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### Standard Specifications for Road and Bridge Construction, March 1, 2006, Part 8 - Roadside Development

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**PART 8-ROADSIDE DEVELOPMENT**

**SECTION 801-SEEDING**

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## SECTION 801-SEEDING

**801.01-Description.** Seeding shall consist of furnishing and placing seed, commercial fertilizer, agricultural limestone, and mulch material when specified, as directed by the Engineer, all in accordance with these Specifications, on all newly graded earthen areas that are not to be paved, stabilized or sodded.

### MATERIALS

**801.02-Materials.** Materials used in this construction shall meet the requirements of the following Subsections of these Specifications:

<u>Material</u>	<u>Subsection or approval list</u>
Grass Seed	918.14
Commercial Fertilizer	918.15
Agricultural Limestone	918.17
Mulch Material	918.18
Inoculant for Legumes	918.24
Liquid Lime	QPL
Mulch Binder:	
Emulsified Asphalt, Type SS-1 or AE-3	904.03
Water	802.02(b)5

### EQUIPMENT

**801.03-Equipment.** All equipment necessary for the satisfactory performance of this construction shall be on the project and approved before work will be permitted to begin.

### CONSTRUCTION REQUIREMENTS

**801.04-General.** The Contractor shall perform the seeding work as prescribed in **Section 209**. At the outset of permanent seeding operations the area to be seeded shall be prepared, shaped and dressed in accordance with **Subsections 203.08** and **801.05**; and, unless otherwise directed by the Engineer, the seed shall not be sown until the topsoil is placed in accordance with **Subsection 203.06**. It is intended that topsoil be used in connection with all permanent seeding activities except where its use is deemed detrimental to effective erosion and siltation control.

Temporary Seeding(with Mulch) or Temporary Seeding (without Mulch) may be performed without full preparation of the seedbed as specified in **Subsection 801.05**, where approved by the Engineer, and application of permanent erosion and siltation control measures is not practicable.

All seeding and related operations shall be continuous operations. A unit in relation to seeding area is 1,000 s.f.(100m<sup>2</sup>). For purposes of measuring water, a unit, 1 M.G. equals 1,000 gallons(m<sup>3</sup>).

**801.05-Preparing the Seedbed.** The seedbed shall be prepared in the following manner and sequence:

Each area to be seeded shall be scarified, disced, harrowed, raked, or otherwise worked until it has been loosened and pulverized to a depth as directed by the Engineer.

This operation shall be performed only when the soil is in a tillable and workable condition. Fertilizer, at the rate of not less than 20 lbs.(10 kgs ) of grade 10-10-10 or equivalent, per unit (1,000 s.f.)(100 m<sup>2</sup>), and agricultural limestone, at the rate of not less than 100 lbs per unit(50 kgs per 100 m<sup>2</sup>), shall be uniformly incorporated into the soil for a depth of approximately 1/2 inch(13 millimeters). When soil ph is below 5.5, liquid lime shall be applied at a rate of 7.5 gallons/acre(22oz/1000 s.f.) in addition to the required agricultural lime. The liquid lime product shall be from the Department's QPL. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment.

The seed group mixture shall be as specified under **Subsection 918.14.**

**801.06-Seeding.** The Engineer will specify which seed group shall be used. The seed shall be sown as soon as preparation of the seedbed has been completed. It shall be sown uniformly by means of a rotary seeder, hydraulic equipment, or other satisfactory means. Seed shall be sown at the rate of 2.5 lbs/unit (1,000 s.f.)(1.25 kgs/100 m<sup>2</sup>) for Groups "A", "B" and "C", 0.6 lbs/unit(0.3 kgs/100 m<sup>2</sup>) for Group "B1" and at a rate of 1.5 lbs/unit (75 kgs/100 m<sup>2</sup>) for all other Groups listed in **Subsection 918.14**, unless otherwise specified or directed.

Group "C" seed and seeds of legumes when sown alone shall be inoculated before sowing in accordance with the recommendations of the manufacturer of the inoculant and as directed by the Engineer.

No seeding shall be done during windy weather, or when the ground surface is frozen, wet or otherwise nontillable. No seeding shall be performed during December and January unless otherwise permitted.

**801.07-Mulching.** When seeding with mulch is specified, the mulch material may be hay, straw or other approved materials.

When the mulching material is hay or straw it shall be spread evenly over the seeded area at an approximate rate of 100 lbs/unit (50 kgs/100 m<sup>2</sup>)for straw and 150 lbs/unit(75 kgs/100 m<sup>2</sup>) for hay immediately following the seeding operations. This rate may be varied by the Engineer, depending on the texture and condition of the mulch material and the characteristics of the area seeded.

Hay or straw mulch shall be held in place by emulsified asphalt or other commercially available tackifier applied at the approximate rate of 6 gallons/unit(25 liters/100 m<sup>2</sup>) as required to hold the mulch in place.

The Contractor shall cover bridges, guardrails, signs and appurtenances, if the mulch binder is applied in such a way that it would come in contact with or discolor the structures.

m<sup>2</sup>

**801.08-Care During Construction.** All seeded areas shall be cared for properly to the Engineer's satisfaction until acceptance of the work.

Areas which have been previously seeded and mulched in accordance with this section but which have been damaged or failed to successfully establish an acceptable stand of grasses or legumes shall be repaired as directed by the Engineer. All material and labor required to repair seeded areas made necessary by negligence on a part of the Contractor will be furnished by the Contractor at no cost to the Department. The cost of repairing seeded areas, except temporary seeding, that is required through no fault of the Contractor will be measured and paid for as provided in **Subsection 801.09** and **801.10** respectively. If the Engineer directs the Contractor to place additional fertilizer on the area to be reseeded, additional liquid lime shall be applied at a rate of 5 gal/acre(15oz/1,000 s.f.) if the ph of the soil is below 5.5.

After an acceptable stand of grass has been attained, seeded areas shall be uniformly topdressed with not less than 10 lbs(5 kgs) of fertilizer of grade 10-10-10, or equivalent, per unit(100 m<sup>2</sup>) at approximately 6 month intervals, unless otherwise specified or directed.

#### COMPENSATION

**801.09-Method of Measurement.** The area of seeding to be measured for payment shall be the number of units seeded in accordance with these Specifications and accepted by the Engineer. Each unit shall consist of 1,000 s.f.(100 m<sup>2</sup>) measured along the surface.

Water necessary for preparation of the seedbed and maintenance will be measured by the M. G.(1,000 gallons)(m<sup>3</sup>) by means of calibrated tanks or distributors, or by means of accurate water meters. Water used in applying seed, fertilizer, and mulch binder will not be measured for payment.

Supplemental items used to repair seeded areas on which a satisfactory stand of grasses or legumes has not been obtained due to causes not attributed to negligence on the part of the Contractor will be measured for payment as provided below. These items shall only be used when the reseeded is confined to small areas whereby, the Contractor's operation would be severely restricted. If the areas to be reseeded are of substantial size, thereby accommodating the Contractor's normal operation, the work shall be performed in accordance with these Specifications and paid for under the applicable original seeding item.

- (a) Seedbed repair shall not be paid for directly but the cost thereof shall be included in the unit price bid for seed (Supplemental Application). If additional materials are required to repair the seedbed, payment will be made under the appropriate item or items as described in **Section 203**.
- (b) The quantity of seed measured for payment to repair seeded areas shall be the actual number of pounds(kilograms) of seed used as determined by bag count of standard weight bags or by weighing the seed on approved scales.
- (c) The quantity of fertilizer measured for payment will be the actual number of tons(metric tons) of dry fertilizer used as determined by

bag count of standard weight bags or by weighing the fertilizer on approved scales. If liquid fertilizer is used the weight shall be converted to its equivalent dry weight in tons(metric tons).

No direct payment will be made for furnishing and applying mulch and all materials used to hold the mulch in place. The cost of mulching shall be included in the unit price for Seed(Supplemental Application).

No direct payment will be made for agricultural limestone or liquid lime used in repairing seeding areas but the cost shall be included in the unit price bid for fertilizer.

Fertilizer applied, as specified or directed, to areas with an acceptable stand of grass will be measured for payment as set out in Paragraph (c) above.

**801.10-Basis of Payment.** Seeding (with Mulch) and Crown Vetch Mixture (with Mulch) will be paid for at the respective contract unit price per seeding unit, which payment shall be full compensation for preparing the seed bed and for furnishing and placing all materials, including fertilizer, agricultural limestone, seed, mulch materials, mulch binder and inoculant, if specified, complete in place.

Temporary Seeding (with Mulch), Seeding (without Mulch) and Mulch will be paid for at the respective contract unit price per seeding unit. The unit payment shall be full compensation for furnishing and placing all materials including seed, fertilizer, agricultural limestone, mulch materials and binder where mulch is used, and inoculant if specified, complete in place.

When the contract does not provide for a unit bid price for Seeding (without Mulch) and this item is used for temporary or permanent erosion control, payment shall be made at a rate per unit equal to 0.45 times the unit price bid for Seeding (with Mulch). In addition, if the contract does not require Mulch and this item is used as specified above, payment shall be made at a rate per unit equal 0.60 times the unit price bid for Seeding (with Mulch).

Water used in the preparation of the seed bed and for maintenance will be paid for at the contract unit price per M. G.(1,000 gallons)(m<sup>3</sup>) of water, which payment shall be full compensation for furnishing and applying the water as specified.

Seed (Supplemental Application) shall be paid for at the contract unit price per pound(kilogram) and shall include minor seedbed repair, mulch materials and mulch binder and inoculant, if specified, complete in place.

Fertilizer (Supplemental Application) and fertilizer applied after an acceptable stand of grass has been attained shall be paid for under the item Fertilizer(Supplemental Application) at the contract unit price per ton(metric ton) and shall include, where required, the cost of liquid lime complete in place.

**SECTION 802-LANDSCAPE PLANTING**

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## SECTION 802-LANDSCAPE PLANTING

**802.01-Description.** Landscape Planting shall consist of furnishing and planting trees, shrubs, seedlings, and ground cover of the kinds and at the locations indicated on the Plans or where directed, and in accordance with these Specifications.

### MATERIALS

**802.02-Materials.** Materials used in this construction shall conform to the following requirements:

(a) Planting Material Standards.

Before performing any work, the Contractor shall furnish proof that he has secured a nursery dealer's certificate with each shipment of plants. The certificate shall indicate the number of plants of each species in the shipment and the project number for which the plants are intended. The certificate shall also include a certification that the plant materials conform to the requirements of the Plans and these Specifications and that all local, State and Federal laws pertaining to the inspection, sales and shipment of plant materials have been complied with.

Collected plant material shall mean plants which are not nursery grown. No collected plant material shall be used unless indicated on the Plans. Any collected plant material called for on the Plans shall be dug with a ball of earth which has a minimum diameter at least 25% greater than that specified for nursery grown stock, and burlapped. Plants shall be so handled that the roots are protected at all times. During delivery, the entire load shall be suitably covered. Coverings shall not be so tight as to cause heating.

(1) Names and Grades.

Plant material shall conform to nomenclature of "Standardized Plant Names," as adopted by the Joint Committee of Horticulture Nomenclature, latest revision. Size and grading standards shall conform to the American Association of Nurserymen, Inc., as published in the "American Standard for Nursery Stocks," Z60.1, latest approved revision. No substitutions of size or grade shall be made without written permission of the Engineer. Each bundle of plants and all separate plants shall be properly identified with legible waterproof tags securely fastened to each plant or bundle of plants.

Plants shall be shipped as follows:

Seedlings in bundles of 100.  
Bare Root in bundles of 10.  
Ball and Burlap individually.

## (2) Health.

All plants, including their roots, shall be free of disease, insects, or other injurious qualities. The trunk bark of all trees shall be sound, trees shall have no large wounds, and any small wounds shall have a satisfactory callus roll formed or forming over them. Plants shall show good annual growth. Buds shall be plump and well filled for the species. Evergreen foliage shall be of good intense color.

## (3) Quality.

All plants shall be true to type; they shall have normal, well developed branch systems, and a vigorous fibrous root system; they shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. They shall have been growing in the same climatic conditions as the location of the project for at least 2 years prior to the date of the contract.

## (4) Ball and Burlap.

All balled and burlapped plants shall conform to the "American Standard for Nursery Stock," Z60.1, latest approved revision. All balls shall be of natural earth in which the plant had been growing. No manufactured or artificially produced or mudded-in balls will be accepted. Balls shall be firm and unbroken. Balled and burlapped plants may be rejected by the Engineer due to their failure to meet good digging and handling practices.

## (5) Container Grown Plants.

In addition to the requirements of the "American National Standard for Nursery Stock," container grown plants shall conform to the following specifications:

1. The space between the rim or top of the container and the soil line within the container shall not be more than 1-1/2 in.(38 mm) for the 1 gallon(3.8 liter) and 2 gallon(7.6 liter) sizes and not more than 2 1/2 in.(64 mm) for the 5 gallon(18.9 liter) size.
2. Encircling roots shall not have grown in such a manner that they will cause girdling of the trunk or stems.
3. Roots shall not protrude through drainage holes or over the rim of the container to the extent that they will be damaged while removing the root ball from the container.
4. Plants shall have been acclimated to outside conditions. Container grown plants may be used provided their use is approved in writing by the Engineer.

## (b) Miscellaneous Planting Materials.

The following materials shall be approved by the Engineer prior to being incorporated in the work:

(1) Topsoil.

This material shall be a natural, friable, fertile, fine sandy loam possessing the characteristics of representative topsoils in the vicinity which produce heavy growths of vegetation. The topsoil shall be free from subsoil, noxious weeds, stones larger than 1 in.(25 mm) in diameter, lime, cement, ashes, slag, or other deleterious matter. Topsoil shall be well drained in its original position and free from toxic quantities of acid or alkaline elements.

(2) Mulch.

Unless otherwise specified, this material shall be a standard commercial quality of peat moss weighing approximately 1 ton/3 c.y.(400 kgs/m<sup>3</sup>).

(3) Fertilizer.

This material shall be a standard commercial fertilizer conforming to the requirements of Subsection 918.15 with the guarantee of analysis conforming to a 6-12-12 formula, unless otherwise specified. The fertilizer shall be uniform in composition, free flowing, and suitable for application with approved equipment. The fertilizer shall be delivered to the site in the original unopened containers, each fully labeled with the manufacturer's guarantee of analysis and conforming to all local, State, and Federal fertilizer laws.

(4) Tree Wrappings.

This material shall be first quality 4 in.(100 mm) wide rolls of bituminous impregnated tape, corrugated or crepe paper, or equal, specifically manufactured for tree wrapping, having qualities to resist insect infestation.

(5) Water.

Water used for all planting work shall be free from any harmful or objectionable qualities or organisms.

(6) Stakes for Bracing and Anchoring.

Stakes used for guying trees shall be at least 6 feet(1.8 meters) long, of sound, sturdy material, reasonably capable of withstanding aboveground and underground conditions. Their top and bottom face dimensions shall be at least 2 x 2 in. (50 x 50 mm), or a minimum diameter of 2-3/4 in.(70 mm), or a substitute approved by the Engineer.

(7) Wire.

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Malleable galvanized wire used for guying, bracing, and anchoring of trees shall be Number 12 ga.(3.31 mm<sup>2</sup>) or an approved substitute.

(8) Hose.

Hose used for protection of tree trunks shall be new fabric-bearing rubber hose with an inside diameter of not less than 1/2 in.(13 mm).

### EQUIPMENT

**802.03-Equipment.** All equipment necessary for the satisfactory performance of this construction shall be on the project and approved before work will be permitted to begin.

**802.04-Time and Condition of Planting.** Unless otherwise specified, all planting shall be performed after the growing season in the fall and prior to April 1.

### CONSTRUCTION REQUIREMENTS

**802.05-General.** All plant and bed locations will be staked by the Engineer, or Contractor when required, in accordance with the plant list and approximate locations shown on the contract drawings. The Contractor shall perform the planting at the approved locations. After planting is completed, ground cover areas and seedling areas shall be outlined with painted stakes and twine as directed by the Engineer.

**802.06-Tree Planting Operations.**

(a) Planting Pits.

Planting pits shall be circular with vertical sides. The diameter of the pits shall be at least 2 ft.(600 mm) greater than the diameter of the ball of the tree. The depth of the pit shall be sufficient to accommodate the ball or roots of the tree when the tree is set to the finished grade, allowing 6 in.(150 mm) of prepared tamped topsoil below the roots of the plant.

(b) Prepared Topsoil.

Backfill for tree planting shall consist of prepared topsoil. Prepared topsoil shall be defined as 50% topsoil as described in **Subsection 802.02(b)**, thoroughly mixed with 50% approved material excavated from tree pits and shrub beds, plus fertilizer. Fertilizer for tree planting shall be mixed at the rate of 1-1/2 lbs/in.(0.7 kgs/25 millimeters) of tree caliper.

(c) Setting of Trees.

Before setting the trees, pits shall be backfilled with "Prepared Topsoil" to a depth of 6 in.(150 mm), tamped and watered. All plants shall be placed at such a level so that, after settlement, the

natural relationship between the original grade at which the plant grew and the present one shall be the same. Trees shall be planted plumb and oriented for desired effect as directed by the Engineer. "Prepared Topsoil" shall be tamped under and around the base of each ball to fill all voids and shall be placed in layers of 6 to 8 in.(150 to 200 mm) thickness, each layer thoroughly tamped and puddled. Burlap shall be opened at the top of the balls and adjusted to prevent air pockets. No burlap shall be pulled from under the balls. When planting bare root trees, care shall be taken to work "Prepared Topsoil" around the roots and to spread them in a natural position before backfilling. Shallow basins or saucers slightly larger than the diameter of the ball shall be formed around all trees to hold additional water.

All plants shall be thoroughly watered immediately after planting. This shall mean full and thorough saturation of all backfill in the pits and beds during the same day of planting. Planting and watering shall be one continuous operation. Water, if applied by hose, shall be applied by an open end hose at very low pressure to avoid air pockets and injury to the roots.

(d) **Guying and Staking.**

Trees shall be guyed immediately after planting, as directed by the Engineer and described herewith. Two posts and 2 guys shall be used for each tree. The posts shall be set at least 12 in.(300 mm) from the trunk and firmly in the ground so that the tree does not sway under normal wind conditions. The guy wires shall be placed solidly around the trunk of the tree in a position free from crotches. The trunk shall be protected with rubber hose and the guys tightened by twisting into a firm spiral twist. Plants shall stand plumb and firm after guying.

**802.07-Wrapping and Pruning of Trees.**

(a) **Wrapping.**

All deciduous trees shall be wrapped. Bandaging shall start at the base of the tree, unless otherwise specified, and shall cover the entire surface of the trunk to the height of the first branches. The wrapping bandage shall be secure and firmly tied at top and bottom of the trunk.

(b) **Pruning.**

All trees shall be neatly pruned after planting, in accordance with the best standard practices. The tree shall be pruned to its particular requirements. In general, at least 1/3 of the wood of deciduous trees shall be removed by thinning or shortening of branches, but no leaders shall be cut. All pruning shall be done with clean, sharp tools. All cuts over 1/2 in.(13 mm) in diameter shall be immediately covered with an approved tree paint having an asphaltic base.

**802.08-Shrub Planting.**

## (a) Planting Beds and Pits.

Planting beds shall be prepared to a depth of 4 to 6 in.(100 to 150 mm), or as directed by the Engineer. Plant pits shall be 6 in.(150 mm) deeper and 6 in.(150 mm) greater on all sides than the plant balls.

## (b) Prepared Topsoil.

Backfill for shrub planting shall consist of "Prepared Topsoil" as specified in **Subsection 802.06(b)**.

## (c) Setting of Shrubs.

Shrubs shall be set in accordance with the requirements of **Subsection 802.06(c)**.

## (d) Pruning of Shrubs.

All shrubs shall be neatly pruned or thinned immediately after planting in accordance with the best standard practices. Broken or badly bruised branches shall be removed with a clean cut. Each shrub shall be pruned to preserve its natural form or character and in a manner appropriate to its particular requirements. All pruning and thinning shall be done with sharp, clean tools. All cuts over 1/2 in.(13 mm) shall be painted with approved tree paint having an asphaltic base.

**802.09-Seedling Planting.** This Specification is intended to produce natural appearing wooded areas similar to others in the vicinity. To gain this effect, seedlings specified for a given area are to be mixed and planted as indicated on the Plans.

Holes to receive these plants are to be of sufficient size and depth to place the roots in a normal position, and to allow the plant to be set slightly below grade, leaving a depression to receive and hold water.

When seedlings have been planted, a thorough watering is to be provided on the same day. Planting and watering shall be a continuous operation. Upon completion of planting as specified above, each plant shall be solidly in the ground and thoroughly wetted.

**802.10-Ground Cover Planting.** The planting of ground cover will be an overplanting of existing grasses or other growing material. Holes to receive these plants shall be of sufficient size and depth to accommodate the roots and to allow the plant to be set slightly below grade, leaving a slight depression to receive and hold water. Two in.(50 mm) of topsoil shall be placed under the plant and around the roots. Containers except those of organic material shall be carefully removed from pot-grown plants to avoid damage to the soil ball.

Planting and watering shall be a continuous operation and thorough watering is to be provided on the same day as planting. This may be done by mechanical means if adequate equipment is available. When watering is

completed, inspection shall show that each plant has been thoroughly wetted and that the plant is solidly in the ground.

**802.11-Temporary Storage and Heeling-In.** Plants shall be shipped directly from the nursery. When temporary storage or heeling-in is required, the Contractor shall provide and prepare a suitable heeling ground or heeling-in nursery conveniently located near the planting site prior to the shipment of the plant material from the growing nursery or other source. Care shall be taken in requesting shipment so that long periods of temporary storage are avoided.

Plant material delivered to the Project shall be immediately heeled-in or transported to the planting site and planted. Material left out of ground overnight or left with its roots bare to the sun and wind, or otherwise unprotected during transit, unloading, or storage will be rejected by the Engineer.

**802.12-Mulching.** Upon completion of the planting operation for trees and shrubs, a 4 in.(100 mm) depth of mulch shall be applied within 2 days after planting, entirely covering the saucer of individual tree pits and the entire shrub beds.

**802.13-Final Cleanup.** Upon completion of all operations described in these Specifications, the Contractor shall remove all refuse, brush, including standing dead and rejected plants, sticks, packaging, and potting debris, etc., regardless of whether it was directly connected with his work or previously left by others. The general area shall be left in a neat and orderly condition meeting with the approval of the Engineer.

**802.14-Period of Establishment.** Installation of the plant material shall be regarded as part completion of the project. The "Period of Establishment" will be April 15 through September 15 following planting, except that unless otherwise specified on the Plans, the Period of Establishment will end when the project is accepted. The Period of Establishment shall not apply to seedlings.

All work to be done during this period shall be performed by fully qualified plantmen and arborists, able to make the necessary and correct decision on the spot and to perform all necessary operations in accordance with conditions existing on the project site. No untrained or semiskilled labor shall be permitted to handle any plant material during the period of establishment unless properly supervised by qualified personnel. The Contractor shall keep all plants and plant material installed in a living, healthy condition up to the date for termination of his responsibility for care specified herein. Unless otherwise specified by the Engineer, the following work shall be performed in a continuous manner during the period of establishment.

(a) Watering.

During periods of low rainfall or drought, the Contractor will be required to water all woody plants at weekly intervals unless otherwise directed by the Engineer. Surface flooding or watering

by hose will not be permitted. Sufficient quantities of water shall be applied slowly and gradually until the root area of the plants is saturated. Both force and volume of water shall be carefully adjusted. Damage to plants, backfill, mulching material, etc., shall not be permitted.

(b) Cultivating.

All planting areas shall be kept free from grass and weeds throughout the entire growing season; the area shall always be kept clean, open and properly mulched, unless covered with plastic and mulched. Such areas as slope bed plantings shall be closely mowed.

(c) Retying and Adjusting of Tree Ties and Guys.

Tree ties and guys shall be kept tight at all times during the period of establishment.

(d) Health.

Treatment of wounds, abrasions, protection from rodents, etc., shall be done as necessary or as requested by the Engineer. Spraying shall be done whenever requested by the Engineer or immediately after identification of a damaging pest or virulent disease.

Plants that are evidently dead during the period of establishment shall be removed from the site.

**802.15-Inspection and Replacement of Plants.**

(a) Primary Inspection and Replacement of Plants.

Inspection of initial planting will be made by the Engineer during and before the end of the planting season (April 1), and determination will be made by the Engineer to require replacement of dead, degenerated, defective, or missing plants. Any plant fitting into the above categories or any plant that is stagnant whether technically alive or not shall be removed and shall be replaced with the specified plant at the Contractor's expense. For each plant replaced, the Contractor shall perform all necessary work for the establishment of the plant, regardless of any already fulfilled obligation in regard to other plant material on the site. Based on the findings of the inspection mentioned above, all plants that are required to be replaced shall be replaced by the Contractor on or before May 1.

(b) Final Inspection: Replacement and Acceptance of Plants.

Final inspection of planting will be made by the Engineer, during and before the end of the first full growing season, and on or about October 1, after the first full growing season. Determinations will be made to either require replacement of plants as stated in (a) above or not to require replacement of such

plants where replacement would be inadvisable, due to seasonal or other conditions.

The Contractor's responsibility for care of all plantings that are acceptable on the date of inspection mentioned above shall end on that date.

Based on findings of the inspection mentioned above, plants that are required to be replaced shall be replaced by the Contractor with plants of the same species, size and quality at no expense to the Department. Such replacements shall be made prior to the 15th of February following one full growing season with final inspection of the replacement work on or about April 1st. The Contractor's responsibility for care of all replacement plantings installed after the inspection date mentioned above shall end upon completion and acceptance of all replacement plantings.

Unless otherwise specified on the Plans or in the Contract, final acceptance of "Landscape Planting" completed in reasonably close conformity with the Plans and in accordance with these Specifications will be made upon completion and acceptance of all replacement planting as specified above.

(c) Performance Bond

If work is completed on the entire project except for final inspection and acceptance of replacement plantings, and the project is ready for final inspection and acceptance, the Contractor may provide the Department with a performance surety bond in the amount of the unaccepted plantings to guarantee establishment of the plantings as described above.

## COMPENSATION

**802.16-Method of Measurement.** Only plants in a living, healthy condition at the time the Contractor's responsibility for care of the plants is ended, will be measured for payment. Living trees, seedlings, and shrubs will be measured for payment by the unit(per each). Ground cover will be measured for payment by the s.y.(m<sup>2</sup>), in accordance with the provisions of **Section 109**, Measurement and Payment.

**802.17-Basis of Payment.** In making partial payments for planting items, approximately 1/3 of the contract price will be considered as the value of preparing the holes for planting including placement of prepared mixtures, approximately one-third as the value of the furnishing and planting of the original plants, and the remaining one-third will be considered as the value of the plant establishment work. Partial payments for the plant establishment work may be made as the work progresses at times to be established by the Engineer at intervals of not less than three months.

All living trees, seedlings, and shrubs of the kinds and sizes specified will be paid for at the contract unit price bid per plant, complete in place. Ground cover of the type specified will be measured and paid for at the unit price bid per s.y.( m<sup>2</sup>) of ground cover, complete in place. Water required for the plant establishment period will be paid for at the unit price bid per

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M.G.(1,000 gallons)( m<sup>3</sup>). No compensation will be made for water used in plant installation work. Such payment will be full compensation for all labor and materials necessary to complete the work.

**SECTION 803-SODDING**

**803.01-Description ..... 706**  
**803.02-Sod ..... 706**  
**803.03-Fertilizer Grade ..... 706**  
**803.04-Ammonium Nitrate..... 706**  
**803.05-Agricultural Limestone ..... 707**  
**803.06-Equipment ..... 707**  
**803.07-Weather Limitations..... 707**  
**803.08-Removing and Storing Sod for Resetting ..... 707**  
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**803.10-Care and Establishment ..... 708**  
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**803.12-Method of Measurement ..... 709**  
**803.13-Basis of Payment ..... 709**

## SECTION 803-SODDING

**803.01-Description.** Sodding shall consist of furnishing and placing sod at all locations shown on the Plans or where directed, and in conformity with these Specifications.

Ordinarily, the Work will consist of the furnishing and placing of new sod originating from sources outside the rights-of-way. In some cases, however, the Work will include removing sod from areas where the requirements of the improvement would destroy existing sod, storing the sod so removed, and resetting it in areas shown on the Plans or designated by the Engineer.

### MATERIALS

**803.02-Sod.** New sod shall consist of live, dense, well-rooted growth of permanent grasses, free from Johnson grass, nut-grass, and other undesirable grasses or weeds, well-suited for the intended purpose and for the soil in which it is to be planted.

All sod shall be cleanly cut in strips having a reasonably uniform soil thickness of not less than 1 in.(25 mm) and a reasonably uniform width of not less than 8 inc in.hes(200 mm) and a length of not less than 12 in.(300 mm).

The sale or movement of turf grass or sod for propagation is controlled by **Tennessee Plant Pest Act of 1955, TCA 43-515**, et. seq. It requires inspection during the growing season and authorization by the Tennessee Department of Agriculture prior to removal. The authorization may be certificates for "Tennessee Certified Premium" sod, or "Tennessee Certified" sod. If the sod offered for use will not meet the requirements for certified sod but will meet the requirements of this Subsection, a "Permit for Movement of Non-certified Turf Grass Sod" will be required.

The Contractor should request the inspection from the Tennessee Department of Agriculture as early as possible to avoid any undue delay. The request for inspection should provide the following information: project number, county, name and address of the owner or seller, name and address of purchaser, kind or variety, exact location of sod, location where sod will be used and approximate date movement of sod will begin. The Contractor shall furnish a copy of the Department of Agriculture authorization to the Project Engineer prior to removing sod.

Request for inspection should be directed to Division of Plant Industries, Tennessee Department of Agriculture, Ellington Agricultural Center, Melrose Station 40627, Nashville, Tennessee 37204, Telephone (615) 360-0130.

**803.03-Fertilizer Grade.** Fertilizer shall conform to the requirements of **Subsection 918.15**, and shall be Grade 10-10-10 or 1-1-1 formula unless otherwise specified on the Plans or in the Special Provisions.

**803.04-Ammonium Nitrate.** Ammonium nitrate shall conform to the requirements of **Subsection 918.16**.

**803.05-Agricultural Limestone.** Agricultural limestone shall conform to the requirements of **Subsection 918.17**.

### **EQUIPMENT**

**803.06-Equipment.** All equipment necessary for satisfactory performance of this work shall be on the project, and approved before work will be permitted to begin.

### **CONSTRUCTION REQUIREMENTS**

**803.07-Weather Limitations.** Sod shall be set or reset only when the soil is moist and favorable to growth. No setting or resetting shall be done between December 1 and February 1, unless weather and soil conditions are considered favorable and permission is granted by the Engineer.

**803.08-Removing and Storing Sod for Resetting.** Sod removed from such areas as lawns, yards, lots, etc., shall be so cut, handled, and stored that the sod can be reset in the same locations from which it was removed. No interchange of sod will be permitted unless approved by the Engineer. Unless reset immediately after cutting, sod shall be stacked in piles and kept moist until reset. Sod shall be reset within 7 days after removal, unless specifically permitted by the Engineer.

**803.09-Sodding.** The area to be sodded shall be brought to the lines and grades shown on the Plans, care should be taken when laying sod adjacent to structures, ditch paving, sidewalks, etc. that water does not pond, but allowed to flow as designed. The surface of the ground to be sodded shall be loosened to a depth of not less than 1 in.(25 mm) with a rake or other device. If necessary, it shall be sprinkled until saturated for a minimum depth of 1 in.(25 mm) and kept moist until the sod is placed. Immediately before placing the sod, fertilizer and lime shall be applied uniformly to the prepared surface of the ground. Fertilizer shall be applied at the rate of 12 lbs(6 kgs) of Grade 10-10-10, or equivalent per 1,000 s.f.(100 m<sup>2</sup>). Agricultural limestone shall be applied at the rate of 100 lbs(50 kgs s) per 1,000 s.f.(100 m<sup>2</sup>).

Sod shall be placed as soon as practicable after removal from the point of origin, and shall be kept in a moist condition during the interim. On urban projects the sod shall be placed on all newly graded cut and fill slopes as work progresses to prevent damage to adjacent facilities and property due to erosion. Care shall be exercised to retain the soil on the root system during excavating, hauling and planting. All sod shall be in an acceptable condition upon delivery and placement at the work site. Sod damaged by heat or dry conditions shall not be used.

The sod shall be carefully placed by hand on the prepared ground surface with the edges in close contact and, as far as possible, in a position to break joints. Each strip of sod laid shall be fitted into place, thoroughly wetted and rolled with an approved roller or hand-tamped, as approved by the Engineer. On slopes of two to one or steeper, pinning or pegging may be required to hold the sod in place.

**803.10-Care and Establishment.** The Contractor shall provide all labor and arrange for all watering necessary for rooting of the sod. In the absence of adequate rainfall, watering shall be performed as deemed necessary by the Contractor and approved by the Engineer during the first 14 days of the period of establishment so as to maintain a moist soil. After 14 days ammonium nitrate at the rate of 3.5 lbs/1,000 s.f.(1.7 kgs/100 m<sup>2</sup>) will be applied and the sod re-watered.

All water applied during the first 14 days after sodding work is complete, including the water used in the re-watering of the sod after the application of the ammonium nitrate, will be paid for at the contract unit price for Water applied after the above described period will not be paid for and shall be included in the cost of other items.

An inspection to determine the acceptability of the sodding will be made by an authorized representative of the Department no less than 90 days but not more than 150 days after completion of the sod work or at the acceptance of the entire project, whichever is later, except that the Engineer may delay the inspection when conditions are such that the acceptability of the sodding cannot be determined at the end of the 150 days period or at the time the entire project is accepted. The Contractor shall guarantee, at the time of this inspection, a minimum of 95% live sod on the sodded areas and that there are no vacant areas of dead sod larger than 100 s.f.(15 m<sup>2</sup>). This guarantee shall apply to all permanent sodding performed in conjunction with the project, regardless of the type protection used or the season in which the sodding is performed.

When the sodding does not meet the guarantee requirements at the time of inspection, the Contractor will be required to repair all defective areas. Additional work required may include preparation of sod bed, refertilizing, resodding, or any erosion control items that were originally required. The Contractor shall perform all additional work as soon as favorable working conditions occur after being advised of the additional work required. The additional work and materials required to fulfill the guarantee requirements will not be paid for.

From the time sodding and protection work begins until the date the entire project is accepted, the Contractor shall keep all sodded areas in good condition at all times. Any damage to sodded areas shall be promptly repaired as directed. All work and materials necessary to protect, maintain, and/or restore sodded areas during the life of the contract shall be performed at no additional cost to the Department, except additional work caused by changes in the project by the Department. When it becomes necessary to disturb previously sodded areas due to slope changes, addition of paved ditches not previously located by the Engineer, or other changes made at the direction of the Engineer, payment for a reasonable amount of additional work, as determined by the Engineer, will be made at the original contract unit prices. No payment will be made for additional work due to changes made for the benefit of the Contractor, such as slope changes to obtain balance excavation in lieu of borrow excavation, nor will payment be made for additional work required because the Contractor has failed to properly coordinate his entire erosion control schedule thus causing

previously sodded areas to be disturbed by operations that could have been performed prior to sodding.

If the work is completed on the entire project, except for the expiration of the guarantee period, and the project is ready for final inspection and acceptance, the Contractor may provide the Department with a performance surety bond in the amount of the unaccepted work to guarantee establishment of the sod as described above.

The Contractor shall not allow any equipment or material placed on any planted area and shall erect suitable barricades and guards to prevent his equipment, labor, or the public from traveling on or over any area planted with sod.

If, on Contracts involving sodding and other items of construction, the other items have already been completed, the time required for establishment under this item will not be charged against the time stipulated in the Contract for completion of the project.

**803.11-Disposal of Surplus Material.** All surplus material shall be disposed of as directed by the Engineer.

#### COMPENSATION

**803.12-Method of Measurement.** Sod will be measured for payment by the s.y.(m<sup>2</sup>) in accordance with the provisions of **Section 109**, Measurement and Payment. Only areas upon which the sod has been set or reset will be measured for payment.

Water will be measured by the M. G.(1,000 gallons)(m<sup>3</sup>)by means of calibrated tanks or distributors, or by means of accurate water meter.

**803.13-Basis of Payment.** The accepted quantities of sodding will be paid for at the contract unit price per s.f.(m<sup>2</sup>) for Sodding (New Sod), and/s.f.(m<sup>2</sup>) for Removing, Storing and Resetting Sod, complete in place. Water applied as ordered by the Engineer will be paid for at the contract unit price/M. G.(1,000 gallons)(m<sup>3</sup>).

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**SECTION 804-SPRIGGING OF CROWN VETCH**

<b>804.01-Description .....</b>	<b>711</b>
<b>804.02-Materials.....</b>	<b>711</b>
<b>804.03-Equipment.....</b>	<b>711</b>
<b>804.04-General .....</b>	<b>711</b>
<b>804.05-Preparation of the Sprigging Area.....</b>	<b>711</b>
<b>804.06-Sprigging of Crowns.....</b>	<b>711</b>
<b>804.07-Mulching.....</b>	<b>712</b>
<b>804.08-Water .....</b>	<b>712</b>
<b>804.09-Method of Measurement.....</b>	<b>712</b>
<b>804.10-Basis of Payment.....</b>	<b>712</b>

## SECTION 804-SPRIGGING OF CROWN VETCH

**804.01-Description.** Sprigging of Crown Vetch shall consist of furnishing and setting crowns, furnishing and spreading commercial fertilizer, agricultural limestone and mulch material, all in accordance with these Specifications, where indicated on the Plans, and as indicated by the Engineer.

### MATERIALS

**804.02-Materials.** Materials used in this construction shall meet the requirements of the following Subsections of these Specifications:

<u>Materials</u>	<u>Subsection</u>
<b>Crowns</b>	<b>918.25</b>
<b>Fertilizer</b>	<b>918.15</b>
<b>Agricultural Limestone</b>	<b>918.17</b>
<b>Mulch Material</b>	<b>918.18</b>
<b>Mulch Binder:</b>	
<b>Emulsified Asphalt, Type SS-1 or AE-3</b>	<b>904.03</b>

### EQUIPMENT

**804.03-Equipment.** All equipment necessary for the satisfactory performance and completion of this construction shall be on the project and approved before work will be permitted to begin.

### CONSTRUCTION REQUIREMENTS

**804.04-General.** The Contractor shall notify the Engineer at least 48 hours in advance of the time he intends to begin sprigging the crowns and shall not proceed with such work until permission to do so has been granted by the Engineer.

All planting and related operations shall be continuous.

**804.05-Preparation of the Sprigging Area.** The sprigging of crown vetch will be an over-planting of existing grasses or other growing material. Fertilizer, at the rate of 12 lbs(6 kgs) of grade 0-20-20 or equivalent/1,000 s.f.(100 m<sup>2</sup>) and agricultural limestone at the rate of 100 lbs(50 kgs)/1000 s.f.(100 m<sup>2</sup>), shall be distributed uniformly over the area to be planted. The fertilizer and agricultural limestone shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of 1/2 in.(13 mm).

**804.06-Sprigging of Crowns.** Sprigging shall be performed during September-November or April-May and only when the soil is in tillable or workable condition. No crowns shall be set during windy weather or when the ground surface is frozen.

Crowns shall be set as soon as preparation of the sprig bed has been completed. The crowns shall be set at the rate of three sprigs per s.y.(m<sup>2</sup>). Crowns shall be set as specified by means of a tree-planting bar or equal.

**804.07-Mulching.** Mulching, where specified, shall be performed prior to planting as directed by the Engineer. Mulch material shall be evenly spread over the area to be planted at the rate of 100 lbs/1,000 s.y.(50 kgs/100 m<sup>2</sup>). This rate may be varied by the Engineer depending upon the texture and condition of the mulch material and the ground surface.

All areas to be mulched shall be covered with a uniform layer of mulch so that 20% to 25% of the ground is visible. The mulch shall be loose enough to allow sunlight to penetrate and air to circulate slowly, but thick enough to partially shade the ground and to reduce erosion.

The mulch shall be held in place by a method satisfactory to the Engineer. Emulsified asphalt shall be applied at the rate directed by the Engineer, not to exceed 0.1 gallon/s.y.(0.5 liter/m<sup>2</sup>), as required to hold the mulch in place.

**804.08-Water.** Application of water to the sprigged area shall be in accordance with **Subsection 802.10**.

#### COMPENSATION

**804.09-Method of Measurement.** The area requirements for planting of Crown Vetch sprigs will be measured by the number of s.y.(m<sup>2</sup>) sprigged as ordered in accordance with these specifications and accepted by the Engineer.

**804.10-Basis of Payment.** The number of crowns set will be paid for at the respective contract unit price per s.y.(m<sup>2</sup>), which price and payment shall constitute full compensation for furnishing and applying water, fertilizer, agricultural limestone, mulch material of the kinds and in the amounts specified for the preparation of the sprig bed, for the maintenance of the sprigged area, and for all labor, equipment, tools and incidentals necessary to complete the item.

**SECTION 805-EROSION CONTROL BLANKETS**

<b>805.01-Description .....</b>	<b>714</b>
<b>805.02-Materials.....</b>	<b>714</b>
<b>805.03-Equipment .....</b>	<b>714</b>
<b>805.04-General .....</b>	<b>714</b>
<b>805.05-Maintenance.....</b>	<b>714</b>
<b>805.06-Method of Measurement.....</b>	<b>715</b>
<b>805.07-Basis of Payment.....</b>	<b>715</b>

## SECTION 805-EROSION CONTROL BLANKETS

**805.01-Description.** This Work shall consist of furnishing and placing Jute Mesh, Straw, Straw With Coconut Fiber, Excelsior, or Coconut Fiber Blankets over previously prepared and seeded areas as shown on the Plans or as directed by the Engineer.

### MATERIALS

**805.02-Materials.** Materials used in this construction shall meet the requirements of the following Subsections of **Part 9 - Materials**:

<u>Material</u>	<u>Subsection</u>
Staples	918.19
Erosion Control Blankets	918.28

### EQUIPMENT

**805.03-Equipment.** All equipment necessary for the satisfactory performance of this construction shall be on the project and approved before work will be permitted to begin.

### CONSTRUCTION REQUIREMENTS

**805.04-General.** The areas to receive the erosion control blankets shall have been previously shaped, fertilized, and seeded as shown on the plans or as specified by the Engineer. The surface shall be smooth and free of depressions and eroded areas that would allow water to collect or flow under the blanket. The appropriate type of blanket as specified shall be placed within twenty four hours after the area has been seeded and prior to any rain or watering. If a Jute Mesh blanket is used, after the blanket is stapled into place, it shall be pressed into the ground with a light lawn roller or by other means approved by the Engineer.

The blankets shall be placed as indicated on the Plans and/or Standard Drawings. Staples shall be driven vertically into the ground to anchor the plastic mesh. Staples shall be spaced as specified by the Plans and/or Standard Drawings. Where blankets are laid side to side, the staples shall be placed with the staple anchoring mesh from each blanket.

In waterways, ditches, flumes, and channels the blanket shall be unrolled and placed in contact with the soil in the direction of the flow of water. The Engineer may specify additional staples or check slots in waterways where slopes are steep or large water volumes and/or velocities are anticipated.

**805.05-Maintenance.** The Contractor shall maintain the blanket installation during the life of the Contract. Prior to acceptance of the Project, if any staples have become loosened or raised, or if the blanket becomes loose, torn, or undermined for any reason, the damaged areas shall

be reshaped, re-seeded, re-fertilized and the blanket satisfactorily repaired or replaced without additional compensation.

#### COMPENSATION

**805.06-Method of Measurement.** Blankets of the specified type(s), installed and accepted, will be measured for payment complete in place by the s.y.(m<sup>2</sup>). Overlaps, overwidth and cut anchor slots will not be measured, but will be considered as incidental to the Work.

**805.07-Basis of Payment.** The preliminary preparation of the areas on which the blanket is to be placed, including seeding shall be paid for under the appropriate contract items.

Blankets of the specified type(s) measured for payment will be paid for at the contract unit price per s.y.(m<sup>2</sup>), which shall be full compensation for all materials, equipment, tools, labor, and incidentals including maintenance. The cost of placing topsoil, furnishing and application of all seed, fertilizer and water shall be paid for under their specific item numbers.