Attachment 1

Manufactured Treatment Device (MTD) Registration

1. **Manufactured Treatment Device Name:** *The Cascade Separator™*

2. **Company Name:**
Contech Engineered Solutions, LLC
Mailing Address: 9025 Center Point Dr., Ste 400
City: West Chester, OH
State: OH Zip: 45069

3. **Contact Name (**to whom questions should be addressed**):**
For Project Specific and Design Questions, Please Contact Contech's Baltimore, Maryland Office:
7037 Ridge Road, Suite 350
Hanover, MD 21076
Ph.: 410-740-8490
Web address: www.conteches.com

For Regulatory Matters: Jacob Dorman
Mailing Address: 7037 Ridge Road, Suite 350
City: Hanover
State: MD Zip: 21076
Phone number: 757-374-4321
Fax number: 410-740-8492
E-mail address: jdorman@conteches.com
Web address: www.conteches.com

4. **Technology**
Specific size/capacity of MTD assessed (include units): *Laboratory testing utilized a full-scale, dimensionally accurate 4-ft diameter Cascade Separator.*
Range of drainage areas served by MTD (acres): *Cascade Separator is available in numerous sizes and can treat a wide range of drainage areas.*
Include sizing chart or describe sizing criteria: *The Cascade Separator is designed to maintain a consistent hydraulic loading rate (64.3 gpm/ft^2) across all model sizes. See sizing chart in New Jersey Department of Environmental Protection (NJDEP) certification letter attached to this submittal*.
Intended application: on-line or offline: *The Cascade Separator has been certified by NJDEP for online use.*
Media used (if applicable): *n/a*

5. **Warranty Information** (describe, or provide web address)**:**

Contech provides a one (1) year warranty on all of its stormwater treatment solutions.

6. Treatment Type

☒ Hydrodynamic Structure
☐ Filtering Structure
☐ Manufactured Bioretention System
Provide Infiltration Rate (in/hr):
☐ Other (describe):

7. Water Quality Treatment Mechanisms (check all that apply)

☒ Sedimentation/settling
☐ Infiltration
☐ Filtration (specify filter media)
☐ Adsorption/cation exchange
☐ Chelating/precipitation
☐ Chemical treatment
☐ Biological uptake
☒ Other (describe): *Separation of trash and debris including neutrally buoyant material*

8. Performance Testing and Certification (check all that apply):

Performance Claim (include removal efficiencies for treated pollutants, flow criteria, drainage area):
Based on laboratory trials, Cascade Separator has been certified by NJDEP for 50% removal of total suspended solids (TSS) with a d50 of 57 um at 100% design flow rate with influent concentrations near 200 mg/L.

Table 3: Summary of Removal Efficiency Results

PERFORMANCE SUMMARY						
Test ID	Average Flow Rate (ft^3/s)	Average Influent SSC (mg/L)	Average Adjusted Effluent SSC (mg/L)	Removal Efficiency (%)	Weighting Factor	Weighted Removal Efficiency (%)
25%	0.46	199	63.7	68.1	0.25	17.0
50%	0.91	199	80.2	59.6	0.30	17.9
75%	1.36	198	97.1	51.0	0.20	10.2
100%	1.81	200	116	42.0	0.15	6.3
125%	2.26	191	127	33.5	0.10	3.3
Annualized Weighted Removal Efficiency at MTFR of 1.80 cfs (%):						54.8

Specific size/Capacity of MTD assessed: *A 4 ft. diameter Cascade Separator (CS-4) model with an MTFR of 1.80 cfs was evaluated in accordance with NJDEP's Laboratory Protocol*

to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device- January 25, 2013.

Has the MTD been "approved" by an established granting agency, e.g. New Jersey Department of Environmental Protection (NJDEP) , Washington State Department of Ecology, etc.

☐ **No**

☒ **Yes**; For each approval, indicate (1) the granting agency, (2) use level if awarded (3) the protocol version under which performance testing occurred (if applicable), and (4) the date of award, and attach award letter.

Cascade Separator has been certified by NJDEP for 50% removal of total suspended solids (TSS) with a d50 of 57µm. The attached NJDEP Certification letter is dated October 1, 2019.

Was an established testing protocol followed?

☐ **No**

☒ **Yes**, (1) Provide name of testing protocol followed, (2) list any protocol deviations:

(1) *NJDEP's Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device- January 25, 2013*

(2) *No deviations noted*

Provide the information below and provide a performance report (attach report):

For lab tests:

i. Summarize the specific settings for each test run (flow rates, run times, loading rates) and performance for each run: *NJDEP certification letter and final NJCAT verification report are included with this submittal. The NJDEP HDS protocol requires test trials at 25%, 50%, 75%, 100% and 125% of the MTFR. Each trial run included: Fifteen (15) effluent grab samples collected at evenly spaced intervals; 15 background SSC samples taken at paired sampling times with effluent SSC samples; and Six (6) sediment feed samples taken. Test times ran from just over 42 minutes to 13.5 minutes respectively at the % of the MTFR. The Cascade Separator testing has been determined to be fully compliant with the NJDEP HDS Protocol. Please see final verification report for complete results.*

ii. If a synthetic sediment product was used, include information about the particle size distribution of the test material: *The sediment used for removal efficiency and scour tests was a custom silica blend with an average PSD determined to be in compliance with the NJDEP protocol.*

iii. If less than full-scale setup was tested, describe the ratio of that tested to the full-scale MTD: *n/a*

For field tests:

i. Provide the address, average annual rainfall and characterized rainfall pattern, and the average annual number of storms for the field-test location: *n/a*

ii. Provide the total contributing drainage area for the test site, percent of impervious

area in the drainage area, and percentages of land uses within the drainage area (acres): *n/a*

iii. Describe pretreatment, bypass conditions, or other special circumstances at the test site: *n/a*

iv. Provide the number of storms monitored and describe the monitored storm events (amount of precipitation, duration, etc.): *n/a*

v. Describe whether or not monitoring examined seasonal variation in MTD performance: *n/a*

vi. If particle size distribution was determined for monitored runoff and/or sediment collected by the MTD, provide this information: *n/a*

9. MTD History:

How long has this specific model/design been on the market? *<1 year*

List no more than three locations where the assessed model size(s) has/have been installed in Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude: *n/a*

List no more than three locations where the assessed model size(s) has/have been installed outside of Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude:

1) *CS-4 – Phase 3B Addition and Healthmark Alterations; Macomb County, Michigan*
2) *CS-6 - Popeye's; Rome, GA*

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents): *See attached maintenance guide. The guide can also be located at https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Cascade-Maintenance%20Guide.pdf?ver=2018-11-05-093254-300*

Is there a maintenance track record/history that can be documented?
☒ No, no track record.
☐ Yes, track record exists; (provide maintenance track record, location, and sizing of three to five MTDs installed in Virginia [preferred] or elsewhere): *As a new to market stormwater treatment solution, a volume of maintenance records for Cascade Separator is not presently available. Contech recommends the Cascade Separator system be inspected regularly to establish expected maintenance intervals and be cleaned out when necessary to ensure optimum performance. Ongoing maintenance records are typically the responsibility of the project owner and should be kept by them.*

Recognizing that maintenance is an integral function of the MTD, provide the following: amount of runoff treated, the water quality of the runoff, and what is the expected maintenance frequency for this MTD in Virginia, per year? *Contech recommends*

inspection and maintenance as necessary. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics.

Total life expectancy of MTD when properly operated in Virginia and, if relevant, life expectancy of media: *The Cascade Separator is expected to remain viable for the life of its concrete housing as long as it is regularly inspected and maintained.*

For media or amendments functioning based on cation exchange or adsorption, how long will the media last before breakthrough (indicator capacity is nearly reached) occurs? *n/a*

For media or amendments functioning based on cation exchange or adsorption, how has the longevity of the media or amendments been quantified prior to breakthrough (attach necessary performance data or documents)? *n/a*

Is the maintenance procedure and/or are materials/components proprietary?
☐ Yes, proprietary
☒ No, not proprietary

Maintenance complexity (check all that apply):
☐ Confined space training required for maintenance
☒ Liquid pumping and transportation
Specify method: *Vactor Truck is generally the most effective method*
☒ Solids removal and disposal
Specify method: *Vactor Truck is generally the most effective method*
Other noteworthy maintenance parameter (describe):

11. Comments

Include any additional explanations or comments: n/a

12. Certification

Signed by the company president or responsible officer of the organization:

"I certify that all information submitted is to the best of my knowledge and belief true, accurate, and complete."

Signature: _  _____

Name: _Jacob Dorman _____

Title: _Regional Regulatory Manager_____

Date: _10/14/19_____

NOTE: All information submitted to the department will be made publically accessible to all interested parties. This MTD registration form will be posted on the Virginia Stormwater BMP Clearinghouse website.