

PART 1 - General

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| <u>1.1 Related Sections</u> | .1 | Section 01 33 00 - Shop Drawings and Other Submittal Procedures. |
| | .2 | Section 31 23 25 - Gravel Fill. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials (ASTM)
.1 ASTM D4791-05, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate. |
| <u>1.3 Samples</u> | .1 | Submit samples in accordance with Section 01 33 00 - Shop Drawings and Other Submittal Procedures. |
| | .2 | Allow continual sampling by Departmental Representative during production. |
| | .3 | Provide Departmental Representative with access to source and processed material for sampling. |
| | .4 | Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling. |
| | .5 | Pay cost of sampling and testing of aggregates which fail to meet specified requirements. |
| <u>1.4 Waste Management And Disposal</u> | .1 | Divert unused granular materials from landfill to local quarry facility as approved by Departmental Representative. |
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PART 2 - Products

- 2.1 Materials
- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
 - .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five(5) times least dimension.
 - .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
 - .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.
- 2.2 Source Quality Control
- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least two (2) weeks prior to commencing production.
 - .2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
 - .3 Advise Departmental Representative two (2) weeks in advance of proposed change of material source.

2.2 Source Quality .4
Control
(Cont'd)

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

PART 3 - Execution

3.1 Preparation .1

Aggregate source preparation:

.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 Departmental Representative.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and 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 neat condition.

.2 Processing

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

.3 Handling

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

- 3.2 Cleaning
- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
 - .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
 - .3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

PART 1 - General

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| <u>1.1 Related Sections</u> | .1 | Section 01 35 43 - Environmental Procedures. |
| | .2 | Section 31 23 25 - Gravel Fill. |
| <u>1.2 Measurement For Payment</u> | .1 | No measurement for payment to be made under this section. Include costs in unit prices for item for which excavating, trenching and backfilling is required. |
| <u>1.3 References</u> | .1 | American Society for Testing and Materials (ASTM)
.1 ASTM C 117-95, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
.2 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
.3 ASTM D 422-98, Standard Test Method for Particle-Size Analysis of Soils.
.4 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft ³) (600 kN-m/m ³).
.5 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. |
| | .2 | Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric. |
| | .3 | Canadian Standards Association (CSA)
.1 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction. |
| <u>1.4 Definitions</u> | .1 | Excavation classes: two (2) classes of excavation will be recognized; common excavation and rock excavation.
.1 Rock: any solid material in excess of 0.25 m ³ and which cannot be removed by means |
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1.4 Definitions
(Cont'd)

- .1 (Cont'd)
 - .1 Rock: (Cont'd)
of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .4 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.1.
 - .2

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
 - .3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .5 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 Measurement .1 There will be no separate measurement for
For Payment this section. Costs to be incidental to Gravel
Fill, Section 31 23 25.

PART 2 - Products

2.1 Materials .1 Type 1 fill: to the following requirements:
.1 Crushed, pit run or screened stone,
gravel or sand.
.2 Gradations to be within limits specified
when tested to ASTM C 136. Sieve sizes to
CAN/CGSB-8.1.

.2 Type 2 fill: selected material from
excavation or other sources, approved by
Departmental Representative for use intended,
unfrozen and free from rocks larger than
75 mm, cinders, ashes, sods, refuse or other
deleterious materials.

.3 Table
Sieve % Passing
Designation

	Type 1
101.6 mm	100
50 mm	75-100
4.75 mm	25-55
1.2 mm	10-35
0.3 mm	5-20
0.075 mm	0-12

.4 Granular Base:
.1 Granular Base (0-31.5 mm) - This
material must meet the following gradation:
.1 Crushed Rock: Gradations to be
within limits specified when tested to
ASTM C136 and ASTM C117. Sieve sizes to
CAN/CGSB-8.1.

Sieve Designation	% Passing
37.5 mm	100
31.5 mm	95-100
25 mm	81-100
19 mm	66-90
12.5 mm	50-77
9.5 mm	41-70
4.75 mm	27-54
2.36 mm	17-43

2.1 Materials (Cont'd)	.4 Granular Base: (Cont'd)
	.1 (Cont'd)
	1.18 mm 11-32
	0.300 mm 4-19
	0.075 mm 0-8

PART 3 - Execution

3.1 Site Preparation	.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
3.2 Excavation	.1 Excavate to lines, grades, elevations and dimensions as indicated.
	.2 Remove all other obstructions encountered during excavation in accordance with Section 02 41 16 - Sitework, Demolition and Removal.
	.3 Excavation must not interfere with bearing capacity of adjacent foundations.
	.4 Dispose of surplus and unsuitable excavated material in approved location off site.
	.5 Do not obstruct flow of surface drainage.
	.6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
	.7 Notify Departmental Representative when bottom of excavation is reached.
	.8 Obtain Departmental Representative's approval of completed excavation.
3.3 Fiff Types And Compaction	.1 Use fill of types as indicated.

- 3.4 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.
 - .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
 - .5 Backfilling around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 1.0 m.

- 3.5 Restoration
- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
 - .2 Clean and reinstate areas affected by Work as directed by Departmental Representative.
 - .3 Restore site to its normal state prior to excavation.

PART 1 - General

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| <u>1.1 Description</u> | .1 | This section specifies supply, placement, and compaction of gravel fill as required or as directed by Departmental Representative. |
| <u>1.2 Related Sections</u> | .1 | Section 31 23 10 - Excavating, Trenching, and Backfilling. |
| <u>1.3 Measurement For Payment</u> | .1 | Gravel Fill: Supply, placement, and compaction of gravel fill will be measured by the tonne. Include the cost of all plant, labour, equipment, and materials required to complete the work as specified. |
| | .2 | Contractor will make own assessment of the quantity of gravel fill that is required as indicated on the drawings. |

PART 2 - Products

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| <u>2.1 Gravel Fill</u> | .1 | Gravel fill will be of hard, durable, evenly graded material having a maximum diameter of 75 mm in major portion of fill and a maximum diameter of 25 mm in upper 300 mm of rock fill. Fill material will contain not more than 6 percent by weight passing the 12 mm sieve. Gravel fill to be evenly graded within the limits specified. |
| | .2 | Use of shale rock or slate will not be permitted. |
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PART 3 - Execution

- 3.1 Placing Gravel Fill
- .1 Only fill material approved by Departmental Representative will be placed. Material will be placed uniformly across full cross-section in layers not exceeding 300 mm loose depth.
 - .2 Use suitable earth moving and surface grading equipment to place and spread fill in continuous and uniform horizontal layers.
 - .3 Compact fill after each 300 mm lift to minimum 95% standard proctor density.

PART 1 - General

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| <u>1.1 Related Sections</u> | .1 | Section 01 74 19 - Construction/Demolition Waste Management And Disposal. |
| <u>1.2 Measurement Procedures</u> | .1 | Timber Fender Piles: Measurement for payment will be made by the unit. Included will be the removal and disposal of existing and the supply and installation of new timber fender piles. |
| <u>1.3 References</u> | .1 | CSA-O80 Series-97, Wood Preservation.
.1 CSA-O80.18-97, Pressure Treated Piles and Timbers in Marine Construction. |
| <u>1.4 Protection</u> | .1 | Avoid dropping, bruising or breaking of wood fibres. |
| | .2 | Avoid breaking surfaces of treated piles. |
| | .3 | Do not damage surfaces of timber piles below cutoff elevation. |

PART 2 - Products

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| <u>2.1 Materials</u> | .1 | Round wood piles: to CAN3-056, with minimum butt size of 300 mm and tip diameter related to length as indicated in table A-1. Order length of piles as required. |
| | .2 | Type of peeling: all fender piles to be machine turned. |
| | .3 | Departmental Representative will be sole judge of quality and dimension of piles. Remove rejected piles from site of Work. |
| | .4 | Wire nails, spikes, staples: to CSA B111. |
| | .5 | Bolts, nuts and washers: to ASTM A 307. |
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2.1 Materials .6 Hot dip galvanize bolts, nuts and washers and
(Cont'd) unless otherwise specified, staples, cable
clamps, pipe sleeves, spikes and nails to
CAN/CSA-G164. Other hardware to be galvanized
to ASTM A 123/A123M.

PART 3 - Execution

3.1 Preparation .1 Select piles for uniformity of size and
straightness.

3.2 Installation .1 Install piles as shown on Plan.