

**SPECIFICATIONS FOR  
HARBOUR IMPROVEMENTS  
LITTLE GRINDSTONE POINT, MB**



Department of Fisheries & Oceans  
Small Craft Harbours Branch  
Winnipeg, Manitoba

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## 01 11 05 – GENERAL INSTRUCTIONS

### **Part 1      General**

#### **1.1      DESCRIPTION OF WORK**

- .1      The work site described in this specification as located at Little Grindstone, Manitoba. Little Grindstone is located on Lake Winnipeg approximately 174 kilometres north of Winnipeg. See Chart of Location on Drawing C-1.
- .2      The work under this contract covers:
  - .1      Demolition and removal of the existing wood and steel piles.
  - .2      Demolition and removal of existing pipe sliders
  - .3      The supply and installation of new steel piles.
  - .4      The supply and installation of new steel pipe sliders.
  - .5      The supply and installation of treated timber crib wharf.
  - .6      The supply and installation of float wharves and aluminum gangways, including supply of required hardware.
  - .7      The re-installation of existing float wharves, gangway and conveyor.
  - .8      Supply and installation of amour stone barrier as indicated on drawings.
  - .9      Demolition and removal of existing precast concrete launch ramp pads
  - .10     Supply and installation of new precast concrete launch ramp pads
- .3      The work to be done by the Contractor under this Contract shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, insurance, and all things necessary for and incidental to the satisfactory performance and completion of all work as specified herein. All work to be done in accordance with details shown on the accompanying plans and as specified herein.

#### **1.2      DEFINITIONS**

- .1      The word "provide" means "supply and install".
- .2      For purposes of this contract, "Departmental Representative", "Architect/Engineer" and "Engineer" shall have the same meaning.

#### **1.3      WORK SCHEDULE**

- .1      Provide within 10 working days after Contract award, schedule showing anticipated progress stages and final completion of work within time period required by contract documents.
- .2      Interim reviews of work progress based on work schedule will be conducted as decided by Engineer and schedule updated by Contractor in conjunction with and to approval of Engineer.
- .3      Work under this contract is to be performed in a timely manner. Commence planning and preparatory work immediately upon receipt of official notification of acceptance of Contract and schedule the work so that all work will be completed by **March 14, 2014** with the exception of the installation of the new concrete launch ramp pads which shall be completed by **May 1<sup>st</sup>, 2014**.
- .4      Work sequence:

- .1 Before work is undertaken, ensure that all materials and trades required are available to finish work in as short a period as possible.
- .2 No area to be renovated shall be placed out of service until it is confirmed that there shall be no need to stop the work waiting for receipt of materials, equipment or labour.

#### **1.4 CERTIFICATES AND TRANSCRIPTS**

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

#### **1.5 FEES, PERMITS AND CERTIFICATES**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and work permits required.
- .3 Furnish certificates and permits when requested.

#### **1.6 MEASUREMENT FOR PAYMENT**

- .1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.
- .2 Submit to Engineer, at least 14 days before Information for first application for payment, cost breakdown, Progress Payment in detail as directed by Engineer, for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment. After approval by Engineer, cost breakdown will be used as basis for progress payments.

#### **1.7 INTERPRETATION OF DOCUMENTS**

- .1 In the event of discrepancies or conflicts in interpreting the Plans (drawings) and Specifications, Specifications take precedence over drawings bound with specifications.
- .2 Drawings and specifications are complementary. When work is shown or mentioned on the drawings but is not indicated in the specifications, or when work is indicated in the specifications but is not shown or mentioned on the drawings, it shall nevertheless be included in the Contract.
- .3 The sub-division of the Specification into sections, identified by title and number, is for convenience only and does not modify the singularity of the document, nor does it operate to make or imply that the Engineer is an arbiter to establish the limits or extent of contract between Contractor and Subcontractors or to determine the limits or extents of work that may be decided by trade unions or contractors' organizations. Extras to the Contract will not be considered on the grounds of differences in interpretation of the Specification and/or Drawings as to which trade performs the work.

#### **1.8 CONTRACTOR'S USE OF SITE**

- .1 Co-ordinate use of premises under direction of the Engineer.
- .2 Do not unreasonably encumber the site with materials and equipment.
- .3 Assume full responsibility for protection and safekeeping of products under this Contract.

- .4 Move stored products or equipment which interfere with operations of Engineer or other harbour users.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Engineer.
- .8 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

### **1.9 EXISTING SERVICES**

- .1 Notify Engineer and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Engineer 72 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Engineer of findings.
- .4 Submit schedule to and obtain approval from Engineer for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Where unknown services are encountered, immediately advise Engineer and confirm findings in writing.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.

### **1.10 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 Change Orders.
  - .6 Other Modifications to Contract.
  - .7 Copy of Approved Work Schedule.
  - .8 Health and Safety Plan and Other Safety Related Documents.
  - .9 Other documents as specified.

**1.11 CODES AND STANDARDS**

- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Work to meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

**1.12 PROJECT MEETINGS**

- .1 Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

**1.13 SETTING OUT OF WORK**

- .1 Engineer will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give engineer reasonable notice of requirements for such control points and stakes.
- .2 Set grades and lay out work in detail from control points and grades established by Engineer.
- .3 Provide devices needed to lay out and construct work.
- .4 Supply such devices needed to lay out and construct work.
- .5 Supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.
- .6 Supply stakes and other survey markers required for laying out work.

**1.14 ADDITIONAL DRAWINGS**

- .1 Engineer may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.
- .2 When additional drawings and instructions are required by the Contractor, provide reasonable notice in writing to the Engineer in advance of the date they are required.

**1.15 EXAMINATION**

- .1 Before submitting tender, examine existing conditions and determine conditions affecting work.
- .2 Obtain all information which may be necessary for proper execution of Contract.

**1.16 SITE INSPECTION**

- .1 The submission of a tender is deemed to be a confirmation of the fact that the Tenderer has inspected the site and is fully conversant with all the conditions under which the work is to be carried out.

**1.17 MATERIAL AND EQUIPMENT**

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

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

**1.18 SECURING WORK AREA**

- .1 Secure the work areas in each stage in an approved manner. This includes fencing or barricades to prevent public access to any areas where construction activities occur and construction materials are stored.

**1.19 DRAWINGS**

- .1 The following drawings are to be read in conjunction with this specification:
  - .1 C-1 Plan View & Demolition Details
  - .2 C-2 Float Connection & Pile Installation Details
  - .3 C-3 Timber Crib & Grading Details
  - .4 C-4 Launch Ramp Construction Details
  - .5 C-5 Float Wharf Construction Details
  - .6 C-6 Gangway Fabrication & Float Wharf Layout Details

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **01 35 29 – HEALTH AND SAFETY REQUIREMENTS**

### **Part 1 General**

#### **1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Manitoba
  - .1 The Workers Compensation Act RSM 1987 - Updated 2006.

#### **1.2 SUBMITTALS**

- .1 Submit site-specific Health and Safety Plan: Within 10 days after date of Notice to Proceed and prior to commencement of Work.
- .2 Submit copies of incident and accident reports to Engineer.
- .3 Engineer will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor after receipt of plan. Revise plan as appropriate and resubmit plan to Engineer within 5 days after receipt of comments from Engineer.
- .4 Engineer'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.

#### **1.3 SAFETY ASSESSMENT**

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

#### **1.4 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Observe and enforce construction safety measures required by Canadian Construction Safety Code, Provincial Government, Worker's Compensation Board and municipal statutes and authorities.
- .3 In the event of a conflict between any provisions of above authorities having the most stringent provision will apply.

#### **1.5 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**1.6 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 verbally and in writing.

**1.7 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **01 35 43 – ENVIRONMENTAL PROCEDURES**

### **Part 1      General**

#### **1.1      MEASUREMENT FOR PAYMENT**

- .1      No separate measurement will be for work of this section. Work is incidental to the project cost.

#### **1.2      FIRES**

- .1      Fires and burning of rubbish on site 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      WORK ADJACENT TO WATERWAYS**

- .1      No in-water work or shoreline work is permitted between April 1 and June 15 with the exception of the installation of the new concrete launch ramp pads.
- .2      Construction equipment may not enter the lake unless the lake is frozen. If construction equipment will be located on the frozen surface of the lake, it will be removed from the lake each night if the on-ice component of the projects spans more than one day.
- .3      Construction equipment will enter and leave the lake at such a location and in such a manner that disturbance to the lakeshore.
- .4      Every effort will be made to minimize the introduction of sediment to the lake during on ice work activities. Any sediment tracked onto the ice during the project must be cleaned off at the end of the project. This includes any ice that needs to be removed from the shoreline to accommodate stabilization works. All material used for shoreline stabilization will be clean and free of silt and clay.
- .5      Do not use waterway beds for borrow material.
- .6      Waterways to be free of excavated fill, waste material and debris.
- .7      Design and construct temporary crossings to minimize erosion to waterways.
- .8      Do not skid logs or construction materials across waterways.
- .9      Avoid damage to shoreline.
- .10      Supply, install, and maintain approved erosion control blankets to unprotected slopes until revegetation is established.
- .11      Any impacts below ordinary high water mark that are not shown on the site plan are not permitted without written approval from the Engineer. Up to 30 days may be required for approval.
- .12      Protect shoreline with a build-up of snow.

- .13 Reclaim and restore disturbed areas to previous or better condition.

## **1.5 POLLUTION CONTROL**

- .1 Construction activities should occur when water levels are stable, or are rising slightly due to wind set up from the lake. Construction should stop if water levels are dropping and turbid water from construction is being drawn from the worksite into the main water body.
- .2 Construction shall be monitored to ensure that the mitigation measures are effective at containing the sediment to the launch ramp construction area. Adjustments may have to be made to get the containment to function better.
- .3 Control emissions from equipment and plant to local authorities' emission requirements.
- .4 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .6 Locate temporary fuel storage 100 metres from shore and comply with Provincial Environmental Legislation.
- .7 Refueling, servicing, or cleaning of equipment on ice or within 100 metres of shore is prohibited. Contractor to ensure all equipment operating on project is free of external fluid leaks, grease, oil, and mud.
- .8 Contractor to contain all oil leaks from equipment working adjacent to waterways.
- .9 No maintenance of vehicles or equipment in construction areas.
- .10 Use drip pans to catch leaking oil from compressors, pumps, etc.
- .11 Keep an emergency spill kit for in-water use on site during construction.

## **1.6 DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways. Hazardous wastes including fuels, oils and lubricants to be disposed of by a licensed hazardous waste carrier/handler in accordance with Provincial Environment Legislation.
- .3 Collect all rubbish and waste material and dispose of in accordance with applicable governing authorities.
- .4 Do not allow debris of any type to enter waterway.

## **1.7 PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties.
- .2 Avoid disturbance of topsoil and vegetation unless otherwise specified. Contractor is responsible to restore all impacted areas to original state.

## **1.8 VERTICAL SILT CURTAIN**

- .1 Contractor to isolate the work area from the lake with an approved silt curtain to prevent the drift of sediment from the work area into the lake as required. The silt curtain

must extend from the top of the ice/water to within 300mm of the lake bottom. The silt curtain must be left in place until all suspended sediments are settled out. On completion of the project carefully remove silt curtain to ensure settled sediment is not disturbed. An acceptable product is "Tough Guy" Type 1E Turbidity Barrier or approved equivalent. Costs for supply, installation, maintenance, and removal to be considered incidental to the project cost.

**Part 2            Products**

**2.1                NOT USED**

.1                Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

## **01 45 00 – QUALITY CONTROL**

### **Part 1 General**

#### **1.1 INSPECTION**

- .1 Allow Engineer access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Engineer.
- .3 Engineer will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

#### **1.2 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies may be engaged by Engineer for purpose of inspecting and/or testing portions of Work.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Engineer at no cost to. Pay costs for retesting and reinspection.

#### **1.3 ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

#### **1.4 PROCEDURES**

- .1 Notify Engineer in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

#### **1.5 REJECTED WORK**

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

- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Engineer.

**1.6 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.

**1.7 MILL TESTS**

- .1 Submit mill test certificates as requested.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **01 77 00 – CLOSEOUT PROCEDURES**

### **Part 1        General**

#### **1.1        ADMINISTRATIVE REQUIREMENTS**

- .1        Acceptance of Work Procedures:
  - .1        Contractor's Inspection: Contractor to conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .2        Final Inspection:
    - .1        When completion tasks are done, request final inspection of Work by Engineer.
    - .2        When Work incomplete according to Engineer, complete outstanding items and request re-inspection.
  - .3        Final Payment:
    - .1        When Engineer considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .4        Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

#### **1.2        FINAL CLEANING**

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

#### **1.3        RECORD DRAWINGS**

- .1        Maintain project “as-built” record drawings and record accurately significant deviations from Contract documents caused by site conditions and changes ordered by Engineer.
- .2        Mark “as-built” changes in red coloured ink.
- .3        Record the following information:
  - .1        Field changes of dimension and detail.
  - .2        Changes made by Change Order or Field Order.
- .4        At completion of project and prior to final inspection, neatly transfer “as-built” notations to second set and submit both sets to Engineer.

### **Part 2        Products**

#### **2.1        NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

## **02 41 13 – SELECTIVE SITE DEMOLITION**

### **Part 1 General**

#### **1.1 MEASUREMENT FOR PAYMENT**

- .1 Demolition and removal of timber piles will be paid for per unit removed.
- .2 Demolition and removal of steel piles will be paid for per unit removed.
- .3 Demolition and removal of concrete launch ramp pads will be paid for per unit removed.
- .4 Demolition and removal of steel pipe sliders will be paid for per unit removed.
- .5 Demolition and removal of concrete gangway base shall be considered incidental to item 1.1.3 above.

#### **1.2 DELIVERY, STORAGE AND HANDLING**

- .1 Storage and Protection.
  - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Engineer and at no cost to Engineer.
  - .2 Remove and store materials to be salvaged, in manner to prevent damage.
  - .3 Store and protect in accordance with requirements for maximum preservation of material.
  - .4 Handle salvaged materials as new materials.

#### **1.3 SITE CONDITIONS**

- .1 Site Environmental Requirements:
  - .1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
  - .2 Ensure proper disposal procedures are maintained throughout the project.

### **Part 2 Products**

#### **2.1 NOT USED**

- .1 Not Used.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 Inspect site and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

### **3.2 REMOVAL OPERATIONS**

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Demolition and excavation for cribs adjacent to the existing fish plant is to be undertaken in a manner that prevents movement that could cause damage to the adjacent fish plant.

### **3.3 REMOVAL FROM SITE**

- .1 Dispose of materials not designated for salvage or re-use in work, off-site at location acceptable to Engineer.

### **3.4 RESTORATION**

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

**END OF SECTION**

**03 04 15 – PRECAST CONCRETE LAUNCH RAMP PADS**

**Part 1           General**

**1.1               MEASUREMENT FOR PAYMENT**

- .1       Precast concrete launch ramp pads will be measured for payment as per unit supplied.
- .2       Installation of precast launch ramp pads will be measured per unit.

**1.2               DELIVERY AND STORAGE**

- .1       Transport launch ramp pads with points of support and direction of reactions approximately same as when they will be in final position in work.
- .2       Handle, store and protect launch ramp pads in order to avoid damage to concrete.
- .3       Identify lifting points by inserting hooks during manufacture. Remove and replace damaged new launch ramp pads from site at no extra cost.

**Part 2           Products**

**2.1               MATERIALS**

- .1       Portland cement: to CAN3-A5-M77, normal, type 10.
- .2       Water to CAN3-A23.1-M77.
- .3       Admixtures:
  - .1       Air entraining admixtures: to CAN3-A266.1-M78.
  - .2       Chemical admixtures: to CAN3-A266.2-M78.
- .4       Curing compounds: to CGSB 90-GP-1a, Type 1, clear of translucent ASTM C309-74 Type 1, Type 1-D with fugitive dye.
- .5       Reinforcing Steel: all reinforcing steel to G30.120M1977 Grade 300.

**2.2               CONCRETE MIXES**

- .1       Proportion concrete to comply with CAN3-A23.1-09 to meet following requirements:
  - .1       Concrete in precast slabs:
    - .1       Compressive strength at 28 days: 30 MPa.
    - .2       Do not use calcium chloride or compounds containing calcium chloride.

**Part 3           Execution**

**3.1               CASTING**

- .1       Traction surfaces of slabs to be serrated dandelion rake finish with approximately 10mm ribs.

### **3.2 ALLOWABLE TOLERANCES**

- .1 Long dimensions of launch ramp pads not to vary from design length by more than +/- 25mm.
- .2 Cross sectional dimensions of launch ramp pads not to vary from design lengths by more than +/- 25mm.
- .3 Deviations from straight lines in long sections not to exceed 10mm in 3m throughout length.

### **3.3 INSTALLATION**

- .1 Place pads in boat launch ramp to details shown on plan.
- .2 Pads not to be forced into position or to be subjected to stresses or overloads which could cause damage.
- .3 Replace launch ramp pads damaged during installation to satisfaction of Engineer at no additional cost.
- .4 Extend granular base beyond sides of launch ramp as indicated on drawing.
- .5 Remove excavated material and any broken launch ramp pads from site.
- .6 Launch ramp pads to be spaced 50mm apart with galvanized pipe spacers.
- .7 After placing slabs on boat launch ramp fill spaces between slabs with surfacing gravel.
- .8 Launch ramp pads to be joined by a continuous 12mm dia. galvanized steel cable fastened at the upper end of the launch ramp with three (3) galvanized cable clamps.

**END OF SECTION**

**05 14 12 – ALUMINUM GANGWAY FABRICATION**

**Part 1 General**

**1.1 MEASUREMENT FOR PAYMENT**

- .1 Supply and installation of new aluminum gangways and any required fasteners will be paid for per unit supplied and installed.
- .2 Re-installation of existing aluminum ramps will be paid for per unit installed.

**1.2 REFERENCES**

- .1 Aluminum Association (AA)
  - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
  - .1 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM A325-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - .3 ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength.
  - .4 ASTM A490-09, Standard Specification for Structural Bolts Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  - .5 ASTM A490M-09a, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3 for Structural Steel Joints.
  - .6 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - .7 ASTM B210M-05, Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
  - .8 ASTM B211M-03, Standard Specification for Aluminum and Aluminum Alloy Bar, Rod and Wire.
  - .9 ASTM F593-02(2008), Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .3 CSA International
  - .1 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .2 CAN/CSA-S157/S157.1-05, Strength Design in Aluminum/Commentary on CAN/CSA-S157, Strength Design in Aluminum.
  - .3 CSA W47.2-M1987(R2008), Certification of Companies for Fusion Welding of Aluminum.
  - .4 CSA W59.2-M1991(R2008), Welded Aluminum Construction.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 Master Painters Institute (MPI)

- .1 MPI - EXT 5.5D, Bituminous Finish.

### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural aluminum and include product characteristics, performance criteria, physical size, finish and limitations.

### **1.4 QUALITY ASSURANCE**

- .1 Submit 1 copy of mill test reports showing chemical and physical properties and other details of aluminum to be incorporated into work, at least 4 weeks prior to fabrication of structural aluminum. Mill test reports to be certified by metallurgists qualified to practice in Province of Manitoba, Canada.
- .2 Fabricator of structural aluminum to provide an affidavit stating that materials and products used in fabrication conform to applicable material and products standards called for by design drawings and specifications.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect structural aluminum from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Aluminum bar, rod, wire: to ASTM B211M.
- .2 Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Shapes, and Tubes: to ASTM B221M.
- .3 Aluminum sheet or plate: to ASTM B209M.
- .4 Aluminum drawn tubes: to ASTM B210M.
- .5 Aluminum bolts and rivets: to ASTM B316M.
- .6 Aluminum welding wire: to AWS - A5.10/A5.10M.
- .7 Stainless steel bolts: to ASTM F593.
- .8 Steel bolts: to ASTM A307.
- .9 Bituminous paint: MPI - EXT 5.5D, without thinner.
- .10 Galvanizing: hot dip galvanize steel bolts to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.

**2.2 FABRICATION**

- .1 Fabricate to CAN/CSA-S157 and in accordance with approved shop drawings.

**2.3 FINISHES**

- .1 Finish: plain mill as indicated on drawings.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Do structural aluminum work: to CAN/CSA-S157.
- .2 Do welding: to CSA W59.2.

**3.2 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative for direction before starting fabrication.

**3.3 ERECTION**

- .1 Erect structural aluminum as indicated and to CAN/CSA-S157 and approved erection drawings.
- .2 No field cutting or altering structural members.

**3.4 JOINT SEALING AND PAINTING**

- .1 Surface preparation of aluminum in contact with or embedded in dissimilar materials: to CAN/CSA-S157. Treat locations as if there is moisture present.
- .2 Paint to CAN/CSA-S157.

**3.5 PROTECTION**

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

**END OF SECTION**

## **05 55 00 – METAL FABRICATIONS**

### **Part 1 General**

#### **1.1 MEASUREMENT FOR PAYMENT**

- .1 Supply and installation of the steel lugs, backing plates, chain, shackles and any required fasteners shall be considered incidental to the cost to install the float wharves.
- .2 Supply and installation of steel pipe sliders, backing plates and any required fasteners will be paid for per unit supplied and per unit installed.

#### **1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
  - .4 CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .5 CSA W59-1989(R2001), Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .4 The Environmental Choice Program
  - .1 CCD-047a-98, Paints, Surface Coatings.
  - .2 CCD-048-98, Surface Coatings - Recycled Water-borne.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 350W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, painted finish.
- .3 Welding materials: to CSA W59.

- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

## **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

## **2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating  $600 \text{ g/m}^2$  to CAN/CSA-G164.
- .2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
- .3 Shop coat primer: to CAN/CGSB-1.40.
- .4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

## **2.4 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.
  - .3 Wood.

## **2.5 SHOP PAINTING**

- .1 Apply one shop coat of primer to metal items unless stated otherwise on drawings, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

## **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 Provide suitable means of anchorage acceptable to Engineer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.

- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

### **3.2 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

## **06 05 73 – WOOD TREATMENT**

### **Part 1 General**

#### **1.1 REFERENCES**

- .1 American Wood-Preservers' Association (AWPA)
  - .1 AWPA M2-01, Standard for Inspection of Treated Wood Products.
  - .2 AWPA M4-06, Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA O80 Series-97(R2002) - O80S2-05, Wood Preservation.
  - .2 CSA O80.20-1.1-M97(R2002), This Standard applies to the fire-retardant treatment of lumber by pressure processes..
  - .3 CSA O80.27-1.1-M97(R2002), This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes.
  - .4 CSA O80.201-M89, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.
  - .5 CSA O322-02, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Preservative treatment by a pressure process to CSA O80 Series.

### **Part 3 Execution**

#### **3.1 APPLICATION: PRESERVATIVE**

- .1 Treat timber to CSA O80 Series preservative to obtain minimum net retention of 6.4 kg/m<sup>3</sup> of wood.

#### **3.2 CARE OF PRESSURE-TREATED WOOD PRODUCTS**

- .1 Apply the recommended and accepted practices followed in the care and handling of all wood products to pressure-treated wood products.
- .2 Avoid damage of field fabrication causing alteration of the original pressure-treated surface.
- .3 Thoroughly saturate all cuts or injuries occurring subsequent to pressure treatment by liberal brushing, spraying, dipping, soaking or coating with preservative solution.
- .4 Fill holes necessarily bored after pressure treatment with preservative solution to allow ample soaking time for penetration of solution.

- .5 Use in any of the above the same preservative solution as that used in the original pressure treatment or a field treating solution of colour to match original treatment.

**END OF SECTION**

**31 23 33 – EXCAVATING, TRENCHING AND BACKFILLING**

**Part 1 General**

**1.1 MEASUREMENT PROCEDURES**

- .1 Excavation for installation of timber cribs to be considered incidental to supply and installation of square sawn timber.
- .2 Granular surface 20mm minus required for precast launch ramp pad installation will be paid for per cubic metre supplied and installed.
- .3 Granular fill 100mm minus required for precast launch ramp pad installation will be paid for per cubic metre supplied and installed.
- .4 Grading of slope will be considered incidental to supply and installation of square sawn timber.
- .5 Supply and installation of Amour Stone barrier will be paid for per unit supplied and installed and remaining in the work.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Armour stone:
  - .1 Greatest dimension of each stone not to exceed two times least dimension.
  - .2 Stone sizes to be 1000mm minimum. Armour stone to be fractured and angular. Field stone not acceptable.
- .2 Granular fill material: in accordance with following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
  - .4 The gradation and physical requirements to be as follows:

Sieve Designation	% Passing
100 mm	100
75 mm	95-100
50 mm	85-100
19 mm	75-100
16 mm	57-83
9.5 mm	37-61
5 mm	12-32
1.2 mm	8-23
0.4 mm	5-10
0.08 mm	5-8

- .3 Granular surfacing material: A-base 20mm minus
  - .1 Crushed, pit run or screened stone, gravel or sand.

- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .3 The gradation and physical requirements to be as follows:

Sieve Designation	% Passing
20 mm	100
10 mm	35-85
5 mm	15-65
0.08 mm	0-12

### **Part 3 Execution**

#### **3.1 EXCAVATION**

- .1 Excavate to lines, grades, elevations and dimensions as directed by Engineer.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 Keep excavated and stockpiled materials safe distance away from edge of excavation as directed by Engineer.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Notify Engineer when bottom of excavation is reached.
- .11 Obtain Engineer approval of completed excavation.

#### **3.2 BACKFILLING**

- .1 Do not commence backfilling until areas of work have been inspected and approved by Engineer.
- .2 Ensure no frozen material is placed.
- .3 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Place granular materials using methods which do not lead to segregation or degradation.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Engineer may authorize thicker lifts (layers) if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace portion of layer in which material has become segregated during spreading.

#### **3.3 COMPACTION**

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 98% corrected maximum dry density.

- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Engineer.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.4 SITE TOLERANCES**

- .1 Finished granular surface to be within 10 mm of elevation as indicated but not uniformly high or low.

**3.5 PROTECTION**

- .1 Maintain finished granular surface in condition conforming to this section until granular surfacing is accepted by Engineer.

**END OF SECTION**

## **31 53 13 – TIMBER CRIBWORK**

### **Part 1 General**

#### **1.1 MEASUREMENT PROCEDURES**

- .1 Treated timber decking will be paid for by the square metre of decking supplied, installed and remaining in the work for the construction of the timber cribs. This item includes all fastenings.
- .2 Treated square sawn timber to be measured in cubic metres of timber supplied, installed and remaining in the work, including all fastenings. This item to include curb, stringers, fenders, posts and all cribwork timbers required for the construction of the timber cribs.
- .3 Ballast rock will be paid for by the cubic metre supplied, installed and remaining in the work.
- .4 Stone mattress will be paid for by the cubic metre supplied, installed and remaining in the work.
- .5 The supply and installation of 20mm minus granular surfacing required for backfilling behind crib wharf to be considered incidental to supply and installation of square sawn timber.
- .6 The supply and installation of 100mm minus granular fill required for backfilling behind crib wharf to be considered incidental to supply and installation of square sawn timber.
- .7 Cubic measure of timber to be determined by product of actual cross-sections and length dimensions in place. The cross-section dimensions will be obtained from Table N-9 in "Metric Handbook for Canadian Softwood Lumber".

#### **1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A307-04, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA-O80 Series-97(R2002), Wood Preservation.
- .3 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2003 edition.

#### **1.3 QUALITY ASSURANCE**

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.
- .2 Worker protection:
  - .1 Workers must wear gloves, eye protection and protective clothing when handling, drilling, sawing or cutting preservative treated wood and applying preservative materials.

- .2 Workers must not eat, drink or smoke while applying preservative material.
- .3 Clean up spills of preservative materials immediately with absorbent material. Safely discard of absorbent material to approved landfill.

#### **1.4 WASTE MANAGEMENT**

- .1 Do not dispose of preservative treated wood through incineration.
- .2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .3 Dispose of treated wood, end pieces, wood scraps and sawdust at an approved landfill.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Timber: use timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Accreditation Board of CSA.
  - .1 Species: Group A (Douglas Fir).
  - .2 Grade: Structural, No 2 or better.
  - .3 Grading authority: BCLMA
  - .4 All timber to be rough sawn.
  - .5 All decking to be square sawn sized lumber.
  - .6 All specified treated timber and planks to be pressure treated with CCA preservative, incision method, to 6.4 kg/cubic metre (0.40 lb/cubic foot) retention or refusal. Treatment to conform to the latest edition of CSA specification 080.
  - .7 All end cuts, abrasions and bolt holes to be well soaked with two coats of CCA preservative acceptable to Engineer.
  - .8 Machine bolts used are to be of sufficient length to accept two washers and one fully threaded hexagonal headed nut.
  - .9 Drift bolts to have countersunk, tapered head and chisel point as manufactured by Dominion Bridge or equivalent.
  - .10 Bore holes for drift bolts 1.5 mm smaller diameter than bolt and 52 mm short of length of bolt. Bore holes for machine bolts to same diameter as bolt.
  - .11 All end cuts to be placed above high water line where possible.
- .2 Miscellaneous steel:
  - .1 Hot dip galvanized: to CAN/CSA-G164.
  - .2 Wire nails, spikes, staples: to CSA-B111.
  - .3 Bolts, nuts, washers: to ASTM A307.
  - .4 Steel straps and plates: to CAN/CSA-G40.21, Grade 300.
- .3 Ballast for filling cribs to following requirements:
  - .1 Stone, consisting of hard durable particles free from clay lumps, organic material and other deleterious materials. Ballast stone supplied to be well graded with maximum size not exceeding 250 mm and minimum size to be not less than 200 mm.

- .4 Crushed stone mattress: Stone, consisting of hard durable particles free from clay lumps, organic material and other deleterious materials with size to be 100 mm minus.
- .5 Granular fill: 100mm minus granular fill.
- .6 Granular Base:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested.
  - .3 Table:

Sieve Designation	% Passing
75 mm	-
50 mm	-
37.5 mm	-
25 mm	100
19 mm	75-100
12.5 mm	-
9.5 mm	50-100
4.75 mm	30-70
2.00 mm	20-45
0.425 mm	10-25
0.180 mm	-
0.075 mm	3-8

- .7 Granular Surfacing:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 Gradations to be within limits specified when tested.
  - .3 Table:

Sieve Designation	% Passing
75 mm	-
50 mm	-
37.5 mm	-
25 mm	100
19 mm	85-100
12.5 mm	-
9.5 mm	
4.75 mm	35-60
2.00 mm	20-45
0.425 mm	10-25
0.180 mm	-
0.075 mm	0-17

- .8 Max. Los Angeles Abrasion Loss: 45 %

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Excavate area of crib base and place and level crushed rock mattress as indicated.
- .2 Before construction, stockpile sufficient ballast to completely fill cribs.
- .3 Take closely spaced accurate soundings, precisely located by template, to determine actual configuration of base area of crib.
  - .1 Construct crib bottom to match base configuration.

### **3.2 DECKING AND CURB**

- .1 Decking will be 76 mm square sawn sized lumber laid heart side down. Planks will be spaced 6 mm apart and secured with two 200 mm galvanized spiral spikes per timber contact. Plank widths to be not less than 240 mm and not more than 310 mm wide. Deck planks to cross width of wharf in one length.
- .2 Planks to be cut flush with outer faces of work.
- .3 All planks to be pre-drilled for the spikes to prevent splitting.
- .4 In cases where the thickness of deck planks vary due to shrinkage or swelling, planks are to be sorted and installed so that changes in elevations are kept to a minimum. Chamfer edges of plank where changes cannot be avoided.
- .5 Place curb on risers and secure with countersunk 20 mm diameter machine bolts as shown on the plan.
- .6 Riser blocks are to be secured to the deck with two 200 mm galvanized spiral spikes.

### **3.3 CRIB CONSTRUCTION**

- .1 All longitudinal and cross timbers shall be of sufficient length to span crib in one length or as noted on drawing. Longitudinals and cross timbers to be drifted to each other at each contact point with 20 mm x 355 drift bolts. Each longitudinal and cross timber to be fastened to vertical binder post with 20 mm machine bolt complete with nut and 2 washers. All machine bolts used to be of sufficient length to accept 2 washers and have room for fully threading a hexagonal nut. All machine bolts to be countersunk on exterior faces.
- .2 Place ballast floor on pockets on bottom or second course from bottom timbers. Secure each ballast floor timber to bottom timbers with 20 mm x 305 drift bolts.
- .3 Vertical binder posts to be in one length from bottom of cribwork to top of cribwork.
- .4 Stringers to be installed in lengths as shown on drawings. Stringers to be fastened to crib timbers with 20 mm x 406 drift bolts at each contact.
- .5 Maximum spacing between cross timbers and longitudinal not to exceed 215mm.
- .6 Bore holes for drift bolts 1.5 mm smaller diameter than bolt 52 mm short of length of bolt. Bore holes for machine bolts to same diameter as bolts.

### **3.4 HANDLING TREATED TIMBER**

- .1 Handle treated material without damaging original treatment.

- .1 Replace treated timber with major damage to original treatment, as instructed by Engineer.
- .2 Field treatment: apply and saturate cuts, minor surface damage, abrasions, and nail and spike holes with preservative to CAN/CSA-O80 Series.

### **3.5 BALLAST**

- .1 Place ballast to avoid damage to timber cribwork.
- .2 Place ballast so that differential height of fill between adjacent cells, at any time, will be less than 1 m.
- .3 Cribs to be fully ballasted from ballast floor to bottom of stringers.

### **3.6 TOLERANCES**

- .1 1 in 300 in overall dimensions.

### **3.7 CLEANING**

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

## **31 61 13 – PILE FOUNDATIONS, GENERAL REQUIREMENTS**

### **Part 1      General**

#### **1.1            MEASUREMENT FOR PAYMENT**

- .1      Supply of 200 mm diameter, schedule 40 steel pipe piles will be measured in lineal metres delivered to site. Length of steel piles to be as shown on plan.
- .2      Installation of 200mm diameter, schedule 40 steel pipe piles to be measured in lineal metres of pile installed and incorporated into the work. This item includes installing top plates, bottom plates and bottom tips for piles as well as the sand fill. Cost to prepare ice to support pile driving equipment shall be included in this item.

#### **1.2            DELIVERY, STORAGE AND HANDLING**

- .1      Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.
- .2      Replace damaged piles as directed by Engineer.

#### **1.3            EXISTING CONDITIONS**

- .1      Notify Engineer in writing if subsurface conditions at site differ from those indicated and await further instructions from Engineer.

#### **1.4            SCHEDULING**

- .1      Drive piles in what is considered to be the most economical sequence.
- .2      Provide schedule of planned sequence of driving to Engineer for review, not less than two weeks prior to commencement of pile driving.

#### **1.5            PROTECTION**

- .1      Protect public and construction personnel, adjacent structures and work of other sections from hazards attributable to pile driving operations.

### **Part 2      Products**

#### **2.1            MATERIALS**

- .1      Supply full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.
- .2      Pile lengths indicated on plans are based on lengths estimated to remain in completed structure.
- .3      Do not splice piles without written permission of Engineer.

#### **2.2            EQUIPMENT**

- .1      Equipment information: prior to commencement of pile installation operation, submit to Engineer for approval, 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 pars 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 Hammer:
  - .1 Hammers to be selected on basis of driveability analysis using wave equation theory, performed to show that piles can be driven to levels indicated.
  - .2 Driveability analysis to include, but not be limited to, following: hammer, cushion, and cap block details; static soil parameters; quake and damping factors, total soil resistance, blow count, pile stresses and energy throughput at representative penetrations.
  - .3 When required criteria can not be achieved with the proposed hammer, use larger hammer and take other measures as required.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 Protection:
  - .1 Piles to be driven from ice surface, existing structures may not be used as a platform and contractor to prepare ice to support pile driving equipment.
  - .2 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
  - .3 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
  - .4 When damages occur, remedy damaged items to restore to original or better condition at own expense.
- .2 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 INSTALLATION**

- .1 Leads: construct pile driver leads to provide free movement of hammer.
  - .1 Hold leads in position at top and bottom, with guys, stiff braces, or other means reviewed by Engineer to ensure support to pile while being driven.
  - .2 Length: except for piles driven through water, provide sufficient length of leads to ensure that use of follower is unnecessary.
- .2 Followers:
  - .1 Provide followers of such size, shape, length and mass to permit driving pile in desired location to required depth and resistance.

#### **3.3 APPLICATION / DRIVING**

- .1 Hold piles securely and accurately in position while driving.
- .2 Deliver hammer blows along axis of pile.

- .3 Cut-off piles neatly and squarely at elevations indicated. Provide sufficient length above cut-off elevation so that part damaged during driving is cut-off.
- .4 Remove cut-off lengths from site on completion of work.

### **3.4 OBSTRUCTIONS**

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

### **3.5 REPAIR AND RESTORATION**

- .1 Remove rejected pile and replace with new, and if necessary, longer pile.
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.
- .3 Engineer will reject any pile that is driving out of position, is driven below cut-off elevation, or is damaged during driving or handling.

**END OF SECTION**

## **35 59 11 – FLOAT WHARVES**

### **Part 1      General**

#### **1.1          MEASUREMENT FOR PAYMENT**

- .1      Timber float wharves to be paid for per unit supplied and installed.
- .2      Connections between float wharves, fastenings, hardware and mooring cleats shall not be measured separately for payment, but considered incidental to the work.
- .3      Re-installation of conveyor and scrub plate will be considered incidental to the cost to supply and install the 3.048m X 7.315m principal float wharf.
- .4      Re-installation of existing float wharves and supply and modification of hinges to suit shall be paid for per unit.

### **Part 2      Products**

#### **2.1          MATERIALS**

- .1      Lumber and timber: except as otherwise specified, use lumber and timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.
  - .1      Species: Douglas Fir Group 1b.
  - .2      Grade: structural or better
  - .3      Grading authority: BCLMA
  - .4      All timber to be rough sawn.
  - .5      Galvanized bolts and nuts: to ASTM A307-07b.
  - .6      Countersunk head bolts to CSA B34-67(R1972).
  - .7      Washers: pressed steel.
  - .8      Galvanized spikes and nails: spiral type to CSA B111-1974(R2003).
  - .9      Hot-dip galvanized, stainless steel, silicone, bronze or copper wood screws and fasteners: to ASTM Standards: ASTM-A153 (for hot-dip fastener products), and ASTM-A653 (coating designation G-185 for hot-dip connector and sheet products) and Type 305 and 316 for stainless steel.
  - .10     Plastic bushings: ultra-high molecular weight polyethylene (UHMWPE), density 0.94, black.
  - .11     Shapes, plates: fabricated from steel conforming to CAN/CSA-G40.20-04 and CAN/CSA-G40.20-04, Grade 300W.
  - .12     Primer: CAN\CGSB-1.40-M80 primer, structural steel, oil alkyd type.
  - .13     Preservative:
    - .1      Pressure Treatment: all specified treated timber and planks to be pressure treated with CCA or ASA preservative salts to 0.64 g/cu. cm. (0.40 lbs/cu. ft.) retention.

- .14 Machine bolts used are to be of sufficient length to accept two washers and one fully threaded hexagonal headed nut.
- .15 Mooring Cleats: galvanized grey iron ship or dock cleat (two hole type) indicated on drawings.
- .16 Floatation units:
  - .1 Dimensions/Capacity:
    - .1 Floatation units for principal float wharves and finger float wharves shall be of size 600 mm x 1200 mm x 300 mm deep with a minimum buoyancy of 196 kg each.
    - .2 Floatation units for whitefish float wharves shall be of size 1219mm x 1829mm x 610 mm deep with a minimum buoyancy of 1225 kg each.
    - .3 Alternate floatation units shall be used only with written approval of engineer.
  - .2 Materials:
    - .1 One piece, seamless rotational moulded outer shell.
    - .2 Manufactured from linear polyethylene resin with UV inhibitors and carbon black pigment.
    - .3 Nominal shell thickness minimum 3.8 mm.
    - .4 Heavy duty, reinforced moulded in mounting slots.
    - .5 Built in vent.
    - .6 Foam filled to 1.0-1.5 lbs/ft<sup>3</sup>
  - .3 Warranty:
    - .1 Manufacturer to warrant floats for a period of ten (10) years from date of purchase against cracking, peeling, sloughing and ultraviolet deterioration. Floatation units shall retain their resiliency against being frozen in or other abrasions from normal usage.
    - .2 Contractor will submit to engineer manufacturer's documentation indicating date of purchase.
    - .3 Alternate floatation units meeting or exceeding the above specification may be used only upon written approval of the engineer.

## **Part 3 Execution**

### **3.1 CONSTRUCTION**

- .1 Construct timber floats as indicated on drawings.
- .2 Build work square, true, straight and accurate to the required size, with all joints closely fitted and properly secured.
- .3 Except where specified, use of shims, wedges, or short pieces of timber not permitted.
- .4 Drill holes for bolts the same size as bolt diameter.
- .5 Lay deck planks, stringers and headers in one piece.
- .6 Project all bolts at least 6 mm beyond nut.

- .7 Place a washer under the head of each bolt and under nuts in contact with wood.
- .8 Connect floatation units with bolts c/w rubber and stainless steel washer as indicated on drawings.
- .9 Install stringers as designated.
- .10 Decking: Screw planks to each stringer contact with two (2) wood screws to a minimum penetration of 50 mm. Holes in decking are to be pre-drilled. Drill all screws 2 mm below deck surface. Space planks maximum 10 mm apart.
- .11 Curbing: If specified on drawings, nail timber curb along edges of deck with spiral nails at 600 mm centers. Chamfer exposed sides of curb 12 mm along upper edges. Curbing in minimum lengths of 4 m. Nail riser blocks to deck with 2 spiral spikes.
- .12 Fabricate and install all connection hardware as indicated.
- .13 Paint all float connectors, shapes and plates with one coat of primer prior to installation.

**END OF SECTION**