SECTION 13 1103 – WATER FEATURE GRADING AND EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following:
 - 1. Removal of Topsoil and Subsoil.
 - 2. Cutting, grading, filling, rough contouring, compacting, and shaping the site for water features and associated mechanical buildings and structures.
 - 3. Excavating for foundations.
 - 4. Excavating for slabs-on-grade, paving, and landscaping.
 - 5. Excavating for site structures.
- B. Related Sections:
 - 1. SECTION 13 1101 WATER FEATURE EARTHWORK
 - 2. SECTION 13 1102 WATER FEATURE GEOSYNTHETICS FOR EARTHWORK
 - 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 1303 WATER FEATURE MEMBRANE LINER
 - 9. SECTION 13 1401 WATER FEATURE PIPE AND FITTINGS
- C. References:
 - 1. ASTM C136 STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
 - 2. ASTM D1556 STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY THE SAND-CONE METHOD
 - 3. ASTM D1557 STANDARD TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT
 - 4. ASTM D2167 STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY RUBBER BALLON METHOD
 - 5. ASTM D2419 STANDARD TEST METHOD FOR SAND EQUIVALENT VALUE OF SOILS AND FINE AGGREGATE
 - 6. ASTM D2434 STANDARD TEST METHOD FOR PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
 - 7. ASTM D6938 STANDARD TEST METHOD FOR DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH)
- 1.1 UNIT PRICE MEASUREMENT AND PAYMENT
 - A. Miscellaneous Fill: By the cubic yard (meter). Includes excavating existing soil, supplying soil materials, stockpiling, scarifying substrate surfaces, placing where required, and compacting.
 - B. Structural Fill Type A: By the cubic yard (meter). Includes excavating existing soil, supplying structural fill materials, stockpiling, scarifying substrate surfaces, placing where required, and compacting.

1.2 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.
- 1.3 PROJECT RECORD DOCUMENTS
 - A. Submit as per Project Specifications.

B. Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Topsoil: As specified in Section 13 1101 WATER FEATURE EARTHWORK.
 - B. Subsoil: As specified in Section 13 1101 WATER FEATURE EARTHWORK.
 - C. Structural Fill: As specified in Section 13 1101 WATER FEATURE EARTHWORK.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions prior to beginning the Work.
- B. Verify that survey benchmarks and intended elevations for the Work are as indicated in the Contract Documents.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain from excavation and grading activities.
- D. Notify all utility companies to remove and relocate utilities.
- E. Protect above and below grade utilities that remain.
- F. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- G. Protect Benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform the Work by hand and cut roots with a sharp axe.
- D. Stockpile in area designated on site to depth on exceeding and protect from erosion. Remove from subsoil not being used from the site.
- E. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide firm bearing and in compliance with OSHA standards and requirements.
- F. Stability: Replace damaged or displaced subsoil to the same requirements as specified for fill.

3.4 EXCAVATION

- A. Underpin adjacent structures that may be damaged by excavating Work.
- B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving, site structures, utilities, or other construction operations, and to the elevation and dimensions indicated on the Contract Documents.
- C. When excavation has reached required subgrade elevations, notify the Owner, who will inspect conditions. Do not excavate below indicated depth unless directed by the Owner or Owner Representative.

- D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity or to a minimum of 3,000-psf (144 kPa) or 4,000-psf (192 kPa) as indicated on the Contract Documents; perform compaction in accordance with Section 31 23 33.13 and 31 23 33.16.
- E. If inspection indicates unsuitable material and conditions, additional excavation and corrective Work shall be performed as directed by the Owner.
- F. Slope banks with machine to angle of repose or less until shored.
- G. Do not interfere with 45-degree bearing splay of foundations.
- H. Grade top perimeter of excavating to prevent surface water from draining into excavation.
- I. Hand trim excavation. Remove loose material.
- J. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in the area until notified to resume Work.
- K. Correct areas over excavated in accordance with Section 31 23 33.16.

3.5 FILLING

- A. Install the Work in accordance with Project specifications and referenced standards.
- B. Fill areas to proposed contours and elevations with appropriate fill materials.
- C. Place fill material in continuous layers and compact to attain required compaction density.
- D. Slope grade away from buildings at a minimum of 2-inches (50mm) in 10-feet (3m), unless otherwise noted.
- E. Make grade changes gradual. Blend slope into level areas.
- F. Remove surplus fill material from the site.

3.6 TOLERANCES

- A. Top surface of subgrade shall be plus or minus 1 foot (300mm) from required elevation.
- 3.7 FIELD QUALITY CONTROL
 - A. Comply with the requirements of the Project specifications and referenced standards.
 - B. Perform excavation Work in compliance with applicable requirements of governing authorities and codes having jurisdiction.
 - C. Testing shall be in accordance with ASTM D1556, ASTM D1557, ASTM D2167, and ASTM D6938.
 - D. If testing indicates that the Work does not meet specified requirements, remove Work, replace, and retest.
 - E. Frequency of Tests: Test upper 12-inches (300mm) as recommended by the Project Geotechnical Engineer.
- 3.8 SCHEDULES
 - A. Conform to the Project specification and referenced standards.
 - B. Structural Fill for Building Pads:
 - Fill shall consist of clean sand that is free of organic matter and other deleterious substances. It shall have a fines content that does not exceed 15-percent. Maximum compacted depth shall be 8-inches (200mm).
 - C. Subsoil Fill:
 - 1. Fill Type S1: Maximum compacted depth shall be 8-inches (200mm).

- 2. Compact to minimum 98-percent of maximum density.
- D. Topsoil Fill:
 - 1. Fill Type S2: Maximum compacted depth shall be 8-inches (200mm).
 - 2. Compact to minimum 95-percent of maximum density.

3.9 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation, maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundations from damage caused by settlement, lateral movement, undermining, washout, and other hazards caused by earthwork operations.
- C. Provide warning lights, DANGER or CAUTION signs and watchmen at all places where excavation constitutes, in any way, a hazard to any persons whose injuries might result from the failure to take such precautions.
- D. The Contractor shall take any measures necessary to ensure the safety of workers and others present on the job site throughout the contract period. This shall include, but is not limited to, conforming with all applicable OSHA regulations, as well as the rules of the regulatory agencies with proper jurisdiction.

END OF SECTION