SP-150734
(New)

SPECIAL PROVISIONS
FOR
MODULAR SUBSURFACE FLOW WETLAND SYSTEM

Polk County
NHSX-006-4(189)--3H-77

Effective Date
February 16, 2021

THE STANDARD SPECIFICATIONS, SERIES OF 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150734.01 DESCRIPTION.

A. The purpose of this specification is to establish generally accepted criteria for Modular Subsurface Flow Wetland Systems used for biofiltration of stormwater runoff including dry weather flows and other contaminated water sources.

B. Modular Subsurface Flow Wetland Systems (MSFWS) are used for filtration of stormwater runoff including dry weather flows. The MSFWS is a pre-engineered biofiltration system composed of a pretreatment chamber containing filtration cartridges, a horizontal flow biofiltration chamber with a peripheral void area and a centralized and vertically extending underdrain, the biofiltration chamber containing a sorptive media mix which does not contain any organic material and a layer of plant establishment media, and a discharge chamber containing an orifice control structure. Treated water flows horizontally in series through the pretreatment chamber cartridges, biofiltration chamber, and orifice control structure.

150734.02 MATERIALS.

A. General.
The MSFWS and all of its components shall be self-contained within a concrete structure constructed of concrete with a minimum 28 day compressive strength of 5000 psi, with reinforcing per ASTM A 615 or ASTM A 706, Grade 60, supporting an H20 loading as indicated by AASHTO. Each Chamber shall have appropriate access hatches for easy maintenance and sized to allow removal of all internal components without disassembly.

B. Water Transfer System Components.

1. Filter netting: 100% Polyester with a number 16 sieve size, and strength tested per ASTM D 3787.

2. Drainage cells shall be manufactured of lightweight injection-molded plastic and have a

minimum compressive strength test of 6000 psi and a void area along the surface making contact with the filter media of 75% or greater. The cells shall be at least 2 inches in thickness and allow water to freely flow in all four directions.

C. Pretreatment Chamber Components.

1. Filter cartridges shall operate at a loading rate not to exceed 3 gallons per minute per square foot surface area.

2. The drain down system shall include a pervious floor that allows water to drain into the underdrain pipe that is connected to the discharge chamber.

D. Biofiltration Chamber Components.

1. Media shall consist of ceramic material produced by expanding and vitrifying select material in a rotary kiln. Media must be produced to meet the requirements of ASTM C330, ASTM C331, and AASHTO M195. Aggregates must have a minimum 24 hour water absorption of 10.5% mass. Media shall not contain any organic material. Flow through media shall be horizontal from the outer perimeter of the chamber toward the centralized and vertically extending underdrain. The retention time in the media shall be at least 3 minutes. Downward flow filters are not acceptable alternatives. The thickness of the media shall be at least 19 inches from influent end to effluent end. The loading rate on the media shall not exceed 1.1 gallons per minute per square foot surface area. Media must be contained within a structure that spaces the surface of the media at least 2 inches from all vertically extending walls of the concrete structure.

2. Planting shall be native, drought-tolerant species recommend by MSFWS manufacturer.

3. Plant Support Media shall be made of a 3 inch thick moisture retention cell that is inert and contains no chemicals or fertilizers, is not made of organic material, and has an internal void percentage of 80%.

E. Discharge Chamber.
The discharge device shall house a flow control orifice plate that restricts flows greater than the designed treatment flow rate. All piping components shall be made of high-density polyethylene. The discharge chamber shall also contain a drain down filter if specified on the drawing.

F. Submittals.
Submit shop drawings detailing the MSFWS, all components required, the sequence for installation, and supporting documentation including:

1. System configuration with primary dimensions

2. Interior components

3. Accessory equipment

4. Operation and maintenance manuals and warranty information from the MFFWS manufacturer.

150734.03 CONSTRUCTION.

A. Installation.

1. The Contractor shall furnish all labor, equipment, materials, and incidentals required to install the MSFWS device(s) and appurtenances in accordance with the drawings and these

specifications.

2. Compaction – All soil shall be compacted to 95% of Standard Proctor or 90% of Modified Proctor prior to the installation of MSFWS components.

3. Backfill shall be placed and compacted in maximum 8 inch lifts. Provide a minimum of 6 inches of granular bedding under all concrete structures.

4. Subsurface Flow Wetland Media shall be carefully loaded into the area so as not to damage the Wetland Liner or Water Transfer Systems. The entire wetland area shall be filled to a level 9 inches below the finished surface.

5. Planting layer shall be installed per manufacturer's drawings and consist of a minimum 3 inches grow enhancement media that ensures greater than 95% plant survival rate and 6 inches of wetland media. Planting shall consist of native plants recommended by the MSFWS manufacturer. No chemical herbicides, pesticides, or fertilizers shall be used in the planting or care and maintenance of the planted area.

B. Inspection.

After installation, the contractor shall demonstrate that the MSFWS has been properly installed at the correct location(s), elevations, and with appropriate components. All components associated with the MSFWS and its installation shall be subject to inspection by the engineer at the place of installation. In addition, the contractor shall demonstrate that the MSFWS has been installed per the manufacturer's specifications and recommendations. All components shall be inspected by a qualified person once a year and results of inspection shall be kept in an inspection log.

C. Quality Assurance.

1. Warranty: The Manufacturer shall guarantee the MSFWS against all manufacturing defects in materials and workmanship for a period of 5 years from the date of delivery to the customer. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The MSFWS warranty is limited to the recommended application for which it was designed.

2. Performance Certification: The MSFWS manufacturer shall submit to the Engineer a "Manufacturer's Performance Certificate" certifying the MSFWS is capable of achieving the specified removal efficiency for suspended solids, phosphorous, and dissolved metals.

150734.04 METHOD OF MEASUREMENT.

Measurement will be by count for each size of Modular Subsurface Flow Wetland System installed.

150734.05 BASIS OF PAYMENT.

A. Payment for each size of Modular Subsurface Flow Wetland System will be the contract unit price.

B. Payment is full compensation for manufacturing, delivering, and installation of complete Modular Subsurface Flow Wetland System unit including, but not limited to, pretreatment chamber components, concrete structures, biofiltration chamber components, and flow control discharge structure.