SECTION 32 90 00
PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plants, soils, turf, and landscape materials.

1.2 RELATED REQUIREMENTS

1.3 DEFINITIONS

A. Pesticide: Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate pests and is specifically labeled for use by U.S. Environmental Protection Agency (EPA). Also, any substance used as plant regulator, defoliant, disinfectant, or biocide.

B. Planter Bed: An area containing one or combination of following plant types: shrubs, vines, wildflowers, annuals, perennials, ground cover, and mulch topdressing excluding turf. Trees may also be found in planter beds.

C. Stand of Turf: 95 percent of established species.

1.4 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American National Standards Institute (ANSI):

1. Z60.1-2014 - Nursery Stock.

C. American Society for Testing And Materials (ASTM):

1. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
2. B221M-13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. C33/C33M-16-Concrete Aggregates.
4. C136/C136M-14 - Sieve Analysis of Fine and Coarse Aggregates.
5. C602-13a - Agricultural Liming Materials.
6. D977-13e1 - Emulsified Asphalt.
7. D5268-13 - Topsoil Used for Landscaping Purposes.

D. Hortus Third: Concise Dictionary of Plants Cultivated in United States and Canada.

E. Tree Care Industry Association (TCIA):

1. A300P1-2008 - Tree Care Operations - Trees, Shrubs and Other Woody Plant Maintenance Standard Practices (Pruning).

2. Z133.1-2012 - Arboricultural Operations - Safety Requirements.

F. Turfgrass Producers International (TPI):

1. 2006 Guideline Specifications to Turfgrass Sodding.

G. United States Department of Agriculture (USDA):

1. DOA SSIR 42-2014 - Soil Survey Laboratory Methods Manual.
2. Handbook No. 60 - Diagnosis and Improvement of Saline and Alkali Soils.

1.5 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:
   a. Contracting Officer's Representative.
   b. Architect/Engineer.
   c. Contractor.
   d. Installer.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Inspection of planting materials.
   b. Installation schedule.
   c. Installation sequence.
   d. Preparatory work.
   e. Protection before, during, and after installation.
   f. Installation.
   g. Inspecting.
   h. Environmental procedures.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.6 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Photographs: Color photographs of each plant species showing actual size and condition of plants to be provided with measuring device included for scale. Where more than 20 plants are required of any species, submit minimum three photographs of average, best, and worst quality plant to be provided. Include

on each photograph, plant full scientific name, size, and source nursery.

3. Installation instructions.
4. Warranty.

C. Samples:

1. Organic and Compost Mulch: 0.5 L. (1 pint) sealed plastic bag of each required mulch, including label with percentage weight of each material and source representing material to be provided. Samples to match color, texture, and composition of installed material.
2. Mineral Mulch: 1.0 kg (2 lb.) sealed plastic bag of mulch, including label with source. Samples to match color, texture, and composition of installed material.
3.
4. Tree Wrap: Width of panel by 300 mm (12 inches).
   a. .

D. Test reports: Certify products comply with specifications.

E. Certificates: Certify products comply with specifications.

1. Plant Materials: Department of Agriculture certification by State Nursery Inspector declaring material to be free from insects and disease.
2. Seed and Turf Materials: Notarized certificate of product analysis.

F. Qualifications: Substantiate qualifications comply with specifications.

1. Installer, including supervisor with project experience list.

G. Operation and Maintenance Data:

1. Care instructions for each plant material.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Regularly installs specified products.
2. Installed specified products with satisfactory service on five similar installations for minimum five years.
   a. Project Experience List: Provide contact names and addresses for completed projects.
3. Member in good standing of The National Association of Landscape Professionals.
4. Personnel assigned to Work certified in one of the following categories from The National Association of Landscape

Professionals and submit one copy of certificate to Contracting Officer's Representative:

a. Certified Landscape Technician (CLT) - Exterior, with installation and maintenance specialty areas, designated CLT-Exterior.

B. Landscape Industry Certified Manager. Licensed Arborist required to submit one copy of license to Contracting Officer's Representative.

C. Independent or university laboratory, recognized by State Department of Agriculture, with experience and capability to conduct testing indicated and that specializes in types of tests to be performed.

D. Measure plants according to ANSI Z60.1. Pruning to obtain required sizes will not be permitted.

E. Contracting Officer's Representative may review plant materials either at place of growth or project site before planting for compliance with requirements. Contracting Officer's Representative retains right to inspect trees and shrubs to determine if any unacceptable conditions exist and to reject any trees or shrubs at any time during Project. All rejected trees and shrubs must be immediately removed from Project site.

1. Submit plant material source information to Contracting Officer's Representative seven days in advance of delivery to Project site.

F. Material Test Reports: For standardized ASTM D5268 topsoil, existing native surface topsoil, existing in-place surface soil, and imported or manufactured topsoil.

1. For each unamended soil type, provide soil analysis and written report by qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of soil.

2. Comply with USDA's Handbook No. 60 testing methods and written recommendations.

3. Soil-testing laboratory to oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Contracting Officer's Representative. Take minimum ___2___ representative samples from varied locations for each soil to be used or amended for planting purposes.

4. Report suitability of tested soil for plant growth.

5. Based on test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 92.9 sq. m (1000 sq. ft.) or volume per 0.76 cu. m (1 cu. yd.) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
6. 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 additional recommendations for corrective action.

1.8 DELIVERY

A. Deliver packaged products in manufacturer's original sealed packaging.
B. Bulk Products:
   1. Deliver bulk products away from buildings, utilities, pavement, and existing turf and planted areas. Maintain dry bulk product storage away from contaminants.
   2.
C. Apply antidesiccant to trees and shrubs according to manufacturer's instructions to protect during digging, handling, and transportation.
   1. For deciduous trees or shrubs in full leaf, spray with antidesiccant at nursery before transporting and again two weeks after planting.
D. Wrap trees and shrubs with tree wrap according to manufacturer's instructions to protect from wind and other damage during digging, handling, and transportation.
E. Deliver branched plants with branches tied and exposed branches covered with material that allows air circulation. Prevent damage to branches, trunks, root systems, and root balls and desiccation of leaves.
F. Use of equipment such as "tree spades" is permitted provided plant balls are sized according to ANSI Z60.1 and tops are protected from damage.

1.9 STORAGE AND HANDLING

A. Store seeds and other packaged materials in dry locations away from contaminants.
B. Plant Storage and Protection: Store and protect plants not planted on day of arrival at Project site as follows:

1. Shade and protect plants in outdoor storage areas from wind and direct sunlight until planted.
2. Protect balled and burlapped plants from freezing or drying out by covering balls or roots with moist burlap, sawdust, wood chips, shredded bark, peat moss, or other approved material. Provide covering that allows air circulation.
3. Keep plants in moist condition until planted by watering with fine mist spray.
4. Do not store plant materials directly on concrete or bituminous surfaces.

C. Topsoil: Before stockpiling topsoil, eradicate on site undesirable growing vegetation. Clear and grub existing vegetation three to four weeks before stockpiling existing topsoil.

D. Handling: Do not drop or dump plants from vehicles. Avoid damaging plants being moved from nursery or storage area to planting site. Handle balled and burlapped and container plants carefully to avoid damaging or breaking earth ball or root structure. Do not handle plants by trunk or stem. Remove damaged plants from Project site.

1.10 FIELD CONDITIONS

A. Environment:

1. Coordinate installation of planting materials during optimal planting seasons for each type of plant material required.
2. Planting Dates:
   a. Deciduous Material: From March 1to May 31for spring planting and from September 15to November 30for fall planting.
   b. Evergreen Material: March 1to May 31 for spring planting and from September 15to November 30for fall planting.
3. Restrictions: Do not plant when ground is frozen, snow covered, muddy, or when air temperature exceed 32 degrees C (90 degrees F).

B. Weather Limitations: Install plantings only during current and forecasted weather conditions that comply with plant requirements. Apply associated products in compliance with manufacturers' instructions.

1.11 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant plantings and against material defects.
   1. Warranty Period: Two years.
   2. Plant and Turf Warranty Periods will begin from date of Substantial Completion.
   3. Contracting Officer's Representative will reinspect plants and turf seven (7) days prior to the end of Warranty Period. Replace any dead, missing, or defective plant material and turf immediately. Warranty Period will end on date of this inspection provided Contractor has complied with warranty work required by this specification. Comply with following requirements:
      a. Replace any plants more than 25 percent dead, missing or defective plant material before final inspection.
      b. Only one replacement of each plant will be required except when losses or replacements are due to failure to comply with these requirements.
      c. Complete remedial measures directed by Contracting Officer’s Representative to ensure plant and turf survival.
      d. Repair damage caused while making plant or turf replacements.

PART 2 - PRODUCTS

2.1 PRODUCTS - GENERAL

A. Provide each product from one source or manufacturer.

B. Sustainable Construction Requirements:
   1. Select products with recycled content to achieve overall Project recycled content requirement.
      a. Fertilizer.
   2. Biobased Content:
      a. Organic Mulch: 100 percent.
      b. Peat: 100 percent.

2.2 PLANT MATERIALS

A. Plant Materials: ANSI Z60.1, conforming to varieties specified and be true to scientific name as listed in Hortus Third. Well-branched, well-formed, sound, vigorous, healthy planting stock free from disease, sunscald, windburn, abrasion, and harmful insects or insect eggs and having healthy, normal, and undamaged root system.
   1. Trees-Deciduous and Evergreen: Single trunked with single leader, unless otherwise indicated; symmetrically developed

deciduous trees and shrubs of uniform habit of growth; straight boles or stems; free from objectionable disfigurements; evergreen trees and shrubs with well-developed symmetrical tops, with typical spread of branches for each particular species or variety. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk; crossing trunks; cut-off limbs more than 19 mm (3/4 inch) in diameter; or with stem girdling roots will be rejected.

2. Ground Cover Plants: Provide number and size as specified on drawings, together with proper age for grade of plants specified. Provide ground cover plants well established in removable containers, integral containers, or formed homogeneous soil sections. Provide plants grown under climatic conditions similar to those in locality of project. Spray all plants budding into leaf or having soft growth with an anti-desiccant at nursery before digging.
3. Provide plants of sizes indicated, measured before pruning with branches in normal position. Plants larger in size than specified are acceptable with approval of Contracting Officer’s Representative, with no change in contract price. When larger plants are used, increase ball of earth or spread of roots according to ANSI Z60.1.
4. Provide nursery grown plant material conforming to requirements and recommendations of ANSI Z60.1. Dig and prepare plants for shipment in manner that will not cause damage to branches, shape, and future development after planting.
5. Balled and burlapped (B&B) plant ball sizes and ratios will conform to ANSI Z60.1, consisting of firm, natural balls of soil wrapped firmly with burlap or strong cloth and tied.
6. Container grown plants to have sufficient root growth to hold earth intact when removed from containers, but not be root bound.
7. Make substitutions only when plant (or alternates as specified) is not obtainable and Contracting Officer’s Representative authorizes change order providing for use of nearest equivalent obtainable size or variety of plant with same essential characteristics and an equitable adjustment of contract price.

8. Only plants grown in nurseries are permitted.

B. Label plants with durable, waterproof labels in weather-resistant ink. Provide labels stating correct botanical and common plant name and variety and size as specified in list of required plants. Groups of plants may be labeled by tagging one plant. Labels are to be legible for minimum 60 days after delivery to planting site.

2.3 SOD

A. Sod: Nursery grown, certified and classified in TPI's "Guideline Specifications to Turfgrass Sodding" as GSS. Machine cut sod at uniform thickness of 19 mm (3/4 inch) within tolerance of 6 mm (1/4 inch), excluding top growth and thatch. Each individual sod piece to be strong enough to support its own weight when lifted by ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will not be permitted.

B. Sod Species: Genetically pure, free of weeds, pests, and disease.

1. Full Sun: Proportion grass species as follows:
   a. 95 percent Turf-Type Tall Fescue.
   b. 5 percent Kentucky Bluegrass
2. Sun and Partial Shade: Proportion grass species as follows:
   a. 90 percent Turf-Type Tall Fescue.
   b. 10 percent Kentucky Bluegrass.
3. Shade: Proportion grass species as follows:
   a. 70 percent Turf-Type Tall Fescue.
   b. 20 percent Kentucky Bluegrass.
   c. 10 percent Perennial Ryegrass.

2.4 SEED

A. Grass Seed: State-certified / seed of latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will not be acceptable. Field mixes will be acceptable when field mix is performed on site in presence of Contracting Officer's Representative.

B. Seed Mixtures: Proportion seed mixtures by weight.

1. Full Sun: Proportioned grass species as follows:
   a. 29.50 percent Golconda Tall Fescue.
   b. 19.65 percent Toltec Tall Fescue.

c. 14.75 percent Frontier Perennial Ryegrass.

d. 17.47 percent Deepblue Kentucky Bluegrass.

e. 9.82 percent Singular Perennial Ryegrass

f. 9.80 percent Hood Chewings Fescue

g. 1.67 percent inert matter

h. .04 percent other crop seed (no noxious weeds)

2. Sun and Partial Shade: Proportioned grass species as follows:

a. 29.50 percent Golconda Tall Fescue.

b. 19.65 percent Toltec Tall Fescue.

c. 14.75 percent Frontier Perennial Ryegrass.

d. 17.47 percent Deepblue Kentucky Bluegrass.

e. 9.82 percent Singular Perennial Ryegrass

f. 9.80 percent Hood Chewings Fescue

g. 1.67 percent inert matter

h. .04 percent other crop seed (no noxious weeds)

3. Shade: Proportioned grass species as follows:

a. 24.65 percent Golconda Tall Fescue.

b. 24.60 percent Toltec Tall Fescue.

c. 14.75 percent Hood Chewings Fescue.

d. 14.70 percent Creeping Red Fescue

e. 9.82 percent Frontier Perennial Ryegrass

f. 9.82 percent Pivot Kentucky Bluegrass

g. 1.66 percent insert matter/other crop seed (no noxious weeds)

2.5 TURF SELECTIONS

A. Grasses for Cool Regions:

1. Bluegrasses: Kentucky (Popratensis), Rough-stalked (Potrivialis) and Canada(Poa compressa).
2. Fescue: Red (Festucrubra), Meadow (Festucpratensis) and Tall (Festucarundinacea).
3. Ryegrasses: Perennial (Lolium perenne).

2.6 PLANTING SOILS

A. Planting Soil: Evaluate soil for use as topsoil according to ASTM D5268. From 5 to 10 percent organic matter as determined by topsoil composition tests of Organic Carbon, 6A, Chemical Analysis Method described in USDA DOA SSIR 42. Maximum particle size, 19 mm (3/4 inch), with maximum 3 percent retained on 6 mm (1/4 inch) screen.

Mix topsoil with following soil amendments and fertilizers as recommended by soils analysis.

B. Existing Planting Soil: Existing, native surface topsoil formed under natural conditions retained during excavation process and stockpiled on-site . Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
   1. Supplement with planting soil when quantities are insufficient.
   2. Mix existing, native surface topsoil with soil amendments and fertilizers as recommended by soils analysis.

C. Imported Planting Soil: Imported topsoil or manufactured topsoil from off-site sources are acceptable if sufficient topsoil is not available on site to meet specified depth. At least 10 days before topsoil delivery, notify Contracting Officer’s Representative of topsoil sources. Obtain imported topsoil displaced from naturally well-drained construction or mining sites where topsoil is at least 100 mm (4 inches) deep. Topsoil from agricultural land, bogs, or marshes will be rejected.

2.7 INORGANIC SOIL AMENDMENTS

A. Lime: Commercial grade ground limestone containing calcium carbonate equivalent (CCE) specified in ASTM C602 of minimum 80 percent.

B. Sulfur: 100 percent elemental.

C. Iron Sulfate: 100 percent elemental.

D. Aluminum Sulfate: Commercial grade.

E. Perlite: Horticultural grade.

F. Agricultural Gypsum: Coarsely ground from recycled scrap gypsum board comprised of calcium sulfate dehydrate 91 percent, calcium 22 percent, sulfur 17 percent, minimum 96 percent passing through 850 micrometers 20 mesh screen, 100 percent passing through 970 micrometers 16 mesh screen.

G. Coarse Sand: ASTM C33/C33M, clean and free of materials harmful to plants.

H. Vermiculite: Horticultural grade for planters.

I. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

J. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.8 ORGANIC SOIL AMENDMENTS

A. Organic Matter: Commercially prepared compost. Free of substances toxic to plantings and as follows:
   1. Organic Matter Content: Biobased content 100 percent. Wood cellulose fiber processed to contain no growth or germination-inhibiting factors, dyed with non-toxic, biodegradable dye to appropriate color to facilitate visual metering of materials application.
   2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Peat: Natural product of sphagnum moss peat derived from fresh-water site, conforming to ASTM D4427 and containing no invasive species, including seeds. Shred and granulate peat to pass 12.5 mm (1/2 inch) mesh screen and condition in storage pile for minimum 6 months after excavation. Biobased content is a minimum of 100 percent.

C. Composted Derivatives: Ground bark, nitolized sawdust, humus, or other green wood waste material free of stones, sticks, invasive species, including seeds, and soil stabilized with nitrogen and having following properties:
   1. Particle Size: Minimum percent by weight passing:
      a. 4.75 mm (No. 4) mesh screen: 95.
      b. 2.36 mm (No. 8) mesh screen: 80.
   2. Nitrogen Content: Minimum percent based on dry weight:
      a. Fir sawdust: 0.7.
      b. Fir or pine bark: 1.0.
   3. Biobased Content: 100 percent.

D. Manure: Well-rotted, horse or cattle manure containing maximum 25 percent by volume of straw, sawdust, or other bedding materials; free of seeds, stones, sticks, soil, and other invasive species.

2.9 PLANT FERTILIZERS

A. Soil Test: Evaluate existing soil conditions and requirements before fertilizer selection and application to minimize use of all fertilizers and chemical products. Obtain approval of Contracting Officer’s Representative for allowable products, product alternatives, scheduling and application procedures. Evaluate existing weather and site conditions before application. Apply products during favorable weather and site conditions according to manufacturer's instructions

and warranty requirements. Fertilizers to be registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer applicable to specific areas as required for Project conditions and application. Provide commercial grade plant and turf fertilizers, free flowing, uniform in composition and conforms to applicable state and federal regulations.

B. Fertilizer for groundcover, wildflowers, and grasses is not acceptable. Provide fertilizer for trees, plants, and shrubs as recommended by plant supplier, except synthetic chemical fertilizers are not acceptable. Fertilizers containing petrochemical additives or that have been treated with pesticides or herbicides are not acceptable.

C. Granular Fertilizer: Organic, granular controlled release fertilizer containing minimum percentages, by weight, of plant food nutrients.

1. Composition: Nitrogen, phosphorous, potassium, sulfur, and iron in amounts recommended in soil reports from qualified soil-testing laboratory.

D. Fertilizer Tablets: Organic plant tablets composed of tightly compressed fertilizer chips, insoluble in water, to provide continuous release of nutrients for minimum 24 months and containing following minimum percentages, by weight, of plant food nutrients:

1. Nutrient Composition: 20 percent available nitrogen, 20 percent available phosphorous, and 5 percent available potassium.

2.10 MULCH

A. Organic Mulch:

1. shredded hardwood for project site when available. Biobased content is a minimum 100 percent. Wood cellulose fiber processed to contain no growth or germination-inhibiting factors, dyed with non-toxic, biodegradable dye to an appropriate color to facilitate visual metering of application.

a. Straw for Lawn Seed Bed Mulch: Stalks from oats, wheat, rye, barley, or rice free of noxious weeds, mold or other objectionable material. Air dried and suitable for placing with blower equipment.

2. Color: Natural.

B. Compost Mulch: Decomposed organic matter with low carbon to nitrogen ratio.

C. Mineral Mulch: Coarse, clean stone of following type, size, and color:

1. Type: Naturally occurring quartzite.

2. Size: ASTM C136/C136M, 1/2 inch.
3. Alabama Sunset (as shown on drawings).

2.11 ANTIDESICCANT

A. Antidesiccant: An emulsion specifically manufactured for agricultural use that will provide protective film over plant surfaces permeable enough to permit transpiration.

2.12 STAKING AND GUYING MATERIALS

A. Staking Material:
1. Tree Support Stakes: Treated Lodgepole Pine free of knots, rot, cross grain, bark, long slivers, or other defects that impair strength. Minimum 50 mm (2 inches) diameter by 2.4 m (8 feet) long, pointed at one end.

B. Guying Material:
1. Rubber Tree Tie: Cinch-tie, Gro-strait, or equal.
2. Nails: Galvanized roofing.

2.13 WATER

A. Water: Source approved by Contracting Officer's Representative and suitable quality for irrigation, containing no elements toxic to plant life, including acids, alkalis, salts, chemical pollutants, and organic matter. Use collected storm water or graywater when available.

2.14 PESTICIDES

A. Consider IPM (Integrated Pest Management) practices to minimize use of all pesticides and chemical products. Obtain Contracting Officer's Representative's approval for allowable products, product alternatives, scheduling and application procedures. Evaluate existing weather and site conditions before application. Apply products during favorable weather and site conditions according to manufacturer's instructions and warranty requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
1. Verify that no materials that would inhibit plant growth are present in planting area. If such materials are present, remove

soil and contaminants as directed by Contracting Officer's Representative and provide new planting soil.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations if soil moisture becomes excessive. Resume soil preparations when moisture content returns to acceptable level.
4. If soil is excessively dry, not workable, and too dusty, moisten uniformly.
5. Special conditions may exist that warrant variance in specified planting dates or conditions. Submit written request to Contracting Officer’s Representative stating special conditions and proposed variance.

B. Proceed with planting operations only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect existing and proposed landscape features, elements, and site construction and completed work from damage. Protect trees, vegetation, and other designated features by erecting high-visibility, reusable construction fencing. Locate fence no closer to trees than drip line. Plan equipment and vehicle access to minimize and confine soil disturbance and compaction to areas indicated on drawings.

B. Install erosion control materials at all areas inside or outside limits of construction that are disturbed by planting operations. Provide erosion control and seeding with native plant species to protect slopes.

C. Stake out approved plant material locations and planter bed outlines on project site before digging plant pits or beds. Contracting Officer’s Representative reserves right to adjust plant material locations to meet field conditions. Do not plant closer than 24-36 inches) to building wall, pavement edge, or wall edge, and other similar structures, depending on plant’s mature size . Provide on-site locations for excavated rock, soil, and vegetation.

3.3 PLANT BED PREPARATION

A. Verify location of underground utilities before excavation. Protect existing adjacent turf before excavations are made. Do not disturb topsoil and vegetation in areas outside those indicated on Drawings.

Where planting beds occur in existing turf areas, remove turf to depth that will ensure removal of entire roof system. Measure depth of plant pits from finished grade. Provide depth of plant pit excavation and relation of top of root ball and finish grade as indicated on drawings. Install plant materials as specified in Article 3.8. Do not plant trees within 3 m (10 feet) of any utility lines or building walls.

B. For newly graded subgrades, loosen subgrade to minimum 150 mm (6 inches) deep. Remove stones larger than 50 mm (2 inches) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Government's property.

1. Apply fertilizer, lime, and soil amendments directly to subgrade before loosening, at rates recommended by soils analysis.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
3. Spread planting soil 150 mm (6 inches) deep but minimum required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
   a. Spread approximately 1/2 thickness of planting soil over loosened subgrade. Mix thoroughly into top 100 mm (4 inches) of subgrade. Spread remainder of planting soil.
   b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Finish grade planting areas to smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 13 mm (1/2 inch) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in immediate future.

3.4 TREE, AND SHRUB PLANTING

A. Move plant materials only by supporting root ball or container . Set plants on hand compacted layer of prepared backfill soil mixture 150 mm (6 inches) thick and hold plumb in center of pit until soil has been tamped firmly around root ball.

B. Set plant materials in relation to surrounding finish grade 25 to 50 mm (1 to 2 inches) above depth at which they were grown in nursery, collecting field, or container. Replace plant material whose root balls are cracked or damaged either before or during planting process.

C. Place backfill soil mixture on previously scarified subsoil to completely surround root balls and bring to smooth and even surface, blending into existing areas.

D. Balled and Burlapped Stock: Backfill with prepared soil mixture to approximately half ball depth then tamp and water. Carefully remove or fold back excess burlap and tying materials from top to minimum 1/3 depth from top of root ball. Tamp and complete backfill, place mulch topdressing, and water. Remove wires and non-biodegradable materials from plant pit before backfilling.

3.5 MECHANIZED TREE SPADE PLANTING

A. At designated locations and with approved equipment, trees may be planted by mechanized tree spade. Tree spade is not acceptable for moving trees that are larger than maximum size of similar field-grown, balled-and-burlapped root-ball diameter recommended by ANSI Z60.1, or that are larger than manufacturer's recommended maximum size for tree spade to be used, whichever is smaller.

B. For tree extraction, center trunk in tree spade and move tree and solid root ball.

C. Cut any exposed roots with sharp instruments.

D. Excavate planting hole with same tree spade used to extract and move tree.

E. If possible, place trees with same orientation as at location from which they were extracted.

3.6 TREE AND SHRUB PRUNING

A. Pruning: Performed by trained and experienced personnel according to TCIA A300P1.

B. Remove dead and broken branches. Prune only to correct structural defects.

C. Retain typical growth shape of individual plants with as much height and spread as practical. Do not central leader on trees. Make cuts with sharp instruments. Do not flush cut with trunk or adjacent branches. Collars to remain in place.

D. Do not apply tree wound dressing to cuts.

3.7 STAKING AND GUYING

A. Staking: Stake trees as indicated on drawings. Drive stakes to depth of 0.80 to 0.91 m (2-1/2 to 3 feet) into the ground outside plant pit. Do not injure root ball.

3.8 MULCH INSTALLATION

A. Provide specified mulch over entire planting bed surfaces and individual plant surfaces, including earth mount watering basin around plants, to 75 mm (3 inches) depth after plant installation and before watering. Do not place mulch in crowns of shrubs. Place mulch minimum 50 to 75 mm (2 to 3 inches) away from tree or shrub trunks.

3.9 SODDING

A. Place sod maximum 36 hours after initial harvesting according to TPI GSS, except as modified herein.

B. Finishing: After sodding, blend edges of sodded area smoothly into surrounding area. Eliminate air pockets and provide true and even surface. Trim frayed areas and patch holes and missing areas with sod.

C. Rolling: Immediately after sodding, firm entire area, except slopes in excess of 3: 1, with roller maximum 134 kg (90 lbs.) for each foot of roller width.

D. Watering: Start watering sodded areas as required by daily temperature and wind conditions. Water at rate sufficient to ensure thorough wetting of soil to minimum 150 mm (6 inches) deep. Prevent run-off, puddling, and wilting. Do not drive watering trucks over turf areas, unless otherwise directed. Prevent watering of other adjacent areas or plant materials.

3.10 SEEDING

A. Broadcast and Drop Seeding: Uniformly broadcast seed at rate of 5 pounds per 1000 square feet). Use broadcast or drop seeders. Sow one-half seed in one direction and sow remainder at right angles to first sowing. Cover seed uniformly to maximum 6 mm (1/4 inch) deep in clay soils and 13 mm (1/2 inch) deep in sandy soils by means of spike-tooth harrow, cultipacker, raking, or other approved device.

B. Rolling: Immediately after seeding, firm entire area, with roller not exceeding 130 kg/m (90 lb./ft.) of roller width.

3.11 TURF RENOVATION

A. General: Restore to original condition existing turf areas damaged during turf installation and construction operations. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. Clean other paving when work in adjacent areas is complete.

B. Overseeding: Apply seed according to applicable portions of "Seed Application Method" at rates specified in "Seed Composition."

3.12 PLANT MAINTENANCE

A. Frequency: Begin maintenance immediately after plants have been installed. Inspect plants at least once week and perform required maintenance promptly.

B. Promotion of Plant Growth and Vigor: Water, prune, fertilize, mulch, eradicate weeds, and perform other operations necessary to promote plant growth and vigor.

C. Planter Beds: Weed, fertilize, and irrigate planter beds and keep pest free, pruned, and mulch levels maintained. Do not permit planter beds to encroach into turf areas. Maintain edging breaks between turf areas and planter beds. Fertilize plant materials to promote healthy growth without encouraging excessive top foliar growth. Remove noxious weeds common to area from planter beds by mechanical means.

D. Shrubs: In addition to planter bed maintenance requirements, selectively prune and shape shrubs for health and safety when following conditions exist:

1. Remove growth in front of windows, over entrance ways or walks, and any growth which will obstruct vision at street intersections or of security personnel.
2. Remove dead, damaged, or diseased branches or limbs where shrub growth obstructs pedestrian walkways, where shrub growth is growing against or over structures, and where shrub growth permits concealment of unauthorized persons.
3. Properly dispose of all pruning debris.

E. Trees: Adjust stakes and ties and water, fertilize, control pests, mulch, and prune for health and safety .

1. Fertilize trees to promote healthy plant growth without encouraging excessive top foliar growth. Inspect and adjust stakes and ties to avoid girdling and promote natural development.
2. Selectively prune all trees within project boundaries, regardless of caliper, for safety and health reasons, including, but not limited to, removal of dead and broken branches and correction of structural defects. Prune trees according to their natural growth characteristics leaving trees well shaped and balanced.

3. All pruning, must be completed by or in presence of certified member of International Society of Arboriculture and according to TCIA Z133.1.
4. Properly dispose of all pruning debris.

3.13 REMOVAL OF DYING OR DEAD PLANTS

A. Remove dead and dying plants and provide new plants immediately upon commencement of specified planting season and replace stakes, mulch, and eroded earth mound water basins. No additional correction period will be required for replacement plants beyond original warranty period. Plants will be considered dead or dying as follows:
   1. Tree: Main leader died back or minimum 20 percent of crown died.
   2. Shrub and Ground Cover: Minimum 20 percent of plant died.
   3. Determination: Scrape on maximum 2 mm (1/16 inch) square branch area to determine dying plant material cause and provide recommendations for replacement.

3.14 TURF MAINTENANCE

A. Mow turf to uniform finished height measured from soil. Perform mowing in manner that prevents scalping, rutting, bruising, uneven and rough cutting. Before mowing, remove and dispose of all rubbish, debris, trash, leaves, rocks, paper, and limbs or branches on turf areas. Sweep or vacuum clean adjacent paved areas.

B. Apply fertilizer in manner that promotes health, growth, vigor, color and appearance of cultivated turf areas. Determine method of application, fertilizer type and frequencies by results of laboratory soil analysis. Apply fertilizer by approved methods and according to manufacturer's instructions.

C. Watering: Perform irrigation in manner that promotes health, growth, color, and appearance of cultivated vegetation, complying with Federal, State, and local water agency and authority directives. Prevent overwatering, water run-off, erosion, and ponding due to excessive quantities or rate of application.

3.15 CLEANING

A. Remove and legally dispose of all excess soil and planting debris.

3.16 PROTECTION

A. Protect plants from traffic and construction operations.

B. Provide temporary fences or enclosures and signage, at planted areas. Maintain fences and enclosures during maintenance period.

C. Remove protective materials immediately before acceptance.

D. Repair damage.

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