Fisheries and Oceans Canada | Pêches et Océans Canada

Electrical Upgrade
Dipper Harbour Wharf
Saint John Co., NB

Issued for Tender		July 26, 2022	
Issue or Revision	**Reviewed By:**	**Date**	**Issued By:**

TEK CONSULTANTS LIMITED

2022-07-26

REGISTERED PROFESSIONAL ENGINEER
B. E. Thompson
2022-07-26
PROVINCE OF NEW BRUNSWICK

Project No. C2-00324

TABLE OF CONTENTS

END OF SECTION

SPECIFICATION APPROVALS

1. APPROVED BY: DATE:

July 26, 2022

2. TENDER BY: DATE:

July 26, 2022

LIST OF DRAWINGS

Drawing No	Title	Date
Electrical		
E1 of 18	Wharf Plan - Power	2022-07-26
E2 of 18	Wharf Plan - Lighting	2022-07-26
E3 of 18	Service Building ‘A’ - Electrical and Details	2022-07-26
E4 of 18	Service ‘A’ Electrical Schedules	2022-07-26
E5 of 18	Service ‘A’ Conduit and Cable Schedule - Part 1	2022-07-26
E6 of 18	Service ‘A’ Conduit and Cable Schedule - Part 2	2022-07-26
E7 of 18	Service Building ‘B’ - Electrical and Details	2022-07-26
E8 of 18	Service ‘B’ Electrical Schedules	2022-07-26
E9 of 18	Service ‘B’ Conduit and Cable Schedule - Part 1	2022-07-26
E10 of 18	Service ‘B’ Conduit and Cable Schedule - Part 2	2022-07-26
E11 of 18	Electrical Details - Part 1	2022-07-26
E12 of 18	Electrical Details - Part 2	2022-07-26
E13 of 18	Electrical Service Building ‘A’ Plan	2022-07-26
E14 of 18	Electrical Service Building ‘A’ Details	2022-07-26
E15 of 18	Electrical Service Building ‘B’ Plan	2022-07-26
E16 of 18	Electrical Service Building ‘B’ Details	2022-07-26
E17 of 18	Wharf Plan - Existing Electrical	2022-07-26
E18 of 18	Existing Electrical Schedules	2022-07-26
Civil		
C1 of 2	Civil Work Plans and Sections	2022-07-26
C2 of 2	Civil Work Sections and Details	2022-07-26

Part 1 General

1.1 DESCRIPTION OF WORK

.1 The work covered under this project consists of the furnishing of all labour, and equipment, for electrical remediation to the wharf structure located at Dipper Harbour, NB., in strict accordance with Specifications and accompanying drawings and subject to all terms and conditions of the contract.

.2 The work consists of but is not necessarily limited to the following:

.1 Supply and installation of new electrical services on the wharf and floats as indicated on the plans or as directed by the Departmental Representative.

.2 Supply and installation of new electrical buildings.

.3 Removal and disposal of all existing electrical equipment including abandoned wire and conduit of all obsolete equipment unless indicated otherwise.

.3 All materials required for the execution of this Contract must be supplied by the Contractor.

1.2 FAMILIARIZATION WITH SITE

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

.2 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

.3 Contractors, bidders or those they invite to site are to review specification Section 01 35 29.06 – Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.

.4 Bidders are required to wear all appropriate personnel protective equipment and take all precautionary measures necessary to ensure their safety during any pre-tender visit.

.5 Contractor shall make own assessment of the site conditions, and difficulties in carrying out the work as specified.

1.3 CODES AND STANDARDS

.1 Perform work in accordance with the 2021 Canadian Electrical Code, 2015 National Building Code of Canada, and any other provincial or local application including all amendments up to project tender closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

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

1.4 WORK SCHEDULE

.1 Submit within 7 work days of notification of acceptance of bid, a construction schedule showing commencement and completion of all work within the time stated on the Bid and Acceptance Form and the date stated in the bid acceptance letter.

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

.3 As a minimum, work schedule to be prepared and submitted in the form of Bar (GANTT) Charts, indicating work activities, tasks and other project elements, their anticipated durations and planned dates for achieving key activities and major project milestones provided in sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time. Generally, Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.4 The Schedule, including updates, shall be to Departmental Representative’s approval. Take necessary measures to complete work within approved time. Do not change schedule without Departmental Representative’s approval.

1.5 ABBREVIATIONS

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

CGSB - Canadian Government Specifications Board
CSA - Canadian Standards Association
ASTM - American Society for Testing and Materials.

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

1.6 MEASUREMENT RESPONSIBILITIES

.1 Notify Departmental Representative at least 72 hours in advance of operations to permit required electrical inspectors to inspect the work done, for payment purposes.

1.7 CONTRACTOR'S USE OF SITE

.1 Co-operate with users of existing facilities. Maintain access to the wharf structures during fishing season and consult with the local Harbour Authority for the site access limitations.

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

.3 Construction operations, including storage of materials for this contract, not to interfere with the fishing activity and/or operations at this harbour.

.4 Contractor is responsible for arranging the storage of materials on or off site. Any materials stored at the site which interfere with any of the day to day activities at or near the site will be moved promptly at the Contractor's expense, upon request by Departmental Representative. Obtain and pay for use of additional storage or work areas needed for operations.

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

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

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

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

1.8 PROJECT MEETINGS

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

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

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

.4 Have a responsible member of firm present at all project meetings.

1.9 PROTECTION

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

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

1.10 ACCEPTANCE

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

1.11 EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to site operations.

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

.3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Provide temporary services when directed by Departmental Representative to maintain critical facility systems.

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

.6 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.

.7 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.

1.12 WORK COORDINATION

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

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

.3 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 to the Prime Contractor to be resolved at own cost.

1.13 WORK COMMENCEMENT

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

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

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

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

1.14 DOCUMENTS

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

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of outstanding Shop Drawings.
.6 Change Orders.
.7 Other modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and other safety related documents.
.11 Electrical Lock-out.
.12 Fire Safety Hot Work Permit.
.13 Permits, Codes and Acts.
.14 Waste Management Plan.
.15 Other documents as stipulated elsewhere in the Contract Documents, Drawings and these Specifications.

1.15 PERMITS

.1 In accordance with the General Conditions, obtain and pay for building permit, certificates, licenses and other permit 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.

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

1.16 NOTICE TO SHIPPING/MARINERS

.1 Notify the Marine Communications and Traffic Services' Centre, of Fisheries and Oceans Canada, ten (10) days prior to commencement and upon completion of work, in order to allow for the issuance of Notices to Shipping/Mariners.

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

1.17 FACILITY SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

1.18 INTERPRETATION OF DOCUMENTS

.1 Supplementary to GC1.1 of the General Conditions, the Division 01 sections of the specifications take precedence over technical specifications in other divisions of the specifications.

1.19 CUTTING, FITTING AND PATCHING

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

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

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT MANAGEMENT

.1 Contractor to provide a competent project manager or superintendent who shall be continuously on site when all work is being performed.

.2 The name and credentials of this person to be provided to the Departmental Representative for acceptance.

.3 The designated person cannot be changed unless agreed to in writing by the Departmental Representative.

1.2 ACTION AND INFORMATIONAL 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 – Submittal Procedures.

1.3 WORK SCHEDULE

.1 The work can start anytime after award of Contract and must be completed by September 29, 2023.

.2 Work must be scheduled to have electrical services operational during the fall and spring lobster fishery, October 31, 2022 to January 27, 2023 and May 1, 2023 to July 11, 2023.

.3 New floats are being installed after the spring lobster fishery so new services cannot be installed to them from Building B until that work is completed.

.4 The facility is used year round and work must be scheduled to minimize downtime of electrical services on the floats, finger and marginal wharves. Provide a minimum of 72 hours notice and obtain Departmental Representative’s approval prior to any electrical service disruption.

.5 Upon acceptance of bid submit:

.1 Preliminary work schedule within 7 calendar days of contract award.

.2 Detailed work schedule within 21 calendar days of contract award.

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

.7 Provide sufficient details in preliminary 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.

.8 Preliminary 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.

.2 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.9 Detailed Work Schedule:

.1 Prepare by use of Critical Path Method (CPM) indicating:

.1 Complete and detailed sequence of all construction activities. Show projected start and completion dates for each activity.

.2 Number of calendar days required to carry out each activity.

.3 Critical path items with resulting critical dates, non-critical activities and resulting float time.

.4 Actual workdays from non-working days such as weekend and statutory days etc.

.5 Projected and actual percentage of work completed for each major work activity.

.2 Prepare CPM schedule by use of well recognized and widely used electronic software. Submit copy of schedule in paper format and one electronic version on diskette for each submission.

.3 Accompany CPM with written narrative as required and in sufficient detail to fully describe work and demonstrate a reasonable implementation plan for completion of project within designated time.

.10 Work schedule must take into consideration and reflect the work phasing, required sequence of work, special conditions and operational restrictions as specified below and indicated on drawings.

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

.12 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.

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

.14 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.

.15 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.

.16 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.

1.4 OPERATIONAL RESTRICTIONS

.1 The Contractor must recognize that wharf users will be affected by implementation of this contract. The Contractor must perform the work with utmost regard to the safety and convenience of facility occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the wharf without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.

.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 Safety Signage:

.1 Provide onsite, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public of construction activities in progress and alerting need to exercise caution.

.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 meters. 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 price.

.4 Dust and Dirt Control:

.1 See Section 01 74 00 – Cleaning for cleaning requirements.

.2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Departmental Representative before undertaking work, especially for major dust generating activities.

.3 Do not allow demolition debris and construction waste to accumulate on site and contribute to the propagation of dust.

.4 As work progresses, maintain construction areas in a tidy condition at all times.

1.5 PROJECT MEETINGS

.1 Schedule and administer project meetings, held as directed by Departmental Representative, for entire duration of work and when deemed necessary due to progress of work or particular situation.

.2 Prepare agenda for meetings.

.3 Notify participants in writing 4 days in advance of meeting date.

.1 Ensure attendance of all subcontractors.
.2 Departmental Representative will provide list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Departmental Representative.

.5 Preside at meetings and record minutes.

.1 Indicate significant proceedings and decisions. Identify action items by parties.
.2 Distribute to participants by email within 3 calendar days after each meeting.
.3 Make revisions as directed by Departmental Representative.

1.6 WORK COORDINATION

.1 The 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 The General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.

.3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.

.4 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.

.5 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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

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

.3 Submit location and address of proposed quarries for material testing.

.4 Submit Environmental Plan including location of access road and what material will be used for review as per Section 01 35 44 - Environmental Mitigation Requirements.

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

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

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

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

.9 Verify field measurements and affected adjacent Work are coordinated.

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

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of New Brunswick, Canada.

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

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

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

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

.7 Accompany submissions with transmittal letter, in duplicate, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data

.8 Submissions include:

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

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

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

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

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

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

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

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Fire and Safety Requirements.

.2 Hot Work Permit.

.3 Existing Fire Protection and Alarm Systems.

1.2 RELATED SECTIONS

.1 Section 01 35 29.06 – Health and Safety Requirements.

1.3 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.

1.4 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.

1.5 ACTION AND INFORMATIONAL 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 – Submittal Procedures.

1.6 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.

1.7 HOT WORK AUTHORIZATION

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

.2 To obtain authorization submit to Departmental Representative:

.1 Contractor's typewritten Hot Work procedures to be followed on site as specified below.

.2 Description of the type and frequency of Hot Work required.

.3 Sample Hot Work Permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented 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.

1.8 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.

1.9 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.

.2 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 29.06.

.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 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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

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

.2 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.

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

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

.4 PPE: personal protective equipment including COVID-19 protection.

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.

.1 Submit within 10 work days of notification of Bid Acceptance. Provide 1 electronic copy.

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

.3 Revise the Plan as appropriate and resubmit within 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.

.6 Contractor must submit a site-specific health and safety plan prior to commencing work. The Contractor must include health and safety requirements to protect its workers and the project site, including precautions and mitigation measures related to the risk of contracting or spreading Covid-19. A source of guidance can be found in the Canadian Construction Association’s standard Covid-19 protocols for all construction sites in Canada.

.3 Submit name of designated Health & 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, Provincial and Territorial health and safety inspectors.

.7 Submit copies of incident and accident reports.

.8 Submit WHMIS SDS - Safety Data Sheets.

1.3 COMPLIANCE REQUIREMENTS

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

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.

.1 The Canada Labour Code can be viewed at: www.http://laws.justice.gc.ca/en/L-2/

.2 COSH can be viewed at: www.http://laws.justice.gc.ca/eng/SOR-86-304/ n e .html

.3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F)

.3 Observe construction safety measures of:

.1 Part 8 of National Building Code

.2 Municipal by-laws and ordinances.

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

.5 Maintain WorkSafe N.B. Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

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

1.4 RESPONSIBILITY

.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.

1.5 SITE CONTROL AND ACCESS

.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 by Departmental Representative 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.

.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.

.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. Provide security guard where adequate protection cannot be achieved by other means.

1.6 PROTECTION

.1 Give precedence to safety and health 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 the situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.7 FILING OF NOTICE

.1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.

.1 Departmental Representative will assist in locating address if needed.

1.8 PERMITS

.1 Post permits, licenses and compliance certificates, specified in Section 01 10 10 – General Instructions, at Work Site.

.2 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.

1.9 HAZARD ASSESSMENTS

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carry out initial assessment prior to commencement of Work with further assessments 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 Keep documentation on site for entire duration of the Work.

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, 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.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety coordinator and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

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 Known latent site and environmental conditions:

.1 Traffic work (maritime and automotive).

.2 Working in bad weather.

.3 Working close to wildlife.

.4 Uneven work surfaces.

.5 Working with the tides.

.2 Covid-19 measures to protect the Contractor, employees, consultants, Departmental Representative and port users. Update as required. Discuss any concerns throughout the contract with the Departmental Representative.

.1 Include measures in place for physical remoteness to and from the site, during breaks, lunch, supper and hotel.

.3 Ongoing facility operations:

.1 The Contractor will work with users of existing facilities. Maintain access to existing dock structure and consult with Departmental Representative for site access limits.

.2 If interference occurs, follow the instructions of the Departmental Representative.

.3 Do not unduly encumber the site with materials.

.4 Move stored products or equipment that interfere with operations.

.5 Comply with all regulations and authorities having jurisdiction over the work.

.6 Working near/above water.

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

1.12 MEETINGS

.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 regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.13 HEALTH AND SAFETY PLAN

.1 Prior to commencement of Work, develop written Health and Safety Plan, specific to the Work. Implement, maintain, and enforce Plans for entire duration of Work and until final demobilization from sites.

.2 Health and Safety Plan shall include the following components:

.1 List of health risks and safety hazards identified by hazard assessment.

.2 Control measures used to mitigate risks and hazards identified.

.3 On-site Contingency and Emergency Response Plan as specified below.

.4 On-site Communication Plan as specified below.

.5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.

.6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:

.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.

.2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of firefighting equipment and other related data.

.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.

.4 Emergency Contacts: name and telephone number of officials from:

.1 General Contractor and subcontractors.

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

.3 Local emergency resource organizations.

.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plans. Departmental Representative will provide pertinent data including name of Fisheries and Oceans and Facility Management contacts.

.4 On-site Communication Plan:

.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.

.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

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

.8 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 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.

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

.6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

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

1.15 TRAINING

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

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

.3 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; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:

.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety vest, safety footwear, safety glasses and hearing protection.

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

.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.

.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non-compliance. Post rules on site.

1.17 CORRECTION OF NON-COMPLIANCE

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

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

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

1.18 WORK STOPPAGE

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

1.19 HAZARDOUS PRODUCTS

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

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

.1 Post on site.

.2 Submit copy to Departmental Representative.

.3 For interior work in an occupied Facility, post additional copy in one or more publicly accessible locations.

1.20 POWDER ACTUATED DEVICES

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

1.21 CONFINED SPACES

.1 Comply with occupational health and safety regulations for work in confined spaces.

.2 Obtain an entry permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations to enter an existing identified confined space located in the facility or workplace.

.1 Obtain a license from the facility manager.
.2 Keep a copy of the permit issued.

.3 Inspector Safety:

.1 Provide PPE and training to the Departmental Representative and others who are required to enter a confined space to conduct inspections.
.2 Be responsible for the effectiveness of equipment and the safety of persons while entering and occupying the confined space.

1.22 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.

1.23 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous locations on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:

.1 Site specific Health and Safety Plan
.2 WHMIS data sheets.
.3 Fire and Safety Requirements.
.4 Special Procedures on Lockout Requirements.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

1.2 GENERAL

.1 All Environmental Environment Mitigation Measures are the Contractor's Responsibility under this contract. All measures to mitigate hazardous material from entering the watercourse, all acts and regulations and mitigation measures listed under this section are the Contractor's responsibility to follow for the duration of this contract.

.1 Construction work will be monitored daily and establish mitigation measures as required. Adjust and upgrade items as required to meet the Municipal, Provincial and Federal Acts as required.

1.3 SUBMITTAL REQUIREMENTS

.1 Develop written ENVIRONMENTAL MITIGATION Plan based on the project specific prior to beginning site Work and continue to implement, maintain, and enforce plan that will be used until demobilization from site.

.2 Develop written SITE SPECIFIC EROSION CONTROL MEASURES based on the project specific plan under this contract.

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

.1 Departmental Representative may request an updated document at any time during the Construction period under this contract if measures on site do not meet acts and regulations specified under this contract.

.4 Develop written road/causeway access, location, type of material that will be used construction and how the areas will be restored to its original state or better.

1.4 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Possibility of High winds.
.2 Uneven work areas
.3 Adverse weather conditions
.4 Access restrictions
.5 Continuous Traffic, in water and on land

.2 All Vessels are to be permitted safe access through the worksite at all times, and assisted as necessary,

1.5 WORK STOPPAGE

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

1.6 REFERENCES

.1 Canada Shipping Act, Transport Canada, (CSA) 2001, amended 2017-12-12 or latest edition.

.2 Canadian Coast Guard Regulations, Fisheries and Oceans Canada.

.3 Canadian Environmental Assessment Act, 2012, amended 2017-06-22.

.4 Canadian Environmental Protection Act, 1999, amended 2018-04-04.

.5 Fisheries Act, 1985, Fisheries and Oceans Canada, amended 2016-04-05.

.6 Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, 1998.

.7 Migratory Birds Convention Act, 1994, Environment Canada, amended 2017-12-12.

.8 Navigation Protection Act, 1985. Transport Canada, amended 2017-06-22.

.9 New Brunswick – Environmental Impact Assessment Regulation, Clean Environmental Act.

.10 Species at Risk Act, 2002, amended 2018-05-30.

.11 The Federal Policy on Wetland Conservation, 1991, Environment Canada.

.12 Transportation of Dangerous Goods Act, 1992, Transport Canada, amended 2017-01-01.

.13 New Brunswick *Heritage Conservation Act.*

.14 New Brunswick Watercourse and Wetland Alteration Technical Guidelines.

.15 Equipment and heavy machinery:

.1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.2 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.

.16 Work activities must comply with all / any conditions of the Navigation Protection Act (NPA) permit issued by Transport Canada.

.17 Ensure project activities comply with the NBDELG Coastal Areas Protection Policy. The policy identifies sensitive coastal areas as beaches, dunes, rock platforms, coastal marshes and diked lands; which should be considered in regulatory plans/approvals. For more information contact the Manager, Surface Water Protection Section, at (506) 457-4850.

1.7 DEFINITIONS

.1 Archaeological Resources: all tangible evidence of human activity that is of historical, cultural or scientific interest. Examples include features, structures, archaeological objects (artifacts) or remains at or from an archaeological site, or an object recorded as an isolated archaeological find. An “artifact” is any object manufactured, used, moved or otherwise modified by human beings, including all waste materials and by-products of these processes.

.2 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.

.3 Deleterious substance:

.1 any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water,

Or

.2 any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.

.4 Fish habitat: spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.

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

.6 Invasive or alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.

.7 Navigable water: a canal and any other body of water created or altered as a result of the construction of any work.

.8 Surface watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.

.9 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands", and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat

1.8 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit site-specific In-Water Mitigation Protection Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work.

.1 Mitigation Measures to prevent sedimentation.

.2 Mitigation Measures to prevent hazardous material to cause water contamination.

.3 Location and type of materials used for temporary access roads and measures to restore the access to its original state or better, the Departmental Representative's will be the sole judge of what it deemed acceptable as a final product.

.3 Submit 1 digital copy of Contractor's In-Water Mitigation Measures to be submitted to the Departmental Representative 7 days before commencement of work, for review.

.4 Submit copies of reports or directions issued by Municipal, Federal or Provincial health and safety inspectors.

.5 Departmental Representative will review Contractor's In-Water Mitigation Measure Plan and provide comments to the Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.

.6 Departmental Representative's review of Contractor's final In-Water Mitigation plan should not be construed as approval and does not reduce the Contractor's overall responsibility for In-Water Environmental Mitigation Measures during the construction of this contract.

.7 Advise the Canadian Coast Guard, Marine Communication and Traffic Services (MCTS) at (902)564-7751 or toll free at 1-800-686-8676 sufficiently in advance of commencement of work or when deploying or removing site markings in order to allow for appropriate Notices to Shipping/Mariners action.

.8 Develop and submit to the Departmental Representative an Emergency Response Plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. Include Provincial Environmental Emergency Contact information, and Departmental Representative's contact information.

.9 The contractor is required to provide a minimum of 48-hour notice to the Departmental representative before commencing dredging activities.

.10 Before commencing construction activities or delivery of materials to site, the contractor must submit an Environmental Protection Plan (EPP) for review and approval by PSPC. The EPP must include a comprehensive overview of known or potential environmental issues to be addressed during construction/the project

1.9 TRANSPORTATION

.1 Transport hazardous materials and hazardous waste in compliance with the Transportation of Dangerous Goods Act.

.2 Maintain trucks clean and free of mud, dirt, and other foreign matter.

.3 All materials and equipment used in construction must be marked in accordance with the Collision Regulations of the Canada Shipping Act, 2001 when located on the waterway.

.4 Temporary causeways, upon approval from the Departmental Representative, shall be constructed in isolation from the waterbody using filter fabric/silt curtain or cofferdam.

1.10 OPERATION OF MACHINERY

.1 Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

.2 Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the water body.

.3 Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

.4 Biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices.

.5 All in-water activities should be conducted during low wind, wave and suitable weather conditions.

.6 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

.7 Do not perform cleaning and washdown within a 30 meter buffer zone of a wetland, watercourse or other identified environmentally sensitive area. Abide by requirements and recommendations from Fisheries and Oceans Canada – Fisheries Protection Program in cleaning and wash down of equipment

1.11 TEMPORARY STORAGE

.1 No staging of vehicles or equipment/material will take place on any beach, dune, wetland or other environmentally sensitive areas

1.12 CONTAINMENT AND SPILL MANAGEMENT

.1 Comply with Federal (CEPA *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*) and Provincial regulations, codes, standards and guidelines for the storage of fuel and allied petroleum products on site.

.2 In the event of a petroleum spill, immediately notify the Departmental Representative and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour report line). Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

.3 Do not dump petroleum products or any other deleterious substances on ground or in the water.

.4 Be diligent and take all necessary precautions to avoid spills and contamination of the soil and water (both surface and subsurface) when handling petroleum products on site and during fuelling and servicing of vehicles and equipment.

.5 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre (55 gallon) overpack spill kit for containment and clean-up of spills.

.6 Maintain vehicles and equipment in good working order to prevent leaks on site.

.7 Materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals are not to enter the watercourse.

.8 Develop and submit to the Departmental *Representative* an Emergency Response Plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. Include Provincial Environmental Emergency Contact information, and Departmental Representative's contact information.

.9 Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

.10 If an oiled seabird is encountered, methodology for the handling and release of marine and migratory birds outlined in Environment and Climate Change Canada (ECCC) – Canada Wildlife Service (CWS)'s Oiled Birds Protocol will be implemented. A permit application must be obtained from ECCC-CWS prior to implementation of this protocol.

1.13 HAZARDOUS MATERIAL HANDLING

.1 Store and handle hazardous materials in accordance with applicable federal and provincial regulations, codes, standards and guidelines. Store in location that will prevent spillage into the environment.

.2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.

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

.4 Store and handle flammable and combustible materials in accordance with National Fire Code.

.5 Workers in contact with hazardous materials must be provided with, and use regulated personal protective equipment and must have the necessary training to know how to handle the different hazardous materials for Health and Safety and according to Environmental Regulations.

1.14 DISPOSAL OF WASTE

.1 Do not bury rubbish, construction and demolition debris (i.e., concrete, creosote timbers, steel, impacted soil materials etc.) and waste materials on site.

.2 Dispose and recycle construction and demolition debris and waste materials in accordance with Provincial Waste Management Regulations and the project waste management requirements specified in sections 02 41 16 – Sitework, Demolition and Removal.

.3 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners etc.) and petroleum products into waterways, storm or sanitary sewers or in waste landfill sites.

.4 Dispose of hazardous waste in accordance with applicable federal and provincial, regulations, codes, standards and guidelines.

.5 Dispose of construction related debris, including demolished cribwork materials and cut timber at an approved landfill that is licensed to dispose of creosote timber or in a manner approved by the province.

.6 Perform dumping of residual material and truck cleaning operations only at the concrete plant. Follow environmental regulations and good practices as approved by the Provincial Department of the Environment and other authorities having jurisdiction.

.7 Chipped vegetation may be used as mulch but must not be spread into a waterbody or wetland.

.8 All salvageable stockpiles of creosote timbers must be situated a minimum of 500 meters from any dwelling or water well and a minimum of 100 meters from any watercourse/wetland or environmentally sensitive area. Any stockpile must be contained, off the ground and must be contained on federal land, unless approved by Departmental Representative.

.9 Debris entering the marine environment should be immediately retrieved when it is safe to do so.

.10 Concrete waste:

.1 Do not discharge residual or rejected concrete on site.

.2 Immediately clean any accidental release of concrete on site prior to solidification.

.11 The contractor must provide the Waste manifest of the deconstruction material, to the Departmental Representative with the progress claim.

1.15 FISH PROTECTION

.1 Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.

.2 Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.

.3 Keep Record of Assurance Logbook updated from project to project**.** Upon request, submit logbook to Departmental Representative for review.

.4 Do not perform cleaning and washdown within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area. Abide by requirements and recommendations from Fisheries and Oceans Canada – Fisheries Protection Program in cleaning and wash down of equipment.

.5 The introduction of deleterious substances into the watercourse is not permitted.

.6 Conduct in-stream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.

1.16 INVASIVE SPECIES

.1 To minimize the possibility of fish habitat contamination and the spread of aquatic invasive species, all construction equipment which will be immersed into the water of a watercourse, or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species prior to mobilization to the site.

.1 Equipment shall include boats, barges, cranes, excavators, haul trucks, pumps, pipe lines and other all miscellaneous tools and equipment previously used in a marine environment.

.2 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.

.2 Conduct cleaning and washing operations as follows:

.1 Scrape and remove heavy accumulation of mud and dispose appropriately.

.2 Wash all surfaces of equipment by use of a pressurized fresh water supply.

.3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.

.4 Check and remove all plant, animal and sediment matter from all bilges and filters.

.5 Drain standing water from equipment and let fully dry before use.

.6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.

.3 Record of Assurance Logbook:

.1 Maintain an on-going log of past and present usage and washdowns of all equipment to illustrate mitigation measures undertaken against fish habitat contamination by alien species.

.2 Write data in a hard cover bound logbook to include the following:

.1 Date and location where equipment was previously used in a watercourse or wetland;

.1 Type of work performed.

.2 Dates of wash down for each piece of equipment;

.3 Cleaning method and cleaning agent(s) used.

.4 Keep Record of Assurance Logbook updated from project to project. Upon request, submit logbook to Departmental Representative for review.

.3 The Departmental Representative has the right to request a video inspection of the equipment, including hulls, to ensure that they are free of marine growth and alien species prior to mobilization to the site.

1.17 SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLAN

.1 Contractor is responsible to develop a Site Specific Erosion and Sediment Control Plan that minimizes risk of sediment of the water body during all phases of the work. Plan is to be submitted as per section 01 33 00, for review by the Departmental Representative. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the water body or settling basin and runoff water is clear. The plan should, where applicable, include

.1 Where required, effective sediment control measures (e.g. silt fencing, check dams) must be an initial step in the construction sequence to prevent the entry or re-suspension of sediment in the water body. Notes on inspection, repairs, and removals are outlined below.

.2 Inspect sediment control measures regularly to ensure they are functioning properly, and make all necessary repairs if any damage occurs. Upon completion of use, remove these control measures in a way that prevents the escape of settled sediment.

.3 Measures for managing water flowing onto the site, as well as water being pumped / diverted from the site such that sediment is filtered out prior to the water entering a water body. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system. The water will be pumped to a sediment pond or into a filter bag to ensure that the concentration of sediment is below regulated discharged criteria before it reaches a water body.

.4 Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment. This should include measures for material stockpiles (e.g. tarps).

.5 Measures for containing and stabilizing waste material (e.g., dredged material, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby water bodies to prevent re-entry.

.6 Description of approach for managing potential impacts to the local environment including silt curtains, sediment fence, hay bales, treatment, etc.

.7 Methodology for monitoring weather, specifically rainfall and storms and altering work plan for inclement weather.

1.18 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

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

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

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

.4 Departmental Representative 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 replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

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

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

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

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

1.3 ACCESS TO WORK

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

.2 Cooperate to provide reasonable facilities for such access.

1.4 PROCEDURES

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

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in 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.

1.5 REJECTED WORK

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

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

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative 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.

1.6 REPORTS

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

.2 Provide copies to subcontractor of work being inspected or tested.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ACCESS

.1 Provide and maintain adequate access to project site.

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

1.2 CONTRACTOR’S SITE OFFICE

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

1.3 SANITARY FACILITIES

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

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

1.4 POWER

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

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

1.5 WATER SUPPLY

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

1.6 SECURITY

.1 Contractor to make own arrangements for security of his equipment, materials, damages resulting from fire and theft.

1.7 CONSTRUCTION SIGN AND NOTICES

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

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

.3 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321.

.4 Maintenance and Disposal of Site Signs:

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

1.8 REMOVAL OF TEMPORARY FACILITIES

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

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

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

.2 Canadian Standards Association (CSA International)

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

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

1.2 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.3 HOARDING

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

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

1.4 GUARD RAILS AND BARRICADES

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

.2 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

.1 Design enclosures to withstand wind pressure and snow loading.

1.6 ACCESS TO SITE

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

1.7 PUBLIC TRAFFIC FLOW

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

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

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

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

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

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

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

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

1.2 QUALITY

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

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

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

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

.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.

1.3 AVAILABLITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

1.4 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

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

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

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

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

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

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

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

1.7 QUALITY OF WORK

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

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

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

1.8 COORDINATION

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

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

1.9 REMEDIAL WORK

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

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

1.10 LOCATION OF FIXTURES

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

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

1.11 FASTENINGS

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

.2 Prevent electrolytic action between dissimilar metals and materials.

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

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

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

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

1.12 EXISTING UTILITIES

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

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

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

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

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

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

.5 Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Waste Management and Disposal.

.6 Dispose of waste materials and debris off site.

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

1.2 FINAL CLEANING

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

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

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

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

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

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 19 – Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Accomplish maximum control of solid construction waste.

.2 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 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.

.6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

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

.8 Recycling: process of sorting, cleansing, 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.

.9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

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

.10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.11 Separate Condition: refers to waste sorted into individual types.

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

1.3 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

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

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

.5 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

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

1.4 DISPOSAL OF WASTE

.1 Do not bury rubbish or waste materials.

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

1.5 USE OF SITE AND FACILITIES

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

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

3.2 CLEANING

.1 Remove tools and waste materials on 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/recycled into specified sort areas.

3.3 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E - Government Chief Responsibility for the Environment:

Province	Address	General Inquiries	Fax
New Brunswick	Department of Environment 364 Argyle Street PO Box 6000 Fredericton, NB E3B 5H1	506-453-3700	506-453-3843

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

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

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

.2 Request Departmental Representative's inspection.

.2 Departmental Representative's Inspection:

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

.2 Contractor to correct Work as directed.

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

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

.2 Defects: corrected and deficiencies completed.

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

.4 Certificates required by Utility companies: submitted.

.5 Operation of systems: demonstrated to Departmental Representative's personnel.

.6 Work: complete and ready for final inspection.

.4 Final Inspection:

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

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

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

.6 Final Payment:

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

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 00 – Cleaning.

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

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week before contract completion with Departmental Representative to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

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

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

1.2 SUBMITTALS

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

.2 Two weeks before Substantial Performance of the Work, submit to the Departmental Representative, three final copies of operating and maintenance manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Warranties and Certificates: for work and systems.

.6 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Quality Control.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

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

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

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

.1 Provide files, racks, and secure storage.

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

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

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

.1 Do not use record documents for construction purposes.

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

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of opaque drawings provided by Departmental Representative.

.2 Use red marking pen for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

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

.1 Measured depths of elements of foundation in relation to finish first floor datum.

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

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

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

1.7 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.13 Additional requirements: as specified in individual specification sections.

1.8 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

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

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

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

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

1.9 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

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

.3 Deliver to site; place and store.

.4 Receive and catalogue items:

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit before final payment.

.2 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

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

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.11 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Departmental Representative for approval before each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, motors, transformers, commissioned systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 9 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 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.

1.3 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.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – 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.

Part 2 Products

2.1 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.

Part 3 Execution

3.1 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.

3.2 FORMWORK REMOVAL

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

.1 7 days for steel sheet pile encasement and concrete walls and concrete building base pad edges.

.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

Part 1 General

1.1 RELATED SECTIONS

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

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

.3 Section 05 50 00 – Metal Fabrications.

1.2 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.

1.3 SHOP DRAWINGS

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

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, 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.

1.4 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.

Part 2 Products

2.1 MATERIALS

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

.2 Reinforcing steel: carbon steel, having a yield stress of 400 MPa, deformed bars to CSA G30.18, unless indicated otherwise.

.3 Chairs, spacers, bar supports and support blocks: in accordance with CSA A23.1. Non-Metallic.

.4 Tie Wires: to ASTM 1064/A1064M.

2.2 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.

2.3 SOURCE QUALITY CONTROL

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

Part 3 Execution

3.1 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.

3.2 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

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 03 20 00 – Concrete Reinforcing.

.3 Section 05 50 00 – Metal Fabrications.

1.2 REFERENCES

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

- .1 ASTM C260/C260M-10a (2016), Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C494/C494M-19, Standard Specification for Chemical Admixtures for Concrete.
- .3 ASTM D1751-18, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.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 A283:19, Qualification Code for Concrete Testing Laboratories.
- .3 CSA A3000-18, Cementitious Materials Compendium.
  - .1 CSA A3001-18, Cementitious Materials for Use in Concrete.

1.3 FIELD 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 Cold and hot weather concreting.
- .2 Saw-cutting procedure.
- .3 Form types.
- .4 Chairs and spacers for support of reinforcing.
- .5 Curing and protection of concrete.
- .6 Finishes.
- .7 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 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

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

.5 Carefully coordinate the specified concrete work with weather conditions and tides.

1.4 QUALITY ASSURANCE

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

.2 Convene pre-installation meeting at least 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.

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

.4 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 an engineer licensed to practice in the Province of New Brunswick.

.5 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.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Designate a cleaning area for concrete trucks off site, at a company owned site for such a purpose meeting all federal and provincial requirements.

.2 Use trigger operated spray nozzles for water hoses.

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

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

.5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or waterways. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal.

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

Part 2 Products

2.1 MATERIALS

.1 Blended hydraulic cement: Type GUb-F/SF to CSA A3001.

.2 Supplementary cementing materials: to CSA A3001.

.3 Water: to CSA A23.1.

.4 Aggregates: to CSA A23.1/A23.2. Coarse aggregates to be normal density.

.5 Air entraining admixture: to ASTM C260/C260M.

.6 Chemical admixtures: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.7 Concrete retarders: to ASTM C494/C494M water based, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.

.8 Adhesive anchoring system: to be injectable, two-component, fast-cure hybrid adhesive tested in accordance with ACI 355.4 and ICC-ES AC308 for use in cracked and uncracked concrete. Acceptable products:

.1 HY200 Injection Adhesive System by HILTI.

.2 AT-XP BY Simpson Strong-Tie.

.3 AC200+ by DeWalt.

.4 Alternate materials: Approved by addendum in accordance with Instructions to Tenderers.

2.2 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: GUb-F/SF.
.2 Minimum compressive strength at 28 days: 35 MPa.
.3 Minimum cement content: 400 kg/m³ of concrete.
.4 Maximum water/cement ratio: 0.40.
.5 Class of exposure: C-1.
.6 Nominal size of coarse aggregate: 19 mm.
.7 Air content: 5 to 8 %.

.4 Mix design for all concrete shall have a maximum shrinkage less than 0.04% at 28 days as per CSA A23.1.

.5 Shrinkage reducing admixtures will be permitted in the mix.

.6 Submit written laboratory test results showing that proposed mix will meet or exceed performance specified. Costs of these tests shall be the responsibility of the Contractor.

Part 3 Execution

3.1 CONCRETE DELIVERY

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

.2 Mixers and agitators used for transporting concrete shall deliver their load to the site and discharge shall be completed within 2 hours of initial mixing unless longer time is agreed to with Departmental Representative's Laboratory Representative and Concrete Producer as described in CSA A23.1/A23.2.

.1 Under conditions contributing to rapid stiffening of concrete, the Departmental Representative may specify a time of less than 2 hours.
.2 Deviations to be submitted for review by Departmental Representative.

.3 The batch delivery ticket meeting the requirements of CSA A23.1 shall accompany each batch of concrete delivered to site.

.1 The batch ticket shall include quantities of materials batched.
.2 A copy of the batch ticket shall be given to the Departmental Representative for record.

.4 Water shall not be added after batching for any purpose without written authorization by the Mix Design Engineer, and subject to approval by the Departmental Representative.

.1 Slump adjustment of superplasticized concrete shall be with admixture only.

.5 The temperature of material charged in the mixer shall be such that the temperature of the mixed concrete, at the time of placement does not exceed 25 °C nor shall it be less than 10 °C.

3.2 PREPARATION

.1 Inform Department Representative before placing concrete. Provide 24 hours' notice prior to placing of concrete.

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

.3 Ensure that reinforcement and formwork are thoroughly clean before placing.

.4 Prior to placing of concrete advise Departmental Representative of proposed method for protection of concrete during placing and curing in adverse weather.

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

.6 Protect previous work from staining.

.7 Hardened concrete surfaces to receive new concrete shall have a Concrete Surface Preparation (CSP) of 5 to 10 in accordance with the International Concrete Repair Institute (ICRI) CSP scale.

.8 Hardened concrete surfaces shall be thoroughly saturated with water, for 24 hours in advance of placing concrete.

.1 All concrete shall be placed in a space free of standing water.

3.3 CONSTRUCTION

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

.2 Hot-Weather and cold-weather concreting shall be carried out, protected, and cured in accordance with CSA A23.1.

.3 Place concrete in dry conditions.

.4 Do not permit vertical free fall of concrete mix to exceed 1500 mm.

.5 During concreting operations:

.1 Development of cold joints is not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or work.

.6 Concrete shall be placed while still plastic and workable.

.1 Re-tempering any partially hardened concrete with additional water shall not be permitted.

.7 Ensure reinforcement and inserts are not disturbed during placement operations.

.8 All procedures and applications to be conducted in a manner to produce a product of the highest quality within the standard guidelines of ACI 546R.

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

3.4 FINISHING AND CURING

.1 All formed surfaces to be smooth form finish.

.2 Concrete finish and tolerance shall be in accordance with CSA A23.1.

.1 Float horizontal surfaces with wood or metal floats or power finishing machines and bring surfaces to true grade or dimensions.

.2 Electrical building base finish shall be Class ‘A’, non-slip.

.3 All exposed concrete surfaces shall be continuously wet cured.

.1 Cure concrete surfaces by moist cure for minimum 7 consecutive days after placing, and in accordance with CSA A23.1.

.2 Wet curing shall be carried out by means of ponding, continuous sprinkling, absorptive mat, or fabric kept continuously wet.

.3 A burlap, absorptive mat, or non-woven geotextile fabric shall be applied immediately after finishing of the concrete surface.

.4 Traffic, including construction traffic, shall not be permitted on any new concrete until it has attained a minimum compressive strength of 25 MPa.

3.5 SITE TOLERANCE

.1 Concrete tolerance in accordance with CSA A23.1.

3.6 CONCRETE ACCEPTANCE

.1 Acceptance of concrete:

.1 Strength level of each type of concrete shall be considered satisfactory if both of the following requirements are met:

.1 Average of all sets of three consecutive strength tests equals or exceeds the required specified 28-day compressive strength.

.2 No individual strength test falls below 90 % of the required specified 28-day compressive strength.

.2 Unsatisfactory results:

.1 In case of unsatisfactory results, the Departmental Representative shall have the right to request one or more of the following at no extra cost to the Owner:

.1 Non-Destructive testing.

.2 Core drilling and testing.

.3 Removing and replacing of all defective concrete.

.3 Rejection:

.1 All construction not meeting the required standard of quality and workmanship shall be rejected unless, in the opinion of the Departmental Representative, suitable repair work can be performed within the work schedule. Cost of replacement or repair shall be borne entirely by the Contractor. All remedial work must be carried out to the satisfactory of the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 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.

1.3 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.

1.4 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.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

.1 Steel angles, plates, C shape sections, and rods to CSA G40.20/G40.21, Grade 300W. Steel H-Pile sections to CSA G40.20/G40.21, Grade 350W, or to ASTM A572, Grade 50

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

2.2 FABRICATION-GENERAL

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

Part 3 Execution

3.1 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.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Division 01 – General Requirements.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.1-21, Canadian Electrical Code (CEC), Part 1 (25th Edition), Safety Standard for Electrical Installations.

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

.3 C235:19, Preferred Voltage Levels for AC Systems up to 50,000 V.

.4 Z462:21, Workplace Electrical Safety.

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

.1 EEMAC Y1-2-1979, Performance Specifications for Finishing Systems for Outdoor Electrical Equipment.

.2 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

.3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

.1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 DESIGN REQUIREMENTS

.1 Operating voltages: to CSA C235.

.2 Control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

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

.4 Use one nameplate for both languages.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data: submit WHMIS SDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.3 Shop drawings:

.1 Submit manufacturer shop drawings of all equipment.

.2 Part numbers for submitted products and equipment to be clearly highlighted, boxed or arrowed with all required accessories and components identified.

.3 Submitted information must be detailed and relevant to the project. Bulk generic information is not acceptable.

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

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

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

.7 If changes are required, resubmit corrected drawings.

.8 Where the use of electronic shop drawings has been agreed to by the Departmental Representative, the following submittal requirements are to be followed:

.1 Shop drawings to be submitted in PDF format, legible and clear.

.2 Shop drawings to be grouped by specification section, with one PDF file per specification section. The file name to indicate the section number and name, i.e. “26 50 00 Lighting Rev0.PDF” with resubmissions appended Rev1, Rev2, etc.

.3 Supplemental information not previously submitted to be identified as follows: “26 50 00 Lighting Supplement 1.PDF”, Supplement 2, etc.

.4 A cover sheet is to be incorporated into each PDF submission and indicate the project name and number, specification section number and name, the contractors name, suppliers name, date submitted, contractor’s stamp and signature identifying that the contractor has reviewed the information prior to submission for correctness and completeness. Sufficient white space (minimum of ¼ page) is to be left for the Departmental Representative’s stamp and comments.

.5 Part numbers for submitted products to be clearly highlighted, boxed or arrowed with all required accessories and components indicated.

.6 Submitted information must be specific, detailed and relevant to the project. Bulk, generic information is not acceptable.

.4 Quality Control: in accordance with Section 01 45 00 – Quality Control.

.1 Provide CSA certified equipment and material.

.2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.

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

.4 Permits and fees: in accordance with General Conditions of contract.

.5 Submit, upon completion of Work, load balance report as described in PART 3 – FIELD QUALITY CONTROL.

.5 Upon completion of project, submit as-built drawings and maintenance manuals.

1.6 QUALITY ASSURANCE

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

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.

.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.

.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Site Meetings:

.1 Site Meetings: as part of Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

.4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

1.8 SYSTEM STARTUP

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

1.9 OPERATING INSTRUCTIONS

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

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

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.10 SITE VISIT

.1 Prior to tender submission, visit the site and become familiar with the job and all conditions which may affect costs. Ignorance of existing conditions will not be considered as basis for extra claims.

1.11 MEASUREMENT FOR PAYMENT

.1 Electrical will be measured by lump sum.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 – Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.3 Factory assemble control panels and component assemblies.

2.2 ELECTRIC EQUIPMENT AND CONTROLS

.1 Verify installation and co-ordination responsibilities related to equipment and controls, as indicated. Verify size, location and wiring requirements of all equipment with appropriate trade and reviewed shop drawings prior to rough-in.

.2 Provide wiring and conduit.

2.3 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of authority having jurisdiction and Departmental Representative.

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

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

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

.1 Nameplates: plastic laminate lamicoid 3 mm thick plastic engraving sheet, matte white finish face, black core, lettering accurately aligned and engraved into core and mechanically attached with 3M VHB acrylic adhesive type 4941.

.2 Sizes as follows:

NAMEPLATE SIZES

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

.2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

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

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

.6 Lamicoid nameplate installed on distribution panelboards, meter centers, circuit breaker enclosures and power modules 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.

.5 The following is an example.

PANEL D1 – 400A

120/208V – 3PH – 4W

FED FROM TRANSFORMER: TX1

.7 Lamicoid nameplates installed on manual starters, control panels, disconnect switches, large junction and pull boxes, service equipment and service modules shall contain the following information:

.1 Designated name of equipment.

.2 Designated name of power source.

.3 Voltage(s), number of phases and wires.

.4 Branch circuit breaker number(s) where possible.

.8 All junction and/or pull boxes (volume less than 8500 cu cm) 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.

.9 Install an additional lamicoid nameplate on all, or any piece of electrical equipment, or apparatus, i.e. panelboards 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 10 KAIC.

Example:

Minimum interrupting capacity of breakers installed in this panel is to be not less than 14 KAIC	Minimum interrupting capacity of fuses installed in this fusible switch is to be not less than 100 KAIC

2.6 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, indicating panel and circuit number; i.e., D2-31. Normal ground circuits to have ground, neutral and phase wires identified with black on white background tape. Tape to be preprinted vinyl, self-adhesive. Circuits to be identified at both ends and at all pull and junction boxes.

.2 Use coloured plastic tapes to identify feeders on both ends of phase conductors and at junction and pull boxes if conductor insulation colours are other than red, black, blue, white and green.

.3 Maintain phase sequence and colour coding throughout.

.4 Colour coding: to CSA C22.1.

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

2.7 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 distribution enclosures light grey to EEMAC 2Y-1.

Part 3 Execution

3.1 INSTALLATION

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

.2 Do underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 VAPOUR BARRIER PENETRATIONS

.1 Outlet and junction boxes installed in walls or ceilings equipped with a vapour barrier are to be surrounded with a moisture resistant barrier or boxes that are specifically designed for vapour barrier penetrations are to be used.

.2 Penetrations through vapour barriers shall be effectively sealed to maintain the integrity of the vapour barrier.

3.3 CUTTING AND PATCHING

.1 Provide cutting, coring and drillings as required for installation of electrical services. Hole sizes to be kept to a minimum. Restoration of damaged surfaces to preconstruction condition will be by this contractor.

3.4 NAMEPLATES AND LABELS

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

3.5 CONDUIT AND CABLE INSTALLATION

.1 Install cables, conduits and fittings embedded in structure as indicated.

3.6 LOCATION OF OUTLETS AND EQUIPMENT

.1 Locate outlets in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

.2 Change location of outlets and equipment at no extra cost or credit, providing distance does not exceed 3000 mm, unless indicated otherwise, and information is given before installation.

.3 Locate light switches on latch side of doors.

3.7 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 Local switches: 1200 mm.

.2 Wall receptacles: 1000 mm.

.3 Panelboards: 1500 mm or as required by Code

.4 Refer to all detail drawings and confirm mounting of outlet boxes prior to roughing-in.

3.8 COORDINATION OF PROTECTIVE DEVICES

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

3.9 FIELD QUALITY CONTROL

.1 Load Balance:

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

.2 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS: phase and neutral currents on panelboards, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests in accordance with Section 01 45 00 – Quality Control.

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

.2 Circuits originating from branch distribution panels.

.3 Lighting and its control.

.4 Insulation resistance testing:

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

.2 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

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

3.10 CLEANING

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

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

.1 In general, work of this Section consists of the removal and replacement of electrical services on existing wharf as noted.

.2 Remove all redundant/obsolete/abandoned electrical equipment, wire, cable and conduit. This includes:

.1 Existing meters, fused switches and distribution.
.2 Existing shrouds, outlets and luminaires as noted.
.3 Existing feeds to winches.
.4 All wire, cable and conduit underneath the wharf.
.5 Un-reused embedded conduits to be cut off flush with concrete.
.6 Existing service entrance conduits on Utility pole to minimum of 300mm below grade.

1.2 RELATED SECTIONS

.1 Section 01 74 19 – Waste Management and Disposal.

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

1.3 SITE SURVEY

.1 Prior to Tender submission, visit the site and survey and Quantify the extent of the removals/alterations required for this contract and include all costs in the total tendered price.

1.4 REFERENCE STANDARDS

.1 All removal and alteration work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.5 PROTECTION

.1 The contractor is responsible for any damages to existing structure as a result of the work.

Part 2 Products

2.1 Not Applicable

Part 3 Execution

3.1 GENERAL REMOVALS

.1 Remove existing electrical services as noted

.2 Schedule all removal work with the Departmental Representative. Arrange work to minimize disruptions to wharf operations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 WASTE MANAGEMENT AND DISPOSAL

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

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

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

.4 Do not dispose of preservative treated wood with other materials destined for recycling or reuse. Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill as approved by Departmental Representative.

.5 Dispose of unused wood preservative material at official hazardous material collections site.

.6 Do not dispose of unused preservative material into sewer system, ocean, streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

Part 2 Products

2.1 WOOD PRODUCTS

.1 All wood products shall be cut from live timber and must be free from physical defects such as surface rot, heart rot and loose knots.

.2 Wood products to be pressure treated in accordance with CAN/CSA-080 Series-08(R2012). Use ACA or CCA treatment only.

.3 Pressure treatment to be AWPA category 4B with a CCA pcf of 0.60, suitable for marine use.

.4 Any field cuts to be treated in accordance with AWPA standard M4 with a preservative containing at least 2% copper.

.5 Rough hardware: bolts, nuts, washers, lags, pin, screws; 316 stainless steel.

.6 Wood products to be ordered to length to avoid field cuts.

2.2 WOOD UTILITY POLES

.1 Wood utility poles: to CAN/CSA-O15, wood species Pine, Class 4, preservative treated.

.1 9 m long poles for site lighting as indicated.

.2 11 m long poles for services to ground out.

Part 3 Execution

3.1 INSTALLATION

.1 Layout and install the work in the locations and arrangement shown on the drawings or as indicated by the Departmental Representative.

.2 Where indicated install new wood pole. Install new light fixtures, associated wiring and switching.

.3 Pre-drill all anchor holes to prevent splitting of wood.

.4 All field cuts, holes and breaks in the preservative treatment shall be given two coats of preservative before assembly.

.5 Securely fasten new wood products and poles to existing structure.

.6 Use 316 stainless steel or hot dipped galvanized hardware to fasten wood products and poles in place and for mounting of new or existing equipment to the wood products and poles.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals

1.3 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 POWER PEDESTALS

.1 Power pedestals to be a self-contained enclosure housing terminal blocks and receptacles for separately metered marina shore power services and general power as indicated. Pedestals to include:

.1 Main housing constructed of 16 gauge 316L stainless steel with a UV resistant white polyurethane finish and be 3R rated. Each Pedestal to accommodate a combination of separately metered L14-30R receptacles and non metered L5-20R receptacles fed from the general services panel. Enclosure to be divided into 2, 3 or 4 separate sections as required, each containing copper terminals capable of accepting #10 AWG to #2/0 AWG conductors for single phase 120/240V feed through capacity. Pedestal to house receptacles and associated breakers as noted on drawings. Pedestal dimensions to be 1333mm H x 282mm W x 282mm D.

.2 Pedestal to be c/w polycarbonate mounting base plate to isolate the bottom housing from the dock surface.

.3 30A receptacles to be corrosion resistant marine grade, 120/240V, 30A L14-30R c/w lockable cover and 30A, 2P breaker, quantity as indicated.

.4 20A receptacles to be corrosion resistant marine grade, 120V, type L5-20R c/w lockable cover and 20A, 1P 5mA GFI breaker, quantity as indicated.

.5 Each 30A receptacle will be fed from a separately metered service located in the service building.

.6 Each 20A receptacle will be fed from the wharf general services Panel A in the service building.

.7 Fully assembled pedestals to be CSA certified and labeled.

.2 Acceptable materials

.1 Marina Electrical Equipment Harbor Light SS series c/w receptacles as indicated.

2.2 EQUIPMENT IDENTIFICATION

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

.2 Size 4 lamacoid nameplate for each metered outlet. Example F31 where:

.1 F3 – indicates pedestal number.

.2 1 – indicates outlet on pedestal.

Part 3 Execution

3.1 INSTALLATION

.1 Existing floating wharves to be modified as indicated to accept Power Pedestals. Use Wood Products as specified in Section 26 05 10 for additional support. Fasten base plates to floating wharves sub-structures as shown in details and as approved by Departmental Representative. Exact locations of pedestals to be reviewed with Departmental Representative prior to installation.

.2 Feed power cables through float wireways or structure and up into pedestal base.

.3 Install cable connectors and terminate on appropriate terminal blocks as per manufacturer’s installation instructions. Each pedestal will be uniquely labeled and receptacles numbered to match meter in service building as per table.

.4 Megger all feeders prior to energizing and test each receptacle and ground fault protection.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.3 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.
.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 SERVICE MODULES

.1 Fabricate service modules utilizing 9mm thick aluminum plate, Type A82C 5052-H32 as indicated.

.2 Fabricate using sound, continuous full penetration welds conforming to CSA Specification W59-03.

.3 After fabrication, all parts shall be cleaned; welds ground smooth.

2.2 ANCHORAGE

.1 16mm diameter 316 stainless steel anchor bolts and stainless steel nuts and washers.

Part 3 Execution

3.1 INSTALLATION

.1 Install service module and secure in place.

.2 Install corrosion resistant electrical components as indicated in service module.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No.18.3-12 (R2017), Conduit, Tubing and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 and UL 514B).

.2 C22.2 No.65-18, Wire Connectors (Tri National Standard with NMX-J-543-ANCE and UL 486A-486B).

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

.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer’s instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 MATERIALS

.1 Crimp style wire connectors, nylon insulated, with current carrying parts of copper alloy, for conductors #16 AWG and smaller.

.2 Fork tongue, nylon insulated, crimp style terminals for connecting conductors #16 AWG and smaller to screw down terminals.

.3 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper alloy sized to fit copper conductors as required. Use twist-on connectors for #14 AWG to #8 AWG wires.

.4 Crimp style wire connectors, nylon insulated with current carrying parts of copper alloy, for connecting solid to stranded conductors.

.5 Compression type connectors or terminal blocks in suitable enclosure for connecting #6 AWG conductors and larger, unless indicated otherwise. Compression type connectors to have a temperature rating of 90 deg. C.

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

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

.1 Connector body and stud clamp for stranded round copper or aluminum conductors.
.2 Clamp for stranded round copper conductors.
.3 Stud clamp bolts.
.4 Bolts for copper conductors.
.5 Sized for conductors as indicated.

.8 Waterproof gel filled twist-on type wire connectors up to #6 AWG to: CAN/CSA-C22.2 No.65 and UL486G, with current carrying parts of copper alloy sized to fit copper conductors as required.

.1 Suitable for use in damp, wet, raintight and submersible locations.
.2 Temperature rating: 105 deg. C.
.3 Silicone sealant temperature: -43 deg. C to 204 deg. C.
.4 Acceptable materials:
.1 King Innovation: Dryconn waterproof connectors.
.2 Ideal “Underground” connectors.

.9 Insulated splicer/ reducer inline or offset connectors:

.1 Aluminum construction suitable for copper and aluminum conductors.
.2 Captive pressure screws.
.3 Watertight touch safe.

.4 Removable plugs, plastisol black cover.

.5 Wire range size to suit.

.6 Acceptable materials:

.1 Ilsco type PBTO.

.2 Penn Union Type IPBB.

.3 T & B.

.4 Burndy Clear UNITAP inspectable.

.10 Insulated splicer/ reducer inline terminal blocks:

.1 Aluminum construction suitable for copper and aluminum conductors.

.2 Captive pressure screws.

.3 Touch safe plastic covers.

.4 Wire range size to suit.

.5 Acceptable materials:

.1 Square D type 9080 LBA (#14-2/0).

.2 Merson type MPDB miniature (#14-2/0).

.3 Ilsco.

.11 Teck Connectors:

.1 Watertight, copper free aluminum approved for TECK cable.

.2 Acceptable materials:

.1 Thomas & Betts StarTeck.

.2 Iberville Tek Series.

.12 Flexible cord strain-relief connectors:

.1 Watertight connector body with grip for strain relief. Approved for use with insulated flexible cord.

.2 Aluminum connector body.

.3 Stainless steel mesh grip.

.4 Grip diameter range to match cable diameter.

.13 Flexible Cable Insulated Ferrules:

.1 Ferrules for terminating flexible wire in screw clamp terminals.

.2 Thin-walled copper tube throat construction.

.3 Compression fit using manufacturer’s recommended tool with colour coded die.

.14 Cold Weather Tape:

.1 Acceptable materials:

.1 Scotch Brand ‘88’.

Part 3 Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.2 Install splice/reducer connectors and terminal blocks for cables larger than #6 at field and panel ends terminating with #12 AWG conductors for 15A & 20A circuits and #10 AWG for 30A circuits. For larger amperage circuits use appropriately sized connectors based on equipment amperage.

.3 Install gel filled twist-on type connectors for lighting and receptacle circuit splice locations and tighten.

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

.5 Install ferrules on all flexible wire connections in accordance with ferrule manufacturer’s recommendations.

.6 Wrap connectors in junction boxes with double half lapped layer of cold weather tape.

.2 Use waterproof silicone filled connectors for splices in damp or wet locations, including but not limited to, connections inside of exterior light fixtures, receptacles and junction boxes.

3.2 RESTRICTIONS

.1 No splices are allowed in panelboards or in equipment enclosures unless noted otherwise.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 20 – Wire and Box Connectors (0 - 1000V).

.3 Section 26 05 29 – Hangers and Supports for Electrical Systems.

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No. 0.3-09 (R2019), Test Methods for Electrical Wires and Cables.
.2 C22.2 No. 96-17 (R2021), Portable Power Cables.
.3 C22.2 No. 131-17, Type TECK 90 Cable.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.
.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 WIRES

.1 Conductors: stranded for 8 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.2 TECK CABLE

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

.2 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Chemically cross-linked thermosetting polyethylene rated type RW90, 600V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: flat interlocking aluminum.

.6 Overall covering: thermoplastic polyvinyl chloride material.

.7 Fastenings:

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

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

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

.8 Connectors:

.1 Corrosion resistant aluminum, watertight approved for TECK cable.

.2 Cold shrink corrosion protection kit connector covers.

2.3 FLEXIBLE POWER CABLES

.1 Cable to: C22.2 No. 96-17.

.2 Conductors:

.1 Type G and Type G-GC – two, three or four conductors plus grounds, size as indicated, stranded tinned copper.

.3 Insulation:

.1 Ethylene-propylene-rubber (EPR) rated 2kV.

.2 Oil and moisture resistant.

.3 Insulation rated 90 deg C.

.4 Colour coded: red, black, white, green ground.

.4 Outer jacket:

.1 Black heavy duty CPE thermoset compound.

Part 3 Execution

3.1 INSTALLATION OF WIRES

.1 Install wiring as follows:

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

3.2 INSTALLATION OF TECK CABLE 0 -1000 V

.1 Install cables, fastened in place at 1200 mm intervals and 300 mm from terminations.

.2 Terminate cables with bulkhead connectors complete with cold shrink protection covers.

.3 Terminate wires in accordance with Section 26 05 20 – Wire and Box Connectors (0 - 1000V).

.4 Terminate with 90 degree PVC coated connectors for entries into existing light poles.

3.3 INSTALLATION OF FLEXIBLE POWER CABLES

.1 Install cables in accordance with C22.1:21.

.2 Terminate wires in accordance with Section 26 05 20 – Wire and Box Connectors (0 - 1000 V); use stainless steel flexible cord strain relief connectors for all attachments to electrical enclosures.

.3 Support cables using stainless steel flexible cord support grips.

3.4 RESTRICTIONS

.1 Installation of cables must be done in a manner to prevent damage from nor interfere with wharf activities.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 21 – Wires and Cables (0-1000V).

1.2 REFERENCES

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

.1 ANSI/IEEE 837-2014, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International)

.1 C22.2 No.41-13 (R2017), Grounding and Bonding Equipment (Tri-National Standard with NMX-J-590-ANCE and UL 467).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 EQUIPMENT

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

.2 Ground plates: hot-dipped galvanized steel with minimum 10 mm thickness and 0.36 m^2 area.

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

.4 Insulated grounding conductors: green, type RW90 minimum size #12AWG.

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

.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Compression type conductor connectors.
.5 Bonding jumpers, straps.

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, conductors, connectors, accessories. Install an insulated ground wire in all conduits.

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

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make connections to rod electrodes using copper welding by thermit process or compression connectors.

.5 Make connections to ground plates by thermit weld process.

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

.7 Soldered joints not permitted.

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

3.2 ELECTRODES

.1 Install rod electrodes and make grounding connections.

.2 Where rock is encountered ground plates may be used instead of rods.

.3 Bond separate, multiple electrodes together.

.4 Use size 1 AWG copper conductors for connections to electrodes.

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

.6 If onshore conditions are not suitable for grounding, ground plate must be installed on the Harbour bottom at least 2 m below low tide level on the lee side of the wharf. Ground plate and installation to conform with CEC rule 78-058.

3.3 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral of 240 V systems.

3.4 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: service equipment, distribution panels, outdoor lighting.

3.5 FIELD QUALITY CONTROL

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

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

.3 Perform tests before energizing electrical system.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.3 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 SPECIFIC PURPOSE SUPPORTS

.1 U-Shaped, 41x41mm, 2.5mm thick 316 stainless steel surface mounted or suspended as required.

.2 9.5 mm dia 316 stainless steel threaded rods for supporting suspended channel.

.3 Specific purpose, 316 stainless steel, fasteners to be used to support boxes, conduit and cable from support channel and/or directly from structure.

.4 Two hole 316 stainless steel straps for cables and conduits.

2.2 MOUNTING HARDWARE

.1 316 Stainless steel corrosion resistant concrete inserts and mounting hardware to be used.

2.3 FLEXIBLE CORD SUPPORT GRIPS

.1 Heavy duty type.

.2 Double weave stainless steel mesh grip.

.3 Grip range to match cable diameter.

2.4 MESSENGER CABLE

.1 Stranded galvanized steel according to CAN/CSA G12.

.2 Type MG with a 8 mm diameter and breaking load of 4700 kg.

.3 Hardware and fittings for aerial cable installation to be in accordance with CAN/CSA C83.

Part 3 Execution

3.1 INSTALLATION

.1 Secure cables directly to underside of structure with expandable inserts or use support channels, surface mounted or suspended.

.2 Secure surface mounted equipment with stainless steel fasteners.

.3 Fasten exposed conduit or cables to structures or support systems using two hole stainless steel straps.

.4 Install fastenings and supports as required for each type of equipment and cable in accordance with manufacturer’s installation recommendations.

.5 Install flexible cord support grips as indicated and in accordance with manufacturer’s instructions.

.6 Attach Teck cables to aerial messenger cable using stainless steel cable ties at 600 mm intervals.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.1-21, Canadian Electrical Code (CEC), Part 1, 25th Edition.

.2 C22.2 No. 40-17, Junction and Pull Boxes.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 JUNCTION AND PULL BOXES

.1 Construction: rigid PVC or 316 stainless steel as noted, CSA 4X rated.

.2 Covers Surface Mounted: stainless steel hinged covers complete with neoprene gasket.

.3 Mounting feet.

.4 Mounting plate.

.5 Drilled conduit holes to suit.

.6 Acceptable materials:

.1 Carlon
.2 Hoffman
.3 Hammond
.4 IPEX
.5 Rittal

2.2 WIRING TROUGHS

.1 Construction: 14 gauge plated steel, CSA 3R rated with grey polyester powder paint finish inside and out. Size as indicated.

.2 Slip on cover.

.3 Provision for padlocking.

.4 Mounting plate.

.5 Drilled conduit holes to suit.

.6 Acceptable materials:

.1 Hoffman.

2.3 DRAIN/BREATHER

.1 Drain and breather to accommodate pressure changes and allow moisture or condensation to drain from enclosure while maintaining CSA rating.

.2 Constructed of fibre reinforced nylon with castellated locknuts and inner dust seal to prevent contaminants from entering enclosure.

Part 3 Execution

3.1 JUNCTION AND PULL BOXES INSTALLATION

.1 Install pull boxes in accessible locations as indicated.

.2 Size and install junction and pull boxes to CSA C22.1.

.3 Install breather/drain on all junction and pull boxes

3.2 WIRING TROUGHS

.1 Install wiring troughs in building as indicated.

.2 Install terminal blocks and grounding strips sized to accommodate conductors installed.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 – Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating system name voltage and phase or as indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.1-21, Canadian Electrical Code, Part 1, 25th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

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

.2 102 mm square or larger outlet boxes as required.

.3 Blank cover plates for boxes without wiring devices.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

2.3 CONDUIT BOXES

.1 FD PVC boxes with factory hubs and mounting feet for surface wiring of devices unless noted otherwise.

.1 Acceptable materials:

.1 Leviton 'Wetguard'

.2 Provide gasketed covers for exterior boxes.

2.4 FITTINGS - GENERAL

.1 Bushings and connectors with nylon insulated throats.

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

.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Galvanized steel outlet boxes can only be used inside of building.

.3 Fill boxes with sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.4 Provide correct size of openings in boxes for conduit and cable connections. Do not install reducing washers.

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

.6 Identify systems for outlet boxes as required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No. 18.3-12 (R2017), Conduit, Tubing, and Cable Fittings (Tri-National Standard with ANCE NMX-J-017 and UL 514B).

.2 C22.2 No. 18.4:15 (R2019), Hardware for the Support of Conduit, Tubing and Cable (Bi-National Standard with UL 2239).

.3 C22.2 No. 45.1-07 (R2017), Electrical Rigid Metal Conduit- Steel (Tri-National Standard with UL 6 and NMX-J-534-ANCE-2007).

.4 C22.2 No. 83-M1985 (R2017), Electrical Metallic Tubing.

.5 C22.2 No. 211.2:06 (R2021), Rigid PVC (Unplasticized) Conduit.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer’s instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

1.5 LOCATION OF CONDUITS

.1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

Part 2 Products

2.1 CONDUITS

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

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

2.2 CONDUIT FASTENINGS

.1 Two hole 316 stainless steel straps to secure surface conduits.

2.3 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18.3, manufactured for use with conduit specified.

.2 Ensure factory "ells" where 90 degrees bends are required.

2.4 CONDUIT CEMENT

.1 Conduit cement and primer for PVC conduit.

2.5 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install conduits to cause minimum interference in spaces through which they pass.

.2 Use EMT inside electrical building.

.3 Use rigid PVC conduit underground.

.4 Use PVC conduit, fittings and straps for all surface and exposed work to services, devices and equipment where indicated. Install in accordance with manufacturer’s recommendations.

.5 Use both primer and conduit cement for joining conduits and fittings.

.6 Minimum conduit size: 21 mm.

.7 Use standard radius elbows for PVC conduit.

.8 Mechanically bend conduit over 21 mm diameter.

.9 Install fish cord in all conduits to wharf services.

.10 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.11 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Group conduits wherever possible on steel channels.

3.4 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

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

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 00 – Cleaning.

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 21 – Wires and Cables (0-1000V).

.3 Section 31 23 10 – Excavation and Backfill.

.4 Section 33 65 76 – Direct Buried Underground Cable Ducts.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)

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

1.3 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 CABLE MARKER TAPE

.1 Metal detectable polyethylene marker tape: 75 mm wide for direct burial.

.2 Marker sheet red in colour with the following words printed in large black block letters: CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW.

Part 3 Execution

3.1 DIRECT BURIAL OF CABLES

.1 After sand bed in accordance with Section 31 23 10 – Excavation and Backfill, is in place, lay cables maintaining 75 mm clearance from each side of trench to nearest cable.

.1 Do not pull cable into trench.

.2 Include offsets for thermal action and minor earth movements.

.1 Offset cables 150 mm minimum for each 60 m run, maintaining minimum cable separation and bending radius requirements.

.3 Underground cable splices are not acceptable.

.4 Minimum permitted radius at cable bends for rubber or plastic covered cables, 8 times diameter of cable or in accordance with manufacturer's written recommendations; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.

.5 Cable separation:

.1 Maintain 25 mm minimum separation between cables of different circuits.

.6 After sand protective cover specified in Section 31 23 10 – Excavation and Backfill, is in place, install continuous row of cable warning tape as indicated to cover length of run.

3.2 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in conduits.

.1 Do not pull spliced cables inside conduits.

.2 Install multiple cables in conduits simultaneously.

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

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

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

3.3 MARKER TAPE

.1 Install cable marker tape 300mm below grade, continuous over full length of cable ducts.

3.4 FIELD QUALITY CONTROL

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

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

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

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

.5 Pre-acceptance tests.

.1 After installing cable but before splicing and terminating, perform insulation resistance test with 500V megger on each conductor.

.6 Provide 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 test criteria.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: Submit operational and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 PHOTOELECTRIC LIGHTING CONTROL

.1 Die cast aluminum body, stem mounting.

.2 SPST-Rated 2000W, 120 V.

.3 Voltage variation: plus or minus 10%.

.4 Temperature range: minus 40 degrees C to plus 60 degrees C.

.5 Switching on lights at 10 to 50 lx.

.6 Switching off lights at 30 to 150 lx.

.7 Rated for 5000 operations.

.8 Fail-safe circuit when de-energized.

.9 On-off adjustment by moving slide cover.

.10 Time delay both ‘on’ and ‘off’.

.11 Colour coded lead wires.

.12 Five year warranty.

.13 Acceptable materials:

.1 Tork 2115.

Part 3 Execution

3.1 INSTALLATION

.1 Install photoelectric controls in accordance with manufacturer's instructions.

.2 Mount on a cast FS style box.

.3 Connect to contactor circuit.

.4 Adjust slide cover for correct on-off footcandle.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 28 – Grounding – Secondary.

.3 Section 26 05 31 – Junction Boxes, Pull Boxes and Wiring Troughs.

.4 Section 26 28 13.01 – Fuses – Low Voltage.

.5 Section 33 71 73.02 – Underground Electrical Service.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.3 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

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

1.4 UTILITY COSTS

.1 Any fees or costs required by the utility for service and each new meter installation to be paid for by contractor as part of the contract price.

Part 2 Products

2.1 SUPPLY DATA

.1 Service equipment suitable for incoming power supply: 120/240V, 600A, 60Hz, single phase, 3 wire, grounded neutral.

2.2 EQUIPMENT

.1 Fused disconnect switch.

.2 Multiple meter centres: to utility supply authority requirements.

2.3 FUSED DISCONNECT SWITCH

.1 Heavy duty, fusible, service entrance rated disconnect switch in CSA 1 Enclosure to CSA C22.2 No.4, size as indicated.

.2 Provision for padlocking in off switch position by three locks.

.3 Mechanically interlocked door to prevent opening when handle is in ON position.

.4 Fuses: in accordance with Section 26 28 13.01 - Fuses - Low Voltage.

.5 Fuseholders: to CSA C22.2 No.39, relocatable and suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 ON-OFF switch position indication on switch enclosure cover.

2.4 MULTIPLE METER CENTRES

.1 Rated for 600A, 240V, one phase, 3 wire service with the following features:

.1 Each meter stack to be suitable for 6- 100A 1 phase services or 3- 200A services as indicated.

.2 Each meter to be complete with a main breaker sized as indicated.

.3 Tap box, if required, rated for 600A with main lugs suitable for 2 x 350MCM copper conductors per phase and neutral.

.4 Factory pre-bussing from main lugs to the line side of all positions.

.5 Interchangeable hubs.

.6 Top or bottom entry.

.7 Blank covers for unused sockets.

2.5 NAMEPLATES

.1 Each meter stack suitable for 6-100A 1 phase services to have a size 7 nameplate at the top stating: ‘MAXIMUM BREAKER SIZE TO BE INSTALLED IS 60A’.

.2 Each meter to be identified with pedestal or service module number with size 2 nameplate.

Part 3 Execution

3.1 INSTALLATION

.1 Install service equipment.

.2 Connect to incoming service.

.3 Connect to outgoing services.

.4 Make grounding connections in accordance with Section 26 05 28 – Grounding – Secondary and utility requirements.

.5 Make provision for power supply utility’s metering to meet their requirements.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 28 16.02 – Molded Case Circuit Breakers.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No.29-15 (R2019), Panelboards and Enclosed Panelboards.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer’s instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 PANELBOARDS

.1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 250 V panelboards: bus and breakers rated for 10kA (symmetrical) interrupting capacity or as indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Four keys for each panelboard and key panelboards alike.

.6 Copper bus with neutral of same ampere rating as mains.

.7 Mains: suitable for bolt-on breakers.

.8 Trim with concealed front bolts and hinges.

.9 Trim and door finish: baked grey enamel.

.10 Minimum of 33% spare space unless indicated otherwise.

2.2 LOADCENTRES- PRIVATE SERVICES

.1 250V loadcentre: minimum 60A mains, single phase, with bus and breakers rated for 10 kA (symmetrical) interrupting capacity. CSA 1 surface mounted steel or non- metallic enclosure.

.2 Space for two 25mm or four 12mm plug in breakers.

.3 Loadcentres to be c/w 30A, 2P 30mA GFI breakers to feed metered service receptacles on wharf.

2.3 BREAKERS

.1 Breakers: to Section 26 28 16.02 – Molded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

.3 Breakers with 30 mA ground fault trip where indicated.

2.4 EQUIPMENT IDENTIFICATION

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

.2 Nameplate for each panelboard and loadcentre size 4 engraved as indicated.

.3 Complete circuit directory with typewritten legend showing location and load of each circuit.

.4 Arc flash hazard label installed on panel door.

Part 3 Execution

3.1 INSTALLATION

.1 Locate panelboards and loadcentres as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Mount panelboards to height specified in Section 26 05 00 – Common Work Results for Electrical or as indicated.

.3 Connect loads to circuits.

.4 Connect neutral conductors to common neutral bus with respective neutral identified.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No.42:10(R2020), General Use Receptacles, Attachment Plugs and Similar Devices.

.2 C22.2 No.42.1:13 (R2017), Cover Plates for Flush-Mounted Wiring Devices (Bi-National standard with UL 514D).

.3 C22.2 No. 55:15 (R2020), Special Use Switches.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 SWITCHES

.1 15A, 120V, single pole switches to: CSA-C22.2 No.55 and CSA-C22.2 No.111.

.2 Manually-operated heavy duty specification grade ac switches with 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 Brown toggle.

.3 Toggle operated fully rated for LED lighting, and up to 80% of rated capacity of motor loads.

.4 Switches of one manufacturer throughout project.

2.2 RECEPTACLES

.1 Duplex receptacles for indoor use, heavy duty specification grade, type 5-20R, 125V, 15/20A, U ground, to: CSA-C22.2 No.42 with following features:

.1 Brown urea moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacles.

.4 Double wipe contacts and riveted grounding contacts.

.2 Single receptacles, CSA type L14-30R, 125/250V, 30A, grounded, to: CSA-C22.2 No. 42 with following features:

.1 Corrosion resistant, marine grade, CSA 4X enclosure complete with weatherproof cover. Mounted in corrosion resistant PVC outlet box suitable for separately mounted devices.

.2 Suitable for No. 10 AWG back and side wiring.

.3 Triple wipe contacts and riveted grounding contacts.

.4 Acceptable materials for outlets:

.1 Box: Leviton single gang FDBX1-Y.

.2 Receptacle c/w cover: Leviton #99W74-S.

.3 Single receptacles, CSA type 5-20R, 125V, 20A, grounded, to: CSA-C22.2 No.42 with following features:

.1 Corrosion resistant, marine grade, CSA 4X enclosure complete with weatherproof cover. Mounted in corrosion resistant PVC outlet box suitable for separately mounted devices.

.2 Suitable for No. 10 AWG back and side wiring.

.3 Triple wipe contacts and riveted grounding contacts.

.4 Acceptable materials for outlets:

.1 Box: Leviton FDBX2-Y.

.2 Receptacle c/w cover : Leviton #90W33-S.

2.3 GFI MODULE

.1 GFI Module rated 20A, 120VAC, 60 Hz, 5mA with the following features:

.1 Corrosion resistant, marine grade, CSA 3R enclosure complete with weatherproof cover. Mounted in corrosion resistant PVC outlet box.

.2 Suitable for No. 10 AWG back wiring.

.3 Manual Reset.

.4 Acceptable materials for modules:

.1 GFI Module: Hubbell #GFMST20.

.2 Box: Leviton FDBX2-Y (where protecting receptacle outlet).

.3 Cover: Killark #FCL-GF.

2.4 WELDER RECEPTACLE

.1 Receptacle:

.1 Single receptacle, 125/250V, 50A, 3 pole, grounded twistlock with following features:

.1 Corrosion resistant, marine grade, mounted in corrosion resistant PVC FD outlet box with hubs. Complete with yellow valox weatherproof cover. Complete assembly rated CSA 4X

.2 Suitable for No. 6 AWG wiring with screw terminals

.3 Acceptable materials:

.1 Box: Leviton #FDBX1-Y.

.2 Receptacle: Leviton #6369CR.

.3 Cover: Leviton #7788-CR.

.2 Plugs:

.1 50A, 125/250V twistlock nickel plated brass plug with heat resistant thermoset interior and combination metal/rubber grip cord c/w yellow seal tight cover for weather proofing.

.2 Supply one plug for each 50A matching receptacle.

.3 Acceptable materials:

.1 Leviton #6365CR.

Part 3 Execution

3.1 INSTALLATION

.1 Switches:

.1 Install single throw switches with handle in "UP" position when switch closed.

.2 Mount toggle switches at height in accordance with Section 26 05 00 – Common Work Results for Electrical as indicated.

.2 Receptacles:

.1 Install receptacles in outlet boxes c/w weatherproof covers where indicated.

.2 Mount receptacles and outlets at heights indicated.

.3 Do not install coverplates meant for flush outlet boxes on surface mounted boxes.

.4 Do not use back entrances for connecting wiring devices to circuits. Wrap conductors around screw terminals and tighten.

.5 GFI modules:

.1 Install GFI modules in single or two gang tandem outlet box as indicated.

.6 Welder receptacle:

.1 Install receptacle as indicated.

.2 Install lamacoid plate indicating “FOR WELDER USE ONLY”.

.7 Identification:

.1 Provide identification indicating circuit and panel number or meter number at all wiring devices or services using lamacoid plates.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 24 01 – Service Equipment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

1.4 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.

.2 Two spare fuses of each type and size installed up to and including 600A.

Part 2 Products

2.1 FUSES - GENERAL

.1 Fuses: product of one manufacturer.

2.2 FUSE TYPES

.1 Type RK1 current limiting, fast acting, (UL Class RK1).

.2 Type T current limiting, fast acting.

.3 Class CC fuses.

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 fuse is fitted to assigned electrical circuit.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 24 16.01 – Panelboards Breaker Type.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 C22.2 No. 5:16 (R2021), Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-National Standard with UL 489 and NMX-J-266-ANCE-2016).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 BREAKERS GENERAL

.1 Molded-case circuit breakers, to CSA C22.2 No. 5.

.2 Bolt-on molded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.5 Circuit breakers to have minimum 10KA symmetrical rms interrupting capacity rating, unless indicated otherwise.

.6 Circuit breakers being installed in panelboards to be by the same manufacturer as the panelboard.

.7 Breakers must be new, complete with original factory warranty and supplied from an authorized manufacturer's distributor.

2.2 THERMAL MAGNETIC BREAKERS

.1 Molded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 OPTIONAL FEATURES

.1 Include ground fault interrupting capability (30mA maximum) where indicated.

Part 3 Execution

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

.2 All feeders on the wharf must be protected with 30mA ground fault trip breakers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 28 13.01 – Fuses – Low Voltage.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CAN/CSA C22.2 No.4:16 (R2020), Enclosed and Dead Front Switches (Tri-National Standard with NMX-J-162-ANCE-2016 and UL 98).

.2 C22.2 No.39-13 (R2017), Fuseholder Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 DISCONNECT SWITCHES

.1 Heavy duty, fusible or non fusible, horsepower rated disconnect switch, to CAN/CSA C22.2 No.4 size as indicated. CSA 1 enclosure when installed indoors and CSA 4 stainless steel enclosure when mounted outdoors.

.2 Disconnect switches to be approved for service entrance use as required.

.3 Provide disconnect switches with number of poles to match load.

.4 Provide disconnect switches with solid neutral terminal as required.

.5 Provision for padlocking in on/off switch position by three locks.

.6 Mechanically interlocked door to prevent opening when handle in ON position.

.7 Fuses: size as indicated, in accordance with Section 26 28 13.01 - Fuses - Low Voltage.

.8 Fuseholders: to CSA C22.2 No.39, relocatable and suitable without adaptors, for type and size of fuse indicated.

.9 Quick-make, quick-break action.

.10 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

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

.2 Indicate name of load controlled on size 4 nameplate.

Part 3 Execution

3.1 INSTALLATION

.1 Install disconnect switches as indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 CSA International

.1 C22.2 No.14-18, Industrial Control Equipment.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA ICS 2-2000 (R2020), Controllers, Contactors and Overload Relays Rated 600 V.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: Submit operational and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 CONTACTORS

.1 Contactors: to CSA C22.2 No.14.

.2 Electrically held controlled by pilot devices as indicated and rated for type of load controlled. Half size contactors not accepted.

.3 Complete with 1 normally open and 1 normally closed auxiliary contacts unless indicated otherwise.

.4 Number of poles as indicated.

.5 Mount in a CSA Enclosure 1 unless otherwise indicated.

.6 Rated for a 30A lighting load.

.7 Control coil rated 120V with fused primary.

.8 Acceptable manufacturers or approved equal:

.1 Allen-Bradley.
.2 Cutler-Hammer.
.3 Schneider Electric.
.4 Siemens.

2.2 EQUIPMENT IDENTIFICATION

.1 Identify equipment in accordance with Section 26 05 00 – Common Work Results for Electrical.

.2 Size 4 nameplate indicating equipment tag, name of load controlled, panel and circuit number.

Part 3 Execution

3.1 INSTALLATION

.1 Install contactors and connect power wires and photocell control.

.2 Identify contactors with lamicoid plate engraved ‘Wharf Lighting’.

.3 Test contactors in accordance with Section 26 05 00 – Common Work Results for Electrical.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 C22.2 No.46-13 (R2018), Electric Air-Heaters.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA 250-2018, Enclosures for Electrical Equipment (1000 V Maximum).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 FORCED AIR WALL MOUNTED HEATERS

.1 Forced air heaters, wall mounted, commercial type as follows:

.1 Enclosure:

.1 Steel, 1.2 mm thick.

.2 Knockouts for 16 mm diameter conduit left, right, bottom and rear.

.3 Grill and frame finished almond.

.2 Elements and Fan:

.1 Tubular heating element with fins.

.2 Mineral insulated, nickel chromium alloy.

.3 Motor: totally enclosed, shaded pole, impedance protected motor.

.4 Fan delay switch.

.5 Voltage: as indicated.

.2 Controls:

.1 Built-in accessible controls. 'On-Off-Fan Only' selector switch and temperature control knob.

.3 Accessories:

.1 Surface mounting backbox.

Part 3 Execution

3.1 INSTALLATION

.1 Install heaters in accordance with manufacturer's written recommendations.

.2 Make power and control connections.

3.2 FIELD QUALITY CONTROL

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 SYSTEM DESCRIPTION

.1 Lighting system consists of light fixtures specified in the section, including all associated frames, supports, hangers, spacers, stems, aligner canopies, junction boxes and other hardware required for a complete and proper installation.

.2 Surface luminaires to have frames that are compatible with the ceiling systems for which they are intended.

.3 Luminaire voltage to match the voltage of the circuit serving the same.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer’s instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Product Data:

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

.2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

.3 Photometric data to include: VCP Table where applicable, spacing criterion, electronic IES files.

.4 Operational and Maintenance Data: submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

Part 2 Products

2.1 LED LUMINAIRES

.1 Luminaires and all components (LEDs, driver, housing, etc.) to have a complete 5-year manufacturer warranty.

.2 LED luminaire performance to be in accordance with CSA C866.

.3 Luminaires to be DLC Standard version 4.4 listed.

.4 Luminaire efficacy: in accordance with DLC requirements.

.5 Surge protection to: IEEE C.62.41 and UL8750.

.6 In situ temperature measurement test (ISTMT) provided by an OSHA or UL testing laboratory.

.7 LEDs

.1 LED lifetime projections to: IES TM-21.
.2 Performance measurement to: IES LM-79.
.3 Lumen maintenance testing to: IES LM-80.
.4 Minimum 50,000 hours.
.5 Colour bin size to: ANSI C78 377A.
.6 Minimum colour rendering index (CRI): 80.
.7 Colour temperature 3500K or as indicated.
.8 IES L70 minimum 50,000 hours at 25 degrees Celsius.

.8 LED array to be field replaceable.

.9 LED Drivers

.1 Voltage as indicated.
.2 Solid-state electronic.
.3 Power factor: minimum 90% lagging or leading.
.4 Harmonics: 20 % maximum THD.
.5 Short circuit and overload protection.
.6 0-10V dimming standard.

.10 Luminaires to be Restriction of Hazardous Substance Directive (RoHS) compliant.

.11 Compatibility: manufacturer to submit in writing compatible external control components for each luminaire used.

.12 Luminaire manufacturer shall be a company with a minimum of 5 years of success manufacturing LED light fixtures for the Canadian market. The agency representing the manufacturer shall be an established company that has had and currently maintains a locally run and operated business in New Brunswick for at least five years. A listing of five (5) projects shall be provided (if requested) where the manufacturer’s similar products have been used in Canada, including location, contact person and telephone number.

2.2 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

.2 Baked enamel finish:

.1 Conditioning for metal before painting:

.1 For corrosion resistance, conversion coating to ASTM F1137.

.2 For paint base, conversion coating to ASTM F1137.

.2 Metal surfaces of luminaire housing and reflectors finished with high gloss baked enamel to give smooth, uniform appearance, free from pinholes or defects.

.3 Reflector and other inside surfaces finished as follows:

.1 White: minimum reflection factor 85%.

.2 Colour fastness: yellowness factor not above 0.02 and after 250 hour exposure in Atlas fadeometer not to exceed 0.05.

.3 Film thickness: not less than 0.3 mm average and in no areas less than 0.025 mm.

.4 Gloss: not less than 80 units as measured with Gardner 60 degree glossmeter.

.5 Flexibility: withstand bending over 12 mm mandrel without showing signs of cracking or flaking under 10 times magnification.

.6 Adhesion: 24 mm square lattice made of 3 mm squares cut through film to metal with sharp razor blade. Adhesive cellulose tape applied over lattice and pulled. Adhesion satisfactory if no coating removed.

2.3 LUMINAIRES

.1 Acceptable manufacturer or approved equal:

TYPE	DESCRIPTION	LAMP	MOUNTING
A	LED LUMINAIRE, 120V DRIVER, PCB MOUNTED LED TECHNOLOGY, SEGMENTED MIRO 4 INTERNAL REFLECTORS, BOROSILICATE GLASS REFRACTOR, IP66 AND 3G VIBRATION RATED, SUPER DURABLE GRAY TGIC THERMOSET POWDER COAT FINISH OVER ANODIZED ALUMINUM PRE-FINISH, LOW COPPER CONTENT DIECAST ALUMINUM HOUSING, PAINT FINISH FOR MARINE ENVIRONMENT, STAINLESS STEEL HARDWARE, COUNTER BEAM DISTRIBUTION HOLOPHANE #TNLEDMED PK1 40K MVOLT CCB DGRA SCRW	57W LED 6858 LUMENS 4000K CCT	UNDER SIDE OF STEEL BEAM USING FOUR 9.5mm DIA. GRADE 5 MOUNTING BOLTS, LOCK WASHERS AND NUTS

TYPE	DESCRIPTION	LAMP	MOUNTING
B	LED LUMINAIRE, ECOFORM AREA LED, 32 LED'S, NEUTRAL WHITE, TYPE 2 DISTRIBUTION, 530 mA, 120V, 56W, MEDIUM GRAY, SUITABLE FOR MARINE ENVIRONMENT, 3G VIBRATION RATED, METAL BIRD DETERRENT SPIKES, STEEL TENON BRACKET BOLTED DIRECTLY TO POLE GARDCO: ECF-S-32L-530-NW-G2-SF-2-120-MGY c/w BIRD DETERRENT SPIKE KIT MOUNTING BRACKET # SBRKT SAB L1-4 WA MG	56W LED 7536 LUMEN 4000K, 70 CRI	MOUNTED ON WOOD POLE 6000mm ABOVE DECK
C	LED SITE LUMINAIRE, 48 LEDS, 120V DRIVER, LM79/LM80 COMPLIANT, IES TYPE 4 DISTRIBUTION, DIE CAST ALUMINUM, FADE AND ABRASION RESISTANT, CORROSION RESISTANT, MEDIUM GRAY PAINT FINISH, 3G VIBRATION AND IP66 RATED, METAL BIRD DETERRENT SPIKE KIT GARDCO # P26-48L-400-NW-G2-SF-4-120-MGY c/w BIRD DETERRENT SPIKE KIT c/w ALUMINUM DAVIT MOUNTING ARM	60W LED 8800 LUMEN 4000K	MOUNTED TO NEW ARM ON NEW WOOD POLE 6000mm ABOVE GRADE
D	LED STRIP LUMINAIRE, 915mm, 120V DRIVER, CHANNEL AND COVER FORMED FROM CODE GAUGE COLD-ROLLED STEEL, HOUSING AND END CAPS OF INJECTION MOLDED PLASTIC, HIGH GLOSS BAKED WHITE POLYESTER FINISH, ACRYLIC FLAT DIFFUSE LENS, FIXTURE TO BE C/W TONG MOUNTING HARDWARE. LITHONIA CAT. #CLX36-3000LM-SEF-FDL-120-GZ10-35K-80CRI-WH-THCLXWH	25W LED 3000 LUMEN 3500K, 70 CRI+	CEILING MOUNTED INSIDE SERVICE BUILDINGS.
E	LED WALL PACK LUMINAIRE, 120V DRIVER, -40°C RATED, HOUSING FORMED FROM CODE GAUGE CAST ALUMINUM, CASTINGS ARE SEALED WITH GASKET, BRONZE POLYESTER FINISH, PRISMATIC GLASS DISTRIBUTION LENS. FIXTURE TO BE C/W MOUNTING HARDWARE AND BUILT-IN PHOTOCELL. LITHONIA CAT. #WPX1-LEDP2-LED-40K-MVOLT-PE-DDBXD	30W LED 3000 LUMEN 4000K, 70 CRI+	MOUNTED ABOVE DOOR ON EXTERIOR OF SERVICE BUILDINGS.

TYPE	DESCRIPTION	LAMP	MOUNTING
F	LED FLOOD LUMINAIRE, 120V DRIVER, LM79/LM80 COMPLIANT, WIDE DISTRIBUTION, DIE CAST-ALUMINUM, FADE AND ABRASION RESISTANT, MEDIUM GRAY PAINT FINISH, RECTANGULAR MEDIUM FLOOD (NEMA 7 X 4) DISTRIBUTION, G1 VIBRATION AND IP66 RATED, YOKE MOUNT SLIP FITTER GARDCO # CSFM-A11-740-RMF-SLF-120-MG	120W LED 15189 LUMEN 4000K	MOUNTED TO NEW BRACKET 5000mm ABOVE DECK

Part 3 Execution

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

.2 Provide adequate support to suit ceiling system.

.3 Supply and install all materials and accessories as required for proper mounting of all luminaires.

3.2 WIRING

.1 Connect luminaires to lighting circuits:

.1 Install junction boxes and wire luminaires and switches from junction boxes.

3.3 CLEANING

.2 Clean in accordance with Section 01 74 00 – Cleaning.

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

.3 Clean luminaires, lenses and reflectors in accordance with manufacturer’s cleaning instructions and procedures.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 23 10 – Excavation and Backfill

.2 Section 32 11 16 – Granular Sub-Base

.3 Section 32 11 23 – Granular Base

1.2 MEASUREMENT PROCEDURES

.1 No measurement will be made under this section. Include costs in items of work that require aggregate.

1.3 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.

1.4 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.

Part 2 Products

2.1 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.

Part 3 Execution

3.1 AGGREGATE SOURCE

.1 Sources to be supplied by Contractor.

3.2 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.

3.3 HANDLING

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.4 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

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 32 21 – Geotextiles.

.2 Section 32 11 16 – Granular Sub-Base.

.3 Section 32 11 23 – Granular Base.

1.2 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.

1.3 DEFINITIONS

.1 Unclassified excavation: excavation of deposits of whatever character encountered in Work. This includes concrete foundations, concrete patches behind SSP wall, 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.

1.4 EXISTING CONDITIONS

.1 Existing surface features:

.1 Conduct, with Departmental Representative, condition survey of existing guide rails, fencing, service poles, wires, site features, asphalt pavement, concrete slab, survey benchmarks 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.

1.5 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 Submit manufacturer's material specifications and installation method for trench sheeting to be installed in the work.

.5 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.

1.6 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 29.06 – Health and Safety Requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

.2 Divert excess materials from landfill to local quarry for reuse as directed by Departmental Representative.

1.8 SPECIAL INSPECTION

.1 Do not proceed with backfilling until bottom of excavation has been inspected and approved.

Part 2 Products

2.1 MATERIALS

.1 Filter fabric: As specified under Section 31 32 21 – Geotextiles.

.2 Granular Sub-base: As specified under Section 32 11 16 – Granular Sub-Base.

.3 Granular Base: As specified under Section 32 11 23 – Granular Base.

Part 3 Execution

3.1 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.

3.2 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.

3.3 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.

3.4 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.

3.5 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 29.06 – Health and Safety Requirements and Health and Safety Act for the Province of New Brunswick.

3.6 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.

3.7 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 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.

.4 Keep excavated and stockpiled materials safe distance away from edge of trench.

.5 Restrict vehicle operations directly adjacent to open trenches.

.6 Dispose of surplus and unsuitable excavated material off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Notify Departmental Representative when bottom of excavation is reached.

.9 Obtain Departmental Representative's approval of completed excavation.

.10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as determined by the Departmental Representative.

.11 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.

.12 Install filter fabric in accordance with Section 31 32 21 – Geotextiles.

3.8 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.

3.9 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 7 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 Testing Agency and/or Departmental Representative will not augment or replace Contractor quality control nor relieve the Contractor of contractual responsibilities.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 23 10 – Excavation and Backfill.

1.2 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.

1.3 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, geogrid and debris/sediment containment curtain proposed to be used.

1.4 DELIVERY, STORAGE AND HANDLING

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

.2 Damaged material shall be replaced at no cost to the owner.

Part 2 Products

2.1 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 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.

.2 Seams: to be in accordance with manufacturer's recommendations.

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

Part 3 Execution

3.1 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.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 05 16 – Aggregates – General.

.2 Section 31 23 10 – Excavation and Backfill.

.3 Section 32 11 23 – Granular Base.

1.2 MEASUREMENT PROCEDURES

.1 Granular Sub-Base: 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.

1.3 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.

Part 2 Products

2.1 MATERIALS

.1 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.

	ASTM % PASSING
SIEVE DESIGNATION	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.

Part 3 Execution

3.1 INSPECTION OF SUBGRADE SURFACE

.1 Do not place granular sub-base until finished sub-grade is inspected and approved by Departmental Representative.

3.2 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 Begin spreading sub-base material on crown line or high side of one-way slopes.

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

.5 Place material to full width in uniform layers not exceeding 300mm uncompacted thickness.

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

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

3.3 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 behind wall.

3.4 COMPACTING

.1 Compact to a density not less than 100% 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.

3.5 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.

3.6 MAINTENANCE

.1 Maintain finished sub-base in a condition conforming to this section until succeeding base is constructed.

END OF SECTION

Part 1 General

1.1 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

1.2 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.

1.3 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 D422-63(2007)e2, Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM C136/C136M-19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.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 (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

.8 ASTM D1883-21, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted 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.

Part 2 Products

2.1 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.

Part 3 Execution

3.1 INSPECTION OF UNDERLYING SUBGRADE SURFACE

.1 Do not place granular base until finished granular sub-base is inspected and approved by Departmental Representative.

3.2 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.

3.3 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.

3.4 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

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 23 10 – Excavation and Backfill.

.2 Section 32 11 23 – Granular Base.

1.2 REFERENCES

.1 New Brunswick Department of Transportation and Infrastructure (NBDTI) Standard Specifications 2019.

1.3 SOURCE SAMPLING

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling.

.2 If requested, at least 1 week prior to commencing work submit samples of following materials proposed for use.

.3 One 5 litre container of asphalt cement.

.4 If materials have been tested by an independent testing laboratory within previous 2 months and have successfully passed tests equal to requirements of this specification, disregard above instructions and submit test certificates from testing laboratory showing suitability of materials for this project.

Part 2 Products

2.1 MATERIALS

.1 All materials to meet the New Brunswick Department of Transportation and Infrastructure (NBDTI) specification for asphaltic concrete. Asphalt cement to ASTM D946, performance grade PG 64-28. Unless otherwise indicated, Pavement Structure to consist of the following:

.2 Asphalt Concrete Surface course – (NBDTI Type D) 40 mm thick.

.3 Asphalt Concrete base course – (NBDTI Type B) 60 mm thick.

.4 The Contractor will supply previous test results of the proposed materials for review and approval.

.5 Submit job mix formula to Departmental Representative for approval. Design of mix to meet NBDTI specification. Do not change job-mix without prior approval. Should change in material source be proposed, a new job-mix formula to be provided to the Departmental Representative.

Part 3 Execution

3.1 GENERAL

.1 Requirements for the plant and equipment used and the mixing, transportation, placing, compaction and rolling of the materials to meet NBDTI specification unless otherwise indicated or directed.

3.2 PREPARATION

.1 Reshape granular bed as required to attain proper drainage as directed.

.2 The contractor will need to match the new grades with the existing adjacent asphalt pavement surfaces to ensure that service and parking lot area drainage will drain to the existing catch basins.

.3 The contractor will mill a key in the existing adjacent asphalt as shown on contract drawings.

3.3 PLACING

.1 Place asphaltic concrete to depths, widths and lines indicated or as directed by the Departmental Representative.

.2 The finish elevation of the asphalt over the existing pavement should have a uniform surface as much as possible.

3.4 FINISH TOLERANCES

.1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with a 4 m straight edge placed in any direction.

.3 Finish surface smooth, true to grade to following tolerances:

.1 Base Course: 7mm in 3m.

.2 Seal Course: 3mm in 3m.

3.5 DEFECTIVE WORK

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing signs of cracking or hairline cracking.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.

1.2 REFERENCES

.1 CSA International

.1 C22.2 No. 211.2:06 (R2021), Rigid PVC (Unplasticized) Conduit.

1.3 DEFINITIONS

.1 In this section duct means rigid PVC conduit.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

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

1.5 QUALITY ASSURANCE

.1 Quality assurance submittals: submit following in accordance with Section 01 45 00 – Quality Control.

.1 Certificates: signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

.2 Manufacturer's Instructions: for installation and special handling criteria, installation sequence and cleaning procedures.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

.1 Separate waste materials for reuse and recycling.

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

1.7 MEASUREMENT PROCEDURES

.1 No measurement for payment will be made under this section. Include cost in lump sum payment.

Part 2 Products

2.1 PVC DUCTS AND FITTINGS

.1 Rigid PVC duct: size as indicated, with expanded flange ends, for direct burial.

.1 Nominal length: 3 m as required, plus or minus 12 mm.

.2 Rigid PVC bends, couplings, reducers, end fittings, plugs, caps, adaptors same product material as duct, to make a complete installation.

.3 Rigid PVC 90 degree and 45 degree bends as required.

.4 Expansion joints as required.

2.2 SOLVENT WELD COMPOUND

.1 Solvent cement and cleaner for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

.1 6 mm stranded nylon/polyester pull rope tensile strength 5 kN.

2.4 WARNING TAPE

.1 Standard 4-mil polyethylene 76 mm wide tape, red with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW ".

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install ducts in accordance with manufacturer's instructions and at elevations as indicated.

.2 Apply cleaning and solvent compounds in accordance with manufacturer’s instructions.

.3 Clean inside of ducts before laying.

.4 Slope ducts with 1 to 400 minimum slope.

.5 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.

.6 Pull through each duct a mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.

.1 Pull stiff bristle brush through each duct immediately before pulling-in cables.

.7 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.

.8 Place continuous strip of warning tape 300 mm below final grade above duct and as indicated.

.9 Notify Departmental Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

3.3 CLEANING

.1 Clean in accordance with Section 01 74 00 – Cleaning.

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

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

.2 Section 26 05 21 – Wires and Cables (0 – 1000 V).

.3 Section 26 05 28 – Grounding – Secondary.

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

.5 Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.

.6 Section 26 24 01 – Service Equipment.

.7 Section 31 23 10 – Excavation and Backfill.

.8 Section 33 65 76 – Direct Buried Underground Cable Ducts.

1.2 REFERENCES

.1 NB Power Standard Construction Practices – Underground.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings to include manufacturer's instructions, printed product literature and data sheets including characteristics, physical size, finish and limitations.

.3 Operational and Maintenance Data: Submit operational and maintenance data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals.

1.4 DELIVERY STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

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

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Perform Work to comply with applicable Provincial/Territorial regulations.

.2 Coordinate and meet requirements of power supply authority.

.1 Ensure availability of power when required.

1.6 COORDINATION WITH POWER SUPPLY AUTHORITY

.1 Coordinate and meet requirements of local Utility. Ensure availability of power when required.

.2 Arrange for primary line extensions, utility installation, connections and energization of new and disconnection, removal of existing services made redundant.

1.7 UTILITY COSTS

.1 Any fees or costs required by the utility to provide new services and removal of existing is to be paid for by the contractor, as part of the contract price. This is to include energization fees for each new metered service.

1.8 MEASUREMENT PROCEDURES

.1 No measurement for payment will be made under this Section. Include cost in lump sum payment.

Part 2 Products

2.1 MATERIALS

.1 Underground ducts: to Section 33 65 76 – Direct Buried Underground Cable Ducts.

.2 Rigid PVC conduit: to Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

.3 Conductors: copper, type RW90, to Section 26 05 21 – Wires and Cables (0 – 1000 V), size and number of conductors as indicated.

.4 Backfill: clean and free of debris, to Section 31 23 10 – Excavation and Backfill.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 All work to be in conformance with NB Power Standard Construction Practices – Underground.

.2 Terminate ducts at service pole in accordance with NB Power Standard Construction Practices.

.3 Install direct buried underground cable ducts as indicated.

.4 Terminate at main switch.

.5 Install cables in ducts and conduit in accordance with Section 26 05 43.01 – Installation of Cables in Trenches and in Ducts.

.6 Allow adequate conductor length for connection to supply by power supply authority.

.7 Allow adequate conductor length for connection to service equipment.

.8 Make grounding connections in accordance with Section 26 05 28 – Grounding – Secondary.

.9 Seal ducts and conduits at service entrance after installation of cable.

3.3 FIELD QUALITY CONTROL

.1 Site Tests:

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

.2 Perform additional tests if required by authority having jurisdiction.

.2 Submit written test results to Departmental Representative for review.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 00 – Cleaning.

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

END OF SECTION