230.06. BASIS OF PAYMENT.

Accepted sodding, measured as provided above, shall be paid for at the contract unit price as follows:

(A) SOLID SLAB SODDING. ..... SQUARE YARD (SQUARE METER)
(B) MULCH SODDING. ..... SQUARE YARD (SQUARE METER)
(C) ROW SPRIGGING ..... SQUARE YARD (SQUARE METER)
(D) BROADCAST SPRIGGING (METHOD A) ..... SQUARE YARD (SQUARE METER)
(E) BROADCAST SPRIGGING (METHOD B) ..... SQUARE YARD (SQUARE METER)
(F) WATERING ..... M-GAL (KILOLITER)

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

SECTION 231
PLANTING

231.01. DESCRIPTION.

This work shall consist of furnishing, handling, planting, and establishing plant materials in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or established by the Engineer.

231.02 . MATERIALS.

Materials shall meet the requirements specified in the following Subsections of Section 700 Materials.

Plant Materials	735.03
Plant Soil Mix	735.03
Vegetable Compost	735.03

Water shall be free from harmful quantities of toxic salts or other substances that might interfere with the establishment and growth of plants.

231.03. EQUIPMENT.

You must furnish equipment meeting the requirements of Subsection 108.06 and as prescribed herein. When machine planting trees, the equipment must have all the accessories necessary to dig, lift, carry, and deposit a plant intact into an excavation (previously dug by the same or identical type machine) without damage to the ball of soil or the plant.

231.04. CONSTRUCTION METHODS.

(a) **General.**

(1) Perform all work under the supervision of a competent and experienced nurseryman.

(2) Protect all new plants and existing trees, shrubs, and turf from damage or injury before, during and after construction and plant establishment operations.

(3) Bare-rooted plants will be designated BR, and balled and burlapped plants will be designated B&B.

(b) **Care and Handling of Plants.**

(1) While BR or B&B plants are being transported to the project site, moved to and from the heeling-in beds, being distributed in planting beds, or awaiting planting after distribution, protect the roots and balls from drying out.

(2) If BR plants are not planted within 2 hours after delivery to the project site or planting location, you must see that they are heeled-in in moist soil or sawdust in accordance with acceptable horticultural practices.

(3) If B&B plants are not planted within 24 hours after delivery to the project location, protect the balls adequately with moist soil or sawdust until they are removed for planting.

(4) Protect containerized plants in the same manner as B&B plants.

(5) Maintain all heeled-in plants properly until planted.

NOTE: Plants remaining heeled-in during the summer will not be acceptable.

(6) In digging, loading, unloading, planting, and other handling operations, exercise utmost care to prevent injuries to the roots, stems, or branches of the plants. Carefully preserve the solidity of the ball of the B&B plants, which you must handle by the rootball, not by the stems or trunk.

NOTE: You must replace, at your own expense, any plants that are rendered unfit for planting.

(7) Dig collected plants with extreme care in a manner satisfactory to the Engineer. Digging, transporting and replanting of collected plants shall be performed in accordance with acceptable horticultural practices. An approved tree digging machine may be used to dig, transport, and plant collected plants.

(8) Unless plants are dug, transported, and planted by approved tree-digging machines, all evergreens shall be balled and burlapped (B&B) except when they are container grown and are still in the container. Deciduous plants may be either B&B, BR, or containerized, as specified on the Plans.

(c) **Seasonal Planting Restrictions.**

(1) Planting operations for deciduous plants shall be restricted to the period from November 25th to the following March 31st, and the planting operations for Evergreen plants shall be restricted to the period from October 1st to the following May 15th.

(2) Regardless of the specified planting dates, the work shall be suspended when the temperature is below 25°F(-3.8°C), the wind velocity over 25 miles (40 kilometers) per hour, the natural ground or topsoil is frozen or too wet, or the continuation of prevailing weather would likely cause unsatisfactory results.

(3) The Contractor shall complete his planting operations as early in the specified season as practicable.

(4) Plants that do not meet specifications for any reason after planting shall be removed immediately, and if within the current planting season, be replanted immediately, or if out of planting season, be replanted the following season all in accordance with these Specifications.

(d) **Plant Locations.** The plant locations shown on the Plans are approximate and may be adjusted to suit actual field conditions as determined by the Engineer.

(e) **Plant-Hole Excavation.**

(1) Unless plant holes are dug with an approved tree digging machine, make all plant holes cylindrical with approximately vertical sides. When excavations are in rocky subsoil (or in any impervious material that would hamper proper drainage and would likely retard normal root development and growth), loosen the soil by methods approved by the Engineer. Caliper determinations shall be in accordance with current USA Standard for Nursery Stock USAS Z60.1.

(2) Excavate holes sufficiently deep to provide space for at least 4 inches (100 mm) of the existing excavated soil to be replaced below the roots or balls and to let the plant stand slightly higher than it stood in the nursery or collecting field. Regardless of the minimum size, for holes shown in the following Table for BR plants, make the diameters large enough to allow at least 8 inches (200 mm) of backfill between the outside tip of fully spread roots and the sides of the hole.

(3) Make plant holes for potted or containerized plants 3 times the diameter of the container and 150 millimeters deeper than the height of the container, unless otherwise specified on the Plans.

(4) When plants are to be grouped together in a plant bed, loosen the entire area of the plant bed, and break up all clods, to a depth of at least 6 inch (150 mm) prior to excavating plant holes.

(5) Thinly spread excess material from plant-hole excavations over the surrounding area, making a neat appearance. If material is not appropriate for spreading, dispose of it in a manner approved by the Engineer.

(f) **Pruning.**

(1) Before planting, examine the root systems of all BR plants and cut off smoothly any bruised or broken parts.

(2) Prune the tops of all plants in accordance with acceptable horticultural practices, as determined by the type, shape, size, and condition of the plant.

(g) **Planting Procedures.**

(1) Loosen the subsoil in the bottom of the plant hole 6 inch (150 mm) deep. Then place and firm a layer of soil 4 inch (100 mm) or more in depth in the bottom of the hole, to provide correct final planting elevation, before the plant is placed.

(2) Then place the plant in the prepared hole at the proper position with regard to depth, alignment, final grade of surrounding ground level, and vertical placement of the trunk or stems—and this position shall be maintained during all subsequent backfilling and watering operations. The plants shall stand, at the time of completion of the planting operation, slightly deeper than they stood in the nursery or collecting field, except that spreading evergreen plants shall stand slightly higher than they stood in the nursery.

(3) After BR plants are placed in the proper position, backfill the hole with friable soil, placing it in thin layers and carefully working and firming around the roots in such a manner as to avoid bruising or breaking the roots.

(4) When 1/2 to 2/3 of the backfilling has been completed, apply sufficient water to settle the soil. Do not saturate the soil to the extent of filling voids and excluding all oxygen from around the roots. After sufficient water absorption has occurred, fill the remainder of the hole as previously specified.

(5) Handle B&B plants the ball and place them in the hole in such a manner that the soil of the ball shall not be loosened from the roots. Backfilling, firming, and settling shall be carefully done in the same manner as specified for BR plants. Just before the final backfilling above the top of the ball, loosen the burlap or cut it away from around the stem, the edges laid back and the plant thoroughly watered.

(6) On relatively flat areas, make a shallow saucer-like depression that extends from around the plant to 18 inches (450 mm) outside the plant hole. On steeper slopes, construct a ridge of firmly compacted soil, of sufficient plasticity to withstand washing and approximately 6 inches (150 mm) high, 18 inches (450 mm) outside and around the lower half of the plant hole.

(h) **Vegetable Compost.** A 2 inch (50 mm) covering of approved vegetable compost, conforming to Subsection 735.03, shall be placed over the entire spaded area around each plant. When plants are placed in beds, the entire bed shall receive a covering of the compost. This compost shall be maintained as a fine textured mulch around the plants until acceptance of the project.

(i) **Mulch.**

(1) Following the application of nitrogen fertilizer, place a 4 inch (100 mm) covering of vegetable compost approved by the Engineer over the entire plant pit and saucer-shaped area around each plant as detailed on the Plans.

(2) When plants are placed in beds, fertilize the entire bed and cover it with mulch 4 inch (100 mm) deep. Maintain this mulch around the plants until final acceptance of the project.

(3) Place a slow release 38-0-0 Nitrogen fertilizer prior to placement of bark mulch, and spread it at the rate of 22 pounds per 100 square yards (12 kg per 100 square meters) of plant pit or plant bed area.

(j) **Water.** Furnish and apply water in sufficient quantity whenever necessary to keep the plants in alive and healthy condition, from the time of delivery to the final acceptance at the end of the plant establishment period. If plants are replanted the following season, water them sufficiently for them to become established.

(k) **Staking.** Immediately following the application of vegetable compost, stake all trees as shown on the Plans so that they present a neat appearance. Take precautions during staking operations to prevent damage or injury to the plants and roots.

(l) **Plant Establishment Period and Replacements.** Maintain plant material for an establishment period of twenty-four months. When specified on the plans, the Contractor will warrant the trees for the entire twenty-four months period. The establishment period will begin upon completion of the entire planting operation and after a field inspection of the completed plantings. Employ all possible methods to keep the trees in a healthy growing condition for the duration of the establishment period. Good horticultural practices during the establishment period will include spraying for insects and disease control, watering, pruning, cultivating, adjustment of support guys and stakes and other tree maintenance activities as directed by the Engineer.

Water the trees to supplement rainfall amounts, with the amount of water needed dependent upon weather conditions. The use of a soil moisture probe is recommended for evaluation of watering needs.

Take care not to over water the trees. Maintain the mulch layer around the base of the trees at a minimum depth of 4 inches (100 mm) during the establishment period. Replace trees which are dead, dying, or otherwise unhealthy with trees of the same size and variety as the original planting. Alternate or substitute varieties of plants shall be used only if approved by the Engineer. Nursery stock of a similar variety with minimum diameter of 3 inches (75 mm) could be considered for a replacement item, if acceptable transplant trees are not available. Replacement shall occur as soon as weather conditions allow.

(m) **Method of Determining Progress Percentages.**

(1) Upon completion of the entire planting and a semi-final inspection and acceptance by the Engineer, the Contractor will have completed 75 percent of the contract work for machine planted trees.

(2) After the first 12 months of the establishment period, the trees shall be inspected and if the Engineer agrees that the Contractor has performed the specified establishment activities, the remaining 25 percent of the contract work for machine planted trees shall be considered complete.

(3) Payment for work specified during the establishment period will occur on a monthly basis for the duration of the 24 month period.

(n) **Carry-Over of Work not Completed During Specified Season.**

(1) If any of the proposed planting items are not completed at expiration of the initial planting season, planting work on the uncompleted items shall stop immediately, and the period during which the planting may be performed, regardless of the reason for failure to complete work, will not be extended. The work shall be carried over and completed the following planting season in accordance with these Specifications and the Plans.

(2) During the carry-over period, the Contractor shall be responsible for maintenance of planted areas and plant material. This work shall be as described in Subsection 231.04(l).

(3) Time will be charged from the beginning of the following planting season until all carry-over work is planted. Time will not be charged during the period from October 1st to November 25th for deciduous plants, or when replanting only is involved.

(o) **Machine Planting of Trees.** For machine planting of trees the following additional requirements shall apply.

(1) Digging. Excavated plants shall have a ball of soil encompassing their root systems. The size of the balls of all plants shall conform to the recommended specifications of ANSI-Z-60.1, Nursery Stock.

(2) Transporting. The plants shall be transported from the nursery to their new locations on the project by the same machine that dug them.

(3) Transplanting. Trees to be transplanted shall be placed in holes previously dug by the same or identical type machine. The top of the ball shall be placed in its final position at a slightly

lower elevation than the existing surrounding ground. After the machine is removed, and any necessary backfill is applied, the plant shall be thoroughly watered and mulched, then staked as shown on the Plans.

231.05. METHOD OF MEASUREMENT.

Live and healthy plants in satisfactory condition will be measured by each category, and the quantities to be paid for under this item will be the number of each kind of (A) *Trees,* (B) *Shrubs,* (C) *Vines* or *ground covers,* and (D) *Trees machine planted.*

231.06. BASIS OF PAYMENT.

Accepted planting, measured as provided above, will be paid for at the contract unit price as follows:

(A)	TREES (KIND)	EACH
(B)	SHRUBS (KIND)	EACH
(C)	VINES OR GROUND COVERS (KIND)	EACH
(D)	TREES MACHINE PLANTED (KIND)	EACH
(E)	ESTABLISHMENT PERIOD	EACH

Such payment shall be full compensation for furnishing replacement trees, material, equipment, labor and all incidentals to complete the work as specified.

SECTION 232
SEEDING

232.01. DESCRIPTION.

This work shall consist of seedbed preparation, and furnishing and planting seeds in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or established by the Engineer. It includes seeding for permanent erosion control and seeding for the temporary erosion control.

232.02. MATERIALS.

Materials shall meet the requirements specified in the following Subsections of Section 700 Materials.

Seed	735.04
Fertilizer	735.07

Water shall be free from harmful quantities of toxic salts or other substances that might interfere with the establishment and growth of turf.

232.03. EQUIPMENT.

Furnish equipment in satisfactory working condition, and in sufficient quantity to perform the work as specified. Have the equipment on the project site and approved by the Engineer before beginning work on the corresponding item.