SECTION 329113
SOIL PREPARATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. PART A and DIVISION 1 of PART B are hereby made a part of this SECTION.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

1.02 RELATED WORK

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division One of these Specifications.

1. Landscape Maintenance - Section 310125
2. Earthwork - Section 312000
3. Finish Grading - Section 312219
4. Planting - Section 329000
5. Lawns and Grasses – Section 329200
6. Landscape Subdrainage – Section 334610

1.03 DEFINITIONS

A. Subgrade: Soil material and levels resulting from the approved rough grading work.

1. Cultivation of all subgrade areas prior to amending is included in this section.

2. Subgrade soil(s): Subgrade soil shall be existing soil or other materials which are either undisturbed or have been placed resulting from the approved rough grading work and are located in lawn, tree or shrub planting areas.

B. Existing Subsoil: This shall be the soils that exist on the site below the existing topsoil in the lawns and planting areas.

C. Existing Topsoil: This shall be the topsoil that is existing on site.
1. On-site topsoil has been stripped and stockpiled on the Owner’s property as part of the work of Section 312000 Earthwork. Moving stockpiled topsoil to the site area shall be part of the work under this section.

D. Amended Topsoil for Lawns and Sports Field Topsoil: Existing amended topsoil mixed and batched with soil building materials for use on sport field areas only.

E. Amended Plant Backfill Mix: Soil placed around the rootball of a plant in a plant pit in an on-grade condition. It shall be comprised of existing amended topsoil or imported amended topsoil soil which has been amended by the Contractor as required by the soils test report for the plant species specified.

F. Landscape Soils: A collective term for all topsoil and subsoils in landscaped areas.

G. References to Landscape Architect shall mean Architect or the Architect’s designated representative.

1.04 SOILS TESTING LABORATORY FOR EXISTING SUBSOIL AND TOPSOILS

A. The Contractor shall retain a Soils Testing Laboratory that is acceptable to the Landscape Architect and which is capable of providing all the soil testing and amending work specified in this Section.

B. The Contractor shall submit representative samples of loam which he intends to bring onto the site, and samples of loam that was stockpiled from on-site stripping, to the University of Massachusetts Field Station or to a Soil and Plant Testing Laboratory acceptable to the Landscape Architect. All reports shall be sent to the Landscape Architect for approval. Samples of loam to be brought to the site must be approved prior to delivery of soil. Deficiencies in the loam shall be corrected by the Contractor, as directed by the Landscape Architect after review of the testing agency report.

1. All costs for confirmatory testing shall be paid by the Contractor.

2. Sampling shall be provided by the Contractor. The Owner’s representative may carry out additional or confirmatory sampling.

C. The Contractor shall send a copy of this Section 329113 – Soil Preparation and a copy of the plant list (from the Planting Plans) to the Soils Testing Laboratory for their use when making recommendations.
D. Testing Reports shall contain at a minimum the following tests and the laboratory’s recommendations for amending the soils for each of the following; the existing subsoil, the existing stockpiled topsoil, and the imported topsoil(s).

1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.

2. The silt and clay content shall be determined by a Hydrometer Test of soil passing the # 200 sieve.

3. Percent of organics shall be determined by an Ash Burn Test or Walkley/Black Test.


5. Soil analysis tests shall include recommendations for each of the tested soils for soil additives to correct soils deficiencies as necessary, to perform for their respective relationship to plant types including lawns.

a. Provide rates of application for all additives per both 1000 sq. ft and per cubic yard.

6. All tests shall be performed in accordance with the current standards of the Association of Official Agricultural Chemists.

1.05 SUBMITTALS

A. Product Data: Manufacturer’s current catalog cuts and/or specifications and granular analysis demonstrating compatibility with the specifications of the following:

1. Fertilizer(s)

2. Soil and Soil Amendment(s)

3. Compost or other organic matter amendment(s)

4. Agricultural chemical(s)

5. Uniformly Graded Coarse Sand

B. Soil Testing and Soils Testing Report Submittal:
1. All testing of existing subsoil and existing topsoil, except any environmental testing, if required, shall be carried out by the Soils Testing Laboratory. Recommendations for amending subsoil and topsoil will be provided to the Contractor by the Soils Testing Lab after approval by the Landscape Architect.

2. All testing of the soil mix components shall be carried out by the Soils Testing Laboratory. Recommendations for amending and/or correcting the soil mix will be provided to the Contractor by the Soils Testing Lab after approval by the Landscape Architect.

3. Failure of any material by testing and/or amendment procedure to meet Specification requirements shall require the Contractor to seek another source for the failed material and the initiation of all testing procedures for the new replacement material shall immediately take place.

4. The Contractor shall be responsible for recognizing that these critical project materials warrant timely and serious attention, that the testing process to achieve Approved materials should be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be an excuse for “staying on project construction schedule.”

C. Samples: Submit 1 gallon planting soil samples in two phases. Submit samples concurrent with horticultural soil test reports in both phases. Submit as phase one, planting soil base components for approval. Only after approval of phase one components, submit as phase two, soil blend mixes/ mediums for approval. All reports must be from recent analyses, less than 90 days old, and represent materials that are available in the quantities needed for delivery to the site.

1. Phase One Submittals of Planting Soil Base Components:
   a. Base Loam/On-Site Stripped Topsoil
   b. Organic Amendment Materials
   c. Sand for Root Zone Medium

2. Phase Two Submittals of Planting Mediums: mixing and batching of soil mediums to be submitted in the same manner as bulk soils and will be prepared prior to delivery to site.
   a. Amended Lawn Topsoil & Plant Backfill Mix
   b. Amended Sports Field Topsoil

3. Submit reports for each of the above samples: Submit sample from each proposed source for testing and approval. Deliver samples to
both the testing laboratory and the project soil scientist and pay costs. Send report directly to Owner’s Representative.

4. Soil Sample Submittals: Sampling shall be done by the Contractor. The size of the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a Composite Sample, which consists of 5 separate sub samples taken from a minimum of (5) different locations at each source and mixed together to make the test sample. Samples shall be submitted for the following items:

5. The Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation.

D. Certification of Conformance for the Contractor’s Amending and Installing Topsoil(s): The Contractor shall submit a written certification of his installation of landscape soils, soil mix, and backfill mixes for conformance and compliance with the Approved Soils Testing Report(s).

1.06 PROJECT/SITE CONDITIONS AND DOCUMENTS

A. Existing Conditions

1. The Contractor shall become familiar with and review the Owner's soil boring data and existing horticultural test reports.

1.07 QUALITY ASSURANCE

A. Inspections

1. The Contractor shall not place any Lawn Topsoil on Prepared Subgrade prior to inspection and written approval of Landscape Architect for compliance with depth, grading and compaction specifications. The Contractor shall request inspection before proceeding.

2. The Contractor shall not place Sand Underdrainage Blanket on Prepared Subgrade prior to inspection and written approval of Landscape Architect for compliance with depth, grading and compaction specifications. The Contractor shall request inspection before proceeding.

3. The Contractor shall not place Amended Sports Field Topsoil on Sand Underdrainage Blanket prior to inspection and written approval of Landscape Architect for compliance with depth, grading and
compaction specifications. The Contractor shall request inspection before proceeding.

4. The Contractor shall not place Amended Plant Backfill Mix on Prepared Subgrade prior to inspection and written approval of Landscape Architect for compliance with depth, grading and compaction specifications. The Contractor shall request inspection before proceeding.

5. The Contractor shall not place any planting soils prior to inspection and written approval of Landscape Architect for proper installation of landscape subdrainage.

1.08 FIELD QUALITY CONTROL

A. Tests: The right, at any time is reserved by the Landscape Architect to take samples of the landscape soils and backfill mix(s) for testing for conformity to the approved Soils Testing Report.
PART 2 – MATERIALS

2.01 TOPSOIL:

A. It is anticipated that Existing Topsoil stripped on-site and amended with Coarse Sand and Organic Matter per 2.04 and 2.05, and any other amendments per the Approved Soils Test(s), as specified herein, will supply topsoil needs for construction of the sports fields and general lawn and meadow grass areas.

If Imported Topsoil from off-site is required for the work due to insufficient quantity or if the Existing Topsoil has been contaminated by incorporation of subsoil, it shall not be acceptable for use and shall be replaced with Imported Topsoil meeting specification requirements at no additional cost to the owner.

B. Imported Topsoil, if needed, as required for the work shall be a naturally occurring soil formed from geologic soil forming processes without admixtures of sand or organic matter sources (composts) and shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Imported Topsoil shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Imported Topsoil shall not be delivered or used for planting while in a frozen or muddy condition. Imported Topsoil for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

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<tr>
<th>U.S. Sieve Size Number</th>
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1. The ratio of the particle size for 80% passing ($D_{80}$) to the particle size for 30% passing ($D_{30}$) shall be 8 or less. ($D_{80}/D_{30} < 8$)

2. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
3. The organic content shall be between 4.0 and 8.0 percent.

4. The pH shall be between 5.5 and 7.0

2.02 ORGANIC AMENDMENT MATERIALS (COMPOST):

A. Organic Material (Compost) as Amendment For Soil Mixes: stable, humus-like material produced from the aerobic decomposition of organic residues consisting of Leaf or Yard Waste Compost which shall be composted for a minimum of one year (12 months). Compost shall be free of debris such as plastics, metal, concrete or other debris and stones larger than 1/2", larger branches and roots and wood chips over 1/2" in length or diameter. Compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.

B. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.

C. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests shall be conducted by Woods End Research Laboratory, Mt. Vernon, Maine, Soil Control laboratory of California, or approved equal.

D. Pathogens/Metals/Vector Attraction reduction shall meet 40 CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).

E. Organic Content: at least 20 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. Organic content shall be determined by weight loss on ignition or H₂O₂ for particles passing a Number 10 sieve according to procedures performed by the West Experiment Station at the University of Massachusetts, Amherst or equal. For loss by ignition, a 50-cc sub-sample of the screened and mixed compost is ground to pass the number 60 sieve. Two to three grams (+ 0.001g) of ground sample, dried to a constant weight at 105 degrees C is placed into a muffle furnace. The temperature is slowly raised (5C/minute) to 450C and maintained for three hours. The sample is removed to an oven to equilibrate at 105C and the weight is taken. Organic matter is calculated as loss on ignition.
F. pH: between 6.5 to 7.2 as determined from a 1:2 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy Methods of Soil Analysis, Part 2, 1986.

G. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.0 mmhos/cm (dS/m).

H. Compost: screened to 1/2 inch maximum particle size and shall contain not more that 3 percent material finer that 0.002mm as determined by hydrometer test on ashed material.

I. Nutrient content: determined by the University of Massachusetts Soil Testing Laboratory or equivalent laboratory and utilized to evaluate soil required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Chromium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), buffer pH, and micronutrients.

2.03 SAND FOR ROOT ZONE MEDIUM

A. Sand: for mixing with Existing or Imported Topsoil to meet specification requirements shall be uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock and free from loam or clay, surface coatings, mica, other deleterious materials with the following gradation.

<table>
<thead>
<tr>
<th>Percent Passing</th>
<th>Minimum</th>
<th>Maximum</th>
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<tbody>
<tr>
<td>U.S. Sieve Size Number</td>
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B. Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

C. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 2.8 or less. (D70/D20 <2.8)

D. The pH shall be below 7.2.
2.04 PLANTING SOIL MIXES

A. Uniformly mix ingredients by a minimum of three mixing events with construction equipment on an approved hard surface area or by processing components through a screener. Organic Amendment and Topsoil shall be maintained moist, not wet, during mixing. Amendments shall not be added unless approved to extent and quantity by the Landscape Architect and additional tests have been conducted to verify type and quantity of amendment is acceptable. Percentages of components, unless otherwise noted, will be established upon completion of individual test results for components of the various mixes.

B. After component percentages are determined by the Soil Scientist and production begins, each planting soil mix shall be tested for physical and chemical analysis prior to delivery or placement.

2.05 GENERAL LAWN AND PLANTING SOIL

A. It is anticipated that General Lawn and Planting Bed Soil will consist of a combination of approximately one part by volume Sand to 2 parts by volume Existing Stripped Topsoil to one part Organic Amendment (compost) (1S:2T:1C), as specified above to create a uniform blend which meets the following requirements. Final mix ratios to be provided after Phase 1 Submittals of Base Components as Provided in Section 1.05 (A-D).

B. The following gradation for material passing a Number 10 Sieve shall be achieved in the final mix.

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<tr>
<th>U.S. Sieve Size No</th>
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C. Maximum size shall be one half-inch largest dimension. The maximum retained on the #10 sieve shall be 15% by weight of the total sample. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

D. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 7 or less. (D80/D30 <7)
E. The final mix shall have an organic content between 5 and 7 percent by weight.

F. The final mix shall have a hydraulic conductivity of not less that 1.5 inches per according to test procedure ASTM D5856-95 (2000) hour when compacted to a minimum of 86 percent Standard Proctor ASTM D 698.

G. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

2.06 AMENDED SPORTS FIELD TOPSOIL

A. It is anticipated that Amended Sports Field Topsoil will consist of a combination of approximately one part by volume Sand to 1 part by volume Existing Stripped Topsoil to one half parts Organic Amendment (compost)(1S:1T:0.5C), as specified above to create a uniform blend which meets the following requirements. Final mix ratios to be provided after Phase 1 Submittals of Base Components as Provided in Section 1.05 (A-D)

B. Gradation for Material Passing the Number 10 Sieve:

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<tr>
<th>U.S. Sieve Size No.</th>
<th>Percent Passing</th>
<th>Minimum</th>
<th>Maximum</th>
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C. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 15% by weight of the total sample.

D. Ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 5.0 or less (D_{70}/D_{20} <5.0). Saturated hydraulic conductivity of the mix shall not be less than 3 inches per hour according to ASTM D5856-95 (2000) when compacted to a minimum of 88% Standard Proctor, ASTM 698. Organic content shall be between 3.5 and 4.5 percent by weight.
E. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

2.07 SOD/SOD FARM GROWING MEDIUM

A. If sod is to be placed on the lawn or field areas, it must have less than 0.5-inches of thatch and the soil in which sod was grown shall be classified as loam or sandy loam (silt loam is not acceptable) and shall conform to the following grain size distribution for material passing the #10 sieve:

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<thead>
<tr>
<th>U.S. Sieve No.</th>
<th>% Passing by Weight Minimum</th>
<th>% Passing by Weight Maximum</th>
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<td>10</td>
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B. The maximum retained on the #10 sieve shall be 15% by weight of the total sample.

C. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

D. The organic content shall be between 3.0 and 8.0 percent.

2.08 CHEMICAL COMPONENTS: The following additives shall be used as applicable depending on the recommendations of the soils testing report(s).

A. Standard commercial pre-mixed and balanced pre-plant or lawn fertilizers which meet the recommendations of the Soils Testing Report(s).

B. Ground Limestone: Agricultural limestone containing not less than 85% of total carbonates, ground to such fineness that 50% will pass #100 sieve and 90% will pass #20 sieve.

C. Dolomite Lime: Agricultural grade mineral soil conditioner containing 35% minimum magnesium carbonate and 49% minimum calcium carbonate, 100% passing #65 sieve. "Kaiser Dolomite 65 AG" by Kaiser, Inc. or accepted equal.
D. Gypsum: Agricultural grade product containing 80% minimum calcium sulfate.

E. Iron Sulfate (Ferric or Ferrous): Supplied by a commercial fertilizer supplier, containing 20% to 30% iron and 35% to 40% sulfur.

F. Sulfate of Potash: Agricultural grade containing 50% to 53% of water-soluble potash.

G. Single Superphosphate: Commercial product containing 20% to 25% available phosphoric acid.

H. Ammonium Sulfate: Commercial product containing approximately 21% ammonia.

I. Ammonium Nitrate: Commercial product containing approximately 34% ammonia.

J. Calcium Nitrate: Agricultural grade containing 15-1/2% nitrogen.

K. Ureaform: Granular commercial product containing 38% nitrogen, and minimum 27% water insoluble nitrogen (WIN).


M. Soil Sulfur: Agricultural grade sulfur containing a minimum of 96% sulfur.

N. Iron Sequestrene: Geigy Iron Sequestrene 330 Fe, by Ciba-Geigy Corporation, (919) 292-7100, containing approximately 10% iron.

O. Potassium Nitrate: Agricultural grade containing approximately 13% nitrogen (N) and 44% potash (K20).

P. Trace Elements: FRIT Industries product 503 Micromax manufactured by Grace/Sierra or equal.

Q. Bone Meal: A fine ground, steam-cooked, packing house bone with a minimum analysis of (23) percent phosphoric acid and (1) percent nitrogen.

1. Bone meal shall be used for all bulbs in amounts as required by the Soils Lab.

2.09 COMMERCIAL FERTILIZER SUPPLIERS AND MIX BLENDERS:

A. Sierra Chemical Co. (408-263-8080).

C. Or Equal.

2.10 **ACCESSORIES**

A. Water: Clean, fresh and potable. Transport as required.
PART 3 – EXECUTION

3.01 STRIPPING OF TOPSOIL

A. All work areas within the limit of work requiring excavation and grading shall be stripped of topsoil to the extent necessary to satisfy project requirements. Topsoil shall be stripped in such a manner as to ensure that subsoil is not mixed with the loam. Topsoil that is contaminated with subsoil shall not be used as planting media within the project.

B. All topsoil so removed shall be stockpiled on the site where convenient for work operations and as approved by the Engineer/ Landscape Architect. Topsoil shall be free of subsoil, stiff clay or hardpan and foreign material such as cinders ashes, asphalt and wood. The suitability of stripped materials for use as topsoil shall be determined by the Engineer/Landscape Architect and his decision shall be final.

C. An adequate quantity of suitable, stripped topsoil shall be maintained on the site for reuse in lawn and landscape areas. Stockpiled loam shall be protected from wind and rain erosion. It is recommended to cover stockpiled topsoil during freezing weather and for precipitation events to minimize delays due to soil moisture content.

3.02 SOIL MOISTURE CONTENT

A. Soil Moisture Content

1. Contractor shall not move, blend or grade soil when moisture content is so great that pumping occurs or visible water occurs, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, or allow soil to dry to bring soil moisture between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 for compaction, grading and plantings.

2. Field Soil Moisture Test

a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.

b. If the soil will not retain shape it is too dry and should not be worked.

c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
If the soil glistens or free water is observed when the sample is patted in the palm of hand the soil is too wet and should not be worked.

3.03 CLEARING AND SUBGRADE PREPARATION OF SPORTSFIELD, LAWN AND PLANTING AREAS

A. Refer to the drawings for location of the General Lawn areas, Athletic Fields lawn area, and planting areas.

B. Clearing: Clear all lawn and planting areas of stones 1-inch diameter and larger, weeds, debris and other extraneous materials prior to soil preparation work.

C. Coordinate the following scarification work to eliminate subgrade compaction with the site Earthwork Specifications done as a result of Construction Operations when located in lawn and planting areas.

1. Heavy Site Subgrade Compaction Mitigation:
   a. Heavily compacted subgrade areas such as, but not limited to, temporary parking areas, material stockpile areas, temporary roadways, construction areas and areas around the building and other similar areas.
   b. Prior to establishing the final subgrade of Earthwork material, these areas shall be dug up or ripped to a depth of (18) inches to break up the soil hard pan, then re-compacted with two passes of the tracks of a wide track bulldozer size D-6 or smaller, or other approved equipment. Vibratory compaction of subgrade in planted areas is prohibited.

2. General Site Subgrade Compaction Mitigation for all lawn and planting areas that are not heavily compacted and would be mitigated as specified in Item 1 above:
   a. Immediately prior to placing topsoil, the entire subgrade shall be loosened to a minimum depth of 6-inches using the teeth of a backhoe or other suitable equipment, then re-compacted with two passes of the tracks of a wide track bulldozer size D-6 or smaller, or other approved equipment. Vibratory compaction of subgrade in planted areas is prohibited.
   b. After the subgrade soils have been loosened and inspected, topsoil may be spread by using a wide track
bulldozer size D-5 or smaller or may be dumped and spread with the bucket of a backhoe from the edge of the loosened area. No rubber-tired equipment or heavy equipment except for a small bulldozer shall pass over the subsoils (subgrade) after they have been loosened and recompressed. If the Contractor plans to utilize such areas for any use of heavy equipment, this work should be carried out prior to beginning the process of loosening soils or filling in that area.

D. Cultivation and Amending Subgrade in all lawn and planting areas:

1. Verification:
   a. Verify that subgrade elevations for installation of the topsoil have been established under rough grading in Section 312000 Earthwork and have been approved. Do not do any subgrade work specified in this Section on unapproved subgrades.
   b. Report all variations for correction immediately before proceeding.

3.04 PLACING OF ORDINARY FILLS UNDER SPORTSFIELDS

A. Ordinary Fills Except under the Sportsfield’s Drainage Blanket shall be placed and compacted to 84 to 88% Standard Proctor.

B. Ordinary Fills Under the Sportsfield’s Drainage Blanket shall be placed and compacted to 88 to 92% Standard Proctor.

3.05 SPREADING, DEPTH AND AMENDING FOR TOPSOIL IN SPORTS FIELD LAWN AREAS

A. Sequence: Soil subgrade cultivation shall be approved prior to spreading of topsoil.

1. Installation of topsoil:
   a. Install in all Athletic Field areas of the project. After the drainage blanket and drain lines have been installed and inspected, amended sports field topsoil may be spread by using a wide track bulldozer size D-5 or smaller from the edge of the loosened area. No rubber-tired equipment or heavy equipment except for a small bulldozer shall pass over the sand drainage blanket after they have been loosened. If the Contractor plans to utilize such areas for

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any use of heavy equipment, this work should be carried out prior to beginning the process of filling in that area.

b. Fine Grading. See Section 312219 Finish Grading.

2. **Spread amended topsoil (12) inches minimum thickness for Sport Field Lawn Areas.**

3. **Amendments incorporation for topsoil:**
   
a. After the topsoil has been spread and graded, apply soil amendments at the rate recommended in the topsoil analysis. Apply limestone at least 5 days prior to application of fertilizer. Apply commercial fertilizer within 10 days of seeding or sodding.

b. Thoroughly and evenly incorporate soil amendments into the soil to a depth of 6 inches by discing or other approved method. In areas inaccessible to power equipment, use hand tools. Off site mixing of soil amendments with topsoil is not acceptable unless approved in advance by Landscape Architect. After the incorporation of soil amendments into the soil, re-compact and fine grade the filled area to remove all ridges and depressions, and clear the surface of all stones one inch or more in diameter and other debris. Re-compress topsoil with two perpendicular passes with a small wide-tracked bulldozer size CAT D-5 or smaller to 86-88% Standard Proctor Density.

c. Sodding or seeding may be done immediately thereafter provided the bed has remained in a good friable condition and has not become muddy or hard. If it has become hard, till to a friable condition. Apply water to dry soil to a depth of 4 inches, 48 hours prior to seeding.

3.06 **SPREADING, DEPTH(S) AND AMENDING FOR TOPSOIL TO MAKE BACKFILL MIX FOR PLANT BEDS AND GENERAL LAWNS**

A. **Sequence:** Soil subgrade cultivation and amending shall be approved prior to spreading of topsoil.

   1. Topsoil shall be amended as required in the Approved Soils Test Report:

      a. Install topsoil in all general lawn and plant bed areas of the project.
2. Spread topsoils to the depth(s) required for shrub beds as shown on the planting details.

3. Spread topsoils to (15) fifteen inch minimum depth for perennial planting areas or as noted on the drawings.

4. Spread topsoils to (15) fifteen inch minimum depth for bulbs in ground cover beds.

5. Spread topsoil to (9) nine inch minimum depth for general lawn areas.

6. Amendments for topsoil to make backfill mix:
   a. After spreading topsoil, spread the following amendments as required by the approved Soils Tests Report.
   b. Amendments shall be incorporated by rototilling or diskng to a depth of 6 inches unless otherwise required by the Approved Soils Test Report.
   c. In areas inaccessible to power equipment, use hand tools. Off site mixing of soil amendments with topsoil is not acceptable unless approved in advance by Landscape Architect. After the incorporation of soil amendments into the soil, re-compact and fine grade the bed to remove all ridges and depressions, and clear the surface of all stones one inch or more in diameter and other debris. Re-compress topsoil with two perpendicular passes with a small wide-tracked bulldozer size CAT D-5 or smaller or other approved equipment to 84-86% Standard Proctor Density.

3.07 BACKFILL MIX(S) FOR TREES AND SHRUBS THAT ARE PLANTED IN INDIVIDUAL PLANT PITS

1. Topsoil for this planting backfill mix shall be amended by using fertilizer tablets – see Section 329000 - planting for this work.

3.08 FIELD QUALITY CONTROL

A. Tests: Right is reserved to take samples at any time of amended landscape soils and backfill mixes for testing for conformity to Specifications.
B. Rejected Materials: Remove and legal dispose off site at Contractor's cost. Pay cost of testing of materials, not meeting Specifications.

END OF SECTION