823 ROADSIDE IMPROVEMENTS

823.01 TOPSOIL

(A) Topsoil shall be natural, surface soil, in a friable condition and shall contain not less than 3% subsoil. The topsoil shall be free of hardpan material, stones and clods larger than ½ inch in diameter, sticks, tree or shrub roots, debris, toxic substances (i.e., residual pesticides) and other material detrimental to plant growth. The area to be planted and the topsoil shall be free of plant, plant seed, or plant parts of undesirable plants such as, but not limited to, bemuda grass, nut sedge, mugwort, Johnson grass, quack grass, Canada thistle or noxious weeds as set forth in the Federal Seed Act.

(B) The Contractor shall notify the Chief Engineer of the location of all sources of the topsoil and shall furnish the Chief Engineer a certified report from the agricultural experiment station or approved agricultural laboratory of an analysis performed not more than 60 calendar days prior to the date of submission. The topsoil shall be certified to meet the following requirements:

1. Soil shall be a natural, original surface soil of a sandy loam texture with a mechanical analysis of 60-65% sand, 15-25% silt and 10-15% clay.

2. Soil shall be at least 2%, but not more than 5%, organic matter.

3. Soil pH shall be from 5.5 to 6.6 inclusive unless otherwise specified.

4. Soil salinity, measured by electrical conductivilty, shall not exceed 500 parts per million (ppm) as determined by "Method of Soil Analysis" Part 2, published by the American Society of Agronomy, 1965.

(C) The soil nutrient level shall be greater than 100 lbs/acre of magnesium, 150 lbs/acre of phosphorus and 120 lbs/acre of potassium. .Limestone as per 823.02(F) may be used to adjust an acidic condition and shall be thoroughly mixed by volume. No more than 5 pounds of limestone per cubic yard of topsoil may be used for this purpose.

(D) Topsoil that has been synthesized by blending materials that do not individually meet the requirements of this specification will not be accepted even though the resulting blend meets the organic matter, mechanical analysis, pH and soluble salts requirements.

(E) The Chief Engineer reserves the right to inspect and sample all topsoil at the source and/or at the time of delivery, at no additional cost to the Contractor.

(F) Topsoil must not be delivered or handled in a frozen or muddy condition.

(G) All topsoil must be approved by the Chief Engineer before delivery to the job site. Material not meeting requirements of this specification may be rejected on or after delivery.

823.02 FERTILIZERS

(A) **FERTILIZER FOR SEEDING.** Fertilizer shall be a standard commercial grade as per standards of the Association of Official Analytical Chemists and shall contain the equivalent of 10 percent nitrogen, 6 percent phosphoric acid, and 4 percent potash by

weight, and shall be applied to all seeding and sodding areas at the rate of 1,000 lbs. per acre.

Fertilizer shall be furnished in new, clean, sealed, and properly labeled bags.

(B) FERTILIZER FOR HYDROSEEDING (Crownvetch). Standard quality commercial 0-20-20 farm grade fertilizer shall be applied at the rate of 500 pounds per acre (12 pounds per 1,000 square feet) combined with Ureaform (38-0-0) or Blue Chip Nitroform, Kapco-38, or equivalent, applied at the rate of 400 pounds per acre (9 pounds per 1,000 square feet). Ureaform 38-0-0 shall meet the following additional requirements:

Total nitrogen (TN)	38.0 percent minimum
Water-insoluble Nitrogen	27.0 percent minimum
Activity Index (AI)	40.0 percent minimum
Urea Nitrogen	3.5 percent maximum

(C) STABLE MANURE USED FOR PLANTING. Manure shall be well rotted, unleached horse and/or cow manure, free from shavings, sawdust, or refuse, and shall not contain material harmful to plant growth. It shall be not less than 6 months old nor more than 2 years old.

(D) UREAFORM FERTILIZER FOR PLANTING. Ureaform fertilizer shall be granular or pelletized with a 38-0-0 analysis.

(**E) MICROPORE FERTILIZER RELEASE PACKETS.** Micropore fertilizer release packets shall be used during the planting in accordance with packet manufacturer's instructions, or as specified. Each packet shall be sealed in a polyethylene laminated envelope and shall contain a minimum soluble fertilized analysis of 16% nitrogen, 8% phosphorus and 16% potash. Packets shall be 4 ounces, 8 year release packages as approved by the Chief Engineer.

(F) LIME. Lime, if necessary to adjust soil pH for grass renovation, shall consist of an agricultural calcic or dolomitic ground limestone containing at least 85 percent of total calcium and magnesium carbonates. Limestone shall be per standards of the Association of Official Agricultural Chemists.

Lime shall meet the following grading analysis:

SIEVE SIZE PASSING BY WEIGHT	**MINIMUM PERCENT**
No. 100	40
No. 8	95

Lime shall be applied to all grass areas at the rate of 3,000 lbs. to the acre. It shall be evenly spread and well incorporated into the soil.

823.03 SEED

(A) SEED FOR GRASS. Seed mixes and seed shall meet the requirements listed in Table 823.03. The germination portion of Crown vetch seed shall consist of 35 percent normal sprouts and 35 percent hard seed.

Seed sown from March 1 to April 30 and from August 15 to October 31 shall be Seed Mix No. 1, Seed Mix No. 2, or Seed Mix No. 3, as specified in the Special Provisions. If not specified or directed in writing, Seed Mix No. 1 shall be used.

Seeding with the above mixes at other than the indicated dates may be allowed upon written approval.

Seed Mixes No. 1 and No. 2 shall be sown at the rate of 100 pounds per acre or 2-1/2 pounds per 1,000 square feet.

Seed sown from May 1 to July 31 shall be Korean Lespedeza (Lespedeza stipulaces). This seed shall be sown at the rate of 40 pounds per acre.

Korean Lespedeza (Lespedeza stipulaces) may be sown from February 15 through March 31. This seed shall be sown at a rate of 30 pounds per acre or 1 pound per 1,000 square feet. Apply 200 pounds of 10-10-10 fertilizer per acre and apply lime if pH is less than 5.5.

(B) CROWN VETCH SEED FOR HYDROSEEDING. Seed Mix No. 3 shall be used. Crown vetch seed, sown at the rate of 20 pounds per acre, shall be 95 percent pure with 70 percent germination of which a minimum of 35 percent shall be normal sprouts and the remaining hard seed. The total mixture, including the companion nurse grass seed, shall be sown at the rate of 80 pounds per acre or 1-3/4 pounds per 1,000 square feet.

All seed shall be from the last available crop. No seed shall be accepted with a date of test of more than 9 months prior to date of sowing. All seed shall be labeled, tagged, or marked in accordance with the best practice and according to law.

TABLE 823.03 SEED MIXTURES

	Purity (percent)	Germination (percent)	Maximum Weed Seed (percent)
SEED MIX NO. 1 75% Kentucky Blue Grass (Poa pratensis) 20% Red Fescue (Festuca rubra) (Illahee Strain) 5% Red Top (Agrostia alba)	 85 95 92	 75 80 90	 0.75 0.50 1.00
SEED MIX NO. 2 70% Kentucky 31 Fescue (Festuca elatior) 30% Red Fescue (Festica rubra) (Illahee Strain)	 98 95	 90 80	 0.50 0.50
SEED MIX NO. 3 35% Perennial Rye Grass (Lolium perenne) 35% Kentucky 31 Fescue (Festuca elatior arundinacae) 30% Crownvetch (Coronilla varia Var. Penngift)	 98 98 95	 90 90 70	 0.50 0.50
OTHER SEEDS Korean Lespedeza (Lespedeza stipulaces)	98	70	0.75

823.04 MULCH

(A) MULCH FOR SEEDING. Material used for mulching in seeding areas shall be wheat or oat straw, rye or other approved hay or stems resulting from harvesting seed or approved herbaceous mowings. All mulch material shall be reasonably free from weed seed, mold, and foreign matter and shall not contain sticks larger than 1/4-inch in diameter.

Straw mulch shall be in an air-dry condition and suitable for placing with mulch blower equipment.

(B) Hydromulch shall be wood cellulose fiber mulch. Degradable green dye wood cellulose fiber or 100% recycled long fiber pulp, free from weeds or other foreign matter toxic to seed germination and suitable for hydromulching.

(C) MULCH FOR PLANTING. Mulch shall be medium grade and free from matter injurious to plant growth and shall be one of the following:

(1)Tanbark

(2) Hardwood

(3) Root bark

823.05 SOD

Sod for residential areas shall be well rooted Kentucky Blue Grass (Poa pratensis) containing a growth of not more than 30 percent of other grasses and clovers and free from noxious weeds, Bermuda grass, wild mustard, and crabgrass. Soil adhering to roots shall be not less than 1 inch thick and as uniform as practicable.

Sod for non-residential roadside areas shall be a certified grass mixture of 90 percent Tall Fescue and 10 percent Kentucky Blue Grass, or a percentage acceptable to the Chief Engineer. Improved varieties of Tall Fescue such as Finelawn, Bonanza, Mustang or Crossfire are acceptable. Sod shall be free from noxious weeds such as Bermuda grass, wild mustard and crabgrass.

Sod shall be well rooted and field grown for a minimum of 12 months. Sod shall be placed within 48 hours of being cut and rolled. It shall be cut into strips not less than 14 inches nor more that 20 inches in width. Sod shall be machine cut to a uniform thickness of ¾ inch, ±1/4 inch, at the time of cutting. Thickness shall exclude top growth and thatch. Sod shall be relatively free of thatch (3/8 inch or less) at time of cutting.

823.06 PEAT

(A) PEAT MOSS FOR PLANTS AND PLANTING. Peat moss shall be granulated sphagnum peat moss nearly free from woody substances, consisting of at least 75 per cent of partially decomposed stems and leaves of sphagnum and essentially brown in color. Texture may vary from porous-fibrous to spongy-fibrous and shall be free from sticks, stones and mineral matter. Peat moss shall be in an air-dry condition, shall have a pH of 3.5 to 5.5, and shall otherwise be per federal regulation. Peat moss shall be moistened prior to and at time of use.

(B) PEAT HUMUS FOR PLANTS AND PLANTING. Peat humus shall be a natural peat or peat humus from fresh water saturated areas, consisting of sedge, sphagnum, or reed peat deposits in which the organic matter consists of incompletely decomposed residues containing a minimum of 70% organic material by weight. Humus shall be free from sticks, stones, roots, and other objectionable materials. Samples taken at the source of supply shall show the following analysis:

pH range	4.0 to 7.5
Water absorption ability	200 percent by weight min. on oven-dry basis

Organic content: 60 percent min. when dried at 105º C

823.07 PLANT MATERIALS

(A) QUALITY. All plants, unless otherwise specifically permitted, shall conform to the standards of the current edition of "American Standard for Nursery Stock" as approved by American Standards Institute, Inc.

All plant grades shall be those established in the current edition of American Standards for Nursery Stock manual. Only one size per grade will be listed rather than a size range. The one size shall mean the minimum size for that grade and shall include plants from that size up to but not including the next larger grade size.

(B) PLANTS. Plants shall be defined as tress, shrubs, vines and plants of all descriptions. Unless otherwise specified, all plants shall be nursery grown stock that has been transplanted or root trimmed two or more times, according to the kind and size of plants. Furnished plant material shall be certified by State or Federal Department of Agriculture to be free from disease or infestation.

All plant materials shall have normal, well developed branches and a vigorous root system. The branch system shall have normal development and be free from disfiguring knots, sun-scald, injuries, abrasions of the bark, dead or dry wood, broken terminal growth, insect eggs and infestations, or other objectionable disfigurements. The plants shall be healthy and free from physical defects, plant diseases, and insect pests. Plant materials grown in fields or blocks that show evidence of containing any parts of Johnsongrass or Canada Thistle will be rejected.

(C) PLANT NAMES. All scientific and common plant names shall per "Standardized Plant Names" as adopted by the American Joint Committee on Horticultural Nomenclature. All plants shall be true to name and legibly tagged with the names and sizes of material.

(D) GRADING STANDARDS. Grading of plants, including Balled and Burlapped Specifications, Bare Root Specifications, Nursery, Collected, Container Grown ans Seedling Stock shall be as per American Standard for Nursery Stock, as approved by the American Association of Nurserymen, Inc., latest edition (ANSI Z60.1).

(E) PLANT DIGGING AND HANDLING. All plants shall be dug in conformance with the digging specifications in the current edition of American Standard for Nursery Stock, unless otherwise specified.

All bare root deciduous plants shall be shipped in a dormant condition. Roots shall be adequately protected and kept moist.

(F) PLANT SUBSTITUTION. No substitutions shall be made without prior permission of the Chief Engineer.

In cases where plant materials are not available at the time of planting, the Contractor shall submit written evidence that the plants are unavailable. The Chief Engineer may determine a suitable substitution.

823.08 PLANTING MATERIALS

(A) PEAT MOSS shall meet the requirements of 823.06(A).

(B) PEAT HUMUS shall meet the requirements of 823.06 (B).

C) STABLE MANURE shall meet the requirements of 823.02 (C).

(D) STAKES. Stakes used to support trees shall be rough sawn, straight grain hardwaood reasonably free from knots, bark, wane, warp and splits, as determined by the Chief Engineer. Stakes shall be full cut 2x2 inch thickness. The stake lengths shall be as indicated in the contract documents.

(E) GUYING & STAKING WIRE. Wire shall be new, soft annealed galvanized steel wire, free from bends and kinks. No. 10 wire shall be used in guying and No. 12 wire shall be used in staking. Turnbuckles used in guying shall be galvanized steel or zinc coated, as per 811.07.

(F) HOSE. Hose used with wire for guying and staking shall be 5/8 inch I.D. new garden or steam hose.

(G) ANTIDESICCANT. Antidesiccant, for retarding excessive loss of plant moisture and inhibiting wilt, shall be an approved emulsion that will provide a film over plant surfaces permeable enough to permit transpiration. Antidesiccant shall be used only after approval by the Chief Engineer.

(H) HERBICIDES. Herbicide shall be an EPA-approved chemical to control and prevent re-growth of undesirable vegetation. The herbicide will be subject to approval by the Chief Engineer.