

PART 1 - GENERAL

1.1 Related Work

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| .1 | Site Grading | Section 02210 |
| .2 | Topsoil & Finish Grading | Section 02260 |
| .3 | Sodding | Section 02938 |

1.2 Site Conditions

- .1 Confirm underground and surface utility lines and buried objects as marked by Contract Administrator.

1.3 Protection

- .1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, surface or underground utility lines which are to remain. Make good any damage.

PART 2 - PRODUCTS

2.1 Materials

- .1 Fill: Clay fill material obtained from excavation of drainage lines and trenches, or other sources, approved by the Contract Administrator for use intended, unfrozen and free from rocks larger than 50 mm (2"), cinders, ashes, sods, refuse or other deleterious materials. Use approved clay fill to create bunker surrounds as indicated on layout drawings and approved by the Contract Administrator.

- .2 Bunker sand: Washed, non-calcareous sand, angular to sub angular in shape only. Colour to be tan to light brown and approved by the Contract Administrator.

Particle Size	% Allowable
<0.25 mm	0%
0.25 mm to 0.50 mm	minimum 75%
0.50 mm to 1.00 mm	up to 25%
>1.00 mm	0%

- .3 Drainpipe: 100 mm (4") diameter, solid and perforated high density polyethylene pipe with 1.3mm to 12.7mm (1/16" x 1/2") slots.

- .4 Non-calcareous pea gravel: rounded and washed, free from clay and silt fines. Soft limestones, sandstones or shale are not acceptable. Particle size distribution:

<u>Particle Size</u>	<u>% Allowable</u>
≥ 12 mm	zero
6 mm to 9 mm	minimum 65%
≤ 2 mm	less than 10%
≤ 1 mm	less than 5%

Materials shall be tested for weathering stability (ASTM - C - 88), and must show a loss of material less than 12% by weight to be acceptable. LA Abrasion Test (ASTM C - 131) for mechanical stability, values must not exceed 40.

- .5 Sod: Dwarf Bluegrass, mixture grown on mineral soil, suitable to the Contract Administrator. Refer to Section 02938.
- .6 Protect approved materials from contamination.

2.2 Materials Testing

- .1 Provide the Contract Administrator with three (3) different sand samples, each weighing samples 500 gm (1.1 lbs.), dry and suitable for testing.

Testing will be conducted to determine:

- .1 Particle size distribution
 - .2 Visual shape analysis
 - .3 Percolation rate
 - .4 Mechanical weathering
- .2 Provide samples a minimum of three (3) weeks prior to start of bunker construction work or as directed by the Contract Administrator.
- .3 The Contract Administrator will determine acceptability of materials and may conduct random testing on site during construction to confirm suitability of materials.

PART 3 - EXECUTION

3.1 Layout

- .1 The Contract Administrator will provide initial layout of bunkers as indicated on drawings and stake proposed elevations. Obtain approval from the Contract Administrator before proceeding with excavation.

3.2 Excavation and Drain Pipe Installation

- .1 Place fill as required.
- .2 Excavate bunker to approved grades. Unless otherwise directed by the Contract Administrator, using back hoe equipped with articulating ditching bucket; maximum width of 1.2m (4'). Maximum slopes allowable are 60% for bunker faces with a minimum subgrade slope of 2% toward all drainpipe.
- .3 Contour subgrade to allow for installation of a typical compacted sand depth of 100 mm (4"). Receive approval of subgrade elevations from the Contract Administrator. Adjust and fine grade as required.
- .4 Drainage trenches in bunker to be cut to a minimum depth of 250 mm (10") and located as indicated on drawings. Place pipe in trench and back fill with pea gravel to 25mm (1") below bunker floor. Ensure that pipe is not displaced during backfilling procedures. Remove excess materials.

3.3 Sodding Bunker Surrounds

- .1 Place sod along bunker edges immediately after topsoil in order to prevent erosion of edges and contamination of bunker floor and drainlines. Refer to construction detail drawing 2/L5. Water as required.

3.4 Placing and Compacting Bunker Sand

- .1 Stockpile sand in bunker bottom prior to topsoil and sod installation. To prevent contamination of bunker sand, do not spread until sod installation is complete. Spread and compact to 100 mm (4") depth, to contours approved by the Contract Administrator.
- .2 Compact sand to density which will resist foot printing to depths of greater than 12.7 mm (1/2"). To improve compaction on less stable sands, place sand in 50 mm (2") lifts and compact with vibratory compaction equipment.
- .3 Water thoroughly and add sand to bring elevation up to finish grade. Hand rake and compact sand on to bunker face as instructed by the Contract Administrator.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Method of Measurement

- .1 Sand bunkers shall be measured on a lump sum basis, including shaping, excavation, drainage installation and sand placement, for work completed in accordance with this specification, and acceptable to the Contract Administrator.

4.2 Basis of Payment

- .1 Sand bunkers shall be paid for at the Contract Unit Price for the "Items of Work" listed below, which price shall be payment in full for supplying and placing all materials herein described and all other items incidental to the work included in the specification.

Items of Work:

- i) Bunker Construction at Kildonan Park Golf Course
- ii) Bunker Construction at Windsor Park Golf Course