NJCAT TECHNOLOGY VERIFICATION

Saturn Separator™

Contech Engineered Solutions
A Quikrete Company

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1 Description of Technology

The Saturn Separator™ is designed to protect waterways from the pollutants transported by stormwater runoff. The device captures and retains sediment (even at high flow rates) and provides easy unobstructed access for maintenance. The Saturn Separator is commonly used as both a standalone stormwater control measure and as pretreatment for other stormwater control measures (SCMs) such as filtration, detention/infiltration, bioretention, rainwater harvesting systems and green infrastructure (GI) practices.

The Saturn Separator (**Figure 1**) accepts flow through a pipe inlet. Water then enters the inlet chamber where it wraps around the center chamber, travels downward along the outer manhole wall, and then either toward the open bottom of the inner center flow channel or is distributed between a series of seven angled flow rings and associated center flow windows to further dissipate energy and enhance settling of sediment. The angled flow rings initially direct water toward the outer manhole wall to prolong the flow path. Flow then either travels to the bottom of the manhole and back up toward the outlet through the center flow channel or moves along the rings and enters the center flow channel through one of the center flow windows on the bottom side of each ring. The bottom angled flow ring is extended closer to the manhole wall on the outlet side of the unit to prevent the scour of previously settled pollutants during higher flows. This extension to within 1" of the manhole wall spans 60 degrees in each direction from the centerline of the outlet (120 degrees total). Treated stormwater flows upward through the center flow channel where it overtops the operational weir before discharging into the outlet channel and exits through the outlet pipe. A drain down orifice is located at the invert of the operational weir to allow for the water surface elevation within the system to return to the outlet pipe invert elevation after the storm has subsided. **Figure 2** provides a plan view of the device and critical components.

The Saturn Separator is designed to handle high flow rates without the risk of scouring previously captured pollutants. The unit is designed to accept a specified maximum treatment flow rate (MTFR) and includes an internal flow bypass for peak flow storm events. While in internal bypass, the unit continues to treat the stormwater that enters the treatment components and ultimately the center flow channel while excess flow passes over the bypass weir and exits the system untreated. This internal bypass feature allows the Saturn Separator to be installed online, therefore eliminating the need for additional bypass structures. The red arrows in **Figure 2** show the flow paths within the system.

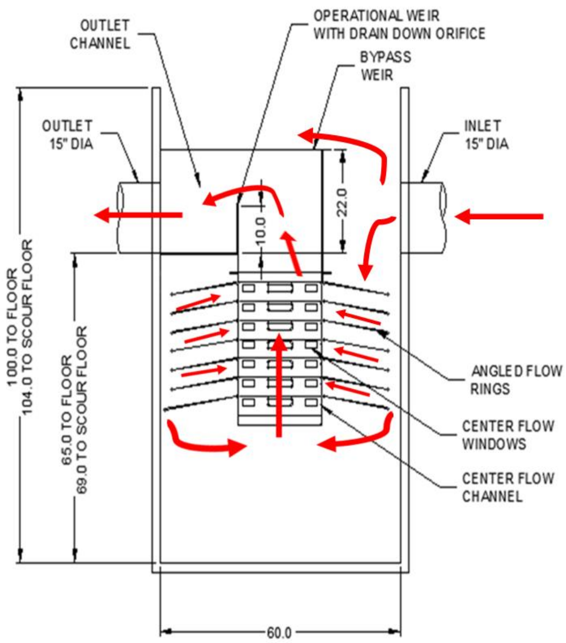

Figure 1: Saturn Separator Internals – Side View

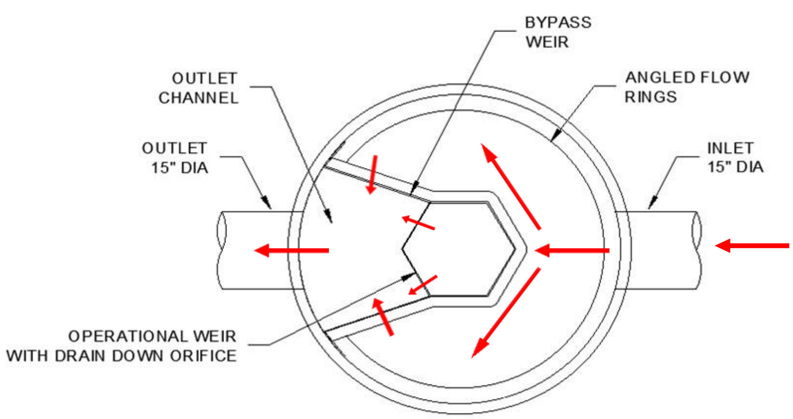

Figure 2: Saturn Separator Internals – Top View

2 Laboratory Testing

The performance evaluation of the Saturn Separator detailed herein was conducted at Contech Engineered Solution's (Contech) product evaluation laboratory in Oceanside, California during March and April 2026. Independent, third-party observation was provided by Integral Consulting Inc, an environmental consulting firm located in Carlsbad, CA. All testing was executed in full accordance with the *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device* (NJDEP, 2023), referred to as the HDS Protocol. A quality assurance project plan was submitted to and approved by NJCAT before the commencement of testing, as required by the *Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology* (NJDEP, 2021), referred to as the NJDEP Verification Procedure.

2.1 Test Unit

Testing was conducted on a full-scale Saturn Separator (SAT-5). The 5 ft diameter test unit (shown in **Figure 3** and **Figure 4**) was comprised of components and materials consistent with a commercial installation, except for the manhole housing, which was made of aluminum for ease of installation in a laboratory setting.

Figure 3: 5 ft. Diameter Test Unit

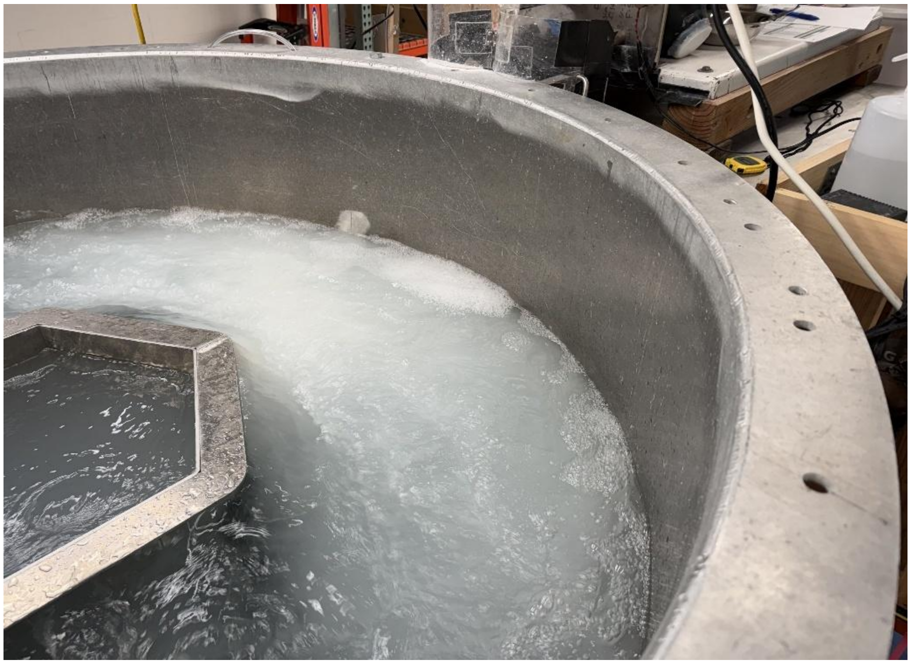

Figure 4: Test Unit in Operation

The test unit influent and effluent pipes were equivalent in elevation and nominal diameter (15 in.). Hydraulic characterization and removal efficiency (RE) testing was conducted at 50% of the maximum sediment storage depth, which was accomplished by installing the test unit floor at the effective depth of 65 in. (below the pipe inverts). Scour was evaluated with the floor adjusted to 69 in. below the inverts to accommodate 4 in. of pre-loaded scour sediment. The critical dimensions of the test unit are summarized in **Table 1**.

Table 1: Saturn Separator (SAT-5) Test Unit Critical Dimensions

Saturn Separator Model ID	SAT-5
Test unit diameter (ft)	5
Test unit area (ESTA), (ft^2)	19.63
Aspect ratio (effective depth / housing diameter)	1.08
Effective depth, below invert (in)	65
Full depth, below invert (in)	74
Maximum sediment storage depth (in)	18
Maximum sediment storage capacity (ft^3)	29.45
Floor distance for hydraulic and RE tests, below invert (in)	65
Floor distance for scour test, below invert (in)	69
Influent pipe, nominal diameter (in)	15
Effluent pipe, nominal diameter (in)	15

2.2 Test Loop

The Saturn Separator was tested on a recirculating test loop (**Figure 5**). Depending on the target flow rate, water was pumped from the water storage tanks using the 3 in. Goulds e-1500 or 8 in. Xylem A-C e-1500 centrifugal pump (or a combination of pumps). The pumps (**Figure 6**) were controlled by Aquavar IPC AVA20200B0F0X0X1 variable frequency drives. Flow measurement for all pumps was provided by a Toshiba LF654 electromagnetic flow meter and LF620 flow meter converter. The calibrated flow meters were installed according to the manufacturer's recommendations with accuracy of ± 0.5% of reading. Flow rate was measured to the nearest 1 gpm and recorded with a calibrated MadgeTech CurrentX4 data logger (and related software), configured to record a flow measurement once every 2 seconds.

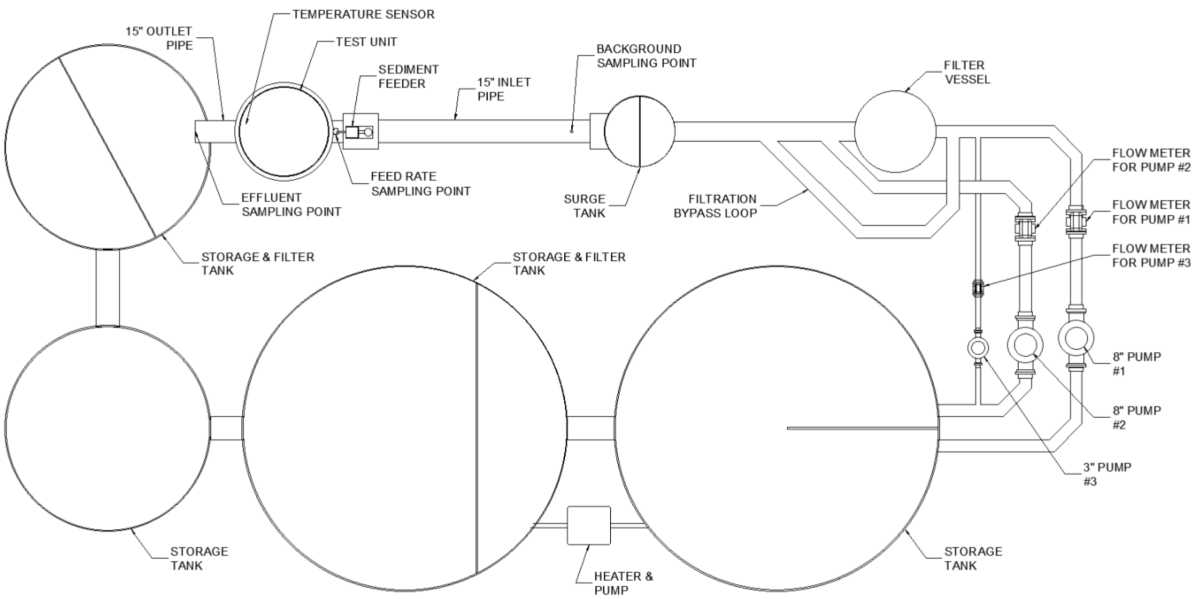

Figure 5: Test Loop Schematic

Prior to reaching the influent pipe, test water was pumped (fully or partially) through a high-efficiency filter housing (**Figure 7**) containing 1um absolute filter cartridges to reduce background concentrations. Flocculants were not used. The clean water entered a 4 ft diameter surge tank, which dampened variation in water surface level (WSL). To confirm steady state hydraulic conditions at the influent pipe approach, the surge tank WSL levels were manually measured to the nearest 1/8 in. with a calibrated ruler and piezometer tube (0.25 in. flexible PVC tubing) and recorded once every 5-minutes during all removal efficiency and scour testing. Water exited the surge tank via a 24 in. pipe stub, where an adapter decreased the pipe size to couple with the 15 in. (nominal) SDR35 PVC influent pipe. Water traveled down the straight influent pipe (minimum length of ten pipe diameters), set at a 1-2% slope before entering the test unit. During removal efficiency tests, a volumetric feeder injected sediment into the crown of the influent pipe less than 3ft from the test unit. Effluent flow exited the test unit via a straight effluent pipe set at 1-2% slope. The 15 in. (nominal) SDR35 PVC effluent pipe terminated with a free-fall condition into the receiving tank (**Figure 8**). Storage tank pre-filtration was provided as water moved through a filter wall installed in the receiving tank. The test loop was completed once water flows through each storage tank to reach the pump intake.

Figure 6: Test Loop Pumps

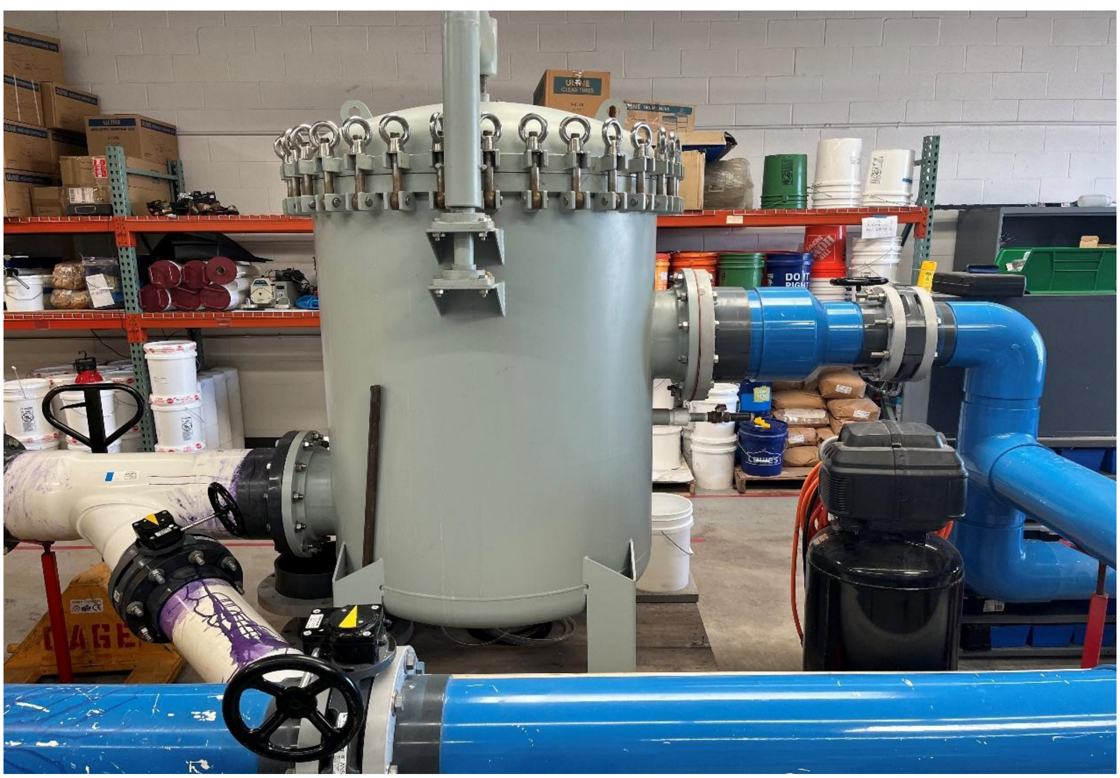

Figure 7: Test Loop Filter Vessel

Figure 8: Free Effluent Discharge

Storage tank water temperature was maintained using a BUUD 845OTI-E pool heater. A calibrated Elitech RC-5+TE thermometer and data logger were installed in the test loop and recorded water temperature at 30 sec intervals, to the nearest 0.1 °F. Water temperature did not exceed 80 °F during testing.

2.3 Test Sediment

2.3.1 Removal Efficiency Test Sediment

The sediment used for removal efficiency testing was a custom silica blend with a specific gravity of this of 2.65, provided by AGSCO corporation. The test sediment was batched, labeled, and stored in 5-gallon buckets (with lids) for the duration of the project. Prior to testing, sediment was sampled under third-party observation following Section 6 of the ASTM E3317 Standard Specification for Silica-Based Sediments for the Evaluation of Stormwater Treatment Devices. Following sampling, the buckets were sealed with tamper-proof quality labels that were signed by the observer and opened for use only under third-party observation.

The removal efficiency test sediment samples were analyzed at GeoTesting Express, an independent and accredited analytical laboratory located in Acton, MA. Each sample was analyzed for particle size distribution (PSD) following ASTM D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis and ASTM D7928 Standard Test

Method for Particle Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis, and for moisture content following ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass. GeoTesting Express holds accreditation for all three of the ASTM methods from the American Association for Laboratory Accreditation (A2LA) service in accordance with International Standard ISO/IEC 17025:2017. The scope of accreditation is provided at: https://www.geocomp.com/wp-content/uploads/2025/08/GTX-MA-A2LA-Cert-and-List.pdf.

The removal efficiency test sediment average PSD met the requirements of **Table 1** in Section 4A of the HDS Protocol, and the average d50 particle size was 69 µm. The average moisture content was below the method detection limit of 0.1%. The PSD results are summarized in **Table 2 and Figure 9**.

Table 2: Average Removal Efficiency Test Sediment PSD

Particle Diameter (µm)	Percent Finer by Mass (%)					
	NJDEP Removal Efficiency Specification	NJDEP Minimum Allowable	Sample 1	Sample 2	Sample 3	Test Sediment Average
1000	100	98	98	98	98	98
500	95	93	95	95	95	95
250	90	88	88	88	88	88
150	75	73	73	74	73	73
100	60	58	58	59	58	58
75	50	48	51	52	51	51
50	45	43	45	47	47	46
20	35	33	34	36	36	35
8	20	18	20	19	19	19
5	10	8	13	12	13	13
2	5	3	5	5	5	5
d50 (µm)	< 75	-	70 µm	66 µm	71 µm	69 µm

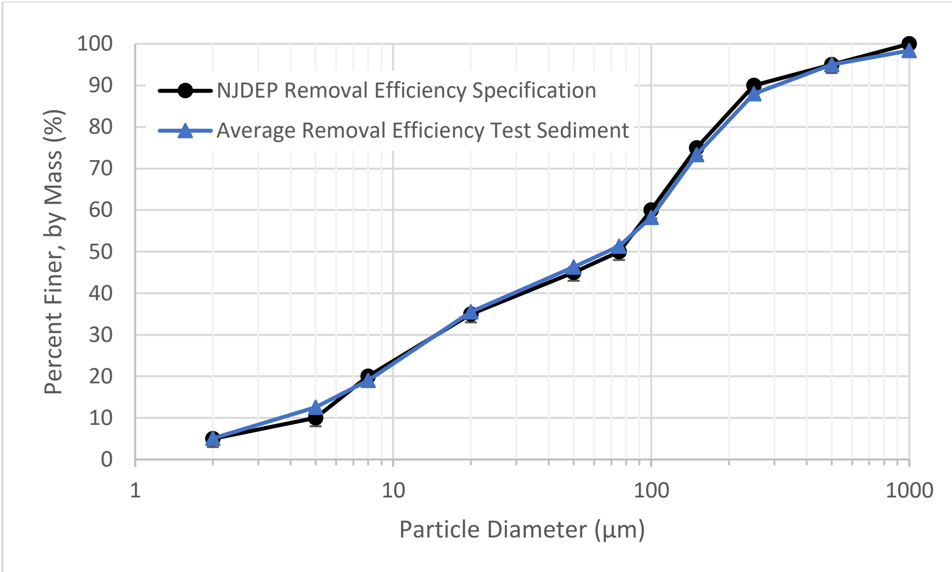

Figure 9: Average Removal Efficiency Test Sediment PSD

2.3.2 Scour Test Sediment

The sediment used for scour testing was a custom silica blend with a specific gravity of 2.65, provided by AGSCO Corporation. The test sediment was batched, labeled, and stored in 5-gal buckets (with lids) for the duration of this project. Prior to testing, sediment was sampled under third-party observation following Section 6 of ASTM E3317. Following sampling, the buckets were sealed with tamper-proof quality labels signed by the observer and opened for use only under third-party observation.

The scour test sediment samples were also analyzed for PSD at GeoTesting Express following ASTM D6913 and ASTM D7928. GeoTesting Express holds accreditation for both methods.

The scour test sediment average PSD met the requirements of Table 1 in Section 4A of the HDS Protocol, and the d50 particle size was 140 µm. The PSD results are summarized in **Table 3** and **Figure 10.**

Table 3: Average Scour Test Sediment PSD

Particle Diameter (µm)	Percent Finer by Mass (%)					
	NJDEP Scour Specification	NJDEP Minimum Allowable	Sample 1	Sample 2	Sample 3	Test Sediment Average
1000	100	98	100	100	100	100
500	90	88	91	92	88	90
250	55	53	75	77	69	74
150	40	38	57	59	51	56
100	25	23	27	27	25	26
75	10	8	10	11	8	10
50	0	0	5	7	5	6
20	0	0	1	2	2	1
8	0	0	1	1	1	1
5	0	0	1	1	1	1
2	0	0	1	1	1	1
d50 (µm)	-	-	137 µm	135 µm	147 µm	140 µm

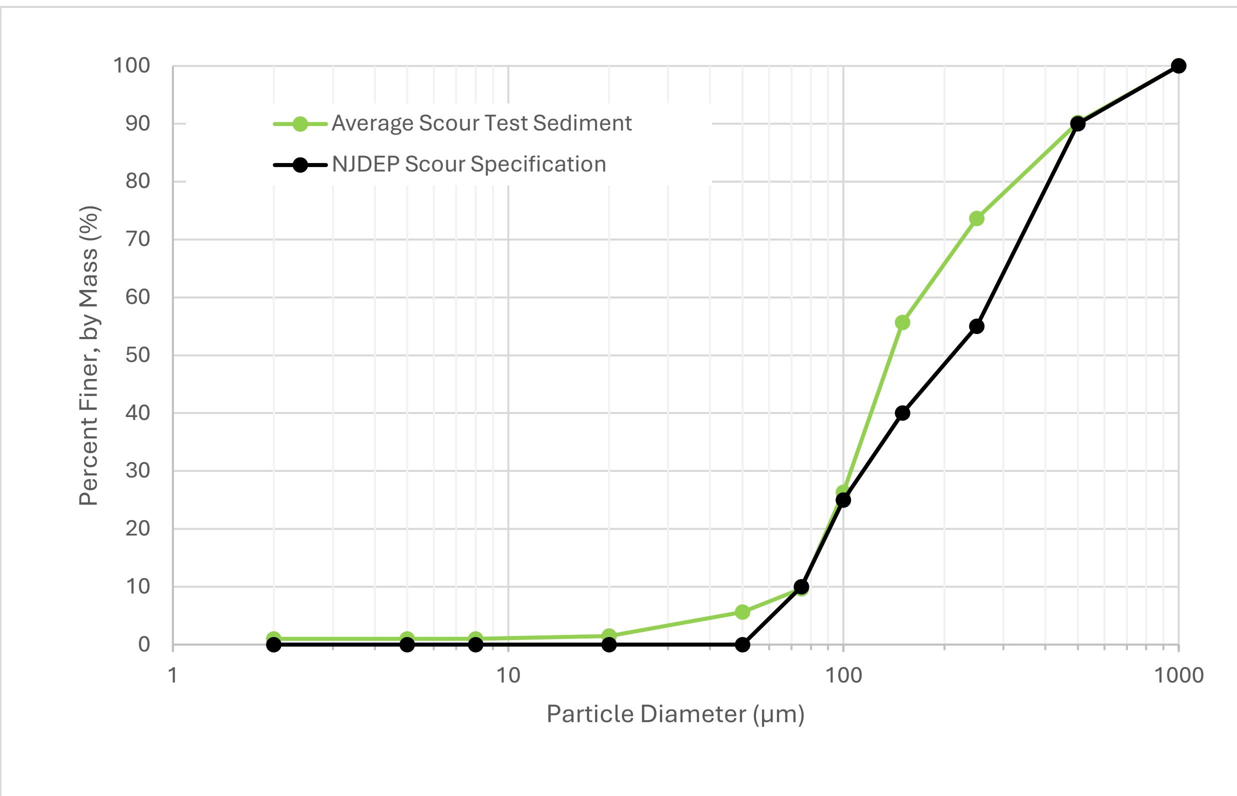

Figure 10: Average Scour Test Sediment PSD

2.4 Hydraulic Testing

Hydraulic testing was performed as required in the NJDEP protocol to assess water levels upstream and downstream of the test unit and upstream of the internal bypass within the test unit. Testing was conducted on a clean test unit with the test cylinder floor set at 50% of the maximum sediment storage depth. The flow rates evaluated ranged from 10% to 200% of the target MTFR and included the flow rate at bypass. Piezometers were installed in the inlet and outlet pipes of the test cylinder and within the test cylinder to obtain water levels and recorded to an accuracy of 0.125 in. Flow measurements were logged in 2 sec. intervals.

2.5 Sediment Removal Efficiency Testing

Sediment removal efficiency testing followed the mass capture test method outlined in Section 4 of the HDS Protocol. Discrete removal efficiency tests were performed at 10%, 25%, 50%, 75%, 100%, 125% and 150% of the initial target MTFR of 2.82cfs 64.5gpm/ft^2). All removal tests were conducted on a clean unit with a floor installed at 50% of the sediment storage capacity height (65 in. below invert).

During each test, the flow rate was held steady during the test at ±10% of the target value with a maximum coefficient of variation (COV) of 0.03. The water temperature was logged at a minimum of 30-second intervals throughout each test and remained below 80 °F during all testing.

Influent test sediment was injected via an Acrison 105X-DD/2 volumetric feeder run at a known rate to produce a target influent TSS concentration of 200 mg/L (± 10%) with a maximum COV of 0.10. Test sediment feed rate was determined by sampling the injection stream at six evenly spaced intervals throughout each test. Samples were collected in clean wide-mouth bottles. Each sample's collection time was less than 1 min (timed to the nearest 0.01 sec) and mass was a minimum of 20.0 g. The samples were weighed under observation, in-house to the nearest 0.001g.

A minimum of eight background SSC samples were collected at evenly spaced intervals throughout each test. The background sampling port was opened and allowed to flush for a minimum of 3 seconds prior to sample collection. Each sample was collected in a clean, 1 L wide-mouth bottle from the background sampling port located upstream of the sediment injection point on the influent pipe. Background sample volumes were quantified to ensure each sample exceeded the minimum volume QC requirement in the NJDEP HDS Protocol of 0.5 L. All background samples were analyzed by Apex Laboratory in Tigard, OR per ASTM D3977-97. Apex holds method specific accreditation for ASTM D3977-97 so proficiency testing was not required. Maximum background concentrations did not exceed 20 mg/L during any test.

A minimum of 25 lb of sediment was injected and delivered into the test unit during each test run. The influent mass during each test was determined by weighing the sediment mass in the feed hopper before and after each test (including any sediment added to the hopper during the test), subtracting the mass collected for feed rate samples, and subtracting any sediment mass retained in the influent pipe during that test run.

The sediment retained in the test unit was collected under observation following completion of each removal efficiency test run to determine how much mass was retained in the test unit. At the conclusion of each test run, the suspended sediment in the test unit water volume was allowed to gravity settle for a minimum of 1 hour before mass capture collection activities began. The water volume was then decanted using a peristaltic pump. A portion of the decanted water was run through new Graver filter cartridges. Prior to use, the high-temperature rated filter cartridges were placed in lined pans and oven-dried at no more than 100°C in order to establish their dry/clean weight. Once dried, they were weighed in-house in their lined pans under observation to the nearest 0.001 lb. After decanting the majority of the water volume through the filter cartridges, the cartridges and any retained sediment were oven-dried at no more than 100°C in their lined pans.

Following filtration of the decanted water, the remaining sediment mass and residual water were collected from the test unit. The sediment and residual water slurry were placed in labeled, lined aluminum pans which were pre-weighed under observation to the nearest 0.001 lb. The pans were placed in oven(s) and the sediment allowed to dry at no more than 100°C. To confirm dryness, two consecutive weights (at room temperature) were measured on the scale at no less than 2 hrs. of additional dry time apart. The filters and sediment were considered dry when there was less than a 0.1% mass change between the two measurements.

Removal efficiency was calculated for each target flow rate using Equation 1.

$$Removal\ Efficiency\ (\%) = \frac{Total\ Mass\ Collected\ in\ MTD\ (lb)}{Total\ Mass\ Input\ During\ Run(lb)} \times 100$$

Equation 1

2.6 Scour Testing

The Saturn Separator was evaluated for scour under online installation conditions following the procedure described in Section 5 of the NJDEP HDS Protocol. The false floor was adjusted to 4 in. below the 50% sediment storage capacity height (69 inches below invert) and pre-loaded with a level, 4 in. layer of scour test sediment. The unit was then filled with tap water up to the inlet and outlet inverts. All aspects of the scour testing procedure including sediment preload were completed under 3rd party observation.

The scour test began less than 96 hours after the sediment was preloaded and the system was filled to the invert with water. The test started (time zero) when flow was introduced to the pre-loaded test unit. The flowrate was increased over a 3-minute period until the target flowrate (minimum of 200% of the MTFR) was reached. For the remainder of the test, the flowrate was held steady at ±10% of the target rate with a maximum COV of 0.03. Water temperature was logged at 30-second intervals and remained below 80 °F during all testing.

The effluent was sampled starting at 1 min after the introduction of flow and continued every 2 min until a total of 15 effluent samples were collected. The total scour test duration was 29 min.

Each effluent sample was collected in a clean, 1 L wide mouth bottle by sweeping the bottle through the cross-section of the freely discharging effluent stream in a single pass. Background SSC samples were paired with odd-numbered effluent sampling times (8 total). Each background sample was also collected in a clean, 1 L wide mouth bottle from the background sampling port. The background sampling port was opened and allowed to flush for a minimum of 3 seconds prior to sample collection.

Effluent and background sample volumes were quantified to ensure each sample exceeded the minimum volume QC requirement in the NJDEP HDS Protocol of 0.5 L. All samples were analyzed by Apex Laboratory in Tigard, OR per ASTM D3977-97. Maximum background concentrations did not exceed 20 mg/L.

3 Performance Claims

3.1.1 Total Suspended Solids Removal Efficiency

For the particle size distribution and weighted calculation method required by the NJDEP HDS Protocol, the SAT-5 Saturn Separator demonstrated a 50.69% weighted, annualized TSS removal efficiency at a MTFR of 3.05 cfs, which is equivalent to 69.8 gpm/ft^2 of effective treatment sedimentation area (ETSA)

3.1.2 Maximum Treatment Flow Rate

The SAT-5 Saturn Separator MTFR was demonstrated to be 3.05 cfs (1,370 gpm) which corresponds to a surface loading rate of 69.8 gpm/ft^2.

3.1.3 Maximum Sediment Storage Depth and Volume

The maximum sediment storage depth for all Saturn Separator model sizes, including the SAT-5 test unit, is 18 inches. The SAT-5 has a maximum sediment storage volume of 29.45ft^3. The 50% sump full sediment storage depth is 9 inches and the 50% sediment storage volume for the SAT-5 is 14.73ft^3.

3.1.4 Effective Sedimentation Treatment Area (ESTA)

The effective sedimentation treatment area for the SAT-5 is 19.63ft^2.

3.1.5 Hydraulic Loading Rate

The MTFR or hydraulic loading rate for the Saturn separator is 69.8 gpm/ft^2

3.1.6 Detention Time and Volume

The detention time and operational wet volume of the Saturn Separator varies based on the loading rate it is being operated at. For the purposes of this testing, the operational wet volume of 149ft^3 was calculated based on the “full condition” achieved during scour testing, Water Surface

Elevation (WSE) 26.3 inches above the invert (The unit assumed to be full at the inlet WSE for calculation purposes despite the WSE being higher on the inlet side relative to the outlet side). The calculated maximum operational wet volume was utilized to calculate the detention for each of the target test flows. Doing so represents a conservative estimate of meeting the >3x detention time requirement during test runs since it overestimates detention time (longer test runs than the required minimum) for lower flow rates.

3.1.7 Online Installation

Based on successfully passing the specified online scour test at average flow rate of 2047gpm (139.9 gpm/ft^2) in the SAT-5, >200% of the demonstrated MTFR, the Saturn Separator qualifies for online installation.

4 Supporting Documentation

The NJDEP Verification Procedure, Section 5.D requires that “copies of the laboratory test reports, including all collected and measured data; all data from performance evaluation test runs; spreadsheets containing original data from all performance test runs; all pertinent calculations; etc.” be included in this section. This was discussed with NJDEP, and it was agreed that as long as such documentation could be made available by the New Jersey Corporation for Advanced Technology (NJCAT) upon request it would not be prudent or necessary to include all this information in this verification report.

4.1 Hydraulic Testing Results

Hydraulic characterization testing was performed to determine the Saturn Separator SAT-5 system head loss over the range of hydraulic loading rates (HLRs) covered by the test program, which spanned 10% to 200% of the target MTFR. bypass occurred at a flowrate of 1640 gpm (~120% of MTFR). Note that HLR is defined as the flow rate divided by the effective sedimentation treatment area (i.e. surface area of the 5 ft manhole unit). The head loss and associated average HLRs are presented in **Table 4** and **Figure 11.** The maximum recorded test water temperature during hydraulic testing was 75.5 °F.

Table 4: Saturn Separator Hydraulic Characterization Summary

Flow Rate			Water Surface Level (inches)			
MTFR (%)	gpm	cfs	Inlet Pipe	Upstream of Bypass Weir	Outlet Pipe	Loss (inches)
10	128	0.28	9.500	9.750	1.750	7.750
25	314	0.70	10.875	11.125	3.125	7.750
50	631	1.41	12.625	12.875	4.625	8.000
75	954	2.13	14.500	14.750	5.875	8.625
100	1279	2.85	16.500	16.875	7.125	9.375
125	1578	3.52	18.625	19.000	7.875	10.750
150	1907	4.25	20.625	20.875	8.250	12.375
200	2562	5.71	24.125	24.250	8.375	15.750

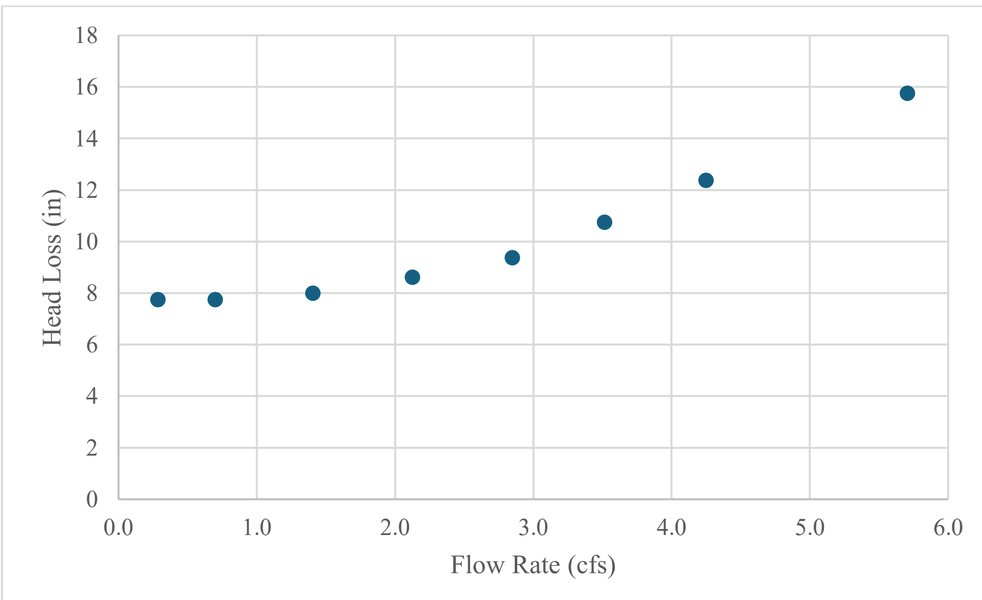

Figure 11: Saturn Separator Flow Rate vs. Head Loss

4.2 Removal Efficiency Testing Results

Sediment removal efficiency tests were performed in accordance with the NJDEP HDS Protocol on the Saturn Separator SAT-5 model at 10%, 25%, 50%, 75%, 100%, 125% and 150% of the target MTFR. Removal efficiencies for each test run with associated sediment masses are shown in **Table 5.** The sediment removal efficiencies for each test run were correlated with flow rate to produce a removal efficiency curve with an R^2 value of 0.9814, exceeding the minimum requirement of 0.97. (**Figure 12**). Based on the resulting removal efficiency curve, the SAT-5 Saturn Separator achieved an annualized weighted TSS removal of 50.69% at a demonstrated

MTFR of 3.05 cfs (69.8gpm/ft^2). The removal efficiency results for all test runs are summarized in **Table 6** and a mass balance summary is provided below in **Table 7** for each test run.

Table 5: Summarized Removal Efficiency from Captured Sediment							
%MTFR	**10**	**25**	**50**	**75**	**100**	**125**	**150**
Total Mass Injected (lb)	30.309	30.847	31.830	30.705	32.724	32.345	30.480
Total Sediment Feed Calibration Sample Mass (lb)	1.315	2.421	3.239	2.359	3.249	2.766	3.083
Sediment Retained in Inlet pipe (lb)	0.031	0.000	0.000	0.000	0.000	0.000	0.000
Sediment Feed into MTD (lb)	28.963	28.426	28.591	28.346	29.475	29.579	27.357
Sediment Captured in MTD (lb)	20.018	17.849	15.608	13.231	11.969	10.622	8.555
Removal Efficiency (%)	69.1	62.8	54.6	46.7	40.6	35.9	31.3

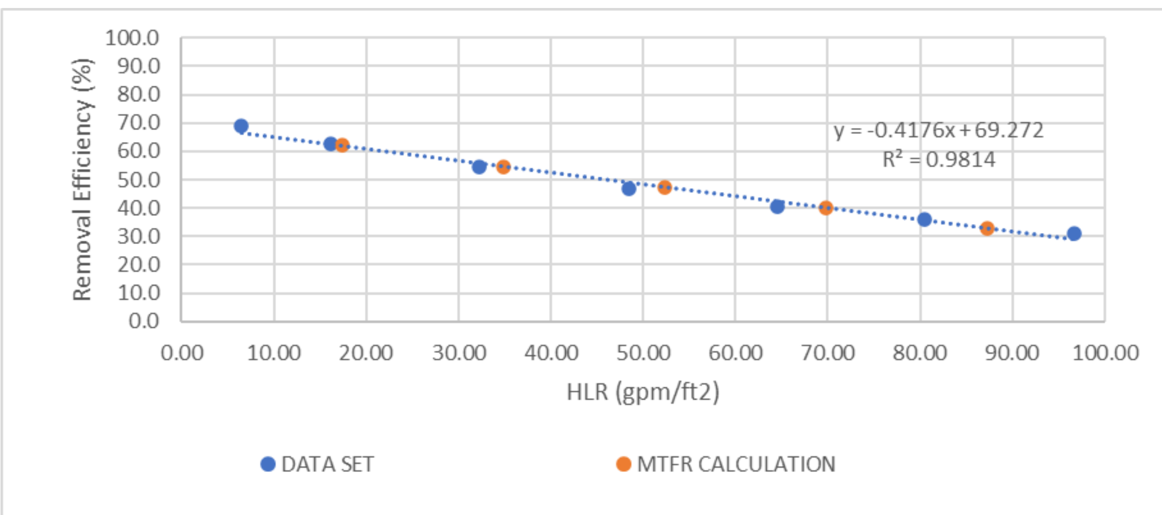

Figure 12: **Removal Efficiency vs. Flow Rate**

Table 6: Demonstrated Removal Efficiency Results Summary				
% MTFR	Flow Rate (gpm)	Removal Efficiency (%)	Weighting Factor	Weighted Removal Efficiency (%)
25%	342.5	62.0	0.25	15.50
50%	685.0	54.7	0.30	16.41
75%	1027.5	47.4	0.20	9.48
100%	1370.0	40.1	0.15	6.02
125%	1712.5	32.8	0.10	3.28
Annualized Weighted Removal Efficiency				50.69

Table 7: Mass Balance Summary						
Test ID	Injected Mass (lb)	Mass Delivered to Unit (lb)	Water Volume During Sediment Addition (L)	Avg. Influent TSS Conc. Based on Mass Injected (mg/L)	Total Mass Added (≥ 25 lb)	Avg Influent TSS Conc. Based on Feed Rate (mg/L) (± 10%)
10% MTFR	30.3	29.0	63,257.0	207.9	29.0	206.3
25% MTFR	30.8	28.4	63,678.4	202.5	28.4	202.8
50% MTFR	31.8	28.6	64,127.0	202.2	28.6	204.3
75% MTFR	30.7	28.3	63,842.4	201.4	28.3	197.9
100% MTFR	32.7	29.5	64,674.9	206.7	29.5	204.0
125% MTFR	32.3	29.6	63,718.6	210.6	29.6	207.8
150% MTFR	30.4	27.4	64,045.8	193.8	27.4	194.3

4.2.1 *Sample Schedule*

The sample schedule for each test run is shown in **Table 8**.

Table 8: Removal Efficiency Sample Schedule

% MTFR (Detention Time)													
10 (8.82 min)		25 (3.53 min)		50 (1.76 min)		75 (1.18 min)		100 (52.9 s)		125 (42.4 s)		150 (40.9 s)	
Time (min)	Event/ Sample	Time (min)	Event/ Sample	Time (min)	Event/ Sample	Time (min)	Event/ Sample	Time (min)	Event/ Sample	Time (min)	Event/ Sample	Time (min)	Event/ Sample
0.0	START	0.0	START	0.0	START	0.0	START	0.0	START	0.0	START	0.0	START
0.0	FEED1	0.0	FEED1	0.0	FEED1	0.0	FEED1	0.0	FEED1	0.0	FEED1	0.0	FEED1
0.0	BACK1	0.0	BACK1	0.0	BACK1	0.0	BACK1	0.0	BACK1	0.0	BACK1	0.0	BACK1
19.5	BACK2	8.1	BACK2	4.2	BACK2	2.7	BACK2	2.1	BACK2	1.6	BACK2	1.4	BACK2
27.3	FEED2	11.4	FEED2	5.9	FEED2	3.8	FEED2	3.0	FEED2	2.3	FEED2	2.0	FEED2
38.9	BACK3	16.2	BACK3	8.4	BACK3	5.4	BACK3	4.2	BACK3	3.3	BACK3	2.8	BACK3
54.5	FEED3	22.7	FEED3	11.7	FEED3	7.6	FEED3	5.9	FEED3	4.6	FEED3	3.9	FEED3
58.4	BACK4	24.3	BACK4	12.5	BACK4	8.1	BACK4	6.3	BACK4	4.9	BACK4	4.2	BACK4
77.9	BACK5	32.4	BACK5	16.7	BACK5	10.9	BACK5	8.4	BACK5	6.6	BACK5	5.6	BACK5
81.8	FEED4	34.1	FEED4	17.6	FEED4	11.4	FEED4	8.9	FEED4	6.9	FEED4	5.9	FEED4
97.3	BACK6	40.5	BACK6	20.9	BACK6	13.6	BACK6	10.5	BACK6	8.2	BACK6	7.0	BACK6
109.0	FEED5	45.4	FEED5	23.4	FEED5	15.2	FEED5	11.8	FEED5	9.2	FEED5	7.8	FEED5
116.8	BACK7	48.6	BACK7	25.1	BACK7	16.3	BACK7	12.6	BACK7	9.9	BACK7	8.4	BACK7
136.3	BACK8	56.8	BACK8	29.3	BACK8	19.0	BACK8	14.8	BACK8	11.5	BACK8	9.8	BACK8
136.3	FEED6	56.8	FEED6	29.3	FEED6	19.0	FEED6	14.8	FEED6	11.5	FEED6	9.8	FEED6

4.2.2 *4.2.2 QA/QC*

The water temperature remained below 80 °F for all tests (**Table9**) and the maximum background concentration remained below 20 mg/L (**Table 10**). Sediment feed rate calibration sample durations did not exceed the one-minute requirement for all tests (**Table 11**). The feed rate sample COV remained below 0.10 for all tests (**Table 11**) and the inflow rate COV remained below 0.03 for all tests (**Table 9**).

Table 9: Flow Rate and Water Temperature							
Test ID	**QAQC PASS/FAIL**	**Target Inflow Rate (gpm)**	**Average Inflow Rate (gpm)** (± 10%)	**Target Inflow Rate (cfs)**	**Average Inflow Rate (cfs)** (± 10%)	**Inflow Rate COV** (< 0.03)	**Maximum Water Temperature (°F)** (< 80 °F)
10% MTFR	PASS	126.6	127.3	0.28	0.28	0.003	75.3
25% MTFR	PASS	316.6	317.4	0.71	0.71	0.004	75.3
50% MTFR	PASS	633.2	633.4	1.41	1.41	0.002	74.6
75% MTFR	PASS	949.8	950.2	2.12	2.12	0.002	74.6
100% MTFR	PASS	1266.5	1266.3	2.82	2.82	0.002	74.1
125% MTFR	PASS	1583.1	1579.4	3.52	3.52	0.004	73.4
150% MTFR	PASS	1899.7	1897.5	4.23	4.23	0.006	74.1

Table 10: Background Concentrations										
Test ID	**QAQC PASS/FAIL** (< 20 mg/L)	**Concentration (mg/L)**								**Minimum Sample Volume (mL)** (≥ 500 mL)
10% MTFR	PASS	0.35	0.31	0.30	0.33	0.33	0.36	0.37	0.31	672
25% MTFR	PASS	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.26	909
50% MTFR	PASS	0.27	0.29	0.27	0.27	0.27	0.28	0.29	0.27	862
75% MTFR	PASS	0.33	0.29	0.30	0.33	0.31	0.29	0.29	0.35	723
100% MTFR	PASS	0.32	0.34	0.34	0.29	0.32	0.30	0.31	0.31	734
125% MTFR	PASS	0.30	0.29	0.29	0.28	0.28	0.70	1.40	2.20	848
150% MTFR	PASS	0.30	0.33	0.28	0.32	0.80	1.90	3.40	5.20	764

Table 11: Sediment Feed Rate											
Test ID	QAQC PASS/ FAIL	Average Influent TSS (mg/L) (± 10% of 200 mg/L)	Moisture Corrected Feed Rate (g/min)						Average Feed Rate (g/min)	Total Feed Mass (g/min)	Feed Rate COV (< 0.10)
10% MTFR	PASS	206	97.28	100.41	99.82	99.53	96.58	103.03	99.44	596.65	0.023
25% MTFR	PASS	203	242.70	248.41	229.64	254.50	238.15	248.84	243.71	1462.23	0.036
50% MTFR	PASS	204	469.34	499.53	495.24	484.69	490.60	499.23	489.77	2938.64	0.023
75% MTFR	PASS	198	678.64	713.55	669.50	732.14	735.32	742.82	711.99	4271.96	0.044
100% MTFR	PASS	204	944.35	933.74	1000.76	955.54	1040.38	993.29	978.01	5868.04	0.042
125% MTFR	PASS	208	1202.98	1251.00	1206.29	1234.08	1307.40	1254.20	1242.66	7455.96	0.031
150% MTFR	PASS	194	1396.20	1403.90	1436.91	1361.43	1405.91	1371.55	1395.98	8375.90	0.019

4.2.3 Data Exclusions

No data was disqualified or excluded from the report. Initially, a scour test was successfully completed at a lower operating rate associated with the target MTFR of 64.5gpm/ft^2. The results of this scour test were not included in this report because after completion of the removal efficiency test runs a second scour test was run (reported herein) at a rate exceeding 200% of the demonstrated MTFR of 69.8gpm/ft^2.

4.3 Scour Testing

Scour testing of the Saturn Separator SAT-5 was conducted following the procedure described in Section 5 of the NJDEP HDS Protocol to verify suitability for online use. The target scour test flow rate was 2749 gpm (6.125 cfs). An average scour test flow rate of 2747 gpm (6.120 cfs) was demonstrated, which represents 200.5% of the 1370 gpm MTFR. The sample schedule is provided in **Table 12**. The flow rate and water temperature QC data are provided in **Table 13.** Eff1uent and background sample volumes exceeded the minimum volume QC requirement in the NJDEP HDS Protocol of 0.5 L. Scour test TSS results are presented in **Table 14.** The average adjusted effluent concentration was below 20 mg/L, qualifying the Saturn Separator for online installation.

Table 12: Scour Sample Schedule		
Time (mm:ss)	**Effluent Sample**	**Background Sample**
01:00	1	1
03:00	2	
05:00	3	2
07:00	4	
09:00	5	3
11:00	6	
13:00	7	4
15:00	8	
17:00	9	5
19:00	10	
21:00	11	6
23:00	12	
25:00	13	7
27:00	14	
29:00	15	8

Table 13: Flow Rate and Water Temperature							
Test ID	**QAQC PASS/ FAIL**	**Target Inflow Rate (gpm)**	**Average Inflow Rate (gpm)** (± 10%)	**Target Inflow Rate (cfs)**	**Average Inflow Rate (cfs)** (± 10%)	**Inflow Rate COV** (< 0.03)	**Maximum Water Temperat ure (°F)** (< 80 °F)
SCOUR	PASS	2749.0	2747.0	6.125	6.120	0.003	74.4

	Table 14: Scour TSS Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	1.5	13.2	26.0	40.2	34.7	37.2	33.7	33.2	31.7	26.4	41.0	26.5	28.3	27.4	25.2
Background	12.8	11.5	10.2	12.9	15.6	16.2	16.8	16.6	16.4	16.1	15.7	15.2	14.6	14.0	13.4
QA/QC $\leq$20 mg/L	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Adjusted Effluent	0.0	1.7	15.8	27.3	19.1	21.0	16.9	16.6	15.3	10.3	25.3	11.3	13.7	13.4	11.8
Average Adjusted Effluent Concentration (mg/L)					14.6										

5 Design Limitations

Contech's engineering team works with the site design engineer during the specification process for each project to ensure the Saturn Separator is properly sized and to address any potential site constraints that could impact the functionality of the system.

5.1.1 Required Soil Characteristics

The Saturn Separator is housed in a precast concrete manhole and generally may be installed in all soil types without limitation.

5.1.2 Slope

It is generally not advisable to install the Saturn Separator unit with steep pipe slopes. When the Saturn Separator is being considered for a project where pipe slopes exceed 10%, Contech recommends contacting their engineering staff to evaluate the design prior to specification.

5.1.3 Maximum Treatment Flow Rate

The maximum treatment flow rate (MTFR) for the Saturn Separator is 69.8 gpm/ft^2 for all model sizes. The specific flow rate this corresponds to for each model size is noted in **Table A-1** in the Verification Appendix.

5.1.4 Maintenance Requirements

The Saturn Separator should be inspected and maintained according to recommendations and guidelines set forth in the Operation and Maintenance which can be accessed at: https://www.conteches.com/media/iyoh1stu/saturn-separator-maintenance-guide.pdf

5.1.5 Driving Head

There is an operational head loss associated with the Saturn Separator that will vary based on operating rate and site specifics. Each project is evaluated to ensure an appropriate amount of head is provided for the system to function as tested.

5.1.6 Installation Limitations

Prior to installation, Contech provides contractors with detailed installation and assembly instructions and is also available to consult onsite during installation. Pick weights for Saturn Separator components are provided prior to delivery so that the contractor can secure proper equipment for lifting the units into place.

5.1.7 Configurations

Saturn Separator units can be installed online or offline. Online units can convey excess flows around the treatment chambers of the unit without the need for an external bypass structure. Contech's engineering staff can help determine the pipe size and locations based on the site requirements.

5.1.8 Load Limitations

Saturn Separator units are typically designed for HS-20 loading (32,000 pounds per truck axle). If additional loading is expected/required then it is advisable to contact Contech to assess loading options.

5.1.9 Pre-treatment Requirements

There are no pre-treatment requirements for the Saturn Separator stormwater treatment system.

5.1.10 Limitations on Tailwater

If tailwater is present it is important to increase the available driving head within the unit to ensure that the full MTFR is still treated prior to any internal bypass. Contech's engineering staff will evaluate the potential impact of tailwater and ensure the system is properly designed for the expected site conditions

5.1.11 Depth to Seasonal High-Water Table

Saturn Separator performance is not typically impacted by high groundwater. Occasionally, when groundwater is expected to be within several feet of finished grade it may be necessary to add a base extension to the unit to counter buoyant forces. If high groundwater is expected, Contech's engineering staff can evaluate whether anti-buoyancy measures are required during the design process.

6 Maintenance Plans

Inspection

The Saturn Separator should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation. Regular inspection (min. 2x annual recommended) initially after installation will help determine the appropriate long-term inspection and maintenance frequency for a given location. Installations should also be inspected more frequently where heavy amounts of sediment, oil, or trash/debris are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, rings, or outlet trough. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick (stadia rod), tape measure, or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection.

The Saturn Separator should be cleaned before the level of sediment in the sump reaches the maximum sediment depth (NJDEP 50% Depth is 9in, Max Sump Storage is 18in) and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred.

Maintenance

Access to the Saturn Separator is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and rings. For large units, multiple manhole covers allow access to the chambers and sump.

Cleaning of a Saturn Separator should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the rings should also be washed off if pollutant buildup exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Saturn Separator must be done in accordance with local regulations.

7 Statements

The following attached pages are signed statements from Contech, Integral Consulting, and NJCAT. These statements are a requirement of the verification process. In addition, it should be noted that this report has been subject to public review, and all comments and concerns have been satisfactorily addressed.

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4/17/2026

Dr. Richard Magee
Executive Director, New Jersey Corporation for Advanced Technology
c/o Center for Environmental Systems
Stevens Institute of Technology
One Castle Point on Hudson
Hoboken, NJ 07030

RE: NJCAT Verification of the Saturn Separator™ Hydrodynamic Separator

Dr. Richard Magee,

This correspondence is being sent to you in accordance with the "*Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology"* dated January 25, 2013. Specifically, the process document requires that manufacturers submit a signed statement confirming that all of the procedures and requirements identified in the aforementioned process document and the *"New Jersey Department of Environmental Protection (NJDEP) Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device"* January 1, 2021 (updated April 25, 2023). have been met. We believe that the testing executed in Contech's laboratory in Oceanside, CA on the Saturn Separator™ during the Winter/Spring of 2026, under the direct supervision of Austin Pyles and Jillian Wulf from Integral Consulting Inc. was conducted in full compliance with all applicable NJDEP/NJCAT protocol and process criteria. Additionally, we believe that all of the required documentation of the testing and resulting performance calculations has been provided within the submittal accompanying this correspondence.

Please do not hesitate to contact me with any additional questions related to this matter.

Respectfully,

Derek M. Berg
Director- Stormwater Regulatory Management - East

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April 23, 2026

Integral Consulting Inc.
3132 Tiger Run Ct
Suite 108
Carlsbad, Ca 92010

Subject: **Stormwater BMP Test Observations Statement of Disclosure**

To Whom it May Concern:

Integral Consultants Inc. provides environmental consulting services focused on stormwater management and water quality. We are familiar with stormwater treatment research having conducted studies of sediment removal and BMP effectiveness. Through our storm water management services, we have extensive experience with the use of analytical laboratories for sample processing, proper sampling techniques, and calculations of flow, pollutant concentration, and pollutant loading. Our clients have included California government agencies, county government agencies, and private consulting firms.

Integral has provided third party review of stormwater device testing to Contech Engineered Solutions between 2022 and 2026. Jillian Wulf or Austin Pyles, served as observers for this series of tests. Beyond this past review work, Integral and Contech have no relationships that would constitute a conflict of interest, as outlined in the Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology (August 4, 2021) Section 4. B Conflict of Interest. Integral has no ownership stake, does not receive commissions, does not have licensing agreements, and does not receive funding or grants beyond those associated with the testing program. If there are any further questions on potential conflicts of interest, please let me know.

Sincerely,

Austin Pyles — Jillian Wulf

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April 23, 2026

Integral Consulting Inc.
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Subject: **Stormwater BMP Test Observations**

To whom it may concern:

Integral Consulting Inc. has served as a third party observer for tests performed by Contech Engineered solutions from 2022 to 2026. The test measured the performance of the Saturn Separator. Tests were performed by Contech at their laboratory at 398 Via El Centro, Oceanside, California, to meet the standards described in *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device* (NJDEP, 2023). On April 24, 2026 we submitted a statement of our qualifications and disclosure record stating that we have no conflict of interest as required by the NJCAT MTD process.

A member of our staff verified compliance with the laboratory testing protocols, and our staff member was physically present to observe the full duration of all laboratory testing. We have reviewed the data, calculations, and conclusions associated with *Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology* (NJDEP, August 4, 2021) by Contech Engineered Solutions, Dated April 2026, and state that they conform to what we saw during our supervisions as a third-party observer.

Sincerely,

Austin Pyles *Jillian Wulf*

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Rutgers EcoComplex
1200 Florence Columbus Rd
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May 5, 2026

Gabriel Mahon, Chief
NJDEP
Bureau of Non-Point Pollution Control
Division of Water Quality
401 E. State Street
Mail Code 401-02B, PO Box 420
Trenton, NJ 08625-0420

Dear Mr. Mahon,

Based on my review, evaluation and assessment of the testing conducted on the Contech Separator™, the test protocol requirements contained in the *"New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device"* (NJDEP HDS Protocol, January 1, 2021- Updated April 25, 2023) were met or exceeded consistent with the NJDEP Approval Process. Specifically:

Test Sediment Feed

The mean PSD of the test sediments comply with the PSD criteria established by the NJDEP HDS protocol. The removal efficiency test sediment PSD analysis was plotted against the NJDEP removal efficiency test PSD specification. The test sediment was shown to be significantly finer than the sediment blend specified by the protocol (<75 µm); the test sediment median (d_{50}) was 70 µm, 66 µm, and 71 µm for the samples analyzed. The scour test sediment PSD analysis was plotted against the NJDEP scour test PSD specification and shown to meet the protocol specifications. The average median (d_{50}) of the three sampleswas 140 µm.

Removal Efficiency Testing

In accordance with the NJDEP HDS Protocol, removal efficiency testing was executed on a Saturn Separator (SAT-5) comprised of full-scale, commercially available internal components to demonstrate the ability of the Saturn Separator to remove 50 % of the NJDEP protocol specified test sediment..

Scour Testing

The scour testing was conducted at 2747 gpm (6.120 cfs), which is equal to 200.5% of the MTFR. The scour test was conducted with the unit preloaded with 4.0” of levelled sediment to the 50% capacity level prior to conducting the test. A total of 15 effluent samples were collected throughout the test. The average calculated effluent concentration, adjusted for background, was 14.6 mg/L.

Sincerely,

Richard S. Magee, Sc.D., P.E., BCEE

8 References

ASTM D2216. (2019). "*Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass,"* ASTM International, West Conshohocken, PA 1963, DOI: 10.152/D2216-19, www.astm.org

ASTM D3977. (2019). "*Standard Test Methods for Determining Sediment Concentration in Water Samples*," ASTM International, West Conshohocken, PA 1980, DOI: 10.1520/D3977-97R19, www.astm.org

ASTM D6913. (2017). "*Standard Test Methods for Particle-Size Distribution (Gradation) Using Sieve Analysis*," ASTM International, West Conshohocken, PA 2004, DOI: 10.1520/D6913_D6913M-17, www.astm.org

ASTM D7928. (2021). "*Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis*," ASTM International, West Conshohocken, PA 2016, DOI: 10.1520/D7928-21E01, www.astm.org

ASTM E3317. (2022). "*Standard Specification for Silica-Based Sediments for the Evaluation of Stormwater Treatment Devices*," ASTM International, West Conshohocken, PA 2022, DOI: 10.1520/E3317-22, www.astm.org

New Jersey Department of Environmental Protection (NJDEP). (2021). *Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology.* https://dep.nj.gov/wp-content/uploads/stormwater/njcat-mtd-process-8-4-2021-1.pdf

New Jersey Department of Environmental Protection (NJDEP). (2023). *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device*. https://dep.nj.gov/wp-content/uploads/stormwater/hds-protocol-04252023-final.pdf

VERIFICATION APPENDIX

Introduction

- Manufacturer:
  Contech Engineered Solutions
  9100 Centre Point Drive
  West Chester, OH 45069
  Phone: 1-800-338-1122
  Fax: (513) 645-7993
  www.ContechES.com

- Standard Saturn Separator Model Sizes, Key Dimensions, and Operating Rates are included in **Tables A-1** and **A-2**

- TSS Removal Rate: 50% Weighted

- Saturn Separator Qualifies for: Online or Offline Installation

Detailed Specification

- NJDEP sizing tables and physical dimensions of the standard Saturn Separator verified models are shown in (**Table A-1** and **Table A-2**).

- New Jersey requires that the peak flow rate of the NJWQ Design Storm event of 1.25 inch in 2 hours be used to select the appropriate model size that is able to treat it for a given project. The tested SAT-5 model has a maximum treatment flow rate (MTFR) of 3.05 cfs (1370 gpm), which corresponds to a surface loading rate of 69.8 gpm/ft^2.

- Pick weights and installation procedures vary with model size and project specifics. Design support is given by Contech's engineering and field services teams for each project and pick weights and installation procedures will be provided prior to delivery.

- NJDEP maximum recommended sediment depth prior to cleanout is 9-inches for all model sizes.

- The Saturn Separator Operation and Maintenance Manual Can be Accessed At: https://www.conteches.com/media/iyoh1stu/saturn-separator-maintenance-guide.pdf

- Under N.J.A.C. 7:8-5.5, NJDEP stormwater design requirements do not allow a hydrodynamic separator such as the Saturn Separator to be used in series with another hydrodynamic separator to achieve an enhanced TSS removal rate.

Table A-1- NJDEP 50% MTFR/Loading Rates and Calc. Sediment Removal Interval for Saturn Separator Models						
Model No.	Manhole Dia (ft)	NJDEP 50% TSS Max. Treatment Flowrate[1] (cfs)	Sedimentation Surface Area (ft^2)	Hydraulic Loading Rate (gpm/ft^2)	50% Max. Sediment Storage[2] (ft^3)	Sediment Removal Interval[3] (months)
SAT-4	4	1.95	12.57	69.8	9.43	34
SAT-5	5	3.05	19.63	69.8	14.72	34
SAT-6	6	4.40	28.27	69.8	21.20	34
SAT-8	8	7.82	50.27	69.8	37.70	34
SAT-10	10	12.21	78.54	69.8	58.91	34

1. Determined based on achieving >50% weighted TSS removal per the NJDEP HDS protocol
2. Calculated based on 9 in. (50% full) sediment in sump
3. Calculated in accordance with Appendix B of the NJDEP HDS protocol

Table A-2- Key Dimensions for Standard Saturn Separator Models							
Model No.	Manhole Dia (ft)	NJDEP 50% TSS Max. Treatment Flowrate (cfs)	Total Sump Depth[1] (ft)	Functional Sump Depth[2] (ft)	Wet Volume Functional Sump (ft^3)	Aspect Ratio Depth: Diameter	Sediment Sump Depth (in)
SAT-4	4	1.95	4.55	3.8	57.2	0.95	18
SAT-5	5	3.05	6.15	5.4	106.0	1.08	18
SAT-6	6	4.40	6.15	5.4	152.7	NA	18
SAT-8	8	7.82	8.15	7.4	372.0	0.925	18
SAT-10	10	12.21	10.05	9.3	730.4	0.93	18

1. Total sump depth is the total depth below invert to the unit floor (includes 18 in. sediment sump).
2. Functional Sump Depth is depth below invert to top of the 50% sump full test condition (9 in. from bottom). Functional sump depth scaling is within 15% allowable tolerance for all models except SAT-6 which remains unchanged since MTFR is <250% of SAT-5 test unit.