

## SECTION 312219 LANDSCAPE GRADING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Scope of Work: Provide landscape grading in landscape areas as shown and specified including: removal of rock, gravel and other construction related material, sub-grade treatment, ripping and rough grading, soil replacement, and finish grading.
- B. Related Sections :
  - 1. Section 32 84 00 Planting Irrigation
  - 2. Section 32 90 00 Planting

#### 1.2 SUBMITTALS

- A. Submit documentation to University's Representative at least [30] [60] [xxx] days before grading certifying that enough soil is available, listing sources of materials.
- B. Submittals shall include but not be limited to the following:
  - 1. Soil test reports of existing site soil (after rough grading) – one test per one thousand square feet of planted landscape area.
  - 2. Soil test reports of any import topsoil (one test per fifty cubic yards of import)
  - 3. Two-gallon sample from each import topsoil source. The sample shall be a mixture of the random samples taken around the source stockpile or field. The soil sample shall have soil peds (soil fragments or clods) intact that represent the size and quantity of expected peds in the final delivered soil.
- C. Quality Assurance Soil Testing - soil tests shall include the following information:
  - 1. Particle size analysis (percentage dry weight) and USDA soil texture analysis.
  - 2. pH and buffer pH
  - 3. Percent organic content by oven dried weight.
  - 4. Nutrient levels by parts per million including: phosphorus, potassium, magnesium, manganese, iron, zinc and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil for optimum growth of the plantings specified.
  - 5. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Milliohm per cm.
  - 6. Cation Exchange Capacity (CEC).

#### 1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Weather: Do not mix, deliver, place or grade soils with moisture above field capacity.
- B. Protect soil and soil stockpiles, including the stockpiles at the soil blender's yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.

#### 1.4 COORDINATION AND SCHEDULING

- A. Protection of University Property: See the Division I: General Requirements section regarding special requirements.
- B. Protection of Existing Trees and Plantings: See the Division I: General Requirements section regarding tree and plant protection.
- C. Scheduling: Landscape grading operations shall be performed prior to irrigation installation or other utility infrastructure shallower than 24 inches.

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- D. Observation Schedule. Contractor shall notify University's Representative in advance for the following site visits, according to the time indicated:
1. Pre-landscape grading conference - 7 days.
  2. Pre-rip inspection - removal of construction debris and deleterious material from soil surface and any known contaminants below surface (lime-treated material, base rock etc.) - 48 hours.
  3. Post rip and scarification – 48 hours.
  4. Incorporation of approved topsoil or import topsoil - 48 hours.
  5. Incorporation of organic amendment or compost into top 12 inches, see also Section 329000, Planting.

1.5 SAMPLES AND TESTS

- A. University's Representative reserves the right to take and analyze samples of materials for conformity to specifications at any time. Contractor shall furnish samples upon request. Rejected materials shall be immediately removed from the site at Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by Contractor.
- B. Contractor shall have soil tested by an independent soil testing laboratory.

PART 2 - PRODUCTS

2.1 IMPORT TOP SOIL

- A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 1 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:
1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
  2. pH value shall be between 5.5 and 7.5.
  3. Percent organic matter (OM): 2.0-5.0%, by dry weight.
  4. Soluble salt level: Less than 2 mmho/cm.
- B. The pH of saturated paste shall be between 5.5 and 7 without high qualitative lime content. The sodium absorption ratio (SAR) shall not exceed six and the electrical conductivity (ECe) of the saturation extract of this soil shall not exceed 2.0 milliohms per centimeter at 25 degrees centigrade. The boron content shall be no greater than one part per million as measured on the saturation extract.
- C. Imported Topsoil shall be a harvested soil from fields or development sites when possible. The organic content and particle size distribution shall be the result of natural soil formation. Manufactured soils where coarse sand, composted organic material or chemical additives has been added to the soil to meet the requirements of this specification section shall not be acceptable. Retained soil peds shall be the same color on the inside as is visible on the outside.
- D. Imported topsoil for planting soil shall NOT have been screened and shall retain soil peds or clods larger than two inches in diameter throughout the stockpile after harvesting.
- E. Stockpiled existing topsoil at the site meeting the above criteria may be acceptable, but must be approved by the University's Representative in writing.

PART 3 - EXECUTION

### 3.1 SOIL CLEANUP, REPLACEMENT AND PREPARATION

- A. Cleanup and preparation: Contractor shall review site conditions and remove all visible stones, stumps, gravel, concrete, asphalt, and other construction debris and deleterious materials including any and all germinated weeds prior to commencing finish grading work in landscape areas.
1. At the conclusion of flatwork installation but prior to the commencement of irrigation system installation, the top twelve inches of soil shall be removed from all landscape areas and disposed of off-site. This shall be considered the minimum requirement for dig-out of all landscape areas on a project unless directed otherwise by the University Representative, pending review of site soil conditions during this phase.
  2. The next lower 12 inches of soil shall be ripped and then cleared of all concrete, asphalt, and other construction debris and deleterious materials, and all stone and gravel larger than 1 inch in diameter, that are brought to the surface as a result of cultivations. However, if subsoil in this profile consists of greater than 15% rock, gravel or other debris of any size by volume it shall be removed entirely and replaced with imported top soil. Cultivation shall be by an excavator or other ripping equipment. Call Underground Service Alert (USA) before beginning cultivation operations. Subsoil shall be compacted to 85 percent relative density prior to backfilling with topsoil.
- B. Soil replacement with stockpiled or imported topsoil
1. Place a minimum of 12 inches of clean topsoil into all planting areas after the subsoil has been ripped to a depth of 24 inches from finished grade. Clean topsoil can be stockpiled on site, but must be kept clear and free of debris and rock, and then used as needed for landscaping upon written approval by the University's Representative.
  2. In areas where site soil has been compacted by construction activity, or building foundations have been over-excavated and re-compacted, additional mitigation measures may be required to improve soil and drainage conditions for planting. These may include, but are not limited to: the installation of subsurface drainage systems for shrub and groundcover areas and individual tree pits; removal of additional soil from the planting areas beyond what is specified above until acceptable drainage and compaction levels are achieved; aeration tubes installed; radial soil trenches dug out around each tree; or other measures as determined and approved by the University's Representative. Mitigation measures shall be completed by the contractor as required at no additional cost to the University. See Planting Installation paragraph for more information and additional related requirements.

### 3.2 FINISH GRADING

- A. When preliminary grading has been completed and the soil is sufficiently dry to be readily worked, add soil amendments to a depth of twelve inches (see Section 329000 Planting) and grade planting areas to the elevations indicated on the Drawings' details. Minor adjustments of finish grades will be made at the direction of the University's Representative. Finish grade will be a smooth, even, and uniform plane with no abrupt change of surface. Soil areas adjacent to the building will slope away from the building to allow a natural run-off of water, and surface drainage will be directed as indicated on the Drawings by remodeling surfaces to facilitate the natural run-off of water. Low spots and pockets will be graded to drain.
- B. The finish grade of all landscape areas shall be one inch below the grade of adjacent pavement, walks, curbs, or headers extending eight to twelve inches beyond edge of paving, transitioning to three inches beyond that to allow for depth of mulch layer. An exception to the above requirements will be made wherever drainage conditions may require flush grades as directed by the University's Representative.

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- C. The finish grade of all sod lawn areas will match grade of adjacent pavements walks, curbs or headers. An exception to the above requirements will be made wherever drainage conditions may require flush grades as requested by the University's Representative.
- D. Contractor shall be responsible for finish grading to ensure positive drainage and proper slope to drains. All flow lines, designated or not, are to be graded and maintained to allow free flow of surface water, and are to conform to the intent of the Drawings after thorough settlement and compaction of the soil.
- E. Dispose of any unacceptable or excess soil legally at an offsite location.

3.3 CLEAN UP

- A. During the progress of the Work, the Contractor shall keep the Project site in a neat and clean condition that is free of debris to the satisfaction of the University's Representative. All materials and debris accumulated in conjunction with completing this Work shall be legally recycled or disposed of by Contractor off campus. Refer to Section 017400 Cleaning and Waste Management. Remove all trash, excess soil, empty plant containers and rubbish from the property. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site.
- B. The Contractor shall leave the site area broom-clean and shall wash down all walkways and other paved areas, leaving the premises in a clean and safe condition.
- C. Promptly remove soil and debris created by landscape grading work from paved areas and building walls. Clean wheels of vehicles before leaving site to avoid tracking soils onto surfaces of roads, walks, or other paved areas.

END OF SECTION 312219