

## SECTION 32 90 00

### PLANTING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. The Work of this Section consists of furnishing and installing all planting materials required for landscaping at all NCA construction projects hereinafter specified in locations as shown. The landscape Contractor shall be required to visit the site prior to submitting Bid Proposal to become familiar with all conditions affecting the proposed Work. The Contractor shall identify and review all underground utility locations prior to commencing Work and shall exercise caution when Working close to utilities and shall notify the COR of apparent conflicts with construction and utilities so that adjustment can be planned prior to installation.
- B. Agronomic consultation on the appropriateness of all plant materials proposed for installation during this project must be obtained from the MSN Agronomist and/or NCA Chief Agronomist via coordination through the COR prior to Project initiation and actual plant installation. In general, all plant material must be regionally adapted to the climate of the site, be of appropriate mature dimensions to fit the planting location and be low maintenance species. This requirement will generally exclude or severely limit the use of rose plants, wild flowers and ground covers.
- C. Any exceptions to these species exclusions must be approved by the MSN Agronomist and/or NCA Chief Agronomist via coordination through the COR prior to Project initiation.

##### 1.2 EQUIPMENT

- A. Maintain all equipment, tools and machinery while on the project in sufficient quantities and capacity for proper execution of the Work.

##### 1.3 RELATED WORK

- A. Topsoil Testing: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- C. Stripping Topsoil and Stock Piling: Section 31 20 00, EARTH MOVING.
- D. Section 32 84 00, PLANTING IRRIGATION.

##### 1.4 SUBMITTALS

- A. Submit the accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

- B. Samples: Submit the following samples for approval before Work is started:
1. Inert Mulch: 1 quart volume of each inert mulch required, in sealed plastic bags labeled with product description, product name, and source(s) of rock. Each sample shall be typical of the lot of material to be delivered and installed on the site; and provide an accurate indication of rock sizes, color and texture.
  2. Organic Mulch: 5 pounds of each type to be used.
  3. Weed Control Fabric: 12 by 12 inches.
  4. All pesticides required such as pre-emergence or post emergence herbicides, insecticides, or fungicides: EPA approved labeling and SDS sheet for each such product selected for use.
- C. Certificates of Conformance or Compliance: Before delivery, notarized certificates attesting that the following materials meet the requirements specified shall be submitted to the COR for approval:
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.
  3. Elemental Sulfur.
  4. Peat.
  5. Seed.
  6. Weed Control Barriers.
  7. Gypsum.
- D. Manufacturer's Literature and Data:
1. Gypsum.
  2. Antidesiccant.
  3. Pre-emergent herbicide.
  4. Mycorrhizae Inoculum.
  5. Weed Control Barriers.
  6. Post-emergent Herbicide.
  7. Tree Stakes.
  8. Fertilizers.
  9. Amendments .
- E. Licenses: Licenses of Arborist shall be submitted to the COR.
- F. Soil laboratory testing results and any soil amendment recommendations from the Contractor's Arborist of Landscaping Subcontractor. Submit soil test results for each variable soil type and condition that exists on the construction site.
1. Organic Soil Amendment and Imported Topsoil: The Contractor shall provide a 5 pound representative sample from each proposed source for testing, analysis, and approval. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the COR. Testing reports shall include the following tests and recommendations:
    - a. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) shall be performed by public extension service agency or a certified private testing laboratory in accordance with the current

- standards of the Association of Official Agricultural Chemists. A hydrometer shall be used to determine percent of clay and silt.
  - b. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230°F, plus or minus 40°F.
  - c. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and acidity (pH).
  - d. Tests, as specified, for gradation, organics, soil chemistry and pH shall be performed by a testing laboratory retained by the Department of Veterans Affairs as described in Section 01 45 29, TESTING LABORATORY SERVICES.
  - e. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for fertilizing and liming applications to support successful turfgrass growth.
  - f. All tests shall be performed in accordance with the current standards of the Association of Official Agricultural Chemists.
- 2. Amended soil (in place): Following the incorporation of amendments and additives, the Contractor shall provide a minimum of six (6) samples per forty thousand (40,000) square feet, six inch (6") depth by three inch (3") diameter core samples of amended soil taken from the site for testing, analysis, and approval. The location of each sample shall be as directed by the COR from areas designated to receive turfgrass or be established to turfgrass on the Contract Drawings. No seeding operations shall occur until acceptance of the amended soil samples has been obtained. Contractor shall deliver samples to testing laboratories and shall have the testing report sent directly to the COR. Tests shall be as directed in paragraph 1.4 E.1.d. of this Section.
  - 3. Seed: Submit a manufacturer's Certificate of Compliance to the Specifications with each shipment of each type of seed. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.
  - 4. Fertilizer: Submit four (4) certificates of analysis for each type of fertilizer.
  - 5. Hydro Mulching: Prior to the start of hydro mulching, submit a certified statement for approval as to the number of pounds of materials to be used per gallon of water.

## 1.5 DELIVERY AND STORAGE

- A. Delivery:
  - 1. Notify the COR of the delivery schedule in advance so the plant material may be inspected upon arrival at the job site. Remove unacceptable plant material from the job site immediately.
  - 2. Protect plants during delivery to prevent damage to root balls or desiccation of leaves. Protect trees during transport by tying in the branches and covering all exposed branches.
  - 3. The use of equipment such as "tree spades" is permitted provided the plant balls are sized in accordance with ANSI Z60.1 and tops are protected from damage.

4. Deliver fertilizer and lime to the site in the original, unopened containers bearing the manufacturer's warranted chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer and lime may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.
  5. During delivery: Protect sod from drying out and seed from contamination.
- B. Storage:
1. Keep seed, elemental sulfur, and fertilizer in dry storage away from contaminants.
  2. Store plants not installed on the day of arrival at the site as follows:
    - a. Shade and protect plants from the wind when stored outside.
    - b. Heel in bare root plants.
    - c. Protect plants stored on the project from drying out at all times by covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material.
    - d. Keep plants, including those in containers, in a moist condition until planted, by watering with fine mist spray.

#### 1.6 PLANTING AND TURFGRASS INSTALLATION CONDITIONS

- A. Perform actual planting only when weather and soil conditions are suitable in accordance with locally accepted practices.
- B. Install trees before lawn areas are installed and only after irrigation system is operable
- C. Perform turfgrass installation operations within the following dates, but not before irrigation system installed, tested, and approved.
  1. Spring Seeding: March 1st to May 1st.
  2. Fall Seeding: September 1st to November 10th.
- D. No Work shall be done when the ground is too wet or in an otherwise unsuitable condition for planting. Special conditions may exist that warrants a variance in the specified planting conditions. Submit a written request to the COR stating the special conditions and proposal variance for approval.

#### 1.7 LANDSCAPE PLANT ESTABLISHMENT PERIOD

- A. The Establishment Period for landscape plants shall begin immediately after installation, with the approval of the COR and continue for a period of time during the growing season sufficiently long (optimally a minimum of 3 months) for the turfgrass and landscape plant materials to achieve an establishment condition and appearance satisfactory to the MSN Agronomist and NCA. These conditions and appearance are described as follows: Landscape Plant Materials shall be fully rooted, actively growing and healthy and planting beds generally weed-free. The Contractor shall be responsible for the health and maintenance of plants during the establishment period. Plants will not be accepted until after completion of an acceptable establishment period. During the Landscape Plant Establishment Period the Contractor shall:

1. Water all plants to maintain a moist soil surface at all times until the plants are well established. An adequate supply of moisture must also be maintained within the root zone. Apply water at a moderate rate so as not to displace the mulch, create any water ponding or runoff from the soil supporting the plants. The actual quantity of applied water required to achieve and maintain these conditions is best determined on site by the MSN Agronomist in consultation with the COR.
2. Prune plants and replace mulch as required.
3. Replace and restore stakes, guy straps, and eroded plant saucers as required.
4. In plant beds and saucers, remove grass, weeds, and other undesired vegetation, including the root growth, before they reach a height of 3 inches. After all unwanted vegetation has been removed and proper mulch quantities have been placed/restored, treat all mulched areas with pre-emergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to both early spring and early fall weed seed germination.
5. Spray with approved insecticides and fungicides to control pests and ensure plant survival in a healthy growing condition, as directed by the COR in coordination with the MSN Agronomist.
6. Replace dead, missing or defective plant material during the establishment period and an active growing season. Immediately replace each plant with one of the same size and species.
7. Complete remedial measures directed by the COR in consultation with the MSN Agronomist to ensure plant survival.
8. Repair damage caused while making plant replacements.

#### 1.8 LANDSCAPE PLANT ACCEPTANCE.

- A. Landscape plant acceptance will occur after completion of the Landscape Plant Establishment Period. The Contractor shall have completed, located, and installed all plants and turfgrass according to the plans and Specifications. All plants are expected to be living and in a healthy condition at the time of inspection and acceptance. The Contractor shall make a written request two weeks prior to final inspection of the landscape plants. Upon inspection when Work is found to not meet the Specifications, the Landscape Plant Establishment Period shall be extended at no additional cost to the 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 number of replacements have been installed.
  4. Remedial measures directed by the Contracting Officer to ensure plant material survival and promote healthy growth have been completed.

## 1.9 PLANT WARRANTY

- A. All Work shall be in accordance with the terms of the Article WARRANTY of GENERAL CONDITIONS of the Contract, including the following supplements:
1. A One Year Plant Warranty will begin on the date that the Government accepts the plants but not before the end of the Landscape Plant Establishment Period.
  2. The Contractor will replace any dead plant material immediately during the warranty period and during an active growing season. A one year warranty for the plants that are replaced will begin on the day the replacement Work is completed and accepted.
  3. Replacement of relocated plants, that the Contractor did not supply, is not required unless they die from improper handling and care during transplanting. Loss through Contractor improper handling, care, or negligence requires replacement in kind and size.
  4. The Government will re-inspect all replacement plants at the end of the One Year Warranty. The Contractor will replace any dead, missing, or defective plant material immediately and during an active growing season. The Warranty will end on the date of this inspection provided the Contractor has complied with the Work required by this specification.
  5. The Contractor shall remove stakes, guy straps and any required tree wrappings from plants having been installed for one year, unless otherwise directed by the COR in consultation with the MSN Agronomist.

## 1.10 APPLICABLE PUBLICATIONS

- A. NCA Handbook 3420 – Turfgrass Maintenance in VA National Cemeteries re-certified 2011. The Agronomic and Horticultural practices specified in this handbook shall serve as the Contractor's official reference guide to all establishment and preliminary maintenance practices employed during this construction project.
- B. The publications listed below, form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- C. American National Standards Institute (ANSI) Publications:  
ANSI Z60.1 .....Nursery Stock  
ANSI Z133.1 .....Tree Care Operations Pruning, Trimming, Repairing,  
Maintaining, and Removing Trees and Cutting Brush  
Safety Requirements
- D. Hortus Third, most current edition. A Concise Dictionary of Plants Cultivated in the U.S. and Canada.
- E. American Society for Testing and Materials (ASTM) Publications:  
C33 .....Standard Specification for Concrete Aggregates  
C136 .....Sieve Analysis of Fine and Coarse Aggregates  
C516 .....Vermiculite Loose Fill Thermal Insulation  
C549 .....Perlite Loose Fill Insulation  
D1557 .....Test Methods for Laboratory Compaction of Soil  
D2103 .....Polyethylene Film and Sheeting

F. U. S. Department of Agriculture Federal Seed Act. Rules and Regulations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All plant and turfgrass material will conform to the varieties specified or shown in the plant list and be true to botanical name as listed in Hortus Third.

2.2 ORGANIC SOIL AMENDMENT

- A. All areas to receive turfgrass seeding may require an organic soil amendment to increase organic content and water retention as well as enhance turfgrass growth. If native topsoil has an organic matter content below 4% it should be amended in-place after grading activities are completed to effectively create a satisfactory topsoil horizon.
- B. Organic soil amendment will be spread and incorporated into the finished subgrade at the depths indicated on the Contract Drawings in order to raise the organic content of the soil to a minimum of four percent (4%) and a maximum of six percent (6%). Contractor will allow for additional depth of the organic soil amendment to bring all grades to the required finished grades as per the grading plans.
1. Organic Soil Amendment shall be dark brown or black in color and capable of enhancing plant growth. Ninety-eight percent (98%) of the material should pass a 1 inch screen. There shall be no admixture of refuse (i.e. noticeable inert contamination) or other materials toxic to plant growth.
  2. Acceptable types of Organic Soil Amendments include peat moss, humus or peat, well rotted manure, various mature composts, and commercially available combinations thereof. Acceptable compost may be derived from natural organic sources such as food or animal residuals, yard trimmings, or biosolids. Organic Soil Amendment shall be free of all woody fibers, seeds, and leaf structures, plastic and other petroleum products, and free of toxic and non-organic matter. Unacceptable sole sources of organic matter include untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.
  3. Organic Soil Amendment shall conform to the following minimum material requirements:

Test Parameter	Acceptable Ranges
Organic Matter	27% to 80%
pH	5.5-8.5
Ash	20-65%
Nitrogen	0.4%-3.5%
Phosphorus	0.2%-1.5%
Potassium	0.4%-1.5%
C:N Ratio	25-30:1
CEC	50-150 meq/100 g

Heavy Metals	Less than max. limits established by EPA 503
Inert Contents	< 1% by weight
Water-Holding Capacity	150-200%
Pathogen/Weed Seed Destruction	Proof of EPA minimum Heating requirements

4. Organic content to be determined by the loss of ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230°F, plus or minus 40°F.
5. Any topsoil stripped and stockpiled on the site may be used provided that, after testing and addition of necessary additives, it meets the above specification. The Contractor shall provide additional Organic Soil Amendment as required to complete the required Work.
6. All Organic Soil Amendment proposed for use shall be tested for conformance to the Specifications and results provided to the COR and Pacific District Agronomist.

## 2.3 PLANTS

- A. Plants shall be in accordance with ANSI Z60.1, except as otherwise stated in the Specifications or shown on the plans. Where the Drawings or Specifications are in conflict with ANSI Z60.1, the Drawings and Specification shall prevail.
- B. Provide well branched and formed planting stock, sound, vigorous, and free from disease, sunscald, windburn, abrasion, harmful insects or insect eggs with healthy, normal, and unbroken root systems. Provide trees, deciduous and evergreen, that are single trunked with a single leader, unless otherwise indicated, display no weak crotches. Provide symmetrically developed deciduous trees and shrubs of uniform habit of growth, with straight boles or stems and free from objectionable disfigurements, and evergreen trees and shrubs with well-developed symmetrical tops with typical spread of branches for each particular species or variety. Provide ground cover and vine plants with the number and length of runners for the size specified, and the proper age for the grade of plants specified. Provide vines and ground cover plants well established in removable containers, integral containers, or formed homogeneous soil sections. Plants shall have been grown under climatic conditions similar to those in the locality of the project.
- C. The minimum acceptable sizes of all plants, measured before pruning with branches in normal position, shall conform to the measurements designated. Plants larger in size than specified may be used with the approval of the COR, with no change in the Contract price. When larger plants are used, increase the ball of earth or spread of roots in accordance with ANSI Z60.1.
- D. Provide nursery grown, Grade 1, plant material conforming to the requirements and recommendations of ANSI Z60.1. Dig and prepare plants for shipment in a manner that will not cause damage to branches, shape, and future development after planting. Never pick-up or move tree species by grasping the trunk. Trees must be moved by lifting the root ball, box or container.



- E. Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers, but shall not be root bound.
- F. Make substitutions only when a plant (or its alternates as specified) is not obtainable and the COR in consultation with the Pacific District Agronomist authorizes a change order providing for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of the Contract price.
- G. When existing plants are to be relocated, ball sizes shall conform to requirements for collected plants in ANSI Z60.1, and plants shall be dug, handled, and replanted in accordance with applicable sections of these Specifications.

## 2.4 LABELS

- A. Each plant, or group and bundles or containers of the same species, variety, and size of plant, shall be legibly tagged with a durable, waterproof and weather-resistant label indicating the correct plant name and size specified in the plant list. Labels shall be securely attached and not be removed.

## 2.5 TOPSOIL

- A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 1/2" (one half inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 6.0 nor more than 7.0, and should be best suited to the region, climate and plant material specific to the project.
- B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet the general requirements as stated above. Amend topsoil not meeting the pH range specified by the addition of pH Adjusters.
- C. If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the COR of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting the pH range specified by the addition of pH adjusters.

## 2.6 ELEMENTAL SULFUR

- A. Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

## 2.7 GYPSUM

- A. Coarsely ground gypsum from recycled scrap gypsum board comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing through 16 mesh screen.

## 2.8 SOIL CONDITIONERS

- A. Peat shall be a natural product of sphagnum moss peat, peat moss, peat humus derived from a fresh-water site conforming to Fed. Spec. Q P 166, except as otherwise specified. Peat shall be shredded and granulated to pass through a 1/2inch mesh screen and conditioned in storage piles for at least six months after excavation.
- B. Coarse Sand: Coarse concrete sand, ASTM C33 Fine Aggregate, shall be clean, sharp, and free of limestone, shale and slate particles and of toxic materials.
- C. Perlite shall conform to ASTM C549.
- D. Vermiculite shall be horticultural grade and free of any toxic materials and conform to ASTM C516.
- E. Pine Bark shall be horticultural-grade milled pine bark, with 80 percent of the material by volume sized between .004inch and .59inch.
  - 1. Pine bark shall be aged sufficiently to break down all woody material. Pine bark shall be screened
  - 2. pH shall range between 4.0 and 7.0.
  - 3. Submit manufacturer's literature for approval.
- F. Organic Matter shall be commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

## 2.9 PLANTING SOIL MIXTURE

- A. The planting soil mixture shall be composed of 3 parts amended topsoil, and 1 part peat moss.

## 2.10 PLANT FERTILIZERS

- A. Provide plant fertilizer that is commercial grade and uniform in composition and conforms to applicable state and federal regulations.
- B. For new plant material, provide a uniform free-flowing granular complete analysis fertilizer containing a minimum of 10% by weight of nitrogen, phosphoric acid and potash with a minimum of 50% of the nitrogen from a controlled release source such as sulfur coated urea.

- C. For existing trees, provide a uniform free-flowing granular fertilizer bearing the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 10% nitrogen (of which 50 percent shall be from a controlled release source such as sulfur coated urea), 10% available phosphoric acid, and 10% potash.

## 2.11 TURFGRASS FERTILIZER

- A. Provide turfgrass fertilizer that is commercial grade, free flowing, uniform in composition, and conforms to applicable state and federal regulations. Granular fertilizer shall bear the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 20% nitrogen (of which 50 percent shall be from a controlled release source such as sulfur coated urea), 5% available phosphoric acid, and 15% potash. Liquid starter fertilizer for use in the hydro mulch slurry will be commercial type with 50 percent of the nitrogen from a controlled release source.

## 2.12 WEED CONTROL BARRIERS

- A. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yard, and a 90 gal. per minute flow rate per sq. ft. flow rate, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis and acids.

## 2.13 MULCH

- A. Mulch shall be free from deleterious materials and shall be stored as to prevent inclusion of foreign material.
- B. Inert Mulch:
  - 1. Gravel Mulch:  $\frac{3}{4}$  inch maximum,  $\frac{1}{4}$  inch minimum; crushed rock from granitic sources. Color: gold.
  - 2. Gravel mulch shall be placed within tree planting areas between burial sections as indicated in the Drawings.
  - 3. Gravel Mulch shall be placed as a topdressing over crushed gravel in the section access path as indicated in the Drawings.
    - a. Available Products: 'California Gold' as available from Southwest Boulder & Stone (Tel.: 877.792.7625); 'Sonoma Gold' as available from Eden Garden (Tel.: 209.983.8538); or approved equal.
- C. Organic mulch materials shall be wood based products such as chips, nuggets or shredded hardwood:
  - 1. Straw for turfgrass seed bed mulch shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold or other objectionable material. Straw shall be in an air-dry condition and suitable for placing with blower equipment.
  - 2. Wood cellulose fiber mulch for use with hydraulic application (Hydro mulch) with fertilizer shall consist of specially prepared wood cellulose fiber, processed to contain no growth or germination-inhibiting factors, and dyed an appropriate color to facilitate visual metering of the

application of materials. Do not apply any turfgrass seed in this type mixture. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus three percent at the time of manufacture. The pH range shall be from 3.5 to 5.0. The wood cellulose fiber shall be manufactured so that:

- a. After addition and agitation in slurry tanks with fertilizers, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogenous slurry.
- b. When hydraulically sprayed on the ground, the material will form a blotter like cover.
- c. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlying soil.

## 2.14 STAKES AND GUYING STRAPS

- A. Provide stakes for tree support of rough sawn wood, free from knots, rot, cross grain, or other defects that would impair the strength. Stakes shall be a minimum of 2 inches by 2 inches, or 2 1/2 inches in diameter, by 8 feet long and pointed at one end or galvanized steel pipe 1 1/4 in. x 10' with cap, primed with 2 coats flat black exterior enamel.
- B. Hose chafing guards shall be new or used 2 ply reinforced rubber or plastic hose of all the same color on the project.
- C. Flags to be fastened to guys shall be surveyor's plastic tape, white in color and 6 inches in length.
- D. Guying straps shall be a fabric material designed specifically to guy newly planted trees. No wire should ever be used for this purpose.
- E. Turnbuckles shall be galvanized or cadmium-plated and have a 3 inch minimum lengthwise opening fitted with screw eyes.
- F. Eye bolts shall be galvanized or cadmium plated having a 1 inch diameter eye with a minimum screw length of 1 1/2 inches.
- G. Deadmen shall be 4 inch by 8 inch rectangular, or 8 inch diameter by 36 inch long sound wood.
- H. Arrow shaped or auger iron anchors shall be noncorrosive, and sized according to the manufacturer's recommendation.
- I. Provide "Reddystake" R2 Single Tree Staking System, or equal, in lieu of wood stakes and guying wherever possible. Use 7' stake for trees up to 15 gal. size and 9' stake for up to 24" box size trees. Use "Mega Stake" for 36" box size trees. Available from J.R. Partners (Tel.: 209.634.7791).

## 2.15 EDGING

- A. Metal Edging:
  - 1. Steel Edging: 1 - 4 inch minimum thickness x 7' deep; Galvanized & powder coated; Color: brown.
  - 2. Install between turf burial section and gravel cemetery vehicle access path and other gravel mulch areas as indicated on the Drawings.
  - 3. Available Product: "Dura-Edge" as available from Dura Edge, Inc. (Tel: 888.453.8328); or approved equal.

## 2.16 WATER

- A. Water shall not contain elements toxic to plant life. It shall be obtained as specified in Section 01 00 00, GENERAL REQUIREMENTS, paragraph, Temporary Services at no cost to the Contractor.

## 2.17 ANTIDESICCANT

- A. Antidesiccant shall be an emulsion specifically manufactured for agricultural use that will provide a protective film over plant surfaces permeable enough to permit transpiration.

## 2.18 SEED

- A. Seed shall be state certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's warranted analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Seed shall be labeled in conformance with U. S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Onsite seed mixing shall be done only in the presence of the COR. All turfgrass seeding operations shall be done separately and prior to the application of any mulch material.
- B. Minimum Acceptable Seed Quality standards for all turfgrass seed utilized are as follows: Purity 95%, Germination 85%, Weed Seed Content less than 0.5%, Noxious Weeds 0.0%, Inert Material less than 3%, Germination Test Date no older than 6 months.
- C. All turfgrass seed mixtures, or sod composition shall conform to the species and cultivar requirements detailed here: The seed mixtures listed below are representative of an almost endless list of acceptable seed mixtures that roughly approximate these guidelines.
- D. Turfgrass Seed Mixtures: Seed is % by weight
  - 1. Seed mix shall be a commercially available mix comprised principally of dwarf type fescues supplemented by Kentucky bluegrass and perennial ryegrass at the proportions shown below:
    - a. 80% Medallion Dwarf Type Fescue – Blend of three types from the three varieties shown below:
      - 1) Avenger (Dwarf) Fescue

- 2) Bonsai 2000 (Dwarf) Fescue
- 3) 2nd Millennium (Dwarf) Fescue
- b. 10% Common Kentucky Bluegrass – One type from the two listed below:
  - 1) Rugby
  - 2) Brooklawn
- c. 10% Perennial Ryegrass – One type from the two listed below:
  - 1) Manhattan 4
  - 2) Pizzazz
- d. Seeding Rate: 11 lb/1000 sq.ft.
2. Each of these species components should be a blend composed of a minimum of 2 regionally adapted cultivars.

E. Any deviation from these turfgrass species requirements must be approved in writing by the NCA Chief Agronomist and/or appropriate MSN Agronomist in coordination with the COR.

F. Erosion Control Grass-Seed Mix

1. Seed mix shall be a commercially available mix comprised of:

Botanical Name	Common Name	Seed Rate – PLS Lbs/Ac	PLS LB S/AC
<i>Agrostis pallens</i> ( <i>diegonensis</i> )	Siskiyou Thingrass	3.00	.73
<i>Aristida purpurea</i>	Purple Three-Awn	2.00	.27
<i>Hordeum californicum</i> Prostate	Prostate California Barley	8.00	2.52
<i>Bouteloua gracilis</i>	Blue Grama	5.00	.90
<i>Vulpia microstachys</i>	Three Week Fescue	3.00	1.08

## 2.19 HERBICIDES AND OTHER PESTICIDES

- A. All herbicides and other pesticides shall be properly labeled and registered with the U.S. Environmental Protection Agency. Keep all pesticides in the original labeled containers indicating the analysis and method of use.

## PART 3 - EXECUTION

### 3.1 LAYOUT

- A. Stake plant material locations and bed outlines on project site for approval by the COR before any plant pits or beds are dug. The COR may approve adjustments to plant material locations to meet field conditions.

### 3.2 FINE GRADING AND ORGANIC SOIL AMENDMENT INCORPORATION

- A. Contractor shall obtain COR's written approval of previously completed rough grading Work prior to commencing organic soil amendment incorporation Work.
- B. Immediately prior to dumping and spreading the approved organic soil amendment, the subgrade shall be cleaned of all stones greater than two inches (2") and all debris or rubbish. Such material shall be removed from the site. Prior to spreading of the organic soil amendment, subgrades which are too compact to drain water and too compact based upon compaction tests shall be ripped with a claw one foot (1') deep, pulled by a bulldozer two feet (2') on center, both directions. Contractor shall then regrade surface.
- C. Organic soil amendment material shall be placed and uniformly spread over approved finish sub-grades to a depth sufficiently greater than the specified depth so that after natural settlement and light rolling, the specified minimum compacted depth will have been provided and the completed Work will conform to the lines, grades and elevations indicated. Incorporate organic soil amendment by disc harrowing, rototilling or other means in a uniform manner. The depth of incorporation shall be based upon the organic content of the tested and approved organic soil amendment, so as to produce a finished soil with an organic matter content of between four (4) and six percent (6%). Supply additional organic soil amendment material, after in-place testing and approval, as may be needed to give the required organic matter content and finished grades under the Contract without additional cost to the Government.
- D. Disturbed areas outside the limit of Work shall be spread with four inch (4") minimum depth of organic soil amendment material to the finished grade.
- E. No subsoil or organic soil amendment material shall be handled in any way if it is in a wet or frozen condition.
- F. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Connect contours and spot elevations with an even slope.
- G. After organic soil amendment material has been incorporated into the subsoil, it shall be carefully prepared by scarifying or harrowing and hand raking. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over one and one half inch (1 1/2") diameter from the amended soil bed. The amended soil shall also be free of smaller stones in excessive quantities as determined by the COR.

### 3.3 EXCAVATION FOR PLANTING

- A. The whole surface shall then be compacted with a roller or other suitable means to achieve a maximum dry density of 88 to 90 percent in accordance with compaction standards of ASTM D1557. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional organic soil amendment and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades. The acceptable

condition of the finished soil grade for all areas that are to be established to turfgrass is best described as "fine textured and firm". The test for satisfactory firmness requires that the surface soil not be fluffy or powdery and will support the weight of an average adult person without creating a visible depression.

- B. Prior to excavating for plant pits and bed, verify the location of any underground utilities. Damage to utility lines will be repaired at the Contractor's expense. Where lawns have been established prior to planting operation, cover the surrounding turfgrass before excavations are made in a manner that will protect turfgrass areas. Barricade existing trees, shrubbery, and beds that are to be preserved in a manner that will effectively protect them during the project construction.
- C. Remove rocks and other underground obstructions to a depth necessary to permit proper planting according to plans and Specifications. Where underground utilities, construction, or solid rock ledges are encountered, the COR may select other locations for plant material.
- D. Dig plant pits by any approved method so that they have vertical sides and flat bottoms. When pits are dug with an auger and the sides of the pits become glazed, scarify the glazed surface.
- E. Where ground cover and planting beds occur in existing turfgrass areas, remove turfgrass to a depth that will ensure the removal of the entire root system, with additional bed preparation as specified in the next paragraph.
- F. Where existing soil is to be used in place, till new ground cover and plant beds to a depth of 4 inches. Spread peat soil amendment uniformly over the bed to depth of 2 inches and thoroughly incorporate it into the existing soil to a depth of 4 inches using a roto tiller or similar type of equipment to obtain a uniform and well pulverized soil mix. Where existing soil is compacted (former roadways, parking lots, etc.) till the soil down to a depth necessary to support the growth of new planting. During tillage operations, remove all sticks, stones, roots, and other objectionable materials. Bring plant beds to a smooth and even surface conforming to established grades.
- G. In areas of new grading where existing soil is being replaced for the construction of new ground cover and plant beds, remove 4 inches of existing soil and replace with topsoil. Plant beds shall be brought to a smooth and even surface conforming to established grades. Till 2 inches of peat soil amendment into the topsoil as specified.
- H. Using topsoil, form earth saucers or water basins for watering around plants. Basins to be 2" high for shrubs and 4" high for trees.
- I. Treat plant saucers, shrub, and ground cover bed areas, after mulching, with preemergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to 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.



### 3.4 SETTING PLANTS

- A. Handle balled and burlapped and container grown plants only by the ball or container. Remove container-grown plants in such a way to prevent damage to plants or root system. Set plants plumb and hold in position until sufficient soil has been firmly placed around the roots or ball. Set plants so that the root crown is 1" higher than the surrounding grade. Plant ground cover plants after the mulch is in place. Avoid contaminating the mulch with the planting soil.
- B. Backfill balled and burlapped and container-grown plants with the native soil removed from the planting hole to approximately half the depth of the ball and then tamp and water. It is desirable to use 100% percent native soil to backfill the hole, but do not use unsuitable fill containing clay, rock or other unsuitable material. For balled and burlapped plants, carefully fold back the top half of the burlap and remove tying materials. Any wire caging or similar material, must be completely removed. Where plastic wrap or treated burlap is used in lieu of burlap, completely remove these materials before backfilling. Tamp and water remainder of backfill native soil; then form earth saucers or water basins around isolated plants with topsoil.

### 3.5 STAKING AND GUYING

- A. Stake and guy plants as shown on the Drawings and as specified.
- B. Drive stakes vertically into the ground to a depth of 2 1/2 to 3 feet in such a manner as not to injure the ball or roots, unless otherwise shown on the Drawings.
- C. Place deadmen not less than 18 inches below the surface of the ground, unless otherwise shown on the Drawings.
- D. Install iron anchors according to manufacturer's recommendations.
- E. Fasten flags securely on each guy strap approximately 2/3 of the distance up from ground level.
- F. Remove stakes and guy straps after one year.

### 3.6 EDGING SECTION TURF AREA

- A. Edge section turfgrass using metal edging. Install per manufacturers recommendations and details.

### 3.7 MULCH INSTALLATION

- A. Seeded area: Mulch within 48 hours after seeding and apply a preemergence granular ornamental herbicide containing 2.0% trifluralin and 0.5% isoxaben. Apply at 200 lb per acre prior to both early spring and early fall weed seed germination.

- B. Placing Inert Material: Install weed control barrier fabric with edges overlapped a minimum of 12 inches to receive inert mulch material. Secure seams with galvanized steel pins. Spread inert mulch to a uniform thickness over the membrane as shown.
- C. Mulch backfilled surfaces of planting areas and other areas indicated. Keep mulch out of plant crowns, pavements and structures.
  - 1. Gravel Mulch at Tree Rows: Apply 2 inches average thickness, of gravel mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place gravel mulch within 24 inches of trunks.
  - 2. Trees in Turf Areas: Apply organic mulch ring of 3 inch average thickness of organic mulch with 36 inch radius around trunks or stems. Do not place mulch within 6 inches of trunks or stems.
  - 3. Organic Mulch in Planting Areas/Gravel Mulched Beds: Apply 3 inch average thickness of organic mulch with 24 inch radius around trunks or stems. Do not place organic mulch within 3 inches of trunks or stems.

### 3.8 PRUNING

- A. Prune new plant material and indicated existing plant material in the following manner: Remove dead, broken and crossing branches. Make cuts with sharp instruments as close as possible to the branch collar. Do not make flush cuts. Do not make "Headback" cuts at right angles to line of growth. Do not pole trees or remove the leader. Remove trimmings from the site. Do not use any type of wound dressing on pruning cuts.
- B. Existing trees to be pruned are shown on the Drawings. Perform tree pruning and cavity Work by a licensed arborist an arborist in accordance with ANSI Z 133.1. Remove dead wood 1/2 inch or more in diameter, branches interfering with or hindering the healthy growth of the trees, and diseased branches with a clean cut made flush with the branch collar. Cut back or remove branches as necessary to give the trees proper shape and balance. In removing large limbs, make the initial cut on the underside at a safe distance from the trunk or lateral, to prevent ripping of bark. Ensure branches and trimmings do not endanger traffic or cause damage to property during removal. Section large branches or limbs that cannot be removed in one piece without endangering traffic or property. Lower sections by ropes. Repair any damage resulting from the Contractor's negligence during pruning. Workmen are not permitted to climb trees with climbing spurs. To promote proper healing, cut off flush with the branch collar stubs or limbs that have resulted from improper cuts or broken as a result of former pruning. Remove girdling roots.

### 3.9 TILLAGE FOR TURFGRASS AREAS

- A. Thoroughly till the soil to a depth of at least 6 inches by scarifying, disking, harrowing, or other approved methods. This is particularly important in areas where heavy equipment has been used. Remove all debris and stones larger than 1 inch remaining on the surface after tillage in preparation for finish grading. To minimize erosion, do not till areas of 3:1 slope ratio or greater. Scarify these areas to a 1 inch depth and remove debris and stones.

### 3.10 FINISH GRADING

- A. After tilling the soil for bonding of topsoil with the subsoil, spread the topsoil evenly to a minimum depth of 4 inches. Incorporate topsoil at least 2 to 3 inches into the subsoil to avoid soil layering. Do not spread topsoil when excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic. Complete lawn Work only after areas are brought to finished grade.

### 3.11 APPLICATION OF FERTILIZER AND SULFUR FOR TURFGRASS AREAS

- A. Apply turfgrass fertilizer at a rate that will deliver 1 pound of nitrogen per 1000 sq.ft. In addition, adjust soil acidity as recommended by soil test results and add any soil conditioners as specified herein for suitable topsoil under PART 2, Paragraphs ORGANIC SOIL AMENDMENT and TOPSOIL.
- B. Spread elemental sulfur as recommended by the soil test results.
- C. Incorporate sulfur into the soil to a depth of at least 4 inches as part of the finish grading operation. Starter fertilizer should be lightly mixed with the top ½ inch of soil. Immediately restore the soil to an even condition before any seeding or sod placement.

### 3.12 DRILL SEEDING

- A. Seed shall be applied through full contact mechanical methods using seed drill machinery equal to models Truax Company or equal Apply seed at a minimum of two different directions no less than 80 degrees to each other at the rates shown:
  - 1. Turfgrass Seed Mix: 11 lbs. per 1,000 sf.
  - 2. Native Grassland Seed Mix: 36 lbs of pure live seed per acre.
  - 3. Soil Inoculants shall be applied at 30 lbs per acre in combination with the seed.
- B. Drill seed prior to Winter rains. Seed will not be germinated by irrigation.
- C. Immediately after drill seeding, firm the entire area with a roller not exceeding 150 pounds per foot of roller width.
- D. Immediately after preparing the seeded area, evenly spread an organic mulch of straw by hand or by approved mechanical blowers at the rate of 2 tons per acre. Application shall allow some sunlight to penetrate and air to circulate but also reduce soil and seed erosion and conserve soil moisture. Anchor mulch by a mulch tiller, twine, or netting.

### 3.13 HYDRO-MULCHING

- A. When hydro-mulching, mix the slow release starter fertilizer, approved wood cellulose mulch material in the required amount of water to produce a homogenous slurry and then uniformly apply slurry under pressure to deliver the recommended quantity of fertilizer per 1,000 square feet.

### 3.14 WATERING

- A. Apply water to the turfgrass areas immediately following installation at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 2 inches. Supervise watering operation to prevent run off. Supply all 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. Contractor shall deep water all trees twice each week during the Plant Establishment Period, providing water penetration throughout the root zone to the full depth of the planting pits, as verified in the field by the COR. Watering shall cease at the first hard frost in the fall and shall resume upon ground thaw in the spring.

### 3.15 PROTECTION OF TURFGRASS AREAS

- A. Immediately after installation of the turfgrass areas, protect against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

### 3.16 RESTORATION AND CLEAN-UP

- A. Where existing or new turfgrass areas have been damaged or scarred during planting and construction operations, restore disturbed area to their original condition. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. In areas where planting and turfgrass Work have been completed, clear the area of all debris, spoil piles, and containers. Clear all other paved areas when Work in adjacent areas are completed. Remove all debris, rubbish and excess material from the station.

### 3.17 ENVIRONMENTAL PROTECTION

- A. All Work and Contractor operations shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

END OF SECTION