



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

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Director

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July 3, 2014

Modular Wetland System, Inc.  
2972 San Luis Rey Road  
Oceanside, California 92058

Re: Assignment of Percent Removal Efficiencies for Total Phosphorus

Dear Mr. Kent,

Thank you for your submittal of the Manufactured Treatment Device (MTD) Registration Form and supporting documentation for the Modular Wetland System Linear (MWS-Linear). The MTD information provided (Appendix A) was reviewed for the purpose of assigning a pollutant removal efficiency for total phosphorus (TP). This review was performed in accordance with the Guidance Memo Number 14-2009 titled "Interim Use of Stormwater Manufactured Treatment Devices (MTDs) to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria, Part IIB Water Quality Design Requirements". The review process included the analysis of the documents submitted and any other publically available reports.

The documents submitted provided descriptive information about the MWS-Linear device, the maintenance plan, and a performance study. The data provided within the contents of the submitted performance study included drainage area size and land cover, storm event and runoff parameters, event mean concentrations (EMC) of selected nutrients, metals, and sediment, and performance results. The performance data received was analyzed by calculating the removal efficiencies for each storm event sampled for TP and then computing the mean of the removal efficiencies for that study period. This method of analysis was applied to all data received in order to achieve a consistent analytical process to aid in the assigning of removal efficiencies. A summary of the results is provided in Appendix B.

Consistent with Guidance Memo Number 14-2009, Modular Wetland System Linear is receiving an EMC percent TP removal efficiency of 50%. As stated in the guidance memo, this information will be posted on the Virginia Stormwater Clearinghouse website. This MTD and the assigned removal efficiency can be manually added into Virginia Runoff Reduction spreadsheet to demonstrate compliance with Virginia Stormwater Management Program.

If you have any questions regarding this information, please contact Robert E. Cooper, P.E. at (804) 698-4033 or e-mail at [Robert.Cooper@deq.virginia.gov](mailto:Robert.Cooper@deq.virginia.gov).

Sincerely;

A handwritten signature in cursive script that reads "Fred K. Cunningham".

Fred K. Cunningham

Director

Office of Water Permits

## Appendix A-Documents

- 1) Manufactured Treatment Device (MTD) Registration
- 2) Draft Technical Evaluation Report-Modular Wetland System Stormwater Treatment System Performance Monitoring
- 3) Appendix H and I from Item 2

## Appendix B-Study Results

Data from Draft Technical Evaluation Report-Modular Wetland System Stormwater Treatment System Performance Monitoring

| Storm Date | Influent EMC (mg/l) | Effluent EMC (mg/l) | *Discrete Removal Efficiency (%) |
|------------|---------------------|---------------------|----------------------------------|
| 4/15/2012  | 0.09                | 0.03                | 72                               |
| 4/17/2012  | 0.14                | 0.02                | 86                               |
| 4/25/2012  | 0.15                | 0.06                | 59                               |
| 5/2/2012   | 0.09                | 0.04                | 58                               |
| 5/21/2012  | 0.18                | 0.06                | 66                               |
| 10/14/2012 | 0.18                | 0.08                | 56                               |
| 10/15/2012 | 0.10                | 0.01                | 90                               |
| 10/28/2012 | 0.07                | 0.04                | 41                               |
| 10/29/2012 | 0.13                | 0.04                | 68                               |
| 10/31/2012 | 0.10                | 0.04                | 61                               |
| 11/29/2012 | 0.09                | 0.04                | 61                               |
| 12/2/2012  | 0.03                | 0.01                | 63                               |
| 12/3/2012  | 0.08                | 0.02                | 69                               |
| 12/11/2012 | 0.26                | 0.05                | 79                               |
| 12/19/2012 | 0.07                | 0.03                | 66                               |
| 1/23/2013  | 0.10                | 0.08                | 19                               |
| 1/24/2013  | 0.10                | 0.04                | 60                               |
| 2/22/2013  | 0.56                | 0.26                | 54                               |
| 3/19/2013  | 0.40                | 0.13                | 67                               |
| 4/4/2013   | 2.15                | 0.40                | 81                               |
| 4/6/2013   | 0.17                | 0.04                | 75                               |
| 5/16/2013  | 0.11                | 0.05                | 56                               |
| 5/21/2013  | 0.21                | 0.10                | 53                               |
|            |                     | Mean                | 64                               |

\*Efficiency =  $100 \times (1 - \text{Effluent EMC} / \text{Influent EMC})$