

## **SECTION 802 -- FURNISHING AND PLANTING OF PLANT MATERIALS**

### **802.01 -- Description**

1. This work shall consist of furnishing, collecting, packaging, delivering, and planting the "plant materials."
2. Plant material shall mean trees, shrubs, vines, ground covers, and plants of all descriptions.
3. *Hortus Third*, compiled and published by the staff of the L. H. Bailey Hortorium, Cornell University, shall be the Department's reference for species nomenclature.

### **802.02 -- Material Requirements**

1. Planting Seasons
  - a. A minimum of 90 days before each planting season, the Contractor shall submit to the NDR Roadside Development Unit:
    - (1) A copy of confirmed nursery purchase orders.
    - (2) A list showing each plant and where it was grown.
  - b. All plant material shall have been grown within the boundaries shown on the plant hardiness zone map in the special provisions.
  - c. Plant material from unapproved sources will be rejected.
  - d.
    - (1) Planting is restricted to the following:
      - (i) Spring, Coniferous -- March 15 to May 1.
      - (ii) Spring, Deciduous -- March 15 to May 15.
      - (iii) Fall, Coniferous -- August 15 to September 30.
      - (iv) Fall, Balled and Burlapped or container grown Deciduous -- August 15 to December 1.
    - (2) Planting within these seasons is further restricted by weather, soil conditions, and accepted local practices.
2. All plant materials shall be grown in a State inspected nursery unless specified otherwise (i.e., collected plant materials).
3. The plans or special provisions may allow or require the use of "Collected Plant Materials". Collected plant material is non-nursery-grown plant material, including coniferous

plant material grown for Christmas trees, which has not received the normal transplanting and root pruning given nursery-grown plant material.

4. All Contractor provided plant materials shall conform to the appearance and physical properties standards as prescribed in the *American Standard for Nursery Stock* published by the American Association of Nurserymen, Inc.

5. a. All plants shall be labeled.

b. The information on each plant's label shall describe the plant's:

(1) Botanical genus.

(2) Species.

(3) Common name.

(4) Size or age.

c. Legible labels shall be attached by the nursery grower to individual plants, boxes, bundles, bales, or other containers to insure that all species and varieties are identified.

d. Plant materials which are delivered and/or planted and are not the species shown on the plant label shall be removed and replaced at no additional cost to the Department.

6. a. All plant material shall be sound, healthy specimens of their species or variety and shall have well-formed tops and healthy root systems.

b. (1) Plant materials which lack proper proportions, have serious injuries to the bark or roots, broken branches, objectionable disfigurements, shriveled dry roots, broken root balls, insect pests, diseases, or which are not found to comply with these *Specifications* will be rejected.

(2) Rejected plant material shall be removed from the project as soon as practical. Diseased or insect infested plant material shall be removed within 24 hours of notification or identification.

c. Bud-break for the birch, redbud, hackberry, oaks, and hawthorns must occur before they are planted.

7. All plant materials are subject to an internal and/or an external examination at any time to ascertain the condition of the roots and the soil around the roots.

8. a. If a Contractor is unable to locate sufficient plant material in the specified sizes, the Department may elect to negotiate for a unit price reduction or increase.

b. Price negotiations shall be concluded before ordering plant materials.

9. Plant material held in storage will be rejected if excessive growth or other detrimental effects have occurred.

10. a. Unnecessary injury to or removal of fibrous roots from the plant material is cause for rejection of the plant material. The soil for balled, container-grown, or pot-grown material shall be in such condition so as to insure no crumbling or cracking. Balls shall be wrapped with burlap before removal from the ground. The burlap shall be held in place with cord and/or pinning nails. Handling of balled and burlapped material shall be done in such a manner as to keep the earth intact. Plant material on which earthen balls do not hold together or which crack in handling causing the plant to be loose in the ball will be rejected.

b. Plant material that is ordered "tree spaded" shall be delivered in burlap lined wire baskets, unless otherwise specified.

11. a. Planting fertilizer shall be pressure formed pellets and have a 20-10-5 (20 percent nitrogen, 10 percent phosphorous, and 5 percent potash) analysis with a mass of  $21 \text{ g} \pm 1 \text{ g}$  per pellet; or the pellets may have a 14-3-3 (14 percent nitrogen, 3 percent phosphorous, and 3 percent potash) analysis and with a mass of  $16 \text{ g} \pm 1 \text{ g}$  per pellet. Either pellet shall contain a minimum of 11.5 percent water insoluble nitrogen.

b. Establishment period fertilizer shall be liquid urea with 28 to 32 percent nitrogen or an approved equal.

12. a. All mulch shall be approved by the NDR Roadside Development Unit.

b. The wood mulch shall be either chips, shreds, or shavings. The wood mulch shall not have been subjected to conditions that would cause it to lose its value as mulch. The mulch shall be reasonably free from sawdust and other foreign materials and shall be free of toxic substances.

13. Stakes shall be wood, approximately 40 mm x 40 mm x 1.8 m for all trees less than 50 mm in trunk caliper and coniferous trees less than 2 m in height.

14. a. The guying material shall be approximately 25 mm wide, flexible, nonabrasive, and shall last at least 1 year.

b. The Contractor shall send a sample to the NDR Roadside Development Unit for approval.

15. a. The absorbent polymer shall be an organic cross-linked co-polymer in a powder form regularly manufactured for agricultural or horticultural uses.

b. When mixed with water, it shall produce a gel that will adhere to and coat plant roots when they are dipped in the solution.

c. The absorbent polymer shall be on the NDR Approved Products List.

16. a. The pre-emergent chemical shall be dimethyl-tetrachloroterephthalate (Dacthal) or an approved equal.

b. The post-emergent chemical shall be glyphosate (Roundup) or an approved equal.

17. Rocks, sods, clods, or other backfill materials that would tend to form air pockets and which will not compact uniformly shall not be used.

### **802.03 -- Construction Methods**

#### **1. Storing and Transporting Plant Materials:**

a. All plant material shall be transported in a covered conveyance to and from the storage area and shall be packed to assure proper protection against injury.

b. Plants that cannot be planted immediately after delivery from the supplier shall be kept in storage.

c. Bare root plant material shall be stored in a building. Their roots shall be kept moist and protected with soil, sawdust, wood chips, shingle toe, moss, peat, straw, hay, or other acceptable moisture holding media.

d. Storage for the balled and burlapped or container-grown plant material shall be in a protected outside area.

e. All storage sites/facilities shall have a water source, good ventilation, protection from sun and drying wind, and be approved by the Engineer before delivery of the plants.

f. Plants in storage (stored plants) shall be watered daily.

2. Plant materials shall not be brought to the construction site until sufficient area has been prepared to allow proper and immediate planting.

3. a. The Contractor shall dip all bare-root stock in a slurry of fully hydrated absorbent polymer and water before transporting plants from storage to the planting site.

b. The mixing ratio for the polymer shall be as directed by the manufacturer and shall produce a gel that fully adheres to all roots and forms a coating around them.

4. The Contractor shall protect plant material, on site and not immediately planted, from freezing, drying, breaking, overheating, and other injuries.

5. a. The Contractor shall till existing vegetation at the planting site into the soil before excavating the planting hole. The dimensions of the area and the depth to be tilled shall be shown in the plans.

b. The Contractor shall cut and remove all volunteer trees or brush within the planting area that cannot be removed by tilling. Immediately after cutting, stumps shall be treated with 2-4-D amine or other approved chemicals.

c. The Contractor may accomplish this preparation work in the fall before the spring planting season with written permission from the Engineer.

d. All trees and brush shall be disposed of in a manner satisfactory to the Engineer.

6. a. For the balled and burlapped plants, the Contractor shall set the ball carefully into the hole on undisturbed soil at the proper planting depth as shown in the plans.

b. The Contractor shall plumb and partially backfill the ball enough to stabilize the plant in position.

c. All twine shall be cut away from the trunk and removed from balled and burlapped plants. Wire baskets shall be cut off half way down the side of the ball. The burlap shall be pulled back from the trunk and cut off.

d. The Contractor shall properly place the fertilizer tablets, complete the backfill, and then consolidate by watering.

e. Wire baskets, twine, and burlap shall be removed from the project site.

f. Balled and burlapped material which is dropped into the planting hole or so roughly handled as to cause the ball to crack and pull away from the roots shall be rejected.

7. a. The Contractor shall examine bare rooted plants, and any bruised or broken root shall be pruned to leave a clean cut.

b. The plant shall be set in the hole at the same depth as it was grown and then plumbed and partially backfilled.

c. The fertilizer shall be properly placed in the hole.

d. The backfilling shall then be completed and consolidated by watering.

8. a. The Contractor shall fertilize all plant material during the planting operation as indicated below or as shown in the plans.

b. Fertilizer shall never be placed in direct contact with plant roots.

c. Pressure-formed pelleted fertilizer shall be placed into the planting hole during planting after the plants are partially backfilled (approximately 50 percent of the backfill material in place) at the following rates:

(1) Three pellets per plant for all shrubs and vines.

(2) Six pellets per plant for all trees less than 50 mm in trunk caliper or less than 2.5 m in height.

(3) Ten pellets per plant for all trees larger than 50 mm in trunk caliper or taller than 2.5 m in height.

d. (1) Establishment period fertilizer shall be applied between May 15 and June 1 of the year following initial planting.

(2) All trees and shrubs shall be fertilized with a liquid solution.

(3) The solution shall be placed in the water basin and metered to insure the solution is applied as specified.

(4) The fertilizer shall be mixed at the rate of one part of liquid urea per 300 parts of water and applied at the following rates:

(i) Coniferous shrubs: 12 L of solution per meter of foliage spread.

(ii) Coniferous trees: 12 L of solution per meter of plant height.

(iii) Deciduous shrubs: 12 L of solution per meter of plant height.

(iv) Deciduous trees: 0.80 L of solution per millimeter of trunk caliper.

9. a. The Contractor shall thoroughly water all plant material following the backfilling operation the same day they are planted. This watering shall completely saturate the backfill. After the ground settles as a result of the watering, additional backfill shall be placed to match the level of the finished grade as shown in the plans.

b. The plant shall be adjusted to sit at the same elevation as it was growing.

c. (1) Plant material shall be watered on the same day it is planted.

(2) All planting shall cease until the watering is caught up to the specified time limit.

d. The plant material shall be kept in a moist condition as dictated by weather conditions, soil conditions, and as directed by the Engineer until final acceptance.

e. All plant material shall be watered, on average over the project life, every 10 days during the establishment period unless excused by the Engineer.

f. The recommended water application rates are shown in Table 802.01.

**Table 802.01**

<b>Recommended Plant Establishment Watering Rates</b>	
<b>Plant Type</b>	<b>Water Application Rate</b>
Trees	40 L per tree every 10 days
Shrubs	20 L per shrub every 10 days

10. a. The Contractor shall properly prune all deciduous plant material to remove dead or broken roots and branches, to improve plant structure, and to remove any branches that are rubbing each other.

b. All pruning cuts shall be made with a sharp tool.

c. All branches removed by pruning shall be disposed of in a manner satisfactory to the Engineer.

11. a. When the backfill is complete and watered, the Contractor shall stake and guy the trees as shown in the plans. The stakes shall be driven so they support the trees, but stakes shall not penetrate the ball or roots of the plants.

b. Guys shall be sufficiently tight to transfer support from the stake to the tree and yet allow some movement for proper trunk development.

12. The Contractor shall construct a watering basin for all plants as shown in the plans. A second watering shall be applied in the completed watering basin before placing the mulch.

13. a. The Contractor shall mulch all planted areas as specified and as shown in the plans.

b. The mulch shall be applied upon completion of the watering basin and after the pre-emergent has been applied.

c. Mulch shall cover all disturbed earth.

14. a. The Contractor shall furnish and apply pre-emergent chemicals to the areas indicated in the plans before mulching and again the next spring. The application rate shall be the midrange of the manufacturer's suggested rate.

b. The Contractor shall furnish and apply post-emergent chemicals to all mulched areas to control weeds as needed or directed by the Engineer during the establishment period. The application rate shall be the midrange of the manufacturer's suggested rate.

15. a. The establishment period will not begin until all of the following items of work, as required in the specifications, the special provisions, and the plans, have been performed on each and every plant: planting, backfilling, fertilizing, watering, pruning, staking, guying, water basin construction, application of chemical vegetation control, and mulching.

b. Each plant shall be in an acceptable growing condition to enter the establishment period and qualify for partial payment.

c. The establishment period shall be until June 1 of the year following the year in which the plant material was planted. The establishment period may be extended for an additional 12 months for failure to maintain the plant material as specified or for providing incorrect varieties or species.

d. During the establishment period, the Contractor shall properly maintain all materials under the contract and shall replace all unacceptable plant material in the spring planting season. The establishment procedures shall include:

- (1) Additional pruning;
- (2) Protective measures against pests and diseases;
- (3) Watering an average of every 10 days, or as often as required by necessity or the direction of the Engineer;
- (4) Repairing damage to the watering basins;
- (5) Replacing mulch which becomes displaced;
- (6) Keeping the stakes firm and the guys adjusted;
- (7) Weed control with a pre-emergent and post-emergent chemical applications or other approved means;
- (8) Other establishment procedures as deemed necessary by the Engineer, including the removal of any dead plant material from the project site.

e. (1) Upon completion of the establishment period, the Contractor, the Project Manager, and a representative from the NDR Roadside Development Unit will make a joint inspection of the project for acceptability.

(2) The NDR Roadside Development Unit representative will determine acceptability of the plant material.

(3) The inspection will normally be made during the week that the establishment period terminates.

(4) The Contractor will be notified of the date of the inspection.

(5) All items of maintenance shall have been performed on the plant material before the inspection, and any item of maintenance that has not been performed may make a plant unacceptable.

(6) The Contractor will be given written notification by the Engineer when the establishment responsibilities on the acceptable plant materials are terminated.



f. The stakes and guys shall be removed from the plant material in the spring following the year in which the material was planted. The stakes shall be left on any replacement plant material. The Engineer may note exceptions. All stakes and guys furnished by the Contractor shall remain the property of the Contractor and shall be removed from the project.

#### **802.04 -- Method of Measurement**

The work of furnishing and planting of plant materials will be measured by the each as listed in the bid proposal Schedule of Items.

#### **802.05 -- Basis of Payment**

<u>1. Pay Item</u>	<u>Pay Unit</u>
Plant material as listed in <i>Schedule of Items</i> _____ (Species) _____ (Size)	Each (ea)

2. Partial Payment. The progress estimate payment schedule for planted materials is shown in Table 802.02.

3. The Engineer and the Contractor will make the joint inspections of the project during each planting season and inspect for establishment procedures on or about July 15 and September 1. A representative of the Roadside Development Unit will normally determine acceptability of the plant material at the September inspection.

4. After the September inspection has been made, the Contractor will be notified in writing by the Engineer of the quantities of plant material that are not acceptable. The Contractor shall replace them at no additional cost to the Department in the spring planting season.

**Table 802.02**

<b>Maximum Payment Percentages of Contract Unit Prices (Spring Planting Only)</b>		
<b>Percent Authorization</b>	<b>Time Payment Is Authorized</b>	<b>Criterion for Payment</b>
88%	After Planting Complete	<ol style="list-style-type: none"> <li>1. Plant materials meet the specifications, have been properly stored and transported to the work site.</li> <li>2. Plant materials are properly planted. (Properly planted means mulched, fertilized, staked, guyed, and watered.)</li> <li>3. Planted materials are in a proper growing condition.</li> </ol>
95%	After September 1 Inspection	<ol style="list-style-type: none"> <li>1. Plant materials are in an acceptable growing condition, have been properly maintained, and the Project Manager, Roadside Development Representative, and the Contractor have inspected the project.</li> </ol>
100%	At the completion of the project as stated elsewhere in these <i>Specifications</i>	<ol style="list-style-type: none"> <li>1. The establishment period is completed.</li> <li>2. All establishment procedures are complete and verified by the Engineer.</li> <li>3. The representative of the Roadside Development Unit has inspected the project and determined the acceptability of each plant based on the normal growth habit for the species or variety.</li> </ol>

5. The unacceptable plantings from the September inspection and any additional losses from the winter shall be replaced during the spring planting season. Plant replacement shall be at no additional cost to the Department and shall be in accordance with the specifications, the special provisions, and the plans. No additional planting fertilizer is required on replacement plant material. The Contractor's responsibility for all replacements shall extend for 30 days after the last plant to be replaced is properly planted and accepted by the Engineer.

6. Payment is full compensation for all work prescribed in this Section.