

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Driving Templates

PART 1 - GENERAL

- | | | | |
|-----|----------------------|----|--|
| 1.1 | <u>Related Work</u> | .1 | Refer to Section 01 33 00 for Shop Drawing/Submissions requirements. |
| | | .2 | Refer to Section 31 61 13 Pile Foundations – General. |
| 1.2 | <u>References</u> | .1 | ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod, 60,000 PSI Tensile Strength. |
| | | .2 | ASTM A325M-14, Standard Specification for Structural Bolts, Steel, Heat Threaded 830 MPa Minimum Tensile Strength (Metric). |
| | | .3 | ASTM A490M-14a, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric). |
| | | .4 | CAN/CSA-G40.20-13, General Requirements for Rolled or Welded Structural Quality Steel. |
| | | .5 | CAN/CSA-G40.21-13, Structural Quality Steel. |
| | | .6 | CAN/CSA-S16-14, Design of Steel Structures. |
| | | .7 | CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel. |
| | | .8 | CSA W59-13, Welded Steel Construction (Metal Arc Welding). |
| | | .9 | CAN/CGSB-1.171M-98 (or latest edition), Inorganic Zinc Coating. |
| 1.3 | <u>Shop Drawings</u> | .1 | Submit shop drawings in accordance with Section 01 33 00. |
| | | .2 | Indicate the following items: |
| | | .1 | Material |
| | | .2 | Anchorage, field control and alignment methods |
| | | .3 | Design parameters |
| | | .4 | Tolerance for driving pile |
| | | .5 | Removable members |
| | | .6 | Alternatives |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Driving Templates

- | | | | |
|-----|--------------------------------|----|--|
| 1.4 | <u>Design Criteria</u> | .1 | Design templates to safely withstand following loads: |
| | | .1 | All gravity loads to which template shall be subjected. |
| | | .2 | Lateral loads to firmly hold pile in position when driving. |
| 1.5 | <u>Protection</u> | .1 | Protect templates from damage. Repair damage to templates, formwork or concrete arising from operations to satisfaction of Departmental Representative at no extra cost. |
| 1.6 | <u>Measurement For Payment</u> | .1 | No measurement will be made under this section. Include costs in items of work that require templates. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|---|
| 2.1 | <u>Materials</u> | .1 | Steel sections and plates: to CAN/CSA-G40.20 and CAN/CSA-G40.21, Type 350W. |
| | | .2 | Welding Materials: to CSA W59. |
| | | .3 | Bolts, nuts and washers: to ASTM A307 or ASTM A325M. |

PART 3 - EXECUTION

- | | | | |
|-----|-----------------------------|----|---|
| 3.1 | <u>Fabrication</u> | .1 | Fabricate structural steel for templates in accordance with CAN/CSA-S16.1 and reviewed shop drawings. |
| | | .2 | Welding in accordance with CSA W59. |
| | | .3 | Welding companies shall be qualified under provisions of CSA W47.1. |
| 3.2 | <u>Positioning</u> | .1 | Position and hold template in location to receive piles with an accuracy which will ensure piles are within tolerances specified in Section 31 61 13, Part 3.5. |
| 3.3 | <u>Removal of Templates</u> | .1 | Avoid any damage to piling when removing templates. |
| | | .2 | When instructed by Departmental Representative, remove templates from project site. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Sitework, Demolition, Removals & Reinstatement

Page 1

PART 1 - GENERAL

- | | | | |
|-----|----------------------------|----|---|
| 1.1 | <u>Description of Work</u> | .1 | This Section includes but is not limited to the following: <ul style="list-style-type: none">.1 All normal removals as required to complete the work. All items to be verified by a site visit prior to submission of a tender as per Section 01 10 10, Part 15..2 Removal and disposal of Pier 401..3 Relocation of derrick on marginal wharf including reinstatement on new concrete foundation pad..4 Relocation of existing armourstone..5 Electrical system modifications..6 Removal of concrete deck and partial removal of timber cribwork..7 All other site work and reinstatement not specified elsewhere. |
| | | .2 | Covered weather shelter to be removed by others unless otherwise indicated. |
| 1.2 | <u>Related Work</u> | .1 | Refer to Section 01 33 00 for Shop Drawing/Submission requirements. |
| 1.3 | <u>Submissions</u> | .1 | Methodology: <ul style="list-style-type: none">.1 When requested provide methodology for carrying out the work.2 Provide submission in accordance with Section 01 33 00. |
| 1.4 | <u>Protection</u> | .1 | Pier 401 has been barricaded to prevent any loading on the structure. It cannot bear any loading to carry out demolition and/or construction and will be removed by others. |
| | | .2 | Prevent movement, settlement or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of Departmental Representative and at no additional cost to Departmental Representative. |
| | | .3 | Prevent debris from going adrift and becoming a menace to navigation. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Sitework, Demolition, Removals & Reinstatement

Page 2

- .4 All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the Departmental Representative.

1.5 Measurement
For Payment

- .1 Sitework, demolition and removals will be measured in accordance with Section 01 29 00.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Preparation

- .1 Inspect site and verify with Departmental Representative items designated for removal and items to be preserved.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Provide temporary power and lighting as shown on the drawings or as required by the Departmental Representative.
- .4 Existing boat slip, existing building and adjacent infrastructure to be protected from any damages. All repairs to damages as a result of Contractor's operations to be at their cost and to the satisfaction of the Departmental Representative.

3.2 Removal

- .1 Remove items indicated.
- .2 Do not disturb adjacent structures designated to remain in place.
- .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.

3.3 Disposal of Material

- .1 Disposal of materials not designated for salvage or re-use in work, will be the contractor's responsibility, and must be disposed of off-site.

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Sitework, Demolition, Removals & Reinstatement

Page 3

- .2 The material to be disposed is to be transported and disposed of in an environmentally acceptable manner to the satisfaction of the Departmental Representative, and in accordance with any local, Municipal, Provincial and Federal restrictions and regulations.

3.4 Restoration

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Reinstall areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.
- .3 Reinstall relocated derrick, fully operational with new concrete foundation pad matching existing.
- .4 Reinstall power to existing derrick identified to remain.

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001****Excavating, Trenching and Backfilling****Page 1****PART 1 - GENERAL**

- | | | | |
|-----|--|----|---|
| 1.1 | <u>Description</u> | .1 | This section specifies requirements for excavating above chart datum, trenching and backfilling for concrete and timber panels, underground infrastructure and tie rods. This section describes the requirements for sandstone fill including placement. |
| 1.2 | <u>Reference Standards</u> | .1 | ASTM D698-12e2 (or latest edition), Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³)) - Method C. |
| | | .2 | AASHTO T099-15 (or latest edition), Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop. |
| | | .3 | PEI Department of transportation, Infrastructure and Energy General Provisions and Contract Specifications for Highway Construction (latest edition). |
| 1.3 | <u>Related Work</u> | .1 | Refer to Section 32 11 23 Granular Surface. |
| | | .2 | Refer to Section 35 20 23 Underwater Excavation and Site Preparation. |
| 1.4 | <u>Definitions</u> | .1 | Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1.5 m ³ . |
| | | .2 | Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, frozen materials and partially cemented materials such as asphalt which can be ripped and excavated with heavy construction equipment. |
| 1.5 | <u>Protection of Existing Features</u> | .1 | Existing buried utilities and structures: |
| | | .1 | Prior to commencing any excavation work, notify applicable utilities or authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001****Excavating, Trenching and Backfilling****Page 2**

- | | | | |
|-----|--------------------------------|----|--|
| | | .2 | Existing buildings and surface features: |
| | | .1 | Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work. |
| 1.6 | <u>Shoring and Bracing</u> | .1 | Comply with applicable local regulations to protect existing features. |
| 1.7 | <u>Samples</u> | .1 | At least 2 weeks prior to commencing work, inform Departmental Representative of proposed source of fill materials and provide access for sampling. |
| 1.8 | <u>Measurement For Payment</u> | .1 | Work performed under this Section will be incidental to work involved in other sections of this specification. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|---|
| 2.1 | <u>Materials</u> | .1 | Sandstone fill in accordance with PEI DOTIE Specifications for Select Borrow. |
| | | .2 | Granular surface material in accordance with Section 32 11 23. |
| | | .3 | Unsuitable excavated on-site material: excavated material, including swamp materials, organic material, peat and/or muck which is not suitable for use in work and must be disposed of. |

PART 3 - EXECUTION

- | | | | |
|-----|-------------------------|----|---|
| 3.1 | <u>Site Preparation</u> | .1 | Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated. |
| 3.2 | <u>Stockpiling</u> | .1 | Stockpile fill materials in areas approved by Departmental Representative. Stockpile granular materials in manner to prevent segregation. |
| 3.3 | <u>Dewatering</u> | .1 | Keep excavations free of water while work is in progress. |
| | | .2 | Protect open excavations against flooding and damage due to surface run-off. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Excavating, Trenching and Backfilling

Page 3

-
- | | | |
|-----|------------------------------------|---|
| | .3 | Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction. |
| 3.4 | <u>Excavation</u> | |
| | .1 | Excavate to lines, grades, elevations and dimensions indicted or as directed by Departmental Representative. |
| | .2 | Dispose of surplus and unsuitable excavated material in approved location off site. |
| | .3 | Do not obstruct flow of surface drainage or natural watercourses. |
| | .4 | Stockpile suitable excavated materials required for backfill in approved location. |
| | .5 | Dispose of surplus and unsuitable excavated material off site. |
| 3.5 | <u>Trench Bottom Preparation</u> | |
| | .1 | Where required due to removal of unsuitable material or unauthorized over-excavation bring bottom of excavation to design grade with approved material. |
| | .2 | Compact trench bottom to density at least equal to density of adjacent surrounding soil. |
| 3.6 | <u>Pre-Installation Inspection</u> | |
| | .1 | Excavations require inspection and approval prior to commencement of installation operations. |
| 3.7 | <u>Backfilling</u> | |
| | .1 | Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations. |
| | .2 | Areas to be backfilled to be free from debris, snow, ice, water and frozen ground. |
| | .3 | Do not use backfill material which is frozen or contains ice, snow or debris. |
-

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001****Excavating, Trenching and Backfilling****Page 4**

- .4 Backfilling around installations:
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Place material by hand under, around, and over installations until 300 mm of cover is provided. Dumping material directly on installations will not be permitted.
 - .5 Place backfill material in uniform layers not exceeding 150 mm in thickness up to subgrade elevation or top of trench. Compact each layer before placing succeeding layer.
 - .6 Compact common backfill and sandstone fill materials:
 - .1 In all areas, compact to a minimum 95% of Standard Proctor maximum dry density, maximum density ASTM D698, AASHTO T099, Method C.
 - .7 Compact granular surface material to a minimum 98% of Standard Proctor maximum dry density, maximum density AASHTO T099, Method C.
 - .8 No fill shall be placed against reinforced concrete wall panels or timber lagging until the tie rods are installed and tightened. Fill will be brought up evenly along the length of wall panels.
 - .9 Initial fill placement activities to be scheduled during low tide periods to minimize the amount of fill to be placed directly in water.
 - .10 Filling below the chart datum (L.N.T.) may be carried out by the simple end dumping process. The Contractor will ensure that large pieces, which will not render good consolidation and compaction do not enter the work.
 - .11 Commence infill above the chart datum (L.N.T.) as soon as possible with maximum 300 mm layers. Each layer will be brought to its required degree of compaction before the next layer is placed. When using hand operated tamping devices, deposit backfill material in uniform layers not exceeding 100 mm loose thickness.
-

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Excavating, Trenching and Backfilling

Page 5

.12 Install geotextile system in backfill as indicated and in accordance with Section 31 32 21.

.13 Compact using approved mechanical tamping devices, or by hand tamping to achieve specified compaction. Care must be taken while compacting near Berlin walls to prevent disturbance of the H-piles and wall panels.

3.8 Restoration

.1 Upon completion of work, remove surplus materials and debris and correct defects noted by Departmental Representative.

.2 Clean and reinstate areas affected by work such as temporary work areas and site access as directed by Departmental Representative.

PART 1 - GENERAL

- | | | | |
|-----|--------------------------------|----|---|
| 1.1 | <u>Related Work</u> | .1 | Refer to Section 31 23 10 Excavating, Trenching and Backfilling. |
| 1.2 | <u>References</u> | .1 | ASTM D4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method. |
| | | .2 | ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile. |
| | | .3 | CAN/CGSB-4.2 No.4.2 (R2013 or latest edition), Textile Test Methods. |
| | | .4 | CAN/CGSB-148.1 No 14-M93 (or latest edition), Methods of Testing Geosynthetics. |
| 1.2 | <u>Mill Certificates</u> | .1 | At least two weeks prior to start of work, furnish Departmental Representative with copies of mill test data and certificate that filter fabric delivered to job site meets requirements of this section. |
| 1.4 | <u>Approval</u> | .1 | Obtain written approval of Departmental Representative for filter fabric before installation of material in work. |
| 1.5 | <u>Measurement For Payment</u> | .1 | Filter fabric will be measured in accordance with Section 01 29 00. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|---|
| 2.1 | <u>Materials</u> | .1 | Synthetic fiber: rot proof, unaffected by action of oil or salt water and not subject to attack by insects or rodents. |
| | | .2 | Fabric: nonwoven polyester and/or polypropylene fabric. |
| | | .3 | Seams: lapped in accordance with manufacturer's recommendations for placement on soil. Lap as noted on drawings for installation behind wharf lagging panels. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Geotextiles

- .4 Physical properties for installation behind lagging panels: to ASTM D4595, CAN/CGSB-4.2 No.4.2, CAN/CGSB-148.1 No 14 and ASTM D4751:
 - .1 Tensile Strength 800 – 850 N
 - .2 Tear Resistance 325 – 400 N
 - .3 Elongation at break 50 - 100%
 - .4 Filtration Opening Size 75 – 115 μ m.
 - .5 Permeability 1.3 cm/sec
- .5 Physical properties for installation under armour slope: to ASTM D4595, CAN/CGSB-4.2 No.4.2, CAN/CGSB-148.1 No 14 and ASTM D4751:
 - .1 Tensile Strength 1100 – 1300 N
 - .2 Tear Resistance 450 – 500 N
 - .3 Elongation at break 50 – 100%
 - .4 Filtration Opening Size 45 - 90 μ m.
 - .5 Permeability 1.9 cm/sec

PART 3 - EXECUTION

- 3.1 Preparation of Base
 - .1 Fine grade area to be covered with filter fabric to a uniform surface area. Fill depressions with suitable material.
- 3.2 Placing Filter Fabric On Slopes
 - .1 Place filter fabric on prepared surface loosely from top of the slope to the bottom allowing fabric to conform easily to contours of the slope.
 - .2 Allow one (1) metre of fabric for overlapping and anchoring purposes, 700 mm at the top and 300 mm at the bottom of the slope.
 - .3 Longitudinal seams will have a minimum of 600 mm overlap and will be pinned every 450 mm with securing pins.
 - .4 Anchor top of fabric at 1 metre intervals with 15mm diameter steel rods 600 mm in length. Anchor bottom of fabric by folding fabric and placing fill on top.
 - .5 No equipment will be permitted on fabric.

3.3

Installing Filter
Fabric Behind
Lagging Panels

- .6

Install geotextile behind lagging panels as indicated on the drawings.
- .1

Install filter fabric flat over lagging panels without gaps. Remove any soil or debris adhered to lagging panels or piles prior to installation of fabric.
- .2

Secure using timber boards as shown on drawings or as required to ensure overlaps are maintained during backfilling.
- .3

No gaps in filter fabric will be allowed at the tie rod connections.
- .4

Protect filter fabric during backfilling

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

PART 1 - GENERAL

- | | | | |
|-----|--|----|---|
| 1.1 | <u>Related Work</u> | .1 | Refer to Section 01 33 00 Shop Drawing/Submission requirements. |
| | | .2 | Refer to Section 31 62 18 Steel H Piles. |
| 1.2 | <u>Reference Standards</u> | .1 | CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding. |
| 1.3 | <u>Submissions</u> | .1 | Methodology:
.1 Provide methodology including type of pile driving equipment to carry out the work.
.2 Provide submissions in accordance with Section 01 33 00. |
| 1.4 | <u>Existing Sub-Surface Conditions</u> | .1 | Sub-surface investigation reports are appended to the specifications. Relevant borehole logs are included on the drawings. |
| | | .2 | Notify the Departmental Representative immediately if subsurface conditions at site differ from these indicated. |
| 1.5 | <u>Protection</u> | .1 | Protect public and construction personnel, adjacent structures and work of other sections from hazards attributes to pile driving operations or any other operations. |
| 1.6 | <u>Scheduling of Work</u> | .1 | Submit schedule of planned sequence of pile driving to Departmental Representative for review, not less than 2 weeks prior to commencement of pile driving for structure. |
| 1.7 | <u>Delivery, Storage And Handling</u> | .1 | Protect piles from damage due to excessive bending stresses impact, abrasion or other damages during storage and handling. |
| | | .2 | Replace damaged piles to the satisfaction of the Departmental Representative. |
-

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

PART 2 - PRODUCTS2.1 Materials

- .1 For material requirements refer to Section 31 62 18 – Steel H-Piles.
- .2 Provide equipment of sufficient capacity to handle full length piles without cutting and splicing. Supply or fabricate full length piles.
- .3 Pile lengths indicated are based on lengths estimated to remain in completed structure, plus a 1.0 metre cut-off allowance.
- .4 Do not splice piles without written permission of Departmental Representative. When permitted, provide details for Departmental Representative review. Design details of splice to bear dated signature stamp of professional engineer registered or licensed in the Province of Prince Edward Island, Canada.
- .5 Welding materials: to CSA W48.

PART 3 - EXECUTION3.1 Equipment Requirements

- .1 Contractor is responsible to determine and provide equipment suitable for driving piles and prevent failure of works during construction.
- .2 Equipment information: prior to commencement of pile installation operation, submit to Departmental Representative for review, details of equipment for installation of piles. For impact hammers give manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer and mass of driving cap.
- .3 Hammer:
 - .1 Supply a hammer of suitable size to advance the piles to achieve necessary bedrock penetration and tip elevation. H-piles shall be driven with a hammer rated to deliver approximately 350 joules per square cm of steel cross sectional area. The hammer selected will be of sufficient energy so as not to damage the piles.

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

Page 3

.2 When required penetration is not obtained by use of hammers complying with minimum requirements, either provide larger hammer or take other measures, acceptable to Departmental Representative. Drop hammers are permitted. All piles damaged due to over driving to be replaced at the Contractor's cost.

.4 Leads:

.1 Construct pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom, with guys, stiff braces, or other means reviewed by Departmental Representative, to ensure support to pile while being driven.

.2 Length: except for piles driven through water, provide length of leads so that use of a follower is unnecessary.

.3 Swing leads: firmly guy top and bottom to hold pile in position during driving operation. Method to be reviewed by Departmental Representative.

.5 Followers:

.1 When permitted, provide followers of such size, shape, length and mass to permit driving pile in desired location to required depth and resistance. Provide followers with socket or hood carefully fitted to top of pile to minimize loss of energy and prevent damage to pile.

3.2 Preparation

.1 Ensure that conditions at pile locations are adequate to support pile driving operation. Make provision for access and support of piling equipment during performance of work.

3.3 Field Measurement

.1 Maintain accurate records of driving for each pile, including:

- .1 Type and make of hammer, stroke or related energy.
- .2 Other driving equipment including water jet, driving cap, cushion.
- .3 Pile size, length and location.
- .4 Sequence of driving piles.
- .5 Number of blows per 500mm for entire length of pile and number of blows per 100 mm for last 2,000 mm, and number of blows per 25 mm for last 500 mm.
- .6 Final tip and cut-off elevations.

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

Page 4

-
- .7 Other pertinent information such as interruption of continuous driving, pile damage.
 - .8 Record elevation taken on adjacent piles during driving of each pile.
 - .9 All measurements, observations and calculations associated with wave equation analysis.
-
- .2 Provide Departmental Representative with three (3) copies of records.
-
- 3.4 Driving
- .1 Use driving caps to protect piles. Reinforce pile heads if necessary. Piles with damaged heads as determined by Departmental Representative will be rejected.
 - .2 Use steel drive shoes to protect pile toes during driving to the approval of the Departmental Representative.
 - .3 Hold piles securely and accurately in position while driving.
 - .4 Deliver hammer blows in direct axis of pile.
 - .5 Reinforce pile heads if necessary.
 - .6 Do not drive piles within a radius of 8 m of concrete which has been in place less than 3 days.
 - .7 Re-drive piles lifted during driving of adjacent piles.
 - .8 Use of water jet:
 - .1 Use water jets only with written permission of Departmental Representative.
 - .2 When water jets are permitted number of jets and volume and pressure of water must be sufficient to freely erode material immediately adjacent to pile. Plant must be capable of delivering water pressure of at least 690kPa as measured at two 20 mm nozzles.
 - .3 Restriction: stop jetting at a minimum of 1 m above tip elevation of piles previously driven within 2 m of jet, except where piles are to be carried to rock surface. Drive piles down beyond depth of jetting until required resistance is obtained. If there is evidence that jetting has
-

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

disturbed load-bearing capacities of previously installed piles, restore bearing capacity of those piles by re-driving. Re-drive where necessary after jetting operations in area have been completed.

- .10 Cut off piles neatly and squarely at elevations indicated. Provide sufficient length above cut-off elevation so that part damage during driving is cut off.
- .11 Remove cut-off lengths from site on completion of work.
- .12 Installation of each pile will be subject to acceptance by Departmental Representative. Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration and tip elevation. Departmental Representative to accept final driving of all piles prior to removal of pile driving rig from site.
- .13 Shape bottom of timber pile so that shoe will have full bearing on pile prior to driving. Install pile shoes using spikes.
- .14 All steel H-piles shall be driven into bedrock with a minimum rock penetration and minimum toe elevation as shown on the drawings. Where augering is required for piles to achieve their required penetration, provide holes of size sufficient to install pile and concrete.

3.5 Driving Tolerances

- .1 Pile heads to be within 50 mm of locations indicated.
- .2 Piles not to be more than 2% of length out of alignment.

3.6 Obstructions

- .1 Where obstruction is encountered that causes sudden and unexpected change in penetration resistance or deviation from specified tolerances, advise Department Representative and submit for their review the Contractor's proposed method(s) for achieving specified penetrations and tolerances. Incorporate review comments in the proposed method(s) and proceed with the work.

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Pile Foundations General

Page 6

-
- | | | | |
|-----|-----------------------------------|----|---|
| 3.7 | <u>Damaged or Defective Piles</u> | .1 | Remove rejected pile and replace with a new, and if necessary, a longer pile. |
| | | .2 | No extra compensation will be made for removing and replacing or other work made necessary through rejection of a defective pile. |
| 3.8 | <u>Penetration</u> | .1 | Protect adjacent structures, services and work of other section from hazards due to pile driving operations. |
| | | .2 | Arrange sequencing of pile driving operations and methods such that no damage occurs to adjacent existing structures. If damaged, remedy damaged items to restore to original or better condition at own expense. |
-

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Steel H Piles

PART 1 - GENERAL1.1 Related Sections

- .1 Section 01 33 00 –Shop Drawings/Submissions.
- .2 Section 31 61 13 – Pile Foundations General.

1.2 Measurement Procedures

- .1 Steel H-piles will be measured in accordance with Section 01 29 00.
- .2 The following are considered as incidental to supply of piles: shoes, steel point reinforcing, and concrete for augered installation.

1.3 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.171M-98, Inorganic Zinc Coating.
- .2 Canadian Standards Association (CSA)
 - .1 CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel.
 - .2 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
 - .3 CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Metric Version).
 - .4 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .3 The Society for Protective Coatings
 - .1 SSPC-SP (latest edition), Surface Preparation Specification.

1.4 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Indicate: pile shoes and tip reinforcement.
- .3 Each drawing submitted shall bear the signature and stamp of qualified Professional Engineer registered or licensed in the Province of Prince Edward Island.

**Machon's Point Marginal
Wharf Construction
Murray Harbour, Kings Co, PEI
Project No. R077232.001**

Steel H Piles

Page 2

- | | | | |
|-----|--------------------------------------|----|---|
| 1.5 | <u>Test Reports</u> | .1 | Furnish mill test reports indicating yield and chemical analysis of steel piles if requested by Departmental Representative. |
| 1.6 | <u>Waste Management and Disposal</u> | .1 | Separate and recycle waste materials in accordance with provincial regulations. |
| | | .2 | Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan. |
| | | .3 | Place materials defined as hazardous or toxic in designated containers. |
| | | .4 | Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative. |
| | | .5 | Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative. |
| | | .6 | Fold up metal banding, flatten and place in designated area for recycling. |
| | | .7 | Unused paint and coating materials must not be disposed of into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard. |

PART 2 - PRODUCTS

- | | | | |
|-----|------------------|----|--|
| 2.1 | <u>Materials</u> | .1 | Steel H piles: to CSA-G40.20/G40.21, Type and Grade 350 W. Size and weight as indicated. |
| | | .2 | Welding materials: to CSA W48. |
| | | .3 | Steel plates: to CSA-G40.20/G40.21, Type and grade 350W. |
| | | .4 | Pile driving shoes: to CSA-G40.20/G40.21, Grade 350W. |

Machon's Point Marginal**Wharf Construction****Murray Harbour, Kings Co, PEI****Project No. R077232.001**

Steel H Piles

PART 3 - EXECUTION3.2 Installation

- .1 Install piling in accordance with Section 31 61 13 - Pile Foundation, General.
- .2 Provide driving shoes for all piles as directed by Departmental Representative.
- .3 Do not splice piles without written permission of Departmental Representative. When permitted, provide splice shop drawings which bear the signature and stamp of a qualified Professional Engineer registered a license in the Province of Prince Edward Island.
- .4 Cut off piles squarely at required elevation.
- .5 Cut-off parts of piles will become the property of the Contractor and will be disposed of. Pile cut-offs to be used as pile connection with tie rods.

3.3 Welding

- .1 Weld to CSA W59 and all related supplements.
 - .2 Welding certification of companies: to CSA W47.1 and all related supplements.
-