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<b>Drawing Number</b>	<b>Revision</b>	<b>Title</b>
307071-00778-00-MA-DAL-1500	B	2015 Wingdam Wall No. 2 - Timber Training Wall Repairs - General Notes and Site Overview
307071-00778-00-MA-DRD-1501	B	2015 Wingdam Wall No. 2 – Timber Training Wall Repairs – Wingdam #2 – Plans, Sections & Details

**\*\*\* END OF SECTION \*\*\***

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**1 GENERAL**

**1.1 General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

**1.2 General Instructions from Department of Fisheries and Oceans Canada (DFO)**

- .1 Site:
- .1 The Work is located along the south side of Shady Island south of Steveston Island at Wingdam No. 2 training wall on the Fraser River in Richmond, BC.
- .2 Datum:
- .1 Water levels and ground elevations shown on the Drawings are in metres and are approximate levels and are referenced to hydrographic (tide and chart) datum. Geodetic elevation of the chart datum at the site is -2.2 m (CHS).
- .3 Schedule of Work:
- .1 Provide a schedule of Work within ten days of award of Contract and complete Work before March 1, 2016.
- .2 Whenever variation from the schedule occurs or is expected to occur, notify the Department Representative of the change.
- .4 Delays:
- .1 Delays which occur, other than those caused by changes requested by the Department Representative, shall not affect the Contract Value (Tender Prices). Claims for such delays will not be entertained by DFO.
- .5 Interference to Navigation:
- .1 The Contractor shall be familiar with vessel movements and fishery activities in the areas affected by the Work. The Contractor shall plan and execute the Work in a manner that will not impede navigation or interfere with fishing operations.
- .2 Claims for loss of production, delays, or other expenses resulting from interference with moored or movement of vessels or fishing activities will not be entertained by DFO.
- .3 Comply with all Canadian Coast Guard regulations and use all necessary navigation aids which may be considered necessary during the course of the Project.

- .6 Notifications:
- .1 The Contractor shall notify the local Fisheries Officer not less than five days prior to commencement and completion of operations.
  - .2 Keep Vancouver Vessel Traffic Services, Canadian Coast Guard informed of operations in order for necessary notices to shipping can be issued. For marine traffic notices to shipping, contact:
    - .1 Canadian Coast Guard  
Regional Marine Information Centre, Pacific  
#2380 - 555 West Hastings Street  
P.O. Box 12107  
Vancouver, BC  
V6B 4N6  
  
Telephone: (604) 666-6011  
E-Mail: [Offshore@rmic.gc.ca](mailto:Offshore@rmic.gc.ca)
- .7 Requirements of Regulatory Agencies:
- .1 Ensure Work meets all applicable environmental regulations and standards.
  - .2 The Contractor shall comply with municipal, provincial, and national regulatory agency regulations relating to the Project.
  - .3 Claims for extra costs resulting from all regulatory agency requirements including those referenced in Clause 1.2.7.2 will not be entertained by DFO.
  - .4 The Contractor shall equip floating equipment with lights in accordance with Notice to Mariners CCG regulations.
  - .5 The Contractor will ensure that a fuel/oil spill emergency action plan is in place at all times.
  - .6 The Contractor shall comply with the "BC Marine and Pile Driving Contractors Association, Best Management Practices for Pile Driving and Related Operations".
  - .7 The mitigative measures outlined in DFO's "Standard Mitigation Organized by Project Activity" included in Appendix 1, will form part of the specification and the Contractor shall adhere to those mitigation measures. The Contractor shall keep a copy of this document and the Specifications on Site and be ready to display if requested by regulator or inspector.

- .8 Inspection and Testing of Materials:
  - .1 Inspection and testing will be arranged by DFO unless otherwise specified.
  - .2 If defects are revealed during inspection and/or testing, the Department Representative will request additional inspection and/or testing to ascertain the full degree of deficiency. The Contractor shall pay the costs for retesting and re-inspection.
  - .3 Satisfactory inspection at any stage does not preclude future rejection if materials and workmanship subsequently are found to lack uniformity or fail to conform to the requirements specified. The Works shall not be acceptance until the materials are satisfactorily installed in the completed structure as specified and inspected.
- .9 Taxes:
  - .1 The Contractor shall pay all provincial and municipal taxes levied by law. Do not include any amounts for the federal Goods and Services Tax in the Contract Value (Tender Price). Any amounts to be levied in respect of the GST will be billed as a separate item on the request for progress payment submitted by the Contractor. The appropriate GST levy will be paid to the Contractor in addition to the amount approved by the Department Representative for the work performed under the Contract and will not affect any of the individual amounts or the total amount of the Contract. The Contractor will be required to remit the appropriate amount to Revenue Canada in accordance with the applicable legislation.

### **1.3 Description of Work**

- .1 Refer to Section 01 11 00 - Summary of Work.

### **1.4 Work Covered by Contract Documents**

- .1 Work under this Contract includes, but is not limited to; the supply of all labour, supervision, management, overhead, materials, Temporary Works, construction plant, supplies, services, freight and handling, transportation, disposal, foreign, provincial and federal sales taxes as applicable, and duties of whatsoever kind and other things necessary for the Wingdam No. 2 Timber Training Wall Repairs in Richmond, BC, Canada. Work shall include but not be limited to all items noted in Clause 1.2 of Section 01 11 00 - Summary of Work.

### **1.5 Codes**

- .1 Perform Work in accordance with all applicable codes, standards, and the requirements of all federal, provincial, or local authorities having jurisdiction, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

- .2 Meet or exceed requirements in the Contract Documents and specifically called for in the specified standards, codes, and referenced documents.

### **1.6 Documents Required**

- .1 Maintain at Contractor's Work area, one copy each of the following:
  - .1 Contract Documents
  - .2 Contract Drawings
  - .3 Copy of Approved Construction Schedule
  - .4 Specifications
  - .5 Addenda
  - .6 Reviewed Shop Drawings
  - .7 Change Orders
  - .8 Field Work Orders
  - .9 Field Memos
  - .10 Other Modifications to Contract

### **1.7 Measurement for Payment**

- .1 Refer to Section 01 29 13 - Measurement and Payment.
- .2 Notify the Department Representative sufficiently in advance of operations to permit required measurements for payment.

### **1.8 Existing Services**

- .1 Before commencing Work, establish location and extent of all service and utility lines in area of Work and notify the Department Representative of findings.
- .2 Submit schedule within ten days of Contract award to and obtain approval from the Department Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .3 Where unknown services are encountered, immediately advise the Department Representative and confirm findings in writing.
- .4 Record locations of maintained, rerouted, and abandoned service lines.
- .5 Where Work involves breaking into or connecting to existing services, carry out Work at times directed by the Department Representative.

### **1.9 Contractor Use of Premises**

- .1 The Site is located on the Fraser River along the south side of Shady Island in Richmond, BC. The Contractor shall limit use of premises for Work, storage, and access to:
  - .1 Allow Work by other Contractors.
- .2 In areas of Site where Work by other Contractors will be undertaken concurrently with Work by Contractor:
  - .1 Control of movements of construction materials and personnel to avoid or minimize conflict with the Work of other Contractors.
  - .2 Allow access by other Contractors to or through Contractor's Work area.
- .3 Fire Safety:
  - .1 The Contractor shall submit to the Department Representative his procedures for fire safety related to hot Work. The Contractor shall maintain a fire watch for a minimum of two hours following hot Work.
  - .2 Review by the Department Representative of fire safety procedures shall not relieve the Contractor of his responsibilities with respect to fire safety.

### **1.10 Additional Drawings**

- .1 The Department Representative may furnish additional Drawings for clarification. These additional Drawings have same meaning and intent as if they were included with Drawings referred to in Contract Documents.

### **1.11 Environmental Requirements**

- .1 Work is to be in accordance with the environmental protection rules, regulations, and practices required by applicable legislation or general construction practice.
- .2 All Work by the Contractor shall be in accordance with the environmental requirements set out by the Fisheries and Oceans Canada (DFO) and the Port of Metro Vancouver.
- .3 Refer to Section 01 35 43 - Environmental Procedures.

### **1.12 Access to the Site**

- .1 Access to the Site is available by boat or barge only. The closest boat launching ramp to the Site is located at Steveston Harbour.
- .2 Loading and unloading of barges or supply vessels by the Contractor will only be carried out with permission of the Department Representative, and the Contractor shall strictly observe the Harbour rules and regulations.



**1.13 Safety**

- .1 The Contractor shall observe and enforce all construction safety measures required by the BC Building Code, WorkSafe BC, and municipal statutes or by-laws.
- .2 In the event of conflict between any provisions of above authorities, the most stringent provision will apply.

**1.14 Examination of Site**

- .1 Prospective Bidders are expected to familiarize themselves with the Site and soil conditions prior to the submission of their Tender.
- .2 The Contractor shall report promptly to the Department Representative any discrepancy, inaccuracy, or deviation between the information contained in the Contract Documents and the actual conditions found to be in existence during the process of the Work.
- .3 The Contractor shall measure and verify dimensions (member sizes, lengths, elevations, etc.) prior to ordering materials and shall notify the Department Representative of any discrepancies.

**\*\*\* END OF SECTION \*\*\***

## **Appendix 1    General Requirements by DFO - Standard Mitigation by Project Activity**

## Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
<p>GENERAL (to be incorporated into all activities below)</p>	<ol style="list-style-type: none"> <li>1. Ensure all personnel involved with activities are adequately trained and utilize appropriate personal protective equipment.</li> <li>2. Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill.</li> <li>3. Waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the marine or terrestrial environment.</li> <li>4. Onsite crews will have emergency spill equipment available.</li> <li>5. All activities should be completed in such a way as to minimize stress and disturbance to resident flora and fauna.</li> <li>6. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the project.</li> <li>7. Aesthetic effects created by activities will be short-term and localized. Sites should be kept in a tidy manner during activities and left in a good condition at the end of the project.</li> <li>8. Archaeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.</li> </ol>
<p>MACHINERY OPERATION</p>	<ol style="list-style-type: none"> <li>1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products.</li> <li>2. Vehicles should not be operated below the line of Highest High Water in the intertidal zone.</li> <li>3. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimise the footprint of the project.</li> <li>4. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.</li> </ol>
<p>POWER-WASHING</p>	<ol style="list-style-type: none"> <li>1. Activities should be completed in such a way as to minimise the amount of fines and organic debris that may enter nearby aquatic environments.</li> </ol>
<p>EXCAVATION/ROCK DRILLING</p>	<ol style="list-style-type: none"> <li>1. Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized.</li> <li>2. Dust and fines entering the water must be avoided.</li> <li>3. Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit.</li> </ol>

## Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
EXCAVATION/ROCK DRILLING continued	<ol style="list-style-type: none"> <li>4. Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events.</li> <li>5. All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone.</li> <li>6. Any blasting will follow the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.</li> </ol>
PILE INSTALLATION	<ol style="list-style-type: none"> <li>1. All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products.</li> <li>2. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds).</li> <li>3. Proper notice should be given to transportation authorities to warn of potential disruptions to navigability during works.</li> <li>4. Whenever Contractors are working in areas where spawning is present, appropriate monitoring by a qualified person will be undertaken and activities ceased if spawn disruption is apparent.</li> <li>5. Where possible, new timber piles will comply with the BMP for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute.</li> <li>6. Where the BMP pilings are not available, creosote piling will stand for a minimum of 45 days prior to installation. These requirements are for new pilings only and will not restrict the use of re-used timber pilings. Reused pilings will not be subject to any additional treatments.</li> <li>7. If pile installation activities are causing fish kill, work must cease immediately and contractors will be responsible for introducing effective means of reducing the level of shock waves or introduce measures that will protect fish from entering the potentially harmful shock wave area. For example, appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile that would defuse the shock waves to an acceptable level.</li> <li>8. If, after preventive measures are introduced, visual monitoring reveals unacceptable conditions (fish kill), then work will stop immediately and the system reviewed and corrected.</li> <li>9. Any instances of fish kill must be reported to the appropriate agencies (DFO).</li> <li>10. When cleaning out pipe piles (i.e. air lifting), if the material that is to be removed inside the pipe is non-toxic, then it shall be redistributed in a manner that will minimize damage to the surrounding aquatic fish habitat.</li> </ol>

## Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE WORKS	<ol style="list-style-type: none"> <li>1. When pouring concrete all spills of fresh concrete must be prevented. If concrete is discharged from the transit mixer directly to the form work or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing.</li> <li>2. All concrete forms will be constructed and sealed in a manner which will prevent fresh concrete or cement laden water from leaking into the surrounding water.</li> <li>3. All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash off water from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.</li> </ol>
SITE ACCESS	<ol style="list-style-type: none"> <li>1. Site access practices must be undertaken with regard to resident flora and fauna, especially during times of the year when they are most sensitive.</li> </ol>
AID MAINTENANCE	<ol style="list-style-type: none"> <li>1. Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment.</li> <li>2. Power washing activities must follow mitigation provided under "POWER-WASHING"</li> <li>3. An approach of "contain and recover" should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly.</li> <li>4. Painting activities should be completed in such a way as to minimize the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.</li> </ol>
PILE REMOVAL	<ol style="list-style-type: none"> <li>1. Contractors will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds).</li> <li>2. When demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations should be monitored in order to control and contain the construction debris.</li> </ol>
CONCRETE BASE REMOVAL	<ol style="list-style-type: none"> <li>1. Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds).</li> <li>2. All debris deposited throughout the life of the aid should be removed from the site.</li> </ol>
CONCRETE BASE ABANDONMENT	<ol style="list-style-type: none"> <li>1. Care should be taken to remove all components of the Fixed Aid that are not incorporated into the concrete base.</li> <li>2. All debris deposited throughout the life of the aid should be removed from the site.</li> </ol>

## Standard Mitigation Organized by Project Activity

PROJECT ACTIVITY	MITIGATION
CONCRETE BASE ABANDONMENT continued	<ol style="list-style-type: none"><li data-bbox="678 172 1524 199">3. Areas near the base should be protected from excessive disturbance.</li><li data-bbox="678 204 1902 263">4. Concrete base abandonment will be conducted only in remote sites, where aesthetic effects are not a concern.</li></ol>

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## 1 SCOPE OF WORK

### 1.1 General

- .1 The list of Work to be performed by the Contractor is presented for the purpose of complementing or clarifying the Drawings, Specifications, and other Contract Documents, but shall not constitute a complete list of the Work of this Contract:
  - .1 Comply fully with the provisions of the Contract Documents.
  - .2 The Contractor shall accept the Site in its prevailing condition at the time of commencement of the Work.
  - .3 Provide and maintain all temporary facilities and services required to accomplish the Work in accordance with the construction schedule.
  - .4 Submit to the Department Representative a list of temporary buildings that the Contractor intends to bring onto the Site if any.
  - .5 Coordinate the Work with that of the Owner and other Contractors so that there is no interference or interruption to the operations of the facility.
  - .6 No temporary construction power will be available at the Site. Contractor to provide temporary power as required.
  - .7 Provide the facilities for performing the Work in extreme weather conditions and, when in the opinion of the Department Representative weather conditions are extreme, use these facilities in order that the Work may proceed and be protected from the weather and when the Work is complete, or prior to completion if protection is no longer required, remove same to the satisfaction of the Department Representative.
  - .8 Establish all lines required to set out the Work from the datums established by the Department Representative. The Contractor shall locate all other reference points and lines and take necessary action to prevent their destruction. All dimensions noted on the Drawings shall be field verified prior to commencement of the Work and material procurement.
  - .9 Maintain the existing roads and road surfaces on-Site in a safe and sound condition during the period of the Contract, including making good and repairing any damage arising from the Work performed under this Contract.
  - .10 Maintain Site cleanliness.
  - .11 Transport to the Site construction equipment and materials required for the performance of the Work and store and locate such equipment and materials in the laydown areas designated by the Department Representative.

- .12 Comply with the requirements of the WHMIS and maintain a library of material safety datasheets on the Site.
- .13 Maintain a sufficient stock of materials on the Site at all times to meet the demands of the construction schedule with a reasonable reserve to compensate for changes in the Work or changes in the construction program.
- .14 Supply all construction tools and consumables required to complete the Work of this Contract.
- .15 Supply and erect temporary barriers around the working area of the Site as required for safety and the protection of operating equipment.
- .16 The lengths, dimensions, and dressing of all new materials shall be confirmed by the Contractor prior to procurement and treatment.
- .17 Supply new connecting hardware for all components that must be disconnected and reconnected for the installation of repair. Existing hardware may only be reused with the permission of the Department Representative.
- .18 The Contractor shall complete the Work in accordance with the requirements set out by the Fisheries and Oceans Canada (DFO) and Port Metro Vancouver.
- .19 Prior to beginning Work, confirm the location of the Work to be repaired or replaced on Site with the Department Representative.

## 1.2 Work by the Contractor

- .1 The intent of the repairs is to restore the repaired elements back to their original condition. The repairs outlined in the Drawings and/or Specifications are based on visual observations of the Site at the time of the inspection, there is a possibility that additional damage and/or deterioration may have occurred since then or that other damage and/or deterioration may have not been detected during the course of the inspection. Elements with damage and/or deterioration not outlined in the Drawings and/or Specifications shall be brought to the attention of the Department Representative for a determination on the course of action.
- .2 The Contractor shall be responsible for executing the Work outlined on the Drawings; the repair summary tables are reproduced below for reference, the Work is summarized in the tables below, but not limited to:

- .1 Pile Repairs:

Location	Quantity	Recommendation
M6 to M14	16	<b>Install</b> missing or damaged offshore and inshore marker piles in missing section of wall.
	37	<b>Install</b> missing or damaged inshore lower piles in missing section of wall (approximately).

Location	Quantity	Recommendation
M6 to M7	2	Repair third and fourth split offshore lower piles east of M6 marker pile with galvanized steel clamps.
	4	Re-drive out of plumb third, fourth, fifth, and sixth offshore lower piles east of M6 marker pile.
M6 to M14	36	<b>Install</b> missing or damaged offshore lower piles in missing section of wall (approximately).
M19 to M20	2	Re-secure to middle and inshore walers at the second and third inshore (north) lower piles west of M20 marker pile.
M20 to M21	2	Re-secure to middle and inshore walers at the first and fourth inshore (north) lower pile east of M20 marker pile.
M21 to M22	2	Re-secure to middle and inshore walers at the first and third inshore (north) lower pile east of M21 marker pile.
M27	1	Re-secure M27 inshore marker pile.
M35.5	1	<b>Replace</b> third broken east lower pile north of M35 marker pile.

.2 Inshore Waler Repairs:

Location	Quantity	Recommendation
M1 to M14	46	<b>Install</b> missing inshore walers approximately from M1 to M14.
M17.5 to M23.5	21	<b>Install</b> missing inshore walers approximately from M17.5 to M23.5.

.3 Middle Waler Repairs:

Location	Quantity	Recommendation
M1	1	Re-secure middle waler to the inshore and offshore M1 marker pile.
M6 to M14	10	<b>Install</b> missing or damaged middle waler in missing section of wall approximately from M6 to M14.

.4 Plank Repairs:

Location	Quantity	Recommendation
M6 to M14	34	<b>Install</b> missing or damaged upper, middle, and lower facing planks in missing section of wall approximately from M6 to M14.
M14 to M15	1	<b>Replace</b> damaged upper facing plank.
M24.5 to M26	3	<b>Install</b> missing top, middle, and bottom facing planks approximately from M24.5 to M26.

.5 General:

Location	Quantity	Recommendation
M27 to M43	Approximately 20	Remove and dispose wood debris retained by 'Wall B' (east section of wall).

\*\*\* END OF SECTION \*\*\*

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**1 GENERAL**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

**2 MEASUREMENT, GENERAL**

- .1 All items of Work listed in the Schedule of Values (except where shown as lump sums) and all items listed in the Schedule of Unit Prices for Additions and Deletions will be measured by the Contractor with copies of the Contractor's calculations submitted to the Consultant for review prior to the Contractor's application for progress payment of each item of Work.
- .2 Methods of measurement and computation to determine quantities of materials furnished and work performed under the Contract will be as described herein unless otherwise specified in the relevant individual sections.
- .3 When a complete structure or structural unit or piece of equipment is specified as the unit of measurement, the unit shall include all necessary hardware, fittings, and accessories.
- .4 No measurement will be made for:
  - .1 Work performed or materials placed outside of the lines indicated on the Drawings or established by the Consultant.
  - .2 Materials wasted, used, or disposed of in a manner not called for under the Contract.
  - .3 Materials rejected after installation that are found not to conform to the provisions of the Contract.
  - .4 Hauling and disposing of rejected materials.
  - .5 Materials remaining on hand after completion of the Work.

**3 PAYMENT, GENERAL**

- .1 Payment for unit price Work acceptably completed under the Contract will be made in accordance with the provisions of the Contract for the various items of Work appearing in the Schedule of Values.
- .2 Any Work called for in the Specifications or indicated on the Drawings, or which is necessary for the completion of the Work, and which is not specifically listed as a separate item in the Schedule of Values, shall be deemed incidental to the Work and no separate payment will be made for such Work. The cost of such Work shall be included in the unit prices for the items of Work appearing in the Schedule of Values.

**4 LENGTH, AREA, AND VOLUME MEASUREMENTS**

- .1 Unless otherwise specified, measurements will be made horizontally and/or vertically. Measurements will be to the neat lines indicated on the Drawings or as altered by the Consultant to suit field conditions or in accordance with approved Change Orders.

**5 MASS MEASUREMENTS**

- .1 Scales for the weighing of materials required to be proportioned or measured and paid for by mass shall be certified commercial scales. When scales are used, the following actions shall be taken:
- .1 Submit to the Consultant proof of scale certification.
  - .2 For each load of material delivered to the Site, provide scale delivery slips stating type of material, gross mass, net mass, mass of truck tare, time and date.
- .2 Payment will not be made for material supplied without a delivery slip signed by the Consultant.

**6 DESCRIPTION OF ITEMS IN SCHEDULE OF VALUES**

- .1 The following is a description of the items appearing in the Schedule of Values. The intent of this description is to clarify the main components included in each item and not to provide a comprehensive list of all Work required to complete the item in accordance with the Drawings and Specifications and any items that may be incidental to the Work. Prices shall include all considerations for labour, materials, tools and equipment, and shall include overhead and profit.
- .2 The schedule of values stated in the Contract will be full compensation for furnishing all labour, materials, and equipment required to complete the following repairs in accordance with the Specifications:
- .1 "Mobilization" shall be paid as a lump sum to mobilize all materials, equipment, and personnel necessary to carry out the requirements of the Contract. This will include relocation of marine construction equipment during the course of the Work required to carry out the requirements of the Contract.
  - .2 "Demobilization" shall be paid as a lump sum to demobilize all surplus materials, equipment, and personnel necessary to carry out the requirements of the Contract.
  - .3 "Supply Marker Pile" shall be paid as a unit price for the supply of each new treated timber marker pile and transportation to Site.

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- .4 "Install or Replace Damaged/Deteriorated/Missing Marker Pile" shall be paid as a unit price for the installation of each new treated timber marker pile, including bolting, application of preservative end treatment, and removal and disposal of existing pile. Where existing piles cannot be removed, the Contractor shall discount the cost of removal and disposal.
  - .5 "Supply Lower Pile" shall be paid as a unit price for the supply of each new treated timber lower pile and transportation to site.
  - .6 "Install or Replace Damaged/Deteriorated/Missing Lower Pile" shall be paid as a unit price the installation of each new treated timber lower pile, including bolting, application of preservative end treatment, and removal and disposal of existing pile. Where existing piles cannot be removed, the Contractor shall discount the cost of removal and disposal.
  - .7 "Re-Drive Out-of-Plumb Marker Pile" shall be paid as a unit price for each re-drive of a marker pile into a true vertical position and for the supply and installation of new securing hardware if the existing securing hardware is missing or damaged.
  - .8 "Re-Drive Out-of-Plumb Lower Pile" shall be paid as a unit price for each re-drive of a lower pile into a true vertical position and for the supply and installation of new securing hardware if the existing securing hardware is missing or damaged.
  - .9 "Repair Split Piles with Galvanized Steel Clamp" shall be paid as a unit price for the supply and installation of galvanized steel clamps to repair each split vertical pile or each split batter pile, including bolting and application of preservative end treatment.
  - .10 "Supply Inshore Waler" shall be paid as a unit price for the supply of each new treated timber inshore waler and transportation to Site.
  - .11 "Install or Replace Damaged/Deteriorated/Missing Inshore Waler" shall be paid as a unit price for the installation of each new treated timber inshore waler, including bolting, application of preservative end treatment, and removal and disposal of existing waler. Where the inshore waler is missing, the Contractor shall discount the cost of removal and disposal.
  - .12 "Supply Middle Waler" shall be paid as a unit price for the supply of each new treated timber middle waler and transportation to Site.
  - .13 "Install or Replace Damaged/Deteriorated/Missing Middle Waler" shall be paid as a unit price for the installation of each new treated timber inshore waler, including bolting, application of preservative end treatment, and removal and disposal of existing waler. Where the inshore waler is missing, the Contractor shall discount the cost of removal and disposal.

- .14 "Supply Plank" shall be paid as a unit price for the supply of each new treated timber plank and transportation to Site.
- .15 "Install or Replace Damaged/Deteriorated/Missing Plank" shall be paid as a unit price for the installation of each new treated timber plank, including bolting, application of preservative end treatment, and removal and disposal of existing plank. Where the plank is missing, the Contractor shall discount the cost of removal and disposal.
- .16 "Re-Secure Pile Bolted Connection" shall be paid as a unit price for each re-securement of the bolted connection and/or for the supply and installation of new securing hardware if the existing securing hardware is missing or damaged.
- .17 "Re-Secure Waler Bolted Connection" shall be paid as a unit price for each re-securement of the bolted connection and/or for the supply and installation of new securing hardware if the existing securing hardware is missing or damaged.
- .18 "Remove Wood Debris" shall be paid as a lump sum for the removal and disposal of wood debris and logs along the training wall as required.

**\*\*\* END OF SECTION \*\*\***

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## **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 British Columbia:
  - .1 Workers Compensation Act, RSBC 1996 - Updated 2006
  - .2 Occupational Health and Safety Regulation
- .4 National Building Code of Canada (NBC):
  - .1 Part 8, Safety Measures at Construction and Demolition Sites

### **1.2 Workers Compensation Board Coverage**

- .1 Comply fully with Workers' Compensation Act, regulations, and orders made pursuant thereto and any amendments up to the completion of Work.
- .2 Maintain Workers' Compensation Board coverage during term of Contract, until and including date that Certificate of Final Completion is issued.

### **1.3 Compliance with Regulations**

- .1 DFO may terminate Contract without liability to Canada where Contractor, in the opinion of DFO, refuses to comply with a requirement of Workers' Compensation Act or Occupational Health and Safety Regulations.
- .2 Contractor is responsible to ensure that all workers are qualified, competent, and certified to perform Work as required by Workers' Compensation Act or Occupational Health and Safety Regulations.

### **1.4 Submittals**

- .1 Submit to Department Representative submittals listed for review.
- .2 Work affected by submittal will not proceed until review is completed.

- .3 Submit the following:
  - .1 Health and Safety Plan.
  - .2 Copies of reports or directions issued by federal, provincial, and territorial health and safety inspectors.
  - .3 Copies of incident and accident reports.
  - .4 Copies of material safety datasheets and all other documents required by WHMIS requirements.
  - .5 Emergency procedures.
- .4 Submission of Health and Safety Plan and any revised version to the Departmental Representative are for information and reference purposes only. It will not:
  - .1 Be construed to imply as approval by Department Representative.
  - .2 Be interpreted as warranty of being complete, accurate, and compliant.
  - .3 Relieve the Contractor of his legal obligations for provision of health and safety for the Project.
- .5 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for Site personnel prior to commencement of Work, and submit additional certifications for any new Site personnel to Departmental Representative.

### **1.5 Filing of Notice**

- .1 Complete and submit Notice of Project as required by provincial authorities.
- .2 Provide copies of all notices to Department Representative.

### **1.6 Safety Assessment**

- .1 Perform Site specific safety hazard assessment related to Project.

### **1.7 Meetings**

- .1 Schedule and administer health and safety meeting with Departmental Representative prior to commencement of Work.

### **1.8 General Requirements**

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

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

### **1.9 General Conditions**

- .1 Provide safety barricades and lights at Work Site as required to provide safe working environment for workers.
- .2 Ensure that non-authorized persons are not allowed in designated construction areas and Work Site:
  - .1 Provide appropriate means by use of barricades, fences, and warning signs.

### **1.10 Regulatory Requirements**

- .1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at Site.
- .2 In the event of conflict between any provisions of above authorities, the most stringent provision will apply.

### **1.11 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.

### **1.12 Unforeseen Hazards**

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

### **1.13 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 Site related working experience specific to activities associated with the Work outlined in the Contract.
  - .2 Have working knowledge of occupational safety and health regulations.



- .3 Be responsible for completing Contractor's health and safety training sessions and ensuring that personnel not successfully completing required training are not permitted to enter Site to perform Work.
- .4 Be responsible for implementing, enforcing daily, and monitoring Site specific Contractor's Health and Safety Plan.
- .5 Be on Site during execution of Work.

#### **1.14 Hazardous Products**

- .1 Comply with the requirements of WHMIS WHMIS regarding use, handling, storage, and disposal of hazardous materials and regarding labelling and provision of MSDS acceptable to Departmental Representative and in accordance with Canada Labour Code.

#### **1.15 Posting of Documents**

- .1 Ensure applicable items, articles, notices, and orders are posted in conspicuous location on Site in accordance with acts and regulations having jurisdiction, and in consultation with Departmental Representative.

#### **1.16 Correction of Non-Compliance**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected. The Contractor will be responsible for costs arising from such "stop work order".

#### **1.17 Confined Spaces**

- .1 Carry out Work in confined spaces in compliance with provincial regulations.

#### **1.18 Overloading**

- .1 Ensure no part of the Work is subject to a load which will endanger its safety or will cause permanent deformation.

#### **1.19 Fire Safety Requirements**

- .1 Store oily/paint soaked rags, waste Products, and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from Site on a daily basis.

- .2 Handle, store, use and dispose of inflammable and combustible materials in accordance with the National Fire Code of Canada.

**1.20 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.

**\*\*\* END OF SECTION \*\*\***

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## **1 GENERAL**

### **1.1 General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.
- .2 Determine and comply with all environmental protection requirements necessary to carry out the specified Work.
- .3 Contractors are expected to be aware of the applicable environmental regulations for the Work. These generally consist of, but are not limited to, containment and disposal of demolition debris, seawater turbidity limits, seawater alkalinity limits, and potable water chlorine limits.

### **1.2 Fires**

- .1 Fires and burning of rubbish on Site are not permitted.

### **1.3 Disposal of Wastes**

- .1 Dispose of all rubbish, wastes, and demolished materials off Site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil, or paint thinner into watercourses, storm, or sanitary sewers.
- .3 Any waste/materials to be disposed of will become the property of the Contractor and shall be disposed of in an environmentally safe manner.

### **1.4 Drainage**

- .1 Do not pump water containing suspended materials into watercourses, sewer, or drainage systems. Water quality at the point of discharge shall comply with the environmental requirements.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with federal, provincial, and municipal requirements.

### **1.5 Site Clearing and Plant Protection**

- .1 Protect trees and plants on Site and adjacent properties.

### **1.6 Pollution Control**

- .1 Control emissions from equipment and plant to local authority's emission requirements.

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

**\*\*\* END OF SECTION \*\*\***

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## 1 **GENERAL**

### 1.1 **General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

### 1.2 **Description of Work**

- .1 This section identifies the Quality Control (QC) activities to be performed by the Contractor during all phases of the Contract. Detailed inspection and test requirements are shown in the individual sections of this Specification where appropriate. All QC responsibilities lie with the Contractor. Conduct additional inspections, tests, or audits beyond those described if required. Quality assurance inspection and testing will be conducted by the Department Representative.

### 1.3 **Submittals**

- .1 The Quality Control Program (QCP) shall contain a comprehensive account of Contractor's QC procedures to be applied throughout the Contract. Include the following:
  - .1 Organization chart identifying by name the manager of the QC organization.
  - .2 List of all applicable tests and inspections Contractor will perform and the frequency at which they will be performed.
  - .3 Procedure to show how materials will be received and inspected for compliance with Contract Documents. Also, how material will be stored and inspected on an ongoing basis, to assure compliance with Contract requirements.
- .2 Submit a list of Suppliers and Subcontractors. List to include items to be supplied, item numbers, Specifications, inspection and test requirements, performance data, anticipated inspection test dates, and other pertinent information as appropriate. Submit list to the Department Representative ten days prior to the performance of required inspections and tests.

### 1.4 **Documentation**

- .1 Make copies of all QC documents available at locations where they are to be used.
- .2 Prepare, identify, and maintain all records and documents which are quality related and make them available to the Department Representative upon request. Protect records from damage, deterioration, or loss. Retain all quality records for at least three years after total performance of the Work.

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## 1.5 Testing and Inspection

- .1 Utilize the following four point inspection plan to assure conformance of the Work to the requirements of the Drawings and Specifications, to the referenced codes and standards, and to the reviewed submittals:
  - .1 Pre-Work Coordination: prior to the start of construction Work on the Contract, hold a coordination meeting. Attendees: Contractor's supervisor, Contractor's safety representatives, and the Department Representative. The purpose of the meeting is to ensure there are no misunderstandings regarding the quality as well as the technical requirements of the Contract. Review the following:
    - .1 Contract requirements.
    - .2 Availability of required materials and equipment.
    - .3 Familiarity and proficiency of Contractor's and Subcontractor's workforce to perform the operation to required workmanship standards.
    - .4 Safety and environmental precautions to be observed.
    - .5 Any other preparatory steps dependent upon the particular operation.
  - .2 Initial Inspection: hold initial inspection upon completion of a representative portion of the Work, and no later than one week after the start. Attendees: Contractor's supervisor, Contractor's safety representatives, and the Department Representative.
    - .1 Review the following:
      - .1 Workmanship to established quality standards.
      - .2 Conformance to Drawings, Specifications, and reviewed Shop Drawings or submittals.
      - .3 Adequacy of materials and articles utilized.
      - .4 Adequacy of safety and environmental precautions.
    - .2 Follow-Up Inspections: Contractor shall monitor the Work on a daily basis to assure continuing conformance of the Work to workmanship standards established during pre-work coordination and initial inspections.



- .3 Completion Inspection:
  - .1 48 hours prior to the completion of the Work, notify the Department Representative who will verify that the segment of Work is substantially complete, all inspections and tests have been completed, and document the inspection on a completion inspection form. The purpose of this inspection is to allow further corrective Work upon, or integral to, the completed segment of Work.
  - .2 Should any items be determined deficient, needing correction or nonconforming, a deficiency list will be prepared and issued to the Contractor for correction, repair, or replacement of any deficient or nonconforming items. Verify correction of deficient or nonconforming items, prior to the start of the next operation.

#### **1.6 Nonconforming Work and Materials**

- .1 Take remedial actions where indicated to correct nonconforming Work.
- .2 Upon satisfactory completion of the remedial action, document results, with a copy of results transmitted to the Department Representative.
- .3 If, in the opinion of the Department Representative, it is not expedient to correct defective Work or Work not performed in accordance with the Contract, the Department Representative may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract, the amount of which shall be determined by the Consultant, after due consultation with the Contractor and the Department Representative.

#### **1.7 Measurement for Payment**

- .1 All Work of this section shall be included in the Contract Price. The Contractor shall pay for the costs any additional inspections that may be required if the previous inspection showed that the Work as defective or not in conformance. The Department Representative may deduct from the Contract Value the cost of re-inspection.

#### **1.8 Quality Assurance Inspection**

- .1 Independent inspection/testing agencies may be engaged by the Owner for the purpose of inspecting and testing portions of Work. Cost of such services will be borne by the Owner. Employment of inspection/testing agencies does not relax Contractor's responsibility to perform Work in accordance with Contract Documents.
- .2 The Department Representative shall have access to the Work at any time.

\*\*\* END OF SECTION \*\*\*

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**1 GENERAL**

**1.1 General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

**1.2 Haul Routes**

- .1 Cooperate with other Contractors and users in use of existing roads.

**1.3 Project Signs**

- .1 The Department Representative may supply and erect a Project sign.
- .2 Unless otherwise approved by the Department Representative, no other signs other than the Project sign identified above are permitted on the Work.

**1.4 Field Offices**

- .1 Contractor shall be prepared to have enough room for material storage, laydown, and the following facilities on a barge:
  - .1 Contractor's office.
  - .2 First Aid Facilities:
    - .1 Contractor shall have adequate first aid facilities for immediate response to minor incidents on site.

**\*\*\* END OF SECTION \*\*\***

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**1 SETTING OUT THE WORK**

- .1 Contractor will set out Work based on existing structures.
- .2 The Contractor shall be responsible for accurately setting out Work from the benchmark(s) or reference line(s) or existing structures and take necessary action to prevent their destruction. Verify figures shown on the Construction Drawings and assume responsibility for any error resulting from failure to exercise such precaution. Establish additional benchmarks, working points, install grade and location stakes, sight rails, screens, batter boards, etc., as required; and, provide all necessary instruments, equipment, and skilled personnel for this Work. Be responsible for the alignment, elevations, and dimensions of all parts of the Work and their mutual agreement.
- .3 Prior to commencing Work, verify the accuracy of the levels of existing grades shown on the Drawings and inform the Department Representative of any variations or discrepancies. Commencement of Work constitutes acceptance of surfaces and conditions except hidden defects not apparent at the time of commencement.
- .4 Prior to commencing the Work, verify locations of existing structures, structural members, and equipment. All dimensions shown on the Drawings are from reference Drawings and must be field checked by the Contractor prior to procuring materials or to commencing the Work. Notify the Department Representative immediately of any discrepancies or unanticipated conditions that may affect the Work.
- .5 Where the Work is dependent upon grades or elevations of existing structures or facilities, then such grades or elevations take precedence over those determined by reference to the benchmark. Advise the Department Representative of any discrepancies.
- .6 Protect and preserve all benchmarks and reference points on the existing structures. If any such benchmarks or reference points are disturbed or damaged by any Work and pay for their repair and/or replacement.
- .7 At points where construction will cover or destroy any land subdivision monuments or property marks be responsible for their protection from disturbance until their positions have been referenced and do not remove them until permitted to do so by the Department Representative.
- .8 If, at any time an error appears or arises in the position of levels, grades, dimensions or alignment of parts of the Work, rectify such error to the satisfaction of the Department Representative, at no cost to DFO. Checking of the position of levels, grades, dimensions or alignment of parts of the Work by the Department Representative does not relieve the Contractor of his responsibility for the correctness thereof.

- .9 Provide the Department Representative with reasonable assistance as may be required for checking the Work.

**2 CONSTRUCTION TOLERANCES**

- .1 Construction tolerances for the Works are detailed in the Specifications and referenced standards. The Contractor is reminded that it is imperative to adhere to these tolerances which will be strictly enforced to ensure the Works meet the required standard. Any Works not meeting the required tolerance shall be cause for rejection.

**\*\*\* END OF SECTION \*\*\***

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**1 GENERAL**

**1.1 General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

**1.2 Submittals**

- .1 Provide one copy to the Department Representative of the following, at obtaining Substantial Performance of the Work and as a condition thereof:
  - .1 Reconciliation of all outstanding Contemplated Change Orders.
  - .2 A tabulated list with letters attached from WorkSafe BC, stating that Contractor and Subcontractor are in good standing.
  - .3 Statutory declaration in a form approved by the Department Representative from the Contractor, Subcontractors, and Suppliers that all wages, accounts for materials, Subcontractors, and Suppliers have been paid.
  - .4 List of any and all insurance claims, liens, or issues related to Contract on behalf of Contractor, Subcontractor, and Suppliers.
- .2 Provide one copy to the Department Representative of the following at obtaining total performance of the Work and as a condition thereof:
  - .1 Letter from WorkSafe BC and other authorities as listed above, stating that Contractor and Subcontractors are in good standing.
  - .2 Release of all liens arising out of this Contract.
  - .3 Statutory declaration from Contractor, Subcontractors, and Suppliers in a form approved by the Department Representative that all wages, accounts for materials, Subcontractors, and Suppliers have been paid as required by the general conditions of the Contract.
  - .4 Record Drawings in accordance with Clause 1.4.
  - .5 Final statement of accounts.
  - .6 Completion of outstanding deficiencies. Refer to Substantial Performance of the Work of this section.



**1.3 Final Cleaning and Clean-Up**

- .1 Refer to Specifications sections for specific clean-up requirement.
- .2 Remove surplus materials and construction plant, Temporary Works, debris, rubbish, and other items not required for performance of remaining Work. Contractor shall complete and have reviewed by the Department Representative.
- .3 Perform cleaning and disposal operations to comply with local ordinances and regulations.

**1.4 Record Drawings**

- .1 Contractor shall complete a field engineering survey following completion of the Work. The Department Representative will provide, at Contractor's cost, one set of white prints of latest construction Drawings necessary for sole purpose of recording "as-built conditions" of deviations from the Contract Documents. Contractor shall clearly identify them as "Record Drawings" and have them available at all times and at each regular Project progress Site meeting for inspection or scrutiny and as may be required by the Department Representative.
- .2 As Work progresses, the Contractor's superintendent or foreman shall record clearly and indelibly in red pencil "as-built" deviations from the Contract Documents as a result caused by Site conditions or various directives by addenda, correspondence, Site clarifications, Site instructions, Change Orders, Shop Drawings, and authorities having jurisdiction. Deviations to be recorded shall include in general, but shall not necessarily be limited to, things hidden from view, things of major importance to future operations, maintenance, alterations, and additional Work.
- .3 Record dimensions in metric measure.
- .4 All Drawing tracings duly certified and signed as instructed above must be submitted in a timely manner and be in possession of the Department Representative no later than one week prior to the date established to declare total performance of the Work.

**\*\*\* END OF SECTION \*\*\***

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## 1 **GENERAL**

### 1.1 **General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

### 1.2 **Related Sections**

- .1 Section 06 13 00 Heavy Timber Construction
- .2 Section 31 62 19 Timber Piles

### 1.3 **Summary**

- .1 This section describes the requirements for miscellaneous steel fabrications.

### 1.4 **References**

- .1 CSA W47.1-09 Certification of Companies for Fusion Welding of Steel Structures
- .2 CSA W48-06 (R2011) Filler Metals and Allied Materials for Metal Arc Welding
- .3 CSA W59-13 Welded Steel Construction (Metal Arc Welding)
- .4 CAN/CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
- .5 ASTM A123/A123M-13 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .6 ASTM A53/A53M-12 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

### 1.5 **Submittals**

- .1 Submit Shop Drawings two weeks prior to the start of fabrication.
- .2 Clearly indicate materials, grades, dimensions, finishes, connection, and support details.
- .3 Shop Drawings of items designed by the Contractor shall bear the seal of a qualified Professional Engineer registered in the Province of British Columbia.

### 1.6 Quality Control Submittals

- .1 Prior to commencing the Work of this section, submit two certified copies of mill reports covering chemical and physical properties of steel to be used in the Work.

### 1.7 Quality Assurance

- .1 Welding practice and qualifications of fabricators shall conform to CSA W47.1 and W59.
- .2 Welding inspection of the Work of this section shall be carried out by a qualified independent agency approved by the Department Representative in accordance with W59 Clause 7 and shall be paid for by the Contractor. The inspection report prepared by the agency shall be submitted to the Department Representative prior to installing the inspected Work.

### 1.8 Field Measurements

- .1 Verify dimensions of existing structures which would affect the Work of this section prior to commencing fabrication.

## 2 PRODUCTS

### 2.1 Materials

- .1 Rolled Steel Sections and Plates: to CAN/CSA-G40.21, Grade 300W. Where specified metric angles or plate thicknesses are not available, equivalent imperial angles or plate thicknesses will be acceptable.
- .2 Steel Pipe for Clamp Jacket Pile Splice: to ASTM A252, Grade 3.
- .3 Lag screws, bolts, nuts, and washers through timber shall conform to ASTM A307, Grade A.
- .4 Unless noted otherwise, the size of plate washers used shall be as follows:

Bolt Diameter	Thickness	Plate Size
19.1 mm	9.5 mm	100 mm by 100 mm
25.4 mm	12.7 mm	125 mm by 125 mm
31.8 mm	12.7 mm	150 mm by 150 mm
38.1 mm	12.7 mm	150 mm by 150 mm

### 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 or installation.

- .3 Do not use intermittent welds. File or grind exposed welds smooth and flush. Seal weld all joints unless restricted otherwise by W59.
- .4 Weld in a manner to avoid distortion or damage to the members.

### **2.3 Protection and Galvanizing**

- .1 All miscellaneous steel sections or fabrications to be hot-dip galvanized after fabrication in accordance with ASTM A123/A123M-13.

## **3 EXECUTION**

### **3.1 Installation**

- .1 Install Work square, plumb, straight and true, accurately fitted, with tight joints and intersections.
- .2 At completion of installation, touch up connections, welds, and burned or damaged surfaces with approved compatible touch up coating to provide a complete continuous internal coating system on all steel surfaces specified to be coated.

### **3.2 Field Quality Control**

- .1 Inspection and testing of materials and workmanship may be carried out by an independent testing agency engaged by the Department Representative and paid for by the Contractor. Such inspection or testing will not augment or replace the Contractor's quality control nor relieve him of his contractual responsibility.
- .2 Replace any material or fabrication which is found to be defective or not in accordance with the Drawings and Specifications, at no cost to DFO.
- .3 Correction of minor misfits and a reasonable amount of cutting and reaming will be considered a part of erection. Any error which will prevent the proper assembly and fitting of parts with a moderate amount of reaming, clipping, or cutting will be considered defective Work.

\*\*\* END OF SECTION \*\*\*

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## 1 GENERAL

### 1.1 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 31 62 19 Timber Piles

### 1.2 References

- .1 ASTM A307-12 Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
- .2 ASTM A123/A123M-13 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .3 ASTM A153/A153M-09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .4 ASTM F1667-13 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .5 AWPA M2-11 Standard for Inspection of Treated Wood Products
- .6 CAN/CSA-O86-14 Engineering Design in Wood
- .7 CAN/CSA-O80 Series-08 (R2012) Wood Preservation
- .8 National Building Code of Canada 2010
- .9 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber
- .10 Western Wood Preservers Institute/Wood Preservation Canada/Southern Pressure Treaters' Association/Southern Forest Products Association, Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments (WWPI-BMPs)

### 1.3 Submittals

- .1 Submit certification of conformance to WWPI-BMPs for treated wood prior to shipping materials to Site.

### 1.4 Quality Assurance

- .1 Lumber shall be identified by a grade stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.
- .2 Preservation treatment, inspection, and re-treatment shall be in accordance with AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.

- .3 Treated wood shall be certified by an independent third party inspection agency to have been produced in compliance with the WWPI-BMPs. Compliance shall be documented as described in the WWPI-BMPs by the use of either the BMP Mark Program or by a certificate of compliance issued by a qualified independent accredited inspection agency.

### **1.5 Delivery, Storage, and Handling**

- .1 Deliver materials to Site in original factory packaging labelled with manufacturer's name and address.
- .2 Notwithstanding pre-shipping inspections, the Department Representative reserves the right to reject materials on Site that do not meet Specifications.
- .3 Store materials off ground and in accordance with manufacturer's recommendations.
- .4 Store and protect wood from nicks, scratches, and blemishes.
- .5 Replace defective or damaged materials with new.

### **1.6 Field Measurements**

- .1 Verify dimensions of existing timbers that are to be repaired or replaced prior to ordering materials and commencing Work.

## **2 PRODUCTS**

### **2.1 Sawn Timber**

- .1 Lumber grades shall conform to the requirements of the NLGA Standard Grading Rules (latest revision).
- .2 All sawn timber shall be Coast Douglas Fir, No. 1 structural grade or better, and unless specified otherwise, shall be properly air-dried and seasoned, containing not more than 19% moisture.
- .3 All materials shall be dressed as existing.
- .4 Preservative treatment, inspection, and retreatment shall be in accordance with CSA O80 and Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments (WWPI-BMPs).
- .5 Timbers shall be given full cell creosote treatment to a net retention of 290 kg/m<sup>3</sup>.

### **2.2 Connections**

- .1 Lag screws, bolts, nuts, and washers through timber shall conform to ASTM A307, Grade A.
- .2 Drift pins shall conform to CSA G40.21, Grade 260W.



- .3 Spikes, nails, and staples to conform to ASTM F1667.
- .4 Hot-dip galvanize all miscellaneous metal and fasteners in accordance with ASTM A123/A123M or ASTM A153/A153M unless noted otherwise.
- .5 Unless noted otherwise, use plate washers under heads and nuts of all bolts bearing on timber.

### **3 EXECUTION**

#### **3.1 Workmanship**

- .1 All timber Work shall be in accordance with CAN/CSA-O86.
- .2 All structural timber used in the Work shall be carefully and accurately placed in accordance with the Drawings. Joints shall be carefully cut to ensure even and uniform bearing on supporting members.
- .3 Install members true to line, levels and elevations, square and plumb.

#### **3.2 Handling of Treated Timber**

- .1 Contractors shall be familiar with and apply as appropriate the Installation and Maintenance Guidelines of treated wood as outlined in the WWPI-BMPs published November 1, 2011 or the most current version including published amendments.
- .2 Carefully handle treated timber to avoid breaking the treated surface. Avoid bruising or breaking of wood fibres.
- .3 Do not use cant hooks and rafting dogs on timbers. Drive no spikes into timbers except to tack the timbers in their final position; if spikes are so used they shall be fully driven and left in.
- .4 Unless specifically noted on the Drawings, do not cut treated timbers to facilitate fitting after treatment.
- .5 Prior to use in the Work, all creosoted timber to be installed below high water shall comply with all applicable environmental regulations and best management practices.

#### **3.3 Field Treatment**

- .1 Field cuts to new treated timbers shall not be permitted except with the written permission of the Department Representative. Replace timbers that are field cut without the permission of the Department Representative with new treated timbers.
- .2 For timbers authorized by the Department Representative for field treatment, comply with AWPA M4, CSA O80 Series, and WWPI-BMPs.

- .3 Treat cuts, breaks, and abrasions on surfaces of creosoted timber, if this damage is accepted by the Department Representative, with two separate coats of copper naphthenate treatment in accordance with CSA O80 for marine exposure. This preservative solution shall contain a minimum of 2% copper as metal (note that to obtain a solution containing 2% copper as metal, a preservative solution containing approximately 17% copper naphthenate is needed). Where bolt holes must be bored through creosoted timbers, treat the inner surface of the holes with two coats of copper naphthenate treatment, and dip the bolts in copper naphthenate treatment before installation.

### 3.4 Timber Connections

- .1 New bolt holes in timber shall be bored to 1 mm to 2 mm oversize. Holes for drift pins shall be 0.8 mm to 1 mm undersize and longer than drift pins. Holes for lag screws shall be as given in CSA Standard O86.
- .2 Unless specified otherwise, place connecting bolts, pins, or spikes in the centre of the timbers and not less than seven times the fastener diameter from the end of the timber.
- .3 Completely fill all unused bolt holes, nail holes, or drift holes in timbers which are removed and reinstalled, with mastic.
- .4 Unless noted otherwise, the size of plate washers used shall be as follows:

Bolt Diameter	Thickness	Plate Size
19.1 mm	9.5 mm	100 mm by 100 mm
25.4 mm	12.7 mm	125 mm by 125 mm
31.8 mm	12.7 mm	150 mm by 150 mm
38.1 mm	12.7 mm	150 mm by 150 mm

- .5 All shims for filling gaps shall be sawn timber, not plywood.

\*\*\* END OF SECTION \*\*\*

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## 1 **GENERAL**

### 1.1 **General**

- .1 This section of the Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

### 1.2 **Summary**

- .1 This section describes the requirements for supply and installation of all treated timber piles and logs.

### 1.3 **Related Sections**

- .1 Section 06 13 00 Heavy Timber Construction

### 1.4 **References**

- .1 CSA O56-M79 Round Timber Piles
- .2 CSA-O80 Series-08UPD-1 Wood Preservation
- .3 CSA G40.21 Structural Quality Steel
- .4 ASTM-A307 Standard Specification for Carbon Steel Bolts and Studs
- .5 Western Wood Preservers Institute/Wood Preservation Canada/Southern Pressure Treaters' Association/Southern Forest Products Association, Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments (WWPI-BMPs)

### 1.5 **Submittals**

- .1 Submit details of proposed pile driving hammer to the Department Representative for review.

### 1.6 **Delivery and Storage**

- .1 Store piles horizontally, evenly supported, and open-piled to permit air circulation when stored for prolonged periods.
- .2 When handling long piles, provide support at sufficient number of points to prevent damage due to excessive bending.
- .3 Handle treated piles with hemp, sisal, manilla, rope slings, or other approved means of support that will not damage the pile surface.

### **1.7 Handling and Protection**

- .1 Carefully handle treated piles to avoid breaking the treated surface. Avoid bruising or breaking of wood fibres.
- .2 Cant hooks and rafting dogs may be used only in the end 1.5 m of piles. Do not drive spikes into the piles below the higher high water level.
- .3 Treat cuts, breaks, or abrasions on surfaces of treated piles, bolt holes, and field cuts with two separate coats of hot creosote in accordance with CSA O80 for marine exposure. Bolts shall be dipped in hot creosote prior to installation.

## **2 PRODUCTS**

### **2.1 Batter Piles and Vertical Piles**

- .1 Round Wood Piles: Coast Douglas Fir to CSA O56 clean peeled piles with minimum 25 mm sapwood. Minimum Size 36 (#14) with tip diameter related to length as indicated in Table A1 of CSA O56.
- .2 Preservative Treatment: full cell creosote treatment to a net retention of 290 kg per cubic metre in accordance with CSA O80 and the "Best Management Practices for the Use of Treated Wood in Aquatic Environments".

### **2.2 Equipment**

- .1 Use an air, diesel, or drop hammer approved by the Department Representative. Hammer shall have a rated energy between 25 and 30 kilojoules (18,500 and 22,000 foot pounds).

## **3 EXECUTION**

### **3.1 Installation**

- .1 The Contractor is to ensure that loading conditions at pile replacement locations are adequate to support pile driving operations. Make provision for access and support of equipment during the performance of the Work.
- .2 The Contractor will be responsible for the temporary removal and reinstallation of all existing bracing members, batter pile connections, walers, etc., in order to facilitate the removal of damaged piles and the installation of new piles.
- .3 All damaged piles will be removed in their entirety. Pile stubs broken off at the mudline are not acceptable.

- .4 Drive vertical piles to a minimum depth of penetration of 6.0 m below the mudline and drive to a final set of five blows per 25 mm. When bedrock is encountered, drive each pile to practical refusal and to the satisfaction of the Department Representative. The Contractor shall be prepared to move rock apron on riverbed to facilitate pile driving if conflict is encountered. Do not over-drive to cause damage to the pile.
- .5 Drive timber piles such that they are not broken or split. Before driving, freshen the ends of the piles and snip (chamfer) the edge of the heads of the piles. If driving is hard, use steel tension bands or wire mesh to prevent the head from splitting; also, use 20 mm thick plywood discs, of equal diameter to the pile tip on the underside of the pile tip. Secure discs to pile tips with 75 mm to 100 mm long spiral nails before driving.
- .6 Any pile which is split or otherwise damaged below the cut-off elevation or which is driven out of position or out of plumb, so that in the opinion of the Department Representative it is unfit for the use for which it is intended, shall be removed and replaced with a sound pile, at the Contractor's expense.
- .7 After driving, the piles shall be cut off at the elevation shown on the Drawings.

### 3.2 Treatment of Pile Tops

- .1 Treat tops of all cut-off and new piles with two separate, liberally brushed coats of hot creosote followed by an application of approved troweled mastic at least 6 mm thick. Allow sufficient interval between applications to permit total absorption of creosote.
- .2 In addition, cover the tops of all cut off and new piles with a sheet of 22 gauge annealed corrosion-resistant aluminum cut 150 mm larger than the diameter of the pile top. Crimp and turn down the overhanging edges and secure to pile with eight aluminum roofing nails. Do not cut to facilitate fitting.

### 3.3 Connections

- .1 Plate washers shall be used under the heads and nuts of all bolts against timber piles. Size shall be:

Bolt Diameter	Thickness	Plate Size
¾ in. (19 diameter)	¾ in. (10 mm)	4 in. by 4 in. (100 mm by 100 mm)
7/8 in. (M22)	¾ in. (10 mm)	4 in. by 4 in. (100 mm by 100 mm)
1 in. (M24)	2 in. (12 mm)	5 in. by 5 in. (125 mm by 125 m)
1 1/8 in. (M27)	2 in. (12 mm)	6 in. by 6 in. (150 mm by 150 mm)
1 ¼ in. (32 diameter)	2 in. (12 mm)	6 in. by 6 in. (150 mm by 150 mm)

- .2 Plate washers against piles shall be curved, 6.5 in. (165 mm) radius.

- .3 All bolts through timber piles shall meet the requirements of ASTM A307, Grade A.
- .4 All miscellaneous metal, bolts, nuts, washers, spikes, and nails shall be hot-dip galvanized.
- .5 All plate, including plate washers, shall conform to CSA G40.21 Grade 300W.

### 3.4 Tolerances

- .1 Pile heads to be within 75 mm of the plan locations indicated.
- .2 Piles not to be more than 2% of length off vertical alignment.
- .3 If obstructions are encountered during pile driving, the Contractor may drive the pile immediately adjacent to the obstruction (even if the above tolerance are not satisfied) with prior approval from the Department Representative.

### 3.5 Field Measurement

- .1 Maintain accurate records of driving for each pile, including type and make of hammer, stroke or related driving energy; pile size, gross length, net length, and penetration position; the number of blows per metre for the entire length of pile and number of blows per 25 mm for the last 127 mm; and, any other pertinent information such as interruption of continuous driving, and pile damage.
- .2 Provide Department Representative with three copies of records.

\*\*\* END OF SECTION \*\*\*