SECTION 13 1101 – WATER FEATURE EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Subsoil Materials
2. Topsoil Materials
3. Structural Fill Materials
4. Aggregate Materials

B. Related Sections:

1. SECTION 13 1102 – WATER FEATURE GEOSYNTHETICS FOR EARTHWORK
2. SECTION 13 1103 – WATER FEATURE GRADING AND EXCAVATION
3. SECTION 13 1104 – WATER FEATURE DEWATERING
4. SECTION 13 1105 – WATER FEATURE FOUNDATION DRAINAGE
5. SECTION 13 1106 – WATER FEATURE TRENCHING
6. SECTION 13 1107 – WATER FEATURE BACKFILLING
7. SECTION 13 1108 – WATER FEATURE EROSION AND SEDIMENTATION CONTROL
8. SECTION 13 1204 – WATER FEATURE CAST IN PLACE CONCRETE
9. SECTION 13 1205 – WATER FEATURE SHOTCRETE
10. SECTION 13 1303 – WATER FEATURE MEMBRANE LINER
11. SECTION 13 1401 – WATER FEATURE PIPE AND FITTINGS

C. References:

1. Site specific Geotechnical Report – Bore Hole Locations and Findings of Subsurface Materials
2. ASTM C136 – STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
3. ASTM D1556 – STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY THE SAND-CONE METHOD
4. ASTM D1557 – STANDARD TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT
5. ASTM D 2167 – STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY RUBBER BALLON METHOD
6. ASTM D2487 – STANDARD PRACTICE FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
7. ASTM D3282 – STANDARD PRACTICE FOR CLASSIFICATION OF SOILS AND SOIL-AGGREGATE MIXTURES FOR HIGHWAY CONSTRUCTION PURPOSES
8. ASTM D4318 – STANDARD TEST METHODS FOR LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
9. ASTM D6938 – STANDARD TEST METHOD FOR DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH)
10. Standard Specifications for local jurisdictions

1.2 SUBMITTALS FOR REVIEW

A. SECTION 01 3300 – SUBMITTAL PROCEDURES

B. Samples: Provide in air-tight containers, 10-pounds (4.5 kg) of each type of fill material to testing laboratory for evaluation.

C. Material Source: Provide the name of imported materials suppliers and location of the material supplies source.

D. Submit test reports on each type of imported material.

1.3 QUALITY ASSURANCE

A. Perform the Work in accordance with the project specifications and referenced standards. Maintain one (1) copy of the test results on site.

1.4 UNIT PRICES – MEASUREMENT AND PAYMENT

A. Subsoil: By the cubic yard. Includes excavating existing subsoil, supplying subsoil materials, and stockpiling.

B. Topsoil: By the cubic yard. Includes excavating existing topsoil, supplying subsoil materials, and stockpiling.

PART 2 - PRODUCTS

2.1 SUBSOIL MATERIALS

A. Subsoil Type S1: Material Type A-1, A-2-4, A-2-5, and A-3. Conforming with ASTM D3282 (AASHTO M-145) and local jurisdiction engineering standards.

B. Subsoil Type S2:

1. Excavated and reused material, imported borrow, and select or local borrow
2. Graded.
3. Free of lumps larger than 3-inches (75mm), rocks larger than 2-inches (50mm), and debris and other organic material.
4. Conforming to ASTM D2487 Group Symbol CL OL.
5. Containing less than 10 percent material retained on a number 200 sieve.

2.2 TOPSOIL MATERIALS

A. Topsoil Type S3: Conforming to the local jurisdiction’s engineering standards, project specifications and references standards.

B. Topsoil Type S4:

1. Excavated and reused material.
2. Graded.
3. Free of roots, rocks larger than 1-inch (25mm), subsoil, debris, large weeds, and foreign matter.
4. Conforming to ASTM D2487 Group Symbol.

C. Topsoil Type S5:

1. Imported borrow.
2. Friable loam.
3. Reasonably free of roots, rocks larger than 1-inch (25mm), subsoil, debris, large weeds, and foreign matter.
4. Acidity range (pH) of 5.5 to 7.5.
5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
6. Conforming to ASTM D2487 Group Symbol OH PT.
7. Limit decaying matter to 10 percent of total content by volume.

2.3 COARSE AGGREGATES FOR EARTHWORK

A. Coarse Aggregates All Types: Conforming to project specifications and referenced standards.

B. Coarse Aggregate Type A (Bedding): Coarse Angular crushed washed stone; free of shale, clay, friable material, and debris; graded in accordance with ASTM C316; within the following limits:

Sieve No. (U.S. Series)	Opening Size inches (mm)	Percent Passing on Sieve (% by Weight)
1-inch	1 (25)	95 to 100
1/2-inch	0.5 (12)	25 to 60
4	0.187 (4.75)	0 to 10
8	0.0937 (2.36)	0 to 5

C. Aggregate Type B (Pea Gravel): Natural Stone; washed free of clay, shale, organic matter; graded in accordance with ASTM C316, to the following limits.

1. Minimum Size: 1/4-inch (6mm).
2. Maximum Size: 5/8-inch (16mm).

2.4 FINE AGGREGATES FOR EARTHWORK

A. Fine Aggregates Type A5 All Types: Project specifications and referenced standards.

B. Fine Aggregates Type A (Selected Backfill): Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C136, within the following limits:

Sieve No. (U.S. Series)	Opening Size inches (mm)	Percent Passing on Sieve (% by Weight)
4	0.187 (4.75)	95 to 100
8	0.0937 (2.36)	85 to 100
16	0.0469 (1.18)	65 to 97
30	0.0234 (0.60)	25 to 70
50	0.0117 (0.30)	5 to 35
100	0.0059 (0.15)	0 to 7
200	0.0029 (0.075)	4 max

2.5 SOURCE QUALITY CONTROL

A. Conform to Project Quality Control Service specification.

B. Subsoil Materials - Testing and Analysis: Perform in accordance with ASTM D1557 and ASTM D6938.

C. Topsoil Materials - Testing and Analysis: Perform in accordance with ASTM D1557 and ASTM D6938.

D. Coarse Aggregate Materials - Testing and Analysis: Perform in accordance with ASTM D1557, ASTM D2167, ASTM D6938, and ASTM C136.

E. Fine Aggregate Materials - Testing and Analysis: Perform in accordance with ASTM D1557, ASTM D2167, ASTM D6938, and ASTM C136.

F. If test indicate materials do not meet specified requirements, change material and retest.

G. Provide materials of each type from the same source throughout the Work.

PART 3 - EXECUTION

3.1 SOIL REMOVAL

A. Excavate subsoil and topsoil from areas designated in the Contract Documents.

B. Removed lumped soil, boulders, rock, vegetation, roots, organic matter, muck, and debris.

C. Stockpile excavated material in area designated on site and remove excess material not being used for the site.

D. Excavated material may require sorting and drying.

3.2 STOCKPILING

A. Stockpile materials on site.

B. Stockpile in sufficient quantities with dividers or stockpile apart to prevent mixing.

C. Prevent intermixing of soil types or contamination.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEAN UP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

B. If a borrow area is indicated, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION