PROJECT TITLE Kingston, Ontario Search and Rescue Dock

PROJECT NUMBER R.106283.001

PROJECT DATE 2020-05-13

END OF SECTION

DESIGN ENGINEER: Brian Riggs P.Eng., Riggs Engineering Ltd.

END OF SECTION

END OF SECTION

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises construction of concrete deck on piles and floating docks at the Canadian Coast Guard Serch and Rescue Facility at Kingston, Ontario.

1.2 CONTRACT METHOD

.1 Construct Work under a combined price contract. All costs for work not specifically identified as a unit price item shall be included in Item 1 - Lump Sum Arrangement.

1.3 COST BREAKDOWN

.1 Within one week of notification of acceptance of bid furnish a cost breakdown of the lump sum arrangement and a list of subcontractors.

1.4 CONTRACTOR USE OF PREMISES

.1 Ingress and egress of Contractor vehicles at site is limited to roadways, routes, and requirements of Section 01 11 00 and Section 01 11 00 attachment - CONSTRUCTION ACCESS ROUTES DIAGRAM
.1 The "existing gate" at the Kingston Penitentiary is controlled by the Commissionaire for for security control. DFO has alotted for 40 days that a Commissionaire will be provided from 7 am to 5 pm (exluding a lunch period). DFO requires a minimum one week notice to allowfor scheduling of Commissionaire personnel. the contractor shall schedule accordingly.

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

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

1.5 OWNER OCCUPANCY

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

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

.1 Execute work to meet or exceed:
.1 National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply as directed by the Departmental Representative.
.2 Rules and regulations of authorities having jurisdiction.
.3 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
.4 Observe and enforce construction safety measures required by National Building Code 2015, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
.5 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.
.6 Ontario Regulation 634/86 for Diving Operations.

1.2 PRECEDENCE

.1 Division 01 Sections take precedence over technical specification sections in other Division of this Specification.

1.3 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.4 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits when requested.

1.5 EXAMINATION

.1 Before submitting bid, examine existing conditions and determine conditions affecting work.

.2 Obtain all information which may be necessary for proper execution of Contract.

1.6 EXISTING SITE CONDITIONS

.1 Borehole logs excerpts are bounded in Appendix A – Borehole Log Excerpts.

.2 Be familiarized with all available data and scope, and price accordingly. The submission of a bid is deemed to be a confirmation of the fact that the Bidder has inspected the site and is fully conversant will all the conditions under which the work is to be carried out.

1.7 SITE

.1 Confine work, including temporary structures, plant, equipment and materials to established limits of site.

.2 Locate temporary buildings, roads, walks, drainage facilities, services as directed and maintain in clean and orderly manner.

1.8 CONSTRUCTION & STORAGE AREA

.1 The limits of the Construction and Storage Area and access to the site will be designated by the Departmental Representative prior to commencement of work unless otherwise shown on the Drawings.

1.9 DOCUMENTS

.1 Keep on site one copy of contract documents and reviewed shop drawings.

.2 Specifications shall govern over Drawings.

.3 Maintain documents in clean, dry, legible condition.

1.10 MEASUREMENT PROCEDURES

.1 Items measured for payment are in metric (SI) units.

.2 Submit requests for payment in metric units corresponding with items on the Unit Price Table.

.3 Submit supporting documents in metric units. Perform all necessary conversions required.

1.11 AS-BUILT RECORD DRAWINGS

.1 As work progresses, neatly record significant deviations from the Contract drawings using fine, red marker on full size white prints.

.2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT RECORD".

.3 Record following significant deviations:
.1 Depths of various elements and foundations.
.2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
.3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
.4 Field changes of dimension.
.5 Other significant deviations which are concealed in construction and can not be identified by visual inspection.

.4 Turn one set of As-Built Record Drawings over to Departmental Representative on completion of work.

.5 If project is completed without significant deviations from contract drawings declare this in writing and submit to Departmental Representative in lieu of As-Built Record Drawings.

1.12 SHOP DRAWINGS

.1 To Section 01 33 00.

1.13 ADDITIONAL DRAWINGS

.1 Departmental Representative may furnish additional drawings to clarify work.

.2 Such drawings become part of Contract Documents.

1.14 LAYOUT OF WORK

.1 Immediately upon entering site for purpose of beginning work on this project, locate all general reference points and take proper action necessary to prevent their disturbance. Include marine access points.

.2 Supply stakes and other survey markers required for this work. Employ competent personnel to lay out work in accordance with lines and grades provided.

.3 Maintain all reference points and markers for duration of contract.

1.15 CO-OPERATION & PROTECTION

.1 Execute work with minimum disturbance to occupants, public and normal use of site. Make arrangements with Departmental Representative to facilitate execution of work.

.2 Maintain access and exits.

.3 Provide necessary barriers, warning lights and signs. Protect work from damage. Replace damaged existing work with material and finish to match original.

.4 Provide final protection and maintain conditions that ensure installed work is without damage or deterioration at time of Substantial Performance.

.5 Use equipment and procedures that prevent damage to existing structures.

.6 Work shall be conducted in a manner to protect the stability of structures on or adjacent to the existing structures, roads or other facilities damage or fouled by work. Complete repairs and clean up at no additional expense to the Contract. Repair made to damaged existing work to equal or better condition.

.7 No part of Work shall be loaded with load which will endanger its safety or will cause permanent deformation.

.8 Repair to original condition any part of work damaged due to overloading at no cost to Contract.

1.16 EXISTING UTILITIES

.1 Establish location, protect and maintain existing utility lines.

.2 Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic.

1.17 MATERIAL AND EQUIPMENT

.1 Use new products unless otherwise specified.

.2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

.3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.18 INSPECTION AND TESTING

.1 The Departmental Representative may, at their own cost, employ an Inspection and Testing company to ensure work conforms with Contract Documents.

.2 When initial tests and inspections reveal work not to contract requirements, the Contractor will pay for tests and inspections required by Departmental Representative on corrected work.

1.19 SCHEDULING OF WORK

.1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion.

.2 When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

1.20 FIRES AND TEMPORARY HEATERS

.1 Burning of rubbish on site not permitted.

.2 Only fires for temporary heaters are permitted on site.

.3 Maintain temperature required to prevent frost damage to work.

1.21 PROGRESS PHOTOGRAPHS

.1 As soon as work commences, take monthly progress photographs.

.2 View points, which will best illustrate progress of work, will be selected by Departmental Representative.

.3 Digital progress photographs shall be sent to the Departmental Representative on a weekly basis.

1.22 DATUM

.1 Elevations and soundings shown on Drawings are expressed in metres relative to chart datum.

.2 Chart datum for Lake Ontario is 74.2 metres I.G.L.D (1985).

1.23 ACCESS AND EGRESS

.1 Primary Construction Access Route: Primary access to the construction site will be south from the intersection of Sir John A. Macdonald B Blvd. and King St. West through the Kingston Penitentiary (KP) parking area, then west to the site as shown on the attached CONSTRUCTION ACCESS ROUTES DIAGRAM appended to the end of this section and as follows:

.1 Provide signage and traffic control to protect users and the KP parking area from construction traffic.

.2 Keep the access route clean and free of debris, noting that the KP parking area will be used extensively by the public attending KP tours.

.3 Provide additional cleaning of the access route during times that heavy earth moving equipment (dump trucks, etc.) are accessing the site. The access route is to be cleaned of debris, mud, and gravel etc. at minimum every two hours.

.4 Existing (Control) Gate: DFO will provide a Commissionaire for 40 days to operate the gate. If additional use of the gate is required, the Contractor shall provide qualified security personnel (ie. Corps of Commissionaires) to operate the existing automatic sliding gate and prevent non-authourized vehicles from entering.

.1 Correctional Services Canada (CSC) will provide the code to the gate to an authourized security firm only and will provide a list of CSC authourized vehicles.

.2 Note that the gate will open automatically for exiting vehicles.

.2 Alternate Access Route: the alternative route shown on the sketch through the Portsmouth Olympic Harbour north parking and the existing gravel road on the east side of the harbour may be used by light vehicles (cars and maximum 3/4 ton pickup trucks) as allowed by the City of Kingston.

.1 It should be noted that this area is extremely congested during major events which include but are not limited to the following dates, during which access and egress within the marina must be maintained:

.1 Cork Festival - Sailing Regattas/Events

.1 Mon. July 26 to Thurs. July 29, 2021

.2 Fri. July 30 to Mon. Aug. 2, 2021

.3 Thurs. Aug. 5 to Sun. Aug. 8, 2021

.4 Mon. Aug. 9 to Thurs. Aug. 12, 2021

.5 Fri. Aug. 13 to Tues. Aug. 17, 2021

.6 Wed. Aug. 18 to Mon. Aug. 22, 2021

.7 Fri. Sept. 17 to Sun. Sept. 19, 2021

.8 Fri. Sept. 24 to Sun. Sept. 26, 2021

.2 Thousand Island Open - Bass Fishing Tournament

.1 Thurs. July 29 to Sat. July 31, 2021

1.24 SPECIAL REQUIREMENTS

.1 Ingress and egress of Contractor vehicles at the site is limited to the roadways, routes, and requirements of 1.23 ACCESS AND EGRESS.

.2 Erect and maintain a construction fence at the north end of the site with appropriate signage as shown on the attached CONSTRUCTION ACCESS ROUTES DIAGRAM appended to the end of this Section.

.3 Maintain pedestrian access to the waterfront and ensure appropriate signage and traffic control is implemented.

.4 If existing fencing is required to be removed for access, the Contractor will be responsible for removing sections and reinstating the fence as necessary and maintaining the temporary construction fence during construction.

.5 The Kingston Search and Rescue base will be operational from March 2021 to December 2021 and, throughout the duration of the project, access cannot be obstructed to prevent the crew from responding to emergency situations (shown in black on the attached CONSTRUCTION ACCESS ROUTE DIAGRAM).

1.25 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

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

.4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

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

1.26 SECURITY

.1 Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

.2 Be responsible for site security at all times.

.3 Entry and egress point shall be secured during non-working hours.

1.27 DEMOBILIZATION

.1 Complete demobilization of equipment no later than two weeks after receiving Departmental Representative's written release from work. Do not leave equipment on job site.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 ADMINISTRATIVE

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

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

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

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

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

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

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

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

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

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

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf and Autocad dwg files on USB or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, 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 Province of Ontario of 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

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

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

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

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

.8 Submissions shall include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 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 three hard copies and one electronic copy of shop drawings for each

requirement requested in specification Sections and as Departmental Representative may reasonably request.

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

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

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

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

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

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

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

.18 Delete information not applicable to project.

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

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

.21 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.

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

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

1.3 SAMPLES

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

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

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

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

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

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

1.4 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workplace Safety and Insurance Board Experience Report.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA): Canada
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2015 (NBC):
.1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2015 (NFC):
.1 NFC 2015, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.4 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

.5 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx ?id=17316&section=text.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section [01 33 00].

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
.1 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
.3 Measures and controls to be implemented to address identified safety hazards and risks.

.3 Contractor's and Sub-contractors' Safety Communication Plan.

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

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

.6 Submit names of personnel and alternates responsible for site safety and health.

.7 Submit records of Contractor's Health and Safety meetings when requested.

.8 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, upon request.

.9 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

.10 Submit copies of incident and accident reports.

.11 Submit Material Safety Data Sheets (MSDS).

.12 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.7 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:
.1 Silica in concrete.

.2 Work at or near water and ice.

1.8 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.10 RESPONSIBILITY

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

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.11 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.12 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
.1 Have site-related working experience specific to activities associated with dock reconstruction at an active site.
.2 Have working knowledge of occupational safety and health regulations.
.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
.5 Be on site during execution of Work.

1.13 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 of Ontario, and in consultation with Departmental Representative.
.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Address and phone number of nearest Ministry of Labour office.
.8 Material Safety Data Sheets.
.9 Written Emergency Response Plan.
.10 Site Specific Safety Plan.
.11 Valid certificate of first aider on duty.
.12 WSIB "In Case of Injury At Work" poster.
.13 Location of toilet and cleanup facilities.

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

1.15 BLASTING

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

1.16 POWDER ACTUATED DEVICES

.1 Use of powder actuated devices is not permitted.

1.17 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.

.2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

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

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

1.2 REFERENCES

.1 U.S. Environmental Protection Agency (EPA)/Office of Water
.1 EPA 832/R-92-005-1991 edition, Storm Water Management for Construction Activities, Chapter 3.
.2 EPA 2017 General Construction Permit (GCP).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets upon request and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS SDS.

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

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

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

.6 Include in Environmental Protection Plan:
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
.3 Names and qualifications of persons responsible for training site personnel.
.4 Descriptions of environmental protection personnel training program.
.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and

reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

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

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

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

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

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

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

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

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

1.4 FIRES

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

1.5 WORK ADJACENT TO WATERWAYS

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

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

.3 Restore disturbed areas to previous or better condition.

1.6 WATER QUALITY PERFORMANCE CRITERIA

.1 Resuspension of particulate matter will be measured for compliance 100 m from the in-water work. The total suspended solids (TSS) will be measured during the first three days of production. A site-specific correlation between turbidity and TSS will be established specifically for the work area. The Departmental Representative may enforce either the TSS criteria or turbidity based on the site-specific relationship.

.2 The maximum increase in TSS over background is 25 mg per litre.

.3 The maximum increase in turbidity over background before a site-specific relationship is developed is 8 NTU.

.4 Comply with the performance criteria of 100 metres from the work site. If the criteria are exceeded stop work and take corrective actions. Corrective actions may include altering the sequence of operations, deployment of a turbidity curtain or other measures to ensure compliance.

1.7 POLLUTION CONTROL

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

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

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

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

.5 Abide by local noise by-laws.

.6 Spills of deleterious substances:
.1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
.2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
.3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

.7 Re-fuelling of machinery must take place at a minimum of 10 meters safe distance from the waterway as designated by Departmental Representative.

.8 Machinery to arrive on site in a clean, washed condition and maintained free of leaks.

.9 Wash, refuel, and service machinery and store fuel and other materials for the machinery a minimmum of 10 meters away from water to prevent any deleterious substance from entering the water.

.10 Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

1.8 CONCRETE OPERATIONS

.1 The following clauses are applicable to all work under Section 03 30 00.

.2 Employ measures to prevent entry of concrete wash water or leachate from uncured concrete into the water.

.3 Containment facilities shall be provided at the site for the wash-down water from concrete delivery trucks, concrete equipment, and other tools and equipment as required. Water used to wash concrete should not be allowed to

enter directly into water bodies. The sediment should be allowed to settle out and reach neutral pH before the clarified water is released to the drain system or allowed to percolate into the ground.

.4 Concrete trucks and concrete equipment should be washed out in a designated area where runoff to the marine environment, adjacent waterways and storm drains can be prevented.

.5 Prior to placement of concrete, all forms shall be thoroughly inspected to ensure that formwork is fully secured and sealed to prevent the release of concrete or concrete contaminated water into the waterway.

.6 If escape of concrete is observed or detected, pumping and or placement should be stopped and appropriate action taken to immediately rectify the situation.

.7 Measure and record baseline pH levels in the project area prior to commencement of work.

.8 Prior to the commencement of operations, demonstrate satisfactory knowledge and use of pH monitoring equipment to Departmental Representative.

.9 Monitor the pH levels frequently in the waterway immediately downstream of isolated work site until completion of work. Emergency measures shall be taken if pH change more than 1.0 pH unit, measured to an accuracy of 0.2 pH units from the background level or is recorded to be below 6.0 or above 9.0 pH units.

.10 The pH levels are to be maintained within the range of 6.5-8.5 as per Provincial Water Quality Objectives (PWQO).

.11 Keep a carbon dioxide (C02) tank with regulator, hose and gas diffuser readily available during concrete work. Use it to release carbon dioxide gas into the affected area to neutralize pH levels should a spill occur. Train workers to use the tank.

1.9 NOTIFICATION

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

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

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

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

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

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 75% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
.1 Provide facilities for collection, handling and storage of source separated wastes.
.2 Source separate the following waste:
.1 Portland cement concrete.
.2 Corrugated cardboard.
.3 Wood.
.4 Steel.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
.1 Indicate how material being removed from the site will be reused and recycled.

1.2 WASTE PROCESSING SITES

.1 Province of: Ontario.
.1 Ministry of Environment, Conservation and Parks, Public Information Centre, 2nd Floor - Macdonal Block, Suite M2-22 - 900 Bay Street, Toronto, ON, M7A 1N3.
.2 General Inquiry: 416-325-4000 or 1-800-565-4923 TTY (for persons who are deaf, deafened or hard of hearing).
.3 Telephone: 416-326-9236 or 1-800-515-2759.
.4 Fax: 416-323-4682.

.2 Recycling Council of Ontario: 215 Spadina Avenue, Suite 225, Toronto, ON, M5T 2C7.
.1 Telephone: 416-657-2797.
.2 Fax: 416-960-8053.
.3 Email: rco@rco.on.ca.
.4 Internet: http://www.rco.on.ca/.

1.3 STORAGE, HANDLING AND PROTECTION

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

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

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

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

.5 Support affected structures.

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

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

.8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off-site processing facility for separation.
- .3 Provide waybills for separated materials.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste, volatile materials,mineral spirits, oil, paint thinner, into waterways, onto ground, storm, or sanitary sewers, or in other location where it will pose health or environmental hazard.

.3 All waste materials shall be disposed of in a legal manner at a site approved by Local Authorities.

.4 Provide acceptable containers for collection and disposal of waste materials, debris and rubbish.

.5 Do not allow deleterious substances to enter the waterway.

.6 Keep records of construction waste including:
- .1 Number and size of bins.
- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

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

.8 All waste materials including containers and waste fluids associated with vehicle maintenance shall be disposed of in a legal manner at a site approved by Local Authorities.

.9 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

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

.11 Divert unused concrete materials form landfill to local quarry approved by Departmental Representative.

.12 Divert unused admixtures and additive materials from landfill to official hazardous material collections site as approved by Departmental Representative.

.13 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

.14 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 - PRODUCTS

2.1 NOT USED

.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 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.
.2 Provide instruction on disposal practices.

.2 Divert unused paint/coating materials from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT $table $table

.1 Government Chief Responsibility for the Environment.

Province	Address	General Inquiries	Fax
Ontario	Ministry of Environment, Public Information Centre 2nd Floor - Macdonal Block, Suite M2-22 900 Bay St., Toronto, ON M7A 1N3	(416) 325-4000 (800) 565-4923 (416) 326-9236 (800) 515-2759	(416) 325-3159

END OF SECTION

PART 1 - GENERAL

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an 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 that corrections have been made.
.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Equipment and systems have been tested, adjusted and are fully operational.
.5 Operation of systems have been demonstrated to Owner's personnel.
.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

1.2 CLEANING

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 20.

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 MEASUREMENT PROCEDURES

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

1.2 REFERENCES

.1 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 O86:19, Engineering Design in Wood (Limit States Design).
- .3 CSA O121-17, Douglas Fir Plywood.
- .4 CSA O151-17, Canadian Softwood Plywood.
- .5 CSA O153:19, Poplar Plywood.
- .6 CSA O437 Series-93(R2011), Standards for OSB and Waferboard.
- .7 CSA S269.1-16, Falsework & Formwork.

.2 Council of Forest Industries of British Columbia (COFI)
- .1 COFI Exterior Plywood for Concrete Formwork.

1.3 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00.

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

.3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.4 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

.5 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

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

.3 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Formwork materials:
.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA O86.

.2 Form release agent: biodegradable, low VOC.

.3 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 15 to 24 mmý/s at 40°C, flashpoint minimum 150°C, open cup.

.4 Falsework materials: to CSA S269.1.

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 falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.

.3 Do not place shores and mud sills on frozen ground.

.4 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.5 Fabricate and erect formwork 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 and as specified.

.6 Align form joints and make watertight. Keep form joints to minimum.

.7 Use 25 mm chamfer strips on external corners, unless specified otherwise.

.8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

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

.11 Relative alignment between adjacent formed concrete surfaces shall be less than or equal to 5 mm.

.12 Plumbness of slab edges shall be within 1:400 measured at any one surface.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.
.1 7 days for slabs.

.2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

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

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Cast-in-place concrete in deck and cast-in- place concrete in slab on grade will be measured by the cubic metre base on the neat lines shown on the drawings and shall include all labour, materials and equipment necessary to complete the work

.2 Concrete retaining wall, including concrete steps, will measured by the cubic metre based on the neat lines shown on the drawings and shall include all labour, materials and equipment necessary to complete the work.

.3 Mass concrete plug will be measured by the lineal metre and shall include all labour, materials and equipment necessary to complete the work.

.4 Gauge house well will be measured by cubic metres of concrete placed and accepted in the work below the bottom of the new cast-in-place concrete deck and shall include all labour, materials and equipment necessary to complete the work. The corrugated steel pipes and gauge pipes, valves, etc. are considered incidental to the work and shall not be measured separately for payment.

.5 Heating water, aggregates, and for surface preparation and providing cold weather protection is considered included in the placing of concrete and will not be measured separately for payment.

1.2 REFERENCES

.1 ASTM International
.1 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
.2 ASTM C260/C260M-10a(2016, Standard Specification for Air-Entraining Admixtures for Concrete.
.3 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
.4 ASTM C494/C494M-19, Standard Specification for Chemical Admixtures for Concrete.
.5 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.
.6 ASTM D1751-18, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).

.2 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 A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 CSA G30.18-09(R2019), Carbon Steel Bars for Concrete Reinforcement.
.4 CSA G40.20-13/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.5 CAN/CSA-G401-14, Corrugated Steel Pipe Products.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 At least 4 weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
.1 Do not change source of fly ash without written approval of Departmental Representative.

.3 At least 4 weeks prior to beginning Work, submit to Departmental Representative samples of following materials proposed for use: curing compound, joint filler and cold weather protection.

.4 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY ASSURANCE

.1 Provide to Departmental Representative, 2 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
.1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:
.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
.1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
.2 Deviations to be submitted for review by the Departmental Representative.

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

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

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

.1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

.1 Cement: to CSA A3001, Type GU.

.2 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CAN/CSA-A3001.

.3 Water: to CSA A23.1/A23.2.

.4 Reinforcing bars and dowels: to Section 03 20 00 and CSA G30.18, Grade 400W, minimum 30% recycled content.

.5 Premoulded joint filler:
.1 Bituminous impregnated fibreboard: to ASTM D1751.

.6 Joint sealer/filler: chemical curing, multi-component compound to ASTM C920, Type M.

.7 Backer rod: extruded closed-cell polyethylene foam backer rod to Departmental Representative's approval.

.8 Formwork: to CSA A23.1/A23.2 and Section 03 10 00.

.9 Other concrete materials: to CSA A23.1/A23.2.

.10 Admixtures:
.1 Air entraining admixture: to ASTM C260/C260M.
.2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.11 Curing compound: to CSA A23.1/A23.2 white and ASTM C309, Type 1-chlorinated rubber Type 1-D with fugitive dye.

.12 Epoxy for threaded rods: 2 component, solvent free, high modulus, moisture insensitive, high strength structural epoxy suitable for use in cracked or

uncracked concrete and capable of developing an ultimate tensile strength of 100 kN minimum at an embedment depth of 175 mm in 28 MPa concrete for a 19 mm diameter threaded rod

.13 Non-shrink grout: composition of non metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 50 MPa at 28 days.

.14 Corrugated steel pipe (CSP): to CAN/CSA-G41 and to dimensions as indicated.

2.4 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
- .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
- .2 Provide concrete mix to meet following plastic state requirements:
  - .1 Uniformity: to CSA A23.1/A23.2.
  - .2 Workability: free of surface blemishes, loss of mortar, colour variations, and segregation.
  - .3 Finishability: minimal amount of bleeding.
- .3 Provide concrete mix to meet following hard state requirements:
  - .1 Durability and class of exposure: C-1.
  - .2 Compressive strength at 28 days: 35 MPa minimum.
  - .3 Intended application: new concrete pour and concrete repairs.
  - .4 Aggregate size 19 mm maximum.
  - .5 Volume stability: acceptable volume change range due to shrinkage, creep and freeze thaw cycle.
  - .6 Pre-qualification: yes.
  - .7 Top surface texture: coarse broom finish.
- .4 Concrete supplier's certification: both batch and plant materials to meet CSA A23.1/A23.2.

PART 3 - EXECUTION

3.1 DEMOLITION AND REMOVALS

.1 Carry out demolition and removals to Section 02 41 14.

3.2 PREPARATION

.1 Provide Departmental Representative 24 hours notice before each concrete pour.

.2 Place concrete reinforcing in accordance with Section 03 20 00 and to details indicated on drawings.

.3 During concreting operations:
.1 Development of cold joints not allowed.
.2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.

.4 Protect previous Work from staining.

.5 Clean and remove stains prior to application of concrete finishes.

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

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

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

.9 Prior to placing concrete, obtain Departmental Representative approval of proposed method of protection of concrete during placing and curing.

.10 Where concrete must bond to existing surfaces, clean surface just prior to starting concrete placement.
.1 Use water jets, mechanical scrapers or other means, and when quantities of mud or rock cutting are present, remove by air lift.

3.3 INSTALLATION/ APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Sleeves and inserts:
.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
.2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative.

3.4 NEW CONCRETE

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Clean existing surfaces as specified.

.3 Moisture surface of harden concrete that are to have new concrete cast against them.

.4 In no case shall concrete be cast against frozen material.

.5 Carry out the placing of concrete continuously from joint to joint. Consolidate concrete mechanically unless otherwise specified.

.6 Pour and place concrete to details indicated.

3.5 FINISHES

.1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.

.2 Gauge house pad: provide smooth trowelled surface.

.3 Parapet, deck slab, sidewalk, ramps, stairs, bench, retaining walls and exposed site concrete:
.1 Screed to plane surfaces and use aluminum floats.
.2 Provide round edges and joint spacings using standard tools.
.3 Trowel smooth and provide broom finish to provide lightly brushed non-slip finish.

3.6 CONTROL JOINTS

.1 Form control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

3.7 EXPANSION AND ISOLATION JOINTS

.1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

3.8 CURING AND COLD WEATHER PROTECTION

.1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

.2 Provide cold weather protection in accordance with CSA A23.1/A23.2.

3.9 SITE TOLERANCES

.1 Complete work to the following tolerances:
.1 Straight to 1:500.
.2 Thickness to 6 mm.
.3 Plumb to 1:600.

3.10 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and

paid for by Departmental Representative.

3.11 CLEANING

.1 Use trigger operated spray nozzles for water hoses.

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

.3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43.

.4 Waste Management: separate waste materials in accordance with Section 01 74 20.

.1 Divert unused concrete materials from landfill to local quarry or facility.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Stringer beams including decking supports and angles, steel stubs, nuts, bolts and washers shall be measured by the lineal metre of beam and shall include all labour, materials and equipment necessary to complete the work.

.2 Pile caps shall be measured by the pile cap and shall include all labour, materials and equipment necessary to complete the work.

1.2 REFERENCES

.1 American Association for State Highway and Transportation Officials (AASHTO)
.1 AASHTO HB-17 Standard Specifications for Highway Bridges-17th Edition 2002.

.2 ASTM International (ASTM)
.1 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.3 CSA International (CSA)
.1 CSA G40.20-13/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CSA S6:19 Package, Canadian Highway Bridge Design Code.
.3 CSA S269.1-16, Falsework and Formwork.
.4 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
.5 CSA W59-18, Welded Steel Construction, (Metal Arc Welding).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:
.1 Convene pre-installation meeting two weeks prior to beginning work of this Section, with Contractor's Representative and Departmental Representative to:
.1 Verify project requirements.
.2 Review pile installation conditions.

.2 Departmental Representative will provide verbal notification of any change to meeting schedule 24 hours prior to scheduled meeting.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS SDS.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate shop and erection details including beam lengths, shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, and welds. Indicate welds by CSA W59, welding symbols.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle in accordance with Section 01 61 00.

.2 Provide protective blocking for lifting, transportation and storing.
.1 Exercise care during fabrication, transportation and erection so as not to damage beams.
.2 Do not notch edges of members.
.3 Do not cause excessive stresses.

.3 Mark mass on members weighing more than 3 tonnes.

.4 Ensure that no portion of steel comes into contact with ground.

.5 Provide Departmental Representative with delivery schedules minimum 7 days prior to shipping.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.

.3 Storage and Handling Requirements:
.1 Provide protective blocking for lifting, transportation and storing.
.1 Exercise care during fabrication, transportation and erection of beams.
.2 Do not notch edges of members.
.3 Do not cause excessive stresses.
.2 Mark mass on members weighing more than 3 tonnes.
.3 Protect unpainted weathering steel, before erection, with waterproof covering.
.4 Ensure that no portion of steel comes into contact with ground.
.1 Replace defective or damaged materials with new.

1.7 QUALITY ASSURANCE

.1 Preconstruction Testing:
.1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.
.2 Provide Mill Test Reports for all structual steel types used.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Structural steel: to CSA G40.20/G40.21, grade 350W, minimum 25% recycled content.

.2 Bolts, nuts and washers: to ASTM A307, galvanized.

.3 Pipe: to Section 31 62 16

.4 Welding electrodes: to CSA W48 series.

.5 Stubs: Concrete reinforcing bar to CSA G30.18, Grade 400W(weldable).

2.2 SOURCE QUALITY CONTROL

.1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.

2.3 FABRICATION

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.

.2 Verify location of substructure units, elevations and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.

.3 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
.1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
.2 Ensure reamed holes are 2 mm maximum larger than bolt size used.

3.3 INSTALLATION

.1 Do falsework in accordance to CSA S269.1.

.2 Do fabrication and erection of structural steel in accordance with Ontario Highway Bridge Design Code.

.3 Do welding in accordance with CSA W59, except where specified otherwise.
.1 Do welding in shop unless otherwise permitted by Departmental Representative.
.2 Weld only at locations indicated.

.4 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

.5 Span length tolerances:
.1 Beams: plus or minus 6 mm

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing and protecting of steel.
.2 Submit manufacturer's field services consisting of product use

recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 PILE CAPS

.1 Fabricate and install pile caps to details indicated.

.2 Perform welding in accordance with Section 05 12 35.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International):
.1 CSA W47.1:19, Certification of Companies for Fusion Welding of Steel.
.2 CSA W47.2-11(R2015), Certification of Companies for Fusion Welding of Aluminum.
.3 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
.4 CSA W59-18, Welded Steel Construction (Metal Arc Welding).
.5 CSA W59.2-18, Welded Aluminum Construction.

1.2 WELDER QUALIFICATIONS

.1 Use only welders qualified under CSA W47.1 and CSA W47.2.

.2 Make available to Departmental Representative currently valid Canadian Welding Bureau Qualification Certificate for each welder employed on the work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Welding materials to CSA W59 and CSA W59.2.

PART 3 - EXECUTION

3.1 WELDING GENERAL

.1 Welding: to CSA W59 and CSA W59.2.

.2 Do not deviate the size, length and location of welds from the design or from details shown on reviewed shop drawings without approval of Departmental Representative.

.3 Grind flush all butt welds.

3.2 PREPARATION

.1 Surfaces to be welded shall be smooth, uniform and free from fins, tears and other defects which would adversely affect the quality of the weld.

.2 Ensure areas within 50 mm of the weld are free from loose scale, slag, rust, grease, moisture, paint or other matter which would impair the quality of the weld.

.3 Remove slag before welding over previously deposited metal and brush clean weld and adjacent base. This requirement applies to successive layers, successive beads and to crater area when welding is resumed after any interruption.

.4 Before welding is started from the second side remove to sound metal the root of the initial weld of all butt welds except when produced with the aid of backing. Thoroughly fuse the weld metal with the backing in all butt welds made with the use of backing of the same material as the base metal.

3.3 ASSEMBLY

.1 Bring members to be welded into correct alignment and hold securely in position until the joint has been welded.

.2 Carefully align abutting parts joined by butt welds.

.3 Weld in a sequence that will balance the effects of applied heat of welding on various sides as the welding progresses.

3.4 WELD QUALITY

.1 Weld metal to be sound throughout with no porosity or cracks on the surface of any weld or weld pass.

.2 Ensure complete fusion between the weld metal and the base metal and between successive passes throughout the joint.

.3 Welds shall be free from overlap and the base metal free from undercutting.

.4 Fill all craters to the full cross section of the welds.

.5 Fill and grind to profile any craters at the extreme ends of fillet welds.

3.5 TESTING

.1 Give Departmental Representative 48 hours notice of when work is ready for inspection.

.2 All welds will be subject to visual inspection requirements of CSA W59 and CSA W59.2.

.3 Welds which fail the visual inspection will be subject to further nondestructive testing. This testing may be either radiographic or ultrasonic. The full length of the weld will be examined.

.4 If more than 50% of the welds fail the visual inspection requirements all welds will be tested by nondestructive testing methods.

.5 Pay all costs for nondestructive testing resulting from visual inspection failure.

.6 Departmental Representative will not approve any weld until all required inspection is completed, found acceptable and marked as such.

3.6 ACCEPTANCE REQUIREMENTS

.1 Welds subject to nondestructive testing unacceptable if:
.1 There is any imperfection within 25 mm from the beginning or end of a butt weld.
.2 There is any type of crack, tear, zone of incomplete fusion or incomplete penetration regardless of size and location.
.3 Inclusion:
.1 Occurs in any 25 mm of a welded joint containing two or more inclusions where the sum of the greatest dimensions of those inclusions exceed 5 mm;
.2 Is greater that one-third the joint thickness but in no case larger than 19 mm.

.2 Repair defective welds by chipping, air-arc gouging or grinding out from one side or both sides. Remove all traces of defects before rewelding. Remove all traces of oxidation after air-arc gouging.

.3 Resubmit all repaired welds to nondestructive testing.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Supply and installation of guardrails will be measured by the lineal metre fabricated and installed and shall include all labour, materials and equipment necessary to complete the work.

.2 Supply and installation of pipe curb will be measured by the lineal metre fabricated and installed and shall include all labour, materials and equipment necessary to complete the work.

.3 Bollards will be measured by each bollard installed and shall include all labour, materials and equipment necessary to complete the work.

.4 Safety ladder will be measured by each ladder installed and shall include all labour, materials and equipment necessary to complete the work.

.5 All specified painting is considered incidental to the work and will not be measured separately for paymnet.

1.2 REFERENCES

.1 ASTM International
.1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.

.2 CSA International
.1 CSA G40.20-13/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.2 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
.3 CSA W59-18, Welded Steel Construction.

.3 The Steel Structures Painting Council (SSPC)
.1 SP6/NACE No.3, Commercial Blast Cleaning.

.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
.1 Safety Data Sheets (SDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data

sheets for sections and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS and MSDS.
.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

1.4 QUALITY ASSURANCE

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

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

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

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

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

.4 Waste Management and disposal: in accordance with Section 01 74 20.

1.6 WELDER QUALIFICATIONS

.1 To Section 05 12 35.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Welding materials: to CSA W59 and to Section 05 12 35.

.2 Welding electrodes: to CSA W48 Series and to Section 05 12 35.

.3 Hollow structural section: to CSA G40.20/G40.21, Grade 350W.

.4 Steel sections, round bars and plates: to CSA G40.20/G40.21, Grade 300W.

.5 Bolt, anchor bolts, nuts and washer: hot dipped galvanized to ASTM A307, Grade A.

.6 Epoxy: to Section 03 30 00.

.7 Primer: rust inhibiting, zinc rich, low VOC, modified alkyd resin primer, minimum 51% solids by volume, compatible with specified paint.

.8 Paint: two component, high solids, polyester- aliphatic urethane suitable for marine environment, minimum volume of solids 65%, colour: traffic yellow.

.9 Galvanizing: hot dipped galvanizing with zinc coating 600 g/mý, Coating Grade 85, to ASTM A123/A123M.

2.2 FABRICATION

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

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

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

2.3 SHOP PAINTING

.1 Shop painting:
.1 Preparation of new surface:
.1 Commercial blast clean to remove paint, loose mill scale, welding slag, rust, dirt, oil, grease and other foreign substances.
.2 Commercial blast to SSPC-SP6.
.2 Apply primer unadulterated, as prepared by manufacturer. Paint on dry surface, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
.3 Apply paint in shop using spraying equipment in accordance with the paint manufacturer's recommendations.
.4 Apply one coat of primer 3 to 5 mils and one coat of paint 2 to 3 mils. Total dry film thickness 5 to 7 mils.

.2 Field painting:
.1 Touch up metal which as been shop coated with the same type of paint and to same thickness as shop coat.

2.4 FINISHES

.1 Pipe curb, bollards, sliders and safety ladders: all components to be prime and painted, unless otherwise noted.

.2 Guardrail to be hot dip galvanized.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION

.1 Do welding work in accordance with CSA W59 and to Section 05 12 35

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

.3 Field cutting or altering of steel members: to approval of Departmental Representative.

.4 Make field connections with bolts to details indicated.

3.3 GUARDRAILS

.1 Fabricate to details indicated on drawings and to manufacturer's recommendations.

.2 Install guardrails in manner and locations as indicated.

3.4 BOLLARDS

.1 Fabricate and shop paint to details indicated on drawings and to manufacturer's recommendations.

.2 Epoxy anchor bollards in locations as indicated.

3.5 PIPE CURB

.1 Fabricate and shop paint to details indicated on the drawings.

.2 Epoxy anchor pipe curb in locations indicated.

3.6 SAFETY LADDERS

.1 Fabricate and shop paint to details indicated on drawings and to manufacturer's recommendations.

.2 Install safety ladders in manner and locations as indicated.

3.7 SLIDERS

.1 Fabricate and shop paint to details indicated on drawings and to manufacturer's recommendations.

.2 Install sliders in manner and locations as indicated.

3.8 CLEANING

.1 Progress Cleaning: leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment off site.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Light standards will be measured by each unit installed and shall include all labour, materials, and equipment necessary to complete the work, including all wiring, conduit, junction boxes, etc. as necessary.

.2 Power pedestals will be measured by each unit installed and shall include all labour, materials, and equipment necessary to complete the work, including all wiring, conduit, junction boxes, etc. as necessary.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

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

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

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

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

.1 IEEE SP1122, 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 CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

1.5 PAYMENT PROCEDURES

.1 Power pedestals will be measured by the unit and shall include all labour, materials and equipment necessary to complete the work.

.2 Light Standards will be measured by the unit and shall include all labour, materials and equipment necessary to complete the work.

1.6 SUBMITTALS

.1 Submittals: in accordance with Section on Submittal Procedures.

.2 Shop drawings:

- .1 Submit drawings stamped and signed by General Contractor.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment

devices.

.3 Quality Control: in accordance with Section on Quality Control.

.1 Provide CSA certified equipment and material.

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

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

.4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Consultant.

1.7 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section on Quality Control.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license.

1.8 SYSTEM STARTUP

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

.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

1.9 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.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Material and equipment to be CSA certified.

.2 Factory assemble control panels and component assemblies.

2.2 WIRING TERMINATIONS

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

2.3 EQUIPMENT IDENTIFICATION

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

.1 Nameplates: lamicoid 3mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Labels: embossed plastic labels with

6 mm high letters unless specified otherwise.

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

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

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

.2 Supply and install typewritten circuit legend.

2.4 WIRING IDENTIFICATION

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

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

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

2.5 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime YELLOW colour and 20 mm wide auxiliary colour.

2.6 FINISHES

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

.1 Paint outdoor electrical equipment "equipment green" finish.

PART 3 - EXECUTION

3.1 INSTALLATION

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

3.2 NAMEPLATES AND LABELS

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

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: plastic sheet metal, sized for free passage of conduit, and protruding 50 mm.

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

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

3.4 LOCATIONS OF OUTLETS

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

.2 Locate light switches on latch side of doors.

3.5 MOUNTING HEIGHTS

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

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

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

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

.3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, 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 on 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 Systems: fire alarm system.

.5 Insulation resistance testing:

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

V instrument.

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

.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Consultant.

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

3.8 CLEANING

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

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

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

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section on Submittal Procedures.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

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

.2 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material, 90 degC Type RWU90.

PART 3 - EXECUTION

3.1 INSTALLATION OF BUILDING WIRES

.1 Install all wiring in conduit systems.

3.2 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.

.2 Install cable in concealed locations.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45, Rigid Metal Conduit.
- .3 CSA C22.2 No. 83, Electrical Metallic Tubing.
- .4 CSA C22.2 No. 211.2, Rigid PVC Conduit.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section on Submittal Procedures.

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
- .1 Submit cable manufacturing data.

.3 Quality assurance submittals:
- .1 Test reports: submit certified test reports.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 CONDUITS

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

2.2 CONDUIT FASTENINGS

.1 One hole malleable iron steel straps to secure surface conduits 50 mm and smaller.

.2 Two hole steel straps for conduits larger than 50 mm.

.3 Channel type supports for two or more conduits

2.3 CONDUIT FITIINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connections and couplings for Rigid PVC Conduit.

2.4 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 conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits.

.3 Use rigid PVC conduit underground and in corrosive areas.

.4 Minimum conduit size for lighting and power circuits: 19 mm.

.5 Install fish cord in empty conduits.

.6 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.7 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building/dock lines.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building/dock lines.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Excavate, backfill and compaction of native fill is considered incidental to the work and will not be measured separately for payment.

.2 Clear stone fill will be measured by the tonnes of material placed and accepted in the work as totalled from quarry weigh tickets and shall include all labour, materials and equipment necessary to complete the work.

1.2 REFERENCES

.1 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS.PROV 1004 November 2012, Ontario Provincial Standard Specification, Material Specification for Aggregates - Miscellaneous.
.2 OPSS.PROV 1010 April 2013, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.3 SUBMITTALS

.1 Submit in accordance with Section 01 33 00.
.1 Provide Departmental Representative with weigh tickets at time of delivery to site.

1.4 PROTECTION

.1 Protect excavated earth from freezing by approved method.

.2 Grade around excavations to prevent surface water runoff into excavated area.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Clear stone fill: to OPSS.PROV 1004, Maximum size 19.0 mm, Type 2.

PART 3 - EXECUTION

3.1 SITE PREPARATION

.1 Remove obstruction, ice and snow from surfaces to be excavated within limits indicated.

.2 Protect existing features from damage during work. Make good of all damages at no extra costs to Contract.

.3 Keep excavation clean, free from standing water and loose soil.

.4 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.5 Protect natural and man-made features required to remain undisturbed.

3.2 EXCAVATING

.1 Excavate to elevations and dimensions indicated or required for construction of work.

.2 Dispose of surplus excavated material off site.

3.3 BACKFILLING

.1 Do not commence backfilling until mass concrete plug has been placed along full length of new concrte deck.

.2 Backfill all spaces excavated and not occupied by parts of the structure, or other permanent works, with specified material placed as shown on the drawings.

.3 Areas backfilled to be free from debris, snow, ice, water or frozen ground.

.4 Do not backfill around newly placed concrete until concrete has been in place 7 days and approval has been obtained from the Departmental Representative.

.5 Do backfilling to details shown on drawings.

.6 Disposed surplus soil, grass and vegetations off site and in accordance with Section 01 74 20.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 75 mm to 150 mm Crushed Rock and 100 kg to 200 kg Crushed Rock will be measured in tonnes of materials placed and accepted in the work as totalled from Quarry weigh tickets and shall include all labour, equipment and material necessary to complete the work. No allowance made for material placed outside specified limits.

1.2 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 C127-15, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
.3 ASTM C131/C131M-14, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 STONE

.1 Hard, dense with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
.1 Class A limestone.
.2 Where applicable, Los Angeles Abrasion degradation in accordance with ASTM C131/C131M, maximum 32% loss by weight.
.3 75 mm to 150 mm Crushed Rock: well-graded and uniform distribution with minimum 75 mm to maximum 150 mm in size.
.4 100 kg to 200 kg Crushed Rock: well-graded and uniform distribution between 100 kg and 200 kg.

2.2 WEIGHING OF STONE

.1 Weigh all stone placed in the work at quarry on scale in accordance to Section 01 82 01.

.2 Weigh tickets will not be accepted by Departmental Representative for measurement purposes unless they are initialled by weigh scale operator as specified in Section 01 82 01.

PART 3 - EXECUTION

3.1 PLACEMENT OF 75 mm to 150 mm CRUSHED ROCK

.1 Place to thickness and details indicated on Drawings. Make slope face uniform.

.2 Give Departmental Representative 2 days notice for inspection of completed rock placement. Do not commence placement of 100 kg to 200 kg Crushed Rock until Departmental Representative has approved placement of the slope.

.3 No allowance made for material placed outside specified limits.

3.2 PLACEMENT OF 100 kg to 200 kg CRUSHED ROCK

.1 Place to thickness and details indicated on Drawings. Make slope face uniform.

.2 No allowance made for material placed outside specified limits.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 No separate measurement for payment will be made under this section. Include costs in piling items.

1.2 DELIVERY AND HANDLING

.1 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.

.2 Replace or repair damaged piles with steel to CSA G40.20-13/G40.21-(R2018), minimum 30% recycled content.

.3 If material is stockpiled on a structure, ensure that structure is not overloaded.

1.3 EXISTING CONDITIONS

.1 Existing sub-surface soil conditions: to Section 01 11 02.

.2 Ensure that ground conditions at pile locations are adequate to support pile driving equipment or make provision for support.

.3 Clear the driving line of any fallen fenders, boulders or debris within 0.6 metres of the harbour bottom for installation of steel sheet piling. Salvage boulders to be reviewed by Departmental Representative before disposal.

1.4 PROTECTION

.1 Adopt safe procedures and protect public and construction personnel, adjacent structures and the work of other sections from all hazards attributable to pile driving operations.

1.5 SCHEDULING OF WORK

.1 Submit schedule of planned sequence of driving to Departmental Representative for approval, not less that 2 weeks prior to commencement of pile driving for any structure.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 For material requirements refer to Section 31 62 16.19.

.2 Supply full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.

.3 Do not splice piles without written approval of Departmental Representative. When permitted, provide details for Departmental Representative review. Design details of splice to bear dated signature stamp of professional engineer registered or licensed in Ontario, Canada.

2.2 EQUIPMENT REQUIREMENTS

.1 Equipment information: Prior to bringing on site, submit to Departmental Representative for review, details of equipment for installation of piles. For impact hammers give manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer and mass of driving cap. For non-impact methods of installation such as augering, jacking, vibratory hammers or other means, give full details of characteristics necessary to evaluate performance.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Ensure that ground conditions at pile locations are adequate to laterally support the driven piles. Make provision for access and support of piling equipment during performance of work.

.2 Unless otherwise directed, do not drive piles until excavation has been completed or within embankments until embankment has been placed.

3.2 FIELD MEASUREMENT

.1 Maintain accurate records of driving for each pile, including:
- .1 Type and make of hammer, stroke or related energy.
- .2 Other driving equipment including water jet, driving cap, cushion.
- .3 Every 4 hours measure size, and indicate type of cushion employed.
- .4 Pile size, length and heat number, location of pile in pile group,

location or designation of pile group.
.5 Sequence of driving piles in group.
.6 Number of blows per metre for entire length of pile.
.7 Final tip, head and cut-off elevations.
.8 Other pertinent information such as interruption of continuous driving, pile damage.

.2 Provide Departmental Representative with three copies of records.

3.3 INSTALLTION

.1 Notify Departmental Representative at least 48 hours prior to commencement of driving.

.2 Provide all necessary facilities for inspection and co-operate with Departmental Representative in inspecting and recording at all times.

.3 Hold piles securely and accurately in position while installing.

.4 Cut off piles neatly and square at elevations indicated on drawings. Provide 300 mm length above cut off elevation so that any part damaged during installation is cut off.

.5 Cut-offs become property of contractor. Remove cut off lengths from site on completion of work.

3.4 PILE CAPACITY

.1 Install each pile to a minimum penetration of 1.5 meters of the pile tip into sound bedrock.

3.5 INSTALLATION TOLERANCES

.1 Install piles to the following tolerances:
.1 Pile heads within 25 mm of locations shown on drawings.
.2 Piles not more that 0.3 percent of length out of alignment.
.3 Cut off elevation within 10 mm of required elevation.

3.6 DAMAGED/ DEFECTIVE PILES

.1 Departmental Representative will reject any pile that is out of position or is damaged during or installation or handling.

.2 Pull out rejected piles and replace with new piles as directed.

.3 Remove rejected pile and replace with a new, and if necessary, a longer pile.

.4 No extra compensation will be made for removing and replacing or other work made necessary through rejection of a defective pile damaged due to faulty workmanship.

.5 Where piles are damaged or caused to drift outside specified tolerance due to Piles obstructions or other causes beyond Contractor's control the remedial measures adopted will be paid by the Departmental Representative at the Contract Unit Price or in accordance with the General Conditions if no unit prices apply.

3.7 OBSTRUCTIONS

.1 Where obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, remove obstruction and proceed as directed by Departmental Representative.

3.8 PROTECTION

.1 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.

.2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures. When damages occur, remedy damaged items to restore to original or better condition at own expense.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 New concrete-filled pipe piles will be measured by each pile supplied and installed acceptably into work and shall include all labour, materials and equipment necessary to complete the work including cap plate, tires, threaded rods, concrete fill, drilling, and all necessary field welding.

.2 Trimming, coping and cutting top of the new pipe piles is considered incidental to the pile installation and will not be measured separately for payment.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A106/A106M-19a, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
.2 ASTM A252A252M-19, Standard Specification for Welded and Seamless Steel Pipe Piles.

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

1.3 SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheet.

.3 Quality Assurance:
.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.2 Submit pile installation records, as described in PART 3 - RECORDS, for review by Departmental Representative.

1.4 DELIVERY, STORAGE, AND HANDLING

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

.2 Deliver new, undamaged materials to site, accompanied by certified test

reports, with manufacturer's logo and mill identification mark provided on pipe piling.

.3 Storage and Protection:
.1 Store and handle pipe piling in accordance with manufacturer's written instructions to prevent permanent deflection, distortion or damage to interlocks.
.2 Support pipe piling on level blocks or racks spaced not more than 3 m apart and not more than 0.60 m from ends.
.3 Store pipe piling to facilitate required inspection activities and prevent damage to coatings and corrosion prior to installation.

.4 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel pipe: seamless, of sizes and wall thicknesses indicated, plain cut ends to ASTM A252, Grade 3.

.2 Pipe material to have following minimum properties:
.1 Yield strength: 310 MPa.
.2 Tensile strength: 455 MPa.
.3 Weldable steel: to ASTM A106/A106M carbon equivalent less than 0.55%.

.3 Pipe chemical composition: to ASTM A252/A252M.

.4 Plates, shaped and bars: to CSA G40.20/G40.21, Grade 300W.

.5 Welding: to Section 05 12 35.

.6 Concrete and reinforcing steel: in accordance with Section 03 30 00.

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 FABRICATION

.1 Fabricate full length piles.

.2 Allowable tolerance on axial alignment to be 0.25% as measured by 3 m straight edge.

.3 Repair defective welds as approved by Departmental Representative and in accordance with Section 05 12 35.

.4 Repair damaged exterior protective coating of piles.

3.3 INSTALLATION

.1 Install piling in accordance with Section 31 61 13.

.2 Drill holes to pile outer diameter to ensure snug fit. Drive pile tip to elevations indicated in the Drawings.

.3 If approved by Departmental Representative, splice piles in place during installation by welding.
.1 To prevent distortion, tack opposite points first and then weld opposite sections for pipe walls thinner than 10 mm weld against a back up ring. Hold members in alignment during splicing operation.
.2 Make splice by complete joint penetration groove welds.

.4 Perform internal visual inspection of steel pipe, joints and base prior to placing of concrete.
.1 Ensure pipe inside is free from foreign matter.

.5 Place concrete in accordance with Section 03 30 00.

.6 Install pile caps as indicated.

3.4 WELDING

.1 Weld to Section 05 12 35.

3.5 RECORDS

.1 Keep complete and accurate record of each pile installed.

.2 Indicate:
.1 Pile location.
.2 Deviations from design location.

.3 Cross section shape and dimensions.
.4 Original length.
.5 Ground elevation.
.6 Tip elevation.
.7 Cutoff elevation.
.8 Penetration in blows per meter for entire length of penetration.
.9 Hammer data including: rate of operation, make and size.
.10 Unusual pile behaviour or circumstances experienced during driving such as redriving, heaving, weaving, obstructions, jetting, and unanticipated interruptions.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)
.1 ASTM D751-06(2011), Standard Test Methods for Coated Fabrics.
.2 ASTM D2261-13, Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of- Extension Tensile Testing Machine).
.3 ASTM D5034-09(2013), Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

1.2 SUBMITTALS

.1 Submit details of the temporary turbidity curtain system to the Departmental Representative prior to the start of the Work.

.2 Submit to Departmental Representative details of geotextile material and seam at least 2 weeks prior to commencing work.

1.3 DELIVERY AND STORAGE

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

PART 2 - PRODUCTS

2.1 MATERIAL

.1 Turbidity Curtain:
.1 Flotation Properties:
.1 Size: 150 mm x 150 mm.
.2 Curtain Depth: 8.5 m.
.3 Bouyancy: 20 Kg/m.
.2 Curtain Body Properties:
.1 Nylon Vinyl Reinforced: 5492 g/mý.
.2 Grab Tensile: to ASTM D5034, 1779 N.
.3 Tear: to ASTM D2261, 444 N..
.4 Hydrostatic Resistance: to ASTM D751, 4136 kPa.
.5 Seam strength: Heat Sealed.

.6 Fabric: Impermeable.
.7 Ballast Chain: 6 mm.

.2 Seams: sewn in accordance with manufacturer's

.3 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

PART 3 - EXECUTION

3.1 GENERAL

.1 Supply, install, maintain and remove silt curtains when instructed by the Departmental Representative.

.2 Turbidity curtain is only required for work commencing prior to July 15, 2021.

.3 Monitoring of water turbidity outside the turbidity curtain will be done by the Departmental representative. Turbidity shall not exceed 8 NTU above background conditions.

3.2 INSTALLATION

.1 Turbidity curtains shall consist of turbidity curtain geosynthetic, load line, flotation, ballast, anchors, mooring buoys, mooring lines, adjustment lines, and tie-downs.

.2 Design to conform to US Army Corps of Engineers EP 1110-1-16 Appendix C, BMP 27 Type 1.

.3 Turbidity curtains shall be constructed as follows:
.1 The flotation shall provide support along the length of the turbidity curtain.
.2 A sleeve shall be formed and heat-sealed or sewn along the entire bottom edge of the turbidity curtain geosynthetic, to contain the ballast in the sleeve. Breaks may be made in the sleeve to facilitate pulling, provided they are a minimum 100 mm in size and spaced at minimum 3 m intervals.
.3 Where turbidity curtain geosynthetic is joined to provide a continuous run, the sections shall be connected to provide a continuous seal and prevent the escape of turbid water between the sections.
.4 The turbidity curtain, as prepared for installation, shall be of sufficient width to account for water depth and wave action.
.5 The turbidity curtain shall be of sufficient length to permit work inside the area enclosed by the curtain without restricting equipment operations, and personnel from working.
.6 Seal the ends of the turbidity curtain where it is terminates at the existing structure face.

.4 Install turbidity curtain from the shore out to prevent fish capture.

3.3 OPERATION AND MAINTENANCE

.1 Turbidity curtains shall be installed to prevent sediment and debris passage, from the area enclosed by the curtain, to the remaining water body. Turbidity curtains shall be installed and maintained in a manner that avoids entry of equipment, other than hand-held equipment or boats, to the remaining water body.

.2 Equipment is permitted in the work area enclosed by the turbidity curtain.

.3 Turbidity curtains shall be operated and maintained in the specified location, with the entire top edge above the water surface.

.4 The turbidity curtain shall be free of tears and gaps, and the bottom edge of the curtain is to be continuously in contact with the water course bed so that sediment passage from the area enclosed is prevented.

.5 Any folds in the turbidity curtain which form next to the floatation collar shall be regularly monitored and freed of collected sediment.

.6 Monitor and maintain the silt curtains booms both during and outside normal working shifts as required. Provide all personnel, materials and equipment necessary to maintain, repair or relocate the turbidity curtain system.

.7 Carry out construction operations to minimize impact on fish habitat from both disturbed sediments and fill materials.

.8 Replace damaged or deteriorated fabric to approval of Departmental Representative.

.9 Remove turbidity curtain when authorized by the Departmental representative after completion of the work.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International
.1 ASTM A193/A193M-19, Standard Specification for Alloy and Stainless Steel Bolting for High temperature or High Pressure Service and Other Special Purpose Applications.
.2 ASTM A240/A240M-19a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application.
.3 ASTM A269/A269M-15a(2019), 5Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
.4 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
.5 ASTM B209M-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
.6 ASTM B221M-13, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes(Metric).

.2 CSA International
.1 CSA B111-1974(R2003), Wire Nails, Splikes and Staples.
.2 CSA G40.20-13/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.3 CSA S16:19, Design of Steel Structures.
.4 CSA S157-17/S157.1-17(R2015), Strength Design in Aluminum/Commentary on CAN/CSA-S157, Strength Design in Aluminum.
.5 CSA W47.2-11(2015), Certification of Companies for Fusion Welding of Aluminum.
.6 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
.7 CSA W59-18, Welded Steel Construction (Metal Arc Welding).
.8 CSA W59.2-18, Welded Aluminum Construction.

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

.4 National Lumber Grades Authourity (NLGA)
.1 NLGA Standard Grading Rules for Canadian Lumber GR-2017.

1.2 SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Provide shop drawing details of aluminum safety grating for review including details of grating connection to steel stringers.

1.3 DELIVERY AND STORAGE

.1 Ensure safe delivery and storage of floats at site in area designated by Departmental Representative.

.2 Provide Departmental Representative with 2 days notice prior to shipping.

.3 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with section 01 74 20.

1.4 MEASUREMENT PROCEDURES

.1 Floating docks will be measured by the unit fabricated and installed and shall include all labour, materials and equipment necessary to fabricate, transport and unload.

.2 Aluminum Gangways will be measured by each gangway fabricated, delivered and installed at the site and shall include all labour, materials and equipment necessary to fabricate, transport and install. Gangway hinge plates shall be considered included and will not be measured seperately for payment.

1.5 PROTECTION

.1 Protect work from damage resulting from work of other sections and from damage resulting from environmental conditions.

.2 Repair or replace at no extra cost damage caused by work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Hollow structural steel sections: to CSA G40.20/G40.21, Grade 350W, Class H.

.2 Structural steel plates, shapes, bars: to CSA G40.20/G40.21, Grade 350W, minimum 30% recycled content.

.3 Aluminum, shapes, tubes and plates: to ASTM B209M and ASTM B221M, grade 6061 T6.

.4 Galvanized bolts and nuts: to ASTM A307, hot dipped.

.5 Washers: galvanized pressed steel.

.6 Lumber: to National Lumber Grades Authority Standard Grading Rules for Canadian Lumber, species and grade catagory as follows:
.1 Fascia and planks: 100% S-P-F "No. 1".

.2 Preservative treatment: to Section 06 05 73.
.3 Forest Stewardship Council (FSC) certified.

.7 Safety Grating: Aluminum to ASTM B221M, Grade 6063-T6. Depth of deck 25.4 mm. Minimum section modulus 7472 mm^3/304.5 mm width.

.8 Threaded rods, nuts, and washers: to ASTM F593, (304/316) condition CW.

.9 Epoxy for threaded rods: 2 component, solvent free, high modulus, moisture insensitive, high strength structural epoxy suitable for use in cracked or uncracked concrete and capable of developing an ultimate tensile strength of 100 kN at an embedment depth of 175 mm in 28 MPa concrete for a 19 mm diameter threaded rod.

.10 Nuts, bolts, pins and screws for ramp and float decking and ramp hinges: to ASTM A193/A193M B8, Class 1, AISI Type 304.

.11 Gangway Wheels: polyurethane

.12 Bushings, Washers and Transition Nosing: ultrahigh molecular weight polyethylene (UHMWPE), colour black and UV stabilized.
.1 Density: 0.940.
.2 Tensile Strength: 40 MPa(ultimate).
.3 Compressive Yield Strength: 22.8 MPa.

.13 Welding Materials: to CSA W59 and CSA W59.2.

.14 Welding electrodes for steel: to CSA W48 Series.

PART 3 - EXECUTION

3.1 REMOVALS

.1 Perform removals in accordance to Section 02 41 14.

3.2 FLOAT FABRICATION

.1 Construct floats as indicated on drawings.

.2 Build work square, true, straight, and accurate to the required size.

.3 Complete welding to Section 05 12 35.

.4 Close off pipe float ends with steel plate fully welded all around. Install plugs on top section of pipe floats to permit pressure testing for air tightness. Carry out air testing at 340 kPa for 15 minutes, repair leaks and repeat test. Tightly seal plugs upon completion of testing.

.5 Fabricate steel saddle frames as detailed.

.6 Drill holes for bolts 2 mm larger than bolt diameter in steel sections and the same diameter as bolt in timber, except where specified otherwise.

.7 Place washer under heads or nuts of bolts in contact with wood.

.8 Fabricate and install pipe bollards in locations indicated. Cap top of bollards with plate and grind all rough or sharp edges smooth.

.9 Fasten aluminum safety grating at each stringer contact complete with bond breaker. Apply continuous bond breaker anchored to each stringer below aluminum decking contact area.

.9 Install timber fascia as detailed.

.10 Nail and bolt fascia timbers along both sides and ends of float. Spiral nails to be at 300 mm centers and bolts to be at 1500 mm centers for side fascia. Nail end fascias with two nails per contact.

.11 Fabricate and install hinge connections in manner and location indicated.

3.3 Gangways

.1 Construct gangways as indicated on drawings.

.2 Build work square, true, straight, and accurate to required size.

.3 Fabricate and install hinge plates to details indicated.

.4 Complete welding to Section 05 12 35.

3.4 HANDLING AND USE TREATED LUMBER

.1 Handle and use treated material in a manner of which will avoid damage of field fabrication causing alteration in original treatment.

.2 Apply preservative to end cuts.

3.5 FLOAT INSTALLATION

.1 Install floats in location and to details indicated on the drawing.

END OF SECTION

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Rubber fenders including all mounting hardware and epoxy shall be measured by each unit supplied and installed and shall include all labour, materials and equipment necessary to complete the work.

1.2 REFERENCES

.1 ASTM International
.1 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
.2 ASTM D2000-18, Standard Classification System for RubberProducts in Automotive Applications
.3 ASTM D2240-15e1, Standard Test Method for Rubber Property-Durometer Hardness.

.2 Canadian Standards Association (CSA)
.1 CSA G40.20-13/G40.21-13(R2018), general Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate items as follows:
.1 General arrangement of fender units.
.2 Location and sizes of anchor bolts.
.3 Arrangement and attachment of rubbing pieces.
.4 Rubber fender units, along with attachement details and energy absorption/reactions and deflections rating curves.

1.4 DELIVERY, STORAGE AND HANDLING

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

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

.3 Storage and Handling Requirements:

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

.4 Packaging Waste Management: in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Square-shaped fender:
.1 Rubber elements shall be extruded rubber homogeneous and free from any defects, impurities and cracks to the following properties:
.1 Hardness: 73±5 Durometer (Shore A) Z4 to ASTM D2240.
.2 Tensile Strength: 9600 kPa to ASTM D412.
.3 Polymer: 100% EPDM Z3 to ASTM D2000
.2 200 mm x 250 mm D-bore, with Reaction/Energy Absorption ratio of 9.5 minimum at 50% deflection.
.3 Galvanized steel shapes and plates: to CSA G40.20/G40.21, Grade 350W.
.4 Galvanized, threaded rods, anchor bolts, nuts and washers to ASTM A307.
.5 Epoxy to Section 03 30 00.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install in accordance with manufacturer's instructions and as indicated.

.2 Accurately drill and epoxy threaded rods to concrete to details indicated.

3.2 CLEANING

.1 Progress Cleaning:
.1 Leave Work area clean at end of each day.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION