MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**WETLAND AND BERM SEEDING**

ISH:TDS 1 of 8 APPR:JW:JLB:03-10-21

**a. Description.** This work consists of seeding in wetland areas. This special provision covers the requirements for the seeding that is identified in the proposed emergent and forested wetland areas. Ensure all work is done in accordance with section 816 of the Standard Specifications for Construction, except where noted herein and as directed by the Engineer.

**b. Materials.**

1. Product Delivery, Storage, and Handling. Ensure all seeds are packaged and kept dry to ensure adequate protection against damage, and maintain dormancy while in transit, storage or during planting operations.

Ensure all seed is delivered to the site in sealed containers and labeled, in compliance with the Federal Seed Act and MCL 286.701, et. seq, as amended.

When applicable, the wetland seed supplier must provide seed that has been treated to overcome dormancy mechanisms during the first growing season. Some of the specified species do not require this treatment.

A. Submittals.

(1) At the preconstruction meeting, submit for approval to the Engineer a written description of the proposed seed mixes indicating the following:

(a) Name and Location of seed supplier(s).

(b) Geographic origins of each seed species.

(c) Percentage of Pure Live Seed (PLS) for each species or commitment by supplier to provide germination results.

(d) Proposed substitutions of species due to lack of availability. Ensure all substitutions are approved by Engineer or Wetland Mitigation Specialist prior to seeding.

(e) Within 30 days prior to starting work, submit copies of all seed labels to Engineer.

(2) At the preconstruction meeting, submit a project work schedule to the Engineer indicating the dates of each of the following events:

(a) Approximate collection dates for each species.

(b) Seed installation.

(c) Substantial completion of work.

B. Seed Testing Requirements. The seed weights noted indicate weight per acre in Pure Live Seed (PLS) and must mean the total amount of fresh new crop seed per acre for all species listed. If the seed supplier is unable to verify the percentage of PLS prior to installation, the supplier must submit germination reports that identify the actual germination rates of each specified species. Based on these results, the Contractor will provide supplemental seeding for each species that does not meet the specified rates of PLS. Ensure all reports are submitted within 3 months following seed collection and additional seeding will be required the following late fall or spring, whichever comes first.

C. Seed Mix Composition. Ensure the seed mixtures are composed of the species listed (by weight). Weights of each species to be included in each mixture are also shown for a one acre application.

D. Fertilizer. Fertilizer is not required for wetland seed mixes.

2. Seeding Mixtures. No aggressive, threatened, endangered, or special concern species may be in the seed mixes. Species may be substituted if unavailable, as approved by the MDOT Wetland Mitigation Specialist. Ensure native seed is obtained from sources within the same EPA Level III Ecoregion, or the next adjacent Ecoregion, preferably to the West or East.

Ensure seed is less than 1 year old. Ensure seed is stored as recommended by supplier. The following seed companies or approved equal are suitable seed suppliers:

Cardno Native Plant Nursery Michigan Wildflower Farm

128 Sunset Drive 11770 Cutler Road

Walkerton, IN 46574 Portland, MI 48875

(574) 586-2412 (517) 647-6010

Native Connections Shooting Star Native Seeds

17080 Hoshel Road 20740 County Road 33

Three Rivers, MI 49093 Spring Grove, MN 55974

(269) 580-4765 (507) 498-3944

A. Forested Wetland Seed Mixture. Apply to the mitigation wetland as shown on the plans or as directed by the Engineer or Wetland Mitigation Specialist.

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| PERMANENT GRASSES/SEDGES |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Calamagrostis canadensis* | Canada blue-joint | OBL | 2.00 |
| *Carex crinita* | Sedge | FACW | 1.50 |
| *Carex hystericina* | Sedge | OBL | 4.00 |
| *Carex lupulina* | Sedge | OBL | 6.00 |
| *Carex vulpinoidea* | Sedge | OBL | 2.75 |
| *Elymus canadensis* | Canada wild-rye | FAC | 120.00 |
| *Elymus virginicus* | Virginia wild-rye | FACW | 120.00 |
| *Glyceria striata* | Fowl manna grass | OBL | 2.00 |
| *Leersia oryzoides* | Rice cut grass | OBL | 4.00 |
| *Panicum virgatum* | Switch grass | FAC | 4.00 |
| *Schoenoplectus acutus* | Hardstem bulrush | OBL | 3.00 |
| *Spartina pectinata* | Prairie cord grass | FACW | 16.00 |
| TOTAL: | 285.25 ounces/acre |
| = 17.83 pounds/acre |

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| FORBS |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Alisma plantago-aquatica* | Water-plantain | OBL | 3.00 |
| *Aster umbellatus* | White aster | FACW | 1.25 |
| *Bidens cernua* | Bur-marigold | OBL | 3.00 |
| *Chelone glabra* | Turtlehead | OBL | 1.25 |
| *Helenium autumnale* | Sneezeweed | FACW | 1.50 |
| *Lobelia siphilitica* | Blue lobelia | FACW | 1.50 |
| *Mimulus ringens* | Monkey flower | OBL | 1.75 |
| *Rudbeckia laciniata* | Cone flower | FACW | 0.50 |
| *Verbesina alternifolia* | Wingstem | FACW | 1.00 |
| TOTAL: | 14.75 ounces/acre |
| = 0.92 pound/acre |

B. Emergent Wetland Seed Mixture. Apply to the mitigation wetland as shown on the plans or as directed by the Engineer or Wetland Mitigation Specialist.

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| PERMANENT GRASSES/SEDGES |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Carex comosa* | Sedge | OBL | 2.00 |
| *Carex lacustris*  | Sedge | OBL | 1.50 |
| *Carex lurida*  | Sedge | OBL | 4.00 |
| *Eleocharis obtusa*  | Spike-rush | OBL | 3.00 |
| *Juncus effusus*  | Soft-stemmed rush | OBL | 4.00 |
| *Leersia orzyoides*  | Rice cut grass | OBL | 12.00 |
| *Schoenoplectus acutus* | Bulrush | OBL | 6.00 |
| *Schoenoplectus pungens* | Three-square | OBL | 6.00 |
| *Schoenoplectus tabernaemontani* | Bulrush | OBL | 8.00 |
| TOTAL: | 46.50 ounces/acre |
|  | = 2.91 pounds/acre |

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| FORBS |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Acorus calamus*  | Sweet-flag | OBL | 4.00 |
| *Asclepias incarnata*  | Swamp milkweed | OBL | 2.00 |
| *Alisma plantago-aquatica* | Water-plaintain | OBL | 4.00 |
| *Eupatorium maculatum*  | Joe-pye weed | OBL | 0.50 |
| *Iris virginica shrevei*  | Iris | OBL | 4.00 |
| *Lobelia cardinalis*  | Cardinal flower | OBL | 0.75 |
| *Lobelia siphilitica*  | Blue lobelia | FACW | 0.75 |
| *Ludwigia alternifolia*  | Seedbox | OBL | 0.50 |
| *Mimulus ringens*  | Monkey flower | OBL | 1.00 |
| *Peltandra virginica*  | Arrow-arum | OBL | 12.00 |
| *Pontederia cordata*  | Pickerel weed | OBL | 8.00 |
| *Sagittaria latifolia*  | Arrowhead | OBL | 16.00 |
| *Sparganium eurycarpum*  | Bur-reed | OBL | 4.00 |
| *Verbena hastata*  | Blue vervain | FACW | 2.00 |
| TOTAL: | 59.50 ounces/acre |
|  | = 3.72 pounds/acre |

C. Berm and Upland Seed Mixture. Apply to berms, stockpiles, spoil sites and mitigation wetland sideslopes as shows on the plans or as directed by the Engineer or Wetland Mitigation Specialist.

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| PERMANENT GRASSES |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Andropogon gerardii* | Big bluestem | FAC | 48.00 |
| *Andropogon scoparius* | Little bluestem | FACU | 48.00 |
| *Elymus virginicus* | Virginia wild-rye | FACW | 128.00 |
| *Panicum virgatum* | Switch grass | FAC | 24.00 |
| *Sorghastrum nutans* | Indian grass | FACU | 48.00 |
| TOTAL: | 296.00 ounces/acre |
| = 18.50 pounds/acre |

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| FORBS |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Asclepias syriaca* | Common milkweed | UPL | 0.50 |
| *Asclepias tuberosa* | Butterfly milkweed | UPL | 1.00 |
| *Chamaecrista fasciculata* | Partridge pea | FACU | 8.00 |
| *Coreopsis lanceolata* | Sand coreopsis | FACU | 3.00 |
| *Heliopsis helianthoides* | False sunflower | FACU | 0.25 |
| *Pycnanthemum tenuifolium* | Mountain mint | FAC | 0.50 |
| *Ratibida pinnata* | Yellow coneflower | UPL | 2.50 |
| *Rudbeckia hirta* | Black-eyed susan | FACU | 6.00 |
| *Symphyotrichum laeve* | Smooth blue aster | FACU | 0.25 |
| *Symphyotrichum novae-angliae* | New England aster | FACW | 0.75 |
| TOTAL: | 22.75 ounce/acre |
| = 1.42 pounds/acre |

D. Native Pollinator Seed Mixture. Apply to the mitigation wetland as shown on the plans or as directed by the Engineer or Wetland Mitigation Specialist.

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| PERMANENT GRASSES |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Bouteloua curtipendula* | Side-oats grama | UPL | 8.00 |
| *Elymus canadensis* | Canada wild rye | FAC | 8.00 |
| *Schizachyrium scoparius* | Little bluestem | FACU | 16.00 |
| *Sorghastrum nutans* | Indian grass | FACU | 16.00 |
| TOTAL: | 48.00 ounces/acre |
| = 3.00 pounds/acre |

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| FORBS |
| Scientific Name | Common Name | Wetland Indicator | Quantity (ounces/acre) |
| *Aquilegia canadensis* | Wild columbine | FAC | 8.00 |
| *Asclepias syriaca* | Common milkweed | UPL | 6.50 |
| *Asclepias tuberosa* | Butterflyweed | UPL | 6.50 |
| *Aster laevis* | Smooth aster\* | UPL | 6.50 |
| *Brickellia eupatoroides* | False boneset | UPL | 8.00 |
| *Coreopsis lanceolata* | Sand tickseed | FACU | 6.50 |
| *Echinacea purpurea* | Purple coneflower | UPL | 8.00 |
| *Liatris aspera* | Rough blazing star | UPL | 6.50 |
| *Monarda fistulosa* | Bergamont | FACU | 8.00 |
| *Monarda punctata* | Horsemint | UPL | 5.00 |
| *Penstemon digitalis* | Foxglove beardstongue | FAC | 6.50 |
| *Pycnanthemum virginianum* | Mountain mint | FACW | 1.50 |
| *Rudbeckia hirta* | Black-eyed susan | FACU | 12.00 |
| *Solidago rigida* | Stiff goldenrod | FACU | 8.00 |
| *Tradescantia ohiensis* | Spiderwort | FACU | 6.50 |
| *Verbena stricta* | Hoary vervain | UPL | 8.00 |
| TOTAL: | 48.00 ounces/acre |
| = 3.00 pounds/acre |
| \* Ensure that the seed is de-bearded and free from awns. |

E. Temporary Seed Mixture. Must consist of annual rye (*Lolium multiflorum*), common oats (*Avena sativa*), or another approved equivalent. Apply temporary seed at a rate of 40 pounds per acre on all disturbed areas across the project site. Mix and apply temporary seed mixture with the berm and upland seed mixture, and forested wetland seed mixture.

**c.** **Construction.**

1. General Environmental Conditions. Perform work only when directed by the Engineer. Coordination is required to ensure rainfall does not result in soil moisture conditions that will cause excessive rutting during seeding operations. To meet this requirement, it may be necessary to seed portions of the site as the grading is completed. Failure to meet this requirement will not be an acceptable reason for not installing the seed as specified. Wetland water levels may be drawn down to the lowest level during seeding and pumping may be allowed as directed by the Engineer. Upon completion of seeding reestablish water levels as directed by the Engineer.

Avoid soil compaction in seeding zones as much as possible. Route equipment access and travel around all seeding areas, and limit repeat passes over the same area during all grading, topsoil application, and decompaction work. Utilize equipment having low unit pressure ground contact whenever possible. Prior to seeding, repair any ruts, rills or gullies greater than 2 inches in depth to create smooth continuous grades.

Prepare site by measuring and correcting compaction within the wetland planting zones in the subsoil before application of topsoil, and again in the topsoil itself after application of the full 12 inches. Measure compaction in the subgrade before topsoil application with an approved soil compaction tester to a depth of 12 inches. If readings average greater than 250 pounds per square inch (psi), ensure the soil is ripped, disked, or otherwise loosened to a depth of at least 12 inches until compaction readings average below 250 psi to provide proper conditions for plant root growth. Measure compaction again in the topsoil after application to final grades and correct if necessary.

Do not apply materials over snow or ice. Do not apply seeds, seed mixtures, or slurries with seeds when wind conditions are such that materials would be carried beyond designated areas or materials would not be uniformly applied. Do not undertake seeding and planting activities during stormy weather when excessive precipitation may result in washing of seeds and plantings away from location intended. Do not sow seed where standing water is present. Do not install plant materials during periods of temperature extremes when atmospheric temperature may drop below 36 degrees Fahrenheit (F) or rise above 90 degrees F.

2. Seeding Equipment.

A. Tractors and Crawlers. Must have low-pressure flotation tires or broad tracks so soil compaction is minimized in areas of site preparation or seeding activities.

B. Disc. In good repair with sound unbroken blades, weighted, as necessary to achieve required tillage depth.

C. Rollers or Cultipackers. Minimum 6 inch diameter rollers; of sufficient weight to pulverize clods of soil. To be used following rough grading on subgrade soils as a preparation for installation of seedbed soils.

D. Airway Shattertyne. Roller tynes must be 10 to 12 inches outside diameter so that topsoil or organic-rich common fill and surface mulches are mixed into top 2 to 4 inches of subgrade. Ensure weighting of this equipment is minimal to avoid compaction of organic-rich common fill.

E. Hydraulic Seeder. Hydraulic seeding equipment must include a pump rated and operated at no less than 100 gallons per minute and no less than 100 psi pressure. Ensure tank has a mechanical agitator powerful enough to keep seed in suspension in mixture.

F. Spinning Disc Seeder. When spinning disc seeders are used, mix individual seeds comprising mixture with an appropriate dispersal medium such as damp sterile sand or sawdust prior to sowing.

G. Tractor-drawn or Mounted Seeders. Provide with a calibrated adjustable gate opening providing uniform flow over a width adapted to work and able to drop seed directly on prepared seedbed.

3. Seasonal Limitations. Complete the seeding from April 1 to June 15 or from September 15 to first frost. Optimal wetland seeding time is October 1 through first frost to allow repeat freeze-thaw cycles to incorporate the seed into the substrate and provide cold stratification to break seed dormancy. Ensure seeding is not being performed during periods of snow cover.

4. Seed Installation. Ensure layout of seed bed edges is completed by the Contractor’s surveyor locating the specified contour elevation shown on the plans. The Engineer reserves the right to adjust bed lines without adjusting total seeded area, to meet field conditions, at no additional cost to the contract.

Ensure seeding method(s) is(are) approved by the Engineer prior to seed installation. Hydroseeding equipment cannot be used to install wetland seed. Hydroseeding equipment may be used for all other seed mixes specified. Seeding method(s) selected must ensure complete coverage of the areas to be seeded. Ensure planting depth for seed mixes is not more than 1/4 inch deep. Ensure wetland seeding is performed while the wetland is dry: either immediately following construction prior to inundation, or during periods of normal dry-down. Acceptable methods of wetland seed installation are listed below.

a. Broadcast Seeding. Apply the seed uniformly over the surface using a tractor-mounted combination seeder/cultipacker unit (Brillion, Truax Trillion, or equal). Ensure the seeder is calibrated to uniformly apply the seed at the specified rate. A cone seeder or other similar broadcasting equipment may also be used. Ensure seed is uniformly applied at the specified rates. Immediately following seeding, the seed must then be pressed into the surface using a cultipacker or roller, at depths not-to-exceed 1/4 inch.

b. Drill Seeding. A rangeland-type no-till drill (Truax, Tye, or equal) designed to plant native grasses and forbs may be used. Ensure the seeder is calibrated to uniformly apply the seed at the specified rates. Ensure equipment is adjusted to prevent seed from being installed deeper than 1/4 inch into the soil.

Install blown and crimped straw mulch in all areas seeded with Berm and Upland Seed Mix. Apply straw mulch uniformly at a rate of 1.5 tons per acre immediately following seed installation. Crimp all blown straw 1 to 3 inches into the soil. Do not apply mulch prior to seed installation.

5. Performance Standard. All seeded areas will be inspected by the Engineer and/or the Wetland Mitigation Specialist at the end of the first growing season for health, vigor, signs of erosion and bare areas. All bare areas larger than 10 square feet will require reseeding with the seed mix appropriate to that location by the Contractor at no cost to the contract. Final acceptance of seeded areas will require 90 percent vegetative cover of originally seeded areas. All seeding applications must comply with the requirements of this special provision.

6. Final Acceptance and Warranty. The Contractor must warrant all plant material to be true to botanical name.

A. The Contractor will not be responsible for abuse or damage by others, or unusual phenomena or incidents beyond the Contractors control which result from natural causes such as floods, lightning, storms, freezing rains, severe predation, winds over 60 miles per hour (mph), fires or vandalism.

B. Ensure the Contractor establishes a dense cover of herbaceous species on all wetland areas seeded under the contract. The Wetland Mitigation Specialist will conduct a field inspection of all seeded areas at the end of the first full growing season. Final acceptance will be granted at the end of the first full growing season.

(1) Reseed areas which do not meet the contract requirements within acceptable planting dates as directed by the Wetland Mitigation Specialist.

(2) The Wetland Mitigation Specialist will conduct a time meander search during the field inspections. This procedure consists of a random search of 20 percent of the seeded areas.

(3) Acceptance will be granted if the seeded areas meet the following parameters: 80 percent of species seeded are present and 90 percent total cover is achieved. Reseed areas requiring reseeding as originally specified at no additional cost to the contract.

7. Cleaning, Removal and Restoration. Upon completion of seed installation, remove from the site and legally dispose of all trash and debris including any material removed during grade preparation. Restore existing wetland and upland areas damaged by operations under the contract. Restoration will include finish grading and seeding as required to match existing grade and/or wetlands, and maintenance of restored areas. Ensure any damage by the Contractor to established or newly seeded areas not within the project scope of work is repaired and reseeded at no cost to the contract.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for in accordance with subsection 816.04 of the Standard Specifications for Construction and these additional pay items:

**Pay Item Pay Unit**

Forested Wetland Seed Mixture Square Yard

Emergent Wetland Seed Mixture Square Yard

Berm and Upland Seed Mixture Square Yard

Native Pollinator Seed Mixture Square Yard

Temp Seed Mixture Square Yard

The contract unit price for the pay items above includes all site preparation, labor, materials, including straw mulch, and equipment required to complete the work, including dewatering if required and the proper storage of all seed materials, as specified herein and as detailed on the plans.