31 2200 EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Excavation for trenches and general excavation

2. Fill placement

3. Backfilling of utility trenches

4. Compaction of fill

5. Preparing subgrade for pavements, building pads, curbs and gutter, walks, and vegetated areas

6. Mass and Fine grading

1.2 DEFINITIONS

A. Fill: In terms of volume, defined as a compacted post-construction volume of soil.

B. Subgrade: Surface or elevation remaining after completing the excavation, or top surface of a fill or backfill immediately below subbase or topsoil materials, as applicable.

C. Excavation: Removal of soil material encountered to specified subgrade elevations.

1.3 SUBMITTALS

A. Product data for any specified geotextiles or geofabrics.

B. Test reports prepared by a testing agency that include the following:

1. Field density tests for trench

2. Evaluation of fill materials and their classification

3. Moisture content of soils at intervals deemed appropriate for the project by the testing engineer

4. Verification of footing subgrade compaction and bearing pressure of soils by a qualified Geotechnical Engineer.

C. Blasting or rock removal plan, if applicable.

1.4 QUALITY CONTROL

A. All layout work shall be performed by a registered land surveyor.

B. The Owner is the engage the services of a qualified testing agency to conduct independent laboratory and field quality control testing.

C. All work to be performed in accordance with the standard specifications of the State Department of Transportation, hereinafter, "the specification".

D. Testing as the testing agency deems necessary to provide the information in Section 1.3

E. Blasting work or other rock removal methods are to be in accordance with the requirements of the authority having jurisdiction.

F. Any work that effects underground utilities shall be performed per the requirements, and with the coordination of, the authority having jurisdiction or the provider of the utility.

1.5 PROJECT CONDITIONS

A. Contractor shall visit the site and become familiar with the existing conditions of the site and make any verification to confirm them. Contractor is to accept the existing conditions of the site and perform the work without additional compensation for discrepancies regarding existing conditions.

B. Contractor is to take all precautions to protect surrounding improvements, utilities and the like. The work shall not extend onto adjacent property unless specified on the drawings.

C. All existing equipment or materials that are deemed salvable by the Owner shall be disconnected and removed by the Contractor and stored as directed by the Owner.

D. The work shall not interrupt pedestrian and vehicular traffic flow to adjacent areas unless other written permission is obtained from those affected and furnished to the Owner or Architect.

E. Coordinate the location of any storage containers, job trailers, or other equipment with owner.

F. All necessary shoring and barriers are to be provided by the contractor in order for the work to progress in a safe and non-hazardous manner.

G. Unsuitable soils, debris, excess suitable material and other waste material shall be disposed of offsite in a manner suitable to the authority having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The Contractor is to furnish all tools, barriers, signage, stakes, and other equipment necessary to execute the work in an accurate and non-hazardous manner.

B. Fill material following the recommendations of the specifications and the geotechnical report is to be provided when there is not enough from excavation.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor is to secure the services of a registered land surveyor (registered in the state the work is being performed, hereinafter "the surveyor") to establish the limits of grading and to stake out all proposed improvements, including but not limited to: proposed building footings, proposed utilities, silt fence, curb and gutter, etc.

B. The surveyor shall locate and clearly mark all property monumentation and benchmarks.

C. Any discrepancies in the plans and actual field conditions are to be brought to the Architect's attention immediately and the work shall not continue until the Contractor has been advised by the Architect as to how to proceed.

D. Existing benchmarks or property monumentation is to be marked by the surveyor and preserved by the contractor throughout construction.

E. The Contractor shall protect and maintain all line and grade stakes throughout construction. Any stakes which are disturbed shall be re-staked by the surveyor at the Contractor's expense.

3.2 EROSION AND SEDIMENT CONTROL

A. Contractor is to provide all required erosion and sediment control as depicted on the plans. All requirements of the jurisdiction having authority over sediment control are to be met.

B. In the event that phasing sequencing of site preparation requires a modification to the erosion and sediment control plan, the contractor is to notify the engineer and obtain approval of the proposed modification.

C. Contractor is to control erosion and sedimentation throughout construction. The escape of sediment from the site is not permitted.

D. All grassing and/or other stabilization measures shall be installed as soon as permitted by the progress of the work.

E. Additional erosion and sediment control measures may be required by the inspector of the jurisdiction having authority over erosion control. Any additional measures required shall be installed at the contractor's expense.

3.3 TREE PROTECTION

A. Tree protection fencing installed at the commencement of the project shall be maintained around tree save areas as shown on the drawings or as directed by the authority having jurisdiction prior throughout the duration of the work.

B. No construction vehicle traffic or storage of materials is permitted within the critical root zone of a tree to be protected.

3.4 GENERAL EXCAVATION

A. Excavate to required subgrade elevations regardless of the type or character of the material encountered. Material encountered may include, rock, unsuitable soil or other debris or deleterious material. If rock, unsuitable soil or other debris or deleterious material is encountered, stop and contact the Architect and await further instruction before proceeding. The contracted sum or construction time shall not be affected by associated work to deal with such material.

1. Unsatisfactory soil material encountered shall be replaced or removed and disposed of, as necessary, and replace with satisfactory soil material.

2. Rock is to be removed to appropriate lines and grades to permit the construction of the proposed improvements.

3. Rock is to be removed to provide ample construction room for utilities. Trench bottoms are to be excavated to a depth of 6 inches below the proposed bottom elevation of the pipe or conduit to be installed. Excavation shall be lowered below the bottom of pipe or conduit elevations for pipe or utilities that have period protrusions or bell and spigot type connections so as to provide a uniform slope for the utility or pipe.

B. Unsuitable Material: Unsuitable Material shall be removed and replaced with suitable material at the direction of the geotechnical engineer. The cost of removal and replacement will be borne by the Contractor.

1. Classification of rock quantities will be performed by the Owner's testing agency. Any rock excavation or removal that is not classified by the testing agency will not receive payment.

2. Payment for rock shall be as per the General Conditions portion of the specification.

3. Unsatisfactory soil material encountered shall be replaced or removed and disposed of, as necessary, and replace with satisfactory soil material.

4. Rock is to be removed to appropriate lines and grades to permit the construction of the proposed improvements.

5. Rock is to be removed to provide ample construction room for utilities. Trench bottoms are to be excavated to a depth of 6 inches below the proposed bottom elevation of the pipe or conduit to be installed. Excavation shall be lowered below the bottom of pipe or conduit elevations for pipe or utilities that have period protrusions or bell and spigot type connections so as to provide a uniform slope for the utility or pipe.

C. Excavate locations of proposed pavement, sidewalk, curb and gutter or other hardscape surfaces to the appropriate subgrade to accommodate the proposed improvement.

D. Any bracing or shoring systems are to be designed by a professional engineer and are required when in close proximity to a building, utilities, poorly compacted areas and other situations. Contractor is to ensure that building foundations, utility bearing areas, and the like are not undermined during excavation an installation.

E. All foundation excavation shall be evaluated by a geotechnical engineer to confirm anticipated soil conditions and bearing pressure before beginning footing construction. If material is unsuitable for foundation construction, then the contractor shall notify the architect immediately and wait for further instructions.

3.5 TRENCH EXCAVATION

A. Contractor is responsible for design of all necessary shoring or bracing systems for pipe installation. Shoring is to be designed by a professional engineer in any situations where conventional excavation or trench boxes cannot be used.

B. Trenches shall not be backfilled until all necessary tests and inspections are performed.

3.6 DEWATERING

A. Unless otherwise specified on the drawings, prevent water from accumulating in general excavation areas and in trenches.

B. Contractor is to construct berms or use other means to prevent the accumulation of water in utility trenches.

C. Utility trenches are not to be used to convey or store runoff. Any water that is accumulated in a trench is to be removed by mechanical means if necessary.

3.7 MATERIAL STORAGE

A. All excavation material is to be stockpiled in a manner to promote positive drainage and prevent erosion.

B. Stockpiled material is to be located as to not interrupt surrounding operations or to effect existing improvements or vegetation. Material is not to be stockpiled in tree save areas or in the critical root zone of trees to remain.

3.8 FILL PLACEMENT

A. Soil materials used shall be approved by the testing agency for the application in which they are to be used. Contractor is to supply written approval, upon request, to the Owner or Architect.

B. The testing agency is to oversee the placement of fill and approve areas for their suitability to receive fill. Suitability of receiving fill shall include visual inspection, by the testing agency, of geometry, presence of unsuitable material, etc.

C. If fill is placed against slopes steeper than 5H:1V, the new fill is to be benched into the existing soils to insure and adequate bonding of the fill with the existing material.

D. Before placing fill proofrolling of the subgrade with a fully loaded tandem-axle dump truck (20 tons) during a period of dry weather shall be performed under the direction of a geotechnical engineer. Any areas which "rut" or "pump" excessively under the weight of proofrolling shall be evaluated by the geotechnical engineer for possible undercutting or other remediation. The Contractor is to follow the recommendations of the geotechnical engineer with regards to remediation and retesting at no cost to the owner.

E. Fill is to be placed in 6" lifts (loose) and compacted to the specified density.

F. Fill is not to be placed on mud, frost, ice, or frozen areas.

G. Structural fill shall be free of organic material and rocks larger than 3 inches in diameter and have a plasticity index less than 20.

H. Utility Trench Backfill:

1. Place and compact bedding course along trench bottoms. Shape the bedding course to provide continuous support for all utility appurtenances and pipes.

2. Compact backfill under pipe haunches carefully and evenly, on both sides, along length in such a manner as to avoid damage to the utility.

3. Remove any shoring or bracing during backfilling operation.

4. Stones over 1 foot in diameter are not permitting in the first one foot of fill over pipe.

3.9 MOISTURE CONTROL

A. Where necessary add water or scarify and dry sub grade material to control the moisture content or as directed by the geotechnical engineer.

B. Moisture content of is to be maintained to 2% plus or minus of optimum moisture content.

3.10 COMPACTION

A. Compaction of soil materials is to be achieved by the use of mechanical soil compaction equipment.

B. Compact soil lifts to not less than the following maximum dry density of Standard Procter, per ASTM D-698:

1. All structural fill shall be compacted to 95%

2. The upper 12 inches of fill that will support slabs, pavements, steps, ramps, or sidewalks to 98%

3. For utility trenches compact all layers to 95%

4. For grassed areas compact to 95%

C. Testing is to be performed by the testing agency under the supervision of a geotechnical engineer. Testing is to be conducted, at a minimum as follows:

1. Underfloor areas and in paved areas, 1 test per 2000 square feet of fill area for each two foot lift but not less than 2 tests.

2. Testing frequency is to be increased in confined areas.

3. One test is to be conducted every 50 linear feet of trench but not less than 1 test.

4. One test every 100 linear feet behind a wall but not less than one test.

3.11 GRADING

A. Site is to be graded such that the final elevations shown on the plans are achieved.

B. Contractor is to grade site so that positive drainage away from the building is provided.

C. Graded areas shall be free of irregularities, bumps or ruts. All areas shall be within 0.10' of the proposed grade.

D. Before beginning construction the Contractor is to review and become familiar with the plans. If any discrepancies between the plans and the actual field conditions or a conflict within the set of other sheets showing elevations, the Contractor is to notify the Architect immediately.

E. Provide uniform slopes between areas of proposed grades and spot elevations shown.

F. Once grading is completed topsoil is to be redistributed in areas to be landscaped at depths indicated on the plans. Topsoil should be placed at 4 inch depths if not specified elsewhere. Topsoil shall be suitable for planting and supporting landscape material and be free of deleterious , clods, and rocks.

G. Final graded areas should be within ½" to ¼" of proposed grades.

H. Contractor shall confirm positive drainage away from building at a minimum slope of 1/8" per foot.

3.12 PROTECTION

A. Contractor to protect all adjacent improvements from direct and indirect actions of grading and excavation activity. Any damaged improvement by shall be restored to like new condition at the Contractor's expense.

B. Contractor is to protect adjacent properties from erosion, excess drainage, debris, dust or other undesirable conditions throughout the course of the work.

C. Existing utilities to remain are to be protected throughout the duration of the project. If additional utilities are discovered, notify the architect/engineer immediately and wait for instructions as to how to proceed.

D. Excavation adjacent to trees or tree save areas is to be performed by hand in a manner to minimize impact to trees to be saved. Ripping or pulling of tree roots is not permitted. Tree roots are to be hand sawn if necessary and removed by hand.

E. Areas that become deformed or depressed during construction shall be reshaped, re-filled, and re-compacted as necessary at the Contractor's expense.

3.13 DISPOSAL AND CLEANUP

A. Excess soil, topsoil, vegetation, etc. is to be removed from the Owner's property in a manner that is in compliance with applicable laws and regulations.

B. Any construction or landscaping debris materials is to be removed from the site and disposed of in an appropriate manner.

END OF SECTION 31 2200