

SECTION 329200 LANDSCAPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Trees.
 - 2. Seeded and Sodded Grass Areas.
- B. Related Sections include the following:
 - 1. Division 01 Section, "Construction Waste Management"
 - 2. Division 2 Section "Site Clearing" for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.
 - 3. Division 2 Section "Earthwork" for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract.
- B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
 - 1. Manufacturer's certified analysis for standard products.
 - 2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
 - 3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.
- C. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other information specified.

- E. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
 - 1. Analysis of existing surface soil.
 - 2. Analysis of imported topsoil.
- F. Planting schedule indicating anticipated dates and locations for each type of planting.
- G. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.
- H. Substitutions may be permitted only if proof is submitted to the owner that specific plants or sizes are unobtainable.
- I. Balled and burlapped plants that have cracked or broken balls prior to or during planting operations are not to be planted and must be replaced

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.
- B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Provide quality, size, genus, species, and variety of trees indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."
- D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil.
 - 1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.
- E. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches (150 mm) above ground for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

- F. Pre installation Conference: Conduct conference at Project site to comply with requirements of the Contract for "Project Meetings."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
- C. Trees: Deliver freshly dug trees. Do not prune before delivery, except as approved by Engineer. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees during delivery.
- D. Handle balled and burlapped stock by the root ball.
- E. Deliver trees after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.
 - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 2. Do not remove container-grown stock from containers before time of planting.
 - 3. Water root systems of trees stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.6 PROJECT CONDITIONS

- A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under

requirements of the Contract Documents.

- B. Special Warranty: Warrant the following living planting materials for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth.
 - 1. Trees.
- C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.
- D. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
- E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.9 TREE MAINTENANCE

- A. Maintain trees by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees free of insects and disease. Restore or replace damaged tree wrappings. Maintain trees for the following period:
 - 1. Maintenance Period: 2 years following Substantial Completion.

1.10 LAWN MAINTENANCE

- A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Seeded Lawns: 1 year after date of Substantial Completion.
 - a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season.
 - 2. Sodded Lawns: 1 year after date of Substantial Completion.
- B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and re mulch to produce a uniformly smooth lawn.
- C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4 inches (100 mm).

1. Water lawn at the minimum rate to prevent grass and soil from drying out.
- D. Turfgrass and Sodded Areas
1. Perform first mowing when seedlings are 40% higher than desired height. Mow grass at regular intervals to maintain a maximum height of 2-1/2". Do not cut more than 1/3 of grass blade at each mowing.
 2. Neatly trim edges and hand clip where necessary.
 3. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.
 4. Water to prevent grass and soil from drying out.
 5. Immediately reseed areas showing bare spots
 6. Repair washouts or gullies.
 7. Protect seeded areas with warning signs.
- E. Post fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
1. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. (0.5 kg per 100 sq. m) of lawn area.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

- A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Grade: Provide trees of sizes and grades conforming to ANSI Z60.1 for type of trees required. Trees of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Label each tree with securely attached, waterproof tag bearing legible designation of botanical and common name.

2.2 SHADE TREES

- A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.
1. Branching Height: 1/2 of tree height.
- B. Provide balled and burlapped trees. Bare root material will not be accepted.

2.3 GRASS SEED/SOD MATERIALS

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.

1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on the Contract Documents.
 - a. Grass Seed/Sod Mix – Disturbed Areas

2.4 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch (25 mm) or larger in any dimension, and other extraneous materials harmful to plant growth.
 1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
 2. Topsoil Source: Import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

2.5 FERTILIZER

- A. Basis of Design: Agriform 20-10-5 Planting Tablets Plus Minors, as manufactured by the Scots Company, LLC.
 - a. Provided 21-gram size slow-release Agriform Tablets for all trees (Stock No. 90026).
 - b. Install tablets as follows: Position plant in hole and backfill halfway up the rootball. Place tablet(s) beside the rootball approximately 1" from the root tips. Do not place tablet in the bottom of the hole. Complete topsoil backfill, tamp, water-in and mulch.
 - c. Fertilizer tablet application rates:
 1. Trees of varying sizes: One 21-gram fertilizer tablet every ½" of caliper size.

2.6 TOPSOIL AMENDMENTS

- A. Topsoil for tree pits shall be NJDOT approved, and supplemented with well rotted manure or finish, screened leaf compost at a ratio of 2/3 top soil to 1/3 manure or compost by volume.
- B. Amended topsoil backfill shall be placed in all planted tree pits to a minimum depth of 2'-0", or to the full depth of the root balls whichever is greater.
- C. Hydrophilic polymer crystals shall be added to the amended topsoil, to increase moisture retention as follows:
 - a. Basis of design: TeraGel (T-200) as manufactured by Terawet Ventures, San Diego, CA.
 - (1) Incorporate and thoroughly mix in, as an additional bulk amendment into the amended topsoil backfill, 2-1/2 lbs. (dry weight) of hydrophilic polymer crystals per cubic yard of amended topsoil.
 - (2) In addition to the bulk application described above, add the following quantities of hydrophilic polymer crystals, evenly distributed, directly into the tree/plant pits when they have been backfilled to the half-way point:

- a. Trees 2"-2 1/2" cal. Size – place and evenly distribute an additional 3 tsp. of hydrophilic polymer crystals.
- b. Trees 2 1/2"- 3" cal. Size – place and evenly distribute an additional 5 tsp of hydrophilic polymer crystals.
- c. Trees 3 1/2" – 4" cal size – place and evenly distribute an additional 7 tsp of hydrophilic polymer crystals.

2.7 BROAD SPECTRUM HERBICIDE

- A. Spray areas to be seeded and other areas indicated a minimum of one week prior to seeding to achieve complete vegetative "burn-down".
 1. Basis of Design: 50/50 mix Glyphosate-based Monsanto "Roundup" and Ammonium Nonanoate-based BioSafe "AXXE".
 2. Apply licensed applicator according to manufacturer's instructions.
 3. Apply when air is calm, vegetation is dry, and no precipitation is anticipated for at least two hours following application.

2.8 MULCHES

- A. Organic mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 1. Type: Double Shredded Hardwood Mulch , natural brown in color, which includes no construction debris or other deleterious material or litter.
 2. Install a 4" thick minimum continuous layer after installation of all plant material.

2.9 WEED-CONTROL AND ROOT BARRIERS

- A. Weed-Control Barrier:
 1. Sheet Polyethylene: Black, 0.006-inch (0.15-mm) minimum thickness.
 2. Nonwoven Fabric: Polypropylene or polyester fabric, 3 oz. per sq. yd. (100 g per sq. m) minimum.
 3. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz. per sq. yd. (160 g per sq. m).

2.10 EROSION-CONTROL MATERIALS

- A. Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.
- B. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb per sq. yd. (0.5 kg per sq. m) minimum, with 50 to 65 percent open area. Include manufacturer's recommended steel wire

staples, 6 inches (150 mm) long.

2.11 STAKES AND GUYS

- A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches (50 by 50 mm) by length indicated, pointed at one end.
- B. Guy and Tie Wire: ASTM A 641 (ASTM A 641M), Class 1, galvanized-steel wire, 2-strand, twisted, 0.106 inch (2.7 mm) in diameter.
- C. Guy Cable: 5-strand, 3/16-inch (4.8-mm) diameter, galvanized-steel cable, with zinc-coated turn buckles, 3-inch- (75-mm-) long minimum, with two 3/8-inch- (10-mm-) galvanized eyebolts.
- D. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch (13 mm) in diameter, black, cut to lengths required to protect tree trunks from damage.
- E. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.
- F. Stakes and Guys to be removed at the end of the 2 year maintenance period.

2.12 MISCELLANEOUS MATERIALS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

PART 3 – METHODS OF CONSTRUCTION

3.1 Seed Bed and Sod Bed Preparation

- A. Rototill native soil to a depth of 6"; then rake to remove roots, vegetation, debris and all rocks over one inch in diameter.
- B. Supply and spread screened organic compost soil amendment over area to be seeded or sodded at the rate of one cu yd. of compost per 1000 sf.
- C. Till, disc, or harrow organic compost soil amendment into the tilled and raked native soil to a depth of four inches.
- D. Re-grade and fine grade amended seed beds and sod beds to eliminate any irregularities or low spots.
 - a. Maintain a consistent grade of the seed bed/sod bed at 1/2" below surrounding walks, edging or other hard surfaces.
- E. Test native soil and spread pelletized dolomitic lime if required to maintain pH of at least 5.5 by applying up to a maximum of 50 lbs. of pelletized lime per 1000 sf of sod bed only.

- F. Spread commercial starter fertilizer with an N-P-K ratio of 1-2-1 at a rate of no more than one pound of nitrogen per 1,000 sf to top of prepared seed/sod bed immediately prior to seeding or sodding.

3.2 Sodding

- A. Deliver sod to the site after sod bed has been prepared and approved, the weather is favorable, the area is accessible and the sod is ready to be installed.
- B. Deliver sod on the same day that it is to be installed.
- C. Butt edges and ends of sod pieces/rolls together tightly to avoid gaps and overlaps.
 - a. Stagger joints in each row.
- D. Roll entire area after installation of sod to ensure full sod contact with the soil.
- E. Water immediately after rolling.
- F. Continue regular daily watering schedule as required by prevailing weather conditions until sod is firmly rooted which usually required two weeks to occur.
- G. Maintain sod at a height of 2 ½" until acceptance and for the duration of the two-year maintenance period.
 - a. Do not mow before sod is established and at a height of no less than 3 inches.
- H. Remove all pallets, sod scraps, dirt and debris and leave area broom clean.

3.3 Trees

- A. Trees shall be planted immediately upon delivery to the job site. Trees that cannot be planted the day of delivery shall be set on the ground and be well protected with a layer of wet saw dust or mulch and watered daily.
- B. Trees shall be planted so that their original root crown is flush with, or slightly above, finish grade when in final vertical position. When tree and shrubs pits/beds are backfilled approximately 2/3 full, water thoroughly, saturating the root ball, and eliminating all air pockets, before completing the backfilling process.
- C. All plants shall be mulched within two days after planting.
- D. All deciduous trees are to be staked and guyed using high quality commercial grade materials and techniques. Routine maintenance shall include the periodic tightening, adjusting and replacement of staking and guying materials. All stakes and guying materials are to be removed and properly disposed of by the Design-Builder upon completion of the two-year maintenance period.
- E. Pruning shall be done in accordance with standard horticultural practice, to preserve the health, natural character, form and symmetry of the plant material.
- F. Upon completion of the landscape installation, the Design-Builder shall dispose of all refuse and surplus materials, equipment and appurtenances from the job site, and leave the entire area and public thoroughfares broom clean.

3.4 Seeding to Restore Areas Disturbed by Construction.

- A. Follow seed bed preparation techniques and procedures identical to other non-wildflower seed bed areas.
- B. Utilize industry-standard one-step hydroseeding practices to re-establish areas of existing turf disturbed or damaged during construction.
- C. Remove any hydroseeding slurry overspray immediately.

END OF SECTION 329200