



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219-2000

Charles A. Kilpatrick, P.E.
Commissioner

MEMORANDUM

SENT VIA ELECTRONIC-MAIL

TO: Mr. Nick Burns, Regional Sales Manager – Mid Atlantic
Hydro International
94 Hutchins Drive
Portland, Maine 04102
nburns@hydro-int.com

FROM: Jeff Hancock, P.E., MS4 Section Manager
VDOT Location & Design Division

DATE: June 28, 2017

SUBJECT: Manufactured Treatment Device (MTD) Application for VDOT Approved Products List (APL) – Downstream Defender, First Defense, and Up-Flo Filter

CC:

Mr. Burns:

This office reviewed your application submittals for the three (3) Manufactured Treatment Devices (MTDs) noted in the subject line above. Based upon the review, VDOT determined that the three MTDs are eligible for the VDOT Approved Products List. We will copy you when the Approved Products List is published.

Please do not hesitate to contact me regarding this matter.

Sincerely,

A handwritten signature in blue ink that reads "Jeffrey T. Hancock".

Jeffrey T. Hancock, P.E.
MS4 Section Manager
jeff.hancock@vdot.virginia.gov

Manufactured Treatment Device Product Evaluation

Vendor Information: Hydro International David Scott 94 Hutchings Drive, Portland, ME 04102 207-321-3750	Device Name: Downstream Defender	Device Type: Hydrodynamic	
	Device Model Number: 4-FT; 6-FT; 8-FT; 10-FT	Purpose of Device: Removal of TP, TSS, and oil	
Email Address: dscott@hydro-int.com			
Device Operation: Physical - Vortex separator	Contact Information: Same as vendor information	Listed on VA DEQ BMP Clearinghouse [Y/N]: Yes	
Advantages of Device: Efficient separator; small footprint; low capital cost; prevents washout; verified through nationally recognized programs; low system leadloss; provides high removal efficiencies of settleable solids and their associated pollutants (oil and floatables) over a wide range of flow rates; no moving parts so mechanical failure is not relevant; no external power requirements.			
Cost Requirements (Based on Washington DC Metro Region)			
	Device Cost (Low to High)	Device Cost Info	VDOT Comments
Inspections	Not Provided	Inspect every 6 months during the first year of operation to determine site-specific performance.	
Routine Maintenance	Not Provided	Monitor accumulations of stored pollutants and periodic clean-outs based on site characteristics.	
Capital Costs	Not Provided		
Annualized Costs Per Acre Treated	Not Provided		
Life Cycle Costs	Not Provided		
Performance			
	Device Information	Comments	VDOT Comments
Pollution Removal Efficiency	<u>Pollution removal efficiency for Total Phosphorus per VA DEQ</u>	As listed on VA BMP Clearinghouse	
	20% Total Phosphorus removal efficiency		
Hydraulic Loading Rate	<u>Hydraulic loading rate from pollution removal performance testing</u>		
	4-FT = 502 gpm (1.1 cfs) 6-FT = 1696 gpm (3.8 cfs) 8-FT = 4020 gpm (9.0 cfs) 10-FT = 7860 gpm (17.5 cfs)		

Manufactured Treatment Device Product Evaluation			
Design and Construction			
Standards and Special Considerations	Device Information	Comments	VDOT Comments
		<p>List national design/construction standards and special installation considerations.</p> <p>Unit is pre-assembled, installation is typically 2-4 hours</p>	see submittal package for additional information
Surface Footprint	Typical constructed footprint of the smallest and largest of the devices (sq ft.)		
	Not Provided		
Manufacturer Website	Manufacturer's website link for design assistance.		
	www.hydro-int.com		
Inspection and Maintenance			
Inspection and Maintenance Items	Device Information	Comments	VDOT Comments
	<p>List items for routine inspection and maintenance; confined space entry permits/procedures?</p> <p>The unit should be inspected every 6 months to determine the rate of accumulation and establish a clean out frequency.</p>	Maintenance is limited to clean out of stored pollutants, including trash, debris and sediment, by a vactot truck. The frequency of the sump vac procedure is determined by site specific loadings established the first year.	
Manufacturer Website	Manufacturer's website link for inspection and maintenance information.		
	www.hydro-int.com		

Overall Product Recommendation:	Approve	Deny
	X	
Notes: No internal bypass for large events.		

VDOT Determination:	Approve	Deny
	X	

Manufactured Treatment Device Product Evaluation

Vendor Information: Hydro International David Scott 94 Hutchings Drive, Portland, ME 04102 207-321-3750	Device Name: First Defense	Device Type: Hydrodynamic
	Device Model Number: UFF 4-ft Dia. MH and UFF Precast Vault	Purpose of Device: Removal of TSS and TP
Email Address: dscott@hydro-int.com	Contact Information: Same as vendor information	Listed on VA DEQ BMP Clearinghouse [Y/N]: Yes
Device Operation: Physical Process - Vortex Separator		

Advantages of Device: Optional grated inlet; Integral high-flow bypass eliminates need for upstream diversion structure; Outlet chute orientation prevents short-circuiting to enhance removal; Conventional pipe connectors are easy to fit; Can accommodate dual inlet pipes; Arrives on site assembled and ready for installation.

Cost Requirements (Based on Washington DC Metro Region)

	<u>Device Cost (Low to High)</u>	<u>Device Cost Info</u>	VDOT Comments
Inspections	Not Provided	Inspect every 6 months during the first year of operation to determine your site specific rate of pollutant accumulation.	
Routine Maintenance	Not Provided	Monitor accumulations of pollutants and periodic clean-outs requirements.	
Capital Costs	Not Provided		
Annualized Costs Per Acre Treated	Not Provided		
Life Cycle Costs	Not Provided		

Performance

	<u>Device Information</u>	<u>Comments</u>	VDOT Comments
Pollution Removal Efficiency	<u>Pollution removal efficiency for Total Phosphorus per VA DEQ</u>	as listed in VA BMP Clearinghouse	
	20% Total Phosphorus removal efficiency		
Hydraulic Loading Rate	<u>Hydraulic loading rate from pollution removal performance testing</u>		
	0.71 - 2.2 cfs		

Manufactured Treatment Device Product Evaluation			
Design and Construction			
Standards and Special Considerations	Device Information	Comments	VDOT Comments
		<p>List national design/construction standards and special installation considerations.</p> <p>First Defense is housed within a precast concrete structure so associated standards and installation requirements apply.</p>	see page 29 of the submittal package for additional information
Surface Footprint	Typical constructed footprint of the smallest and largest of the devices (sq ft.)		
	None provided		
Manufacturer Website	Manufacturer's website link for design assistance.		
	www.hydro-int.com		
Inspection and Maintenance			
Inspection and Maintenance Items	Device Information	Comments	VDOT Comments
	<p>List items for routine inspection and maintenance; confined space entry permits/procedures?</p> <p>4-FT - Sediment Clean-out Depth of 26 in 6-FT - Sediment Clean-out Depth of 36 in</p>	No confined space entry needed, clean out done with vac truck. During first year of operation, inspect the device twice to determine routine maintenance schedule based on pollutant accumulation.	
Manufacturer Website	Manufacturer's website link for inspection and maintenance information.		
	www.hydro-int.com		

Overall Product Recommendation:	Approve	Deny
	X	
Notes: Additional information requested		

VDOT Determination:	Approve	Deny
	X	

Manufactured Treatment Device Product Evaluation

Vendor Information: Hydro International Nick Burns, Regional Sales Manager - Mid Atlantic 94 Hutchins Drive Portland, Maine 04102 703-424-3340	Device Name: Up-Flow Filter	Device Type: Filter	
Email Address: nburns@hydro-int.com	Device Model Number: UFF 4-FT Dia. MH (1-6 filter modules) UFF Precast Vault (1-54 filter modules)	Purpose of Device: Removal of TSS, oils, trash, TP, TN, and heavy metals	
Device Operation: Physical Process - Passive upward flow filtration	Contact Information: Same as vendor information	Listed on VA DEQ BMP Clearinghouse [Y/N]: Yes	
Advantages of Device: It combines pre-treatment and fluidized bed technology to optimize hydraulic loading rates and media longevity. Engineered media ensures low headlosses at peak flows, can target a range of pollutants and can be replaced without lifting equipment so that overall life-cycle costs are minimized.			
Cost Requirements (Based on Washington DC Metro Region)			
	Device Cost (Low to High)	Device Cost Info	VDOT Comments
Inspections	\$1,500	every 6 months after installation and after significant storm events	
Routine Maintenance	4ft Manhole Up-Flo Filter: \$3,000 - \$6,000 Single Bay Vault Up-flo Filter: \$4,395 - \$8,355	annually	
Capital Costs	Not Provided	device cost + installation/construction cost	
Annualized Costs Per Acre Treated	4ft - 6 filter module - \$4,062.77 Vault 54 filter module - \$4,191.85	annualized cost = (capital cost x annualization factor) + annual O&M costs + (land x annualization factor) per VDOT	
Life Cycle Costs	4ft - 6 filter module - \$203,139 Vault 54 filter module - \$209,592	total life cycle costs = (annualized cost x MTD life-span in years) per VDOT	
Performance			
	Device Information	Comments	VDOT Comments
Pollution Removal Efficiency	<u>Pollution removal efficiency for Total Phosphorus per VA DEQ</u> 40% Total Phosphorus removal efficiency	as listed in VA BMP Clearinghouse	
Hydraulic Loading Rate	<u>Hydraulic loading rate from pollution removal performance testing</u> Approximately 25 gpm per filter module		

Manufactured Treatment Device Product Evaluation			
Design and Construction			
Standards and Special Considerations	Device Information	Comments	VDOT Comments
		<p>List national design/construction standards and special installation considerations.</p> <p>There are no national standards that Hydro is aware of to list and consequently, no certifications to submit.</p>	see submittal for more information and design considerations.
Surface Footprint	Typical constructed footprint of the smallest and largest of the devices (sq ft.)		
	Model 4ft diameter = 8 ft depth Precast Vault with (3) Filter Bays - 13' x 15' footprint, 8 ft depth		
Manufacturer Website	Manufacturer's website link for design assistance.		
	TechSupport@hydro-int.com		
Inspection and Maintenance			
Inspection and Maintenance Items	Device Information	Comments	VDOT Comments
	<p>List items for routine inspection and maintenance; confined space entry permits/procedures?</p> <p>Visual inspection does not require confined space. Maintenance: removal of trash, debris, and sediment by a vactor truck, pressure washing filter modules. (con't)</p>	Confined space entry needed for non-routine maintenance such as replacing the filters or Media Packs. See inspection checklist from page 9 of submittal (attached).	
Manufacturer Website	Manufacturer's website link for inspection and maintenance information.		
	http://www.hydro-int.com/en/products/flo-filter		

Overall Product Recommendation:	Approve	Deny
	X	
Notes: Requires confined space entry to replace filters. Filters and outlet module only available from the manufacturer (sole source).		

VDOT Determination:	Approve	Deny
	X	