ROAD COMMISSION FOR OAKLAND COUNTY

SPECIAL PROVISION
FOR
TURF ESTABLISHMENT, PERFORMANCE, RCOC

a. Description

Sections 208 and 816 of the *Michigan Department of Transportation (MDOT) 2020 Standard Specification for Construction* is supplemented by this Special Provision. The Contractor is responsible for the performance and quality of turf growth in the areas indicated on the plans and as identified by the Engineer. Comply with all federal, local, state laws when completing this work.

The work consists of fundamental turf work using proven turf establishment industry practices chosen by the Contractor and approved by the Engineer. Provide all necessary labor and equipment; select, provide, and maintain all turf establishment materials including but not limited to topsoiling, seeding and mulch materials, sodding, water; and control erosion and any subsequent sedimentation; preform turf repair and weed control, when requested by the Engineer, or until the turf establishment is accepted. It is expected that the turf growth to be fully established, durable, permanent, free of weeds/unwanted plants, mature, perennial vegetation, and resemble a golf course country club when utilizing THM or TUF seed as defined in this Special Provision for final acceptance.

Perform a site analysis, interpret the results and implement a turf establishment program to ensure compliance with this specification. The site analysis must take into consideration topsoil needs, fertilizer and pH requirements, seed mix or type of sod, existing and future soil moisture levels, slopes and grades, required erosion control items and devices, maintenance requirements, local highway snow removal and deicing practices, and any other characteristics that influence and affect turf establishment.

b. Materials

The entire restoration/maintenance plans along with proposed materials shall be submitted prior to work and approved by the Engineer.

Testing and certifications of materials for seed as defined herein must be in accordance to contract documents and the MDOT Material Source Guide.

Provide topsoil, seed, sod, mulch materials, pesticide, herbicide, and any other unique erosion control materials as necessary to fulfill this specification or detailed in the plans. Use additional materials, as necessary, to meet the standards set forth for turf establishment in this special provision.

Provide delivery tickets, bags, and bag tags to the Engineer.

1. Topsoil

   Provide furnished topsoil that will support vigorous growth. Topsoil is a material that consists of natural loam, sandy loam, silty loam, or clay loam humus bearing soils adapted to sustenance of plant life.

   Material shall be from an offsite topsoil screening plant and be loose and black in color. The

material shall be free from sod, stones or rocks greater than 0.25 inches, roots, plants, clay lumps, weed stalks, clods, debris or other contaminants as determined by the Engineer. The manufactured topsoil shall be a homogeneously blend of mineral soils or sand with stabilized organic soil amendments to produce topsoil. The topsoil shall be obtained from the upper layer of existing fertile soil and be in nutrients with negligible clay content.

Topsoil shall be in accordance with ASTM Standard D5268, 2007, "Standard Specification for Topsoil Used for Landscaping Purposes," ASTM International, West Conshohocken, PA, 2007, DOI: 10.1520/D5268-07, www.astm.org. The contractor shall test topsoil according to ASTM D5268 and the results submitted to the Engineer.

Contractor shall also test for pH content and percent organic content of an 8 to 10 oz. representative sample. One or more samples may be required. Contractor shall make recommendations using these and any additional testing required. Provide Test Data Certification according to the Materials Source Guide.

A. The pH range shall be from 6.0 to 7.5. Topsoil outside of this range shall be amended by the addition of pH adjusters as approved by the Engineer.

B. The organic matter content shall range between 2% and 6% (by dry sample weight).

Topsoil removed from the roadway shall not be used within the project and must be removed from the right of way before project completion. The removed topsoil may be salvaged for use on other projects at the Contractors' expense. All stripped, salvaged, and/or removed topsoil is the property of the contractor.

Temporary topsoil stockpiles shall be located away from drainage courses and wetlands and shall be located outside of the drip line of preserved trees. Temporary stockpile locations outside of the limits of construction shall be restored at the Contractors' expense. If temporarily stockpiling topsoil outside the right-of-way, obtain and provide the Engineer written permission from the owner of the property where the material will be placed. Temporary topsoil stockpiles shall be protected from soil erosion with silt fence and tarps, at the contractor's expense, for any exposed stockpiles left untouched over five calendar days. In lieu of tarps, the Contractor may use other methods to temporarily control erosion including, but limited to, growth of Cereal Rye seeding mixture, as approved by the Engineer.

No stripping, salvaging, and/or removing of topsoil is permitted outside of the roadway. Roadway is as defined in section 101.03 of the *MDOT 2020 Standard Specifications for Construction*.

2. Seed

Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable and according to MDOT requirements.

The bags shall show the species and variety name, lot number, net weight of contents, purity, and germination.

Provide testing of seed per MDOT Material Source Guide.

Seed must be less than 1 year old and stored as recommended by supplier.

Deliver all seed to the site in sealed containers and labeled in compliance with the Federal Seed Act and Michigan Seed Law 1965 PA 329, Michigan Seed Law and/or Certification of Seed Act 1959 PA 221.

Pure Live Seed (PLS) refers to the amount of live, viable seed in a lot of bulk seed. PLS is obtained by multiplying the purity percentage by the percentage of total viable seed, then dividing by 100.

A forb is an herbaceous flowering plant that is not a graminoid (grasses, sedges and rushes).

All wildflower seed will be placed no closer than 20 feet from any pavement edge, unless otherwise directed by the Engineer.

When seed is specified, alternate proposals/materials will be considered with written references from MDOT or public agencies with successful use within 3 years of proposed alternate. Provide 5 successful examples of MDOT projects.

The use of sod as an alternate when seed is specified for an area on the project requires the prior approval of the Engineer. There will be no changes in unit prices for the Turf Establishment pay item specified for the area.

Michigan Crop Improvement Association (MCIA) is the designated state authority to perform seed certification in the state of Michigan according to standards set by state law. Certified seed is labeled with a blue Certified tag and sold by variety name.

The Contractor is required to consider which seeds need to be cold stratified which means subjecting the seeds to both cold and moist conditions to ensure germination.
The following seed mixes are to be used as shown on the plans and pay items.

A. THM Seed Mix (Turf Loamy to Heavy)
For areas that are described as residential and business turf, use seed mixture MDOT THM mix at a minimum rate of 220 lb./acre.

These areas are well maintained, mowed approximately once a week during its established growing season. This seed mix is aesthetically pleasing and is preferred to adjacent landowners who maintain their frontage.

B. TUF Seed Mix (Turf Urban Freeway)
For all other areas, described as rural turf, use seed mixture is MDOT TUF mix at a minimum rate of 220 lb./acre.

These areas are unmaintained, never mowed, or only cut once or twice a year during its established growing season. This seed mix requires less maintenance and is preferred to adjacent landowners who do not maintain the frontage.

C. ES Seed Mix (Environmental Seed)

The ES seeding mix will be utilized to restore roadside embankment slopes adjacent to wetland areas with mature Michigan meadow vegetation (grasses & wildflowers) and contain the proportions of grasses and forbs as shown in Table 1. The mixture proportion of the seed mixture shall be accomplished by using MCIA certified seed from local origin. The seed must not be mixed together but must be packaged individually according to species. The Engineer will inspect seed before individual packages are opened.

This seed mix is suitable for forested wetland, emergent wetlands, berm and uplands.

Table 1: ES Seed Mixture Proportions

Common Name	Scientific Name	Minimum Purity (%)	Germination (%)	Grass, Sedges, Rushes Weight Lbs. (Oz)/Acre	Forbs Weight Lbs. (Oz)/Acre	Total ES Seed Mix Lbs. (Oz)/Acre
Big Bluestem Grass	Andropogon gerardii	90	85	3.5 (56)		
Canada Wild Rye	Elymus canadensis			4 (64)		
Switch Grass	Panicum virgatum			1.5 (24)		
Little Bluestem	Schizachyrium scoparius			2.5 (40)		
Indian Grass	Sorghastrum nutans			4.5 (72)		
Wild Bergamot	Monarda fistulosa				0.15625 (2.5)	
Yellow Coneflower	Ratibida pinnata				0.375 (6)	
Black-eyed Susan	Rudbeckia hirta				0.1875 (3)	
Smooth Aster	Aster laevis				0.125 (2)	
Showy Goldenrod	Solidago speciosa				0.09375 (1.5)	
Butterfly Milkweed	Asclepias tuberosa				0.5 (8)	
Totals:				**16 (256)**	**1.4375 (23)**	**17.4375 (279)**

D. BS Seed Mix (Bio-swale Seed)

The BS seeding mix will be utilized in bio-swales or grassy swales as shown on the plans. The seed must not be mixed together but must be packaged individually according to species. The Engineer will inspect seed before individual packages are opened.

Table 2: BS Seed Mixture

Common Name	Scientific Name	Permanent Grasses/Sedges PLS Lbs. (Oz)/Acre	Temporary Cover PLS Lbs. (Oz)/Acre	Forbs PLS Lbs. (Oz)/Acre	Total BS Seed Mix PLS Lbs. (Oz)/Acre
Big Bluestem	Andropogon gerardii	0.75 (12)			
Bristly Sedge	Carex comosa	0.125 (2)			
Crested Oval Sedge	Carex cristatella	0.0625 (1)			
Bottlebrush Sedge	Carex lurida	0.15625(2.5)			
Prairie Sedge Mix	Carex spp.	0.125 (2)			
Brown Fox Sedge	Carex vulpinoidea	0.25 (4)			
Virginia Wild Rye	Elymus virginicus	0.50 (8)			
Fowl Manna Grass	Glyceria striata	0.0625 (1)			
Switch Grass	Panicum virgatum	0.125 (2)			
Dark Green Rush	Scirpus atrovirens	0.125 (2)			
Wool Grass	Scirpus cyperinus	0.03125(0.5)			
Prairie Cord Grass	Spartina pectinata	0.1875 (3)			
Common Oat	Avena sativa		22.5(360)		
Annual Rye	Lolium multiflorum		6.25(100)		
Water Plantain (Various)	Alisma spp.			0.0625 (1)	
Swamp Milkweed	Asclepias incarnata			0.125 (2)	
New England Aster	Aster novae-angliae			0.03125(0.5)	
Tall Coreopsis	Coreopsis tripteris			0.0625 (1)	
Spotted Joe-Pye Weed	Eupatorium maculatum			0.015625(0.25)	

Blue Flag	Iris virginica			0.25 (4)	
Common Name	**Scientific Name**	**Permanent Grasses/Sedges PLS Lbs. (Oz)/Acre**	**Temporary Cover PLS Lbs. (Oz)/Acre**	**Forbs PLS Lbs. (Oz)/Acre**	**Total BS Seed Mix PLS Lbs. (Oz)/Acre**
Marsh Blazing Star	Liatris spicata			0.0625 (1)	
Cardinal Flower	Lobelia cardinalis			0.015625 (0.25)	
Great Blue Lobelia	Lobelia siphilitica			0.03125 (0.5)	
Common Water Horehou	Lycopus americanus			0.015625 (0.25)	
Common Arrowhead	Sagittaria latifolia			0.046875 (0.75)	
Prairie Dock	Silphium terebinthinaceum			0.0625 (1)	
Blue Vervain	Verbena hastata			0.09375 (1.5)	
Golden Alexanders	Zizia aurea			0.046875 (0.75)	
	Total:	**2.5 (40)**	**28.75 (460)**	**0.921875 (14.75)**	**32.421875 (518.75)**

3. Sod

Where sod is specified, seed will not be an acceptable material unless approved by the Engineer in writing. If a change is approved, no additional compensation will be due to the Contractor.

Mineral (topsoil) sod shall be used. Peat sod will not be allowed.

4. Mulch

Unanchored loose mulch, or mulch crimped into soil alone shall not be permitted. The following mulch types will be used with its associated pay item as specified on the plans.

Ensure mulch material is approved by the Engineer prior to placement.

A. Special Mulch

Special mulch consists of wildlife friendly materials that will not entangle or harm wildlife, including reptiles, amphibians, birds, and small mammals. Wildlife friendly mulch materials shall not contain plastic netting of any type, even if the materials are biodegradable as determined by the manufacturer. The following types of mulch are considered wildlife-friendly mulch.

(1) Biodegradable Anchors.

Wood stakes or other biodegradable stakes must be use used with special mulch.

(2) Loose Mulch with Anchoring or Natural Fiber Netting.
Provide clean, undamaged and rot free straw in an air-dry condition for loose mulch. Loose mulch must be free of deleterious material. Apply this mulch per section 816.03.E. Mulch must be anchored according to section 816.03.F and section 917.15.C. Mulching Netting per section 816.03.F and section 917.15.D. Plastic Netting and fixed mesh sizes are not allowed and shall have the same properties as the netting described below for mulch blankets.

(3) Mulch Blankets, Rolled Erosion Control Products (RECP's), or Erosion Control Blankets (ECB)'s.
Traditional stitch-bonded straw, coconut and excelsior blankets are prohibited.

(a) Mesh Size or Aperture
If netting is used, it cannot have netting or threading which entangle wildlife, and shall have **non-fixed open spaces, mesh size, or aperture so that wildlife can escape.** The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as leno weave, loose weave, or gauze weave) to form a mesh. This mesh shall result in a loose-weave, wildlife-safe design with movable joints (non-welded) between the horizontal and vertical twines, allowing the twines to move independently and thus reducing the potential for wildlife entanglement.

(b) Mesh/Netting material
The netting used in mulch blankets shall be from **natural organic fibers that are 100% biodegradable** (such as jute fiber, coir fiber, sisal, coconut husk fibers, Cotton). Plastic or synthetic materials will not be allowed, (such as polypropylene, nylon, polyethylene, and polyester). Blends of crop-based and petrochemical-based materials are not allowed (such as cornstarch and polyester). To be considered 100% biodegradable, all components, including netting and thread, must be made of natural-fiber materials. Degradable, photodegradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting (including polypropylene, nylon, polyethylene, and polyester) are not acceptable alternatives.

Table 3 shows a list of qualified products. The Contractor can submit for approval for those products not listed in this table.

Table 3: Qualified Products for Biodegradable Netting with free moving mesh

Product	Manufacturer
Rollmax BioNet	Tensar/North American Green (NAG), Poseyville, IN
Futerra EnviroNet	Profile Products LLC, Buffalo Grove, IL
Excel SR-1 (100% straw, signal sided net, short term-12 months)	Western Excelsior Corp., Evansville, IN
Excel SS-2 (100% straw, double sided net, short term-12 months)	Western Excelsior Corp., Evansville, IN

Excel CS-3 (70% straw/ 30% coconut, double sided net, extended term-24 months)	Western Excelsior Corp., Evansville, IN
Excel CC-4 (100% coconut, double sided net, long term-36 months)	Western Excelsior Corp., Evansville, IN

(4) Netless Erosion Control Blankets (NECB's)
NECB's that do not contain netting is the preferred option over netting that is 100% biodegradable. The NECB shall have the same performance as traditional mulch blankets. NECB's must be an open, flexible, and dimensionally stable network of biodegradable fibers. Table 4Table 3 shows a list of qualified products. The Contractor can submit for approval for those products not listed in this table.

Table 4: Qualified Products for NECB's

Product	Manufacturer
Curlex Netfree ECB	American Excelsior Company, Arlington, TX
Futerra F4 netless	Profile Products LLC, Buffalo Grove, IL

(5) Hydraulic Erosion Control Products (HECP), or Hydro-mulching
A HECP is a manufactured, temporary, degradable, pre-packaged fibrous material that is mixed with water and hydraulically applied as a slurry designed to reduce soil erosion and assist in the establishment and growth of vegetation. The HECP will achieve maximum performance after a sufficient curing period, which will vary based upon site specific conditions. The HECP forms a protective layer which controls erosion and allows for enhanced seed germination and accelerated plant growth.

Hydro-mulching is a standalone product of HECP only. Whereas, Hydro-seed has seed and fertilizer with HECP.

Submittals of materials used and amounts of each for each batch must be submitted and approved by the Engineer prior to placement. Contractor shall follow Manufactures recommendations.

The mixture of the refined fiber matrices, tackifiers, super-absorbents, flocculating agents, synthetic fibers, plant bio-stimulants, soil amendments, and other performance enhancing additives are the responsibility of the Contractor to achieve acceptable growth.

If they do a spray in the fall for temp they need to rework it into the soil next spring to make sure the new seed will grow, unless they do dormmate seeding.

The following are the levels of Hydro:

(a) Wood - Base Fiber Mulch or regular HECP mulch
Wood fiber, Paper cellulose, or a Blend (70% wood/30% paper) Wood will last 90 days or 3 good rain events. Application Rate for wood is 2,000 to 2,500 lb./acre. Application rate for paper is 1,500 to 2,000 #/acre and should only be used for very

flat areas.

These products are used for level ground applications up to slopes of 4:1 (horizontal to vertical). Application rate recommended of minimum 1500 lbs./acre on flat surfaces up to 2500 lbs. for slopes. Slope lengths beyond 50' Contractor must use a product in the netter performance level category listed below.

Table 5: Qualified Products for Good Performance Level HECP's

Product	Manufacture
Conwed Fibers Cellulose with Tack	Profile Products, LLC, Buffalo Grove, IL
Geoturf Paper Mulch with Tack	CSI Geoturf, Highland MI
HydraMax System Hydra GS	North American Green (NAG), Poseyville, IN
Cellulose Fiber Plus	HydroStraw, LLC
EZ-Straw Seeding Mulch with Tack	Rhino, Bradley, MI
Geoturf Handy Straw with Geotack II	CSI Geoturf, Highland MI

(b) Better Performance Level - Bonded Fiber Matrices(BFM) / Engineered Fiber Matrix (EFM).
Application rate is 1,500 lbs./acre min. and 2500 lbs. per acre on slopes up to 3:1 Beyond 75' long slopes Contractor must use a product in the best performance level category listed below.

Table 6: Qualified Products for Better Performance Level HECP's

Product	Manufacture
Geoturf 100% Wood fiber with Geotack II as specified and approved by MDOT	CSI Geoturf, Highland MI
Earthguard Pre-Packaged Fiber Matrix	Terra Novo, Bakersfield, CA
Original Formula	HydroStraw, LLC
Mat-Fiber Plus	Mat, Inc., Floodwood, MN
Soil Guard	Mat, Inc., Floodwood, MN
Bindex BFM	American Excelsior Company, Arlington, TX

(c) Best Performance Level – Fiber Reinforced Matrix (FRM)
Application Rate 3,000 to 4,500 #/Acre but based on slope.
Product must be 100% biodegradable and recommended on slopes up to 1:1 or steeper.

Table 7: Qualified Products for Best Performance Level HECP's

Product	Manufacture
ProMatrix (MDOT Approved)	Profile Products, LLC, Buffalo Grove, IL
Flex Guard	Mat, Inc., Floodwood, MN

B. Regular Mulch
Regular mulch consists of materials as defined in section 816.02 and 917 and can be used where specified on the plans.

Any of the special mulching types as described in section b.4.A of this Special Provision can be used at no extra cost to the Department. In addition, traditional stitch- bonded straw, coconut and excelsior blankets are permitted.

5. Weed Control (Herbicide)

Furnish and apply herbicide(s) as needed. Herbicide should not be used on forbs if it will damage the wanted plants. Herbicide applies to the preparation of the earth bed and also the new turf.

Sod and seed options shall require weed control within the turf establishment period.
Obtain the Engineer's approval of work methods and herbicide(s) selected prior to the application of the herbicide(s). Notify the Engineer 48 hours prior to any applications being made. As part of the Michigan Department of Agriculture (MDA) weed control application, the Contractor is required to make proper notifications and/or postings as per label and MDA requirements for all locations that will be sprayed. It is the Contractor's responsibility to select the herbicide(s) and the rate at which it is used. Complete a spray log and submit to the Engineer each day an application is made.

Do not draw water from any waterway (i.e. river, ditch, creek, lake etc.) located on state, county or municipal right-of-way, for mixing with herbicides.

Herbicide is not a pay item and is included in other items of work. It is the responsibility of the Contractor to control weeds as directed by the Engineer until all restoration related pay items are accepted.

6. Fertilizer

Furnish and apply fertilizer(s) as needed and shall meet the following minimum requirements MDOT Class A, 176 lbs./acre. Fertilizer shall be placed in accordance with section 816.03B of the *MDOT 2020 Standard Specifications for Construction*.
It is the Contractor's responsibility to select the fertilizer(s) and the rate/method at which it is used/installed.

Phosphorus is allowed for use only at the time of planting and when required by soil conditions. Obtain the Engineer's approval of work methods and fertilizer(s) prior to the application of the fertilizer(s).

7. Water

Furnish and apply water from an approved source at a rate to promote healthy growth. Water seed or sod until vigorous turf growth is accepted shall be considered included in the surface restoration work.

8. Anchors (Staples and stakes)

Staples and stakes as required must be wood or other biodegradable type anchors.

c. Construction

The Contractor is responsible for all work and all construction methods used in completing this work. Implementation of any part of the Contract Documents, *MDOT 2020 Standard Specifications for Construction*, or Standard Plans by the Contractor does not relieve the

Contractor of responsibility for acceptability of the construction methods or for the quality of the work. Restoration may be required to be performed in multiple stages and mobilizations which are at the Contractor's costs and will not be a basis for additional compensation.

1. Contractor Requirements

A. Turf Establishment Experience
At least 10 workdays prior to start of turf establishment, submit documentation to the Engineer, from the Contractor performing the turf establishment work, that they meet one or both of the following requirements.

(1) At least one person employed by the Contractor performing the turf establishment work and assigned to the job site has a degree or certificate in Turf Management, Horticulture or related field.

(2) At least one person employed by the Contractor performing the turf establishment work and assigned to the job site has at least 5 years of experience in roadside turf establishment.
Application of herbicides control must be done by a commercial herbicide applicator, licensed by the State of Michigan and certified by the Michigan Department of Agriculture (MDA) in the appropriate category to apply herbicides. Use application procedures and materials according to federal, state and local regulations. Use of restricted use chemicals is prohibited. The Contractor must provide appropriate documentation and secure approval from the Engineer before application of herbicides. Submit information to the Engineer.

B. Contractor's Field Supervision
The Contractor shall maintain an experienced full-time supervisor on Project site when work is in progress.

2. Seasonal Limitations, Planting Restrictions, and Weather Limitations
RCOC does not impose seasonal limitations FOR permanent seeding or sodding. Therefore, delete the entire section 816.3.C.4.A and the sentence "Unless

otherwise approved by the Engineer, do not place sod in June, July, or August" in section 816.3.D of the *MDOT 2020 Standard Specifications for Construction.*

Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

If dormant seeding or sodding is placed to meet Contractor's schedule, no additional payment will be made to the Contractor to establish growth according to this Special Provision.

If the Contractor chooses not to proceed with planting, the Contractor is responsible for Erosion Control at their expense.

3. Examination
Examine areas to be planted for compliance with requirements and other conditions affecting performance.

A. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

B. The Contractor shall remove from the site all existing weeds and non-native vegetation.

C. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

D. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

E. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.

F. Do not place mulch blankets, sod, mulch, etc. over structures, catch basins, or any drainage facilities.

4. Preparation (Topsoiling)

Topsoil shall be placed on a prepared earth bed in accordance with section 816.3A of the *MDOT 2020 Standard Specifications for Construction*. The existing earth bed shall be graded such that the placement of topsoil will meet the final plan grades. Place topsoil, trim and grade the finished slope (MDOT Class A) in accordance with subsection 205.3.N of the *MDOT 2020 Standard Specifications for Construction.*

A. Topsoil shall be placed 3 inches deep.

B. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, 100-year floodplain, wetlands, and plantings from damage caused by planting operations.

C. Protect grade stakes set by others until directed to remove them.

D. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Trim existing edge of grass to a straight line by mechanical methods, such as edger, sod cutter, etc., as approved by the Engineer. Excess material from trimming is property of the Contractor and shall be removed from project at no additional cost to the Department.

F. Any excavation required to obtain the required thickness of topsoil and a uniform surface of existing grade disturbed by the Contractor will not be paid for separately but is included in Turf Establishment pay items. This excess material is property of the Contractor and shall be removed from the project at no additional cost to the Department.

G. Turf shall be established in a manner that does not interfere with drainage. Turf shall be below the edge of the pavement and/or shoulder to allow surface water to uniformly

sheet flow off road. Turf shall be constructed to match elevation where meeting other hard surfaces or existing turf as directed by the Engineer.

5. Seeding

A. The application rate for seeding shall be as specified in the Materials section.

B. Seeding areas will require, placement of topsoil, fertilizer, herbicides or other weed control measures, mulch materials, and water within the turf establishment period as detailed in other sections of this specification necessary to promote vigorous seed growth.

C. Do not use wet seed or seed that is moldy or otherwise damaged. Seed must be dry and stored in a cool location prior to time of application.

D. Seed only if ground is free from snow and is not frozen.

E. Seed should ideally be sown in the fall to allow a cold-moist stratification period and allow the free-thaw action of the soil to promote seed-soil contact.

F. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer or plant pocket, or plan bed area that is covered with mulch as shown in the MDOT Standard Plan R-100 Series.

G. During placing seed and initial germination, soil surface shall be loose to promote seed soil contact.

H. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Unless hydroseeding, rake seed lightly into top 1/8-inch of soil, roll lightly, and water with fine spray, to ensure good contact with soil.

6. Hydraulic Erosion Control Products (HECP), or Hydro-seeding

A. Hydro-seeding is an acceptable means of seeding where the mulch and the seed is placed in one operation. Seeding can be broadcasted beforehand and then hydro-mulched as separate processes is also acceptable. See hydro-mulching materials section b.4.A(5) and hydro-mulching construction section c.8.A.

7. Sodding

A. Sodding areas will require, placement of topsoil, fertilizer, herbicides or other weed control measures, and water within the turf establishment period as detailed in other sections of this specification necessary to promote root growth of the sod.

B. Sod shall be placed on shoulders at a depth below the edge of pavement and/or road shoulder to allow roadway surface water to uniformly sheet flow to ditches.

8. Erosion Control (Mulching)

Erosion must be controlled at all times according to section 208 of the *MDOT 2020 Standard Specifications for Construction*. Control of soil erosion is the responsibility of the Contractor. However, sedimentation controls must be placed as indicated on the plans or as directed by the Engineer. The site must be continuously monitored by the Contractor for needed erosion repair from any cause as addressed in the contract documents. All eroded areas must be returned to original grade as detailed in the contract documents.

If sedimentation occurs in drainage structures or any watercourse or water containment area, corrective action must be taken immediately and all disturbed areas contributing to this sedimentation must be stabilized within 24 hours after the erosion occurrence. Sediment deposited as a result of the Contractor's inability to control the soil erosion must be removed at the Contractor's expense.

The Contractor must reimburse RCOC for any costs levied against the RCOC, such as fines, environmental costs, costs for remedies required, or any other costs as a result of the Contractor's failure to comply with this Special Provision and with federal, state and local laws.

A. Mulch Blankets, Rolled Erosion Control Products (RECP's), or Erosion Control Blankets (ECB)'s.
Mulch blanket seeded areas with the appropriate materials for the site conditions to promote germination and growth of seed and to mitigate soil erosion and sedimentation.

The Contractor shall use mulch blanket or high velocity mulch blanket according to MDOT Standard Specification 816. 3 G.

Before placing blanket, remove debris, rocks, and clod to provide a smooth surface to ensure the blanket remains in good contact with the slope.

Use staples/stakes as recommended by manufacturer. Installation in rocky, sandy, or other loose soil may require longer staples/stakes as recommended.

Secure blanket with staples/stakes in locations and pattern recommended by manufacturer.

Do not place mulch blanket over structures, catch basins, or any drainage facilities.

B. Hydraulic Erosion Control Products (HECP), or Hydro-mulching.
Some products can be mixed and applied with a standard hydro-seeding machine but may require a mechanically agitated hydro-seeding machine. A mechanically agitated hydro-seeding machine is recommended.

HECP is not intended to be applied in channels, swales or other areas where concentrated flows are anticipated, unless installed in conjunction with Rolled Erosion Control Products (RECPs) or permanent Turf Reinforcement Mat (TRM).
The slurry should be sprayed directly into the soil so that the slurry is thoroughly mixed and bonded to the soil. The slurry will be applied in successive layers, from two or more directions, to fully cover 100 percent of the soil surface achieving uniform coverage without shadowing. For example, from top and bottom of a slope or left and right.

It is acceptable to spray the material into the air and allow it to fall down onto the site only after the majority of the material has been applied by incorporating the slurry into the soil. This method of application should only be used to finish off an area, fill in tight application areas or “cap” the site.

The minimum application rate is at least 3,000 pounds of slurry per acre, or in accordance with the manufacturer’s recommendations or guidelines according to site characteristics to achieve a long-term longevity of 12 months or more. 3,000 lbs./acre is based on slopes less than 2:1 (H:V) with a maximum uninterrupted slope long of 100 ft. Application rates may need to be increased on highly erosive soils or on irregular surfaces such as chiseled, disked, furrowed or tracked slopes. Position the nozzle perpendicular to the soil surface and spray back and forth, extending 45 degrees from the center.

Do not apply on saturated soils or immediately before, during or after rainfall.

Overspray on paved surfaces, signs or other areas such as but limited to fire hydrants, mailboxes and posts, private properties, other surfaces which the Engineer may designate as needing to be protected shall be promptly removed and cleaned as directed by the Engineer. The costs for removal of all unwanted or unintended overspray shall be the sole responsibility of the Contractor.

C. Turf Reinforcement Mat (TRM)
A Turf Reinforcement Mat is more durable than natural vegetation such as grass but less durable then a hard armor like rock and concrete.

9. Cleanup and Protection
Promptly remove soil and debris created by restoration work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

Remove non-degradable erosion-control measures after grass establishment period.

10. Turf Maintenance
Contractor shall establish a maintenance plan during establishment period and submit plan for review/approval. The plan may be revised based on inadequate field results.
All erosion occurrences and the repairs made by the Contractor must be reported to the Engineer in the format and at the frequency required by the Engineer. Any erosion, displacement or disturbance to ongoing or completed work by any cause must be repaired by the Contractor at no additional cost to the contract.

All prepared turf restoration areas of the entire project limits are the responsibly of the Contractor until final acceptance by the Engineer. Final slopes shall be maintained during the entire turf establishment period.

All corrective action erosion repairs shall be made according to contract documents and shall be made within 24 hours if sedimentation has occurred into a watercourse, erosion may affect

the support of the roadbed, or public safety may be compromised. Otherwise, corrective action shall be made within 5 calendar days.

Maintain and establish grass by watering, fertilizing, weeding, re-planting, core aeration, and performing other operations as required to establish healthy, viable turf. Roll, re- grade, re-plant and re-mulch, or re-sod bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation. To fully repair damaged areas the Contractor may be required to perform the following work: Fill and/or re-grade rills and gullies with topsoil; fill and/or re- grade shoulder with gravel as specified on plans; re-seed or re-sod, fertilize, and when seeding, mulch material placement with anchoring.

If turf is not accepted and turf is damaged from salt from winter maintenance of roadway, any areas required to be redone will be at the Contractors expense.

Any settlement or erosion will be the responsibility of the Contractor to repair at no additional cost to the contract. The Contractor is responsible for all repairs and liable for all consequences (legal, monetary or other) associated with erosion or sedimentation damage to finished or unfinished work. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.

Areas where mulch materials have been disturbed by wind or maintenance operations add new mulch and anchor as required to prevent displacement, any areas required to be redone will be at the Contractors expense.

Shoulders, slopes, and other areas damaged by erosion prior to final acceptance of the project shall be fully repaired as directed by the Engineer at the Contractor’s expense.

Due to any erosion as part of restoration, the Contractor shall be responsible for cleaning out all drainage structures, culverts, and ditches that are located within the area of construction. All ditches shall be restored such that drainage will flow freely. The cost of this work shall be considered as included in the pay items for restoration work.

The Contractor is responsible and liable for all traffic control and safety measures required to repair and protect damaged turf areas. Protective devices such as barriers, directional signs/signals, temporary fence, or any other safety measures must be placed by the Contractor immediately after any erosion damage occurs that has the potential of endangering the public. In these instances, the Contractor must, within 24 hours of the occurrence of the damage, provide the Engineer with a written summary of the immediate action taken describing the repairs made and the safety measures taken. These protective devices are at the Contractors expense.

A. Watering

It is the responsibility of the Contractor to regularly water new seed and/or sod as needed to establish dense coverage of permanent vegetation that is free from mounds and depressions. Watering shall be considered as included in the turf establishment work.

Maintain temporary turf-watering equipment to convey water from sources and to keep turf

uniformly moist to a depth of 4 inches.

Schedule watering to prevent wilting, puddling, erosion, and displacement of seed, sod, or mulch materials. Layout temporary watering system to avoid walking over muddy or newly planted areas.

Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

B. Re-seeding/Re-Sodding

Any portion of a turf establishment area that fails to show a uniform germination, fails to root or dies shall be re-seeded or re-sodded. Such re-seeding or re-sodding shall be at the Contractor's expense and shall continue until dense vegetation is established.

C. Weeding

Weeds must be controlled to less than one percent of the Turf Establishment area or an Engineer specified specific area at all times during construction.

11. Inspection of the Work

The Contractor is responsible for all weekly inspection of turf establishment work.

The contractor shall notify the Engineer 24 hours before performing any work. Contact 248-858-4855 for notification of date and time of planned work. Work performed without notification will be considered unauthorized per contract documents.

The Contractor shall submit written notification to the Engineer of the completion of any stage of turf restoration and adequately identify the limits and location of the completed areas.

Use a Contractor’s Weekly Report, approved by the Engineer, to report inspections made and to document turf establishment work performed on this project. Complete and submit a Contractor’s Weekly Report to the Engineer when any work performed under this special provision is in progress. Submit report within 24 hours of performing work.

Include all necessary materials documentation including tests slips, certifications, bag tags, etc. with the associated Contractor’s Weekly Report.

The Engineer will determine the acceptability of the Contractor’s Weekly Report in terms of their completeness and accuracy. The Engineer reserves the right to verify all submitted measurements and computations. The Engineer’s measurements apply for final field measure and payment. Failure by the Contractor to submit acceptable and timely reports to the Engineer may result in withholding of progress pay estimates on turf-related items until such time as reports are submitted and deemed acceptable.

The Engineer reserves the right to inspect the project for any reason in accordance with subsection 104.01 of the *MDOT 2020 Standard Specifications for Construction*, including the fulfillment of other inspection requirements such as Soil Erosion and Sedimentation Control, NPDES, etc. Inspections made by the Engineer do not relieve the Contractor of the responsibility for inspections required by this special provision or the Contractor’s

responsibilities for erosion control and turf establishment.

12. Progress of Final Restoration

If in the judgment of the Engineer, adequate site restoration efforts are not being expended, then the Engineer will take the necessary steps to perform such restoration and shall charge the Contractor for all of the costs until proper order is restored. The Engineer may also charge damages or reduce the amount of payment.

13. Submittals

The following is a general list of submittals for this special provision:

A. Documentation showing that Contractor meets Turf Establishment Experience Requirements.

B. List of all proposed materials planned to be used on project.

C. When applicable, any alternate materials proposed to be used on the project or other Contractor requests.

D. Topsoil test results.

E. Written notification of the completion of any stage, and its limits and location.

F. Herbicide spray log.

G. Contractor's Weekly Report of inspections.

H. Contractor maintenance plan.

I. Certifications according to MDOT Material Source Guide.

J. Any other documents to meet this Special Provision and Contract Documents.

14. Final Acceptance

The Engineer determines final acceptance and final payment for restoration areas after the Contractor's written request for final inspection of turf, established growth, and establishment period as defined in this special provision. The Contractor may accompany the Engineer during acceptance inspections. If the Contractor would like to attend the acceptance inspections, the Contractor is to provide written notice to the Engineer.

A. Establishment Period

Acceptance will only be considered after 60 calendar days of placement. The days do not include the calendar days between October 10 and April 15.

If the contractor does not establish growth by October 10, the contractor is responsible for all soil erosion and sedimentation control measures. At a minimum, this includes temporary mulch placement in disturbed areas to prevent erosion. The cost for this work is not paid for separately unless there is a separate pay item included in the Contract. At

the sole discretion of the Engineer, the temporary mulch pay item may be used.

B. Established Growth

Established growth must be met throughout all exposed areas of the project designated on the plans or identified by the Engineer as turf establishment areas and is defined by the following minimum parameters:

(1) Meet all requirements of this Special Provision.

(2) No exposed bare soil and the turf must be fully germinated.

(3) Dark green in color and in a vigorous growing condition.

(4) Healthy, uniform, erosion free, weed free, disease free.

(5) Free of surface irregularities.

(6) For Seeded areas, 95 percent of the restoration areas must have established growth. The Engineer may choose, at their sole discretion, to apply a 95 percent established growth to any on specific area which is defined as growth coverage exceeding 95 percent over any ten square feet and bare spots not exceeding one inch by one inch.

(7) For sodded areas, 100 percent of the restoration areas must have established growth. Sod will be accepted when it is rooted into the prepared earth bed, as determined by the Engineer.

(8) Any other items required by Special Provision or Engineer.

C. Contract Adjustments

If Contractor does not receive final acceptance of turf establishment within 90 calendar days of completion of a stage, a negative contract adjustment of $1,000.00 per week will be applied to the Contract.

D. Dispute Resolution

If the Contractor does not agree with the decision made by the Engineer, the Contractor may request an inspection by a mutually agreed upon third party. A joint inspection, to include the Engineer, the Contractor, and the third party, will be scheduled by the Engineer. All expert fees and expenses charged by the third party must be paid by the Contractor.

d. Measurement and Payment

The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	Pay Unit
Turf Establishment, Sod, Performance, RCOC	Square Yard
Turf Establishment, ES Seed, Regular Mulch, Performance, RCOC	Square Yard
Turf Establishment, ES Seed, Spec Mulch, Performance, RCOC	Square Yard
Turf Establishment, THM Seed, Regular Mulch, Performance, RCOC	Square Yard
Turf Establishment, THM Seed, Spec Mulch, Performance, RCOC	Square Yard
Turf Establishment, TUF Seed, Regular Mulch, Performance, RCOC	Square Yard
Turf Establishment, TUF Seed, Spec Mulch, Performance, RCOC	Square Yard

The Contractor is responsible for growth of turf.

These pay items will be measured in place by area in square yards. All materials, labor and equipment required or selected by the Contractor to install, maintain, inspect, testing by the Contractor, repair and meet the acceptance parameters for turf establishment specified in this special provision, including preparation, updating and submittal of the Contractor's Weekly Reports, are included in the contract unit price bid for these pay items.

All of the above requirements within the Special Provision shall not be considered for additional payment and shall be included as part of the contract unit price for these pay items until the turf is accepted**.**

Repairs made to damaged turf establishment areas as a result of any storm event or erosion shall be included in these pay items.

Restoration outside the work zone as defined by the Engineer will not be paid for and is the responsibility of the Contractor to restore.

The following schedule of payment applies to work performed according to this special provision.

Upon written notification by the Contractor of completion of the placement of the mulch stage, including placement of seed, or the placement of sod, 75 percent of the authorized amount for the specified pay item will be paid to the Contractor.

The remaining 25 percent of the authorized amount will be paid upon completion of all other work necessary to comply with this special provision and to meet all final acceptance parameters for these pay items.

If the construction schedule is modified or an extension of time is approved, the contractor shall adjust the turf establishment plan, **watering, and turf maintenance** at no additional cost to the contract.