

**SECTION 32 90 00
PLANTING**

SPEC WRITER NOTE: Use this section only
for NCA projects. Delete text between
// _____ // not applicable to project.
Edit remaining text to suit project.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

1.2 RELATED REQUIREMENTS

SPEC WRITER NOTES: Update and retain
references only when specified elsewhere
in this section.

- A. Topsoil Materials, Stripping and Stockpiling: Section 31 20 00, EARTH MOVING.
- B. Topsoil Testing: Section 01 45 29, TESTING LABORATORY SERVICES.
- C. Erosion control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- D. Protection of Tress and Plantings: Section 02 41 10, DEMOLITION AND SITE CLEARING.
- E. Topsoil Placement and Compaction Test: Section 31 20 00, EARTH MOVING.
- F. Landscape Irrigation: Section 32 84 00, PLANTING IRRIGATION.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American National Standards Institute (ANSI) Publications:
 1. ANSI Z60.1-2014 - Nursery Stock.
 2. ANSI Z133.1-2012 - Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush- Safety Requirements.
- C. ASTM International (ASTM):
 1. C33/C33M-16-Concrete Aggregates.
 2. C136/C136M-14 - Sieve Analysis of Fine and Coarse Aggregates.
 3. D698-12 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m<sup>3
 - 4. D977-13e1 - Emulsified Asphalt.
 - 5. D2028/D2028M-15 - Cutback Asphalt (Rapid-Curing Type).
 - 6. D2103-15 - Polyethylene Film and Sheeting.</sup>

- D. Hortus Third, most current edition: A Concise Dictionary of Plants Cultivated in the United States and Canada.
- E. National Cemetery Administration (NCA):

SPEC WRITER NOTE: Agronomic and Horticultural practices specified in this handbook serve as Contractor's official reference guide for establishment and preliminary maintenance practices during construction project.

- 1. Handbook 3410 - Integrate Pest Management.
- 2. Handbook 3420-11 - Turfgrass Maintenance.
- F. Turfgrass Producers International (TPI):
 - 1. 2006 Guideline Specifications to Turfgrass Sodding.
- G. United States Department of Agriculture (USDA):
 - 1. Federal Seed Act-2011 - Rules and Regulations of the Secretary of Agriculture.
- H. United States Environmental Protection Agency (EPA):
 - 1. 40 CFR Part 503-1993 - Biosolids Rule.

1.4 PREINSTALLATION MEETINGS

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

SPEC WRITER NOTE: Edit participant list to ensure entities influencing outcome attend.

- 1. Required Participants:
 - a. Contracting Officer's Representative (COR).
 - b. COR (RE).
 - c. // Architect/Engineer (A/E). //
 - d. Contractor.
 - e. Installer.

SPEC WRITER NOTE: Edit meeting agenda to incorporate project specific topics.

- 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.

1.5 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.
 - a. Seeds.
 - b. Sod.
 - c. Soil amendments.
 - d. Antidesiccant.
 - e. Erosion control materials.
 - f. Hydro mulch.
 - g. Non-Asphaltic Trackifier.
 - h. Herbicide.
 - i. Weed Control.
 - j. Mulches.
 - k. Edging.
 - l. // insert other required products //.
 - 2. Plant list: List of local/regional suppliers for each species to be installed. Include quantities, plant dimension (height x spread) and container/root ball size. Certify in writing, confirmed orders for plants by submitting a Bill of Sale for each plant to be installed. Each plant of the same species shall be supplied by one grower only unless otherwise approved by COR.
 - a. Requests for substitutions of plants not available in size, quantity or type specified must be made within 30 days after Contract award. Submit written evidence that a specified plant cannot be obtained and has been unobtainable since Contract award.
 - b. Substitutions will only be authorized when a plant (or its alternates as specified) is not obtainable and COR, in consultation with District Agronomist, authorizes a change order

for use of nearest equivalent obtainable size or variety of plant having same essential characteristics with an equitable adjustment of contract price.

3. Warranty.

C. Samples: Submit before beginning Work of this section:

Inert Mulch	2.3 kg (5 lb.) of each type to be used.
Organic Mulch	2.3 kg (5 lb.) of each type to be used.
Imported Topsoils	2.3 kg (5 lb.) of each type to be used.
Organic Amendments	2.3 kg (5 lb.) of each type to be used.
All pesticides required such as preemergence or post emergence herbicides, insecticides, or fungicides.	EPA approved labeling and MSDS sheet for each such product selected for use.
Edging Materials	Manufacturer's standard size

D. Test reports: Certify products comply with specifications.

1. Imported Topsoil: Provide 2.3 kg (5 lbs.) representative sample from each proposed source for testing, analysis, and approval. Deliver samples to acceptable testing laboratory and have testing report sent directly to COR. Testing reports to include following tests and recommendations according to Association of Official Agricultural Chemists standards:

- a. Soil Composition: USDA particle size analysis indicating percentages of sand, silt and clay, and percent organic matter. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) performed by public extension service agency, State Land Grant College, or certified private testing laboratory. Percentages of clay and silt to be determined by hydrometer.
- b. Percent of organics to be determined by loss on ignition of oven-dried samples. Test samples to be oven-dried to constant

weight at 110 degrees C (230 degrees F), plus or minus 5 degrees C (41 degrees F).

- c. Macro and micro nutrient fertility tests as determined by Chemical analysis to include Macro and micro nutrient fertility tests as determined by pH, Salinity (EC), Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Soluble Copper, Zinc, Manganese, Iron, Saturation Extract Boron, Aluminum, Soluble Salts, Exchangeable Sodium Percentage (ESP), // Sodium Adsorption Ratio (SAR) //, and Cation Exchange Capacity (CEC).
 - d. Tests, as specified, for gradation, organics, soil chemistry and pH to be performed by testing laboratory retained by National Cemetery Administration as described in Section 01 45 29, TESTING LABORATORY SERVICES.
 - e. Include recommendations for soil additives to correct soils deficiencies, as necessary, and for fertilizing and to adjust soil pH to optimum range for // cool // warm // season turfgrass liming applications to support successful turfgrass growth.
2. Organic Soil Amendment:
- a. Testing: Provide testing by an independent laboratory, with the experience and capability to conduct the testing indicated following U.S. Composting Council Seal of Testing Assurance (STA) procedures, or equivalent.
 - b. Soil Amendment Analysis: Provide documentation from supplier that compost has reached a monitored temperature of 140 degrees Fahrenheit for at least one week. Engage an independent soil testing laboratory to test representative samples of compost and provide compost analysis report for the following parameters:
 - 1) Percent organic matter, percent moisture, percent inerts (foreign matter), pH, soluble salts, and particle size.
 - 2) Nutrient content, including: Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), and Magnesium (Mg) and Sulfur s.
 - 3) Trace Metals, including: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn).
 - 4) Maturity Indicator. Provide bioassay results. Provide Carbon-Nitrogen ratio.
 - 5) Stability Indicator: Provide respiration test results.

3. Amended Soil (in place): Following incorporation of amendments and additives, provide minimum six (6) samples per 3,700 sq. m (40,000 sq. ft.), 150 mm (6 inch) depth by 75 mm (3 inch) diameter core samples of amended soil taken from project site for testing, analysis, and approval. Locate each samples as directed by COR from areas designated to be planted in turfgrass. Deliver samples to testing laboratories and have testing report sent directly to COR. Obtain amended soil sample acceptance before seeding or hydroseeding.

E. Certificates: Certify products comply with specifications.

F. Before delivery, submit notarized certificates for approval to COR attesting that following materials meet specified requirements:

1. Plant Materials (Department of Agriculture certification by State Nursery Inspector from the state in which the plant material originates declaring material to be free from insects and disease).
2. Fertilizers: Four certificates of analysis for each type of fertilizer.
3. // Lime //
4. // Gypsum //
5. // Soil Sulfur //
6. // Humates //
7. // Mycorrhizae //
8. // Peat //
9. Seed: Include guaranteed percentages of purity, weed content and germination of seed, and net weight and date of shipment.
10. Sod.
11. Membranes.
12. // M-Binder //
13. Hydro Mulching: Number of kilograms (pounds) of materials to be used per liter (gallon) of water.

G. Maintenance Data:

1. Care instructions for each plant material.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Regularly installs specified materials and 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. //
- b. A member with good standing of either the Professional Landcare Network (PLANET) the AmericanHort.
- c. Maintain an experienced full-time supervisor on Project site when work is in progress.
- d. Installer's // field supervisor // personnel assigned to the Work // shall have certification in // one of // all of // the following categories from the Professional Landcare Network and submit one copy of certificate to the COR:
- e. Certified Landscape Technician (CLT) - Exterior, with // installation // maintenance // irrigation // specialty areas, designated CLT-Exterior.
- f. Certified Ornamental Landscape Professional designated COLP.

SPEC WRITER NOTE: Delete if not applicable.

- B. Licenses: Submit licenses to COR:
 - 1. Arborist: One copy.
 - 2. Pesticide Applicator: License in state of project, commercial.

1.7 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.
- D. 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. Protect products from weather.
 - 2. Install erosion control materials to prevent erosion or displacement of bulk products.
- E. Notify COR of delivery schedule five days in advance, minimum. COR will inspect materials upon arrival. Remove unacceptable plant materials from project site immediately.
- F. Protect plants during delivery to prevent damage to root balls or desiccation of leaves.

- G. Protect trees during transport by covering root balls and tying branches.
- H. Machine dug plants are permitted provided root balls are sized according to ANSI Z60.1 and tops are protected from damage.
- I. Protect sod from drying out.

1.8 STORAGE AND HANDLING

- A. Store seeds, soil amendments, fertilizers, and packaged materials in dry locations away from contaminants.
- B. Keep sod moist and protect from exposure to wind and direct sunlight.
- C. Store plants not installed on day of arrival at project site as follows:
 1. Shade and protect plants from wind when stored outside.
 2. Heel in bare root plants.
 3. Protect plants by covering roots with moist wood chips, shredded bark, peat moss, or similar mulching material.
 4. Keep plants moist including those in containers, by watering with fine mist spray until planted.

1.9 FIELD CONDITIONS

- A. Seasons and Conditions:

SPEC WRITER NOTE: All planting dates for
this project to be approved through
consultation with appropriate
NCA District Agronomist.

1. Perform landscape planting operations within following dates: From
// _____ // to // _____ // for spring and from
// _____ // to // _____ // for fall, but not before
irrigation system installed, tested, and approved.
- B. Perform turfgrass installation operations within following dates, but
not before irrigation system installed, tested, and approved.
 1. Spring Planting: // _____ // to // _____ //.
 2. Fall Planting: // _____ // to // _____ //.
- C. Restrictions: Do not plant when ground is // frozen, // snow covered,
// saturated // or in otherwise unsuitable condition for planting.
Special conditions may exist that warrant variance in specified
planting dates or conditions. Submit written request for approval to
COR stating special conditions and proposal variance.

1.10 WARRANTY

SPEC WRITER NOTE: Always retain construction warranty. FAR includes Contractor's one year labor and material warranty.

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Comply with "Warranty" requirements in Section 00 72 00, GENERAL CONDITIONS, including the following supplements:
 - 1. One Year Plant and Turfgrass Warranty: Warranty begins when Government accepts plants and turfgrass but not before end of Landscape Plant and Turfgrass Establishment Period.
 - 2. Replace any dead plant material and any areas void of turfgrass immediately during warranty period and during an active growing season. One year warranty for replaced plants and turfgrass begins on day replacement work is completed and accepted.
 - 3. Replacement of relocated plants, not furnished, is not required unless they die from improper handling and care. Loss due to improper handling, care, or negligence requires replacement in kind and size.
 - 4. Government will inspect replacement plants and turfgrass at end of Warranty period. Replace any dead, missing, or defective plant material and turfgrass immediately and during growing season. Warranty ends on date of this inspection provided work specified in this section is complied.
 - 5. Remove stakes, guys wires/straps at end of one year warranty.

PART 2 - PRODUCTS**2.1 PRODUCTS - GENERAL**

- A. Provide each product from one source or manufacturer.
- B. Plant and Turf Grasses: Comply with the varieties specified or shown in plant list.
- C. Warrant plants are true to botanical name as listed in Hortus Third.
- D. Maintain equipment, tools and machinery on project site in sufficient quantities and capacity for proper execution of Work.

2.2 ORGANIC SOIL AMENDMENT

- A. Organic Soil Amendment: Dark brown or black and capable of enhancing plant growth. Ninety-eight percent of material passes 25 mm (1 inch) screen. No admixture of refuse (i.e. noticeable inert contamination) or materials toxic to plant growth are permitted, free of all woody fibers, seeds, leaf structures, plastic, petroleum products, and toxic and non-organic matter.
1. Acceptable Organic Soil Amendments: Peat moss, humus or peat, and commercially available combinations thereof.
 2. Acceptable Compost: Natural organic sources such as food or animal residuals, or yard trimmings.
 3. Unacceptable Sole Sources of Organic Matter: Untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.
- B. Minimum Material Requirements:

Test Parameter	Acceptable Ranges
Organic Matter	27 to 80 percent
pH	5.5 to 8.5
Ash	20 to 65 percent
Nitrogen	0.4 to 3.5 percent
Phosphorus	0.2 to 1.5 percent
Potassium	0.4 to 1.5 percent
C: N Ratio	25 to 30: 1
CEC	50 to 150 meq/100 g
Heavy Metals	Less than max. limits established by EPA 40 CFR Part 503
Inert Contents	Less than 1 percent by weight
Water-Holding Capacity	150 to 200 percent
Pathogen/Weed Seed Destruction	Proof of EPA minimum heating requirements

- C. Topsoil stripped and stockpiled on project site is acceptable provided, after testing and addition of necessary additives, meets above specification. Provide additional Organic Soil Amendment as required to complete work.

- D. Provide organic soil amendment in areas with organic matter content below 4 percent that will be seeded, sodded or sprigged after grading activities are completed to create satisfactory topsoil horizon.
- E. Spread and incorporate organic soil amendment into finished subgrade at depths indicated on drawings to raise soil organic content to minimum four percent and maximum six percent. Allow for additional depth of organic soil amendment to bring all grades to required finished grades as shown on grading plans.

2.3 PLANTS

- A. Plants: ANSI Z60.1, except as otherwise stated in this section or shown on drawings. Where drawings or specifications are in conflict with ANSI Z60.1, drawings and specification will prevail.
 - 1. Provide well-branched and formed planting stock, sound, vigorous, and free of disease, sunscald, windburn, abrasion, harmful insects or insect eggs with healthy, normal, and unbroken root systems.
 - 2. Provide single stemmed trees, with a single leader, unless otherwise indicated.
 - 3. Provide trees and shrubs of uniform, symmetrical growth, with straight boles or stems, free from objectionable disfigurements, and with branch spread of branches typical of variety.
 - 4. Provide ground cover and vine plants with number and length of runners for size, and proper age for grade of plants specified. Provide well established plants in removable containers, integral containers, or formed homogeneous soil sections.
 - 5. Provide plants grown under climatic conditions similar to those in project locality.
- B. Minimum acceptable sizes of all plants, measured with branches in normal position, to conform to plant list and ANSI Z60.1. Larger plants with COR's approval, at no additional cost to the Government. Increase ball of earth or spread of roots according to ANSI Z60.1 when larger plants are provided.
- C. Do not handle plants by trunk or stem. Trees must be moved by lifting root ball, box or container.
- D. Bare-root (BR) plants to have root system substantially intact, but with earth carefully removed. Cover roots with thick coating of mud by "puddling" after the plants are dug.
- E. Container grown plants to have sufficient root growth to hold earth intact when removed from containers, but not be root bound.

- F. When existing plants are to be relocated, ball sizes to conform to ANSI Z60.1 requirements for collected plants, with plants dug, handled, and replanted according to applicable requirements of this section.

2.4 LABELS

- A. Legibly tag each plant, or group and bundles or containers of the species, variety, and size of plant with durable, waterproof and weather-resistant label indicating correct plant name and size specified in plant list. Labels to be securely attached and not removed until acceptance by the Government.

SPEC WRITER NOTE: In areas where topsoil is unavailable, develop a specification to construct "topsoil" on site by amending existing soils. Utilize subparagraph B when topsoil is needed in addition to that stockpiled from Earthwork operation.

2.5 TOPSOIL

- A. Topsoil: Provide well-graded soil of good uniform quality, natural, friable soil representative of productive soils in project vicinity. Topsoil to be free of subsoil, foreign matter, objects larger than 25 mm (1 inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and have pH value of minimum 6.0 and maximum // 7.0 // ____ //, and be best suited to region, climate and plant material specific to project.
- B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet general requirements stated above. Amend topsoil not meeting pH range specified by the addition of pH adjusters.
- C. When sufficient topsoil is not available on project site to specified depth, provide additional topsoil. Minimum 10 days before topsoil delivery, notify COR of sources from which topsoil will be furnished. Obtain topsoil meeting general requirements stated above and comply with requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting pH range specified by adding pH adjusters.

SPEC WRITER NOTE:
1. Retain inorganic and organic soil amendments below reported to be needed to

amend existing site soils by recommendations of the soils report.
 2. Retain Mycorrhizae and Humates for sterile soils/high clay content soils with low organic matter content.

2.6 INORGANIC SOIL AMENDMENTS

- A. Lime: Agricultural limestone, minimum 90 percent calcium and magnesium carbonates. Grind lime fineness, minimum 90 percent passes No. 8 mesh and minimum 25 percent passes No. 100 mesh. Maximum moisture, 10 percent.
1. Dolomitic Lime: Natural, agricultural limestone (calcium and magnesium carbonate), minimum of 20 percent calcium and 11 percent magnesium and as follows:
 - a. Screen Analysis: 100 percent passing through No.30 sieve; 70 percent passing through No. 100 sieve; minimum 30 percent passing through No.325 sieve. Provide lime in form of granulated, prilled, dolomitic limestone.
 2. Calcitic Lime: Natural, agricultural limestone (calcium carbonate), minimum of 36 percent calcium and as follows:
 - a. Screen Analysis: minimum of 100 percent passing through No. 10 sieve; minimum of 80 percent passing through No. 100 sieve. Provide lime in form of granulated, prilled, limestone.
 3. Agricultural Gypsum: Finely ground, minimum of 90 percent calcium sulfate, or 85 percent calcium sulfate dihydrate.
 4. Sulfur: Granular, biodegradable, minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
 5. Iron Sulfate: Granulated ferrous sulfate minimum of 20 percent iron and 10 percent sulfur.
 6. Aluminum Sulfate: Commercial grade, unadulterated.
 7. Sand: Clean washed river sand, free of calcium, chlorides and other deleterious substances.
 8. // Humates: Derived from mined Gypsum and with guaranteed minimum analysis; Calcium Sulfate dihydrate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) 35.00%; Calcium (Ca) 7.00%; Sulfur s 5.00%, plus Humic Acids 1.5% derived from Leonardite. Pelletized product used for ease of application. //.
 9. // Mycorrhizae: Endomycorrhizal powder inoculum consisting of the following 4 species blend of propagules of arbuscular mycorrhizal fungi: *Glomus intraradices*, *Glomus mosseae*, *Glomus aggregatum*, and

Glomus etunicatum. Minimum 100,000 spores/propagules per pound. The powder particle size shall be less than 300 microns (100 percent passing the #50 screen). //.

2.7 ORGANIC SOIL AMENDMENTS

- A. Peat: Natural product of // sphagnum moss peat // peat moss // hypnum moss // peat reed-sedge peat // peat humus // derived from fresh-water site conforming to Fed. Spec. Q-P-166, except as otherwise specified. Shred and granulate peat to pass 13 mm (1/2 inch) mesh screen and condition in storage piles for minimum six months after excavation.
- B. Perlite: Horticulture grade.
- C. Vermiculite: Horticultural grade, free of any toxic materials.
- D. Organic Matter: Commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

SPEC WRITER NOTE: First paragraph below is for non-native ornamental planting; second paragraph is for native plantings. Retain one or both as appropriate.

2.8 PLANTING SOIL MIXTURE

- A. // Ornamental Plantings: Planting soil mixture composed of 3 parts topsoil and 1 part // peat moss // // compost // //.
- B. // Native Plantings: 100 percent native on-site soil free of clds and subsoil // Do not amend soils intended for native planting.

SPEC WRITER NOTE: Select applicable portions.

2.9 PLANT FERTILIZERS

- A. Provide commercial grade plant fertilizer of uniform composition and complying with applicable state and federal regulations.
- B. For new plant material, provide uniform free-flowing granular complete analysis fertilizer based on recommendations of soils reports, containing minimum 10 percent nitrogen, phosphoric acid and potash by weight with minimum 50 percent of nitrogen from controlled release source such as sulfur coated urea (SCU), polymer coated urea (PCU), and sulfur-coated/polymer coated urea (PCSCU).
- C. For existing trees, provide a uniform free-flowing granular fertilizer bearing manufacturer's warranted statement of analysis. Granular fertilizer to contain minimum 10 percent nitrogen by weight (50 percent

from controlled release source such as sulfur coated urea), 10 percent available phosphoric acid, and 10 percent potash.

2.10 TURFGRASS FERTILIZER

- A. Provide commercial grade granular fertilizer, free flowing, uniform in composition, and complying with applicable state and federal regulations. Submit fertilizer manufacturer's warranted statement of analysis. Fertilizer contain minimum 20 percent nitrogen by weight (50 percent from controlled release source such as sulfur coated urea), 5 percent available phosphoric acid, and 15 percent potash. Liquid starter fertilizer for hydro mulch slurry, commercial type with 50 percent of nitrogen from controlled release source.

2.11 MEMBRANES

- A. Polyethylene: Comply with ASTM D2103, 0.1 mm (4 mils) thick, and clear in color.
- B. Fiberglass Mat: Lime borosilicate glass fibers with 0.3 mm (0.01 inch) average fiber diameter and 50 to 100 mm (2 to 4 inch) strands of fiber bonded with phenol formaldehyde resin. Provide 100 percent textile glass fiber mat. Mat to be roll type, water permeable, and minimum 6 mm (1/4 inch) and maximum 13 mm (1/2 inch) thick with 12 kg/cu. m (3/4 lb. per cu. ft.) minimum density.
- C. Landscape Fabric: // Spun bonded polyester fabric weighing 18 g/sq. m (3/4 oz./sq. yd.) with 9,000 liter per minute flow rate per sq. m (225 gal. per minute flow rate per sq. ft.) // Woven needle-punched polypropylene weighing 113 g/sq. m (4.8 oz./sq. yd.) with 950 liter per minute flow rate per sq. m (90 gal. per minute flow rate per sq. ft.) //.

2.12 MULCH

- A. Mulch: Free of deleterious materials and stored to prevent inclusion of foreign material.
- B. Mineral Mulch: Riverbank stone, granite chips, marble chips, volcanic rock or similar and ranging from 25 mm (1 inch) to 65 mm (2-1/2 inches) according to ASTM C 136.
- C. Organic Mulch: Wood based products such as chips, nuggets or shredded hardwood:
1. Straw for turfgrass seedbed mulch: Stalks from oats, wheat, rye, barley, or rice free of noxious weeds, mold or other objectionable

material. Straw to be air-dried and suitable for placing with blower equipment.

2. Wood cellulose fiber mulch for hydraulic application (Hydro mulch) with fertilizer: Specially prepared wood cellulose fiber, processed with no growth or germination-inhibiting factors, and dyed an appropriate color to facilitate visual metering of application of materials. Do not apply any turfgrass seed in this type mixture. Maximum 12 percent moisture dry weight, plus or minus three percent at time of manufacture. pH range from 3.5 to 5.0. Manufacture wood cellulose fiber for application as follows:
 - a. After addition and agitation in slurry tanks with fertilizers, water, and other approved additives, fibers will become uniformly suspended to form a homogenous slurry.
 - b. When hydraulically sprayed, material will form blotter-like cover.
 - c. Cover allows absorption of moisture and allow rainfall or applied water to percolate to underlying soil.

D. Non-Asphaltic Tackifier:

1. M-Binder: 100 percent organic, non-toxic, biodegradable, free of plant-growth or germination inhibitors; a botanical glue used in hydroseeding, to stabilize soils and for dust control. Derived from the seed of the plantago plant (*Plantago insularis*). Protein content: 1.62; Ash content: 2.70; Fiber: 4.00; ph: 6.8; Settleable solids: 5.00.

SPEC WRITER NOTE: Select Paragraph A or B below. Coordinate with requirements of conservation district for erosion control materials.

2.13 EROSION CONTROL

- A. Erosion Control Net: // Heavy, twisted jute mesh weighing _____kg/sq. m (_____ lbs./sq. yd.) with openings between strands approximately _____ mm square (_____ inches square) // Plastic net with 13 mm square (1/2 inch square) mesh // Knitted synthetic netting, interwoven with paper strips in rolls approximately 1500 mm (56 to 60 inches) wide with openings between strands approximately 13 mm square (1/2 inch square) //. Secure material with 150 mm (6 inch) wire staples by same manufacturer as netting. // Standard weave burlap weighing 100 to 142 g/m (3.5 to 5.0 oz./yd.). // Chicken wire with a

mesh of _____ // Install erosion control net according to manufacturer's instructions.

- B. Erosion Control Blanket: Cellulose fiber blanket bonded to 6 mm (1/4 inch) square plastic net weighing 10 kg/100 sq. m (20 lbs./1000 sq. ft.) in 1250 mm (50 inch) wide rolls.

2.14 STAKES AND GUYING STRAPS

- A. Tree Support Stakes: Rough sawn wood, free of knots, rot, cross grain, or other defects that impair strength. Minimum // 50 mm (2 inches) square // 65 mm (2-1/2 inches) diameter // by 2400 mm (8 feet) long and pointed at one end or galvanized steel pipe 32 mm (1-1/4 inches) by 3000 mm (10 feet) with cap, primed with 2 coats flat black exterior enamel.
- B. Hose Chafing Guards: New or used 2-ply reinforced rubber or plastic hose, all same color.
- C. Flags: White surveyor's plastic tape, 150 mm (6 inches) long, fastened to guying wires or cables.
- D. Guying Straps: Fabric designed specifically to guy newly planted trees. Wire will not be permitted.
- E. Turnbuckles: Galvanized or cadmium-plated steel with minimum 75 mm (3 inch) long openings fitted with screw eyes.
- F. Eye Bolts: Galvanized or cadmium plated steel with 50 mm (1 inch) diameter eye and minimum 40 mm (1-1/2 inches) screw length.
- G. Deadmen: 100 mm by 200 mm (4 inch by 8 inch) rectangular, or 200 mm (8 inch) diameter by 900 mm (36 inch) long sound wood.
- H. Anchors: Arrow shaped or auger iron anchors, noncorrosive, sized according to manufacturer's instructions.

SPEC WRITER NOTE: Edging material such as metal edgers, headerboards, and concrete mowbands are not encouraged on National Cemeteries. There are circumstances where such materials are appropriate and must be approved during the design process by the District Agronomist.

2.15 EDGING

- A. Machine Cut Divot Edge: 'V'-shaped trench used as separation between lawn and mulched planting beds. Fill machine cut divot edge with planting bed mulch as detailed in the drawings.

2.16 WATER

- A. Water: Contains no elements toxic to plant life, obtained from // _____ // as specified in Section 01 00 01, GENERAL REQUIREMENTS, Paragraph, Temporary Services.

2.17 ANTIDESICCANT

- A. Antidesiccant: Emulsion manufactured for agricultural use to provide protective film over plant surfaces permeable enough to permit transpiration.

2.18 SEED

- A. Seed: State-certified seed of latest season's crop delivered in original sealed packages, bearing producer's warranted analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Label complying with USDA Federal Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will not be acceptable. Onsite seed mixing will only be acceptable in presence of COR. Apply turfgrass seed separate from and before mulch material application.
- B. Minimum Acceptable Seed Quality Standards: Purity 95 percent, Germination 85 percent, Weed Seed Content less than 0.5 percent, Noxious Weeds 0.0 percent, Inert Material less than 3 percent, Germination Test Date no older than 6 months.
- C. All turfgrass seed mixtures, or sod composition to conform to species and cultivar requirements // shown on plans // detailed here //. Seed mixtures listed below are representative of an almost endless list of acceptable seed mixtures that roughly approximate these guidelines.

SPEC WRITER NOTE:

1. Choose appropriate species type for project's climate and location, cool or warm season turfgrass.
2. Zoysiagrass is not generally an acceptable species for NCA cemetery use due to its extremely slow rate of growth and high maintenance costs. When unique environmental and growing conditions exist at a NCA construction site, suggest that Zoysiagrass should be considered as the turfgrass species, a special waiver endorsed by NCA Chief Agronomist and appropriate District Agronomist must be obtained in writing before approval of the planting plan.
3. Modify seed mixture below to match cemetery's existing turf where applicable.

Cool Season Turfgrass Seed Mixtures	Percent by Weight
Primary Mixture	50 percent perennial rye grass, 30 percent Ky bluegrass, 20 percent fine fescue
Seeding Rate	2.7 kg/90 sq. m (6 lbs./1000 sq. ft.)
Secondary Mixture	50 percent tall fescue and 50 percent perennial rye grass
Seeding Rate	4.5 kg/90 sq. m (10 lbs./1000 sq. ft.)

1. Blend each species component with minimum two regionally adapted cultivars.

Warm Season Turfgrass Seed Mixtures	Percent by Weight
Preferred Mixture, Sunny Locations	Hybrid bermudagrass cultivars available as seed. Use blend that contains minimum two of the following cultivars in approximately equal proportions - Sunsport, Princess, Riviera, Southern Star, Blackjack, Savannah, Primo Blend.

Warm Season Turfgrass Seed Mixtures	Percent by Weight
Seeding Rate	0.9 kg/90 sq. m (2 lbs./1000 sq. ft.)
Preferred Species, Shady Locations	St. Augustinegrass - sod only
Secondary Species, Low Visibility Areas	centipedegrass or bahiagrass
Seeding Rate	3.6 kg/90 sq. m (8 lbs./1000 sq. ft.)

D. Obtain approval of COR and NCA // Chief // District // Agronomist for deviations from these turfgrass species requirements.

2.19 SOD

A. Sod: Nursery grown, certified sod as classified in TPI "Guideline Specifications to Turfgrass Sodding." Sod must also conform to turfgrass species limitations as outlined in seeding mixtures above.

2.20 HERBICIDES AND OTHER PESTICIDES

A. Properly label and register pesticides with U.S. Environmental Protection Agency. Keep all pesticides in original labeled containers indicating analysis and method of use.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Examine areas to receive planting for compliance with requirements and other conditions affecting performance.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

SPEC WRITER NOTE: Review requirement to stake and guy trees. In most cases, this is not needed.

E. // Stake plant material locations and bed outlines for COR's approval before any plant pits or beds are dug. COR may make adjustments to plant material locations to meet field conditions //.

- F. Identify and review all underground utility locations before commencing work and exercise caution when working close to utilities. Notify COR of apparent conflicts with construction and utilities to plan adjustment before installation.

3.2 FINE GRADING AND ORGANIC AND INORGANIC SOIL AMENDMENT INCORPORATION

- A. Obtain COR's written approval of previously completed rough grading work before incorporating organic soil amendments.
- B. Immediately before dumping and spreading approved organic soil amendment, clean subgrade of stones larger than 50 mm (2 inches) and debris or rubbish and remove from project site. Before spreading organic soil amendment, rip subgrades too compact to drain water or based upon compaction tests with claw 305 mm (12 inches) deep, pulled by bulldozer 610 mm (24 inches') on center, both directions, then regrade surface.
- C. Place and uniformly spread soil amendment materials // humates // and mycorrhizae // over approved sub-grades. Apply inorganic soil amendments as recommended by soils report. Apply organic amendments to depth sufficiently greater than specified depth so after natural settlement and light rolling, specified minimum settled depth conform to lines, grades and elevations indicated on drawings. Incorporate soil amendment by disc harrowing, rototilling or other means in uniform manner. Incorporate upon organic matter deep enough to produce finished soil with organic matter content of between 4 and 6 percent. Provide additional organic soil amendment material, after in-place testing and approval, as required for organic matter content and finished grades at no additional cost to Government.
- D. Spread organic soil amendment material minimum 100 mm (4 inches) deep to finished grade at disturbed areas outside project limits.
- E. Do not handle subsoil or organic soil amendment material when wet or frozen.
- F. Set sufficient number of grade stakes to check finished grades. Set stakes in bottom of swales and at top of slopes. Connect contours and spot elevations with even slope.
- G. After incorporating soil amendments material into subsoil, prepare by scarifying or harrowing and hand raking. Remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove stones over 38 mm (1-1/2 inch) diameter from amended soil bed. Amended

soil also to be free of smaller stones in excessive quantities as determined by COR.

3.3 EXCAVATION FOR PLANTING

- A. Compact whole surface with roller or by other suitable means to achieve 88 to 85 percent maximum dry density according to ASTM D698. During compaction process, fill all depressions caused by settling or rolling with additional organic soil amendment. Regrade and roll surface until presenting smooth and even finish corresponding to required grades. Acceptable finished soil grade condition for all new turfgrass areas is "fine textured and firm." Satisfactory firmness test requires surface soil not be fluffy or powdery and able to support weight of average adult person without creating visible depression.
- B. Verify location of underground utilities before plant pit or bed excavation. Repair damaged utility lines. Where lawns have been established before planting, cover and protect before beginning excavations. Protect existing trees, shrubbery, and beds with barricades during project construction.
- C. Remove rocks and other underground obstructions to depth necessary to permit proper planting according to Drawings. Where underground utilities, construction, or solid rock ledges are encountered, COR may select other locations for plant material.
- D. Dig plant pits by approved method to provide vertical sides and flat bottoms. When sides of pit become glazed, scarify glazed surface.
- E. Where ground cover and planting beds occur in existing turfgrass areas, remove turfgrass to depth that will ensure removal of entire root system. Prepare bed as follows:
 1. Where existing soil is to be used in place, till beds // 150mm (6 inches) // 200mm (8 inches) // 300mm (12 inches) // _____ // deep. Spread soil amendment uniformly over bed // 50 mm (2 inches) // _____ // deep and thoroughly incorporate into existing soil // 150mm (6 inches) // 200mm (8 inches) // 300mm (12 inches) // _____ // deep using a roto-tiller or similar equipment to obtain uniform and well pulverized soil mix. Where existing soil is compacted (former roadways, parking lots, etc.) till soil to necessary depth to support growth of new planting. Remove all sticks, stones, roots, and other objectionable materials. Bring plant beds to smooth and even surface to comply with established grades.

- F. In newly grading areas where existing soil will be removed and replaced to prepare new planting beds, remove // 150mm (6 inches) // 200mm (8 inches) // 300mm (12 inches) // _____ // of existing soil and replace with topsoil. Bring plant beds to smooth and even surface to comply with established grades. Till // 50 mm (2 inches) // _____ // of soil amendment into topsoil as specified.
- G. Form earth saucers around plants with topsoil. Provide 50 mm (2 inch) high basins for shrubs and 100 mm (4 inch) high basins for trees.
- H. Treat plant saucers, shrub, and ground cover bed areas, before mulching, with approved preemergence granular ornamental herbicide. Apply herbicide at 90 kg/hectare (200 lbs./acre) before both early spring and early fall weed seed germination. Plant ground cover in areas to receive erosion control material through that material after material is in place.

SPEC WRITER NOTES: Adjust ball heights to suit local soil conditions.

3.4 SETTING PLANTS

- A. Move balled and burlapped and container-grown plants only by supporting ball or container. Remove container, taking care to prevent damage to plants or root system. Set plants plumb and hold in position until sufficient soil has been firmly placed around roots or ball. Set plants with root crown 25 mm (1 inch) above surrounding grade. Plant ground cover plants after mulch is in place. Avoid contaminating mulch with planting soil.
- B. Backfill balled and burlapped and container-grown plants with native soil removed from planting hole to approximately half ball depth, then tamp and water. Use native soil to backfill hole. Carefully fold back top half of burlap and remove tying materials. Completely remove all wire caging or similar material. Where plastic wrap or treated burlap is used in lieu of burlap, completely remove these materials before backfilling. Tamp and water remainder of backfill, then form earth saucers or water basins around isolated plants with topsoil.
- C. Plant bare-rootstock arranging roots in natural position. Form hill or mound in center of planting hole to allow plant to sit at proper depth. Spread roots out, over, and down mound in natural position. Mound to be firm to avoid settlement of entire plant. Remove damaged roots with clean cut. Carefully work native soil in among roots. Tamp and water

remainder of native soil, then form earth saucers or water basins around isolated plants with topsoil.

SPEC WRITER NOTE: Review requirement to stake and guy trees. In most cases, this is not needed.

3.5 // STAKING AND GUYING //

- A. Stake and guy plants as indicated on drawings and as specified.
- B. Drive stakes vertically to depth of 800 to 900 mm (2-1/2 to 3 feet) into ground outside plant pit, unless otherwise shown on drawings Do not injure root ball.
- C. Place deadmen minimum 450 mm (18 inches) below ground surface, unless otherwise indicated on drawings.
- D. Install iron anchors according to manufacturer's instructions.
- E. Fasten flags securely to each guy strap approximately 2/3 of the distance above ground level.
- F. // Remove stakes and guy straps after one year //.

3.6 EDGING PLANT BEDS

- A. Uniformly edge beds using machine to provide clear cut "V"-shaped trench between planted area and adjacent turfgrass. Fill trench with mulch.

SPEC WRITER NOTES: Use caution when considering polyethylene sheets, etc. These materials can cause soil and/or insect problems.

3.7 MULCHING PLANTS

- A. Apply approved preemergence granular ornamental herbicide and mulch within 48 hours after planting. Apply before both early spring and early fall weed seed germination.
- B. // Placing Inert Material: Place // polyethylene sheet // fiberglass mat // landscape fabric // with edges lapped 150 to 300 mm (6 to 12 inches) to receive inert mulch material. Punch 6 mm (1/4 inch) grid drainage holes in // polyethylene sheet // fiberglass mat // 300 mm (one foot) on centers over entire area. Spread inert mulch to uniform thickness over membrane as indicated on drawings //.
- C. Placing Organic Material: Spread wood-base mulch to uniform 50 to 75 mm (2 to 3 inch) thickness. Rake smooth. Flush mulch with adjacent lawn,

curbs and paving. Taper mulch thickness 50mm (2 inches) where planting beds meet adjacent areas.

- D. Keep mulch out of shrub crowns, away from tree trunks, and off buildings, sidewalks, light standards, and other structures.

3.8 PRUNING

- A. Do not prune new plants unless otherwise directed by arborist and approved by the COR. Prune indicated existing plant material as follows:
 1. Remove dead, broken and crossing branches.
 2. Make cuts with sharp instruments as close as possible to branch collar. Do not make flush cuts.
 3. Do not make "Headback" cuts at right angles to line of growth. Do not pole trees or remove leader.
 4. Remove trimmings from project site.
 5. Do not apply tree wound dressing to cuts.
- B. Prune existing trees as indicated on Drawings. Perform tree pruning and cavity work by licensed arborist according to ANSI Z133.1. Remove 13 mm (1/2 inch) diameter or larger dead wood, branches interfering with or hindering healthy growth of trees, and diseased branches with clean cut made flush with branch collar. Prune trees according to their natural growth characteristics leaving trees well shaped and balanced. Use of climbing spurs is not acceptable. Remove stubs or limbs improper cuts or breaks.

3.9 FERTILIZATION OF EXISTING TREES

- A. Apply fertilizer to existing trees shown on drawings at rate recommended by soil test. Apply in 300 mm to 450 mm (4 inch to 8 inch) deep holes 40 to 50 mm (1-1/2 to 2 inches) in diameter, made by an earth auger, distributed evenly at maximum 600 mm (2 feet) on center throughout outer half of branch spread zone of each tree. Fertilize to within 100 mm (4 inches) of surrounding grade. Use topsoil to bring surface up to surrounding grade. When using fertilizer in packet, tablet, or wedge form, apply according to manufacturer's instructions.

3.10 TILLAGE FOR LAWN AREAS

- A. Thoroughly rip subgrades minimum 150 mm (6 inches) // _____ // deep by scarifying, disking, harrowing, or other approved methods. Remove debris and stones on surface larger than 25 mm (1 inch) on surface after tillage. Do not till areas of 3: 1 slope ratio or greater.

Scarify these areas to 50 mm (1 inch) // _____ // depth and remove debris and stones.

3.11 FINISH GRADING

- A. After ripping subgrade for topsoil/subsoil bonding, spread topsoil evenly to minimum 150 mm (6 inches) deep. Incorporate topsoil at least 50 to 75 mm (2 to 3 inches) into subsoil to avoid soil layering. Spread additional topsoil as required to meet finish grades. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished lawn areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

3.12 APPLICATION OF FERTILIZER AND SOIL AMENDMENTS FOR TURFGRASS AREAS

- A. Apply turfgrass fertilizer and adjust soil acidity as recommended by soil test results. Add soil conditioners as specified for suitable topsoil in PART 2.

SPEC WRITER NOTE: If there are large areas of turf with slope ratio of 3: 1 or greater where, in the designer's judgment, likelihood of topsoil slippage may occur, revise this section and drawings to indicate those areas where new topsoil will not be installed.

- B. Spread soil amendments as recommended by soil test results.
- C. Incorporate soil amendments into soil to minimum 100 mm (4 inches) deep // depth as recommended by soil test results // in finish grading operation. Lightly mix starter fertilizer with top 13 mm (1/2 inch) of soil. Immediately restore soil an even condition before seeding or sod placement.

3.13 MECHANICAL SEEDING

- A. // Broadcast seed // Drill-seed // with approved equipment rate as outlined in "Seed" article above. Plant turfgrass seed before application of mulch material. Uniformly distribute seed in 2 directions at right angles to each other. Drag seeded area using approved device.
- B. Immediately after dragging, firm entire area with roller maximum 225 kg/m (150 lbs./ft.) of roller width.

- C. Immediately after preparing seeded area, evenly spread straw mulch at 0.5 kg/sq. m (2 tons/acre). Anchor mulch by mulch tiller, non-asphaltic tackifier, twine, or netting.

3.14 HYDRO-MULCHING

- A. Hydro-Mulching: Mix slow release starter fertilizer and approved wood cellulose mulch material, and tackifier in required amount of water to produce homogenous slurry. Uniformly apply slurry under pressure to deliver recommended quantity of fertilizer per 100 sq. m (1000 sq. ft.).

3.15 SODDING

- A. Place sod according to TPI Guideline Specifications for sodding. Lay sod at right angles to slope or the flow of water. On slope areas, start at bottom of slope.
- B. Finishing: After sodding, blend edges of sod smoothly into surrounding area. Roll with lightweight roller to eliminate air spaces between sod and firmed soil.

3.16 WATERING

- A. Watering: Start watering turfgrass areas immediately after installation at sufficient rate to ensure thorough wetting of soil to minimum 50 mm (2 inches) deep. Supervise watering operation to prevent run-off. Supply necessary pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations. Keep soil surface constantly moist, not wet, until turfgrass plants are well established.
- B. Deep water all trees twice each week during Plant Establishment Period, providing water penetration throughout root zone to full depth of planting pits, as verified by COR. Discontinue watering at first hard frost in fall and resume at ground thaw in spring.

SPEC WRITER NOTE: Specify erosion control material and installation as recommended by manufacturer. The following is an example.

3.17 EROSION CONTROL MATERIAL

- A. Install and maintain erosion control material on designated areas as shown on drawings. Prepare, fertilize and vegetate areas to be covered, before erosion material is placed. Immediately following planting operations, lay erosion control material evenly and smoothly and in

contact with soil throughout. Omit straw mulch from all seeded areas receiving erosion control material.

- B. For waterways, unroll erosion control material in direction of water flow. When two or more strips are required to cover ditch area, overlap strips minimum 100 mm (4 inches). For strips to be spliced lengthwise, overlap ends minimum 150 mm (6 inches) with upgrade section on top.
- C. On slopes, place erosion control material either horizontally or vertically to slope with edges and ends of adjacent strips butted tightly against each other.
- D. Staple each erosion control strip in three rows (each edge and center with center row alternately spaced) with staples spaced maximum 1200 mm (4 feet) longitudinally. For two or more strips side by side on slopes, install common row of staples on adjoining strips. Staple all end strips at 300 mm (12 inch) intervals at end. Firmly embed staples in underlying soil.
- E. Provide erosion control maintenance to repair damage by erosion, wind, or any other cause. Maintain, protect, repair, or replace erosion control material until Termination of the Plant and Warranty Period.

3.18 LANDSCAPE PLANT AND TURFGRASS ESTABLISHMENT PERIOD

- A. Landscape Plant and Turfgrass Establishment Period: Begins immediately after installation, with COR's approval, and continues through growing season sufficiently long for turfgrass and landscape plant materials to become establish and provide satisfactory to District Agronomist and NCA. Conditions and appearance are as follows:
 1. Turfgrass has obtained minimum of 98 percent generally weed-free surface cover.
 2. Landscape Plant Materials are fully rooted, actively growing and healthy and planting beds generally weed-free.
 3. Maintain plant and turfgrass during establishment period.
 4. Plants and turfgrass will not be accepted until completion of acceptable establishment period.
 5. During Landscape Plant and Turfgrass Establishment Period complete the following:
 - a. Water plants and turfgrass to maintain moist soil surface until plants and turfgrass are well established. Quantity of applied water required to achieve and maintain these conditions determined on site by District Agronomist in consultation with COR.

- b. Prune plants and replace mulch as required.
- c. Replace and restore // stakes, guy straps, // and // eroded plant saucers as required.
- d. Remove grass, weeds, and other undesired vegetation, including root growth, before they reach 75 mm (3 inches) high in plant bed and saucers. After all unwanted vegetation has been removed, apply approved preemergence herbicides and remulch.
- e. Spray with approved insecticides and fungicides to control pests and ensure plant survival in healthy growing condition, as directed by COR in coordination with District Agronomist.
- f. Provide the following during turfgrass establishment:
 - 1) Eradicate weeds. Water, fertilize, overseed, and perform other operation necessary to promote growth of turfgrass.
 - 2) Mow turfgrasses as often as necessary to maintain NCA specified mowing height for each type of turfgrass before final acceptance. Begin mowing when cool season turfgrass is 100 mm (4 inches) high. For warm season turfgrasses, mow at appropriate heights for species and cultivar as directed by COR in consultation with District Agronomist.
- g. Replace dead, missing or defective plant material during establishment period and an active growing season. Immediately replace each plant with one of same size and species.
- h. Replant areas void of turfgrass during an active growing season only.
- i. Sod will be evaluated for species and health thirty (30) days after laying last piece and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from sod operation will be living sod, uniform in color and leaf texture. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Joints between sod pieces to be tight and free of weeds and other undesirable growth.
- j. Seeding will be evaluated for species and health thirty (30) days after final planting and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from seeding operation will be 98 percent coverage uniform in color and leaf texture. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Reseed unsatisfactory areas within seven days during an active growing season.

- k. Complete remedial measures as directed by COR in consultation with District Agronomist to ensure plant and turfgrass survival.
- l. Repair damage caused while making plant or turfgrass replacements.

3.19 LANDSCAPE PLANT AND TURFGRASS ACCEPTANCE

- A. Landscape plant and turfgrass acceptance will occur after completion of LANDSCAPE PLANT AND TURFGRASS ESTABLISHMENT PERIOD. Contractor to have completed, located, and installed all plants and turfgrass according to drawings and specifications. All plants and turfgrass are expected to be living and in healthy condition at time of inspection and acceptance. Make written request two weeks before final inspection of landscape plants and turfgrass. Upon inspection, when work is found to not meet specifications, PLANT AND TURFGRASS ESTABLISHMENT PERIOD will be extended at no additional cost to Government until work has been satisfactorily completed, inspected and accepted.
- B. Criteria for Acceptance of Landscape Plants:
 - 1. Planter beds and earth mound water basins are properly mulched and free of weeds.
 - 2. // Tree support stakes, guys, and turnbuckles are in good condition //.
 - 3. Total plants on site as required by specifications and required replacements have been installed.
 - 4. Remedial measures directed by COR have been completed.
- C. Criteria for Acceptance of Turfgrass:
 - 1. Sod: Living sod grass plants uniform in color and leaf texture and well rooted into soil below so that gentle pulling of turfgrass leaves by hand does not dislodge sod. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Joints between sod pieces shall be tight and free from weeds and other undesirable growth.
 - 2. Seed: Living turfgrass plants with 98 percent coverage, uniform in color and leaf texture. Bare spots to be maximum 0.05 sq. m (0.5 sq. ft.).

3.20 CLEANING

- A. Remove and legally dispose of all debris, rubbish, and excess material from project site.
- B. Where existing or new turfgrass areas have been damaged or scarred, restore disturbed areas to original condition.

- C. In areas where planting and turfgrass work have been completed, clear the area of all debris, spoil piles, and containers.
- D. Maintain minimum one paved pedestrian access route and one paved vehicular access route to each building clean at all times.
- E. Clear other paved areas when work in adjacent areas are completed.

3.21 PROTECTION

- A. Protect plants and turfgrass areas from traffic and construction operations. Erect barricades, as required, and place approved signs at appropriate intervals until final acceptance.
- B. Remove protective materials immediately before acceptance.
- C. Repair damage.

SPEC WRITER NOTE: Delete following
paragraph if not applicable.

3.22 ENVIRONMENTAL PROTECTION

- A. All work and operations to comply with requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

- - - E N D - - -