

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Trenching for utilities outside the building to utility main connections.

1.03 RELATED REQUIREMENTS

- A. Document 00 31 00 - Available Information: Geotechnical report; bore hole locations and findings of subsurface materials.
- B. Section 01 57 13 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- C. Section 01 40 00 - Quality Requirements: Qualifications for Geotechnical Consultant.
- D. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.

1.04 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

1.05 QUALITY ASSURANCE

- A. An independent testing agency shall perform field quality test, as specified in Section 014533 - Special Inspections
- B. Employ services of a Geotechnical Consultant, approved by Architect Engineer for the following services:
 - 1. Determine equipment sizes, and develop excavation, proof-rolling, undercutting, filling, and compaction techniques best suitable to site conditions at the time of construction.
 - 2. Observe the site excavation.
 - 3. Perform applicable laboratory and field tests.
 - 4. Provide professional judgment in determining the limits of undercutting. This judgment shall be to the satisfaction of Architect Engineer.
 - 5. Inspect bottom of individual and continuous footings. For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect Engineer.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.

- C. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect Engineer.

3.03 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Architect Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
 - 1. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- D. Comply with Occupational Safety and Health Administration (OSHA) Safety and Health Regulations for Construction, 29 CFR 1926, Subpart P - Excavations.
- E. Frost Protection: When freezing temperature may be expected, do not excavate to the full depth indicated unless the footings or slabs are to be poured immediately after the excavation has been completed. If placing of concrete is delayed, protect the bottoms of excavations from frost until concrete is placed.
- F. Shoring And Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable condition.
 - 1. Establish requirements for trench shoring and bracing to comply with local codes, OSHA, and authorities having jurisdiction.
 - 2. Install and maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses in order to protect work, to insure safety to workmen and public, and to protect and maintain existing structures, footings, roadways, utilities, etc. adjacent thereto.
 - 3. Design and installation is the sole responsibility of the Contractor and shall be reviewed by a Registered Professional Engineer at the Contractor's expense.
- G. Do not interfere with 45 degree bearing splay of foundations.
- H. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect Engineer. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 PROOF-ROLLING UNDER THE BUILDING AND PAVEMENTS

- A. Following clearing, stripping, and/or excavating, all subgrade soils are to be proof-rolled under the supervision of Geotechnical Consultant with at least a 10 ton roller or similar mechanical compactor, to verify that any localized soft, compressible soils are detected. If soft or unstable soils are detected, Geotechnical Consultant, after obtaining approval from the Architect Engineer, shall determine the course of action.
- B. Do not proof-roll wet subgrades; wait for subgrades to dry out.
- C. Extra payment for removal of soft and unstable soil and replacement with structural fill in accordance with Section 31 23 16 - Excavation and Section 31 23 23 - Fill will be based on the "Unit Price" quoted by the Contractor.
 - 1. Extra payment shall be applied against the allowance established in the contract for the item: Undercutting. The portion of the allowance not used shall be credited to the Owner based on the same unit price quoted in the Contract Documents. Any additional undercutting required above the allowance established, shall be based on the same "Unit Price" quoted by the Contractor, but only after consultation with Geotechnical Consultant and approved by Architect Engineer.
 - 2. The undercut material shall be disposed of off the site and shall not be used for fill.
 - 3. Measurement for determining the extent of undercutting will be by the average end area method for the volume of excavated material below existing subgrade. A registered

engineer or surveyor shall be engaged by Contractor to perform these measurements.
The report of this surveyor shall be submitted to the Architect Engineer for approval.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect Engineer before placement of foundations.

3.06 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

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