SECTION 312000 – EXCAVATION AND FILL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes:

1. Preparing subgrades for structures, walks, pavements, grasses and plants.
2. Subbase course for concrete slabs, walks and asphalt pavement.
3. Excavating and backfilling trenches for utilities and structures.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 31 00 00: Site Clearing

C. Section 31 01 00: Selective Tree Removal and Trimming

D. Section 31 23 16: Rock Removal

E. Section 32 91 20: Topsoil

F. Section 32 92 19: Seeding

1.3 DEFINITIONS

A. Earth Excavation: The removal of all surface and subsurface material not classified as rock as defined below.

B. Unsatisfactory Soil: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction. Soil that may contain rock or gravel larger than 3 inches in any dimension, frozen materials, organic matter, vegetation, soft, nondurable particles, elongated particles or other deleterious matters.

C. Contaminated Soil: Soil that may require specific disposal method/location as it may contain items such as but not limited to trace/detect chemical, oil or soft or loose bituminous asphalt tar.

D. Construction Debris Soil: Soil containing debris, waste, rubbish, slag, cinders, ashes, metals, or other manmade or foreign materials.

E. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.

1. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
2. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.

F. Unclassified Earth Excavation: The excavation and disposal of all surface and subsurface materials of any description necessary to perform the work of this contract. This will include:

1. All soil deposits of any description both above and below groundwater levels. These may be naturally deposited or placed by previous construction operations.

G. Subgrade Surface: Surface upon which subbase or topsoil is placed.

H. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.

I. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Standard Proctor), or ASTM D 1557 (Modified Proctor).

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

K. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.

L. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Engineer.

M. Grading Limit Line (Shown on Drawings): Limits of grading, excavations and filling required for the work of this contract. Unless specifically noted otherwise, the Grading Limit Line and Contract Limit Line will be considered the same.

1.3 SUBMITTALS

A. Product Data:

1. Filter Fabric: Manufacturer's catalog sheets, specifications, and installation instructions.
2. Geogrid: Manufacturer's catalog sheets, specifications, and installation instructions.

B. Quality Control Submittals:

1. Subbase Materials: Material Test Reports: Classification according to ASTM D 2487, laboratory compaction curve according to ASTM D 1557 and certified gradation analysis according to ASTM C136 for each soil material proposed for fill and backfill. Name and location of source and the DOT Source Number.
2. Other Aggregates: Name and location of source and soil laboratory test results.

1.4 PROJECT CONDITIONS/COORDINATION AND SCHEDULING

A. Existing Utilities:

1. Coordinate the work to determine the extent of the areas of subsurface investigation required to locate all underground utilities and service connections in the areas of excavation.
2. Coordinate the work with the Owner and Engineer to minimize utility disruptions and facility operations. Provide a schedule for the Work required to the Owner and Engineer for approval. Upon approval of the schedule, notify the Owner and Engineer a minimum of three (3) working days prior to performing the Work.
3. Within the areas of excavation, all underground utilities and service connections shall be field located and their locations marked at least two (2) weeks prior to the performance of the required excavation work.

B. Existing Conditions:

1. Protect existing trees and plants during performance of the work unless otherwise indicated. Box trees and plants indicated to remain within the grading limit line with temporary steel fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.
2. Dewatering: Include the disposal of surface water and ground water, which may accumulate in open excavations, unfinished fills, or other low areas. Remove water by pumping, or other methods to prevent softening of exposed surfaces. Surface dewatering plan shall include the rerouting of any storm water runoff or natural drainage if necessary and shall comply with NYS DEC requirements.

3. Protection and Restoration of Surfaces: Protect newly graded areas from traffic, erosion, and settlements. Repair and reestablish damaged or eroded slopes, elevations or grades and restore surface construction prior to acceptance. Protect existing streams, ditches and storm drain inlets from water-borne soil by means of straw bale dikes. Conduct work in accordance with NYS DEC requirements.

C. Cold Weather Requirements:

1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
2. Backfilling: Do not backfill with any frozen soil materials.

D. Thru-traffic or fill placement with heavy construction vehicles or equipment which causes rutting or weaving to occur within the perimeter of a building will not be permitted. If rutting or weaving occurs during placement of fill, place specified fill in a stable area outside building perimeter and spread with tracked equipment to specified layer thickness.

1.5 DELIVERY AND STORANGE

A. Deliver and store materials in a manner to prevent contamination or segregation.

B. Protect filter fabric from sunlight during transportation and storage.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

B. Routine testing of existing soils and compacted material for compliance with these Specifications shall be performed by a testing agency acceptable to Engineer.

C. Compacted material that does not meet density requirements shall be removed and/or re-compacted, and retested.

PART 2 PRODUCTS

2.1 MATERIALS

A. Select Granular Fill Material: Stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
2 inch	50.0	100
No. 40	0.425	0-70
No. 200	0.075	0-15

1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve will not exceed 5.0.
3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2-inch sieve will consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.

E. NYSDOT Subbase Course Type 2: Stockpiled, crushed ledge rock or approved blast furnace slag. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
2 inch	50.0	100
1/4 inch	6.3	25-60
No. 40	0.425	5-40
No. 200	0.075	0-10

1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve will not exceed 5.0.
3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2-inch sieve will consist of flat or elongated particles. A flat or elongated

particle is defined as one which has its greatest dimension more than three times its least dimension.

F. NYSDOT #1 Crushed Stone: Clean, durable, sharp-angled fragments of rock of uniform quality. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
1 inch	25.0	100
1/2 inch	12.5	90 – 100
¼ inch	6.3	0-15

1. Magnesium Sulfate Soundness Test: 18 percent maximum loss by weight after ten test cycles.

G. NYSDOT #2 Crushed Stone: Clean, durable, sharp-angled fragments of rock of uniform quality. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
1-1/2 inch	37.5	100
1 inch	25.0	90 – 100
1/2 inch	12.5	0-15

1. Magnesium Sulfate Soundness Test: 18 percent maximum loss by weight after ten test cycles.

H. NYSDOT #1 Screened Gravel: Clean, durable gravel free from coatings. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
1 inch	25.0	100
1/2 inch	12.5	90 – 100
¼ inch	6.3	0-15

1. Magnesium Sulfate Soundness Test: 18 percent maximum loss by weight after ten test cycles.

I. NYSDOT #2 Screened Gravel: Clean, durable gravel free from coatings. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
1-1/2 inch	37.5	100
1 inch	25.0	90 – 100
1/2 inch	12.5	0-15

1. Magnesium Sulfate Soundness Test: 18 percent maximum loss by weight after ten test cycles.

J. Underdrain Filter Type 2 (NYSDOT 605.10, 733-2002): Material consisting of crushed stone, sand, gravel or screened gravel. Comply with the gradation and material requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
1/2 inch	12.5	100
1/4 inch	6.3	20 – 100
No. 10	2.0	0-15
No. 20	.85	0-5

1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after ten test cycles.

K. Selected Borrow/Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		**Percent Passing**
Sieve Size	**Size opening (mm)**	
4 inch	101.6	100
No. 40	0.425	0-70
No. 200	0.075	0-15

L. Infield Mix: Clean, dry clay mixed with washed mason-type sand resulting in a weed-free mixture that is reddish brown in color having a yield of 1.35 tons per cubic yard.

1. Total sand content shall be 58-62 percent.

2. The combined amount of sand retained on the medium, coarse and very coarse sieves shall be 38-45 percent.
3. The combined amount of silt and clay shall be 38-42 percent.
4. The ratio of silt divided by clay, otherwise known as the SCR, shall be 0.5 – 1.0.
5. No particles greater than 3 millimeters.
6. Equal to or less than 5 percent of particles shall be retained on the 2 millimeter.
7. Basis of Design: DuraEdge Pro Infield Mix manufactured by Natural Sand Company, Inc. Approved equivalents are acceptable.

M. Topdressing: Calcined clay product. Add at rate of one 50-pound back per 100 square feet.

N. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size will not exceed 2/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, land fill, muck, and peat will be considered unsuitable for fill and backfill, except topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.

O. Flowable Fill: Shall consist of a mixture of Portland cement, sand, water and admixtures proportioned to provide a non-segregating, free-flowing, self-consolidating material that will result in a hardened, dense backfill.

1. Shall have a 28-day compressive strength between 40 and 100 psi.

P. Bioretention Soil: Material consisting of sand and organic material free of stones, stumps, roots, or other woody material over 1-inch diameter.
1. Shall be classified as a USDA sandy loam, loamy sand, loam, or a loan/sand mix (with 35% - 60% sand).
2. Less than 25% USDA clay.
3. Minimum permeability = 0.5 feet/day
4. pH range: 5.2 – 7.6
5. Organic content: 3-7%

2.2 GEOTEXTILE

A. Pavement Section Geogrid: Tensar TriAx Geogrid or approved equivalent.

B. Erosion Control: Filter X, Mirafi 100X, Stabilinka T140N or approved equivalent.

C. Separation for Underdrains: Amoco 2002 & 2004, Contech Construction Products Inc. C-180, Synthetic Industries Geotex 250ST & 315ST, Mirafi Geolon HP570 & HP1500 or approved equivalent.

D. ADS Geosynthetics 315WTM woven geotextile fabric.

E. ADS Geosynthetics 601T non-woven geotextile fabric.

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.

3.2 CLEARING AND GRUBBING

A. Clear and grub the site within the grading limit line of trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

1. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
2. Where roots and branches of trees indicated to be saved interfere with new construction, carefully and cleanly cut them back to point of branching.

B. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.3 REMOVAL OF TOPSOIL

A. Remove existing topsoil from areas within the Grading Limit Line where excavation or fill is required.

B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.

1. Topsoil will be tested prior to stockpiling. Stockpile only quantities of topsoil approved in writing for re-use.

3.4 UNDERGROUND UTILITIES

A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.

B. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

C. Utilities to remain in service: Will be re-routed as shown on the Contract Drawings.

D. Utilities abandoned beneath and five feet laterally beyond the structure's proposed footprint will be removed in their entirety. Excavations required for their removal will be backfilled and compacted as specified herein.

E. Utilities extending outside the five feet limit specified above may be abandoned in place provided their ends are adequately plugged as described below.

1. Permanently close open ends of abandoned underground utilities exposed by excavations, which extend outside the limits of the area to be excavated.
2. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs or other approved method for the type of material and size of pipe. Do not use wood plugs.
3. Close open ends of concrete and masonry utilities with concrete or flow-able fill.

3.5 EXCAVATION

A. Excavate earth as required for the Work.

B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings.

C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).

1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

D. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade, and shape stockpiles for proper drainage as approved by the Engineer.

E. Excavation for Structures: Conform to elevations, lines, and limits indicated. Excavate to a vertical tolerance of plus or minus 1 inch. Extend excavation a sufficient lateral distance to provide clearance to execute the work.

F. Slabs and Floors: Excavate to the following depths below bottom of concrete for addition of select granular material:

1. Interior Floors: 6 inches unless otherwise indicated.
2. Exterior Slabs and Steps: 12 inches unless otherwise indicated.

G. Pipe Trenches: Open only enough trench length to facilitate laying pipe sections. Unless otherwise indicated on the Drawings, excavate trenches approximately 24 inches wide plus the outside pipe diameter, equally divided on each side of pipe centerline. Cut trenches to cross section, elevation, profile, line, and grade indicated. Accurately grade and shape trench bottom for uniform bearing of pipe in undisturbed earth. Excavate at bell and coupling joints to allow ample room for proper pipe connections.

1. Trench in Rock: Excavate an additional 6 inches below bottom of pipe for bed of cushion material under the piping.

H. Open Ditches: Cut ditches to cross sections and grades indicated.

I. Pavement: Excavate to subgrade surface elevation.

J. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Engineer.

K. Notify the Engineer upon completion of excavation operations. Do not proceed with the work until the excavation is inspected and approved. Inspection of the excavation by the Engineer will be made on three working days notice.

L. Removal of Unsuitable Material Beneath Structures and Other Improvements: Excavate encountered unsuitable materials, which extend below required elevations, to additional depth as directed by the Engineer. Have cross sections taken to determine the quantity of such excavation. Do not backfill this excavation prior to quantity measurement.

3.6 DEWATERING

A. Prior to the performance of any excavations provide dewatering methods such that the groundwater table is maintained at an elevation that is beneath the excavated depth.

B. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

C. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of undercutting footings, and soil changes detrimental to the stability of subgrades. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

D. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

E. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.7 SUBGRADE SURFACE FOR WALKS AND PAVEMENT

A. Shape and grade subgrade surface as follows:

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

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

C. Thoroughly compact subgrade surface for walks and pavement by mechanical rolling, tamping, or with vibratory equipment as approved to the density specified.

3.8 PLACING GEOTECH FABRIC

A. Place and overlap geotech fabric in accordance with the manufacturer's installation instructions, unless otherwise shown.

B. Cover tears and other damaged areas with additional fabric layer extending three feet beyond the damage.

C. Do not permit traffic or construction equipment directly on fabric.

D. Backfill over fabric within two weeks after placement. Backfill in accordance with the fabric manufacturer's instructions and in a manner to prevent damage to the fabric.

3.9 PLACING FILL AND BACKFILL

A. Surface Preparation of Fill Areas: Strip topsoil, remaining vegetation, and other deleterious materials prior to placement of fill. Remove all asphalt pavement in its entirety from areas requiring the placement of fill or break up old pavements to a maximum size of four inches. Prior to placement of fill, smooth out and compact areas where wheel rutting has occurred due to stripping or earthwork operations.

B. Place backfill and fill materials in layers not more than eight inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.

1. Place fill and backfill against foundation walls, and in confined areas such as trenches not easily accessible by larger compaction equipment, in maximum six inch thick loose depth layers.
2. For large fill areas, the layer thickness may be modified by the Engineer, at the Contractor's written request, if in the Engineer's judgment, the equipment used is capable of compacting the fill material in a greater layer thickness. This request will include the type and specifications of compaction equipment intended for use.

C. Under Exterior Concrete Slabs and Steps:

1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
2. Subbase Material: Place 12 inches of select granular material over subgrade surface.

D. Under Pavements and Walks:

1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
2. Subbase Material: Place as indicated.

E. Landscaped Areas: Place suitable material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use material containing rocks over four inches in diameter within the top 12 inches of suitable material.

F. Plastic Pipe in Trenches: Place cushion material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.

1. Trench in Rock: Place a minimum six-inch-deep bed of cushion material under pipe.

G. Backfilling Excavation Resulting From Removal of Unsuitable Material Beneath Structures and Other Improvements: Backfill the excavation with compacted select granular material.

3.10 COMPACTION

A. All materials with exception of open graded stone:

1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor) or 1557 (Modified Proctor).
   a. Structures (entire area within ten feet outside perimeter): 95 percent.
   b. Concrete Slabs and Steps: 95 percent.
   c. Landscaped Areas: 90 percent.
   d. Pavements and Walks: 95 percent.
   e. Pipes and Tunnels: 95 percent.
   f. Pipe Bedding: 95 percent.

2. When the existing ground surface to be compacted has a density less than that specified for the particular area classification, break up and pulverize, and moisture condition to facilitate compaction to the required percentage of maximum density.

3. Moisture Control:

   a. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, and during compaction operations.
   b. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil 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 value which will permit compaction to the percentage of maximum density specified.

4. If a compacted layer fails to meet the specified percentage of maximum density, the layer will be recompacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved.

B. Infield Mix
1. Place the material in lifts of 2 inches and compact with a minimum 1-ton vibratory roller until an optimum compaction of 85 percent is achieved. Scarify the surface to facilitate bonding of the next lift and repeat until finish grade elevation is achieved. Completing this process as described will minimize settling and improve the performance of the product.
2. Apply ½" topdressing to the surface

3.11 ROUGH GRADING

A. Exterior Grading: Trim and grade area within the grading limit line and excavations outside the limit line, required by this Contract, to a level of 4 inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

1. Slope cut and fill in transition areas, outside of the grading limit line, to meet corresponding levels of existing grades at a slope of 1 vertical to 2 horizontal unless otherwise indicated.
2. Landscaped Areas: Provide uniform subgrade surface within 1 inch of required level to receive topsoil thickness specified. Compact fill as specified to within three inches of subgrade surface. Remove objectionable material detrimental to proper compaction or to placing full depth of topsoil. If the top three inches of subgrade has become compacted before placement of topsoil, harrow or otherwise loosen rough graded surface to receive topsoil to a depth of three inches immediately prior to placing topsoil.

3.12 FINISH GRADING

A. Uniformly grade rough graded areas within limits of the grading limit line to finish grade elevations indicated.

B. Grade and compact to smooth finished surface within tolerances specified, and to uniform levels or slopes between points where finish elevations are indicated or between such points and existing finished grade.

C. Grade areas adjacent to building lines so as to drain away from structures and to prevent ponding.

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

1. Grassed Areas: Finish areas to receive topsoil to within one inch above or below the required subgrade surface elevations.
2. Walks: Place and compact subbase material as specified. Shape surface of areas under walks to required line, grade and cross section, with the finish surface not more than 1/2 inch above or below the required subbase elevation.
3. Pavements: Place and compact subbase material as specified. Shape surface of areas under pavement to required line, grade and cross section, with the finish surface not more than 1/2 inch above or below the required subbase elevation.

3.13 MAINTENANCE AND RESTORATION

A. Restore grades to indicated levels where settlement or damage due to performance of the work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials.
B. Restore pavements, walks, curbs, lawns, and other exterior surfaces damaged during performance of the work to match the appearance and performance of existing corresponding surfaces as closely as practicable.

C. Water seeded areas as required until physical completion of the work.

3.14 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. Transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on property, and dispose of such materials as directed.

C. Transport excess topsoil to areas on property designated by the Engineer. Smooth grade deposited topsoil.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: A qualified special inspector shall 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 and maximum lift thickness comply with requirements.

3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: A qualified geotechnical engineering testing agency shall 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. 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.

3.16 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them 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 Engineer; 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.

END OF SECTION 312000

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SECTION 312316 – ROCK REMOVAL

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 31 20 00: Excavation and Fill

1.2 DEFINITIONS

A. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.

1. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.

2. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.

B. Unauthorized Rock Removal:

1. The removal of any rock prior to performing the measurements/work required to determine quantities (Paragraph 3.1 B).

2. The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Owner.

C. General Rock Removal: Quantities of rock removal will be paid for as General Rock Removal when:

1. The width of rock removed, as per measurement limits, is greater than or equal to the total excavation depth required.

2. Boulders removed have a volume greater than 1.0 cu yd.

D. Trench and Pier Rock Removal: Quantities of rock removal will be paid for as Trench and Pier Rock Removal when the width of rock removed, as per measurement limits, is less than the total excavation depth required.

1.3 SUBMITTALS

A. Rock Removal Procedure: Submit a detailed outline of intended rock removal procedure for the Owner's information. This submittal will not relieve the Contractor of responsibility for the successful performance of method used.

1. Where blasting is permitted, show drill hole pattern, method of blasting, explosive types, and amount of explosive load.

B. Quality Control Submittals:

1. Certificates: Competency affidavit required under Quality Assurance Article.
2. Blasters Qualifications Data: Submit the following for each blaster:
3. Name, and employer's name, business address and telephone number.
4. Names and addresses of the required number of similar projects which meet the experience criteria.

C. Measurement data for quantities of rock removal.

1.4 QUALITY ASSURANCE

A. Blasters' Qualifications: The persons performing the blasting operations shall be personally experienced in the handling and use of explosives, shall furnish satisfactory evidence of competency in performing in a safe manner the type of blasting required, and shall have performed blasting operations on 5 similar projects.

B. Regulatory Requirements: Obtain the proper Permit to Blast from authorities having jurisdiction before explosives are bought to the site.

C. Certifications: Affidavit, for each blaster, certifying that blaster is competent in performing the type of blasting required.

D. Pre-Rock Removal Conference: Before the rock removal work is scheduled to commence, a conference will be called by the Owner's Representative at the site for the purpose of reviewing the Contract Documents and discussing requirements for the Work. The conference shall be attended by the Contractor's Representative and the person supervising the rock removal operations.

1.4 PROJECT CONDITIONS

A. Blasting and the use of explosive materials will not be permitted unless a Contractor-prepared Blasting Plan and Safety Plan have been approved by the Engineer and accepted by the Owner.

1. Contractor shall secure and maintain all permits and regulatory approvals if blasting is approved.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION, VERIFICATION & MEASUREMENT

A. Examination of Existing Property and Construction: Prior to starting rock removal Work, thoroughly examine the existing property and construction at the site and record, with notes and drawings or other documentation, existing defects and deterioration. Make this information available to the Engineer upon request.

B. Prior to removing material classified as rock, excavate test pits down to rock for the purpose of verifying the presence of sound rock and determining top of rock elevations.

1. Verification of Sound Rock: Demonstrate to the Engineer that materials to be classified as rock cannot be removed utilizing a backhoe or excavator equipped with any form of bucket, including a bucket equipped with ripping teeth.

2. Required Measurements: Take elevations and measurements as required for the purpose of determining the quantities of rock removal. Record all measurement data and submit a copy of the data to the Engineer. Backfill test pits prior to rock removal as directed. Unless otherwise indicated or directed, excavate test pits as follows:

a. For Structures: One pit for each structure or one pit for each 1000 sq ft, whichever is greater.
b. For Paved Areas: 3 pits for each 2500 sq ft.
c. For Utility Lines: One pit for each 100 lin ft.

3.2 SITE PREPARATION

A. Schedule a site meeting with the Engineer and facility personnel to review the rock removal procedures in detail.

B. If required, have seismographs in place and operational as well as all safety equipment and/or fencing.

3.3 ROCK REMOVAL

A. Remove rock as required and necessary for the installation of the work on as shown on the Contract Drawings. Make sufficient clearance, within the limits specified, for the proper execution of the work.

B. Volume Determination: Top of Rock Elevations established prior to the performance of any rock removal (Section 3.01 B) will be used to determine the depth of rock removed. Measurements for the base and width of the rock excavation shall be taken of the actual rock cut, as required for the Work, or to the specified measurement limits, whichever is smaller. Unless otherwise directed in writing, measurement limits for this work shall be as follows:

1. Cast-In-Place Concrete:
   a. Vertical Limit: Bottom of rock cut for cast-in-place concrete bearing on rock shall be the bottom of concrete elevation indicated on the Drawings.
   b. Horizontal Limit: Limit measurement between vertical side surfaces at bottom of rock cut to the following:

Actual Depth of Rock Cut	**Distance Beyond Edge of Concrete in Each Direction**
Under 3 Feet	18 Inches
3 to 15 Feet	24 Inches
Over 15 Feet	30 Inches

2. Precast Concrete Structures: Measurement will be based on the size of the precast concrete structure specified or indicated on the Drawings.

a. Vertical Limit: Bottom of rock cut for precast concrete structure shall be 12 inches below the required bottom of structure elevation.
b. Horizontal Limit: Limit measurement between vertical side surfaces at bottom of rock cut to the following:

Actual Depth of Rock Cut	**Distance Beyond Edge of Concrete in Each Direction**
Under 5 Feet	12 Inches
5 to 15 Feet	18 Inches
Over 15 Feet	24 Inches

3. Pipe:

a. Vertical Limit: Bottom of rock cut for pipe in trench shall be 6 inches below the required pipe invert elevation, with depth measured from the mean surface of the rock.
b. Horizontal Limit: Limit measurement between vertical side surfaces at bottom of rock cut to the following:

Actual Depth of Rock Cut	**Trench Width**
Under 10 Feet	24 Inches plus Pipe OD
10 to 15 Feet	36 Inches plus Pipe OD
Over 15 Feet	48 Inches plus Pipe OD

3.4 FIELD QUALITY CONTROL

A. Provide the Engineer with the recorded top of rock elevations. Prior to the performance of any rock removal operations obtain, in writing, that the Engineer as reviewed the information and is in agreement with the measurements taken.

B. Notify the Engineer at least 3 work days in advance of all phases of blasting operations.

C. Allow time for visual inspection of bottom of rock cut required for the work.

3.3 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from site and dispose of excess and unsuitable rock materials.

B. Transport excess and unsuitable rock materials to spoil areas on site designated by the Engineer, and dispose of such materials as directed.

3.4 ADJUSTING

A. Unauthorized Rock Removal:

a. Horizontal Direction: Backfill and compact unauthorized rock removal in the horizontal direction as specified for authorized excavation of the same classification, unless otherwise directed.

b. Vertical Direction: Immediately report unauthorized rock removal in the vertical direction to the Engineer. Correct unauthorized rock removal in the vertical direction in accordance with directions of the Engineer.

3.4 CLEANING

A. Where footings and walls will rest entirely on rock, clean rock surfaces free of soil and loose rock.

END OF SECTION 312316

SECTION 312319 – DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes construction dewatering.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 31 20 00: Excavation and Fill

1.3 SUBMITTALS

A. Field quality-control reports.

B. Existing Conditions: Using photographs, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by dewatering operations. Submit before work begins.

C. Record Drawings: Identify locations and depths of abandoned-in-place dewatering equipment.

D. Shop Drawings: Submit drawings and diagrams, with all pertinent data, showing the dewatering system proposed for use. Indicate the spacing and location of wellpoints and reading wells, and location of header lines, pumps, valves and discharge lines.

1.4 QUALITY ASSURANCE

A. Qualifications: The work of this Section shall be performed by a firm experienced in wellpoint dewatering work. The firm shall have satisfactorily completed such work for at least 3 projects of comparable size.

B. The dewatering system shall consist of equipment, appliances and materials designed or suitable for controlling groundwater in construction work.

1.5 PROJECT CONDITIONS

A. Blasting and the use of explosive materials will not be permitted.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

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 dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system 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. Provide temporary grading to facilitate dewatering and control of surface water.

3.2 INSTALLATION

A. Install the dewatering system in accordance with approved shop drawings and as required by site conditions. Locate elements of the system to allow a continuous dewatering operation without interfering with the installation of any permanent project work.

a. Space well points or wells at intervals required to provide sufficient dewatering.
b. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATIONS

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

a. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
b. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

c. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.

C. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

D. Remove dewatering system from project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap below overlying construction.

3.4 FIELD QUALITY CONTROL

A. Maintain a careful check to detect any settlement in existing adjacent Work. Notify the Engineer of any signs of settlement. Establish settlement point benchmarks and take periodic readings when directed.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation. Prepare reports of observations.

3.5 PROTECTION

A. Protect and maintain dewatering system during dewatering operations. Promptly repair damages to adjacent facilities caused by dewatering.

3.6 REMOVAL

A. When the dewatering system is no longer required and when directed, dismantle and remove the system and all appurtenances from the site.

END OF SECTION 312319

SECTION 312513 – EROSION AND SEDIMENT CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes:

1. Furnish, install, inspect, maintain, and remove soil erosion and sediment control measures during construction as shown on the Contract Documents prepared for this project.
2. Minimize the potential short-term adverse environmental impacts associated with construction activity in environmentally sensitive areas.
3. Assure the quantity and quality of stormwater runoff is not substantially altered due to construction activities.
4. Stabilize slopes and protect offsite areas by the installation and maintenance of stabilization and erosion control measures.
5. Dewatering operation procedure.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 31 20 00: Excavation and Fill

1.3 REFERENCE STANDARDS

A. New York Standards and Specifications for Erosion and Sediment Control, NYSDEC, latest edition.

B. NYSDEC: Reducing the Impacts of Stormwater Runoff for New Development, latest edition.

C. NYSDEC Environmental Conservation Law, Article 17. Titles 7, 8 and Article 70.

D. 6 NYCRR Parts 611 – 613 and all additions.

E. OSHA 40 CFR Part 258 and all additions. New York State: Standards and Specifications for Erosion and Sediment Control, latest edition.

1.4 PROJECT CONDITIONS

A. An Erosion and Sediment Control plan (ESC) has been prepared for this project. Install and maintain the temporary storm water and diversion control items as shown on the drawings before starting any grading or excavation and maintain compliance with all SPDES regulations. Provide any temporary sediment and erosion control measures that may be required within limits of the work, including any staging areas, throughout construction in conformance with the plan, and as directed by the Architect. Place the permanent control practices required before the removal of the temporary storm water diversion and control items.

B. During construction conduct operations in such a manner as to prevent or reduce to a minimum any damage to any water body from pollution by debris, sediment, chemical or other foreign material, or from the manipulation of equipment and/or materials in or near a stream or ditch flowing directly to a stream. Any water which has been used for wash purposes or other similar operations which become polluted with sewage, silt, cement, concentrated chlorine, oil, fuels, lubricants, bitumens, or other impurities shall not be discharged into any water body.

C. In the event of conflict between these specifications and the regulation of other Federal, State, or local jurisdictions, the more restrictive regulations shall apply.

D. The Contractor shall adhere to all requirements of the Erosion and Sediment Control plan.

E. The Contractor will submit copies of certificates documenting that on-site workers have completed a NYS Department of Environmental Conservation endorsed Erosion & Sediment Control training as required by State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001).

F. The Work shall consist of furnishing, installing, inspecting, maintaining, and removing soil and erosion control measures as shown on the contract documents or as ordered by the Architect during the life of the contract to provide erosion and sediment control.

G. Temporary structural measures provide erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion. These are used during construction to prevent offsite sedimentation. Temporary structural measures shall include check dams, construction road stabilization, stabilized construction entrance, dust control, earth dike, level spreader, perimeter dike/swale, pipe slope drain, portable sediment tank, rock dam, sediment basin, sediment traps, silt fence, storm drain inlet protection, straw/hay bale dike, access waterway crossing, storm drain diversion, temporary swale, turbidity curtain, water bars or other erosion control devices or methods as required.

H. Permanent structural measures also control protection to a critical area. They are used to convey runoff to a safe outlet. They remain in place and continue to function after completion of construction. Permanent structural measures shall include debris basins, diversion, grade stabilization structure, land grading, lined waterway (rock), paved channel, paved flume, retaining wall, riprap, rock outlets, and stream bank protection or other erosion control devices or methods as required.

I. Vegetative measures shall include brush matting, dune stabilization, grassed waterway, vegetating waterway, mulching, protecting vegetation, seeding, sod, straw/hay bale dike, stream bank protection, temporary swale, topsoil, and vegetating waterways.

J. Biotechnical measures shall include wattling (live fascines, brush matting, brush layering, live cribwall, and branchpacking) vegetated rock gabions, live staking, tree revetment, and fiber rolls.

K. Weekly inspections will be completed by the Engineer. Comply with and correct all deficiencies found as a result of these inspections. At the end of the construction season when soil disturbance activities will be finalized or suspended until the following spring, the frequency of the inspections may be reduced. If soil disturbance is completely suspended and the site is properly stabilized, a minimum of monthly inspections must be maintained. The stabilization activities must be completed before snow cover or frozen ground. If vegetation is required, seeding, planting and/or sodding must be scheduled to avoid die-off from fall frosts and allow for proper germination/establishment. Weekly inspections must resume no later than March 15.

1.5 DEFINITIONS

A. Stabilized Construction Entrance: A stabilized pad of aggregate underlain with geo-textile where traffic enters a construction site to reduce or eliminate tracking of sediment to public roads.

B. Dust Control: Prevent surface and air movement of dust from disturbed soil surfaces.

C. Portable Sediment Tank: A compartmented tank to which sediment laden water is pumped to retain sediment before pumping the water to adjoining drainage ways.

D. Sediment Basin: A barrier constructed across a drainage way to intercept and trap sediment.

E. Sediment Traps: A control device formed by excavation to retain sediment at a storm inlet or other points of collection.

F. Silt Fence: A barrier of geo-textile fabric installed on contours across the slope to intercept runoff by reducing velocity. Replace after 1 year.

G. Storm Drain Inlet Protection: A semi-permeable barrier installed around storm inlets to prevent sediment from entering a storm drainage system.

H. Straw/Hay Bale Dike: Intercept sediment laden runoff by reducing velocity. Replace after 3 months.

I. Storm drain Diversion: The redirection of a storm drain line or outfall channel for discharge into a sediment trapping device.

J. Temporary Swale: A temporary excavated drainage swale.

K. Protecting Vegetation: Protecting trees, shrubs, ground cover and other vegetation from damage.

L. Temporary Seeding: Erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

M. Permanent Seeding: Grasses established and combined with shrubs to provide perennial vegetative cover on disturbed, denuded, slopes subject to erosion.

N. Sod: Used where a quick vegetative cover is required.

1.6 SUBMITTALS

A. Product Data: Manufacturer's catalog cuts, specifications and installation instructions.

B. Contingency Action Plan for prompt remedial action in the event spillage of petroleum products or other pollutants should occur. Contingency Action Plan shall be submitted to the Engineer for acceptance prior to the start of construction.

C. Name and location of all material suppliers.

D. Certificate of compliance with the standards specified above for each source of each material.

E. List of disposal sites for waste and unsuitable materials and all required permits for use of those sites.

F. Where a Stormwater Pollution Prevention Plan has been prepared, the Engineer shall file a Notice of Intent (NOI) with NYSDEC prior to commencing construction activities and a Notice of Termination (NOT) with NYSDEC following construction.

G. Where a Stormwater Pollution Prevention Plan and/or Erosion and Sediment Control Plan has been prepared, the Contractor will submit copies of certificates documenting that on-site workers have completed a NYS Department of Environmental Conservation endorsed Erosion & Sediment Control training as required by General Permit GP-0-20-001. The Contractor will submit copies of certificates documenting that on-site workers have completed a NYS Department of Environmental Conservation endorsed Erosion & Sediment Control training as required by General Permit GP-0-20-001.

PART 2 PRODUCTS

2.1 MATERIALS

A. Silt Fence
1. Mirafi, Envirofence365 South Holland Drive, Pendergrass, Ga, 30567, (888) 795-0808, http://www.tencategeo.us/en-us/
2. Filter X
3. Stabilinka T140N
4. Approved equivalent

B. Filter fabric inlet protection

C. Stone and block inlet protection

D. Temporary filters for inlet protection

E. Hardwood staking material

F. Stone material

G. Dry Rip Rap
1. NYSDOT Standard Specification Section 620

PART 3 EXECUTION

3.1 PREPARATION

A. Prior to any construction activities, install temporary erosion and sediment control barriers or measures as indicated on the Contract Drawings, per manufacturer's specifications

B. The Contractor shall comply with all provisions of the Erosion and Sediment Control Plan prepared by Passero Associates

C. The Contractor shall be required to protect and preserve existing trees and shrubs within the Limit of Disturbance. Contractor shall replace any tree or shrubs damaged in kind to the satisfaction of the Owner.

D. The Contractor shall contact the Engineer once the erosion and sediment control structures have been installed.

E. Prior to commencement of construction, the Engineer shall conduct an assessment of the site and certify that the appropriate erosion and sediment control structures as shown on the Contract Drawings have been adequately installed and implemented.

F. Staging of Earthwork Activities: All earthwork shall be scheduled so that the smallest possible areas will be unprotected from erosion for the shortest time feasible.

G. Vegetation adjacent to or outside of access roads or rights-of-way shall not be damaged.

H. The Engineer has the authority to limit the surface area of erodible earth exposed by earthwork operations and to direct the Contractor to provide immediate temporary or permanent erosion measures to minimize damage to property and contamination of watercourses and water impoundments. Under no circumstances will the area of erodible earth material exposed at one time exceed 5 acres. The Engineer may increase or decrease this area of erodible earth material exposed at one time as determined by their analysis of project, weather and other conditions. The Engineer may limit the area of clearing and grubbing and earthwork operations in progress commensurate with the Contractor's demonstrated capability in protecting erodible earth surfaces with temporary, permanent, vegetative or biotechnical erosion control measures.

I. Schedule the work so as to minimize the time that earth areas will be exposed to erosive conditions. Provide temporary structural measures immediately to prevent any soil erosion.

J. Provide temporary seeding on disturbed earth or soil stockpiles exposed for more than 7 days or for any temporary shutdown of construction. In spring, summer or early fall apply rye grass at a rate of 1 lb/ 1000 sq.ft. In late fall or early spring, apply certified Aroostook Rye at a rate of 2.5 lbs./ 1000 sq. ft. Apply hay or straw at a rate of 2 bales/ 1000 sq. ft. or wood fiber hydromulch at the manufacturer's recommended rate. Hay or straw shall be anchored.

K. Provide temporary grading to facilitate dewatering and control of surface water.

L. Coordinate the use of permanent controls or finish materials shown with the temporary erosion measures.

M. After final stabilization has been achieved, temporary sediment and erosion controls must be removed. Areas disturbed during removal must be stabilized immediately.

N. Disposal of spoil material shall not be in any flood plain, wetland, stream, brook, or sensitive environmental area. The Contractor shall dispose of spoils within staging areas and provide sediment control barriers accordingly.

3.2 CLEARING

A. Tree trunks and roots, vegetation, and project debris shall not be buried on site.

B. Staging areas (for storage of materials and stockpiles) shall be located as shown on the plans. Where areas must be cleared for staging area temporary structures, provisions shall be made for regulating drainage and controlling erosion.

C. All abandoned or useless objects including equipment, supplies, personal property, rubbish, (including those present prior to construction activities) should be removed from the project work area and properly disposed of in accordance with local, state, and federal regulations.

3.3 COMPLIANCE

A. The Owner shall have a qualified professional, as described in the NYSDEC SPDES General Permit for Stormwater Discharge from Construction Permit No. GP-0-20-001, conduct a site inspection following the commencement of construction at least every 7 calendar days.

B. All erosion and sediment control devices must be maintained in working order until the site is stabilized. All preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, re-seeding, or re-mulching, must be performed immediately.

C. The Contractor shall, at the direction of the Engineer, use necessary methods to minimize erosion within access roads, especially in areas that drain to watercourse areas.

D. Cuts, fills, and other disturbed areas will be maintained to prevent erosion until adequate vegetative/impervious cover is established.

E. Water, resulting from dewatering operations that will reduce the quality of receiving waters shall not be directly discharged. The Contractor shall provide, install, and maintain sump pits where necessary to dewater operations as detailed on the plans. Stone used within the sump pits shall be washed clean stone. The Contractor shall provide, install and maintain dewatering bags, as deemed necessary to control sediment deposits at critical environmental areas. Lifting straps shall be placed under the unit to facilitate removal after use. Dewatering bags shall be placed on stabilized areas over grass. Discharge hose from pump shall be inserted a minimum of six inches and tightly secured with attached strap to prevent water from flowing out of the unit without being filtered. Water from

dewatering operations shall be treated to eliminate the discharge of sediment and other pollutants to streams and watercourses. The unit shall be replaced when it is half full of sediment or when the sediment has reduced the flow rate of the pump discharge to an impractical rate. Remove and dispose of sediment and dewatering bag off-site.

F. Silt fence, where identified on plans, shall be installed at down gradient locations to control sediment deposits off-site at critical environmental areas. The silt fence shall be staked (unless noted otherwise), anchored and set as per manufactures specifications. The silt fence shall be inspected on a daily basis and after a rain fall event and repaired as necessary.

G. A stabilized construction entrance shall be installed and maintained for vehicular access on and off site. The entrance shall be constructed of 2″ stone, or approved equal, and shall have a minimum length of 50 feet. The condition of the entrance shall be inspected daily and repaired as necessary.

H. Dust control shall be controlled by the use of water, or calcium chloride application. Water application shall be applied at a rate where mud is not produced. The rate of application of the calcium chloride shall not exceed Federal, State and Local application rates or manufactures recommendations. Dust control shall be applied on adjacent public streets.

I. Dry rip-rap shall conform to the lines, grades and thicknesses indicated on construction plans. It shall be a well-graded mass of variable size stones with no areas of uniform size material. Align stones to obtain a close fit and to minimize voids. Fill spaces between stones with spalls of suitable size.

J. Paved areas within access corridors and parking areas shall be swept on a regular basis (minimum twice per week) as needed to minimize sediment and dust tracked from the work area. Should sediment and dust be tracked off-site, Contractor shall be responsible for sweeping public streets.

K. During the final site restoration, the Contractor shall remove all sediment and debris deposited in the temporary and permanent erosion and sediment control barriers or measures including but not limited to all culverts and drainage swales, at no additional cost to the Owner.

L. When all disturbed areas are stable, all temporary erosion and sediment control measures shall be removed per the approval of the Engineer. The measures are temporary and shall be removed and the areas restored to its original condition when they are no longer required, at no additional cost to the Owner.

M. The Owner and Contractor shall maintain a record of all erosion and sediment control inspection reports at the site in a log book. The site log book shall be maintained on the site and be made available to the permitting authority. The Owner / Contractor shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

N. The Contractor is fully responsible for maintaining, repairing, and protecting his work throughout the project, at no additional cost to the Owner, until the Owner accepts the work.

END OF SECTION 312513