SECTION 310000 - EARTHWORK

PART 1 - GENERAL

1.01 Earthwork:

A. Scope of Work:

1. The General Contractor shall be responsible for the excavation required to install foundations and shall include any site work needed to allow equipment access to the site and preparation of the site for equipment.

2. Excavation and backfill required to install utilities (water, gas, electric, etc.), sanitary plumbing lines and connection to existing sanitary line, installation of electrical line in buried electrical conduit, installation of buried water service line, roof drain and stormwater piping.

3. Preparation of subgrade for building slabs, walks, stairs, footings, and pavements as per drawings.

4. Excavation and backfill required to install new manholes, storm pipe, and roof drains.

5. Backfilling and site restoration to return the area to conditions as they were at the beginning of the job.

6. Excavation shall be done in a manner to minimize the disruption of the services and access to the various parts of the site.

7. Excavated material that is not to be used for backfilling or is unsuitable for backfill shall be removed from the site. It is the responsibility of the contractor to properly remove, haul, and dispose of same.

8. Asphalt pavement and deleterious fill shall be removed off site and properly disposed of.

9. Contractor shall secure all of his equipment at the end of each work day.

10. Installation of storm sewer structures and piping.

11. Site staging area set up including construction fence and temporary stone base.

12. Site restoration.

13. Recycled Concrete Aggregate/Recycled Asphalt Pavement: The use of recycled concrete aggregate or recycled asphalt pavement, or any blend of these materials, with or without soil or quarry process stone shall not be permitted.

B. Quality Assurance:

1. Safety Codes and Standards: Perform earthwork and site grading work in compliance with the applicable requirements of governing authorities having jurisdiction.

Provide and maintain barricades, signs, lights, etc., required for the protection of personnel, tenants, the public, materials, etc. Barricades where applicable shall conform with all the local codes and regulations and shall be removed upon completion of the contract.

The Contractor shall be solely responsible for stability of excavation and shall provide all sheathing, lagging, bracing, etc., required to retain the excavations and to prevent slides sloughs.

C. Job Conditions:

1. Testing and Inspection Service: Employ, at Contractor's expense, testing laboratory to perform soil testing and inspection service for quality control testing during earthwork operations.

D. Submittals: The contractor shall notify the Engineer/architect of the source of fill material to be used. The equipment to be used, the date and time that earthwork operations will start and the name of the person who will be in charge of the operations in the field.

E. Test Reports - Excavating: Submit following reports directly to Engineer from the testing services, with copy the Contractor:

1. Test reports on borrow material.

2. Verification of each footing subgrade.

3. Field density test reports.

4. One optimum moisture - maximum density curve for each type of soil encountered.

5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

F. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities.

Care shall be taken not to move, without the consent of the proper parties, any water or gas pipes, valve boxes, culverts, telegraph, telephone or electric piles, or wires, conduits or other structures or appurtenances, and where interfered with by the work they shall be supported securely in place until the work is complete, and shall be so treated as to render their condition safe and permanent as before. If so directed by the Architect, the location of any existing structures or work shall be changed to meet the requirements of the conditions encountered and leave all in good working order, at no extra cost to the owner.

If any water or gas mains, valve boxes, telephone conduits, drains and other existing structures are broken, injured or caused to leak by reason of the construction of the

sewer or any part thereof, the Contractor shall give immediate notice to the proper parties having such structures in charge, and such parties shall cause such leaks, breaks, or injury to be repaired. If any house connections to the water mains shall become broken or damaged during the construction, they shall be immediately repaired by such parties. The expense of such work shall be paid by the Contractor.

G. Use of Explosives: The use of explosives is not permitted.

H. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

I. Products:

1. Soil Materials - Definitions:

a. Satisfactory soil materials are defined as those complying with the American Association of State Highway and Transportation Officials (AASHTO) soil classification groups A-1, A-2-4, A-2-5 and A-3.

b. Unsatisfactory soil materials are defined as those complying with AASHTO for soil classification groups A-2-6, A-2-7, A-4, A-5, A-6 and A-7, also, peat and other highly organic soils and soil materials of any classification that have a moisture content at the time of compaction beyond the range of 1% below and 3% above the optimum moisture content of the soil material, as determined by moisture-density relations test.

c. Subbase Material: Naturally or artificially graded mixture of natural of crushed gravel, crushed stone, crushed slag, natural or crushed sand as specified on drawings or herein in layers of specified thickness.

d. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2” sieve and not more than 5% passing a No. 4 sieve.

e. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2” in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

J. Execution:

1. Excavation: Work includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered. Remove all deleterious material and materials unacceptable to the Engineer.

All existing rooty organic topsoil, uncompacted fill material, and peat must be removed from within the building and extending five feet beyond the building lines.

All layers of virgin soil directly beneath the peat or fill which are obviously loose or soft, whether due to the presence of roots, frost disturbance, or other causes, must either be removed or recompacted in place depending upon root content, layer thickness, or other pertinent factors, as directed by the Engineer.

Excavated material, free from deleterious matter, may be used to grade areas around the buildings but shall not be reused for fill beneath floor slabs. All excess or unsuitable excavated material shall be disposed of by the Contractor in an approved off-site disposal area provided by the contractor. Should additional fill be required to meet final grade elevations, the contractor shall deliver to the site appropriate fill as part of his contract with no additional cost to the owner.

Earth excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation. Any abandoned utility lines encountered during any and all excavation shall be removed in its entirety.

Rock excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 3.4 cubic yard (heaped) capacity backhoe. Trenches in excess of 10’-0” in width and pits in excess of 30'-0" in either length or width are classified as open excavation.

Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty excavating equipment without drilling, blasting or ripping.

Typical of materials classified as rock are boulders 1/2 cu. yd. or more in volume, solid rock, rock in ledges, and rock- hard cementitious aggregate deposits.

Intermittent drilling, blasting or ripping performed to increase production and not necessary to permit excavation of materials encountered will be classified as earth excavation.

Rock payment lines are limited to the following:

Two feet outside of concrete work for which forms are required, except footings.

One foot outside perimeter of footings.

In pipe trenches, 6” below invert elevation of pipe and 2 ft. wider than inside diameter of pipe, but not less than 3 ft. minimum trench width.

Neat outside dimensions of concrete work where no forms are required.

Under slabs on grade, 6” below bottom of concrete slab.

Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Clean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

a. Additional Excavation: When excavation has reached required subgrade elevations notify Engineer who will make an inspection of conditions.

   If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Engineer

   Removal of unsuitable material and its replacement as directed will be part of base contract. No extra will be paid for any additional excavation.

b. Stability of Excavations: Slope sides of excavations to comply with OSHA, local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

   Maintain sides and slopes of excavations in safe condition until completion of backfilling.

c. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
   Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

   Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

d. Material Storage: Stockpile satisfactory excavated materials w ere directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

   Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

   Dispose of excess soil material and waste materials as herein specified.

e. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms required lines and grades to leave solid base to receive other work. Excavation for footing and foundations shall be to virgin soil. Any existing foundations or other concrete work discovered during excavation shall be completely removed.

In excavating for footings and foundations, the presence of fill shall be completely removed and replaced with selected fill. Excavate to a depth of 4' below existing grade.

f. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

g. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.

For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes or conduit 6" or larger in nominal size, and electrical work indicted to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.

Except as otherwise indicated, excavate for exterior water-bearing piping (water drainage) so top of piping is not less than 3' below finished grade.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

For piping or conduit less than 2'-6" below surface of roadways, provide 4" thick concrete base slab support. After installation and testing of

piping or conduit, provide minimum 4” thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

h. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

2. Compaction:

a. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification.

b. Percentage of Maximum Density Requirements: Compact soil to not less than the allowing percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 1557; and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).

c. Structures, Building: Slabs and Steps, Pavements: Compact top 12" of sub-grade and each layer of backfill or fill material at 90% maximum density for cohesive material or 95% relative density for cohesionless material.

d. Lawn or Unpaved Areas: Compact top 6” of subgrade and each layer of backfill or fill material at 85% maximum density for cohesive soils and 90% relatively density for cohesionless soils.

e. Walkways: Compact top 6” of subgrade and each layer of backfill or fill material at 90% maximum density for cohesive material or 95% relatively density for cohesionless material.

f. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material. Apply water in manner to prevent free water appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3. Backfill and Fill:

a. General: All areas to receive fill shall be leveled. The surface shall be free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment utilized. If placed, the stone drainage blanket shall consist of 3/4" size crushed stone and be uniformly spread over the bottom of the excavation. The average thickness of the drainage blanket shall be 15”. Sump pits shall be set as

required to control the water level in the blanket. Pumps shall be used to maintain the water level a minimum of 12" below the surface of the fill. Material for controlled fill in building areas and extending five feet beyond the building limits shall preferably consist of clean sand and/or gravel, free of vegetable matter or other deleterious substances. The sand and/or gravel shall be well graded and shall contain no more than 70% by weight of material finer than the No. 30 sieve and no more than 15% by weight or material finer than the No. 200 sieve. Boulders and cobbles having a maximum diameter exceeding six inches shall be excluded from the fill material. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

In excavations, use satisfactory excavated or borrow material.

Under grassed areas, use satisfactory excavated or borrow material.

Under walks and pavements, use subbase material.

Under steps, use subbase material.

Under building slabs, use drainage fill material.

Under piping and conduit, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90° of cylinder.

Underground electrical conduit, encase the conduit in 1' of white sand.

Backfill excavations as promptly as work permits, but not until completion of the following:

Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing and perimeter insulation.

Inspection, testing, approval, and recording locations of underground utilities.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

Removal of trash and debris.

b. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground

surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

c. Placement and Compaction: Place backfill and fill materials in layers not more than 8” in loose depth for material compacted by heavy compaction equipment, and not more than 4” in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density floor each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

The surface of the fill shall be kept at a slight slope to facilitate drainage of any ground or surface water which enters the excavation. Sump pits and pumps shall be used, if required, to maintain the fill in a reasonably dry condition.

After each layer has been placed and spread evenly, it shall be thoroughly compacted to an average value of 95% of the maximum Modified Proctor density of the soil being utilized within the building areas and extending five feet beyond the building limits in all directions. No individual test values shall be acceptable if they are below 90%. If required, the maximum density of the material shall be determined by a Soils Engineer in accordance with the American Society for Testing and Materials (ASTM) D 1557, latest edition. Cost for testing will be borne by the contractor at no additional cost to the owner.

A smooth-wheeled vibratory compactor should provide the most suitable means of compaction of essentially non-cohesive granular soils. Small, portable rammer or vibratory plate compactors should be utilized within five feet of existing walls.

Sufficient passes of approved compactor shall be made in order to obtain the specified densities. A minimum of three passes of the compactor shall be required over all portions of each lift. A "pass" shall be defined as one passage of the contact portion of the compactor over the entire surface of the layer.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

4. Grading:

a. General: Uniformly grade areas within limits of grading under his section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

b. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

Finish surfaces free from irregular surface changes, and as follows:

c. Lawn or Unpaved Areas: Finish areas to receive topsoil to within no more than 0.10’ above or below required subgrade elevations.

d. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

e. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

f. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of specified, and to required elevation. Provide final grades within a tolerance of ½” when tested with a 10’ straightedge.

g. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

5. Pavement Sub-Base Course:

a. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

b. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

c. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12” width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

d. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

When a compacted subbase course is shown to be 6” thick or less, place material in a single layer. When shown to be more than 6” thick, place material in equal layers, except no single layer more than 6” or less than 3” in thickness when compacted.

6. Field Quality Control:

a. Quality Control Testing During Construction: Allow testing service of inspect and approve subgrades and fill layers before further construction work is performed.

Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

b. Footing Subgrade: 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 Engineer.

c. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.

d. Foundation Wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.

If, in the opinion, of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

7. Maintenance:

a. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

b. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

c. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

8. Disposal of Excess and Waste Materials:

a. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off Owner's property.

END OF SECTION 310000

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Stripping and stockpiling topsoil.
4. Removing above- and below-grade site improvements.
5. Disconnecting, capping or sealing, and removing site utilities.
6. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Section 015000 "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities.

2. Section 017300 "Execution" for field engineering and surveying.

3. Section 017419 "Construction Waste Management and Disposal.

4. Section 024119 "Selective Demolition" for partial demolition of buildings or structures.

1.3 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify Call Before You Dig for area where Project is located before site clearing.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

E. Do not direct vehicle or equipment exhaust towards protection zones.

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

G. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Wrap a 1-inch (25-mm) blue vinyl tie tape flag around each tree trunk at 54 inches (1372 mm) above the ground.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for pavements and turf and grasses.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete pavements.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.

2. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

3. Section 315000 "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.

4. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: All removal of material encountered shall be included in the base bid for this contract.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Warning tapes.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify "Call Before You Dig" for area where Project is located before beginning earth-moving operations.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 311000 "Site Clearing" are in place.

D. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 15 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

I. Sand: ASTM C 33/C 33M; fine aggregate.

J. Recycled Concrete Aggregate (RCA) from offsite borrow facilities shall not be allowed.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 6 inches outside of minimum required dimensions of concrete cast against grade.
c. 6 inches beneath bottom of concrete slabs-on-grade.
d. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph .

2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1-1/2 inch in any dimension, to a height of 6 inches over the pipe or conduit.

a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

2. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Pavements: Plus or minus 1/2 inch.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Place base course material over subbase course under hot-mix asphalt pavement.

2. Shape subbase course and base course to required crown elevations and cross-slope grades.

3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.

4. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course 6 inches or less in compacted thickness in a single layer.

2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557

3.16 FIELD QUALITY CONTROL

A. Special Inspections: The Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.

2. Determine that fill material classification and maximum lift thickness comply with requirements.

3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: The Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Building Areas: Minimum of 4 tests per fill lift; spacing not to exceed 50’ between test locations.

2. Parking/Roadway Areas: Minimum of 3 tests per fill lift; spacing not to exceed 100 feet between test locations.

3. Trench Backfill: At each compacted fill layer, at least one test for every 150 feet of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312319 - DEWATERING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Furnish all labor, materials, equipment, tools and appurtenances required to remove and dispose of all surface and ground water entering excavations and to permit construction to be performed in the dry, as shown on the Contract Drawings and specified herein.

1.2 RELATED SECTIONS

A. Division 31, Section 312000, Earth Moving

1.3 QUALITY ASSURANCE

A. Carefully examine the site and all available documentation to determine potential hazards to existing structures and natural features.

B. Do not begin any dewatering operations without the prior approval of the Owner.

1.4 SUBMITTALS

A. The Contractor shall submit a dewatering system design for review and approval by the Engineer, which shall include drawings with calculations and written descriptions of the proposed equipment, materials and procedures. All dewatering system design documents shall be submitted at least 2 weeks prior to starting work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Piping, pumping equipment, sump and trench installation and other materials required to provide dewatering of excavations shall be suitable for the intended purpose. Back-up pumping units shall be maintained at the site to be used in case of failure of the normal pumping units.

PART 3 – EXECUTION

3.1 DEWATERING SYSTEM

A. Maintain proper equipment, facilities and personnel to remove all water entering excavations during the construction period.

B. Control the groundwater level and the piezometric level at a minimum depth of 3 feet below excavation level.

C. Provide a standby power system and redundant power supply lines for each pump designed to turn on automatically when the primary power source is interrupted.

D. Perform dewatering in manner to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation. Construct well or sump installations with proper sand filters to prevent removal of fine grained soil from the surrounding ground.

E. Collect water entering the excavation from surface runoff in shallow ditches around the perimeter of the excavation, drain to sumps and pump from the excavation to maintain a bottom free from standing water.

F. Dispose of drainage so that flow or seepage back into the excavated area will be prevented.

G. Contractor shall be responsible for complying with all applicable local, state, and federal regulations and requirements related to dewatering, including but not limited to the Departments of Environmental Protection and Conservation. Contractor shall also be responsible for obtaining any regulatory approvals necessary for dewatering.

3.2 MAINTENANCE

A. The Contractor shall be responsible for the maintenance, servicing, repairs, make additions, changes, or replacements to provide a satisfactory system, at no additional cost to the Owner.

B. If there is a total failure of the dewatering system, the Contractor shall flood the excavation.

C. If the dewatering requirements are not satisfied due to a failure of the dewatering system, the Owner determines that the subgrade has been damaged, the Contractor shall be responsible for the removal and replacement of the affected soils.

D. Accomplish dewatering without damaging existing structures adjacent to excavation.

3.3 FLOOD PROTECTION

A. Provide the work area with adequate protection against floods.

B. If an excavation is flooded as an emergency procedure, the Contractor shall restore the work area and repair all damage caused by the flooding at no additional cost to the Owner.

3.4 REMOVAL OF DEWATERING SYSTEM

A. Remove all elements of the dewatering system at the conclusion of the construction phase, and restore the site to its natural condition, and as directed by the Owner.

END OF SECTION 312319

SECTION 313117 – SOIL CONSERVATION

PART 1 - GENERAL

1.01 Description of Work: The extent of the soil conservation work is shown on the drawings and schedules. Sediment fence details, inlet filter details, construction sequence, and seeding schedules required are shown on the drawings.

The contractor shall comply with all soil erosion and sediment control practices in accordance with the "New York State Standards and Specifications for Erosion and Sediment Control", and as directed by the local Soil Conservation District representative and the architect.

END OF SECTION 313117

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for recording preexisting conditions and excavation support and protection system progress.

2. Section 312000 "Earth Moving" for excavating and backfilling and for controlling surface-water runoff and ponding.

1.3 INFORMATIONAL SUBMITTALS

A. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.4 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Owner's written permission.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.

2. Prevent surface water from entering excavations by grading, dikes, or other means.

3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

4. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 SOLDIER PILES AND LAGGING

A. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

B. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 FIELD QUALITY CONTROL

A. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

B. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.4 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

1. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."

2. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000