**SECTION 32 91 13**

**SOIL PREPARATION**

**Based On DFD Master Specification Dated 01/07/2023**

This section has been written to cover typical situations that contractors will encounter. The Division of Facilities Development expects modifications to this document to account for project specific conditions and design requirements. Use “Track Changes” when making modifications for the Preliminary Design review. Text in red should be customized by the A/E.

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**PART 1 - GENERAL**

**SCOPE**

The work under this section shall consist of providing all work, materials, labor, equipment and

supervision necessary to provide and prepare soil for seeding, sodding, and planting. Included are the following topics:

# RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Section 32 92 00 – Plants

Section 32 92 18 – Seeding

Section 32 92 20 – Native Seeding

Section 32 92 23 – Sodding

Section 00 00 00 – Section Title

**REFERENCE STANDARDS**

WisDNR S100 Compost Specification

# SUBMITTALS

Provide copies of all quality assurance testing reports:

Soil-testing: For native topsoil, stockpiled/stored topsoil, and imported topsoil

Topsoil Description: Contractor to provide a written description and quantity of topsoil required; as native or imported, or a breakdown of each, prior to performing landscape work on the site.

Provide product data, including applicable analytical data, for required topsoil amendments including:

Organic Compost

Fertilizer

# QUALITY ASSURANCE

# SOIL TESTING

The Contractor shall retain the services of an independent soil-testing laboratory to conduct testing and analysis of existing, salvaged, and imported topsoil. The selection of the soil-testing laboratory shall be subject to approval by the DFD Construction Representative and Architect/Engineer.

Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated, and that specializes in types of tests to be performed.

The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be approved by the Architect/Engineer. A minimum of three representative samples shall be taken, per-acre. Samples shall be taken from varied locations to test topsoil for all landscape planting types proposed in the Contract Documents.

The Contractor shall be responsible for scheduling soil tests and shall take into account the time period needed by the soil testing laboratory to conduct tests, to process the samples, and to publish the results and recommendations, and the time needed by the Architect/Engineer to approve submittals and amendments recommended. This is typically at least a two-month process. Contractor is responsible for coordinating all testing and reporting tasks without adversely affecting the project schedule.

Contractor is responsible for paying for all costs related to testing of soil samples.

Soil Analysis: For each un-amended topsoil sample, submit for approval by the DFD Construction Representative and Architect/Engineer a soil analysis and a written report by a qualified soil-testing laboratory, stating existing percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; harmful material; pH; and mineral and plant-nutrient content of the soil.

Topsoil testing methods shall comply with ASTM D5268, Standard Specification for Topsoil Used for Landscaping Purposes.

Report suitability of tested soil to support turf and plant growth.

Based on the test results, provide written recommendations for soil treatments and amendments to be incorporated to support turf and plant growth. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients; and soil amendments to be added to topsoil.

Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide recommendations for corrective action.

The DFD Construction Representative and Architect/Engineer reserve the right to reject improperly amended native topsoil or imported topsoil that does not meet the quality assurance specifications. If rejected, Contractor is responsible for costs of replacement, and/or amendment, and re-testing of topsoil to provide topsoil that will support turf and plant growth.

**PART 2 - PRODUCTS**

##### topsoil

Naturally fertile, agricultural soil, classified as sandy loam to silty loam, capable of supporting turf and plant growth; of uniform composition throughout, without admixtures of subsoil, free of clay lumps, stones larger than 1” diameter [¾” diameter for athletic field uses], roots, trash and debris of any kind.

Soil-testing results shall indicate that topsoil falls within the following acceptable ranges, or can be amended to conform to the following requirements:

pH between 5.5 -7.0

USDA classification loam, sandy loam, clay loam

Phosphorous (P) between 6-10 ppm

Potassium (K) between 51-100 ppm

Organic Matter between 5-8%

C:N Ratio between 12:1 to 15:1

Soluble Salts in the range of 0-2 dS/m

Moisture Capacity of greater than 15%

Heavy Metals acceptable ranges are as follows:

Cd 0.01-3.0 ppm

Co 1.0-40.0 ppm

Cr 5.0-1000.0 ppm

Cu 2.0-100.0 ppm

Fe 10000-50000 ppm

Mn 100-4000 ppm

Mo 0.5-40.0 ppm

Ni 1.0-200.0 ppm

Pb 2.0-200.0 ppm

Zn 10-300 ppm

Li 1.2 – 90.0 ppm

**SAND**

Particles of natural or manufactured rock that will pass through a No. 4 sieve., and be retained on a No. 200 sieve; clean, washed, and free of toxic materials.

## **Lime**

Agricultural limestone material containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing through No. 8 sieve, and a minimum 75 percent passing through No. 60 sieve.

**Organic Compost**

Well-composted, stable, and weed-free organic matter meeting the requirements of WisDNR S100 Compost Specification.

## **Fertilizer**

Fertilizer: Granular, non-burning product composed of not less than fifty (50) percent slow-acting, guaranteed analysis fertilizer. All fertilizers shall be delivered fully labeled according to applicable regulations, bearing name, trade name or trademark of producer, along with producer’s warranty.

## **Planting MixTURE**

A ratio of uniformly mixed organic compost to approved topsoil by volume: [1:3] [1:4] make selection for annual, perennial & shrub plantings areas. All mixing shall be done by mechanical means subject to the approval of the Architect/Engineer.

**PART 3 – EXECUTION**

**SITE PREPARATION**

During construction, protect all structures, utilities, sidewalks, pavements, and other facilities and existing and newly installed vegetated areas from damage at all times.

Delay grading and spreading topsoil if unfavorable weather conditions may result in washouts or loss of material.

# Soil Preparation

The following applies to all planted, seeded or sodded areas.

Newly graded subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Existing vegetated areas: If planting, seeding or sodding occurs in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

Remove existing vegetation. Do not mix vegetation into surface soil. Loosen existing topsoil to a minimum depth of 4 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Rough grade areas to within 1 inch of subgrade elevations. Areas shall be graded to a smooth uniform surface plane with loose, uniformly fine texture. Areas shall be restored if eroded or otherwise disturbed after rough grading is complete.

# placing topsoil

Areas to be seeded or sodded shall have a minimum of [4 to x] inches of topsoil of existing, amended or imported topsoil, but not less than required to meet finish grades after light rolling and natural settlement. Do not spread topsoil if subgrade is frozen, muddy, or excessively wet.

If required topsoil depth is greater than 6 inches, topsoil shall be installed in lifts. Moisten the topsoil surface between lifts. Allow water to thoroughly percolate through and settle and dry before rolling and placing the next lift.

Limit fine grading to areas that can be seeded or sodded in the immediate future. After finish grading, restore any eroded or otherwise disturbed areas before seeding or sodding.

Do not place topsoil on top of saturated or frozen subgrade soil.

**PLACING PLANTING MIXTURE**

The following applies to all perennial, annual and bulb planting areas.

Remove existing soil as needed to accommodate proposed planting mixture.

Provide [8 to x inches] [depth specified on drawings] ***make selection*** of planting mixture in perennial, annual and bulb planting areas.

Do not place planting mixture on top of saturated or frozen subgrade soil.

# SOIL AMENDMENTS AND pH ADJUSTMENT

Provide lime, sand, or other soil amendments as recommended by soil-testing analysis. If topsoil has been determined acceptable by a soil test, no amendments are needed.

Uniformly apply recommended soil amendments and incorporate into the top 4 to 6 inches of soil by tilling or disking.

**FERTILIZER AMENDMENTS**

Provide fertilizer amendments as recommended by soil-testing analysis. If topsoil has been determined acceptable by soil-testing, no fertilizer amendments are needed except in the case of lawn seeding where starter fertilizer is required.

If fertilizer amendments are required for annual, perennial and shrub planting areas, uniformly add amendments, and incorporate into the top 4 to 6 inches of planting mixture by tilling or disking.

***A/E delete the following sentence if using Seeding spec [32 92 19]***

Apply starter fertilizer to surface of finely graded topsoil.

#### END OF SECTION