

SECTION 02300 – EARTHWORK AND GEOTECHNICAL REPORT

1. GENERAL

- A. PERFORM EXCAVATION, FILLING, COMPACTING, GRADING, AND DEWATERING OPERATIONS BOTH INSIDE AND OUTSIDE BUILDING LIMITS AS REQUIRED FOR BELOW-GRADE IMPROVEMENTS AND TO ACHIEVE CONTOURS AND ELEVATIONS INDICATED. PROVIDE TRENCHING AND BACKFILL FOR MECHANICAL AND ELECTRICAL WORK AND UTILITIES.
- B. PROVIDE SUBBASE MATERIALS, DRAINAGE FILL, AND COMMON FILL MATERIALS FOR SLABS, PAVEMENTS, AND IMPROVEMENTS.
- C. PROVIDE SUITABLE FILL FROM OFFSITE IF ON-SITE QUANTITIES ARE INSUFFICIENT, AND DISPOSE OF EXCESS FILL OFFSITE.
- D. EARTHWORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH RECOMMENDATIONS OF GEOTECHNICAL REPORT THAT FOLLOWS THIS SECTION UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THIS SECTION OF THE SPECIFICATIONS.

2. SUBMITTALS

- A. SUBMIT FOR APPROVAL TEST REPORTS.

3. QUALITY ASSURANCE

- A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

4. MATERIALS

- A. SUBBASE MATERIAL: GRAVEL OR CRUSHED STONE GRADED FOR INTENDED USE AS SUBBASE FOR PAVING MATERIALS SPECIFIED.
- B. COMMON FILL: RELATIVELY CLEAN SANDS WITH LESS THAN 12 PERCENT PASSING NO. 200 SEIVE, FREE OF NON-SOIL MATERIALS AND ROCK FRAGMENTS LARGER THAN 3-INCHES IN DIAMETER.
- C. STRUCTURAL FILL: GRAVEL OR SANDY GRAVEL FREE FROM ORGANIC AND UNSUITABLE MATERIALS AND WITHIN THE FOLLOWING GRADUATION LIMITS: 4" SIEVE, 100 PERCENT FINER BY WEIGHT; 1" SIEVE, 60 TO 100 PERCENT; NO. 4 SIEVE, 25 TO 85 PERCENT; NO. 20 SIEVE, 10 TO 60 PERCENT; NO. 50 SIEVE, 4 TO 35 PERCENT; NO. 200 SIEVE, 0 TO 5 PERCENT.

5. INSTALLATION

- A. EXCAVATION IS UNCLASSIFIED AND INCLUDES EXCAVATION TO SUBGRADE REGARDLESS OF MATERIALS ENCOUNTERED. REPAIR EXCAVATIONS BEYOND ELEVATIONS AND DIMENSIONS INDICATED AS FOLLOWS:
 - 1. AT STRUCTURE: CONCRETE OR STRUCTURAL FILL.
 - 2. ELSEWHERE: BACKFILL AND COMPACT AS DIRECTED.
- B. DO NOT PERFORM ANY ADDITIONAL WORK WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER IF SUBGRADE MATERIAL IS UNSUITABLE FOR INTENDED USE.
- C. MAINTAIN STABILITY OF EXCAVATIONS; PROVIDE SHORING AND BRACING AS REQUIRED BY AUTHORITIES HAVING JURISDICTION. PREVENT SURFACE AND SUBSURFACE WATER FROM ACCUMULATING IN EXCAVATIONS. STOCKPILE SATISFACTORY MATERIALS FOR REUSE, ALLOW FOR PROPER DRAINAGE AND DO NOT STOCKPILE MATERIALS WITHIN DRIP LINE OF TREES TO REMAIN.
- D. COMPACT MATERIALS WITHIN 3% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D1557 BY AERATION OR WETTING TO THE FOLLOWING PERCENTAGES OF MAXIMUM DRY DENSITY:
 - 1. STRUCTURE, PAVEMENT, WALKWAYS: SUBGRADE AND EACH FILL LAYER TO 95% OF MAXIMUM DRY DENSITY.
 - 2. UNPAVED AREAS: TOP 6" OF SUBGRADE AND EACH FILL LAYER TO 90% MAXIMUM DRY DENSITY.
- E. PLACE ACCEPTABLE MATERIALS IN LAYERS NOT MORE THAN 12" LOOSE DEPTH FOR MATERIALS COMPACTED BY HEAVY EQUIPMENT AND NOT MORE THAN 4" LOOSE DEPTH FOR MATERIALS COMPACTED BY HAND EQUIPMENT TO SUBGRADES INDICATED AS FOLLOWS:
 - 1. STRUCTURAL FILL: USE UNDER FOUNDATIONS, SLABS ON GRADE IN LAYERS AS INDICATED.
 - 2. DRAINAGE FILL: USE UNDER BUILDING SLABS, AT FOUNDATION DRAINAGE AND ELSEWHERE AS INDICATED.
 - 3. COMMON FILL: USE UNDER UNPAVED AREAS.
 - 4. SUBBASE MATERIAL: USE UNDER PAVEMENT, WALKS, STEPS, PIPING AND CONDUIT.
- F. GRADE TO WITHIN 1/2" ABOVE OR BELOW REQUIRED SUBGRADE AND WITHIN A TOLERANCE OF 1/2" IN TEN FEET.
- G. PROTECT NEWLY GRADED AREAS FROM TRAFFIC AND EROSION. RECOMPACT AND REGRADE SETTLED, DISTURBED AND DAMAGED AREAS AS NECESSARY TO RESTORE QUALITY, APPEARANCE, AND CONDITION OF WORK.
- H. CONTROL EROSION AND WINDBLOWN DUST. DISPOSE OF WASTE AND UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER.

6. TESTING

- A. PAYMENT FOR TESTING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- B. DENSITY OF FILL UNDER STRUCTURES AND ROAD BEDS, WHERE PERMITTED OR INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY IN-PLACE DENSITY TESTS MADE IN ACCORDANCE WITH STANDARD METHOD ASTM D1556. THE IN-PLACE DENSITIES ACTUALLY OBTAINED SHALL EQUAL OR EXCEED 95% OF LABORATORY MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT (MODIFIED PROCTOR). ONE TEST SHALL BE PERFORMED FOR EACH 2000 SQUARE FEET PER LAYER OF FILL PLACED UNDER EACH STRUCTURE OR ROADWAY WITH A MINIMUM OF ONE TEST PER LAYER FOR EACH STRUCTURE AND ROADWAY. IN-PLACE DENSITY TESTS FOR TRENCHES THAT ARE NOT UNDER ROADBEDS SHALL BE MADE FOR EACH 1000 LINEAR FEET OF TRENCH, PER LAYER OF FILL, WITH A MINIMUM OF ONE TEST PER LAYER AND SHALL EQUAL OR EXCEED 95% OF LABORATORY MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT (MODIFIED PROCTOR).
- C. LABORATORY TESTS: MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT SHALL BE DETERMINED IN ACCORDANCE WITH STANDARD METHOD ASTM D1557. THE TEST PROCEDURE METHOD SHALL BE IN ACCORDANCE WITH SOIL TYPE ENCOUNTERED.
- D. PROCEDURE: TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY APPROVED BY THE ENGINEER AND REPORTS OF RESULTS SHALL BE SENT DIRECTLY TO THE ENGINEER. FOR EACH TEST THAT FAILS TO MEET THE SPECIFIED DENSITY, ONE ADDITIONAL TEST SHALL BE MADE AFTER ADDITIONAL COMPACTION WORK IS PERFORMED. COSTS OF SOIL TESTING SHALL BE PAID BY THE CONTRACTOR.

END OF SECTION