material or unauthorized over excavation, bring bottom of excavation to design grade with common backfill material.

.7 Compact trench bottom to density at least equal to density of adjacent surrounding soil.

.8 Excavations require inspection and approval prior to commencement of installation operations.

3.2 Bedding Installation

.1 Place sand bed in trenches where cable ducts are direct buried.

.2 Ensure that trench has been excavated to the proper required depth.

.3 Cover bottom of trench with 75mm of sand.

.4 Lay cable ducts in trench in accordance with Section 26 05 41.

3.3 Backfilling & Compaction

.1 Do not proceed with final trench backfilling operations until installation of cable ducts is complete and that PSPC Departmental Representative has inspected installations.

.2 Use approved common backfill material as indicated or directed.

.3 Backfill around installation as shown.

.4 Place backfill material in uniform layers not exceeding 150mm in thickness up to sub-grade elevation or top of trench. Compact each layer before placing succeeding layer.

.5 Compact common backfill materials as follows:

.1 In non-pavement areas to a density at least equal to density of adjacent, undisturbed soil.

.2 In pavement areas and sod areas to a minimum of 95% density for ASTM D698-78 maximum density.

.6 Dispose of surplus backfill material off property after backfilling operations are complete.

3.4 Cable Marker Tape

.1 Install polyethylene marker tape in trenches where cables are installed in cable ducts.

.2 Place marker tape 300mm below final grade; continuous over full length of cable run.

3.5 Restoration of Existing Surfaces Affected

.1 The following paragraphs are intended for complete reinstatement of all the existing surfaces disturbed by the excavations of this section.

.2 Where existing grassed areas are encountered during excavations, stockpile reusable materials for replacement after cable or duct installation and backfilling are completed.

.3 Where existing asphalt pavement is encountered during excavations, remove all asphalt debris from site and after cable duct installation and backfilling are completed, provide new base coarse and asphalt pavement to match existing.

END OF SECTION

Part 1 GENERAL

1.1 Related Work

.1 Trenching for Cables & Ducts: Section 26 05 40.

.2 Concrete Formwork: Section 03 10 00.

.3 Concrete Reinforcement: Section 03 20 00.

.4 Cast-in-place Concrete: Section 03 30 00.

Part 2 PRODUCTS

2.1 Materials

.1 PVC underground telecommunications cable ducting: to CSA B196.3.

.2 Plastic underground power cable ducting: to CSA B196.1.

2.2 Rigid PVC Ducts

.1 Rigid PVC ducts, encased in reinforced concrete, size as indicated for power and telephone.

2.3 PVC Duct Fittings

.1 Rigid PVC opaque solvent welded type couplings, balloon-end fittings, plugs, caps, adapters as required to make complete installation.

.2 Expansion joints as indicated.

.3 Rigid PVC 5° angle couplings as indicated.

.4 Base and intermediate plastic spacers as required.

.5 Rigid PVC 90° & 45° bends as required.

2.4 Cable Pulling Equipment

.1 6mm stranded polypropylene bare pull rope tensile strength 5kn continuous throughout each duct run with 3m spare rope at each end.

2.5 Markers

.1 Over all underground duct and pipe runs, install continuously, at 300mm below grade, 75mm wide electrical underground polyethylene marking tape with warning "CAUTION CAUTION CAUTION, UNDERGROUND LINES BELOW".

Part 3 EXECUTION

3.1 Installation - General

.1 Install reinforced concrete encased underground duct banks, including form work.

.2 Build duct bank on undisturbed soil or on well-compacted granular fill not less than 150mm thick, compacted to 95% of maximum proctor dry density.

.3 Open trench completely before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.

.4 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.

.5 Install base spacers at maximum intervals of 1.5m levelled to grades indicated for bottom layer of ducts.

.6 Lay rigid PVC ducts with configuration and reinforcing as indicated with preformed interlocking, rigid plastic intermediate spacers to maintain spacing between ducts at not less than 75mm horizontally and vertically. Stagger joints in adjacent layers at least 150mm and make joints watertight. Encase duct bank with 75mm thick concrete cover. Use galvanized steel conduit for sections extending above finished grade level.

.7 In concrete wharf decks, lay rigid PVC ducts with configuration and reinforcing as indicated to maintain spacing between ducts at not less than 75mm horizontally and vertically.

.8 Make transpositions, offsets and changes in direction using 5-degree bends sections, do not exceed a total of 20 degrees with duct offset.

.9 Terminate duct runs with a duct coupling set flush with the end of the concrete envelope when dead ending duct bank for future extension.

.10 Cut, ream and taper end of ducts infield to manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

.11 Use conduit to duct adapters when connecting to conduits

.12 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during pouring of concrete. Tie ducts to spacers with twine or other non-metallic material. Remove weights or wood braces before concrete has set and fill voids.

.13 Clean ducts before laying. Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.

.14 Immediately after pouring of concrete, pull through each duct a mandrel followed by a stiff bristle brush to remove sand, earth and other foreign matter. Avoid disturbing or damaging ducts where concrete has not set completely. Pull stiff bristle brush through each duct immediately before pulling in cables.

.15 Allow concrete to attain 50% of its specified strength before backfilling.

3.2 Inspections

.1 Advise PSPC Departmental Representative so that he may inspect ducts prior to pouring and be present during pour of concrete and clean-out.

END OF SECTION

Part 1 GENERAL

1.1 N/A

Part 2 PRODUCTS

2.1 N/A

Part 3 EXECUTION

3.1 Cable Installation in Ducts

.1 Install cables as indicated in ducts.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

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

.5 To facilitate matching of colour coded multi-conductor control cables; reel off in same direction during installation.

.6 Before pulling cable into ducts and until cables are properly terminated, seal ends of cables with moisture seal tape.

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

.8 Install in each empty conduit a 6mm stranded nylon pull rope with tensile strength of 5 kN continuous throughout each duct run with 3m spare at each end.

3.2 Field Quality Control

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

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

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

.4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is no less than 50 megohms.

.5 Tests:

.1 After installing cable, but before splicing and terminating, perform insulation resistance test with 1000V megger on each phase conductor.

.2 Check insulation resistance after each termination to ensure that cable system is no less than 50 megohms.

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

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

END OF SECTION

Part 1 GENERAL

1.1 Reference

.1 Canadian Standards Association, (CSA International).

1.2 Product Data

.1 Submit product data in accordance with Section 26 05 00.

.2 Indicate dimensions and connection details.

1.3 Acceptable Materials

.1 Where materials are specified by the trade name within this section, refer to Section 00 21 14 for procedure to be followed in applying for approval of alternatives.

Part 2 PRODUCTS

2.1 Transformers

.1 Dry type transformers to be manufactured to CSA C22.2 No. 47, CSA C9 and CAN/CSA-C802. All dry-type transformers rated 30kVA or lower shall meet the requirements of the latest edition of CSA Standard C802 – Maximum Losses for Distribution Power, and Dry-Type Transformers. All dry-type transformers rated 45kVA and over all be high efficiency type.

.2 Use transformers of one manufacturer throughout project.

.3 Design:

.1 Type: ANN 75 KVA

.2 150 deg. C temperature rise insulation system.

.3 Basic Impulse Level (BIL): standard.

.4 Hipot: standard.

.5 Average sound level: 55 db (151-300 KVA)

.6 Impedance at 150 deg.C: 3 to 6%

.7 Enclosure: EEMAC 1 construction, removable metal front panel.

.8 Mounting: floor.

.9 Windings: copper electrostatically shielded, losses not to exceed CSA C802.2-00 Standards.

.10 Taps, at 2 ½ and 5% above/below 208V.

.11 Provisions for incoming and outgoing conductor entry shown on drawings.

.12 Ground provisions specified in Table 4 of CSA standard.

.13 Full load voltage regulation not more than 3 to 5% at 80% power factor.

.14 Vibration isolators.

.15 Finish in accordance with 26 05 00.

.16 208V input, 240/120V output, 1PH, 60Hz; sized as per Riser Diagram.

2.2 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00 – Electrical General Requirements.

.2 Label size: 7.

Part 3 EXECUTION

3.1 Mounting

.1 Unless otherwise shown:

.1 Mount transformers up to 75 KVA on wall or floor, unless otherwise shown.

.2 Mount transformers 75 KVA and above, on the floor, unless otherwise shown. Transformers must be bolted securely to concrete housekeeping pads.

.2 Ensure adequate clearance around transformer for ventilation.

.3 Install transformers in level upright position.

.4 Remove shipping supports only after transformer is installed and just before putting into service.

.5 Rubber vibration isolating pads are to be placed between transformer support channels at each of four corners, in locations where transformer has been secured to concrete housekeeping pad. Loosen isolation pad bolts until no compression is visible.

.6 Make primary and secondary connections with flexible metal conduits.

.7 Energize transformers as soon as possible after installation is completed, when practicable.

.8 Provide ground conductor from transformer ground bus to the Building Ground System.

.9 Adjust transformer taps as required to achieve suitable secondary voltage at loads.

.10 All floor mounted transformers to be installed on a 100mm high concrete base.

3.2 Equipment Identification

.1 Use nameplate.

END OF SECTION

Part 1 GENERAL

1.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 26 05 00.

.2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

1.2 Plant Assembly

.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.

Part 2 PRODUCTS

2.1 Panelboards

.1 Panelboards: to CSA C22.2 No. 29.

.2 Panelboards to be product of one manufacturer.

.3 250V panelboards: bus and breakers rated for 22,000A symmetrical interrupting capacity or as indicated.

.4 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.

.5 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated on drawings.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating as mains.

.8 Mains: suitable for bolt-on breakers.

.9 Trim and door finish: baked grey enamel.

.10 Panelboards to have a minimum of 33% spare space unless indicated otherwise.

2.2 Breakers

.1 Breakers to Section 26 28 21.

.2 Breakers with thermal magnetic tripping in panelboards except as indicated.

.3 Lock-on devices for 10% of 15A to 30A breakers installed as indicated. Turn over unused lock-on devices to PSPC Departmental Representative.

2.3 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00.

.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 and 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 Mount panelboards to height given in Section 26 05 00 or as indicated.

.3 Connect loads to circuits as indicated.

.4 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 00.

Part 2 PRODUCTS

2.1 Switches

.1 15A, 120V, single pole, as indicated.

.2 Manually operated general purpose ac switches as indicated and with the following features:

.1 Terminal holes approved for No. 10 AWG wire.

.2 Silver alloy contacts.

.3 Urea or melamine moulding for parts subject to carbon tracking.

.4 Suitable for back and side wiring.

.5 White toggle.

.6 Marine grade.

.7 Thermoplastic coverplate - white.

.3 Toggle operated fully rated for LED light fixtures and up to 80% of rated capacity of motor loads.

.4 Switches of one manufacturer throughout project.

2.2 Receptacles

.1 Marine grade duplex 15/20A receptacles as indicated, CSA Type 5-20 R, 125V, 20A, U ground, with the following features used on shrouds and panel enclosures:

.1 White urea moulded housing, nylon front.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacle.

.4 Eight back wired entrances, four side wiring contacts.

.5 Double wipe contacts and riveted grounding contacts.

.6 Installed in surface FD box (Section 26 05 32) c/w white PVC weatherproof lift-type cover plate.

.2 Single yellow marine grade 20A 1P 3W, 120V L5-20R receptacle twist lock c/w yellow PVC weatherproof spring-loaded flip-up coverplate and yellow surface FD backbox.

2.3 GFCI Sensing Module

.1 NEMA 3R 20A 120V 1-pole sensing module/yellow PVC weatherproof spring-loaded flip-up coverplate/surface yellow FD backbox.

.2 Trip level 4.6 ma, trip time 0.025 sec, 5000AIC.

2.4 Wood Boards, Wood Posts and Poles

.1 Wood boards to be 38mm x 140mm x 3048mm marine grade. 152mm stainless steel lag bolts to be used to fasten the wood boards to wood posts.

.2 All bolts, washers, lock washers and nuts for wood connections to be hot dipped galvanized steel.

.3 Pressure treated wood posts to be 250mm x 250mm x 5000mm long.

2.5 Panel Heat Strip

.1 Stainless steel strip heater:

.1 Stainless steel sheathed heater;

.2 Controlled by integral thermostat;

.3 Direct mount;

.4 200W, 120V

Part 3 EXECUTION

3.1 Installation

.1 Switches:

.1 Install single throw switches with handles in “UP” position when switch closed.

.2 Install switches in gang type outlet box when more than one switch is required in one location.

.3 Mount toggle switches at height specified in Section 26 05 00 or as indicated.

.2 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height specified in Section 26 05 00 or as indicated.

.3 Cover plates:

.1 Protect cover plate finish with paper or plastic film until painting and other work is finished.

.2 Do not use cover plates meant for flush outlet boxes on surface mounted boxes.

.3 Install suitable common cover plates where wiring devices are grouped.

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 00.

1.2 Maintenance Materials

.1 Provide maintenance materials in accordance with Section 26 05 00.

.2 Three spare fuses of each type and size installed up to and including 600A.

1.3 Delivery and Storage

.1 Ship fuses in original containers.

.2 Do not ship fuses installed.

.3 Store fuses in original containers in storage cabinet.

Part 2 Products

2.1 Fuses - General

.1 Fuses: product of one manufacturer to be same as fuses currently on site.

2.2 Fuse Types

.1 Fuses in bottom of pole to be in rubber fuse holder fitted with 3 Amp Type C fuse for camera disconnect; and 8 Amp or 12 Amp Type C fuse for LED light fixture.

Part 3 Execution

3.1 Installation

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

Part 1 GENERAL

1.1 Product Data

.1 Submit product data in accordance with Section 26 05 00.

.2 Include time current characteristic curves for breakers with ampacity of 400A and over.

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 the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3 - 10 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 100% rated circuit breakers where indicated on drawings.

2.2 Thermal Magnetic Breakers

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping.

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 26 05 00.

Part 2 PRODUCTS

2.1 Disconnect Switches

.1 Enclosed manual air break switches in non-hazardous locations: to DSA C22.2 No. 4.

.2 Fuseholder assemblies to CSA C22.2 No. 39.

.3 Heavy-duty fusible disconnect switch in CSA type 4X stainless steel enclosure. 60A fusible disconnect switch to be in watertight CSA Type 4X, 316 grade stainless steel enclosure (provide polycarbonate window for winch disconnects).

.4 Provision for padlocking in ON-OFF switch position complete with heavy-duty padlock.

.5 Mechanically interlocked door to prevent opening when handle in ON position.

.6 Quick-make, quick-break action.

.7 Fuseholders in each fused switch suitable without adapters, for type of fuse as indicated.

.8 ON-OFF switch position indication on switch enclosure cover.

2.2 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Indicate name of load controlled on size 4 nameplate.

Part 3 EXECUTION

3.1 Installation

.1 Install disconnect switches complete with fuses as indicated.

END OF SECTION

Part 1 GENERAL

1.1 Product Data

.1 Submit product data in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Contactors

.1 Contactors: to EEMAC No. 1CS.

.2 Electrically held controlled by pilot devices as indicated and rated for type of load controlled, 4-pole, 30A rating. Half size contactors not accepted.

.3 Breakers combination contactor as indicated.

.4 Complete with normally open and normally closed auxiliary contacts unless indicated otherwise.

.5 Mount in CSA Enclosure 3R unless indicated otherwise.

.6 Including following options in cover as indicated.

.1 Red indicating lamp

.2 HAND-OFF-AUTO selector switch

.7 Control transformer in contactor enclosure where indicated.

2.2 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Size 4 nameplate indicating name of load controlled.

Part 3 EXECUTION

3.1 Installation

.1 Install contactors and connect auxiliary control devices as indicated.

END OF SECTION

Part 1 GENERAL

1.1 Related Work

.1 Electrical General Provisions: Section 26 05 00.

1.2 Product Data

.1 Submit product data in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Electronic Time Clock

.1 Two-channel electromechanical timer, c/w real time clock face and day/night markings for setting trippers.

.2 96 captive trippers on 15 minute “ON” settings.

.3 Contacts rated 40A tungsten per pole up to 120V.

.4 16-hour spring wound reserve.

.5 CSA 1 enclosure.

.6 120V, 60Hz.

.7 Manual “ON-OFF-TIMER” bypass switch.

Part 3 EXECUTION

3.1 Installation

.1 Install time switch controls as indicated.

END OF SECTION

Part 1 GENERAL

1.1 Related Work

.1 Lighting Equipment: Section 26 50 00.

1.2 Product Data

.1 Submit product data in accordance with Section 26 05 00.

Part 2 PRODUCTS

2.1 Photoelectric Lighting Control

.1 Swivel pipe nipple box mounting.

.2 Capable of switching 1500W of lighting at 120V.

.3 Voltage variation: + or – 10%.

.4 Temperature range: -40°C to 70°C.

.5 Switching ‘ON’ lights at 12 lx.

.6 Switching ‘OFF’ lights at 110 lx maximum.

.7 Rated for 5000 operations.

.8 Options:

- .1 Lighting arrestor
- .2 Fail-safe circuit completed when relay de-energized.
- .3 Twist-lock type double pole receptacle switch.
- .4 Terminal strip.

.9 Switching time delay of 30 s.

.10 Wall mounting bracket, stainless steel.

.11 Colour coded leads: size 10 AWG 460mm long.

Part 3 EXECUTION

3.1 Installation

.1 Install photoelectric controls as indicated.

END OF SECTION

Part 1 GENERAL

1.1 Related Sections

.1 Section 01 74 21 – Construction & Demolition Waste Management and Disposal.

1.2 Related Documents and Standards

.1 Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

.2 Section 26 05 00 – Electrical General Requirements.

.3 CSA International:

.1 CSA C22.2 No.9.0-96 (R2006), General Requirements for Luminaires.

.2 CSA C22.2 No.9.0S1-97 (R2002), Supplement No. 1 to C22.2 No.9.0-96.

.3 CSA G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.4 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.5 CSA W47.1-03 (R2008), Certification of Companies for Fusion Welding of Steel Structures.

.6 CSA W59-03 (R2008), Welded Steel Construction (Metal Arc Welding).

.7 CSA CEC 2018, Part 1.

1.3 Summary

.1 This Section provides general requirements for a complete and fully operational Exterior Lighting System including:

.1 Exterior Luminaires.

.2 Accessories.

.3 LED Arrays.

.4 Poles, arms and anchor bolts.

.5 Conduit, wiring and time controls.

1.4 System Description

.1 Descriptions indicated are a design reference and do not necessarily represent the exact number, size, voltage, wattage, type of lamp, driver, finish trim, poles, mounting hardware or special requirements as Specified or as required by the particular installations. Provide complete luminaire and pole to correspond with the features, accessories, number of lamps, wattage and/or size Specified in the text description of each luminaire type. Additional features, accessories and options Specified shall be included.

.2 Luminaire voltage shall match the voltage of the circuit serving same.

1.5 Submittals

.1 Product Data shall indicate that luminaire, LED arrays, drivers, mounting arms, poles, and anchor bolts fully comply with Contract Documents. Data shall be submitted for each type of luminaire and pole indicated, arranged in order of luminaire designation. For standard catalog luminaires provide original product catalog sheets indicating data on features, accessories, finishes, and the following:

.1 Materials and dimensions of luminaires.

.2 Photometric data, in IESNA format, based on certified results of laboratory tests of each luminaire type, outfitted with lamps, LED arrays, drivers and accessories identical to those indicated for the luminaire as applied in the Project.

.3 Photometric data shall be certified by a qualified independent testing agency.

.4 Low voltage transformers.

.5 LED power supplies.

.6 Types of lamps and LED's, including manufacturer, wattage, and Color Rendering Index (CRI) and color temperature in degrees Kelvin (K).

.7 Poles, mounting arms, bird spikes, anchor bolts, etc.

.2 Shop Drawings shall:

.1 Show details of nonstandard or custom luminaires.

.2 Indicate dimensions, weights, method of field assembly, components, features, and accessories.

.3 This Contractor shall provide the manufacturer with accurate field dimensions where required.

.4 Include wiring diagrams, power and control wiring.

.3 Wiring Diagrams shall detail wiring for luminaires and differentiate between manufacturer-installed and field-installed wiring.

.4 Product Certificates shall be signed by manufacturers of luminaires and poles certifying that products comply with requirements.

.5 Maintenance Data shall be provided for luminaires and equipment to include in emergency, operation, and maintenance manuals Specified in Specifications Section describing Operations and Maintenance Data.

.6 Field quality control test reports.

.7 Review of luminaire submittals which indicate voltage, mounting condition, or quantities shall be approval of said voltage, mounting condition, or quantities. This Contractor shall field verify voltage and actual mounting condition and method.

.8 Product samples complete with housing, trim, specified lamp, and 3m cord with plug shall be submitted if requested.

.9 Pole and anchor bolt design shall be stamped by a manufacturer's professional engineer licensed in the Province of New Brunswick.

.10 Indicate vertical and horizontal beam spreads, beam lumens, beam efficiency and complete photometric data as shown in independent laboratory tests.

.11 Include independent laboratory tests and results of computerized lighting analysis indicating average horizontal and vertical lighting levels and average to minimum for areas designated in accordance with requirements detailed on drawing E1 of 4.

1.6 Coordination

.1 Coordinate layout and installation of luminaires with existing pole configuration. Allow for new pole mounting brackets where required.

1.7 Warranty

.1 Warranty Period for Luminaires: Five years from date of Substantial Completion.

.2 Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.

.3 Warranty Period for Color Retention: Five years from date of Substantial Completion.

.4 Warranty Period for LED arrays/drivers: Five years from date of Substantial Completion.

.5 Warranty Period for Poles: Two years from date of substantial completion.

1.8 Closeout Submittals

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

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

1.9 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Materials and Equipment.

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

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect floodlighting equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 Manufacturers

.1 Products: Subject to compliance with requirements, provide products from one manufacturer.

2.2 General Requirements for Luminaires - Type A and B

.1 Flood light in accordance with CSA 22.2 No. 9.0.

.2 Metal Parts: Free of burrs and sharp corners and edges.

.3 Housings: Single piece diecast aluminum with 3mm wall thickness, rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Powder coated grey finish with 0.076mm thickness. Custom clear coat to be applied after painting.

.4 Exposed Hardware Material: Stainless steel (316 grade).

.5 Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

.6 Optical assemblies: full cutoff with zero uplight, “dark sky” compliant. LED assemblies shall comply with BUG rating system.

.7 Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

.1 White Surfaces: 85 percent.

.2 Specular Surfaces: 90 percent.

.3 Diffusing Specular Surfaces: 75 percent.

.8 Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

.9 Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping.

.10 BUG ratings shall be B3-U3-G3 and light distribution shall be type 6 x 6 for type A and 3 x 3 for type B.

.11 Light fixtures to be mounted (three [3] at 0 degrees) on bull horn c/w two (2) or three (3) tenon bull horn on top of steel pole as detailed on drawings.

.12 Luminaire and finish endurance tested to withstand 5,000 hours of elevated ambient salt/fog conditions as defined in ASTM Standard B 117. Luminaire to meet UL Standard 1598A (Salt Water) marine outside tested. Optical enclosures to be sealed and gasketed to IP66 rating.

.13 Luminaire to be 709mm long x 635mm wide by 259mm high with a weight of 33 KG at an effective projective wind area of 0.35m squared.

.14 Reduce glare with refractors and internal prism refractors.

.15 Each light fixture is to have a 1.5m stainless steel cable with a 33 KG weight limit with a stainless steel gripple device. Make attachment between the light fixture and bull arm yoke and tighten cable after light fixture has been aimed.

2.3 LED Drivers and Arrays

.1 LED arrays for type A shall produce minimum 144 lumens/watt when operated at 1050mA and 409 watts. LED arrays for type B shall produce minimum 144 lumens/watt when operated at 1050mA and 357 watts.

.1 Lumen Depreciation Data: At 40 deg C ambient, the L70 hours (per IESNA TM-21) shall be 0.85 at the rated drive current at 100,000 hours.

.2 LED color: neutral white, 4000 deg K, CRI of 70.

.3 Drivers shall accept 120 through 277 volts, 50/60 Hz.

.2 The housing shall have an integral thermal management system with extruded aluminum radiation fins and lateral airways.

.3 Comply with latest edition of IES LM-79 and LM-90 Approved Methods.

.4 Comply with In-Situ testing for more reliable results.

.5 LEDs shall be Restriction of Hazardous Substances Directive (RoHS) compliant.

.6 LEDs to have individual pre-oriented lens to provide type 6 x 6 distribution with 59,026 lumens for type A and 3 x 3 distribution with 51,548 lumens for type B.

2.4 Bird Spikes

.1 Stainless steel Bird-X type bird spikes are to be installed on the top of the light fixtures and arms with epoxy adhesive in cases where S/S banding or S/S nails/ screws are not practical.

2.5 Fuses and Fuseholders

.1 Fuse holders, “in-the-line” type, 2-pole for fuses at each pole controlling each circuit with:

.1 Waterproof enclosure of moulded plastic.

.2 Line side and load side sections.

.3 Terminals: sized to accept indicated conductors.

2.6 Light Pole and Bull Horn

.1 Galvanized tapered round steel pole to have reaction sheer force of 8.1 KN, axial force of 4.1 KN and overturning moment of 75 KN. Pole to be 10.7m high with weight of 262 kg, base OD of 250mm, top OD of 112mm and wall thickness of 3.0mm. Base plate to be 355mm square with a bolt circle diameter of 343mm with a base plate thickness of 32mm.

.2 The anchor bolts to be 32mm diameter and 1500mm long with a 150mm hook at the end. Threaded projection to be 150mm. ASTM F1554-04 Grade 55, low alloy with S1 supplement. Carbon equivalent –

45% max. Yield strength – 55 KSI min. (0.2% offset). Anchor bolts – ASTM A153, Class C. Nuts – ASTM A563, Grade ANSI B18.2.2. Threads – ANSI B1.1, Class 2A. Washers – ASTM F-436.

.3 Handhole to be 100 x 178mm and located 305mm above bottom of pole. Tenon at top of pole to be 127mm long x 60mm diameter with 6.35mm thick round tenon plate. CCTV festoon outlet 75mm wide by 125mm high to be 600mm from top of pole.

.4 Pole design standard to be CAN/CSA S6-06 and all welding to be to CSA W59 2003.

.5 Three-arm bull horn to have arms at 0 degrees with 63mm ID and 73mm OD tenon section with two (2) 9.5mm threaded nuts and set screws to fasten bull horn to pole. Bull arms to be 970mm apart and 432mm high made of 60mm tubes. All components to be galvanized or stainless steel.

.6 Bottom of light pole to have 150mm high x 350mm square two-piece polycarbonate shroud to cover anchor bolts and be secured in place with S/S bolts through into pole base plate on all four sides.

Part 3 EXECUTION

3.1 Luminaire and Pole Installation

.1 Fasten luminaire, bull horn and pole to indicated structural supports, concrete base.

.2 Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

3.2 Wiring

.1 Connect luminaires to lighting circuits.

3.3 Luminaire Alignment

.1 Align luminaires as shown on site plan.

.2 Align luminaires at night-time under direction of Departmental Representative. Allow for four hours' time with three men and bucket truck so that alignment can be made to satisfaction of Client.

3.4 Grounding

.1 Connect luminaire to building grounding system. Ground metal poles and support structures according to Section 26 05 28 "Secondary Grounding."

.1 Install grounding conductor in the base for connecting luminaire to grounding system.

.2 Install fuse in pole handhole on all wire phases.

3.5 Controls

.1 Install contractor's controlling circuits as indicated.

.2 Connect coil circuit to manual bypass toggle switches.

.3 Mount photocell control devices as indicated with sensing eye facing the north sky.

3.6 Fuses and Fuse Holders

.1 Install fuse holder for each circuit inside each pole and locate at hand-hole near bottom of pole.

.2 Install fuses, size as indicated.

3.7 Cleaning

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

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

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

3.8 Field Quality Control

.1 Inspect each installed luminaire for damage. Replace damaged luminaires and components.

.2 Replace all burned out or inoperative LED arrays at the end of construction.

.3 Advance Notice: Give dates and times for field tests.

.4 Provide instruments to make record of test results.

.5 Test as follows:

.1 Verify proper operations, switching and phasing of each luminaire after installation.

.2 Ensure time clock, photocell and bypass-switch are working properly. Allow time for re-programming the time clock to final operation and sequence of Harbour Authority requirements.

.3 Turn on all LED wharf lights on Phase 2 for 48 hours. Subsequently turn on all LED wharf lights and demonstrate operation of photocell to run light 'ON' at dusk and 'OFF' at dawn. Demonstrate operation of time clock to turn 'ON' and 'OFF' circuit C1 (partial lighting) and circuit C2 (full lighting) at sequences requested by Harbour Authority. Demonstrate operation of bypass-switch.

.6 Malfunctioning Luminaires and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

.7 Illumination Tests:

.1 Measure light intensities at night. Use photometers with calibration reference to NIST standards. Comply with the following IESNA testing guide(s):

.1 IESNA LM-64, "Photometric Measurements of Parking Areas."

.2 IESNA LM-72, "Directional Positioning of Photometric Data."

.8 Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

.9 Contractor to turn over all existing removed light fixtures and poles to Harbour Authority.

END OF SECTION