

PART 1 - GENERAL

1.1 Related Work .1 Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.

1.2 Source Approval .1 Source of materials to be incorporated into work or stockpiled requires acceptance.

.2 Inform *Departmental Representative* of proposed source of aggregates and provide access for sampling at least four (4) weeks prior to commencing production.

.3 If, in the opinion of Departmental Representative, materials from the proposed source do not meet, or cannot reasonably be processed to meet specified requirements, procure an alternative source to demonstrate that materials from source in question can be processed to meet specified requirements.

.4 Should a change of material source be proposed during work, advise *Departmental Representative* four (4) weeks in advance of proposed change to allow sampling and testing.

.5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.

1.3 Production Sampling .1 Aggregate will be subject to continual sampling during production.

.2 Provide *Departmental Representative* with ready access to source and processed material for purpose of sampling and testing.

1.4 Measurement For Payment .1 This item will not be measured separately.

PART 2 - PRODUCTS

2.1 Materials .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material or other deleterious substances.

.2 Flat and elongated particles are those whose greatest dimension exceeds four times their least dimension.

- .3 Fine aggregates satisfying requirements of applicable section shall be one, or a blend of following:
 - .1 Natural sand
 - .2 Manufactured sand
 - .3 Screening produced in crushing of quarried rock, boulders, gravel or slag
 - .4 Coarse aggregates satisfying requirements of applicable section shall be one of following:
 - .1 Crushed rock or slag
 - .2 Gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

3.1 Development of
Aggregate Source

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by the *Departmental Representative*.
- .2 Clear, grub and strip an area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
- .3 When operating in stratified deposits use excavation equipment and methods that will produce a uniform, homogeneous aggregate.
- .4 When excavation is completed, provide drains or ditches as required to prevent surface standing water.
- .5 Trim off and dress slopes of waste material piles and leave site in a neat condition.

3.2 Processing

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregate if required to obtain gradation requirements specified. Use approved methods and equipment.

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Aggregates General

.3 Blending to increase percentage of crushed particles or decrease percentage of flat and elongated particles is permitted.

.4 Wash aggregates if required to meet specifications. Use only equipment accepted by *Departmental Representative*.

3.3 Handling

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.4 Stockpiling

.1 Stockpiling aggregates on stabilized, clean and well drained surfaces.

.2 To ensure that no material other than stockpiled aggregate is used, do not incorporate bottom 250 mm of stockpile into work, if aggregates are stockpiled on ground.

.3 Stockpile far enough apart to prevent intermixing.

.4 Reject intermixed or contaminated materials. Remove and dispose of rejected materials as directed within 48 hours of rejection.

.5 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1 m for coarse aggregate and base course materials.

.2 Max 2 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.6 Complete each layer over entire stockpile area before beginning next layer.

.7 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.8 Coning of piles or spilling of material over edges of pile will not be permitted.

.9 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

END OF SECTION

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Sitework, Demolition, and Removals

PART 1 – GENERAL1.1 Related Work

- .1 Refer to other specification sections for related information.
- .2 Refer to Section 01 33 00 for Shop Drawing/Submission requirements.

1.2 Submissions

- .1 Methodology:
 - .1 When requested provide methodology for carrying out the work
- .2 Provide submission in accordance with Section 01 33 00.

1.3 Protection

- .1 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*.
- .2 Prevent debris from going adrift and becoming a menace to navigation.
- .3 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*.

1.4 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 – EXECUTION3.1 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.

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Sitework, Demolition, and Removals

- .3 Provide temporary power and lighting as shown on the plan or as required by the *Departmental Representative*.
- .4 Existing fill and vent pipes, oil waste tanks and underground storage tanks to be protected from any damages. All repairs to damages as a result of Contractor's operations to be at his 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.
- .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 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

END OF SECTION

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Excavating and Backfilling

PART 1 - GENERAL

- 1.1 Description .1 This section specifies requirements for excavating and backfilling for storm sewer, water and sewage mains, and sewage overflow.
- 1.2 Reference Standards .1 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 AASHTO T99-18, Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and 305 mm (12 in) Drop.
- .3 AASTO C127-12, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
- .4 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .5 ASTM C117-13, Standard Test Method for Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.
- 1.3 Related Work .1 Refer to other Specification Sections for related information.
- .2 Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.
- 1.4 Definitions .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 m³.
- .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 Protection of Existing Features .1 Existing buried utilities and structures:
- .1 Prior to commencing any excavation work, notify applicable owner or authorities, establish location and

state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.

- .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 Shoring and Bracing

- .1 Comply with applicable local regulations to protect existing features.

1.7 Samples

- .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 Measurement For Payment

- .1 Work performed under this Section will be incidental to work involved in other sections of this specification.

PART 2 - PRODUCTS

2.1 Materials

- .1 Granular Backfill: to consist of hard, durable, quarry or pit run material of an approved quality. The material will be free from frost, snow stumps, weeds, sod, roots, logs, silt, organic material, garbage, or any other waste materials and must be capable of being compacted to degree as specified herein and meeting approval of the *Departmental Representative*. Material to be uniformly graded having a stone size between 75 to 200 mm (R5 random rip-rap) on any dimension. Slate, sandstone or shale rock shall not be accepted. Specific gravity not less than 2.65 when tested to ASTM C127-12 (AASHTO T85-14).
 - .1 Gradation to meet NBOT 'R5' Random Rip-Rap limits as follows:

ASTM SIEVE SIZE	% PASSING BY MASS
220 mm	100
190 mm	70 – 90
150 mm	40 – 55
70 mm	0 – 15

.2 Gradation to meet NBDOT 'R25' Random Rip-Rap limits as follows:

ASTM SIEVE SIZE	% PASSING BY MASS
380 mm	100
330 mm	70 – 90
260 mm	40 – 55
120 mm	0 – 15

.2 Granular Base and Sub-Base: rock, clear, hard durable, angular, crushed quarried rock aggregate free from silt, clay lumps, organic matter, foreign substances and free from splits, seams or defects. Specific gravity not less than 2.6 when tested to ASTM C127-12 (AASHTO T85-14).

.1 Gradation to be within the following limits when tested to ASTM C136-06 and ASTM C117012 and giving a smooth curve without sharp breaks when plotted on a semi-log grading chart.

.1 Gradation – Granular Base (Type 1):

ASTM SIEVE SIZE	% PASSING BY MASS
31.5 mm	95 – 100
25.0 mm	81 – 100
19.0 mm	66 – 90
12.5 mm	50 – 77
9.5 mm	41 – 70
4.75 mm	27 – 54
2.36 mm	17 – 43
1.18 mm	11 – 32
300 µm	4 – 19
74 µm	0 – 8

.2 Gradation – Granular Sub-Base (Type 2):

ASTM SIEVE SIZE	% PASSING BY MASS
75.0 mm	100
0.425 mm	30 max
0.075 mm	8 max

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Excavating and Backfilling

PART 3 - EXECUTION

- 3.1 Site Preparation .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- 3.2 Stockpiling .1 Stockpile fill materials in areas approved by *Departmental Representative*. Stockpile granular materials in manner to prevent segregation.
- 3.3 Dewatering .1 Keep excavations free of water while work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .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 Excavation .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 Pre-Installation Inspection .1 Excavations require inspection and approval prior to commencement of installation operations.
- 3.6 Backfilling .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.

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Excavating and Backfilling

- .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 materials:
 - .1 In non-pavement areas, to a density at least equal to density of adjacent, undisturbed soil.
 - .2 In pavement areas, compact to a minimum of 90% for cohesive soils and 95% for cohesion less soils of corrected maximum dry density, maximum density ASTM D698, AASHTO T99, Method C.
 - .7 Compact granular backfill material to a minimum 95% of corrected maximum dry density, maximum density AASHTO T99, Method C.
 - .8 Compact using approved mechanical tamping devices, or by hand tamping to achieve specified compaction.
- 3.7 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 as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Work
- .1 Refer to other Specification Sections for related information.
 - .2 Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.
- 1.2 References
- .1 ASTM D4595-17, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .2 CAN/CGSB-4.2 No. 14-2005, Textile Test Methods.
 - .3 CAN/CGSB-148.1 No. 4-94, Geotextiles – Normal Water Permeability Under No Compressive Load.
 - .4 ASTM D4751-16, Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
- 1.3 Mill Certificates
- .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 Approval
- .1 Obtain written approval of Departmental Representative for filter fabric before installation of material in work.
- 1.5 Measurement For Payment
- .1 Filter fabric will be considered incidental to the work.

PART 2 - PRODUCTS

- 2.1 Materials
- .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: sewn in accordance with manufacturer's recommendations.
 - .4 Physical properties: to ASTM D4595, CAN/CGSB-4.2 No. 14-2005, CAN/CGSB-148.1 No. 4-94 and ASTM D4751;
 - .1 Tensile Strength 900 N
 - .2 Tear Strength 360 N

- .3 Elongation at break 50%
- .4 Filtration Opening Size = 100 - 80um.
- .5 Permeability = 2 x 10⁻¹ 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

- .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 seems will have a minimum of 450 mm overlap and will be pinned every 600 mm with 100 mm nails.
- .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 Place granular base material over filter fabric to a depth of 200 mm. No equipment will be permitted on fabric.

END OF SECTION

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to other Specification Section for related information.
- .2 Refer to Section 01 33 00 for Shop Drawings/Submissions requirement
- .3 Section 31 62 18 – Steel H-Piles.
- 1.2 Submissions .1 Methodology:
- .1 Provide methodology including type of pile installation equipment to carry out the work.
- .2 Provide submissions in accordance with Section 01 33 00.
- 1.3 Existing Sub-Surface Conditions .1 Sub-surface investigation reports may be available for viewing at the *Departmental Representative's* office and at the offices of Public Works and Government Services Canada, 1045 Main Street, 1st Floor, Lobby C Unit 108, Moncton, New Brunswick.
- .2 Notify the *Departmental Representative* immediately if subsurface conditions at site differ from these indicated.
- 1.4 Protection .1 Protect public and construction personnel, adjacent structures and work of other sections from hazards attributed to pile installation operations or any other operations.
- 1.5 Scheduling of Work .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.
- 1.6 Delivery, Storage And Handling .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*.

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Pile Foundations – General

PART 2 – PRODUCTS2.1 Materials

- .1 Supply full length steel H-Piles as indicated in accordance with Section 31 62 18 – Steel H Piles.
- .2 Provide equipment of sufficient capacity to handle full length piles without cutting and splicing.
- .3 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 New Brunswick, Canada.
- .4 Welding materials: to CSA W48.1

PART 3 – EXECUTION3.1 Preparation

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

3.2 Installation

- .1 The steel H-piles are to be installed true and plumb along the baseline as shown on the drawings. H-piles shall be installed by pre-drilling into bedrock.
- .2 Pre-drill a 650 mm diameter socket by the full embedment length of the piles into bedrock to achieve satisfactory plumpness and the depth as shown on the drawings.
- .3 All piles are to be installed to a minimum of 4 meters into bedrock as shown on the drawings. The elevations vary depending on the exact location of bedrock.
- .4 Deviations from vertical in any direction shall not exceed 1 to 50 for all piles.
- .5 Hold piles securely and accurately in position during installation.
- .6 Cut off piles neatly and squarely at elevations indicated.
- .7 Remove cut-off lengths from site on completion of work.

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Pile Foundations – General

- 3.3 Field Measurement .1 Maintain accurate records of driving for each pile, including:
- .1 Pile size, length and location.
 - .2 Final tip and cut-off elevations.
- .2 Provide *Departmental Representative* with three copies of records.
- 3.4 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.
- 3.5 Damaged or Defective Piles .1 No extra compensation will be made for removing and replacing or other work made necessary through rejection of a defective pile.
- 3.6 Protection .1 Protect adjacent structures, services and work of other section from hazards due to pile installation operations.
- .2 Arrange sequencing of pile installation operations and methods such that no damage occurs to adjacent existing structures. If damaged, remedy damaged items to original or better condition at Contractor’s expense and to the satisfaction of the *Departmental Representative*.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- .1 Refer to other Specifications Sections for related information.
- .2 Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.
- .3 Section 31 61 13 – Pile Foundations, General Requirements.

1.2 Measurement Procedures

- .1 Supply and installation of H-piles will be measured in accordance with Section 01 29 00.
- .2 Consider pile shows as incidental to installation of piles.
- .3 Mobilization of equipment will be considered incidental to installation of piles.
- .4 Actual number and lengths of piles installed will be established by *Departmental Representative* from piling records.
- .5 Adjustments in contract price due to changes in number and lengths of piles will be based on unit prices established in Contract.

1.3 References

- .1 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel.
- .2 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
- .3 CSA W59-18, Welded Steel Construction.
- .4 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

1.4 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submissions/shop drawings.
- .2 Each drawing submitted shall bear the signature and stamp of qualified Professional Engineer registered or licensed in the Province of New Brunswick, Canada.

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- 1.5 Test Reports .1 Furnish mill test reports indicating yield and chemical analysis of steel piles if requested by *Departmental Representative*.
- 1.6 Existing Sub-Surface Conditions .1 Sub-surface investigation reports are available for viewing at the *Departmental Representative's* office and at the offices of Public Works and Government Services Canada, Unit 100, 4th Floor, 1045 Main Street Moncton, NB. Relevant borehole logs are included on the drawings.
- .2 Notify the *Departmental Representative* immediately if subsurface conditions at site differ from these indicated.
- 1.7 Measurement For Payment .1 Supply of steel H-Piles will be measured in accordance with Section 01 29 00.
- .2 Installation of steel H-Piles will be measured in accordance with Section 01 29 00.
- .3 Mobilization of equipment will be considered incidental to installation of piles.
- .4 Base tender on number and lengths of piles indicated on the plan.
- .5 *Departmental Representative* will establish actual number and lengths of piles installed from driving records.
- .6 Adjustments in contract price due to changes in number and lengths of piles will be based on unit prices established in Contract.
- 1.8 Waste Management and Disposal .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

- 2.1 Materials .1 Steel H piles: to CSA-G40.20/G40.21, Grade 350W. Size and weight as indicated on drawings.
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- .2 Welding materials: to CSA W48.

PART 3 - EXECUTION

3.1 Installation

- .1 Install piling in accordance with Section 31 61 13 - Pile Foundations – General. Piles shall be installed by pre-drilling into bedrock as shown on the drawings.
- .2 Hold piles securely and accurately in position during placement of socket concrete.
- .3 Prior to commencement of pile installation operation, submit to *Departmental Representative* for approval, details of equipment and method to be used for the installation of piles.
- .4 Cut off piles squarely at required elevation.

3.2 Tolerances

- .1 Deviations from the vertical in any direction shall not exceed 1 to 50 for all piles.
- .2 Piles must be install in such a manner so the face of the wharf is straight. Maximum tolerance about axis of pile layout shall be +/- 10 degrees.

3.3 Welding

- .1 Weld to CSA W59.
- .2 Welding certification of companies: to CSA W47.1.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 – GENERAL

- 1.1 Related Work
- .1 Refer to other Specification Sections for related information.
 - .2 Refer to Section 01 33 00 for Shop Drawing/Submission requirements.
 - .3 Section 03 20 00 – Concrete Reinforcement.
 - .4 Section 03 30 00 – Cast in Place Concrete.
 - .5 Section 03 41 00 – Precast Structural Concrete.
 - .6 Section 05 50 00 – Metal Fabrications.
 - .7 Section 31 23 10 – Excavating and Backfilling
 - .8 Section 31 62 18 – Steel H-Piles.

- 1.2 Submissions
- .1 At least two (2) weeks prior commencing the work, submit Berlin Wall Construction methodology to Departmental Representative for review.
 - .2 Prior to commencement of pile installation operation, submit to Departmental Representative for approval, the details of equipment and method to be used for the installation of piles for Berlin Wall.
 - .3 Provide submissions in accordance with Section 01 33 00.

PART 2 - PRODUCTS

- 2.1 Steel H-Piles
- .1 The supply of steel H-piles for the construction of Berlin Wall shall meet the requirements of Section 31 62 18.
- 2.2 Steel Angles,
Tie Rods, and
Miscellaneous Steel
- .1 The supply of steel angles, tie rods, and all miscellaneous steel required as shown on the drawings, shall meet the requirements of Section 05 50 00.

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Berlin Wall Construction

2.3 Concrete Panels
And Anchor Blocks .1 The supply of concrete panels and anchor blocks, as shown on the drawings, shall meet the requirements of Section 03 30 00 and Section 03 41 00.

2.4 Lifting Anchors .1 'Swift Lift' anchors (recessed) as per manufacturer's recommendation. Dayton Superior or approved equal.
.1 Submit shop drawing for review prior to ordering of lifting anchors.

PART 3 - EXECUTION

3.1 General
Installation .1 The installation of steel H-piles, steel angles, tie rods, tie rod connection bracket, concrete panels and anchor blocks for the construction of the Berlin Wall shall be carried out in accordance with their applicable sections.

3.2 H-Pile Installation .1 The steel H-piles for Berlin Wall shall be installed true and plumb along the baseline as shown on the drawings.
.2 Hold piles securely and accurately in position during installation.
.3 Cut off piles squarely at required elevation.
.4 Tolerances:
.1 H-piles are to be installed as shown on the drawings and specified herein.
.2 Deviations from the vertical in any direction shall not exceed 1 to 50 for any pile.
.3 Piles shall be installed in such a manner so the face of the Berlin Wall is straight. Maximum rotation tolerance about axis of pile layout shall be +/- 10 degrees.
.4 Tolerance at the top of Berlin Wall shall be +/- 15 mm.

3.3 Concrete Panel
Installation .1 Place concrete panels between flanges of H-piles.
.2 Temporarily support concrete panels to prevent movement during tie rod installation and backfilling operations.

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- .3 Concrete panels shall be installed with temporary shims to prevent movement of panel until the backfilling operations are complete.
- .4 Concrete panel bearing on flange of H-pile shall be minimum 80 mm.

3.4 Tie Rod Installation

- .1 All H-piles must be driven and approved by Departmental Representative.
- .2 Concrete anchor blocks shall be in place and approved by Departmental Representative.
- .3 Weld tie rod connection brackets to all H-piles.
- .4 Install new tie rods and connect to anchor blocks.
- .5 Tighten tie rod nuts at concrete anchor blocks against bearing plate so that there is no sag in tie rods. Departmental to approve final placement of each tie rod.

3.5 Backfilling

- .1 Do not proceed with backfilling operations until the Departmental Representative has inspected and approved areas to be backfilled.
 - .2 Install filter fabric on back side of panels and on top of existing fill material as shown on the drawings.
 - .3 Place R25 random riprap around perimeter of Berlin Wall to seal gap between existing cribwork structure and bottom of Berlin Wall panels.
 - .4 Place R5 random riprap backfill material into the bottom of the backfilled areas. Backfilling below LNT and up to 400 mm above LNT may be end dumped.
 - .5 Areas to be backfilled to be free from debris, snow, ice, water, and frozen ground.
 - .6 Do not use backfill material which is frozen or contains ice, snow or debris.
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- .7 Place backfill material in uniform layers not exceeding 300 mm compacted thickness. Compact each layer to create a firm, dense and rigid base before placing succeeding layer.
- .8 Compact each layer with 6 passes of 10T vibratory roller or other equipment approved by Departmental Representative. Compact area within 2 m of Berlin Wall using approved mechanical tamping devices, or by hand as approved by Departmental Representative. Compact R5 random riprap to 95% maximum dry density in accordance with ASTM D698.
- .9 Place material by hand under, around, and over tie rod installations until 300 mm cover is provided. Dumping material directly on tie rods shall not be permitted.
- .10 When using hand operated tamping devices, place backfill material in layers not exceeding 100 mm in thickness.
- .11 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .12 Place backfill material in uniform layers simultaneously on sides of the anchor blocks so loading is equivalent.
- .13 Refer to Section 31 23 10 for installation requirements for granular base and granular sub-base material.

END OF SECTION