

APPENDIX V

MATERIAL SPECIFICATIONS

1. Fill and embankment soil
 - a. Dam embankment – MCD dams were constructed using hydraulic fill methods to place different gradations of soil materials in specific zones. Any fill material placed in a dam embankment must be specified to match the existing materials in the zone where it is to be placed. Soil boring or test pits may be required to define the characteristics of the existing material. Soil must be clean natural material free from masses of organic matter, sticks, branches, roots, broken concrete, asphalt, metal, building rubble, and other debris, including hazardous and regulated solid wastes. Under no circumstances shall frozen earth, snow, or ice in the material be considered acceptable.
 - b. Levee embankment – material placed in levee embankments should be naturally occurring or contractor blended clayey material. Addition of lime, cement, or other soil amendments for any reason is not permitted. Soil that is classified in accordance with ASTM D2487 and the Unified Soil Classification System as CH and CL is suitable. Soil classified as ML shall be considered unsuitable; however, minor amounts of ML may be suitably blended with CH or CL to formulate a material that classifies as a CL as per ASTM D2487. Soil must be free from masses of organic matter, sticks, branches, roots, broken concrete, asphalt, metal, building rubble, and other debris, including hazardous and regulated solid wastes. Soil from a contractor-supplied earthen clay material source may not contain excessive amounts of wood. Not more than 1% (by volume) of objectionable material shall be contained in clay material. Pockets and/or zones of wood shall not be acceptable. Material consisting of greater than 35% sands (by dry weight) or materials with a Plasticity Index (PI) of less than 10 will not be accepted as well as material having an organic content exceeding 9% by weight. Under no circumstances shall frozen earth, snow, or ice in the material be considered acceptable.
 - c. Berm or blanket – material placed in a berm or blanket designed to reinforce a dam or levee embankment must meet the design specifications for the berm or blanket. Soil must be clean natural material free from masses of organic matter, sticks, branches, roots, broken concrete, asphalt, metal, building rubble, and other debris, including hazardous and regulated solid wastes. Under no circumstances shall frozen earth, snow, or ice in the material be considered acceptable.
 - d. Random fill – areas designed by MCD as not integral to dam and levee embankments may be filled with random fill material. Soil must be clean natural material free from masses of organic matter, sticks, branches, roots, broken concrete, asphalt, metal, building rubble, and other debris, including hazardous and regulated solid wastes. Under no circumstances shall frozen earth, snow, or ice in the material be considered acceptable.
2. Vegetation Restoration of Levee Slopes shall consist of one of the following methods:

Hydroseeding

- a. Between the Seeding Period of **March 15th through October 30th** all disturbed levee slopes shall be hydroseeded.

- b. Seed types shall consist of an 80/20 Turf Type Tall Fescue Mix with perennial rye with an application rate of 8 pounds per 1000 square feet.
- c. Fertilizer shall be 18-24-12 25% Polyplus Fertilizer.
- d. Mulch shall consist of Cellulose (Paper) Fiber Mulch, or Wood Fiber Mulch. Application Rate for mulch shall be 2000 pounds per acre.
- e. Tackifier shall be added to the solution and applied at an application rate of 2 gallons per acre. The tackifier shall not contain any priority pollutants listed under the U.S. Clean Water Act Section 307(2)(1) Priority Pollutant List (40 CFR 401.15).
- f. Application of the slurry should proceed until a uniform cover is achieved.
- g. Prior to application, the topsoil on the levee slope shall be scarified by tracking it in using a steel cleated piece of equipment.
- h. Hydraulic matrices require 24 hours to dry before rainfall occurs to be effective.
- i. Hydroseeded slopes should be inspected periodically for damage due to wind, water, or human disturbance.
- j. Repair all damaged areas immediately using hydroseeding at the original specifications.
- k. Supplemental watering may be required.

Note: Smaller projects during the Seeding Period of **March 15th through October 30th** may use erosion control blankets as described below with approval from MCD.

Erosion Control Blankets

- a. Between the Seeding Period of **October 31st through March 14th** all disturbed levee slopes shall be protected with biodegradable straw erosion control blankets.
- b. The erosion control blankets shall consist of a rapid-breakdown polypropylene netting design, using the finest straw fibers available, be environmentally sensitive and shall be certified that they are weed seed free.
- c. Performance capabilities shall have a shear stress rating of 84 Pa (1.75 lb/ft²) for slopes that are 2:1 and flatter.
- d. Seed types shall consist of an 80/20 Turf Type Tall Fescue Mix with perennial rye with an application rate of 8 pounds per 1000 square feet.
- e. Fertilizer shall be 18-24-12 25% Polyplus Fertilizer.

3. All other areas

- a. All disturbed earth areas shall be seeded. Seed types shall meet specifications of an 80/20 Turf Type Tall Fescue Mix with perennial rye.
- b. MCD must approve seed mix prior to seeding.
- c. Application rate of 8 pounds per 1000 square feet.
- d. Hydroseeding is acceptable, approved tackifier shall be applied at 2 gallons per acre.
- e. Fertilizer shall be 18-24-12 25% Polyplus Fertilizer.
- f. Mulch shall consist of straw, hay or wood fiber and be free of weed.
- g. Evenly place straw mulch over all seeded areas at the following rates:

<u>Seeding Period</u>	<u>Rate</u>
From March 15 to October 30	2 Tons per acre
From October 31 to March 14	3 Tons per acre

- h. Evenly place wood fiber mulch from March 1 to October 30 at the following rate:
- | | |
|-----------------------|--------------------------------|
| <u>Surface</u> | <u>Rate</u> |
| Slopes 3:1 or flatter | 46 Pounds per 1000 square feet |
- i. Apply a non-toxic and environmentally safe tackifier, at manufacturer's recommendations, to straw, hay or wood fiber mulch.

4. Plantings

All plantings subject to periodic flooding must be able to withstand inundation and be able to regenerate after being under water. In MCD maintained areas Turf Type Tall Fescue shall be used unless alternate planting materials are approved. Alternate planting materials shall be natural materials compatible with their surroundings (i.e. wetlands, mowed areas, prairies, woodlands). Species considered to be invasive to the area will not be allowed.

The following guidelines identify requirements for alternate planting materials within various defined areas of MCD-maintained channels and structures:

- a. Dam embankments
 - Species may be considered on a site-specific case-by-case basis
 - No woody vegetation will be permitted
 - All plantings are subject to periodic mowing (minimum once per year)
- b. Edge of water along maintained areas
 - Woody vegetation and twiggy plants that tend to catch floating debris will not be permitted
 - Roots structures should provide erosion control year around
 - Plants shall withstand high velocity flows and should be able to bend under the force of the water
 - Aesthetics of the plants in their surroundings and the view of the river from trails will be considered
 - Plants should regenerate after mowing
- c. Flat beach area between edge of water and toe of levee
 - Woody vegetation and twiggy plants that tend to catch floating debris will not be permitted
 - Roots structures should provide erosion control year around
 - Plants shall withstand high velocity flows and should be able to bend under the force of the water
 - Aesthetics of the plants in their surroundings will be considered
 - Plants should be able to regenerate after periodic mowing
 - Plants shall withstand occasional vehicular traffic
 - MCD may require a hydraulic analysis to demonstrate that the plants do not affect flow patterns or channel capacity
- d. River side of levee slope
 - Woody vegetation will not be permitted
 - Roots structures shall provide erosion control year around
 - Plants shall completely cover the planted area – no bare earth areas will be permitted
 - Plants shall withstand high velocity flows and should be able to bend under the force of the water
 - Plants shall not block vehicular access

- Plants shall not affect MCD's ability to maintain and inspect the levee
 - Aesthetics of the plants in their surroundings will be considered
 - Plants should be able to regenerate after periodic mowing
 - MCD may require a hydraulic analysis to demonstrate that the plants do not affect flow patterns or channel capacity
 - Low growing plants that require infrequent mowing should be considered for steep slopes
- e. Top of levee
- Plants shall not block vehicular access
 - Trees and woody vegetation may be considered in a case-by-case basis using the following criteria:
 - The top width of the levee is more than 50 feet or the roots are physically contained by a root barrier
 - The trees or vegetation shall not affect MCD's ability to maintain and inspect the levee
 - Roots shall not surface on the levee slope
 - Roots shall not affect recreation trails
- f. Land side of levee slope
- Woody vegetation will not be permitted
 - Plants shall not block vehicular access
 - Plants shall not affect MCD's ability to maintain and inspect the levee
 - Aesthetics of the plants in their surroundings will be considered
 - Plants should regenerate after mowing
 - Low growing plants that require infrequent mowing should be considered for steep slopes
- g. Adjacent to land side levee toe
- Plants shall not block vehicular access
 - Plants, including canopies, shall not affect MCD's ability to maintain and inspect the levee
 - Plants shall not block access to or otherwise affect piezometers or wells
 - Plants shall be able to regenerate after periodic mowing
- h. Under bridges
- Plants must withstand deep shading and dry conditions
 - The requirements for beach areas and river side levee slopes apply for the appropriate location
- i. Adjacent to concrete or stone walls, revetment or other structures
- Plants shall not affect MCD's ability to maintain and inspect the structure
 - Roots shall not affect the structure
 - Vines and other climbing plants will not be permitted
5. Environmental Considerations
- a. No natural material including plants, rocks, or soil shall be removed or destroyed without prior written approval.
 - b. The top ten (10) inches of topsoil is to be removed and stockpiled for restoration purposes prior to starting any excavation.
 - c. No tree four (4) inches in diameter or great may be removed without prior written approval. The planting of two (2) trees will be required for the removal of every tree larger than four (4) inches in diameter. Type and location of trees to be planted will be as directed.

- d. Except for authorized activities, no bird nest or animal habitation shall be moved or destroyed.
 - e. Concerning the removal of trees located along MCD owned or controlled property lines
 - If MCD determines any portion of the tree presents a hazard, the tree will be trimmed or removed by MCD, subject to an agreement with adjacent property owner to have the tree trimmed or removed at no liability to MCD.
 - If MCD determines the tree is of no danger to the adjacent property no further action will be taken.
 - If written authorization is granted by MCD allowing the adjacent property owner or its agent to trim or remove any portion of the tree, MCD, subject to pre-approval, agrees to pay fifty (50%) percent of the cost of trimming or removal.
6. Asphalt for recreation trails
- a. ODOT ITEM 304 - Aggregate base – 8” course
 - b. ODOT ITEM 407 – Tack coat @ 0.075 GAL/SY
 - c. ODOT ITEM 448 - Asphalt Concrete – 2” Intermediate Course - Type 2, PG 64-22, per ODOT ITEM 441.02
 - d. ODOT ITEM 448 – Asphalt Concrete – 1” Surface Course, Type 1, PG 64-22, per ODOT ITEM 441.02
 - e. ODOT ITEMS are referenced to the 2013 ODOT Construction and Material Specifications.
7. Concrete for structures
- a. Concrete for structures on MCD property shall conform to ODOT ITEM 511.
 - b. Concrete shall be Class QC1 per ODOT ITEM 499.
 - c. Dowels and reinforcing steel shall be epoxy coated and conform to ODOT ITEM 709.
 - d. Anchoring grout shall be a non-shrink, non-metallic material that conforms to ODOT ITEM 705.20.
 - e. ODOT ITEMS are referenced to the 2013 ODOT Construction and Material Specifications.
8. Other Materials – all other materials not specified herein shall be approved by MCD prior to use on MCD property.