PROJECT TITLE: ERIEAU, ONTARIO
RONDEAU WEST PIER REHABILITATION

PROJECT NUMBER: FP802-140433/002/E

PROJECT DATE: 2017-03-31


REGISTERED PROFESSIONAL ENGINEER
R. I. MAKSYMEC
31/03/17
PROVINCE OF ONTARIO

Part 1 General

1.1 MINIMUM STANDARDS

.1 Execute work to meet or exceed:

.1 National Building Code of Canada 2010, Canadian Highway Bridge Design Code, National Fire Code of Canada 2010, 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.

.2 Rules and regulations of authorities having jurisdiction.

.3 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.

.4 Observe and enforce construction safety measures required by National Building Code 2010, 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.

1.2 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.3 SITE EXAMINATION

.1 Before submission bid, examines existing conditions and determine conditions affecting work.

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

1.4 SITE

.1 Confine work, including temporary structures, plant, equipment and materials to established limits of site. Insure that Work avoids encroachment into areas required for future work.

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

1.5 CONSTRUCTION AND STORAGE AREA

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

1.6 DOCUMENTS

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

.2 Most stringent specifications shall govern over Drawings

1.7 CONTRACTORS AS-BUILT DRAWINGS AND SPECIFICATIONS

.1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files. Include general dimensions of existing timber crib and cross walls exposed during construction.

.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".

.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.

.6 Alternative materials and systems installed replacing original materials and systems specified by trade name.

.4 Turn one set, paper copy and electronic copy, of As-Built Record Drawings and specifications 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.

1.8 ADDITIONAL DRAWINGS

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

.2 Such drawings become part of Contract Documents.

1.9 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.

.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.

1.10 MEASUREMENT AND PAYMENT

.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.

.4 Items included in this specification shall form part of the lump sum arrangement.

1.11 CONSTRUCTION PHOTOGRAPHS

.1 Submit electronic copy of colour digital photography in JPG format, standard resolution.

.2 Identification: name and number of project and date of exposure indicated.

.3 Locations: location of viewpoints determined by Departmental Representative.

.4 Frequency: at regular intervals or milestones during construction, and at completion of work as directed by Departmental Representative.

1.12 EXISTING SERVICES

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

.2 Maintain existing services in occupied areas.

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

1.13 TEMPORARY FACILITIES AND SERVICES

.1 Provide and maintain temporary facilities and services required to carry out work.

.2 Remove temporary facilities and services on completion of work

1.14 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.

1.15 COORDINATION AND COOPERATION

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

1.16 INSPECTION AND TESTING

.1 Departmental Representative may employ an Inspection and Testing company to ensure work conforms with Contract Documents. Testing to be paid by Owner.

1.17 SCHEDULING OF WORK

.1 Upon award of contract, Contractor shall submit, within two weeks, a bar chart construction schedule indicating anticipated progress stages within time of completion.

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

.3 Contract extension requires formal submission and execution of change order in conformance with Departmental Representative's criteria.

.4 On site construction shall begin no earlier than September 5, 2017.

1.18 FIRES AND TEMPORARY HEATERS

.1 Burning of rubbish on site not permitted.

1.19 DATUM

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

.2 Chart datum for Lake Erie is 173.5 metres I.G.L.D. (1985).

.3 Water Level Chart for Lake Erie is bound together with these specifications in Drawing 1

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Shop drawings and product data.

.2 Certificates and transcripts.

1.2 ADMINISTRATIVE

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

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

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

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

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

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

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

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

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

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

1.3 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 Ontario.

.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 days for Departmental Representative review of each submission.

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

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

.7 Accompany submissions with transmittal letter, containing:

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

.8 Submissions include:

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

.9 After Departmental Representative review, distribute copies.

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

.11 Submit 1 print and 1 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 1 print and 1 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 1 print and 1 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 1 print and 1 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 electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 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.

1.4 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 site office.

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

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

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

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

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

1.5 PHOTOGRAPHIC DOCUMENTATION

.1 Submit 1 print and 1 electronic copy of digital photography in jpg format, standard resolution monthly with progress statement as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 2 locations.

.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: weekly as directed by Departmental Representative.

.1 Upon completion of: excavation, as directed by Departmental Representative.

1.6 CERTIFICATES AND TRANSCRIPTS

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA):

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

.2 National Building Code 2010 (NBC):

.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2010 (NFC):

.1 NFC 2010, Division B, Part 2 Emergency Planning, subsection 2.8.2 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 Project s, O. Reg. 213/91 as amended, Diving Operations, O. Reg. 629 /94, as amended.

.2 Ontario Ministry of Labour, Guideline - Lead on Construction Projects.

.3 Ontario Ministry of Labour, Guideline - Silica on Construction Projects.

.4 Workplace Safety and Insurance Act, 1997.

.5 Municipal statutes and authorities.

.5 Fire Commissioner of Canada (FCC):

.1 FC-301 Standard for Construction Operations, June 1982.

.2 FC-302 Standard for Welding and Cutting, June 1982.

1.2 SUBMITTALS

.1 Make submittals 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 operations found in work plan.

.3 Measures and controls to be implemented to address in-water safety precautions, specifically during Winter.

.4 Measures and controls to be implemented to address identified safety hazards and risks.

.5 Provide a Fire Safety Plan, specific to the work location.

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

.7 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations.

.3 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 3 days after receipt of comments from Departmental Representative.

.4 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.

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

.6 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.

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

.8 Submit copies of incident and accident reports.

.9 Submit Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00.

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

.11 On-site Contingency and Emergency Response Plan shall address standard operating procedures to be implemented during emergency situations.

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.

.3 In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any 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.

.4 Erect adequate safety barriers and signs for safety of workers and public.

.5 Develop a Construction Access Plan. The Town of Erieau and Fisheries and Oceans (Small Craft Harbours) must be notified and consulted.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1.9 0 Chapter 0.1, as amended.

1.9 RESPONSIBILITIY

.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 for the Province of Ontario.

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition become evident or occur 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.

1.11 HEALTH AND SAFETY COORDINATOR

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

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

.2 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.

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

1.12 POSTING OF DOCUMENTS

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

.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. Government of Canada HEALTH AND SAFETY REQUIREMENTS Sect 01 35 29.06 Fisheries and Oceans Page 4 Project No. 131-23620-00 2016-08-17

.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.

1.13 CORRECTION OF NON-COMPLIANCE

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

.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.

1.14 BLASTING

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

1.15 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.

.3 Departmental Representative may also stop Work for health and safety considerations.

END OF SECTION

Part 1 General

1.1 ENVIRONMENTAL MEASURES

.1 Meet or exceed the requirements of all environmental legislation and regulations, including all amendments up to the project date provided that in any case of conflict or discrepancy the more stringent requirements shall apply.

.2 Definitions:

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

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

.3 Reference Standards:

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

.1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

.2 EPA General Construction Permit (GCP) 2012.

1.2 FIRES

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

1.3 DRAINAGE

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

.2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Minimize stripping of topsoil and vegetation.

.2 Restrict tree removal to areas indicated in drawings.

.1 Existing tree at Sta. 0+320 to be removed.

1.5 WORK ADJACENT TO WATERWAYS

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

.2 Design and construct temporary crossings to minimize erosion to waterways.

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

1.6 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 Vehicles/machinery and equipment should be in good repair, equipped with emission controls, as applicable, and operated within regulatory requirements.

.4 Minimize the operation and idling of gas/diesel powered equipment and vehicles, in particular during smog advisories.

.5 Re-fueling of machinery must take place at a safe distance from the waterway as designated by the Departmental Representative.

.6 Prevent sandblasting abrasives and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures or other approved methods to contain.

.7 Avoid excavation, and other construction activities with potential to release particulates, during windy and prolonged dry periods.

.8 Restore disturbed areas as soon as possible to minimize the duration of soil exposure

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

.10 Stabilize all stockpiled material.

.11 Provide dust control for temporary roads. Cover or wet down gravel and paved areas to minimize the release of dust. Use water to wet down materials. Use chemical dust suppressants only where necessary on problem areas.

.12 Minimize vehicle traffic on exposed soils and stabilize high traffic areas with a clean gravel surface layer or other suitable cover material. Provide dust control for temporary roads.

.13 Do not allow any debris, fill or other foreign material to enter the waterway.

.14 Abide by local noise by-laws.

.15 Make appropriate spill containment and clean-up materials available at all times on site and ensure crews onsite are fully trained on their use. Develop spill prevention and response procedures. In the event of a spill of a deleterious substance:

.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.

1.7 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.

.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.

1.8 MEASUREMENT AND PAYMENT

.1 Items included in this specification shall form part of the lump sum arrangement.

END OF SECTION

Part 1 General

1.1 CONSTRUCTION AND DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert from waste destined for landfill to maximum extent possible. Reuse, recycle 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 Brick and hardened concrete.

.2 Corrugated cardboard and paper.

.3 Wood.

.4 Fresh concrete waste.

.5 Concrete admixtures and additives.

.6 Steel.

1.2 WASTE PROCESSING SITES

.1 Gore Landfill (WM),

.1 Chatham-Kent County Rd 19, Blenheim, ON N0P 1A0.

.2 Telephone: 519-676-4787.

.2 Chatham-Kent Recycling Inc

.1 6584 Middle Line, Merlin, ON N0P 1W0.

.2 Telephone: 519-689-4651.

1.3 DEMOLITION REMOVAL AND DISPOSAL – MEASUREMNT FOR PAYMENT

.1 Demolition removal and disposal of all components identified on the drawings and as specified, shall be removed as individual items, except for the armour stone, and entire North End, which will be included as lump sum removals.

.2 Item components to be demolished, removed and disposed as individual items include, but are not limited to concrete related components (existing deck and parapet), partial removal around patch repairs, the bollard at Sta. 0+180, all existing fenders, and steel angles that lie atop the existing SSP.

.3 The item components to be removed, salvaged, and reinstalled is the steel pipe curb that is currently installed from Sta. 0+080 to Sta. 0+180. The concrete superstructure at the North end of the West Pier is to be removed and (only) salvaged upon confirmation from Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment:

.1 Province: Ontario

.1 Ministry of Environment and Energy:

.2 Address: 135 St Clair Avenue West, Toronto, ON M4V 1P5 Canada, general inquiries (800)565-4923 or (416)323-4321, fax (416)323-4682

.2 Environment Canada:

.1 Address: Toronto, ON, general inquiries (416)734-4494.

3.2 PROTECTION

.1 Protect structures, existing pavement not designated for removal, and portions of existing wharf structure from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

.2 Prevent movement, settlement, or damage to adjacent structures, and utilities that are to remain in place. Provide bracing and shoring as required.

3.3 DEMOLITION, REMOVAL AND DISPOSAL

.1 All removals to be performed as per Contract Drawings and/or as directed by Departmental Representative.

.2 The following is a summary of removals:

.1 Saw cut concrete sidewalk slab in a neat line at limits of removal

.2 Contractor is to remove and store:

.1 The steel pipe curb from Sta. 0+080 to 0+180.

.3 Contractor is to remove and salvage:

.1 The armour stone from Sta. 0+301 to 0+324.7.

.2 Concrete superstructure at north end. Contractor is to cut existing north end into four (4) sections and salvage concrete for use as fill in new section, upon confirmation from Departmental Representative.

.4 Contractor is to remove and dispose of:

.1 25 mm of unreinforced concrete uniformly behind deteriorated areas at Sta. 0+000.

.2 The most eastern bollard at Sta. 0+180.

.3 The asphalt that tops the existing concrete deck, from Sta. 0+83.5 to 0+146.6 and 0+151.2 to 0+306.6 (to be removed simultaneously with underlying concrete deck via saw cut removal; full depth).

.4 The existing concrete deck, from Sta. 0+83.5 to 0+146.6 and 0+151.2 to 0+306.6.

.5 Partial depth of the existing concrete parapet from Sta. 0+83.5 to 0+106.5 and 0+243.5 to 0+326.5.

.6 The existing marine tire fenders found between Sta. 0+135 and 0+160 (included in Lump Sum Arrangement).

.7 The timber piles found between Sta. 0+320 and 0+332.97 (included in Lump Sum Arrangement).

.8 The land side steel angle sections found between Sta. 0+180 and 0+303 (included in Lump Sum Arrangement).

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 Removal of existing asphalt pavement will be measured in square metres of surface removed (to full depth).

.2 Removal of existing concrete will be measured in cubic metres of concrete removed. This will include full and partial depth removals.

.3 Removal and reinstallation of the existing steel pipe curb will be measured in meters.

.4 Removal of the bollard at Sta. 0+180 shall be measured as a single unit, and shall include the installation of a new bollard as per drawings.

1.2 REFERENCES

.1 Definitions:

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.

.2 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.

.3 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.4 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.2 Reference Standards:

.1 CSA International

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

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

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 SITE CONDITIONS

.1 Environmental protection:

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

1.5 EXISTING CONDITIONS

.1 Structures to be demolished are based on their condition at time of examination prior to tendering.

.1 Remove, protect and store salvaged items in accordance with Section 01 74 21 - Construction/Demolition and Waste Management.

Part 2 Products

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from string line, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, per Section 01 35 43 - Environmental Procedures.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

.2 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Prevent movement, settlement or damage of adjacent trees landscaping, adjacent grades, and properties.

.3 Prevent debris from blocking surface drainage systems, which must remain in operation.

3.2 DEMOLITION

.1 Asphalt

.1 Remove and dispose of asphalt via complete depth removal of underlying concrete deck.

.2 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.2 Concrete

.1 Remove and dispose of existing parapet to partial depth as indicated in drawings.

.3 Bollard

.1 Remove and dispose of existing bollard as indicated in drawings.

.4 Fenders

.1 Remove and dispose of existing tire fenders from Station 0+135 to 0+170.

.5 North End

.1 Demolish concrete mass wharf at North end of West Pier from Sta. 0+325.1 to 0+330. Cut existing North end structure into four (4) sections (or more if required), and salvage concrete for use as fill in new North end structure upon receiving confirmation of salvaging from Departmental Representative.

.2 Remove all timber piles from Sta. 0+320 to 0+330.

3.3 REMOVAL

.1 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.2 Suppress dust generated by removal process.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

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

.2 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.3 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

.2 CSA International

.1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.

.1 Include application instructions for concrete floor treatment[s].

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 FORMWORK MATERIALS

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.

2.2 CURING COMPOUNDS

.1 Select low VOC curing compounds.

2.3 MIXES

.1 Mixing ratios in accordance with manufacturer's written instructions.

Part 3 Execution

3.1 FABRICATION AND ERECTION

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

.2 Obtain Departmental Representative’s approval for use of earth forms framing openings not indicated on drawings.

.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.4 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.5 Align form joints and make watertight.

.1 Keep form joints to minimum.

.6 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.7 Line forms for following surfaces:

.1 Secure lining taut to formwork to prevent folds.

.2 Pull down lining over edges of formwork panels.

.3 Ensure lining is new and not reused material.

.4 Ensure lining is dry and free of oil when concrete is poured.

.5 Application of form release agents on formwork surface is prohibited where drainage lining is used.

.6 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.

.7 Cost of textile lining is included in price of concrete for corresponding portion of Work.

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

3.2 REMOVAL AND RESHORING

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

.1 4 days for slabs, decks and other structural members

.2 Remove formwork when concrete has reached 70 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

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

3.3 EXAMINATION

.1 Verify that slab surfaces are ready to receive work and elevations are as indicated on drawings.

3.4 PREPARATION OF EXISTING SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges.

.2 Saw cut control joints to CAN/CSA-A23.1, 24 hours maximum after placing of concrete.

3.5 APPLICATION

.1 Clean over spray. Clean sealant from adjacent surfaces.

3.6 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

3.7 SMOOTHING

.1 Smoothed all exposed metals with grinding stone.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 35 49 25 – Turbidity Curtain.

1.2 MEASUREMENT AND PAYMENT

.1 Cast-in-place concrete will be measured by the cubic meter calculated from neat dimensions as indicated. This will include:

- .1 Deck concrete.
- .2 New North end section concrete.
- .3 Concrete anchor block.

.2 Concrete patch repairs will be measured by the square metre calculated from neat dimensions as indicated.

.3 Bagged concrete will be measured by lump sum basis and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.4 Concrete placed beyond dimensions indicated will not be measured.

.5 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.

.6 Joint accessories including smooth bars, joint filler, backer rod and sealant are considered included in the construction of joints and will not be measured separately for payment.

.7 Reinforcing steel, dowels, splices, wire ties, bar supports, chairs, spacers and other accessories are considered included in the placing of concrete and will not be measured separately for payment (are included in price of concrete).

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

.9 All work described under clause 3.1 Preparation shall be considered incidental to the cast-in-place concrete and will not be measured separately for payment.

1.3 REFERENCES

.1 American Concrete Institute (ACI)

- .1 SP-66-04, ACI Detailing Manual 2004.

.2 ASTM International:

- .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- .2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
- .3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .4 ASTM A497/A497M-07,Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
- .5 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.6 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.3 CSA International:

.1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/ Methods of Test for Concrete.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.4 CSA G30.18-09, Carbon steel bars for concrete reinforcement.

.5 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.6 CAN/CSA S269.3-M92(R2013), Concrete Formwork

.7 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.8 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Canadian Standards Association (CSA International)

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

.2 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.3 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

.5 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 SUBMITTALS

.1 Submit administrative documents, shop drawings, product data, samples, photographs, certificates, and transcripts in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.

.1 Include application instructions for concrete floor treatment[s].

1.5 DESIGN REQUIREMENTS

.1 Alternative 1 - Performance: in accordance with CSA A23.1/A23.2, and as described in Mixes of Part 2 – Products.

1.6 QUALITY ASSURANCE

.1 Submit to Departmental Representative, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.2 Quality Control Plan: submit written report, as described in Part 3 - Verification, to Departmental Representative verifying compliance that concrete in place meets performance requirements.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Concrete hauling time: maximum allowable time limit for concrete to be delivered to site of work and discharged not to exceed 120 minutes after batching.

.1 Modifications to maximum time limit must be agreed to by the 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 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.4 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.

.2 Ensure emptied containers are sealed and stored safely.

.3 Divert unused concrete materials from landfill to local facility as reviewed by Departmental Representative.

.4 Provide appropriate area on job site where concrete trucks can be safely washed.

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

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

Part 2 Products

2.1 MATERIALS

.1 Cast-in-place concrete:

.1 Cement: to CSA A23.01-09, Type GU.

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

.3 Exposure class: C-1 to CSA A23.1/ A23.2.

.4 Aggregate size: 20 mm maximum size to CSA A23.1/A23.2.

.5 Slump: 70 mm +/-20 mm at time of deposit.

.6 Air content: Table 4, Category 1, 6%.

.7 Admixtures: air entraining to ASTM C233/C233M-11 Standard Test Method for Air-Entraining Admixtures for Concrete. Calcium chloride or compounds containing calcium chloride not permitted.

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

.2 Reinforcing bars and dowels: to CSA G30.18, Grade 400W.

.3 Welded steel wire fabric: flat sheets to ASTM A497/A497M, 152 x 152 mm, MW18.7 x MW 18.7.

.4 Anchor bolts: to CSA G40.20/G40.21, Grade 300W.

.5 Grout: non-shrink, premixed, 35 MPa compressive strength at 24 hours.

.6 Joint Filler: bituminous impregnated fibreboard, to ASTM D1751.

.7 Sealer: exterior grade, non-sag sealant.

.8 Other concrete materials: to CSA A23.1/A23.2. Fabrication

.9 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

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

.1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

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

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

.13 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.14 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.15 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.

.16 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.

.17 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m5.

.1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.

.2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.

.1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.

.18 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION OF REINFORCEMENT

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

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

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

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

.1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

2.3 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 in PART 3 - Verification.

.2 Provide concrete mix to meet following hard state requirements:

.1 Durability and class of exposure: C-1.

.2 Compressive strength at 28 age: 35 MPa.

.3 Surface texture: smooth formed finish.

.3 Concrete supplier's certification: both batch plant and materials meet CSA A23.1/A23.2 requirements.

.4 Provide quality management plan to ensure verification of concrete quality to specified performance.

.5 Mixing ratios in accordance with manufacturer's written instructions.

2.4 CURING COMPOUNDS

.1 Select low VOC curing compounds.

2.5 FORMWORK MATERIALS

For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.

Part 3 Execution

3.1 PREPARATION

.1 Provide Departmental Representative 24 hours minimum notice before each concrete pour. Placing of concrete is permitted only after approval of equipment and mix.

.2 During concreting operations:

.1 Development of cold joints not allowed.

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

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

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

.5 Surfaces shall be thoroughly cleaned of all foreign material prior to depositing fresh concrete. For hardened concrete surfaces, the aggregate shall be partially exposed and surface to be rough.

.6 Protect previous Work from staining.

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

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

.9 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.

.1 Place steel dowels and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated

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

3.2 PREPARATION OF REINFORCING STEEL

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment to be 1 hour per 25 mm of bar diameter.

.2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.3 FIELD BENDING

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

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

.3 Replace bars, which develop cracks or splits.

3.4 PLACING REINFORCING STEEL

.1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Use plain round bars as slip dowels in concrete.

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 When paint is dry, apply thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.

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

.5 Protect epoxy coated portions of bars with covering during transportation and handling.

.6 Accurately place reinforcing steel and dowels in the positions shown on the drawings and hold firmly during the placing, compacting and setting of concrete.

.7 Reinforcement steel and dowels must be in place and inspected by the Departmental Representative prior to placement of concrete.

.8 Reinforcing steel fabricating and placing tolerances shall not reduce the concrete cover to less than the specified minimum clear concrete cover noted in the general notes.

.9 Reinforcement requirements are shown on detail drawings. Where details of bar sizing and spacing are not shown, allow for minimum reinforcement in accordance with CAN/CSA A23.3. All reinforcement shown shall be continuous unless detailed otherwise.

3.5 FABRICATION AND ERECTION OF FORMWORK

.1 The design, fabrication, erection, and use of concrete formwork shall conform to the requirements of CAN/CSA-S269.3 and CSA A23.1/A23.2. Government of Canada CAST-IN-PLACE CONCRETE Section 03 30 00 Fisheries and Oceans Page 5 Project No. 131-23620-00 2016-08-17

.2 Ensure formwork is held securely in place and is fit tight to profile of existing concrete. Seal all openings prior to placement of concrete. Adequately design forms for concrete pumping pressures.

.3 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings.

.4 Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.

.5 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.7 Align form joints and make watertight.

.1 Keep form joints to minimum.

.8 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.9 Line forms for following surfaces:

.1 Secure lining taut to formwork to prevent folds.

.2 Pull down lining over edges of formwork panels.

.3 Ensure lining is new and not reused material.

.4 Ensure lining is dry and free of oil when concrete is poured.

.5 Application of form release agents on formwork surface is prohibited where drainage lining is used.

.6 If concrete surfaces require cleaning after form removal, use only pressurized water stream so as not to alter concrete's smooth finish.

.7 Cost of textile lining is included in price of concrete for corresponding portion of Work.

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

3.6 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.7 CONSTRUCTION

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

3.8 FINISHES

.1 Finish concrete to CSA A23.1/A23.2, Table 22.

.2 Steel trowel to smooth dense surfaces. Provide round edges.

3.9 REMOVAL AND RESHORING

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

.1 4 days for slabs, decks and other structural members

.2 Remove formwork when concrete has reached 70 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

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

3.10 TIME INTERVAL BETWEEN CONCRETE PLACEMENT

.1 Construction joints: 7 days wet cure continuously.

.2 Control joints: 6 days.

.3 Expansion joints/contraction joints: 1 day.

.4 Stage 2 concrete pour of anchor wall may be placed as soon as initial placing has 25% of design strength but no sooner than 12 hours.

3.11 CURING

.1 Cure concrete in accordance with CSA A23.1/A23.2, Clause 7.4.

.2 Provide cold weather protection during curing period.

3.12 EXAMINATION

.1 Verify that slab surfaces are ready to receive work and elevations are as indicated on drawings.

3.13 PREPARATION OF EXISTING SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges.

.2 Saw cut control joints to CAN/CSA-A23.1, 24 hours maximum after placing of concrete.

3.14 APPLICATION

.1 Clean over spray. Clean sealant from adjacent surfaces.

3.15 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

3.16 SMOOTHING

.1 Smoothed all exposed metals with grinding stone.

3.17 VERIFICATION

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in PART 2 - Products, by Departmental Representative and provide verification of compliance as described in Part 1 - Quality Assurance.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00.

1.2 REFERENCES

.1 Definitions:

.1 Tremie concrete: concrete placed underwater through tube called tremie pipe.

.2 Tremie pipe: pipe has hopper at upper end and may be open ended or may have foot valve, plug or travelling plug to control flow of concrete. Pipe has diameter of 200 mm minimum, constructed from sections with flange couplings fitted with gaskets.

.1 Concrete is placed in hopper and sufficient head of concrete is maintained in tremie pipe to provide desired rate of flow.

.3 Pumped concrete method: method of placing concrete underwater uses concrete pump with discharge line used in similar manner to tremie pipe. Bottom-dump bucket method: method of placing concrete underwater requires use of bucket designed to discharge from bottom after it has contacted foundation or surface of previously placed concrete.

.2 Reference Standards:

.1 American Concrete Institute (ACI)

.1 ACI 304R-00, Guide for Measuring, Mixing, Transporting and Placing Concrete.

.2 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

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

1.4 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.

1.5 MEASUREMENT AND PAYMENT

.1 Underwater placed concrete will be measured by the cubic metre calculated from neat dimensions as indicated. This will include:

.1 In-pan fillings for steel patch repair plates.

Part 2 Products

2.1 MATERIALS

.1 Concrete materials: to Section 03 30 00 - Cast-in-Place Concrete.

2.2 CONCRETE MIXES

.1 Cement: to CSA A23.01-09, Type GU.

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

.3 Exposure class: C-1 to CSA A23.1/ A23.2.

.4 Aggregate size: 20 mm maximum size to CSA A23.1/A23.2.

.5 Slump: 170 mm +/-20 mm at time of deposit.

.6 Air content: Table 4, Category 1, 6%.

.7 Admixtures: air entraining to ASTM C233/C233M-11 Standard Test Method for Air-Entraining Admixtures for Concrete. Calcium chloride or compounds containing calcium chloride not permitted.

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

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for concrete placement 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 PREPARATION

.1 Where concrete must bond to existing surfaces, clean surfaces before starting concrete placement.

.1 Use water jets, mechanical scrapers or other means, when quantities of mud or rock cuttings are present, remove by air lift.

3.3 INSTALLATION

.1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete and Section 03 20 00 - Concrete Reinforcing and to CSA A23.1/A23.2. Testing for concrete to CSA A23.1/A23.2.

.2 Place concrete in one continuous operation to full depth required.

.1 Supply complete equipment for every phase of operation.

.2 Provide sufficient supply of concrete to complete pour without interruption.

.3 Tremie method:

.1 Provide water-tight tremie pipe sized to allow free flow of concrete. Diameter of tremie pipe to be maximum 150 mm and minimum eight times maximum size of coarse aggregate.

.2 Provide hopper at top of tremie pipe and means to raise and lower tremie pipe.

.3 Provide plug or foot valve at bottom of tremie pipe to permit filling pipe with concrete initially.

.4 Start placement with tremie pipe full of concrete. Keep bottom of pipe buried minimum 300 mm in freshly placed concrete.

.5 Trapezoidal steel support plates, and steel patch repair plates are to be installed prior to tremie concrete fillings.

.6 If seal is lost, allowing water to enter pipe, withdraw pipe immediately. Refill pipe, and continue placing as specified.

.7 Do not vibrate, disturb or puddle concrete after placement.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 ASTM C881/C881M-13, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

.4 ASTM C882/C882M-13a, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.

.5 ASTM D570-98(2010)e1, Standard Test Method for Water Absorption of Plastics.

.6 ASTM D638-10, Standard Test Method for Tensile Properties of Plastics.

.7 ASTM D695-10, Standard Test Method for Compressive Properties of Rigid Plastics.

.8 ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

.9 ASTM F593-13a, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.10 ASTM F594-09e1, Standard Specification for Stainless Steel Nuts.

.2 CSA International

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

.2 CSA S16-09, Design of Steel Structures.

.3 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.4 CSA W59-13 Welded Steel Construction (metal arc welding).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

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

1.3 MEASUREMENT PROCEDURES

.1 Bollard shall be measured on a per unit basis and shall include all labour, materials and equipment necessary to fabricate, supply and install. Bollard to have 220mm outer diameter.

.2 Steel patch repair plates shall be measured by total tonnage of 12mm thick plate, and shall include all labour materials and equipment necessary to fabricate, supply and install each plate.

.1 Washer plates, and j-bolts, and welding are considered necessary equipment for the installation of the steel patch repair plates.

.2 Prior to the fabrication of steel patch repair plates, the contractor is responsible for performing an underwater diving assessment to confirm the dimensions as indicated in the drawings along the West Pier steel sheet pile wall. Based on this assessment, the contractor will have steel patch repair plates fabricated to suit the size of the deficiency, and can be installed per the drawings

.3 Trapezoidal steel support plates shall be measured total tonnage of 6mm thick plate, and shall include all labour materials and equipment necessary to fabricate, supply and install.

.4 Steel pipe curb shall be measured in linear meters, and shall include all labour, materials and equipment necessary to fabricate, supply and install. Steel pipe curb to have diameter of 100mm, and have vertical post spacing of 10.5m.

.5 Circular HSS 324 sections shall be measured by each toe pin and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.6 Waler shall be measured by linear meters and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.7 Tie rods shall be measured by linear meters and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.1 Couplers, pipe sleeves, and washer plates are considered necessary equipment for the installation of the tie rods.

.8 Steel pile cap shall be measured in meters, and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.1 Steel shims, anchor studs, and angles are considered necessary equipment for the installation of the steel pile cap.

.9 Steel safety ladders are to be measured on a per unit basis and shall include all labour, materials and equipment necessary to fabricate, supply and install.

.1 HSS 127x127x8.0 sections, 25mm diameter steel bars, hand grips, and welds are considered necessary equipment for the installation of the steel pile cap.

1.4 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 indoors 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 Welding companies certified to CSA-W47.1.

Part 2 Products

2.1 MATERIALS

.1 Steel plates to: to CSA G40.20/ G40.21, Grade 350W, minimum 30% recycled content.

.2 Steel HSS Sections: to ASTM A53/A53M extra strong minimum 30% recycled content.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307 galvanized

2.2 FABRICATION

.1 Examine existing field conditions and obtain measurements and dimensions required to fabricate. Advise Departmental Representative of any adjustments and conditions affecting the work.

.2 Confirm fit and field dimensions prior to commencing fabrication of all items.

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

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

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 610 g/m2 , Coating Grade 85, to ASTM A123/A123M.

.2 All exposed metals to be smoothed at surface with grinding stone.

2.4 BOLLARD

.1 Steel pipe bollard: 220 mm nominal outside diameter, fabricated to shapes and sizes as indicated in drawings.

.1 Apply two layers of yellow traffic paint.

2.5 STEEL CURB

.1 Steel pipe curb: 100 mm nominal outside diameter, fabricated to shapes and sizes as indicated in drawings.

.1 Apply two layers of yellow traffic paint.

2.6 STEEL PATCH PLATES

.1 Steel patch plates to have 12 mm thickness. Lengths and widths vary as indicated in drawings.

2.7 TRAPEZOIDALS STEEL SUPPORT PLATES

.1 Trapezoidal steel support plates: 6 mm thickness. The plates are to be cut into isosceles trapezoids with one base of 260 mm and one base of 360 mm.

2.8 STEEL CAP CHANNEL

.1 Steel cap channel: to be installed from Station 0+083.5 to Station 0+345.4. All channels to have thickness of 8 mm, width of 300 mm and depth of 100 mm. Install using steel shims at every second land side in pan to maintain a level surface under channel in drawings.

.1 Apply two layers of yellow traffic paint.

2.9 STEEL PILE (TOE PIN)

.1 Steel HSS Pile type HSS 324, 350W.

2.10 STEEL WALER

.1 Steel HSS Channel type HSS C250x30, 350W.

Part 3 Execution

3.1 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

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

.3 Supply components for work by other trades in accordance with shop drawings and schedule.

.4 Make field connections as indicated.

.5 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

.1 Primer: maximum VOC limit 250 g/L

3.2 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 Excavated materials will be measured separately, in lump sums.

.1 Armour stone located between Station 0+301 and 0+324.7 will be measured in a single lump sum for complete excavation.

.2 Hand dredging (necessary for Section 05 50 00 Metal Fabrications) is considered necessary labour for the installation of steel patch repair plates.

1.2 REFERENCES

.1 Ontario Provincial Standard Specification (OPSS):

.1 OPSS 1004, November 2012, Material Specification for Aggregates - Miscellaneous.

.2 OPSS 514, November 2010, Ontario Provincial Standard Specification, Construction Specification for Trenching, Backfilling, and Compacting.

.3 OPSS 1010, April 2004 for Granular A Aggregate.

1.3 UTILITY LINES

.1 Before commencing work, establish location and extent of underground utility lines in area of excavation. The locations of 4 culverts are indicated in the drawings, and are to be maintained.

1.4 PROTECTION

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

.2 Protect existing structures and surface features which may be affected by work from damage while work is in progress. Repair any damage resulting from work.

.3 Adequately protect benchmarks, layout markers, survey markers and geodetic monuments for duration of contract.

.4 Protect existing facilities and equipment situated on site or adjacent to site from damage.

1.5 SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

.1 Granular material: to Ontario Provincial Standard Specification 1010, April 2004 for Granular A Aggregate. Maximum size of Granular A is 19.0 mm. Maximum size of clear stone is 51mm.

.2 Granular B material: to OPSS 1010, 100% crushed rock from a quarry, of natural sand/gravel source. Granular B shall not contain RAP or asphalt coated products.

.3 Gradation requirements for granular materials shall be in accordance with Table 1.

Table 1
Gradation Requirements – Percent Passing

MTO Test Number	Sieve	Granular A	Granular B
LS-602	150 mm	N/A	N/A
	106 mm	N/A	100
	37.5 mm	N/A	N/A
	26.5 mm	100	50-100
	19.0 mm	85-100 (87-100*)	N/A
	13.2 mm	65-90 (75-95*)	N/A
	9.5 mm	50-73 (60-83*)	N/A
	4.75 mm	35-55 (40-60*)	20-55
	1.18 mm	15-40	10-40
	300 µm	5-22	5-22
	150 µm	N/A	N/A
	75 µm	2.0-8.0 (2.0-10.0**)	0-10.0

* When the aggregate is obtained from an air-cooled blast furnace slag source

** When the aggregate is obtained from a quarry or an air-cooled blast furnace slag or nickel slag source.

.4 Notify Departmental Representative of source of materials. All material to be from sources satisfactory to Departmental Representative. Geotextiles: to Section 31 32 19.01 - Geotextiles.

Part 3 Execution

3.1 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation and overloading of existing structures.

.2 Install silt fence barrier around each stockpile of material and maintain for duration of work.

3.2 BACKFILLING

.1 Do not commence backfilling until areas of work to be backfilled have been inspected and approved by Departmental Representative.

.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 Prior to placing fill, compact existing subgrade to obtain same compaction as for specified fill. Cut out "soft" and frozen areas and fill with suitable material until specified compaction can be obtained.

.5 Do not backfill around newly placed concrete until concrete has been in place at least 14 days, test cylinders show strength to be at least twice the working stress used in design, and approval has been obtained from the Departmental Representative.

.6 Place and compact fill materials in continuous horizontal layers not exceeding 300 mm loose depth. Use methods to prevent disturbing or damaging any part of the work. Make good any damage.

.7 Maintain optimum moisture content to enable compaction to attain specified density.

.8 Compact each layer to 98% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.

.9 Perform work in accordance with OPSS 514, November 2010, Ontario Provincial Standard Specification, Construction Specification for Trenching, Backfilling, and Compacting.

.10 The following depths placed within the area of the saw cut and removed deck from Sta. 0+83.5 to 0+146.6 and Sta. 0+151.1 to 0+299.6:

.1 0.6m Granular B compacted to 98%.

.2 0.15m Granular A compacted to 98%.

.11 The following amounts are to be measured and poured within the area of the removed armour stone from 0+299.6 to 0+325.98:

.1 1.5m Granular B compacted to 98%.

.2 0.15 Granular A compacted to 98%.

.12 The following amounts are to be measured and poured within the area of the new section at the North end of the West Pier from 0+325.98 to 0+332.97:

.1 6.9m Clear Stone compacted to 98%.

.2 1.5m Granular B compacted to 98%.

.3 0.15 Granular A compacted to 98%.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 Measure geotextiles in square metres of surface covered by material. No allowance will be made for seams and overlaps.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D4491-99a(2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1860-November 2010, Material Specification for Geotextiles.

1.3 SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

.1 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, well-ventilated area.

.2 Store and protect geotextiles from direct sunlight and UV rays.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIAL

.1 Geotextile: woven synthetic fibre fabric, supplied in rolls.

.1 Width: 2 m minimum.

.2 Length: 10 m minimum.

.2 Factory seams: sewn in accordance with manufacturer's recommendations.

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

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material 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 Departmental Representative.

3.2 INSTALLATION

.1 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.2 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.

.3 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.4 Join successive strips of geotextile by overlapping (min 600mm).

.5 Geotextile to be installed from Sta. 0+83.5 to 0+146.5 and 0+151.2 to 0+325.1.

.6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.7 After installation, cover with overlying layer within 6 hours of placement.

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

.9 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.10 Geotextile to be placed between layers of Granular A and B, or Granular A and Clear Stone.

3.3 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA):

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

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/G40.21.

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

1.3 EXISTING CONDITIONS

.1 Contractor is responsible for making his own assessment of the type and quality of the in-situ materials and its impact on his proposed construction methods and operations.

1.4 MEASUREMENT PROCEDURES

.1 No separate measurement for payment will be made under this section. Refer to Sections 31 62 16.13 Steel Sheet Piles, and 31 62 16.16 Steel HSS Piles for Measurement and Payment Procedures.

1.5 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.

1.6 SCHEDULING OF WORK

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

1.7 SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

.1 Material requirements for piles are specified in Section 31 62 16.13 Steel Sheet Piling.

.2 Supply full length piles

2.2 EQUIPMENT

.1 Equipment information: Supply equipment of sufficient size and capacity to adequately install the piling to indicated depth. 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 auguring, jacking, vibratory hammers or other means, give full details of characteristics necessary to evaluate performance.

.2 Floating plant used in the work to be of sufficient capacity and in good operating conditions to satisfactorily complete the work, within the time schedule and in accordance with the specifications.

.3 Contractor shall submit a complete list of proposed floating plant to Departmental Representative for review prior to commencement of work. Any modifications required to floating plant and associated equipment shall be performed by Contractor prior to commencing work at no additional cost to Departmental Representative.

.4 Mark floating equipment with lights in accordance with the Collision Regulations with Canadian Modifications 1983, and maintain a VHF marine radio watch on board.

.5 Do not impede navigation during progress of work in accordance with the Collision Regulations with Canadian Modifications 1983. Make no claims for delays resulting from vessel movements in harbour area.

Part 3 Execution

3.1 PREPARATION

.1 Ensure that ground conditions at pile locations are adequate to support pile driving operation and load testing operation.

.1 Make provision for access and support of piling equipment during performance of Work.

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 Pile size, length and heat number, location of pile in pile group, location or designation of pile group.
.3 Sequence of driving piles in group.
.4 Final tip, head and cut-off elevations.
.5 Other pertinent information such as interruption of continuous driving, pile damage.
.6 Provide Departmental Representative with three copies of records.

3.3 INSTALLATION

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

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

.3 Furnish such equipment and labour as necessary to enable Departmental Representative to install instrumentation on piles.

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

.5 Do not drive piles within a radius of 8 metres of concrete which has been in place less than 2 days unless otherwise directed by Departmental Representative in writing.

.6 Cut off piles neatly and square at elevations indicated on drawings.

3.4 PILE CAPACITY

.1 Install each pile with approved pile driving procedures. Departmental Representative will be sole judge of acceptability of each pile with respect to depth of penetration or other criteria specified.

.2 Drive each pile to a minimum penetration of the pile tip to elevation shown on the drawings.

3.5 DRIVING TOLERANCES

.1 Install piles to the following tolerances:

.1 Toe Pin pile heads within 250 mm of locations shown on drawings.

.2 Steel Sheet pile heads within 50 mm of locations shown on drawings.

.3 Piles not more that 2 percent of length out of alignment.

.4 Cut off elevation at required elevation.

3.6 DAMAGED/DEFECTIVE PILES

.1 Departmental Representative will reject any pile that is driven out of position or is damaged during driving or handling. Extend piles driven below cut off elevation as directed by Departmental Representative, at no cost to Departmental Representative.

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

.3 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.

.4 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 at the Contract Unit Price or in accordance with the General Conditions if no unit prices apply.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 Measure supply of steel sheet piling in square metres of piling authorized by Departmental Representative and delivered to site.

.1 Calculate area by multiplying lengths of piles by widths.

.2 Width of steel sheet pile section is defined as centre to centre distance between pile interlocks measured along a plane parallel to finished wall.

.2 Measure, supply, and installation of sheet piling in square metres of piling remaining in place after cut-off.

.1 Piling will be measured in plane of bulkhead, calculated by multiplying straight horizontal centre line length of bulkhead measured at top of piles by average vertical length of piles installed and left in work.

.3 Measure splicing of piles by number of splices made.

.4 Nuts, sleeve nuts, turnbuckles, pipe sleeves, bearing plates, washers, transfer bolts, steel wales and other associated hardware supplied and incorporated in Work, as indicated drawings, are to be included in unit price of steel sheet piles.

.5 Measure tie rods by length incorporated in Work, as indicated.

.6 Measure backfill in tonnes of backfill placed to dimensions as indicated and incorporated in completed work.

.7 Mobilization and de-mobilization of equipment for installation of steel sheet piling will be included in the Lump Sum Arrangement.

1.2 REFERENCES

.1 ASTM International

.1 ASTM A6/A6M-11, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

.2 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile.

.3 ASTM A1011/A1011M-10, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra High Strength.

.4 ASTM A328/A328M-07, Standard Specification for Steel Sheet Piling.

.5 ASTM A857/A857M-07, Standard Specification for Steel Sheet Piling, Cold Formed, Light Gage.

.2 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.2 Certificates:

.1 Submit 2 weeks prior to fabrication, 2 copies of steel producer certificates in accordance with ASTM A1011/A1011M, and mill test reports in accordance with CSA G40.20/G40.21.

.2 Submit copy of certification for fusion welding in accordance with CSA W47.1.

1.4 QUALITY ASSURANCE

.1 Inspection and testing of steel sheet piling material will be carried out by testing laboratory designated by Departmental Representative at any time during course of Work.

.2 Materials inspected or tested by Departmental Representative which fail to meet contract requirements will be rejected.

.3 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, Contractor to pay costs for additional tests or inspections. Departmental Representative.

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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area. Store and protect sheet piles from nicks, scratches, and blemishes.

.2 Replace defective or damaged materials with new.

.4 Use slings for lifting piling make sure mass is evenly distributed and piling is not subjected to excessive bending stresses.

.5 Store sheet piling on level ground or provide supports so that sheet piling is level when stored.

.1 Provide blocking at spacing not exceeding 5 m so that there is no excessive sagging in piling.

.2 Overhang at ends not to exceed 0.5 m.

.3 Block between lifts directly above blocking in lower lift.

.6 If material is stock-piled on structure, ensure structure is not overloaded.

Part 2 Products

2.1 MATERIALS

.1 Steel sheet piles: to CSA G40.2, grade 350W, and following:

.2 Continuous interlocking Z section:

.1 Minimum effective section modulus: 1200 cm^3/wall m.

.2 Minimum sheet thickness: 8.5 mm.

.3 Sheet piling: section modulus of 1200 cm^3/m or equivalent as approved by Departmental Representative.

.1 Minimum thickness of any portion: 8.5 mm.

.2 Interlocks: to be such that section of interlock bar of 1 m minimum length will pass along full length of pile without binding.

.3 Mark each piece of sheet piling legibly by stencilling or die-and-stamping with information as follows:

.1 Heat number.

.2 Manufacturer's name.

.3 Length and section number. Do not precut lifting or slinging holes in sheet piles.

.4 Structural steel for wales, bearing plates, wales splices, capping channels, support angles and miscellaneous steel: to CSA G40.21, Grade 300 W.

.5 Tie rods, sleeve nuts and turnbuckles:

.1 Tie rods: to ASTM A615, Grade 413.

.2 Tie rods: to continuously threaded bar with double corrosion protection.

.3 Sleeve nuts, to have load capacity in excess of capacity of tie rod.

.4 Preassemble, mark and test tie rod assemblies in shop. Align threaded connection to following tolerances at sleeve nut or connector sleeve: 1/80 of normal rod diameter, deviation of centreline, 1 in 160.

.6 Nuts and bolts: hexagon nuts, bolts, and washers: to ASTM A307.

.7 Backfill material: to Section 31 23 33.01 - Excavating, Trenching and Backfilling.

2.2 SOURCE QUALITY CONTROL: HOT ROLLED SHEET STEEL PILING

.1 Provide results of tests of sheet piling material to be used on project as follows:

.1 One tension test and 1 bend test from each heat for quantities of finished material less than 50 tonnes.

.2 Two tension tests and 2 bend tests from each heat for quantities of finished material exceeding 50 tonnes.

.2 Tension tests in accordance with CSA G40.20/G40.21. Bend tests: to ASTM A6/A6M.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for steel sheet piles 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 INSTALLATION

.1 Do pile installation Work in accordance with Section 31 62 00 - Pile Installation, General except where otherwise specified.

.2 Do welding in accordance with CSA W59.

.3 Do not begin pile installation until required quality control tests have been completed and test results approved by Departmental Representative.

.4 Submit full details of method and sequence of installation of piling to Departmental Representative for approval prior to start of pile installation work. Details must include templates, bracing, setting and driving sequence and number of piles in panels for driving.

.5 When installation is complete, face of wall at top of sheet piles to be within 50 mm of location as indicated and deviation from vertical not to exceed 1 in 100.

.6 Steel sheet pile splicing is not permitted.

3.3 OBSTRUCTIONS

.1 If obstruction encountered during driving, leave obstructed pile and proceed to drive remaining piles. Return and attempt to complete driving of obstructed pile later.

.2 Advise Departmental Representative immediately if impossible to drive pile to full penetration, and obtain direction from Departmental Representative on further steps required to complete Work.

3.4 CUTTING

.1 When flame cutting tops of piles, and flame cutting holes in piles approved by Departmental Representative, use following procedure:

.1 When air temperature is above 0 degrees C, no pre-heat is necessary.

.2 When air temperature is below 0 degrees C, pre-heat until steel 25 mm on each side of line of cut has reached a temperature very warm to hand (approximately 35 degrees C). Temperature indicating crayon marks may be used to measure temperature.

.3 Use torch guiding device to ensure smooth round holes or straight edges.

.4 Make cut smooth and free from notches throughout thickness. If grinding is employed to remove notch or crack, finished radius to be minimum 5 mm.

3.5 INSPECTION

.1 Steel sheet pile structures may be inspected by divers employed by Departmental Representative after completion of pile driving to confirm that pile toes are properly seated and no significant gaps exist which could cause fill material to escape through pile wall. The contractor shall cooperate and assist in such an inspection.

3.6 BACKFILLING

.1 Backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling and as indicated.

.2 Protect piling tie rods and anchorage systems from damage or displacement during backfilling operations.

3.7 WORK ON VICINITY OF STRUCTURES

.1 Care must be taken when carrying out construction operations adjacent to existing dock walls and structures to avoid any damage or undercutting. Repair and make good any damage at no cost to Departmental Representative.

3.8 COOPERATION AND ASSISTANCE

.1 Furnish use of such boats, equipment, labour and materials as may be reasonably necessary to allow Departmental Representative to inspect, monitor and supervise work. Equip boats with approved life jackets, navigation lights and all other safety devices required.

.2 Cooperate with Departmental Representative on inspection and monitoring work, and provide assistance as requested.

3.9 MONITORING OF WORK

.1 Contractor is responsible to monitor effectiveness and productivity of his own work on an ongoing basis.

.2 Contractor to identify and demonstrate effectiveness of proposed monitoring methods prior to commencement of work.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 HSS Piles to be measured by unit, and shall include the price of fabrication, delivery, and installation. Piles will be driven to a depth of 3m below the bottom of the existing sheet piles, at various distances from the East of the edge of the existing steel channel/top of sheet pile. Offsets from edge of channel are shown in the contract drawings and range from 2.53m to 1.55m.

.2 Mobilization/Demobilization of equipment shall be included in the Lump Sum Arrangement.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.171M-98, Inorganic Zinc Coating.

.2 CAN/CGSB-1.184-98, Coal Tar-Epoxy Coating.

1.3 SUBMITTALS

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

.2 All manufactured HSS material properties must be submitted to Departmental Representative for approval.

.3 All Steel Sheet Pile materials must be submitted to Departmental Representative for approval.

Part 2 Products

2.1 MATERIALS

.1 Steel HSS piles: to CSA-G40.20/G40.21, Type: HSS 324, Grade: 350W.

.1 Size: 8.7 m long, 299 mm outer diameter, 12.7 mm min thickness

Part 3 Execution

3.1 INSTALLATION

.1 Install piling in accordance with Section 31 62 00

.2 Pile driving equipment shall be supported by and operated on a floating barge, which will be provided by the Contractor.

.3 Contractor to drive 8.7m long HSS 324 pile into lakebed at specified location until top of pile reaches a maximum elevation of 175.00m (+1.50m above datum). Contractor is then to connect a second HSS 324 pile to the top of the first as per OPSD 3001.150. Contractor

is then to drive the extended pile to the respective depth as noted in the Contract Drawings.

.4 Pile splices are permitted.

.5 Cut off piles squarely at required elevation.

3.2 RECORDS

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

.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 behavior 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 Ontario Provincial Standard Specifications (OPSS):

.1 OPSS 805 November 2010, Construction Specification for Temporary Erosion and Sediment Control Measures.

.2 Ontario Provincial Standard Drawings (OPSD):

.1 OPSD 219.260 November 2006, Turbidity Curtain.

.2 OPSD 219.261 November 2006, Turbidity Curtain, Seam Detail.

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 148.1, No. 2-M85, Methods of Testing Geotextiles and Geomembranes - Mass per Unit Area.

.2 CAN/CGSB 148.1, No. 3-M85, Methods of Testing Geotextiles and Geomembranes - Thickness of Geotextiles.

.3 CAN/CGSB 4.2, No. 11.2-M89(R2013), Textile Test Methods Bursting Strength - Ball Burst Test.

.4 American Society for Testing and Materials (ASTM):

.1 ASTM D4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

1.2 SUBMITTALS

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

1.3 MEASUREMENT PROCEDURES

.1 Supply and installation of turbidity curtain for environmental protection for all in-water work, maintenance of turbidity curtain during work, and removal of turbidity curtain after all in-water work is completed is paid for by unit.

1.4 DELIVERY, STORAGE AND HANDLING

.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 MATERIALS

.1 Geotextile: woven synthetic fibre fabric, supplied in rolls.

.1 Composed of: minimum 85% by mass of polypropylene polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.

.2 Physical properties:

.1 Thickness: to CAN/CGSB-148.1, No. 3, minimum 0.8 mm.

.2 Mass per unit area: to CAN/CGSB-148.1, No. 2, minimum 220 g/m^2.

.3 Tensile strength and elongation (in any principal direction): to ASTM D4595.

.1 Tensile strength: minimum 900 N, wet condition.

.2 Elongation at break: minimum maximum 25%.

.3 Seam strength: minimum 900 N equal to or greater than tensile strength of fabric.

.4 Mullen burst strength: to CAN/CGSB-4.2, No. 11.2, minimum 2400 N, equal to or greater than tensile strength of fabric.

.3 Seams: sewn in accordance with manufacturer's recommendations.

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

.5 Curtain height: to suit water depth and be bottom-weighted to maintain its vertical position.

Part 3 Execution

3.1 GENERAL

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

.2 Monitoring of water turbidity outside the turbidity curtain will be done by the Departmental Representative. Turbidity shall not exceed 25 mg/l total suspended solids.

3.2 INSTALLATION

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

.2 Design to conform to Ontario Provincial Standard Specification, OPSS 805 and Ontario Provincial Standard Drawings OPSD 219.260 and OPSD 219.261 as a minimum.

.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 Turbidity curtain, as prepared for installation, shall be of sufficient width to account for water depth and wave action.

.5 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 terminates at the existing structure face.

.7 Anchor locations shall be established as is necessary to maintain the turbidity curtain in place and functioning.

3.3 OPERATION AND MAINTENANCE

.1 Turbidity curtains shall be installed to prevent sediment 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 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 flotation collar shall be regularly monitored and freed of collected sediment.

.6 Monitor and maintain the turbidity 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 geotextile 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 MEASUREMENT AND PAYMENT

.1 Measure fenders by units supplied and incorporated into work. All channels, bolts, and work required to install fenders shall be included in their unit price.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

.2 ASTM D429-08, Standard Test Methods for Rubber Property - Adhesion to Rigid Substrates.

.3 ASTM D2240-05(2010), Standard Test Method for Rubber Property-Durometer Hardness.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 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 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.

Part 2 Products

2.1 MATERIALS

.1 Fender type: 203mm deep, 1.5m long ‘D’ shaped rubber fender

.1 Material: EPDM rubber, homogeneous and free from any defects, impurities and cracks.

.2 To be monolithic construction.

.3 To be in agreement with the material requirements presented in Table 1.

Table 1: Fender Material Properties

Property		Required Material Limits
Tensile Strength		1400 psi
Water Resistance, 70 hr @ 212° F (100° C)		
	Volume Change	± 5%
Polymer Type		100% EPDM

.2 Structural Steel for rolled section including channel: to CAN/CSA-G40.21, Grade 350W.

.3 Structural Steel for plates and miscellaneous steel: to CAN/CSA-G40.21, Grade 300W.

.4 Nuts and bolts: hexagon nuts, bolts and washers: to ASTM A325M.

.5 Welding materials: to CSA W48.

Part 3 Execution

3.1 INSTALLATION

.1 Install the fenders at each out-pan location between Station 0+130 and 0+170.

.2 13 total fenders to be installed.

.3 D shaped fender to be bolted to the channel section.

.4 Channel section to be welded to steel sheet pile out-pan.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 Safety ladders will be measured by the number of units installed, including all labour, materials and equipment to fabricate and install.

.2 Bollards will be measured by the number of units installed, including all labour, material and equipment to fabricate and install.

.3 New steel pipe curbs will be measured by the length of curb installed, including all labour, materials and equipment to fabricate and install.

1.2 REFERENCES

.1 Canadian Standards Association

.1 CSA G40.20/G40.21-04(R 2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.3 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.2 ASTM

.1 ASTM A307-12 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod, 60 000 PSI Tensile Strength.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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 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.

1.4 SUBMITTALS

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

Part 2 Products

2.1 MATERIALS

.1 Structural steel for rolled section: to CAN/CSA – G40. 21, Grade 350W.

.2 All metal surfaces and edges to be smoothed.

Part 3 General

3.1 FABRICATION

.1 Fabricate steel components as detailed on drawings and weld according to CSA W59.

.2 All flame cut edges shall be as smooth and regular as those produced by edge planing and shall be free of slag.

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

3.2 SAFETY LADDERS

.1 Fabricate as detailed on drawings, at Station 0-210, 0+012, 0+72, 0+132, 0+192, 0+252, 0+312.

.2 Field weld all ladders to the sheet pile and smooth connection.

3.3 BOLLARD

.1 Fabricate as detailed on drawings.

.2 Install bollard as specified and indicated on the drawings, at Station 180.

3.4 NEW STEEL PIPE CURB

.1 Fabricate as detailed on drawings.

3.5 METAL FOR FENDERS

.1 Fabricate as detailed on drawings.

3.6 PAINTING

.1 Preparation of new metals:

.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 paint after new surface has been cleaned.

.3 Apply paint in shop using spraying equipment in accordance with the paint manufacturer's recommendations.

.4 Apply one coat of primer 76.2 to 127.0 microns and two coats of paint 101.6 to 152.4 microns. Total dry film thickness 177.8 to 279.4 microns.

.5 After installation of miscellaneous steel touch up painted surfaces which have been damaged from installation by cleaning to bare metal and apply primer and top coats as specified. For welds at bollards and pipe rail supports, prepare surface touch up paint around perimeter of plates and brackets. Extend paint a minimum 25 mm beyond weld.

.6 Protect adjacent work and surfaces not to be painted and if damaged, clean and restore such surfaces as directed.

.7 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied. Allow complete drying of each coat prior to applying succeeding coats.

.8 Do not paint metal surfaces which will be embedded in concrete

END OF SECTION