Appendix A:

Lake Sampling Data (2017-2020)

SUMMARY OF WATER DATA COLLECTED IN 3-LAKE SYSTEM FOR THE PERIOD 2012-2019

Lake ID	STATE WQ STANDARD FRESH WATER	8.0				9.0		STATE WQ STANDARD MARINE WATERS	10.0	
LOCATION		North Lake				South Lake			Alligator Lake	
Monitoring Location Name		8A		8B		9B			10B	
STATISTIC		MEAN	ST DEV	MEAN	ST DEV	MEAN	ST DEV		MEAN	ST DEV
Turbidity (NTU)	≤29			11.5	4.9	8.7	1.5	≤29	7.5	2.5
Enterococcus (cfu/100 ml)(MPN)		305.0	105.1	470.2	461.0	142.9	92.2	70.0	223.4	63.9
Total Nitrogen (mg/L)		1.3	0.2	2.2	1.1	1.8	0.5	0.045 (Naples Bay NNC); 1.27 (EPA); 1.27 (Lakes, 62B-302)	1.3	0.2
Total Phosphorus (mg/L)		0.2	0.0	0.1	0.1	0.6	0.9	0.57 (Naples Bay NNC); 0.175 (EPA); 0.05 (Lakes, 62B-302)	0.1	0.0
Total Suspended Solids (mg/L)		4.3	15.9	26.0	21.6	16.3	8.9		14.9	15.5

A=INFLUENT
B=DISCHARGE

ECE
Erickson Consulting Engineers

Testing for UV Treatment Feasibility

Parameters	May 5, 2021		
	TSS (mg/L	UV Transmittence Replicates (%)	
Sample Description	(mg/L)	%	%
Alligator Lake 10am	0.80	43.23	37.50
Alligator Lake 1pm	1.20	36.80	39.20
Alligator Lake 3pm	0.57	38.50	37.57

BENCHMARK
EnviroAnalytical Inc.

NELAC Certification #E84167

ANALYTICAL TEST REPORT
THESE RESULTS MEET NELAC STANDARDS

Submission Number : 21050279

Erickson Consulting Engineers
7201 Delainey Court
Sarasota, FL 34240

Mia C. Esposito

Project Name : NAPLES BEACH RESTORATION & WQ
Project#: 20-380
Date Received : 05/06/2021
Time Received : 1147

Submission Number: 21050279 **Sample Date:** 05/05/2021
Sample Number: 001 **Sample Time:** 1000
Sample Description: 1A: Alligator Lake 10AM **Sample Method:** Grab

Parameter	Result	Units	MDL	PQL	Procedure	Analysis Date/Time	Analyst
TOTAL SUSPENDED SOLIDS	0.800 I	MG/L	0.570	2.280	SM2540D	05/10/2021 16:27	TG/CM

Submission Number: 21050279 **Sample Date:** 05/05/2021
Sample Number: 002 **Sample Time:** 1300
Sample Description: 2A: Alligator Lake 1PM **Sample Method:** Grab

Parameter	Result	Units	MDL	PQL	Procedure	Analysis Date/Time	Analyst
TOTAL SUSPENDED SOLIDS	1.20 I	MG/L	0.570	2.280	SM2540D	05/10/2021 16:27	TG/CM

Submission Number: 21050279 **Sample Date:** 05/05/2021
Sample Number: 003 **Sample Time:** 1500
Sample Description: 3A: Alligator Lake 3PM **Sample Method:** Grab

Parameter	Result	Units	MDL	PQL	Procedure	Analysis Date/Time	Analyst
TOTAL SUSPENDED SOLIDS	0.570 U	MG/L	0.570	2.280	SM2540D	05/10/2021 16:27	TG/CM

BENCHMARK
EnviroAnalytical Inc.

NELAC Certification #E84167

Dale D. Dixon / Laboratory Director — 05/11/2021 Date

Tülay Tanrisever - Technical Director/QC Officer

Kara Peterson - QA Officer

DATA QUALIFIERS THAT MAY APPLY:

A = Value reported is an average of two or more determinations.
B = Results based upon colony counts outside the ideal range.
H = Value based on field kit determination. Results may not be accurate.
I = Reported value is between the laboratory MDL and the PQL.
J1 = Estimated value. Surrogate recovery limits exceeded.
J2 = Estimated value. No quality control criteria exists for component.
J3 = Estimated value. Quality control criteria for precision or accuracy not met.
J4 = Estimated value. Sample matrix interference suspected.
J5 = Estimated value. Data questionable due to improper lab or field protocols.
K = Off-scale low. Value is known to be < the value reported.
L = Off-scale high. Value is known to be > the value reported.
N = Presumptive evidence of presence of material.
O = Sampled, but analysis lost or not performed.
Q = Sample held beyond accepted hold time.
T = Value reported is < MDL. Reported for informational purposes only and shall not be used in statistical analysis.
U = Analyte analyzed but not detected at the value indicated.
V = Analyte detected in sample and method blank. Results for this analyte in associated samples may be biased high. Standard, Duplicate and Spike values are within control limits. Reported data are usable.
Y = Analysis performed on an improperly preserved sample. Data may be inaccurate.
Z = Too many colonies were present (TNTC). The numeric value represents the filtration volume.
! = Data deviate from historically established concentration ranges.
? = Data rejected and should not be used. Some or all of QC data were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
* = Not reported due to interference.
Oil & Grease - If client does not send sufficient sample quantity for spike evaluation surface water samples are supplied by the laboratory.

NOTES:

MBAS calculated as LAS; molecular weight = 340.
PQL = 4xMDL.
ND = Not detected at or above the adjusted reporting limit.

G1 = Accuracy standard does not meet method control limits, but does meet lab control limits that are in agreement with USEPA generated data. USEPA letter available upon request.

COMMENTS:

For questions or comments regarding these results, please contact us at (941) 723-9986.

Results relate only to the samples.

Benchmark EnviroAnalytical, Inc
1711 12th Street East
Palmetto, Fl 34221
941-723-9986
941-723-6061 Fax
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Client Information: **Erickson Consulting Engineer, Inc**
7201 Delainey Court
Sarasota, FL 34240
941-373-6460 Ext 312
941-373-6480 Fax
Attn: Mia C. Esposito
mesposito@ericksonconsultingengineers.com

Project Name: Naples Beach Restoration and Water Quality Improvement
Project Number: 20-380

Laboratory Submission # 21050279

Sample Name	Sample Type[1] / Sample Matrix[2]	Collection		Container			Preservative[4]	Parameters for Analysis	Laboratory Sample #
		Date	Time	Qty	Capacity	Type[3]			
1A: Alligator Lake 10 AM	G / SW	05/05/21	10:00AM	1	8oz	P	Plain	TSS	1
2A: ~~South Lake~~ * Alligator Lake 1PM	G / SW	05/05/21	1:00PM	1	8oz	P	Plain	TSS	2
3A: ~~North Lake~~ * Alligator Lake 3PM	G / SW	05/05/21	3:00PM	1	8oz	P	Plain	TSS	3

1 "Sample Type" is used to indicate whether the sample was a grab (G) or whether it was a composite (C).
2 "Sample Matrix" is used to indicate whether the sample is being discharged to drinking water (DW), groundwater (GW), surface water (SW), soil, sediment (SDMNT), or sludge (SLDG).
3 "Container Type" is used to indicate whether the container is plastic (P) or glass (G).
4 **Sample must be refrigerated or stored in wet ice after collection. The maximum temperature during storage should be 4°C (39.2°F).** Under "Preservative," list any preservatives that were added to the sample container.

Laboratory Sample Acceptability:
pH <2 : ✓
BEA Temperature: 3.1°C

Instructions:
1. Each bottle has a label identifying sample ID, premeasured preservative contained in the bottle, sample type, client ID, and parameters for analysis.
2. The following information should be added to each bottle label after collection with permanent black ink: date and time of collection, sampler's name or initials, and any field number or ID.
3. All bottles not containing preservative may be rinsed with appropriate sample prior to collection.
4. The client is responsible for documentation of the sampling event. Please note special sampling events on the sample custody form.

		Date	Time		Date	Time
1	Collected / Relinquished By: City of Naples	05/05/21	10:00AM - 3:00PM	Received By: Karyn Erickson	05/05/20	3:00PM
2	Relinquished By: [signature]	05/06/21	1140	Received By: [signature]	5/6/21	1147
3	Relinquished By:			Received By:		
4	Relinquished By:			Received By:		

* Corrected sample names per client. NH

Appendix B:

Outfall Sampling Data (2016-2017)

Z:\CADD_Graphics\US Projects\15-304_Naples Outfalls\Design\30% Design\8x11 Water Quality_(2017.09.14).dwg Sep 15, 2017-12:56pm

ECE Erickson Consulting Engineers

Erickson Consulting Engineers
7201 Delainey Court
Sarasota, FL 34240
(941) 373-6460

CITY OF NAPLES BEACH OUTFALLS
WATER QUALITY SAMPLING LOCATIONS

CITY OF NAPLES
COLLIER COUNTY, FL

REVISIONS

PROJECT 15-304	CHECKED BY KME
DATE 02-10-2016	DRAWN BY BRC
SCALE N.T.S.	SHEET: 1 of 1

NAPLES BEACH RESTORATION AND WATER QUALITY IMPROVEMENT PROJECT: WATER QUALITY DATA

	Parameters	May 4, 2016			June 7, 2016			July 21, 2016			June 6, 2017		
		Enterococci (State Limit = 70/100 ML)	Fecal Coliform (State Limit = 400/100 ML)	Turbidity	Enterococci (State Limit = 70/100 ML)	Fecal Coliform (State Limit = 400/100 ML)	Salinity (Gulf Approx = 36 ppt)	Enterococci (State Limit = 70/100 ML)	Fecal Coliform (State Limit = 400/100 ML)	Salinity (Gulf Approx = 36 ppt)	Enterococci (State Limit = 70/100 ML)	Fecal Coliform (State Limit = 400/100 ML)	Salinity (Gulf Approx = 36 ppt)
	Sample Description	(#/100 ML)	(#/100 ML)	(NTU)	(#/100 ML)	(#/100 ML)	(ppt)	(#/100 ML)	(#/100 ML)	(ppt)	(#/100 ML)	(#/100 ML)	(ppt)
Outfall #2	At Outfall	1600	180	35.0	-	-	-			-	-	-	-
	50 ft Down Current	-	-	-	-	-	-	70	10	31.3	-	-	-
	100 ft Down Current	-	-	-	-	-	-	10	20	31.9	-	-	-
Outfall #4	At Outfall	22000	140	26.0	-	-	-			-	1700	12000	35.2
	50 ft Down Current	-	-	-	-	-	-			-	140	80	38.9
	100 ft Down Current	-	-	-	-	-	-			-	120	120	38.6
Outfall #6	At Outfall	19000	10	8.9	170	390	12.1			-	8600	4300	19.8
	50 ft Down Current	-	-	-	30	40	31.6	60	10	31.8	460	110	38.0
	100 ft Down Current	-	-	-	20	120	33.1	100	10	31.5	440	230	38.1
Alligator Lake	Weir Structure	300	10	4.3	460	190	4.1	580	4500	4.3	2900	900	6.1
	Shoreline	-	-	-	190	910	3.9			-	-	-	-
	South Lake Outlets	-	-	-	-	-	-			-	3600	1100	5.3
Outfall #7	At Outfall	6600	3600	72.0	-	-	-			-	52000	8000	2.5
	50 ft Down Current	-	-	-	-	-	-	20	10	31.2	2100	140	36.0
	100 ft Down Current	-	-	-	-	-	-	10	10	31.8	980	70	37.0
Outfall #8	At Outfall	38000	2400	61.0	-	-	-			-	41000	8400	31.8
	50 ft Down Current	-	-	-	-	-	-	30	10	32.4	270	60	34.2
	100 ft Down Current	-	-	-	-	-	-	10	10	34.5	190	100	35.2
Outfall #9	At Outfall	-	-	-	-	-	-			-	400	50	35.5
	50 ft Down Current	-	-	-	-	-	-			-	-	-	-
	100 ft Down Current	-	-	-	-	-	-			-	-	-	-
Outfall #10	At Outfall	4400	140	38.0	-	-	-			-	10	10	39.0
	50 ft Down Current	-	-	-	-	-	-	10	20	31.9	-	-	-
	100 ft Down Current	-	-	-	-	-	-	20	10	33.1	-	-	-

1. Data Collected by ECE on: May 4th, 2016; June 7th, 2016; July 21st, 2016; June 6th, 2017.

2. The conversion from conductivity to salinity was completed using the following website: http://www.chemiasoft.com/chemd/salinity_calculator

3. The approximate salinity of the Gulf of Mexico (36 ppt) was obtained from the following website: hhttps://www.britannica.com/science/salinity

NAPLES BEACH RESTORATION AND WATER QUALITY IMPROVEMENT PROJECT: WATER QUALITY DATA

	Parameters	May 4, 2016						July 21, 2016						June 6, 2017					
		Total Kjeldahl Nitrogen (TKN)	Nitrate+ Nitrite as N	Nitrate Nitrogen	Nitrite Nitrogen	Total Phosphorus as P	Salinity (Gulf Approx = 36 ppt)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen	Nitrate+ Nitrite as N	Nitrate Nitrogen	Nitrite Nitrogen	Salinity (Gulf Approx = 36 ppt)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen	Nitrate+ Nitrite as N	Nitrate Nitrogen	Nitrite Nitrogen	Salinity (Gulf Approx = 36 ppt)
	Sample Description	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ppt)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ppt)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ppt)
Outfall #2	At Outfall	2.840	0.024	0.020	0.004	0.380	-	-	-	-	-	-	-	-	-	-	-	-	-
	50 ft Down Current	-	-	-	-	-	-	1.090	1.100	0.011	0.007	0.004	31.3	-	-	-	-	-	-
	100 ft Down Current	-	-	-	-	-	-	1.020	1.140	0.116	0.111	0.005	31.9	-	-	-	-	-	-
Outfall #4	At Outfall	0.872	0.148	0.138	0.010	0.029	-	-	-	-	-	-	-	0.714	0.765	0.051	0.046	0.005	35.2
	50 ft Down Current	-	-	-	-	-	-	-	-	-	-	-	-	0.615	0.635	0.020	0.020	0.002	38.9
	100 ft Down Current	-	-	-	-	-	-	-	-	-	-	-	-	0.692	0.781	0.089	0.089	0.002	38.6
Outfall #6	At Outfall	1.370	0.056	0.045	0.011	0.159	12.100	-	-	-	-	-	-	0.836	0.922	0.086	0.077	0.009	19.8
	50 ft Down Current	-	-	-	-	-	31.600	1.150	1.230	0.083	0.076	0.007	31.8	0.761	0.808	0.047	0.042	0.005	38.0
	100 ft Down Current	-	-	-	-	-	33.100	1.390	1.420	0.048	0.033	0.015	31.5	0.686	0.715	0.029	0.026	0.003	38.1
Alligator Lake	Weir Structure	1.540	0.011	0.004	0.013	0.112	4.100	1.800	1.820	0.018	0.004	0.029	4.3	1.430	1.500	0.069	0.061	0.008	6.1
	Shoreline	-	-	-	-	-	3.900	-	-	-	-	-	-	-	-	-	-	-	-
	South Lake Outlets	-	-	-	-	-	-	-	-	-	-	-	-	1.460	1.550	0.086	0.078	0.002	5.3
Outfall #7	At Outfall	1.160	0.028	0.022	0.006	0.255	-	-	-	-	-	-	-	1.070	1.240	0.169	0.162	0.007	2.5
	50 ft Down Current	-	-	-	-	-	-	1.110	1.160	0.051	0.046	0.005	31.2	0.689	0.719	0.030	0.030	0.002	36.0
	100 ft Down Current	-	-	-	-	-	-	1.190	1.220	0.032	0.023	0.009	31.8	0.674	0.694	0.020	0.016	0.004	37.0
Outfall #8	At Outfall	1.040	0.070	0.062	0.008	0.174	-	-	-	-	-	-	-	0.728	0.851	0.123	0.120	0.003	31.8
	50 ft Down Current	-	-	-	-	-	-	1.140	1.250	0.110	0.100	0.010	32.4	0.692	0.713	0.021	0.014	0.007	34.2
	100 ft Down Current	-	-	-	-	-	-	1.040	1.060	0.017	0.010	0.007	34.5	0.668	0.719	0.051	0.051	0.002	35.2
Outfall #9	At Outfall	-	-	-	-	-	-	-	-	-	-	-	-	0.742	0.810	0.068	0.061	0.007	35.5
	50 ft Down Current	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100 ft Down Current	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Outfall #10	At Outfall	0.773	0.009	0.005	0.004	0.054	-	-	-	-	-	-	-	0.642	0.657	0.015	0.015	0.002	39.0
	50 ft Down Current	-	-	-	-	-	-	1.060	1.170	0.107	0.097	0.010	31.9	-	-	-	-	-	-
	100 ft Down Current	-	-	-	-		-	1.100	1.110	0.010	0.005	0.005	33.1	-	-	-	-	-	-

1. Data Collected by ECE on: May 4th, 2016; July 21st, 2016; June 6th, 2017.

2. The conversion from conductivity to salinity was completed using the following website: http://www.chemiasoft.com/chemd/salinity_calculator

3. The approximate salinity of the Gulf of Mexico (36 ppt) was obtained from the following website: hhttps://www.britannica.com/science/salinity

NAPLES BEACH RESTORATION AND WATER QUALITY IMPROVEMENT PROJECT WATER QUALITY DATA

	Parameters	May 4, 2016	June 7, 2016			July 21, 2016		June 6, 2017		
		Turbidity	Total Suspended Solids (TSS)	Salinity (Gulf Approx = 36 ppt)	Copper (State Limit = 3.7 UG/L)	Total Suspended Solids (TSS)	Salinity (Gulf Approx = 36 ppt)	Total Suspended Solids (TSS)	Salinity (Gulf Approx = 36 ppt)	Copper (State Limit = 3.7 UG/L)
	Sample Description	(NTU)	(mg/L)	(ppt)	(ug/L)	(mg/L)	(ppt)	(mg/L)	(ppt)	(ug/L)
Outfall #2	At Outfall	35.0	-	-		-	-	-	-	-
	50 ft Down Current	-	-	-	-	25.0	31.3	-	-	-
	100 ft Down Current	-	-	-	-	34.8	31.9	-	-	-
Outfall #4	At Outfall	26.0	-	-	-	-	-	50.0	35.2	-
	50 ft Down Current	-	-	-	-	-	-	57.0	38.9	-
	100 ft Down Current	-	-	-	-	-	-	50.0	38.6	-
Outfall #6	At Outfall	8.9	33.0	12.1	1.8	-	-	226.0	19.8	-
	50 ft Down Current	-	133.0	31.6	0.272[3]	93.3	31.8	149.0	38.0	-
	100 ft Down Current	-	95.7	33.1	0.272[3]	51.7	31.5	173.0	38.1	-
Alligator Lake	Weir Structure	4.3	11.3	4.1	1.2	29.7	4.3	2.0	6.1	0.7
	Shoreline	-	49.7	3.9	3.4	-	-	-	-	-
	South Lake Outlets	-	-	-	-	-	-	6.5	5.3	0.3
Outfall #7	At Outfall	72.0	-	-	-	-	-	20.0	2.5	2.7
	50 ft Down Current	-	-	-	-	39.2	31.2	92.9	36.0	-
	100 ft Down Current	-	-	-	-	46.8	31.8	60.8	37.0	-
Outfall #8	At Outfall	61.0	-	-	-	-	-	30.5	31.8	-
	50 ft Down Current	-	-	-	-	32.3	32.4	10.7	34.2	-
	100 ft Down Current	-	-	-	-	31.8	34.5	11.0	35.2	-
Outfall #9	At Outfall	-	-	-	-	-	-	10616[2]	35.5	-
	50 ft Down Current	-	-	-		-	-	-	-	-
	100 ft Down Current	-	-	-		-	-	-	-	-
Outfall #10	At Outfall	38.0	-	-	-	-	-	883[2]	39.0	-
	50 ft Down Current	-	-	-	-	23.8	31.9	-	-	-
	100 ft Down Current	-	-	-	-	53.2	33.1	-	-	-

1. Data Collected by ECE on: May 4th, 2016; June 7th, 2016; July 21st, 2016; June 6th, 2017.
2. High Suspended Solids due to wave action mixing beach related debris and sediments during collection.
3. Copper (CU) low and out of range due to high salinity levels
4. The conversion from conductivity to salinity was completed using the following website: http://www.chemiasoft.com/chemd/salinity_calculator
5. The approximate salinity of the Gulf of Mexico (36 ppt) was obtained from the following website: hhttps://www.britannica.com/science/salinity

Appendix C:

Upstream Water Quality Sampling Data (2020)

Naples Stormwater WQ Analysis - Sept. 2020														
Parameter			Turbidity	Total Suspended Solids (TSS)	Enterococci (State Limit = 70/100 ML)	Fecal Coliform (MF) (State Limit = 400/100 ML)	Total Coliform	Total Phosphorus	Ortho-Phos.	Total Nitrogen	Total Kjeldahl Nitrogen (TKN)	Nitrate+Nitrite as N	Nitrate Nitrogen	Nitrite Nitrogen
Submission #	Sample #	Sample Description	Result (NTU)	Result (mg/L)	Result (#/100 ML)	Result (#/100 ML)	Result (#/100 ML)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)	Result (mg/L)
20090561	001	JCT 8-7	2.5	1.2 I	31 Q	460 Q	450 Q	0.24	0.16	0.705	0.681	0.02	0.013 I	0.011 I
20090561	002	JCT 8-6	9.4	35	8164 Q	10400 QB	400 QB	0.31	0.21	1.4	1.3	0.11	0.11	0.008 I
20090561	003	JCT 8-6	10	3	17329 Q	8100 QB	2000 QZ	0.19	0.16	1.6	1.5	0.07	0.06	0.006
20090561	004	JCT 8-1	12	46	24196 QZ	2000 QZ	2000 Q	0.27	0.05	1.1	1	0.04	0.04	0.005
20090561	005	JCT 7-9	290	487	24196 QZ	10000 QB	2000 Q	1.7	0.35	23.5	23.5	0.01 I	0.006 U	0.005 I
20090561	006	JCT 7-5	500	6310	720 Q	14200 QB	800 QB	4.5	0.26	34.6	34.5	0.10	0.08	0.019
20090561	007	JCT 7-2	16	154	1616 Q	4200 Q	4900 Q	1.3	0.29	6.4	6.3	0.07	0.05	0.017
20090561	008	JCT 7-1	240	1183	24196 QZ	2000 QZ	2000 QZ	4.3	0.20	37.1	37	0.13	0.12	0.016
20090561	009	AL UP	3.1	130	11199 Q	3600 Q	4800 Q	0.23	0.04	3.1	2.3	0.88	0.87	0.012
20090561	010	AL DN	2.3	3.5	932 Q	290 Q	320 Q	0.008 U	0.002 U	1.1	1.1	0.05	0.05	0.006 I
20090561	011	WEIR	3.8	6.2	63 Q	30 QB	40 QB	0.06	0.01	1.1	1.1	0.008 I	0.005 U	0.005 I

Notes:

1. North Lake samples upstream/downstream were not collected due to lack of water within the drainage structure as it was inspected a few hours after rain event.

2. All samples were collected using a Stormwater Sampler.

3. Samples were collected and stored overnight (~ 20 hrs) in below zero temperatures.

4. Data Qualifiers included are:

Q	**Sample held beyond accepted hold time**
QZ	**Sample held beyond accepted hold time; too many colonies were present.**
QB	**Sample held beyond accepted hold time; results based on colony counts outside ideal range**
U	**Analyte analyzed but not detected at the value indicated**
I	**Reported value is between laboratory MDL and PQL**

Appendix D:

Upstream Sediment Sampling Data (2020)

Naples Stormwater Soil Analysis - Sept 2020							
Parameter			Nitrate+Nitrite as N	Total Volatile Solids	Total Fixed Solids	Median Grain Size (D50)	Percent Fines
Submission #	Sample #	Sample Description	Result (mg/kg)	Result (% DRY WT)	Result (% DRY WT)	Result (mm)	Result (%)
20090181	001	S1: 1022 10 St N (A)	0.5	7	93	1.48	1.8
20090181	002	S2: 600 10th N (A)	2.1	20	80	0.39	9.5
20090181	003	S3: 4150 GSB N (A)	6.1	48	52	0.35	6.4
20090181	004	S4: 4180 GSB N (A)	0.3	8	92	0.48	3.9
20090181	005	S5: 4190 GSB N (A)	0.4	59	41	0.20	37.0
		AVERAGE	**2.2**	**20.5**	**79.5**	**0.7**	**5.4**

Appendix E:

2021 Sampling Plan

PRE-CONSTRUCTION WATER QUALITY MONITORING PROTOCOL
FOR FIELD SAMPLING AND LABORATORY TESTING
(Bacteria, Total Nitrogen & Phosphorus, and TSS)

Pre-Construction Sampling Program

The goal of the 2021 water quality sampling program is to verify and calibrate the baseline water quality including TSS, TN, TP and Bacteria concentrations that presently flow into the City's beach outfall pipes (#2-4 and 6-10).

The objectives of the water quality sampling protocol include:

1. Siting the sampling locations for overall geographic location to estimate and quantify the sub-basin contribution and concentrations;
2. Timing the sampling to capture a range of rainfall events that produce flow into the system;
3. Following established standard methods for sampling and testing to measure pollutants of concern and gather related key baseline and physical information; and
4. Gaining an understanding of variability and levels of water quality impacts to the Gulf associated with stormwater at these outfalls and opportunities to reduce levels of pollutants.

Sampling will be conducted in two triplicates (1) within the pipe network and (2) the associated flows entering the inlet catch basins within Basins 7, 8, 9 and 10 as shown Figure 1. A minimum of four locations (6 samples at each location) within Basins 7 & 8 and a minimum of two locations within Basin 9 and 10 are required, with an additional two sampling locations if time permits. Sampling should occur after stormwater has been flowing to the inlet catch basin for approximately 1hr. The sampling methods were developed to obtain a representative sample of incoming pollutant loads via runoff and existing within the pipe network.

Testing for the following will be performed by Benchmark EnviroAnalytical Inc.

- Enterococci
- TSS
- Total Nitrogen
- Total Phosphorous

The first set of water samples are collected at inlet catch basins immediately after (within 1-2 hours) a rain event when there is flow into the system. If the rainfall event and flow continues during daylight hours, additional samples should be collected 2+ hours after the initial samples to determine if the pollutant loading changes at two locations in Basins 7 and 8 (4 sites total). Sampling (3 replicates at each location) will occur where runoff flows into the catch basin before the runoff flows into the existing stormwater system as well as within the pipe network at the inlets (3 replicates). The goal of the sampling is to capture the incoming conditions that would not be altered by contamination within the pipes or lakes.

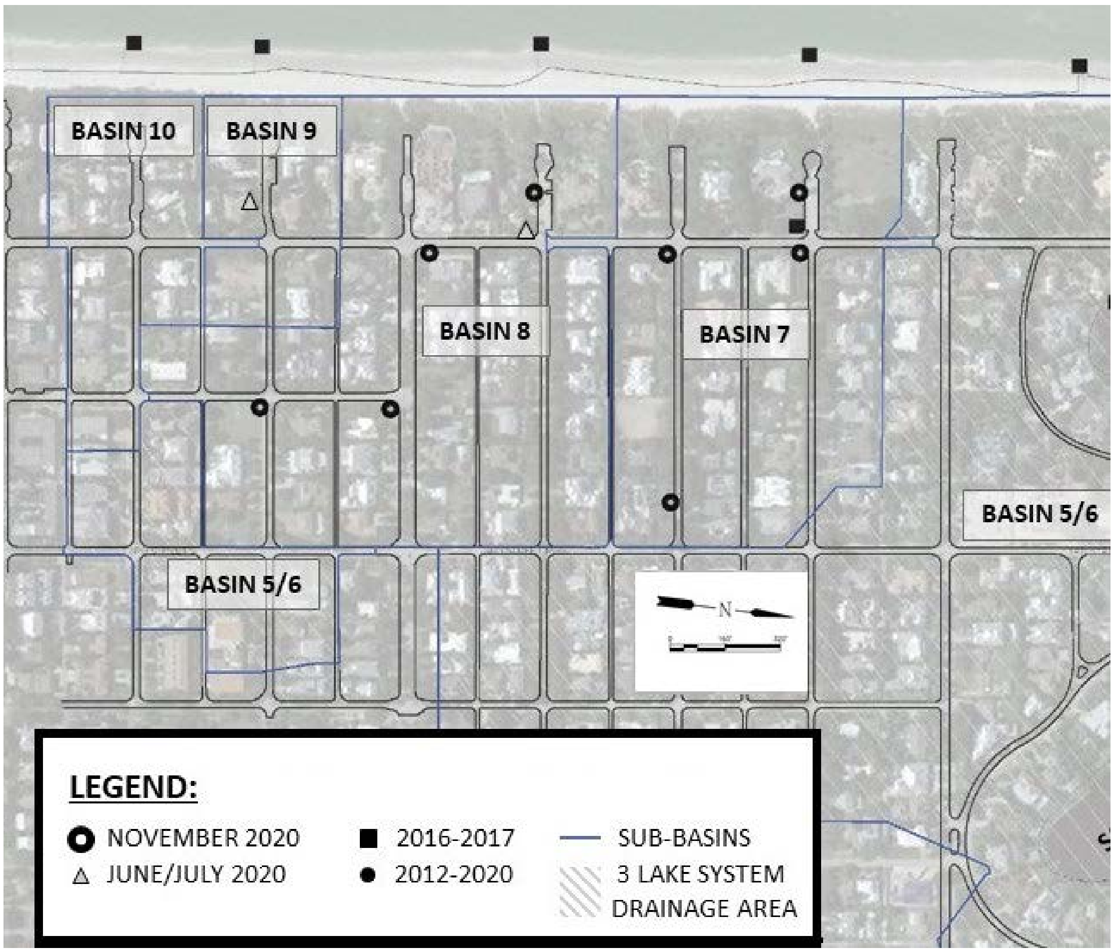


Figure 1. Water Quality Sampling Locations. 2020 Sampling locations to be repeated, and additional inlets in Basins 7, 8 and 9 will be identified on site based on rainfall conditions. At least one inlet in Basin 7 should be upstream of 3rd Street to capture the water quality further from the beach outfalls.

Sampling Methods

Sampling methods will follow FDEP standard operating procedures per DEP-SOP-001/01, Rule 62-160.800 F.A.C., which identify requirements for applicable field collection, quality control and record keeping. SOP subsections FS 2005 – Bacteriological Sampling and method FS 2110 – Surface Water Sampling Techniques will be used for sample collection techniques.

All samples will be stored on ice and transported, with relevant lab forms, for delivery to the analytical laboratory within the appropriate hold times, as identified in DEP-SOP-001/01.

Laboratory Testing Procedures and Data Management

Samples will be immediately stored on ice and transported to the contract laboratory, with appropriate chain of custody forms, as identified in DEP-SOP-001/01. Testing will be conducted by a NELAP certified laboratory for quantifying enterococci by EPA 1600. Laboratories used for testing identified herein hold certification from the Department of Health – Environmental Laboratory Certification Program as required under Rule 62-160.300 F.A.C.

All field notes and laboratory reports will be reviewed for Quality Control.

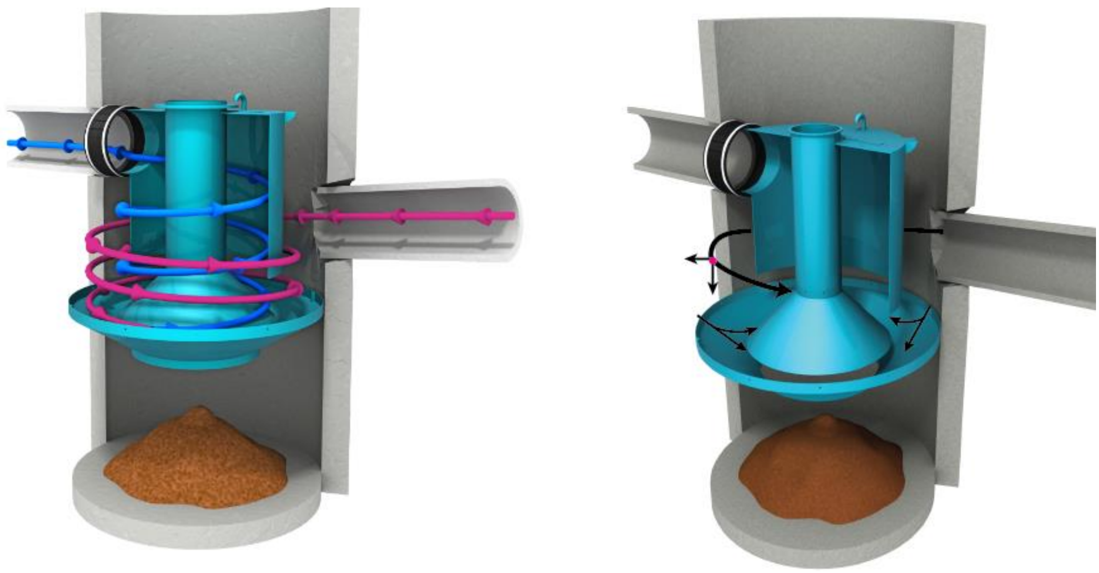
Appendix F:

Water Quality Improvement Measures – Plan Views

APPENDIX A - Phase 1 BMP Treatment Train

Appendix G:

Water Quality Improvement Measures Specification Sheets



Hydro Downstream Defender Application

Prepared for: Florida DEP
October 2018

hydro-int.com

Hydro International

Contents

LIST OF APPENDICES

APPENDIX A – Hydro Downstream Defender Operation and Maintenance Instructions

1. Hydro Downstream Defender® Physical Description

The Hydro Downstream Defender® is an advanced vortex separator designed to utilize the principles of swirl-enhanced gravity separation to remove Total Suspended Solids (TSS), trash, and hydrocarbons from stormwater runoff. It is a structural Best Management Practice (BMP) installed underground as a permanent part of the storm drain line to reduce the overall load of oil, solids, and floatables conveyed through the storm drain to receiving waters.

The Downstream Defender has a tangential inlet to introduce a rotational flow path to the precast treatment chamber while polyethylene flow-modifying internal components stabilize the swirling flow path to reduce turbulence.

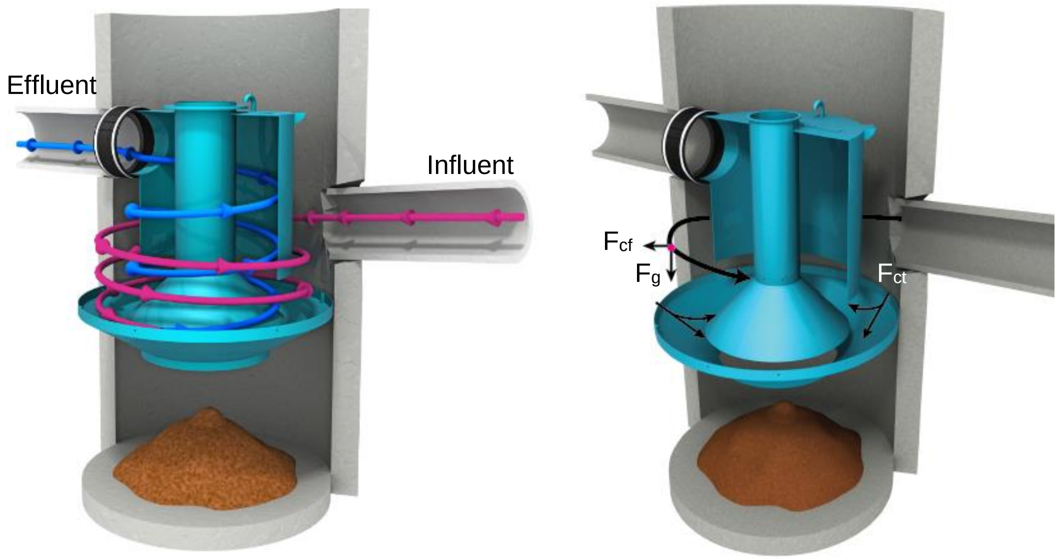


Figure 1 a) The swirling flow path of the Downstream Defender b) augments gravitational (Fg) forces with swirl-induced forces (Fcf, Fct) to remove solids from stormwater runoff.

Stormwater enters the Downstream Defender through a submerged tangential inlet. Hydrocarbons and other floatable solids rise to the surface where they are captured in the chamber as the stormwater spirals downward around the interior cylindrical baffle. When it reaches the center cone, the flow changes direction from downward to upward, passing through a zero-flow velocity "shear" zone where solids fall out of the flow scheme and into the pollutant storage sump. After flow is deflected upward by the center cone, it spirals upwards around the center shaft inside the cylindrical baffle and discharged via the effluent pipe. To prevent washout, a benching skirt protects settled particles in the pollutant storage sump from high scour velocities. The Downstream Defender is available in five standard model sizes, as shown in Table 1:

Table 1 Specifications of Standard Downstream Defender Model Sizes

Downstream Defender Model	Manhole Diameter (ft)	Hydraulic Capacity (cfs)	Maximum Pipe Diameter (in)	Oil Storage Capacity (gal)	Sediment Storage Capacity (yd^3)
4-ft	4-ft	3.0	12	70	0.70
6-ft	6-ft	8.0	18	216	2.10
8-ft	8-ft	15.0	24	540	4.65
10-ft	10-ft	25.0	30	1,050	8.70
12-ft	12-ft	38.0	36	1,770	14.70

2. Performance Claims

2.1 General description of Onondaga Field Test

Onondaga Lake is located immediately northwest of the City of Syracuse in Onondaga County, New York. The Onondaga Lake drainage basin encompasses approximately 247 mi^2 (642 km^2) and, with the exception of 0.75 mi^2 (2 km^2) in Cortland County, lies almost entirely in the Onondaga County drainage basin. The basin includes six natural sub basins: Nine Mile Creek, Harbor Brook, Onondaga Creek, Ley Creek, Bloody Brook and Saw Mill Creek. The City of Syracuse is the region's major metropolitan center, encompassing approximately 20 square miles. The City of Syracuse together with the adjacent towns and villages have been designated as an urban area by the State of New York, and thus fall under the Phase II Stormwater regulations. The urban area including the City of Syracuse is approximately 100 square miles

A stormwater vortex unit was installed at 134 East Seneca Turnpike for removing suspended solids and associated nutrients from the stormwater before discharge to Onondaga Creek. The catchment area serviced by this unit primarily encompasses a 1,000-feet length of East Seneca Turnpike (Figure 1) and is approximately 1.2 acres in size. The unit is a 4-foot diameter Hydro International Downstream Defender (Figures 2 and 3) with a design flow of 0.75 cfs and a maximum capacity of 3.0 cfs. For this project, the project team sized the Downstream Defender much more aggressively than recommended by Hydro International. The sizing rationale for this site was based on exceeding the design flow rate of 0.75 cfs at least once or twice a month. This approach was taken to increase the likelihood that the site would generate flows at or above the design flow and thereby generate performance data at and beyond the unit's design flow.

Figure 1: Area of East Seneca Turnpike chosen for urban runoff study

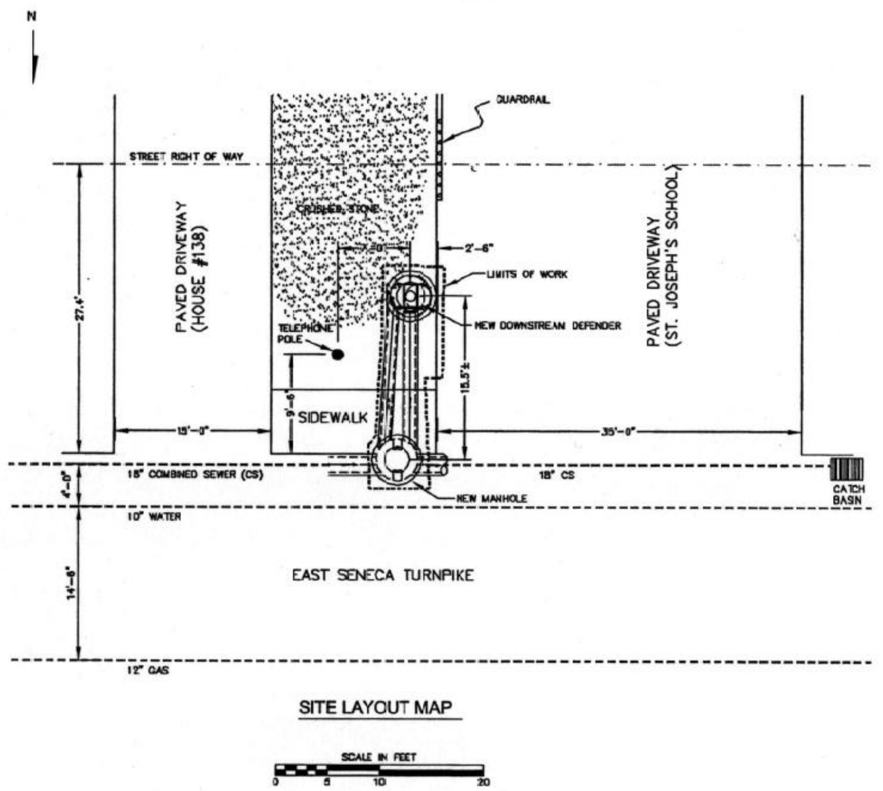


Figure 2: Plan of Downstream Defender installation

Figure 3: Photo of Downstream Defender installation

2.2 Results of Onondaga Field Test

The stormwater vortex unit was monitored for just over a one- year period from March 2001 until May 2002, during which time approximately 40 inches of rain fell during the non-winter months. This equated to approximately 730,000 gallons of stormwater processed by the vortex unit. During this time approximately 100 cubic feet of material was removed from the vortex unit weighing an estimated 4,500 lbs. This equated to approximately 0.14 cubic feet or 6 lbs of material removed per 1,000 gallons of stormwater processed. Most of the material removed from the vortex unit was sand and grit and organic material such as leaves and twigs. Relatively little trash was collected as a result of the grated catchbasins, which prevent trash from entering the stormwater conveyance system. The sediment storage sump of the vortex unit is approximately 12 cubic feet; maintenance is important to the successful operation of such equipment because once the unit's sump is full, a reduction in removal efficacy is possible due to the increased risk of re-entrainment of solids deposited within the zone above the shielded sediment storage sump.

Peak flows by event ranged from 0.3 cfs to 1.9 cfs. The peak flow of 1.9 cfs was generated from approximately 0.35 inches of rain falling in a 15 minute time period. This equates to a rain intensity of 1.4 inches per hours, which is equivalent to approximately one-half the intensity of the 1-year return frequency storm for the City of Syracuse. As a frame of reference the 4- ft diameter Downstream Defender design flow rate is 0.75 cfs and the maximum capacity is 3.0 cfs. The design flow of 0.75 cfs was exceeded during three of the six sampled storm events. As discussed in Section 2.1, a 4-ft diameter unit was installed so that the design flow would be exceeded approximately once or twice a month for the purposes of sampling the unit while it operated at or near the design conditions.

On August 21, 2001 and September 3, 2002 solids were sampled from the sediment storage sump of the Downstream Defender. Nine percent of the material in the sump was characterized as coarse sand, 53% of the material was characterized as medium sand and 38% characterized was as fine sand, silt and clay. This suggests that the majority of the material influent to this particular installation is medium sand and smaller and the material captured by this particular unit ranges from coarse to fine sized sand and smaller. This is not to say this units captures 100% of any particular size material, but rather based on the contents of the storage sump it has the ability to capture coarse to fine sized sand and smaller material.

Onondaga County removed the solids from the unit on an as needed basis with a vactor truck. Cleanout of the diversion manhole and the unit itself took approximately 15 minutes, which included maneuvering the truck into position near the unit, drawing material up with the suction pipe of the vactor truck and pressure washing the solids from the bottom and sides.

2.3 Methodology for Calculations using FSA Assessment Tool

Sediment captured in a manufactured BMP can be used to estimate nutrient capture as described in "Methodology for Calculating Nutrient Load Reductions Using the FSA Assessment Tool" (Bateman, 2012). The following steps from that report can be applied to the Onondaga field study:

1. "Perform O&M activities – collect solids, noting the date of collection."
2. "Each truck load, or other load of solids removed, must be field-weighed; or the volume estimated; and recorded in a tracking system such as a spreadsheet."
    a. Volume is reported in this study, so a dry bulk density 84.9 pounds of dry material per cubic foot of solids is applied. (Bateman, 2012, p.3)
3. "For a period of one year, collect one replicate sample each month for each of the three categories of maintenance. Be sure to track the date of sample collection and the rainfall conditions."
    a. In the Onondaga study seven samples were taken over a period of 15 months. No replicates were taken.
4. "Run the Assessment Tool with the data from the period of interest, such as one week or one month. Input weight or volume values and input moisture content and bulk density. The calculation results in pounds (or kilograms) of TP and TN removed."
    a. Calculations were run by hand and results matched the outputs of the Assessment Tool

2.4 Analysis of Results

Table 2 – Cleaning Dates and Results

Date of Cleaning	Volume of Stormwater Processed (gallons)	Volume of Material Removed (cubic feet)	Notes
March 1, 2001	NA	20	Not cleaned since installation. Filled beyond capacity. Obvious layer of leaf litter from fall foliage. Influent diversion manhole filled with fine silty material.
June 25, 2001	227,899	19	Unit filled to near capacity. Influent diversion manhole filled with heavy grit and effluent diversion manhole filled with fine silty material.
August 21, 2001	95,757	17	Unit filled to near capacity. Influent diversion manhole full. Effluent diversion manhole relatively clean.
November 30, 2001	184,998	19	Unit filled to near capacity. Influent diversion manhole filled with heavy grit and effluent diversion manhole filled with fine silty material.
March 13, 2002	7,965	20	Filled beyond capacity because of winter build-up of road sand. Influent diversion manhole filled with heavy grit and effluent diversion manhole filled with fine silty material.
April 8, 2002	53,219	15	Unit filled to near capacity. Influent diversion manhole full. Effluent diversion manhole relatively clean.
June 5, 2002	167,802	17	Unit filled to near capacity. Influent diversion manhole full. Effluent diversion manhole relatively clean.
Total	737,640	107	

Total Water Treated

737,640 gallons = 2.264 acre-feet

Total Sediment Captured

107 cu.ft. of sump material * 84.9 lbs/cu.ft.[1] = 9084 lbs sediment

9084 lbs / 2.264 acre-feet runoff = 4013 lbs/acre-foot of runoff

Total Phosphorus Captured

107 cu.ft. of sump material * 84.9 lbs/cu.ft. = 9084 lbs = 4120 kg

4120 kg of sump material * 417 mg TP/kg[1] material = 1.7 kg TP = 3.8 lbs TP

3.8 lbs TP / 2.264 acre-feet runoff = 1.67 lbs TP/acre-foot of runoff

Total Nitrogen Captured

107 cu.ft. of sump material * 84.9 lbs/cu.ft. = 9084 lbs = 4120 kg

4120 kg of sump material * 679 mg TN/kg material[1] = 2.8 kg TP = 6.2 lbs TN

6.2 lbs TP / 2.264 acre-feet runoff = 2.73 lbs TN/acre-foot of runoff

[1] Bateman, 2012, pp.1-3

3. Conclusion

When installed at a field test site in Syracuse, NY the Downstream Defender removed 107 cubic feet of solids from 737,640 gallons of water over fifteen months. When these results are analysed using the relationships described in the FSA Assessment Tool, the following performance estimates can be developed:

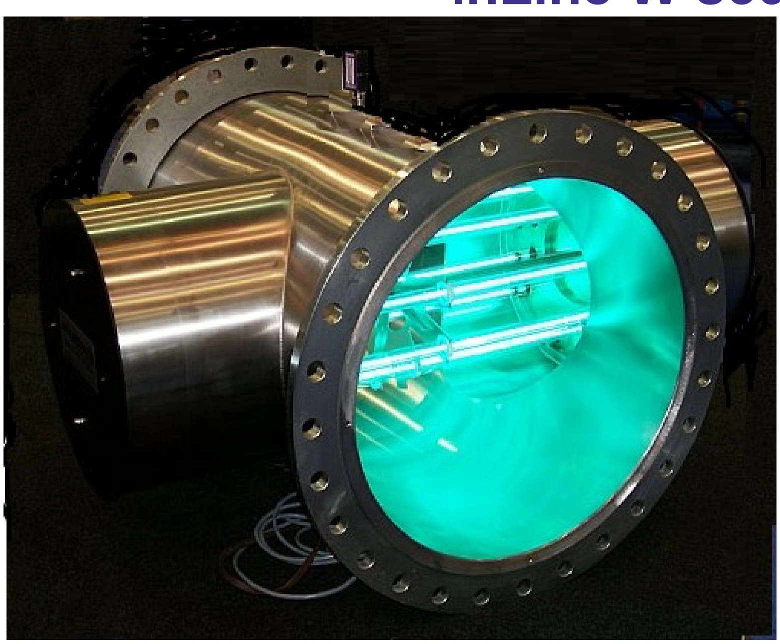
- Total Sediment Captured = 4013 lbs/acre-foot runoff
- Total Phosphorus Captured = 1.67 lbs/acre-foot runoff
- Total Nitrogen Captured = 2.73 lbs/acre-foot runoff

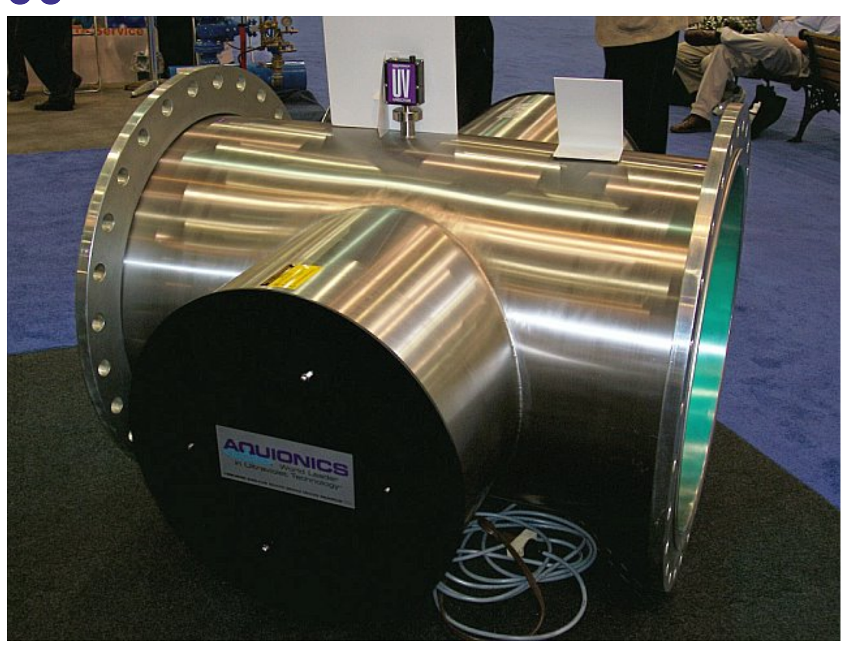
These results indicate that the Downstream Defender can be an effective tool for reducing nutrient transport due to urban stormwater runoff.

Datasheet

InLine+W Series

InLine W 36000+





Type : Version 1
Revision number : 7-2017 BT rev.2
Document version: IL+W EB

UV reactor

Specifications	
Material:	Stainless Steel, 316 L
Internal Finish:	Ra_{max} 0.81 µm
Degree of Protection:	NEMA 12 (IP 54)
Flange Connections:	30” ANSI 150 lbs
Dimensions:	See drawing next page
Weight dry/wet:	2205 lbs (1000 kg)/ 3968 lbs (1800 kg)
Lamp Type:	
Number of Lamps:	18
Temperature Sensor:	(1) PT 100
UV Sensors:	(1) absolute dry sensor (USEPA Compliant)
Sleeve Material:	Quartz – 240 nm
Sleeve Cleaning System:	Automatic cleaning mechanism
Air Release Valves:	2
Drain:	NPT Fittings
Pressure Rating:	101 psi (7 bar) / 145 psi (10 bar)
Maximum Hydraulic Flow Rate:	25 MGD (4000 m^3/h)

Electrical Cabinet

Specifications	
Cabinet Configuration:	(2) Power Cabinets & (1) Control Cabinet; floor standing
Dimensions:	Power: 82.7 x 47.2 x 31.5 in (HxWxD);(2100x1200x800mm) Control:74.8 x 23.6 x 15.8 in (HxWxD);(1900x600x 400 mm)
Weight:	Power: 772 lbs (350 kg); Control: 287 lbs (130 kg)
Material & Color:	Painted Steel; RAL7035
Degree of Protection:	NEMA 12 (IP 54) - Indoor
Standard Cable Length (Cabinet to Reactor):	30 ft (10 m)
Ambient Operatong Temperature (min/max):	40/95° F (5/35° C)
Maximum Ambient Humidity:	95% (non-condensing)
Controller:	UVtronic+ incl. HMI and Modbus
Lamp Driver Type:	Electronic (Stepless variable output 35 to 100%)
Required Voltage Supply:	480V, 3L, 60 Hz
Maximum Power Consumption:	154 kW
Size of Customer Breaker:	80 A
Wiring Included:	30 ft (10 m) – Lamp*, temp. Sensor, UV sensor, limit switches) * TBD prior to installation. Please contact AQX
UL Labeling:	UL 508A

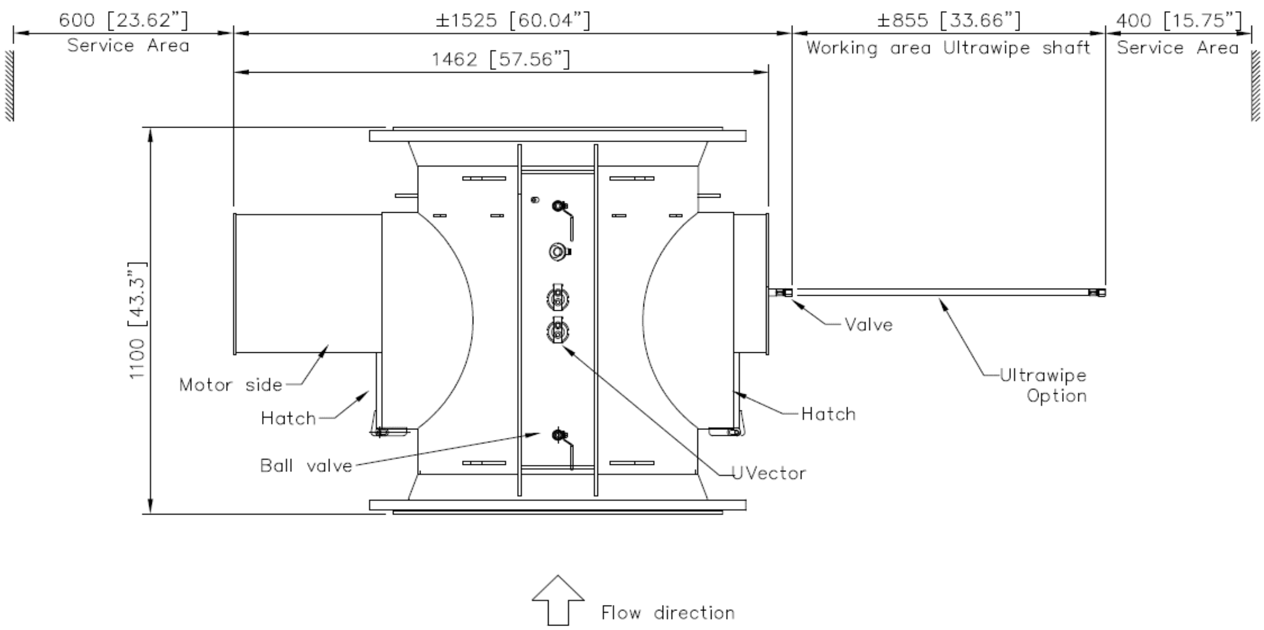
Certifications & Validations

Specifications	
- NWRI 2012 – pending	

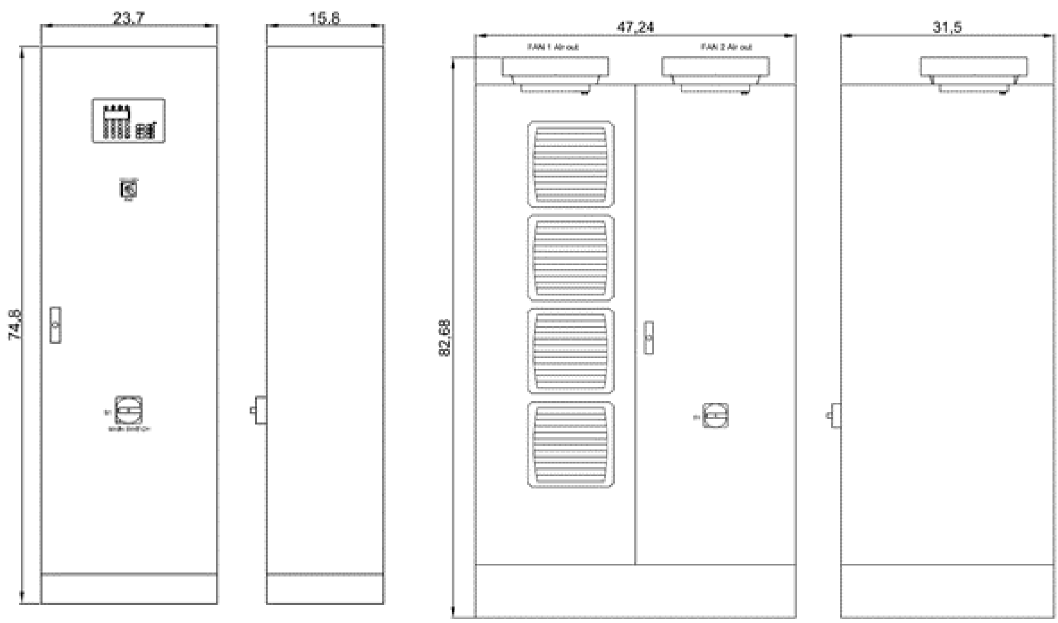
Optional Features

Specifications	
- NEMA 4X Upgrade (w. cabinet air conditioners)	- Stainless Steel Cabinet Upgrade – NEMA 12
- Allen Bradley 800 Series PLC	- Ultrawipe™ (chemical assisted) cleaning system

UV Reactor



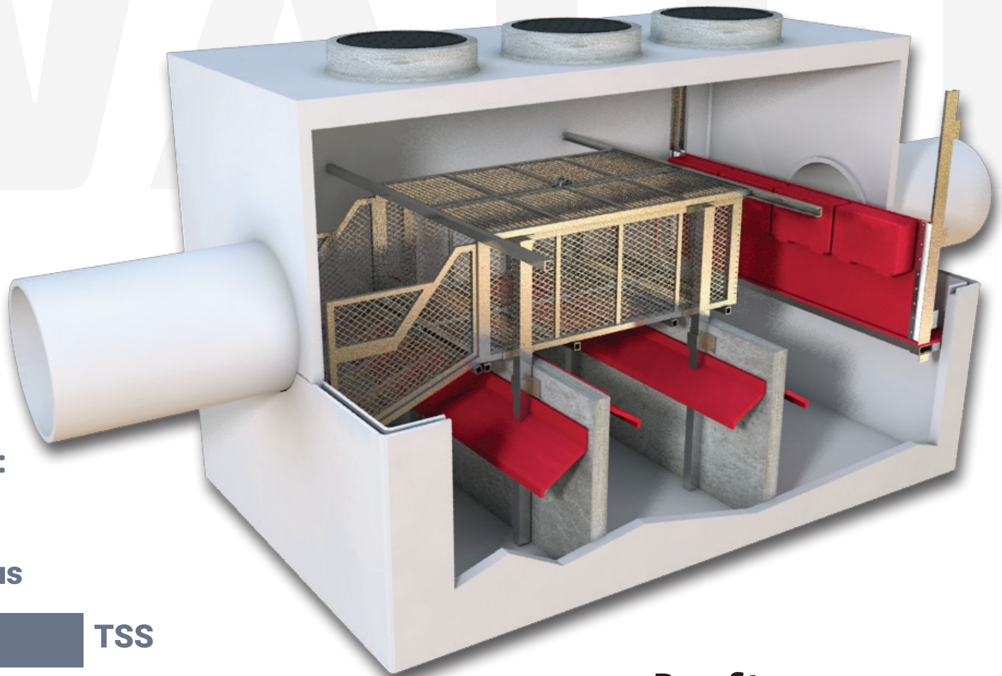
Power/Control Cabinet



Oldcastle Infrastructure™
A CRH COMPANY

NSBB™

Nutrient Separating Baffle Box®



NSBB™ Removal Efficiencies up to:

20%	Nitrogen
19%	Phosphorous
90%	TSS

**Varies based on sizing & site conditions*

The Nutrient Separating Baffle Box (NSBB) is an advanced vault treatment system for stormwater runoff. Its patented screen system is designed to capture and store debris in a dry state to minimize nutrient leaching and allow for easy servicing. The NSBB's triple chamber design affords high TSS removal over a wide range of particle sizes, while patented deflectors ensure no sediment scouring occurs during high flows. This allows for on-line installation without the need for separate diversion structures. The NSBB is a widely accepted stormwater treatment BMP among developers, civil engineers and municipalities nationwide.

Benefits:

- Retrofits existing watersheds
- Patented screens maximize storage and prevent debris loss
- Easy vacuum truck servicing
- Dry state storage separates debris and trash from water and sediment
- Will not go septic between storms
- Captures thousands of pounds of debris, sediment and nutrients
- Pretreatment for rainwater harvesting and detention areas
- Meets requirements for Full Trash Capture TMDL Programs

LEED Credit Eligible:

Stormwater Design / Quality Control

Suntree Technologies Inc.

Oldcastle Infrastructure™
A CRH COMPANY

NSBB

EASY TO INSTALL, SIMPLE TO SERVICE.

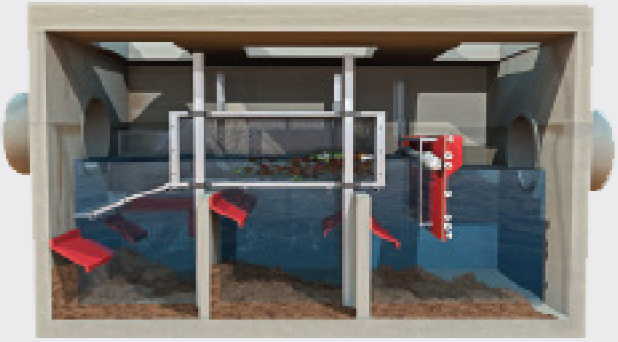
INSTALLATION

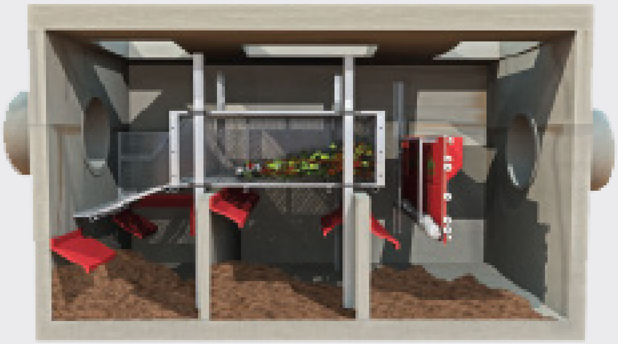
Low pick weights: comprised of multiple sections

Fast set: pre-installed internal components (optional)

Minimal excavation required

OPERATION





- Runoff filters through the screen, leaving behind pollutants while hydrocarbons collecting in front of the skimmer and are absorbed by the StormBoom™.
- Patented turbulence deflectors prevent sediment from becoming resuspended and settle in lower chambers.
- Nutrient pollutant load is not lost to static water and will not be flushed out during the next storm event.
- Separating organic matter from the static water prevents bacterial buildup.

MAINTENANCE

Easy maintenance access via top hatches / manholes without need for confined space entry.

Hinged screens allow for full vacuum access to inner basket and lower sediment chambers.

After cleaning sediment chambers, close and secure bottom screen doors to prevent debris loss.

Suntree Technologies Inc.

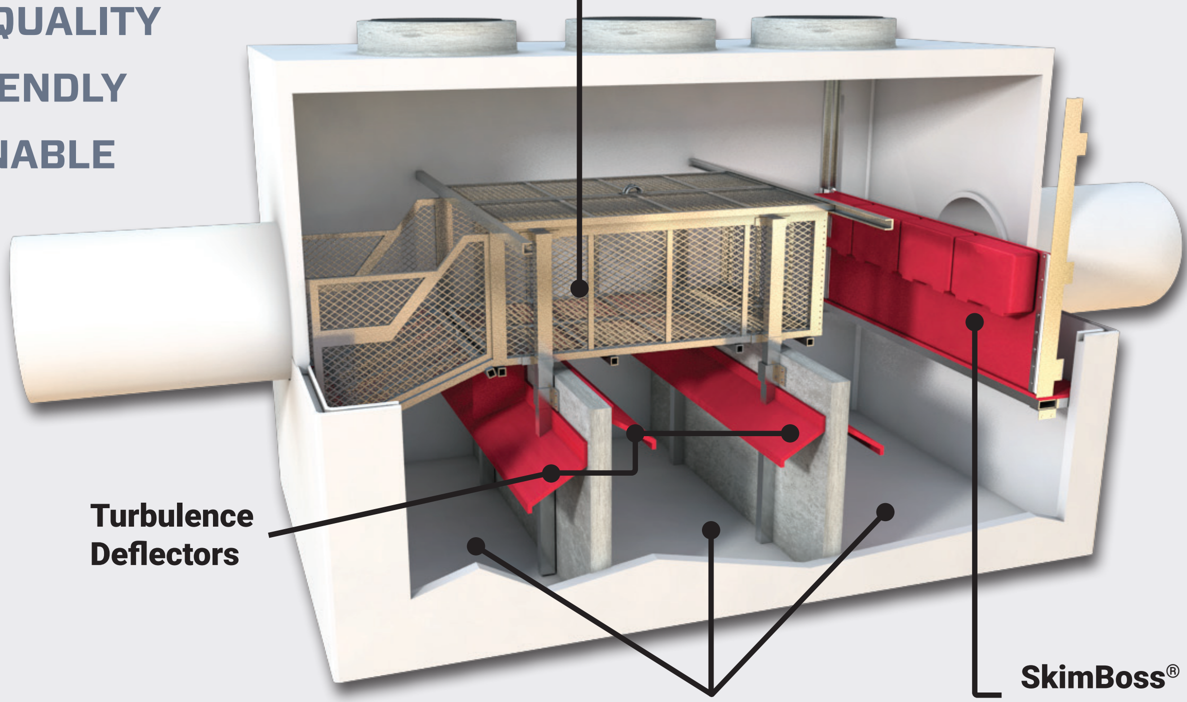
BIORETENTION / BIOFILTRATION

Oldcastle Infrastructure™
A CRH COMPANY

NSBB

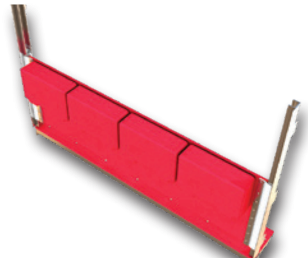
SUPERIOR HYDRODYNAMIC SEPARATION

WATER QUALITY
ECO-FRIENDLY
SUSTAINABLE

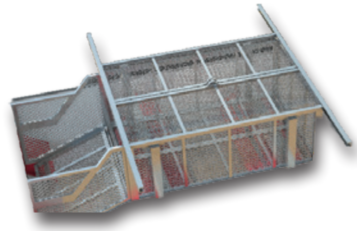


The Nutrient Separating Baffle Box is a multistage, self contained treatment system. Each subsequent component within the system protects prior stages from clogging issues or failures. These stages include filtration, hydrodynamic separation and hydrocarbon absorption.

- Filtration is provided by a rectangular screen system which is suspended above the static water level. The screen has a storage capacity of several cubic yards depending on the model and a primary function to capture gross solids such as trash and debris.
- Hydrodynamic Separation is facilitated by three settling chambers which work to target smaller sediments and particulate metals.
- Absorption is facilitated by the StormBoom(s), that are either free floating or attached to the influent side of the skimmer. This device removes free floating and emulsified hydrocarbons from water.



Patented Hydro-Variant Technology®: The innovative SkimBoss MAX automatically adjusts to hydraulic grade changes to allow for maximum sediment settling without compromising watershed hydrology.



Patented screen system prevents debris loss and nutrient leaching. No need to service after each storm with dry state storage as compared to competing treatment systems.

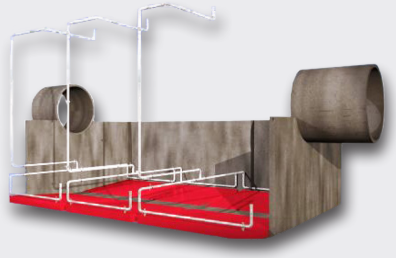
Suntree Technologies Inc.

BIORETENTION / BIOFILTRATION

Oldcastle Infrastructure™ A CRH COMPANY

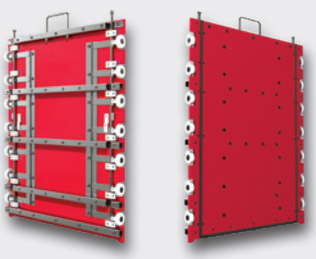
NSBB

NSBB Options:



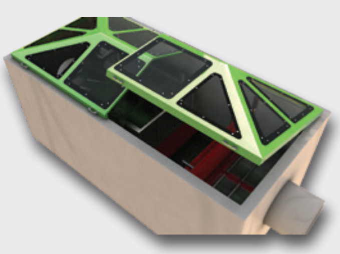
HydroSlide®

The HydroSlide system enables the lower sediment chambers to be easily serviced by a vacuum truck. This maximizes service results while simultaneously reducing overall maintenance efforts and costs.



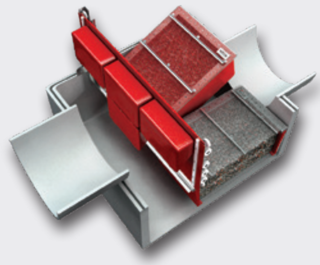
Sungate™ Flow Control

The SunGate is a flow control gate used to isolate an NSBB for servicing when under a significant base flow. The gate is easy to deploy under full hydraulic load and does not require confined space entry.



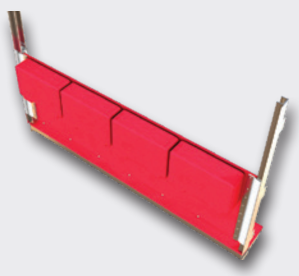
Sunview™ Observation Cover

The Sunview observation cover is an excellent community outreach tool. Its clear lid and accompanied signage are a great choice to satisfy education requirements for 319 grant funding and NPDES programs.



SkimBoss Upflow Filter

The SkimBoss upflow filter system uses Hydro-Variant Technology and Bold & Gold® biosorption media to increase detention time in order to highly reduce TSS, nutrients, metals and turbidity.



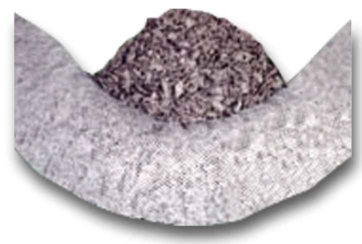
SkimBoss MAX

The SkimBoss MAX harnesses Hydro-Variant Technology, variable hydrology and its shelf system to increase detention times, which result in increased sediment settling and capture performance.

SkimBoss Floating Skimmer

The SkimBoss Floating Skimmer prevents buoyant pollutants from passing through an NSBB vault. Hydro-Variant Technology and inflow side buoyancy allow the skimmer to adjust to hydraulic grade changes.

StormBoom Media



Media Blends

Type 1
Hydrophobic Treated Cellulose

Wide spectrum absorbent with large sieve covering. Capable of absorbing chemicals other than hydrocarbons.

Type 2
Melt Blown Polypropylene

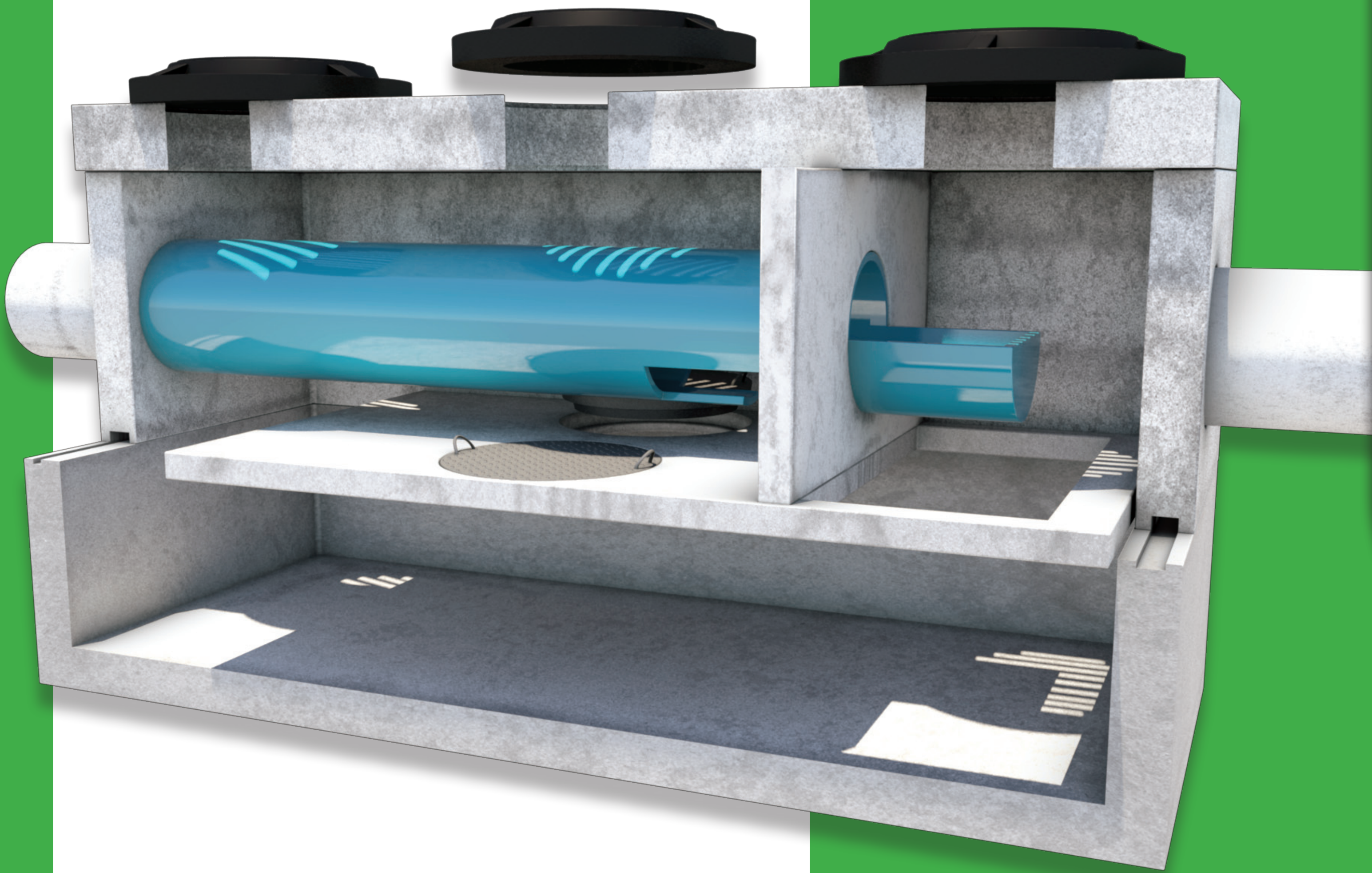
A non biodegradable large sieve size covering that is limited to only hydrocarbon absorption.

Type 3
50 - 50 Types 1 & 2 Blend

Half & half blend of Hydrophobic Treated Cellulose and melt blown polypropylene with a large sieve size covering. This media offers wide spectrum absorption with an emphasis on hydrocarbons.

Type 4
Polymer Crumb Filler

A polymer filler with a fine sieve size covering that will not absorb water, can float indefinitely and is non biodegradable.



STORMPRO

REDEFINING STORMWATER TREATMENT

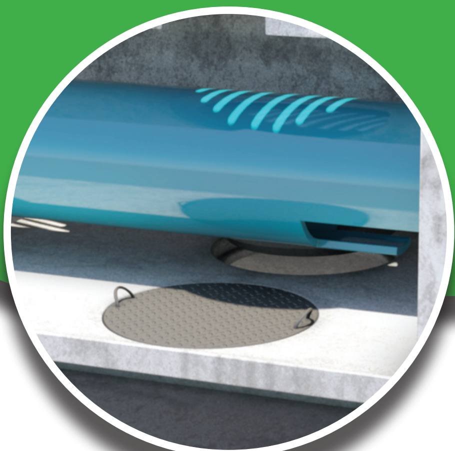
STORMPRO

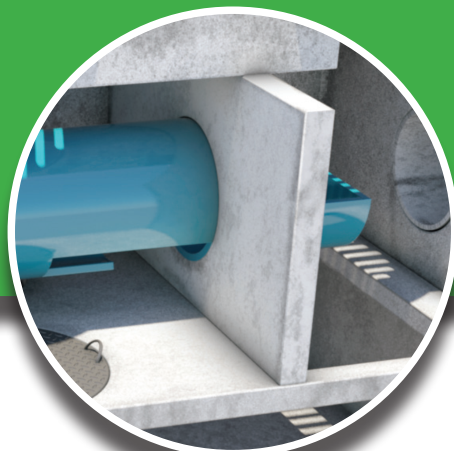
1-800-809-2801

environment 21
Global Stormwater Solutions

STORMPRO STORMWATER TREATMENT SYSTEM

- Single Structure Hydrodynamic Separator with shallow sump
- Online System
- Custom-configurable for multiple inlets/outlets.
- LEED Credits – All components made with locally obtainable materials
- NJCAT Verified, NJDEP Certified (TARP)





STORMPRO Stormwater Treatment System employs unique flow distribution to enhance the removal of pollutants including floatables (oils, bottles, etc.).

STORMPRO has one of the shallowest sumps. This reduces excavation and enables easy access for maintenance.

STORMPRO is designed specifically for each project in order to help meet the USEPA net annual removal goal of 80% Total Suspended Solids (TSS) and 40% phosphates.

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environment 21 Technical support team provides submittal packages within 1-2 business days. Give us a call!

STORMPRO

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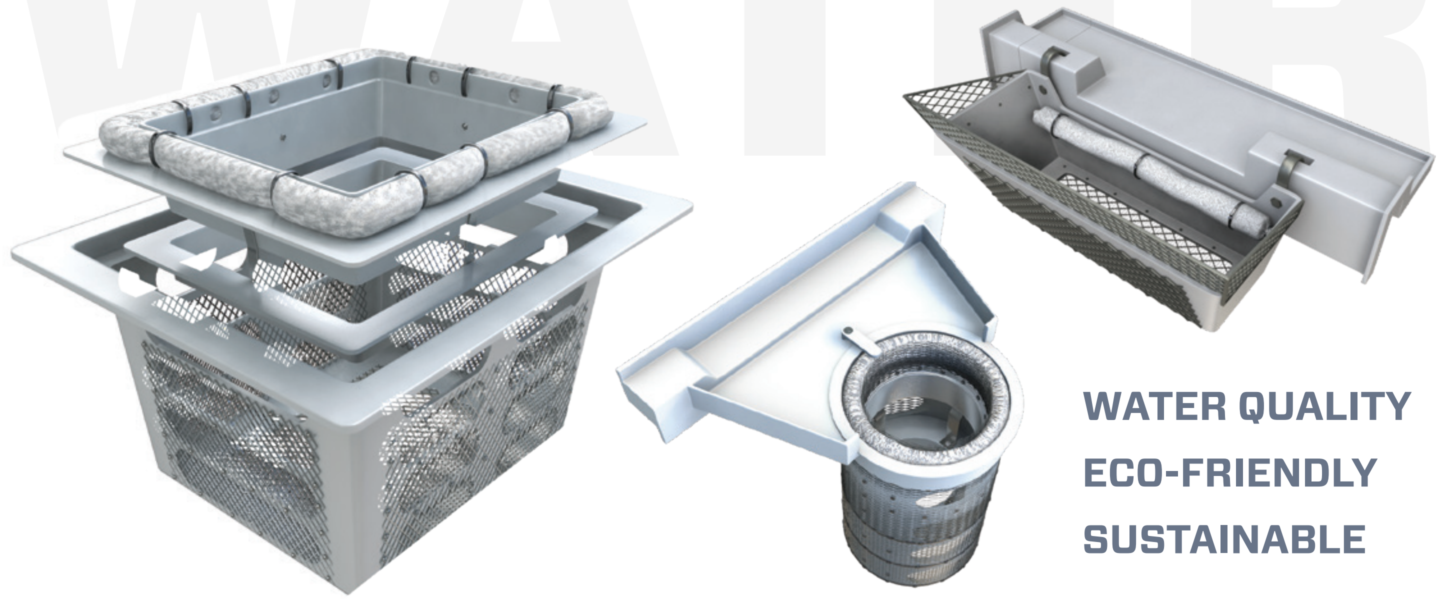
MULTI STAGE
Inlet Filters



WATER QUALITY

ECO-FRIENDLY

SUSTAINABLE

Proven Stormwater Treatment

Grate Inlet Skimmer Box™, Standard Capacity Curb Inlet Basket™ and High Capacity Curb Basket™ multi-stage filtration systems allow inflow stormwater to filter through a patented series of varied sieve size screens which capture and retain a range of pollutants such as foliage, trash and sediment. The GISB™, HCCIB™ and CIB™ are comprised of UV-coated, marine-grade fiberglass and stainless steel screens. These inlet filters have a lower lifetime cost per unit with no filter replacement costs and quick service times at an average of 15 minutes or less.

Benefits:

- Will not impede inlet water flow
- Captures hundreds of pounds of debris and sediment
- Multiple sieve size screens optimize filtration and water flow
- Easy vacuum truck servicing
- Bypass openings prevent clogging
- Minimal space requirements
- Multi-stage treatment system
- Full capture for trash TMDL's

LEED Credit Eligible:

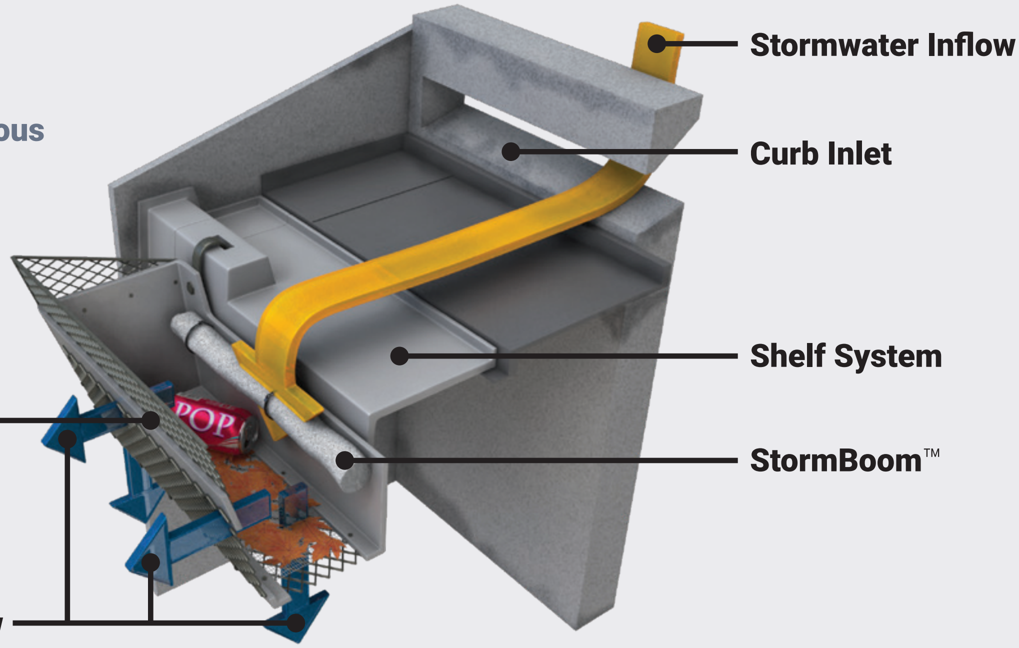
Stormwater Design / Quality Control

INLET FILTERS

CIB | HCCIB Removal Efficiencies up to:

71%	Phosphorous
51%	Hydrocarbons
60%	Nitrogen
86%	TSS

**Varies based on sizing & site conditions*



CIB | HCCIB

The Standard Capacity Curb Inlet Basket (used in shallow catch basins) and High Capacity Curb Inlet Basket (used in deep catch basins) are specialized inlet filters used for curb inlets where the only access element is a manhole. Both units are made of UV-coated, marine-grade fiberglass and stainless steel to ensure longevity and durability. Both inlet filters are unique for their shelf system which directs stormwater flow into the filter positioned directly under the access manhole. This system can be manufactured to any size and style of catch basin. The Standard Curb Inlet Basket and High Capacity Curb Inlet Basket are multi-stage filtration systems that can capture a variety of pollutants and debris during a storm event. Under high volume flows, water can bypass the filtration system by flowing past the filter and into the catch basin.

Standard Capacity Curb Inlet Basket (Shallow Catch Basins)

Operation Summary

- Stormwater carrying debris and pollutants enters through the curb inlet.
- An adjustable throat width funnels water to the weir. The immediate drop in the throat elevation prevents head loss through the inlet This allows sediment to collect along the incoming side of the weir.
- The water flows over the weir and into the filtration basket, filtering out trash, sediment and hydrocarbons.
- Filtered water leaves the basket and enters the catch basin. The position of the curb inlet basket high in the catch basin allows for captured debris to dry between storm events and avoid restriction to up-stream pipes.

High Capacity Curb Inlet Basket (Deep Catch Basins)

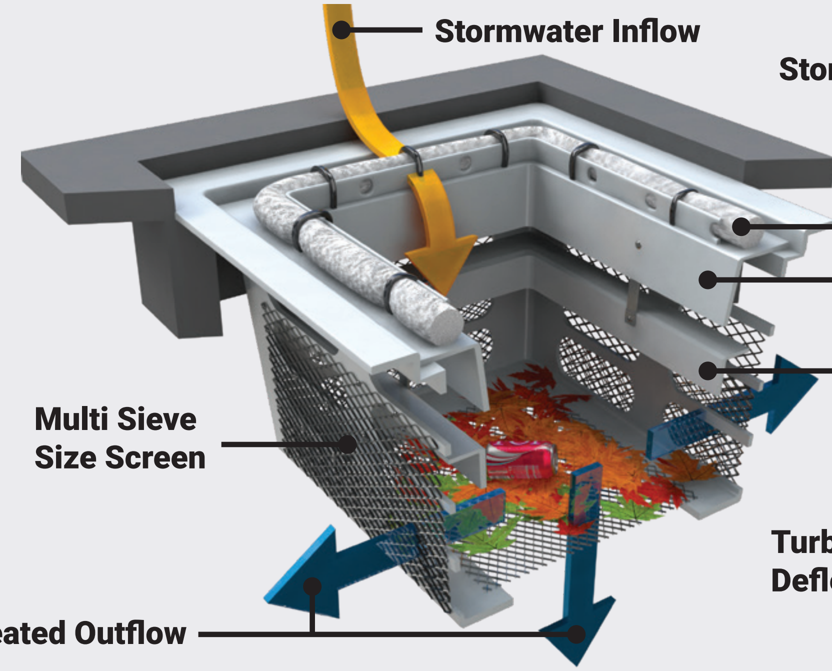
BIORETENTION / BIOFILTRATION

INLET FILTERS

GISB Removal Efficiencies up to:

71%	Phosphorous
51%	Hydrocarbons
60%	Nitrogen
86%	TSS

**Varies based on sizing & site conditions*



Grate Inlet Skimmer Box

The Grate Inlet Skimmer Box (GISB) is a specialized inlet filter used specifically for grated catch basins. The unit is made of marine-grade fiberglass and stainless steel to ensure longevity and durability. During a storm event, all incoming stormwater passes through the internal skimmer tray and into contact with a StormBoom. Stormwater and solid material then fall into the lower section of the skimmer box where small sieve sized filters capture and retain all solids. Turbulence deflectors within the filtration box act to calm the water and allow for a greater removal efficiency. Treated stormwater is thus able to pass into the catch basin system allowing the filters to dry after each storm event.

Operation Summary

- Stormwater enters the inlet and passes through a StormBoom and into the lower filtration chamber.
- The water level increases to a level adjacent with the medium size sieve screens and turbulence deflector.
- During high flows, the water level rises adjacent to the coarse size screens above the turbulence deflectors.
- During extreme flows, water bypasses filtration by through skimmer protected openings at the top.
- Collected debris is suspended and stored in a dry state above static water level until removed during service.

StormBoom Media

Type 1 Hydrophobic Treated Cellulose

Wide spectrum absorbent with large sieve covering. Capable of absorbing chemicals other than hydrocarbons.

Type 2 Melt Blown Polypropylene

A non biodegradable large sieve size covering that is limited to only hydrocarbon absorption.

Type 3 50 - 50 Types 1 & 2 Blend

Half & half blend of types 1 and 2 with a large sieve size covering. This media offers wide spectrum absorption with an emphasis on hydrocarbons.

Type 4 Polymer Crumb Filler

A polymer filler with a fine sieve size covering that will not absorb water, can float indefinitely and is non biodegradable.

INLET FILTERS

SIMPLE TO SERVICE.



CIB | HCCIB Maintenance

Heavy equipment is not required and use of a vacuum truck is optional when servicing the CIB or HCCIB. Whether servicing manually or with a vacuum truck, the 15 minute cleaning time facilitated by the shelf system eliminates the need for confined-space entry.

Manual Servicing Procedure

- Remove the manhole cover.
- Remove filtration basket either by hand or with manhole hook tool.
- Cut zip ties, remove StormBoom and dispose.
- Attach new StormBoom with zip ties.
- Brush filtration basket screens clean if necessary.
- Replace filtration basket and replace manhole cover.

Vacuum Servicing Procedure

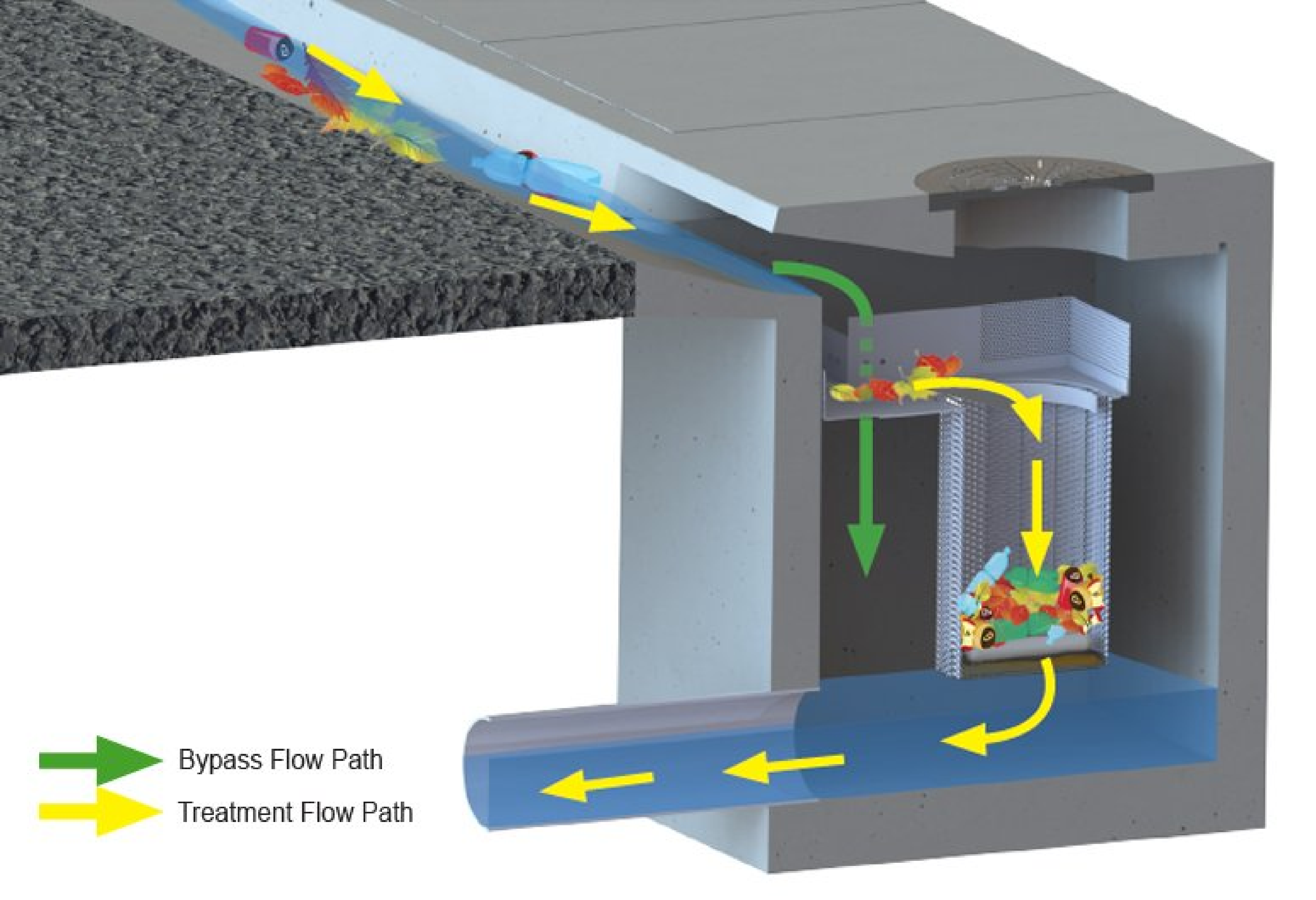
- Remove the manhole cover.
- Cut zip ties, remove StormBoom and dispose.
- Suction out debris from filtration basket with vacuum truck hose
- Attach new StormBoom to skimmer tray with zip ties.
- Replace filtration basket and replace manhole cover.

GISB Maintenance

It is recommended to service the GISB quarterly. The maximum flow capacity of the unit will be restored after servicing. The unit can easily be serviced manually or with the aid of a vacuum truck without the need for confined-space entry.

Servicing Procedure

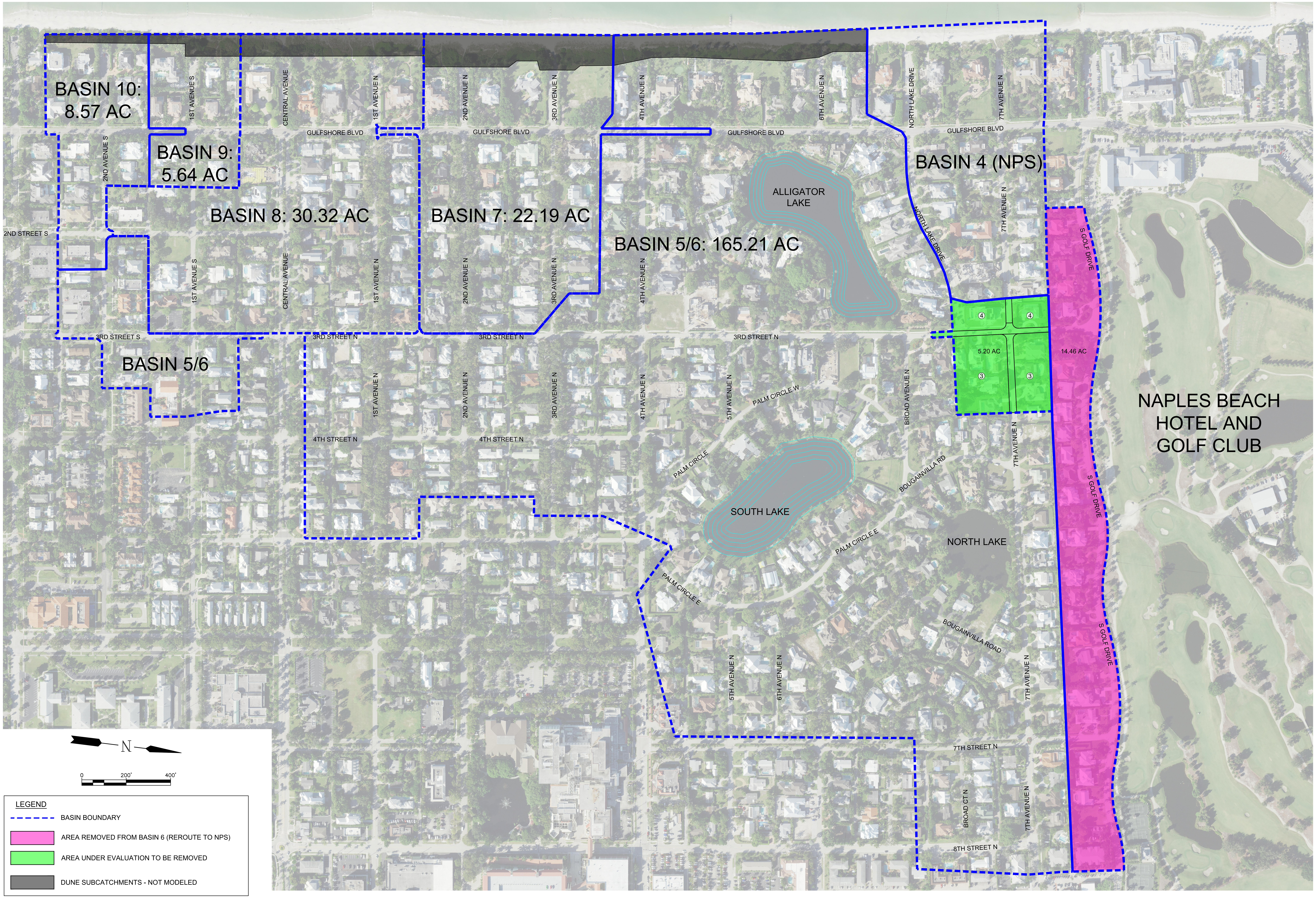
- Remove the grate.
- Remove the skimmer tray.
- Cut zip ties and dispose of StormBoom.
- Dispose of debris in skimmer tray.
- Zip tie new StormBoom to skimmer tray.
- Remove by hand or suction out filtration box with vacuum truck hose, then dispose of debris and brush screens.
- Replace filtration box, replace skimmer tray into filtration box and replace grate.


Bypass Flow Path
Treatment Flow Path

Appendix H:

Phase 1 Sub-Basin Acreage Map

APPENDIX C - Sub-Basin Acreage Map



Appendix I:

State Water Quality Investigations

62-302.530 Table: Surface Water Quality Criteria.

The following table contains both numeric and narrative surface water quality criteria to be applied except within zones of mixing. The left-hand column of the Table is a list of constituents for which a surface water criterion exists. The headings for the water quality classifications are found at the top of the Table, and the classification descriptions for the headings are specified in subsection 62-302.400(1), F.A.C. Applicable criteria lie within the Table. The individual criteria should be read in conjunction with other provisions in water quality standards, including Rule 62-302.500, F.A.C. The criteria contained in Rule 62-302.500, F.A.C., also apply to all waters unless alternative or more stringent criteria are specified in Rule 62-302.530, F.A.C. Unless otherwise stated, all criteria express the maximum not to be exceeded at any time except within established mixing zones or in accordance with site-specific effluent limitations developed pursuant to Rule 62-620.620, F.A.C. In some cases, there are separate or additional limits, which apply independently of the maximum not to be exceeded at any time. For example, the criteria for carcinogens, which are expressed as an annual average (denoted as "annual avg." in the Table), are applied as the maximum allowable annual average concentration at the long-term harmonic mean flow (see subsection 62-302.200(2), F.A.C.). Numeric interpretations of the narrative nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., shall be expressed as spatial averages and applied over a spatial area consistent with their derivation. In applying the water quality standards, the Department shall take into account the variability occurring in nature and shall recognize the statistical variability inherent in sampling and testing procedures. The Department's assessment methodology, set forth in Chapter 62-303, F.A.C., accounts for such natural and statistical variability when used to assess ambient waters pursuant to sections 305(b) and 303(d) of the Federal Clean Water Act.

Criteria for Surface Water Quality Classifications

Parameter	Units	Class I	Class II	Class III and Class III-Limited (see Note 4)		Class IV	Class V
				Predominantly Fresh Waters	Predominantly Marine Waters		
(1) Alkalinity	Milligrams/L as $CaCO_3$	Shall not be depressed below 20. In waterbodies with natural alkalinity levels below 20 mg/L, alkalinity shall not be reduced by more than 25%.		Shall not be depressed below 20. In waterbodies with natural alkalinity levels below 20 mg/L, alkalinity shall not be reduced by more than 25%.		≤ 600	
(2) Aluminum	Milligrams/L		≤ 1.5		≤ 1.5		

(3) Ammonia (Total Ammonia Nitrogen) (Class I, Class III fresh water, and Class III-Limited fresh water)	Milligrams/L as Total Ammonia Nitrogen (TAN = NH_4^+ + NH_3)	The 30-day average TAN value shall not exceed the average of the values calculated from the following equation, with no single value exceeding 2.5 times the value from the equation: $30 - \text{day Average} = 0.8876 \times \left(\frac{0.0278}{1 + 10^{7.688 - pH}} + \frac{1.1994}{1 + 10^{pH - 7.688}}\right) \times \left(2.126 \times 10^{0.028 \times (20 - MAX(T,7))}\right)$ *T* and *pH* are defined as the paired temperature (°C) and pH associated with the TAN sample. For purposes of total ammonia nitrogen criterion calculations, pH is subject to the range of 6.5 to 9.0. The pH shall be set at 6.5 if measured pH is < 6.5 and set at 9.0 if the measured pH is > 9.0.					
(4) Antimony	Micrograms/L	≤ 14.0	≤ 4,300	≤ 4,300	≤ 4,300		
(5)(a) Arsenic (total)	Micrograms/L	≤ 10	≤ 50	≤ 50	≤ 50	≤ 50	≤ 50
(5)(b) Arsenic (trivalent)	Micrograms/L measured as total recoverable Arsenic		≤ 36		≤ 36		

(6)(a) Bacteriological Quality (Fecal Coliform Bacteria)	Number per 100 ml (Most Probable Number (MPN) or Membrane Filter (MF))		MPN or MF counts shall not exceed a median value of 14 with not more than 10% of the samples exceeding the Ten Percent Threshold Value (TPTV) of 43 (for MPN) or 31 (for MF), nor exceed 800 on any one day. To determine the percentage of samples exceeding the criteria when there are both MPN and MF samples for a waterbody, the percent shall be calculated as $100*(n_{mpn}+n_{mf})/N$, where n_{mpn} is the number of MPN samples greater than 43, n_{mf} is the number of MF samples greater than 31, and N is the total number of MPN and MF samples.				

(6) (b) Bacteriological Quality **(***Escherichia coli* Bacteria)	Number per 100 ml (Most Probable Number (MPN) or Membrane Filter (MF))	MPN or MF counts shall not exceed a monthly geometric mean of 126 nor exceed the Ten Percent Threshold Value (TPTV) of 410 in 10% or more of the samples during any 30-day period. Monthly geometric means shall be based on a minimum of 5 samples taken over a 30-day period.		MPN or MF counts shall not exceed a monthly geometric mean of 126 nor exceed the Ten Percent Threshold Value (TPTV) of 410 in 10% or more of the samples during any 30-day period. Monthly geometric means shall be based on a minimum of 10 samples taken over a 30-day period.			
(6)(c) Bacteriological Quality (*Enterococci* Bacteria)	Number per 100 ml (Most Probable Number (MPN) or Membrane Filter (MF))		MPN or MF counts shall not exceed a monthly geometric mean of 35 nor exceed the Ten Percent Threshold Value (TPTV) of 130 in 10% or more of the samples during any 30-day period. Monthly geometric means shall be based on a minimum of 10 samples taken over a 30-day period.		MPN or MF counts shall not exceed a monthly geometric mean of 35 nor exceed the Ten Percent Threshold Value (TPTV) of 130 in 10% or more of the samples during any 30-day period. Monthly geometric means shall be based on a minimum of 10 samples taken over a 30-day period.		

(7) Barium	Milligrams/L	≤ 1					
(8) Benzene	Micrograms/L	≤ 1.18	≤ 71.28 annual avg.	≤ 71.28 annual avg.	≤ 71.28 annual avg.		
(9) Beryllium	Micrograms/L	≤ 0.0077 annual avg.	≤ 0.13 annual avg.	≤ 0.13 annual avg.	≤ 0.13 annual avg.	≤ 100 in waters with a hardness in mg/L of $CaCO_3$ of less than 250 and shall not exceed 500 in harder waters	
(10)(a) Biological Health (Shannon-Weaver Diversity Index using Hester-Dendy type samplers)	Per cent reduction of Shannon-Weaver Diversity Index	The Index for benthic macroinvertebrates shall not be reduced to less than 75% of background levels as measured using organisms retained by a U. S. Standard No. 30 sieve and collected and composited from a minimum of three Hester-Dendy type artificial substrate samplers of 0.10 to 0.15 m^2 area each, incubated for a period of four weeks.		The Index for benthic macroinvertebrates shall not be reduced to less than 75% of established background levels as measured using organisms retained by a U. S. Standard No. 30 sieve and collected and composited from a minimum of three Hester-Dendy type artificial substrate samplers of 0.10 to 0.15 m^2 area each, incubated for a period of four weeks.			

(10) (b) Biological Health (Shannon-Weaver Diversity Index using Ekman or Ponar type samplers)	Per cent reduction of Shannon-Weaver Diversity Index	In lakes, the Index for benthic macroinvertebrates shall not be reduced to less than 75% of established background levels as measured using organisms retained by a U.S. Standard No. 30 sieve and collected and composited from a minimum of three natural substrate samples, taken with Ekman or Ponar type samplers with minimum sampling area of 225 cm^2.	The Index for benthic macroinvertebrates shall not be reduced to less than 75% of established background levels as measured using organisms retained by a U.S. Standard No. 30 sieve and collected and composited from a minimum of three natural substrate samples, taken with Ponar type samplers with minimum sampling area of 225 cm^2.	In lakes, the Index for benthic macroinvertebrates shall not be reduced to less than 75% of established background levels as measured using organisms retained by a U.S. Standard No. 30 sieve and collected and composited from a minimum of three natural substrate samples, taken with Ekman or Ponar type samplers with minimum sampling area of 225 cm^2.	The Index for benthic macroinvertebrates shall not be reduced to less than 75% of established background levels as measured using organisms retained by a U.S. Standard No. 30 sieve and collected and composited from a minimum of three natural substrate samples, taken with Ponar type samplers with minimum sampling area of 225 cm^2.		
(11) BOD (Biochemical Oxygen Demand)		Shall not be increased to exceed values which would cause dissolved oxygen to be depressed below the limit established for each class and, in no case, shall it be great enough to produce nuisance conditions.					
(12) Boron	Milligrams/L					≤ 0.75	
(13) Bromates	Milligrams/L		≤ 100		≤ 100		
(14) Bromine (free molecular)	Milligrams/L		≤ 0.1		≤ 0.1		
(15) Cadmium	Micrograms/L See Notes (1) and (3).	Cd ≤ $e^{(0.7409[lnH]-4.719)}$;	≤ 8.8	Cd ≤ $e^{(0.7409[lnH]-4.719)}$;	≤ 8.8		
(16) Carbon tetrachloride	Micrograms/L	≤ 0.25 annual avg.; 3.0 max	≤ 4.42 annual avg.	≤ 4.42 annual avg.	≤ 4.42 annual avg.		

(17) Chlorides	Milligrams/L	≤ 250	Not increased more than 10% above normal background. Normal daily and seasonal fluctuations shall be maintained.		Not increased more than 10% above normal background. Normal daily and seasonal fluctuations shall be maintained.		In predominantly marine waters, not increased more than 10% above normal back-ground. Normal daily and seasonal fluctuations shall be main-tained.
(18) Chlorine (total residual)	Milligrams/L	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01		
(19)(a) Chromium (trivalent)	Micrograms/L measured as total recoverable Chromium See Notes (1) and (3).	Cr (III) ≤ $e^{(0.819[\ln H]+0.6848)}$		Cr (III) ≤ $e^{(0.819[\ln H]+0.6848)}$		Cr (III) ≤ $e^{(0.819[\ln H]+0.6848)}$	In predominantly fresh waters, ≤ $e^{(0.819[\ln H]+0.6848)}$
(19)(b) Chromium (hexavalent)	Micrograms/L See Note (3)	≤ 11	≤ 50	≤ 11	≤ 50	≤ 11	In predominantly fresh waters, ≤ 11. In predominantly marine waters, ≤ 50
(20) Chronic Toxicity (see definition in subsection 62-302.200(5), F.A.C. and also see below, "Substances in concentrations which...")							

(21) Color, etc. (see also Minimum Criteria, Odor, Phenols, etc.)	Color, odor, and taste producing substances and other deleterious substances, including other chemical compounds attributable to domestic wastes, industrial wastes, and other wastes					Only such amounts as will not render the waters unsuitable for agricultural irrigation, livestock watering, industrial cooling, industrial process water supply purposes, or fish survival.	
(22) Conductance, Specific	Micromhos/cm	Shall not be increased more than 50% above background or to 1275, whichever is greater.		Shall not be increased more than 50% above background or to 1275, whichever is greater.		Shall not be increased more than 50% above background or to 1275, whichever is greater.	Shall not exceed 4,000
(23) Copper	Micrograms/L See Notes (1) and (3).	Cu ≤ $e^{(0.8545[\ln H]-1.702)}$	≤ 3.7	Cu ≤ $e^{(0.8545[\ln H]-1.702)}$	≤ 3.7	≤ 500	≤ 500
(24) Cyanide	Micrograms/L	≤ 5.2	≤ 1.0	≤ 5.2	≤ 1.0	≤ 5.0	≤ 5.0
(25) Definitions (see Section 62-302.200, F.A.C.)							
(26) Detergents	Milligrams/L	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5
(27) 1,1-Dichloroethylene (1,1-dichloroethene)	Micrograms/L	≤ 0.057 annual avg.; ≤ 7.0 max	≤ 3.2 annual avg.	≤ 3.2 annual avg.	≤ 3.2 annual avg.		
(28) Dichloromethane (methylene chloride)	Micrograms/L	≤ 4.65 annual avg.	≤ 1,580 annual avg.	≤ 1,580 annual avg.	≤ 1,580 annual avg.		
(29) 2,4-Dinitrotoluene	Micrograms/L	≤ 0.11 annual avg.	≤ 9.1 annual avg.	≤ 9.1 annual avg.	≤ 9.1 annual avg.		

(30) Dissolved Oxygen	Milligrams/L	See Rule 62-302.533, F.A.C.				Shall not average less than 4.0 in a 24-hour period and shall never be less than 3.0.	Shall not be less than 0.3, fifty percent of the time on an annual basis for flows greater than or equal to 250 cubic feet per second and shall never be less than 0.1. Normal daily and seasonal fluctuations above these levels shall be maintained.
(31) Dissolved Solids	Milligrams/L	≤ 500 as a monthly avg.; ≤ 1,000 max					
(32) Fluorides	Milligrams/L	≤ 1.5	≤ 1.5	≤ 10.0	≤ 5.0	≤ 10.0	≤ 10.0
(33) "Free Froms" (see Minimum Criteria in Rule 62-302.500, F.A.C.)							
(34) "General Criteria" (see Rule 62-302.500, F.A.C. and individual criteria)							
(35)(a) Halomethanes (Total trihalomethanes) (total of bromoform, chlorodibromo-methane, dichlorobromome-thane, and chloroform). Individual halomethanes shall not exceed (b)1. to (b)5. below.	Micrograms/L	≤ 80					
(35)(b)1. Halomethanes (individual): Bromoform	Micrograms/L	≤ 4.3 annual avg.	≤ 360 annual avg.	≤ 360 annual avg.	≤ 360 annual avg.		

(35)(b)2. Halomethanes (individual): Chlorodibromo-methane	Micrograms/L	≤ 0.41 annual avg.	≤ 34 annual avg.	≤ 34 annual avg.	≤ 34 annual avg.		
(35)(b)3. Halomethanes (individual): Chloroform	Micrograms/L	≤ 5.67 annual avg.	≤ 470.8 annual avg.	≤ 470.8 annual avg.	≤ 470.8 annual avg.		
(35)(b)4. Halomethanes (individual): Chloromethane (methyl chloride)	Micrograms/L	≤ 5.67 annual avg.	≤ 470.8 annual avg.	≤ 470.8 annual avg.	≤ 470.8 annual avg.		
(35)(b)5. Halomethanes (individual): Dichlorobromomethane	Micrograms/L	≤ 0.27 annual avg.	≤ 22 annual avg.	≤ 22 annual avg.	≤ 22 annual avg.		
(36) Hexachlorobutadiene	Micrograms/L	≤ 0.45 annual avg.	≤ 49.7 annual avg.	≤ 49.7 annual avg.	≤ 49.7 annual avg.		
(37) Imbalance (see Nutrients)							
(38) Iron	Milligrams/L	≤ 1.0	≤ 0.3	≤ 1.0	≤ 0.3	≤ 1.0	
(39) Lead	Micrograms/L See Notes (1) and (3).	Pb ≤ $e^{(1.273[\ln H] - 4.705)}$;	≤ 8.5	Pb ≤ $e^{(1.273 [\ln H] - 4.705)}$;	≤ 8.5	≤ 50	≤ 50
(40) Manganese	Milligrams/L		≤ 0.1				
(41) Mercury	Micrograms/L	≤0.012	≤0.025	≤0.012	≤0.025	≤ 0.2	≤ 0.2
(42) Minimum Criteria (see Section 62-302.500, F.A.C.)							
(43) Mixing Zones (See Section 62-4.244, F.A.C.)							
(44) Nickel	Micrograms/L See Notes (1) and (3).	Ni ≤ $e^{(0.846[\ln H]+0.0584)}$	≤ 8.3	Ni ≤ $e^{(0.846[\ln H]+0.0584)}$	≤ 8.3	≤ 100	
(45) Nitrate	Milligrams/L as N	≤ 10 or that concentration that exceeds the nutrient criteria					
(46) Nonylphenol (4-nonylphenol)	Micrograms/L	≤ 6.6	≤ 1.7	≤ 6.6	≤ 1.7		
(47) Nuisance Species		Substances in concentrations which result in the dominance of nuisance species: none shall be present.					
(48)(a) Nutrients		The discharge of nutrients shall continue to be limited as needed to prevent violations of other standards contained in this chapter. Man-induced nutrient enrichment (total nitrogen or total phosphorus) shall be considered degradation in relation to the provisions of Rules 62-302.300, 62-302.700, and 62-4.242, F.A.C.					

(48)(b) Nutrients		In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna.					
(49) Odor (also see Color, Minimum Criteria, Phenolic Compounds, etc.)	Threshold odor number		Shall not exceed 24 at 60 degrees C as a daily average.				Odor producing substances: only in such amounts as will not unreasonably interfere with use of the water for the designated purpose of this classification.
(50)(a) Oils and Greases	Milligrams/L	Dissolved or emulsified oils and greases shall not exceed 5.0	Dissolved or emulsified oils and greases shall not exceed 5.0	Dissolved or emulsified oils and greases shall not exceed 5.0	Dissolved or emulsified oils and greases shall not exceed 5.0	Dissolved or emulsified oils and greases shall not exceed 5.0	Dissolved or emulsified oils and greases shall not exceed 10.0
(50)(b) Oils and Greases		No undissolved oil, or visible oil defined as iridescence, shall be present so as to cause taste or odor, or otherwise interfere with the beneficial use of waters.					
(50) Pesticides and Herbicides							
(51)(a) 2,4,5-TP	Micrograms/L	≤ 10					
(51)(b) 2-4-D	Micrograms/L	≤ 100					
(51)(c) Aldrin	Micrograms/L	≤ .00013 annual avg.; 3.0 max	≤ .00014 annual avg.; 1.3 max	≤ .00014 annual avg.; 3.0 max	≤ .00014 annual avg.; 1.3 max		
(51)(d) Beta-hexachlorocyclohexane (b-BHC)	Micrograms/L	≤ 0.014 annual avg.	≤ 0.046 annual avg.	≤ 0.046 annual avg.	≤ 0.046 annual avg.		
(51)(e) Carbaryl	Micrograms/L	≤ 2.1		≤ 2.1			
(51)(f) Chlordane	Micrograms/L	≤ 0.00058 annual avg.; 0.0043 max	≤ 0.00059 annual avg.; 0.004 max	≤ 0.00059 annual avg.; 0.0043 max	≤ 0.00059 annual avg.; 0.004 max		
(51)(g) Chlorpyrifos	Micrograms/L	≤ 0.041	≤ 0.0056	≤ 0.041	≤ 0.0056		
(51)(h) DDT	Micrograms/L	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max	≤ 0.00059 annual avg.; 0.001 max		
(51)(i) Demeton	Micrograms/L	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1		

(51)(j) Diazinon	Micrograms/L	≤ 0.17	≤ 0.82	≤ 0.17	≤ 0.82		
(51)(k) Dieldrin	Micrograms/L	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max	≤ 0.00014 annual avg.; 0.0019 max		
(51)(l) Endosulfan	Micrograms/L	≤ 0.056	≤ 0.0087	≤ 0.056	≤ 0.0087		
(51)(m) Endrin	Micrograms/L	≤ 0.0023	≤ 0.0023	≤ 0.0023	≤ 0.0023		
(51)(n) Guthion	Micrograms/L	≤ 0.01	≤ 0.01	≤ 0.01	≤ 0.01		
(51)(o) Heptachlor	Micrograms/L	≤ 0.00021 annual avg.; 0.0038 max	≤ 0.00021 annual avg.; 0.0036 max	≤ 0.00021 annual avg.; 0.0038 max	≤ 0.00021 annual avg.; 0.0036 max		
(51)(p) Lindane (g-benzene hexachloride)	Micrograms/L	See Minimum criteria in paragraph 62-302.500(1)(d), F.A.C.	See Minimum criteria in paragraph 62-302.500(1)(d), F.A.C.	See Minimum criteria in paragraph 62-302.500(1)(d), F.A.C.	See Minimum criteria in paragraph 62-302.500(1)(d), F.A.C.		
(51)(q) Malathion	Micrograms/L	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1		
(51)(r) Methoxychlor	Micrograms/L	≤ 0.03	≤ 0.03	≤ 0.03	≤ 0.03		
(51)(s) Mirex	Micrograms/L	≤ 0.001	≤ 0.001	≤ 0.001	≤ 0.001		
(51)(t) Parathion	Micrograms/L	≤ 0.04	≤ 0.04	≤ 0.04	≤ 0.04		
(51)(u) Toxaphene	Micrograms/L	≤ 0.0002	≤ 0.0002	≤ 0.0002	≤ 0.0002		
(52)(a) pH (Class I and Class IV Waters)	Standard Units	Shall not vary more than one unit above or below natural background provided that the pH is not lowered to less than 6 units or raised above 8.5 units. If natural background is less than 6 units, the pH shall not vary below natural background or vary more than one unit above natural background. If natural background is higher than 8.5 units, the pH shall not vary above natural background or vary more than one unit below background.					
(52)(b) pH (Class II Waters)	Standard Units	Shall not vary more than one unit above or below natural background of coastal waters as defined in paragraph 62-302.520(3)(b), F.A.C., or more than two-tenths unit above or below natural background of open waters as defined in paragraph 62-302.520(3)(f), F.A.C., provided that the pH is not lowered to less than 6.5 units or raised above 8.5 units. If natural background is less than 6.5 units, the pH shall not vary below natural background or vary more than one unit above natural background for coastal waters or more than two-tenths unit above natural background for open waters. If natural background is higher than 8.5 units, the pH shall not vary above natural background or vary more than one unit below natural background of coastal waters or more than two-tenths unit below natural background of open waters.					

(52)(c) pH (Class III Waters)	Standard Units	Shall not vary more than one unit above or below natural background of predominantly fresh waters and coastal waters as defined in paragraph 62-302.520(3)(b), F.A.C. or more than two-tenths unit above or below natural background of open waters as defined in paragraph 62-302.520(3)(f), F.A.C., provided that the pH is not lowered to less than 6 units in predominantly fresh waters, or less than 6.5 units in predominantly marine waters, or raised above 8.5 units. If natural background is less than 6 units, in predominantly fresh waters or 6.5 units in predominantly marine waters, the pH shall not vary below natural background or vary more than one unit above natural background of predominantly fresh waters and coastal waters, or more than two-tenths unit above natural background of open waters. If natural background is higher than 8.5 units, the pH shall not vary above natural background or vary more than one unit below natural background of predominantly fresh waters and coastal waters, or more than two-tenths unit below natural background of open waters.					
(52)(d) pH (Class V Waters)	Standard Units	Not lower than 5.0 nor greater than 9.5 except certain swamp waters which may be as low as 4.5.					
(53)(a) Phenolic Compounds: Total		Phenolic compounds other than those produced by the natural decay of plant material, listed or unlisted, shall not taint the flesh of edible fish or shellfish or produce objectionable taste or odor in a drinking water supply.					
(53)(b) Total Chlorinated Phenols and Chlorinated Cresols	Micrograms/L	1. The total of all chlorinated phenols, and chlorinated cresols, except as set forth in (c)1. to (c)4. below, shall not exceed 1.0 unless higher values are shown not to be chronically toxic. Such higher values shall be approved in writing by the Secretary. 2. The compounds listed in (c)1. to (c)6. below shall not exceed the limits specified for each compound.					1. The total of the following Phenolic compounds shall not exceed 50: a) Chlorinated phenols; b) Chlorinated cresols; and c) 2,4-dinitrophenol.
(53)(c)1. Phenolic Compound: 2-chlorophenol	Micrograms/L	≤ 120	< 400 See Note (2).	< 400 See Note (2).	< 400 See Note (2).	< 400 See Note (2).	
(53)(c)2. Phenolic Compound: 2,4-dichlorophenol	Micrograms/L	< 93 See Note (2).	< 790 See Note (2).	< 790 See Note (2).	< 790 See Note (2).	< 790 See Note (2).	
(53)(c)3. Phenolic Compound: Pentachlorophenol	Micrograms/L	≤ 30 max; ≤ 0.28 annual avg; ≤ $e^{(1.005[pH]-5.29)}$	≤ 7.9	≤ 30 max; ≤ 8.2 annual avg; ≤ $e^{(1.005[pH]-5.29)}$	≤ 7.9	≤ 30	
(53)(c)4. Phenolic Compound: 2,4,6-trichlorophenol	Micrograms/L	≤ 2.1 annual avg.	≤ 6.5 annual avg.	≤ 6.5 annual avg.	≤ 6.5 annual avg.	≤ 6.5 annual avg.	

(53)(c)5. Phenolic Compound: 2,4-dinitrophenol	Milligrams/L	≤ 0.0697 See Note (2).	≤ 14.26 See Note (2).	≤ 14.26 See Note (2).	≤ 14.26 See Note (2).	≤ 14.26 See Note (2).	
(53)(c)6. Phenolic Compound: Phenol	Milligrams/L	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3
(54) Phosphorus (Elemental)	Micrograms/L		≤ 0.1		≤ 0.1		
(55) Phthalate Esters	Micrograms/L	≤ 3.0		≤ 3.0			
(56) Polychlorinated Biphenyls (PCBs)	Micrograms/L	≤ 0.000044 annual avg.; 0.014 max	≤ 0.000045 annual avg.; 0.03 max	≤ 0.000045 annual avg.; 0.014 max	≤ 0.000045 annual avg.; 0.03 max		
(57)(a) Polycyclic Aromatic Hydrocarbons (PAHs). Total of: Acenaphthylene; Benzo(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoran-thene; Benzo-(ghi)perylene; Benzo(k)fluoranthene; Chrysene; Dibenzo-(a,h)anthracene; Indeno(1,2,3-cd)pyrene; and Phenanthrene	Micrograms/L	≤ 0.0028 annual avg.	≤ 0.031 annual avg.	≤ 0.031annual avg.	≤ 0.031 annual avg.		
(57)(b)1. (Individual PAHs): Acenaphthene	Milligrams/L	< 1.2 See Note (2).	< 2.7 See Note (2).	< 2.7 See Note (2).	< 2.7 See Note (2).		
(57)(b)2. (Individual PAHs): Anthracene	Milligrams/L	< 9.6 See Note (2).	< 110 See Note (2).	< 110 See Note (2).	< 110 See Note (2).		
(57)(b)3. (Individual PAHs): Fluoranthene	Milligrams/L	< 0.3 See Note (2).	< 0.370 See Note (2).	< 0.370 See Note (2).	< 0.370 See Note (2).		
(57)(b)4. (Individual PAHs): Fluorene	Milligrams/L	< 1.3 See Note (2).	< 14 See Note (2).	< 14 See Note (2).	< 14 See Note (2).		
(57)(b)5. (Individual PAHs): Pyrene	Milligrams/L	< 0.96 See Note (2).	< 11 See Note (2).	< 11 See Note (2).	< 11 See Note (2).		
(58)(a) Radioactive substances (Combined radium 226 and 228)	Picocuries/L	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5

(58)(b) Radioactive substances (Gross alpha particle activity including radium 226, but excluding radon and uranium)	Picocuries/L	≤ 15	≤ 15	≤ 15	≤ 15	≤ 15	≤ 15
(59) Selenium	Micrograms/L	≤ 5.0	≤ 71	≤ 5.0	≤ 71		
(60) Silver	Micrograms/L See Note (3).	≤ 0.07	See Minimum criteria in paragraph 62-302.500(1)(c), F.A.C.	≤ 0.07	See Minimum criteria in paragraph 62-302.500(1)(c), F.A.C.		
(61) Specific Conductance (see Conductance, Specific, above)							
(62) Substances in concentrations which injure, are chronically toxic to, or produce adverse physiological or behavioral response in humans, plants, or animals		None shall be present.					
(63) 1,1,2,2-Tetrachloroethane	Micrograms/L	≤ 0.17 annual avg.	≤ 10.8 annual avg.	≤ 10.8 annual avg.	≤ 10.8 annual avg.		
(64) Tetrachloroethylene (1,1,2,2-tetrachloroethene)	Micrograms/L	≤ 0.8 annual avg., ≤ 3.0 max	≤ 8.85 annual avg.	≤ 8.85 annual avg.	≤ 8.85 annual avg.		
(65) Thallium	Micrograms/L	< 1.7	< 6.3	< 6.3	< 6.3		
(66) Thermal Criteria (See Rule 62-302.520)							
(67) Total Dissolved Gases	Percent of the saturation value for gases at the existing atmospheric and hydrostatic pressures	≤ 110% of saturation value	≤ 110% of saturation value	≤ 110% of saturation value	≤ 110% of saturation value		

(68) Transparency	Depth of the compensation point within the water column for photosynthetic activity	The annual average value shall not be reduced by more than 10% as compared to the natural background value. Annual average values shall be based on a minimum of three samples, with each sample collected at least three months apart.	The annual average value shall not be reduced by more than 10% as compared to the natural background value. Annual average values shall be based on a minimum of three samples, with each sample collected at least three months apart.	The annual average value shall not be reduced by more than 10% as compared to the natural background value. Annual average values shall be based on a minimum of three samples, with each sample collected at least three months apart.	The annual average value shall not be reduced by more than 10% as compared to the natural background value. Annual average values shall be based on a minimum of three samples, with each sample collected at least three months apart.		
(69) Trichloroethylene (trichloroethene)	Micrograms/L	≤ 2.7 annual avg., ≤ 3.0 max	≤ 80.7 annual avg.	≤ 80.7 annual avg.	≤ 80.7 annual avg.		
(70) Turbidity	Nephelometric Turbidity Units (NTU)	≤ 29 above natural background conditions	≤ 29 above natural background conditions	≤ 29 above natural background conditions	≤ 29 above natural background conditions	≤ 29 above natural background conditions	≤ 29 above natural background conditions
(71) Zinc	Micrograms/L See Notes (1) and (3).	$Zn \leq e^{(0.8473[\ln H]+0.884)}$	≤ 86	$Zn \leq e^{(0.8473[\ln H]+0.884)}$	≤ 86	≤ 1,000	≤ 1,000

Notes**:** (1) "ln H" means the natural logarithm of total hardness expressed as milligrams/L of $CaCO_3$. For metals criteria involving equations with hardness, the hardness shall be set at 25 mg/L if actual hardness is < 25 mg/L and set at 400 mg/L if actual hardness is > 400 mg/L. (2) This criterion is protective of human health not of aquatic life. (3) For application of dissolved metals criteria see paragraph 62-302.500(2)(d), F.A.C. (4) Class III-Limited waters have at least one Site Specific Alternative Criterion as established under Rule 62-302.800, F.A.C.

Rulemaking Authority 403.061, 403.062, 403.087, 403.504, 403.704, 403.804 FS. Law Implemented 403.021(11), 403.061, 403.087, 403.088, 403.141, 403.161, 403.182, 403.502, 403.702, 403.708 FS. History–New 1-28-90, Formerly 17-3.065, Amended 2-13-92, 6-17-92, Formerly 17-302.540, 17-302.550, 17-302.560, 17-302.570, 17-302.580, Amended 4-25-93, Formerly 17-302.530, Amended 1-23-95, 1-15-96, 5-15-02, 7-19-04, 12-7-06, 8-5-10, 7-3-12, 8-1-13, 2-17-16.

Appendix J:

UV System Overview

Erickson Consulting Engineers, Inc.

NAPLES BEACH RESTORATION & WQ IMPROVEMENT PROJECT
UV TREATMENT SYSTEM EVALUATION

UV Treatment of water to remove bacteria is a proven method to improve municipal and commercial water quality to an acceptable standard to prevent harm to communities and environments. The technology has been in use for decades and has been verified by the EPA.

The FDEP recommends UV treatment for bacteria removal from wastewater and has identified waterwater treatment plants in Florida that utilize UV Treatment. Most of the UV treatment is via the Aquionics systems, and there are some TrojanUV systems in use (Wastewater Management Program, 2021). The bacteria levels are generally higher in wastewater than in stormwater; however, given the measured enterococci levels in the Naples sub-basins, high levels of bacteria removal may be required.

A number of manufactures that produce UV disinfection systems may be suitable for the Naples Water Quality Improvement Project. These include, but are not limited to:

- Megatron UV Water Disinfection System by Atlantic Ultraviolent Corporation
- TrojanUV Systems
- Aquionics UV Systems.

Aquionics is a world leader in UV treatment and has systems verified by the EPA (Scheible & Weber II, 2002) to ensure performance. They provide systems for a range of municipal water treatment options including improving wastewater and stormwater for recharging aquifers and other uses requiring high levels of bacteria removal efficiencies. The Aquionics treatment system was incorporated into the Siesta Key stormwater project in 2015. Aquionics products were selected for evaluation herein given their presence in Florida. During the 90% design development phase, both Aquinonics and TrojanUV systems will be evaluated in detail and priced.

Two Aquionics InLine W 36000+ systems have been evaluated for inclusion in the Naples Water Quality Improvement project. Each system can treat 38.7 cfs (25 million gallons per day) with 3-4 log (99.9% to 99.99%) removal provided a minimum UV Transmittance of 65%. During the next phase of pre-construction water quality testing, samples will be collected to determine UV Transmittance of the lake water as well as flow incoming into the system at inlet grates.

Please see enclosed for Aquionics Design Standards and the Inline W 36000+ Data Sheet.

References

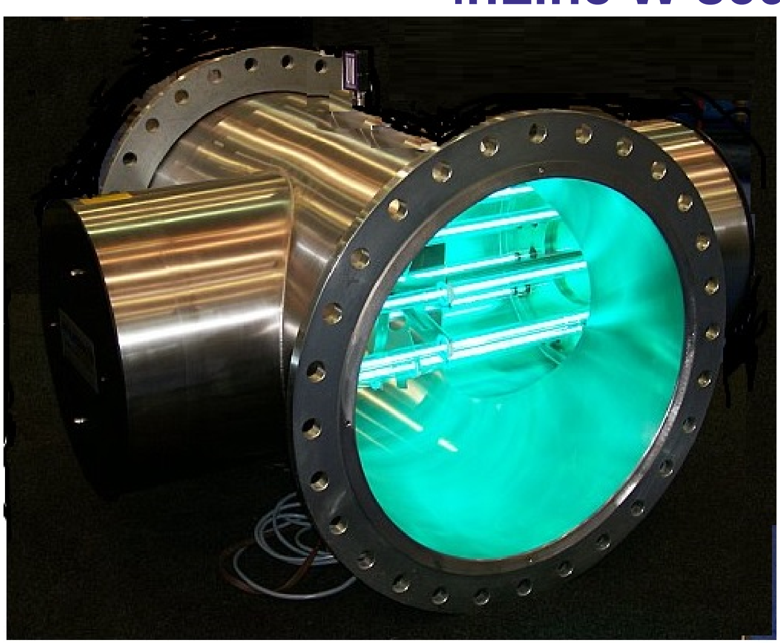
Scheible, O. K., & Weber II, E. T. (2002). *Verification Test Plan for the Aquionic Inc. UV Disinfection System for Reuse Applications.* Edison, NJ: US EPA.

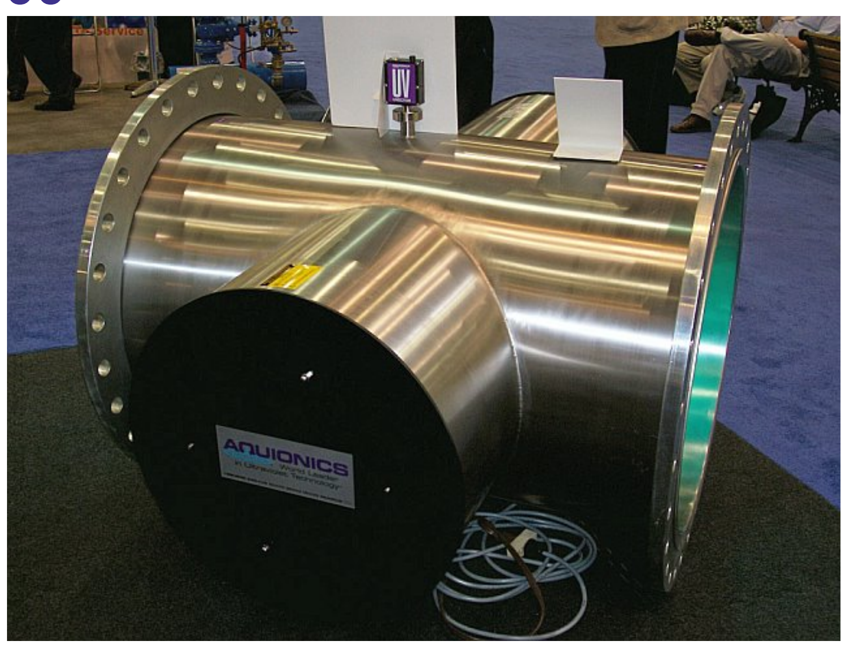
Wastewater Management Program. (2021). *Ultraviolet (UV) Disinfection for Domestic Wastewater*. Retrieved from FDEP: https://floridadep.gov/water/domestic-wastewater/content/ultraviolet-uv-disinfection-domestic-wastewater

Datasheet

InLine+W Series

InLine W 36000+





Type : Version 1
Revision number : 7-2017 BT rev.2
Document version: IL+W EB

AQUIONICS UV Delivered

AQUIONICS UV Delivered

UV reactor

Specifications	
Material:	Stainless Steel, 316 L
Internal Finish:	Ra_{max} 0.81 µm
Degree of Protection:	NEMA 12 (IP 54)
Flange Connections:	30” ANSI 150 lbs
Dimensions:	See drawing next page
Weight dry/wet:	2205 lbs (1000 kg)/ 3968 lbs (1800 kg)
Lamp Type:	
Number of Lamps:	18
Temperature Sensor:	(1) PT 100
UV Sensors:	(1) absolute dry sensor (USEPA Compliant)
Sleeve Material:	Quartz – 240 nm
Sleeve Cleaning System:	Automatic cleaning mechanism
Air Release Valves:	2
Drain:	NPT Fittings
Pressure Rating:	101 psi (7 bar) / 145 psi (10 bar)
Maximum Hydraulic Flow Rate:	25 MGD (4000 m^3/h)

Electrical Cabinet

Specifications	
Cabinet Configuration:	(2) Power Cabinets & (1) Control Cabinet; floor standing
Dimensions:	Power: 82.7 x 47.2 x 31.5 in (HxWxD);(2100x1200x800mm) Control:74.8 x 23.6 x 15.8 in (HxWxD);(1900x600x 400 mm)
Weight:	Power: 772 lbs (350 kg); Control: 287 lbs (130 kg)
Material & Color:	Painted Steel; RAL7035
Degree of Protection:	NEMA 12 (IP 54) - Indoor
Standard Cable Length (Cabinet to Reactor):	30 ft (10 m)
Ambient Operationg Temperature (min/max):	40/95° F (5/35° C)
Maximum Ambient Humidity:	95% (non-condensing)
Controller:	UVtronic+ incl. HMI and Modbus
Lamp Driver Type:	Electronic (Stepless variable output 35 to 100%)
Required Voltage Supply:	480V, 3L, 60 Hz
Maximum Power Consumption:	154 kW
Size of Customer Breaker:	80 A
Wiring Included:	30 ft (10 m) – Lamp*, temp. Sensor, UV sensor, limit switches) * TBD prior to installation. Please contact AQX
UL Labeling:	UL 508A

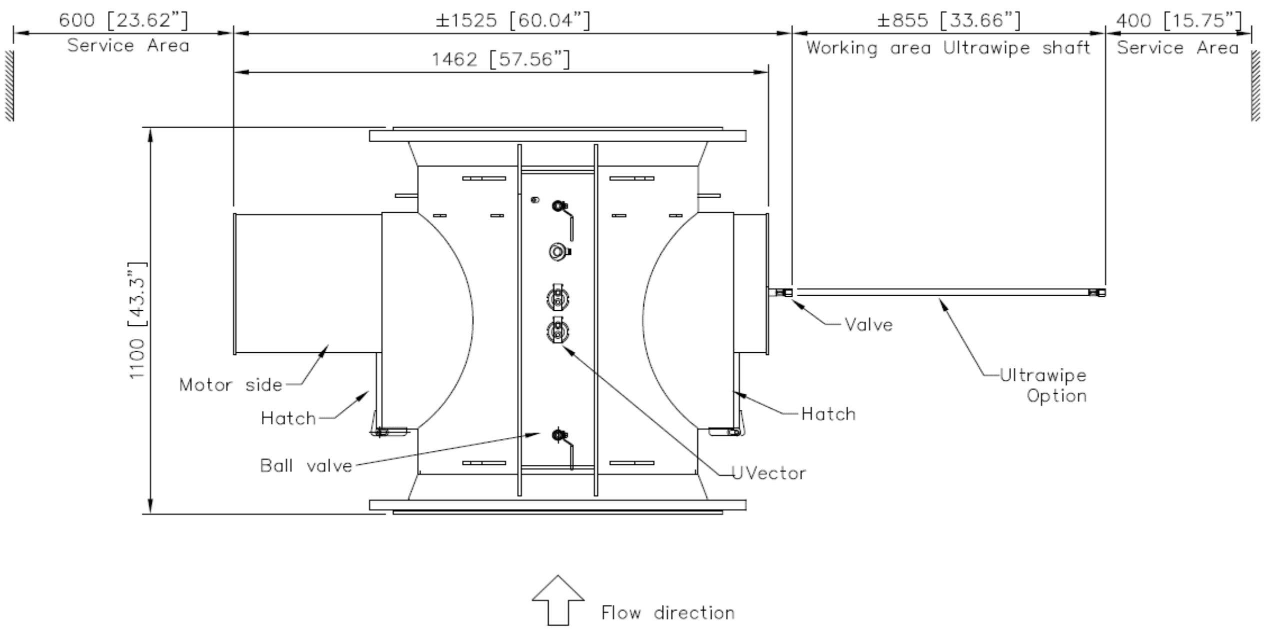
Certifications & Validations

Specifications	
- NWRI 2012 – pending	

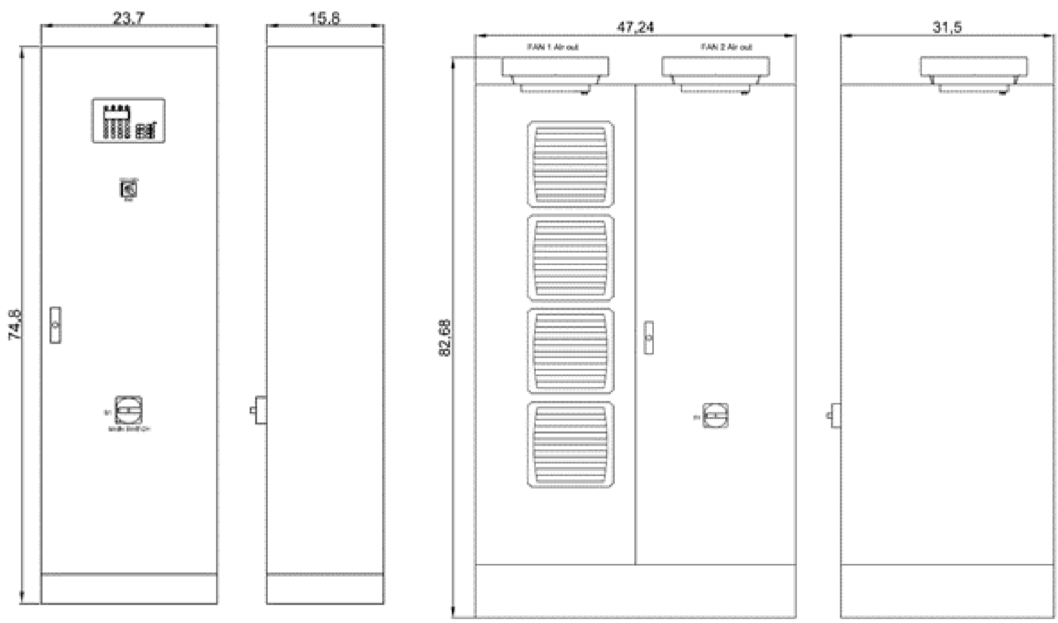
Optional Features

Specifications	
- NEMA 4X Upgrade (w. cabinet air conditioners)	- Stainless Steel Cabinet Upgrade – NEMA 12
- Allen Bradley 800 Series PLC	- Ultrawipe™ (chemical assisted) cleaning system

UV Reactor



Power/Control Cabinet



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To Whom It May Concern:

Aquionics Design Standards related to microorganisms in WWTF effluents

The Halma UV companies, comprised by Aquionics, Hanovia and Berson have worked effectively for many decades across a wide variety of industries and applications to advance their knowledge and capabilities for achieving disinfection using our MP and LPHO lamp technologies.

We generally follow the guidelines of the NWRI and Ten State Standards in regions where each is applicable and sometimes work specifically with local authorities or state agencies if particular requirements are necessary to meet specific target dosages to meet their regulations.

Over a decade ago, we worked closely with VA DEQ to validate and demonstrate the beneficial effect of MP UV with it's broad wavelength signature to provide 3-4 log removal of coliform bacteria at a dose less than one half of that required for LP lamps designed for 254 nM energy focus. (see the attached memoranda of understanding form the state of VA)

In the case of enterococcus faecalis and other variants on the primary coliform in this genus, we have elected to follow the guidance of Dr Bolton and several other noted researchers by utilizing a slightly higher dosage to insure effective kill for these pathogens, since it is similar to e.coli and other bacteria but somewhat resistant based on research over the last couple of decades.

We utilize the validated performance of our reactor designs from NWRI certification and apply a 20 % increase in dose in order to meet the criteria for proper disinfection of enterococcus when it is required in estuaries and marine environments as required by EPA.

Since our reactors were validated with coliform bacteria or other surrogates by third parties, we use CFD modelling and certain conservative design guidelines in our algorthyms to manage the optimal power management for designs such as this one in St. Augustine FL.

		Fluence (UV dose) (mJ/cm^2) for a given log reduction without photoreactivation								
Bacterium	**Lamp Type**	**1**	**2**	**3**	**4**	**5**	**6**	**Proto-col?**	**Notes**	**Reference**
Enterococcus faecalis										
ATCC27285	LP	3.7	8.0	14 + tailing				yes		Moreno-Andrés et al. 2016
DSM 20478	LP	7.1	8.7	13 + tailing				yes		Chen et al. 2015
DSM 20478	MP	5.5	7.6	12 + tailing				yes		Chen et al. 2015

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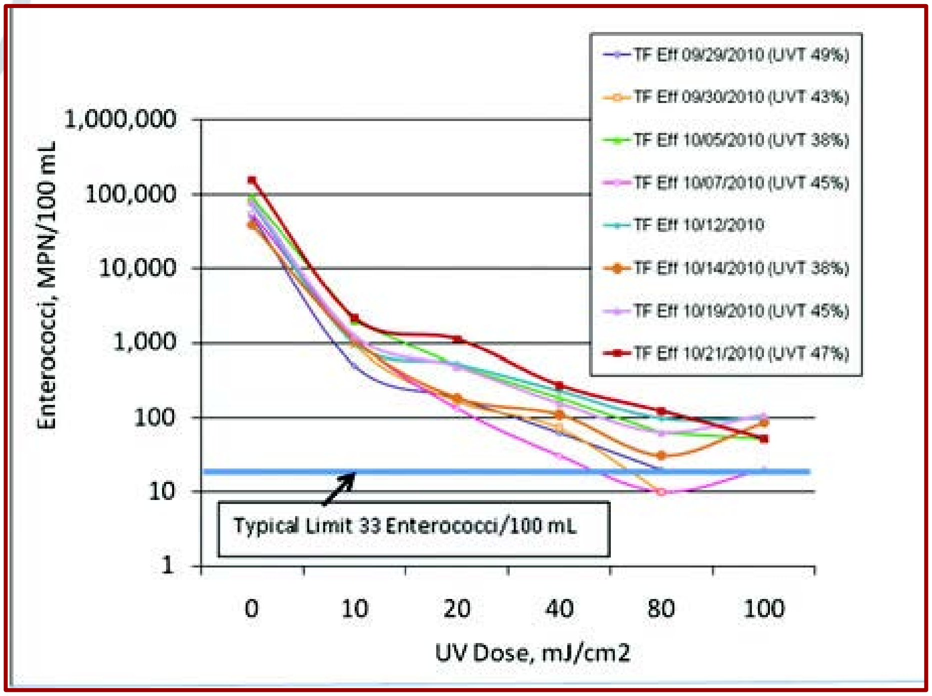
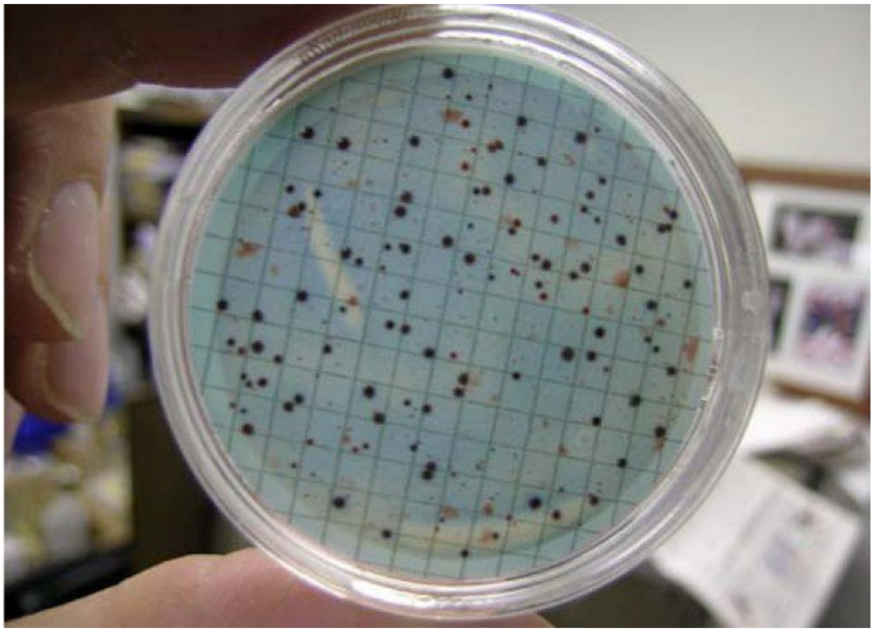


As shown in the above graphics and the attached and referenced papers, we believe that this conservative approach is more than adequate for design purposes and field testing shall confirm the proper design of said reactors upon installation and start up of the systems. We can provide our NWRI 3rd party validation information as the project progresses for these particular reactors once a final design selection has been made and the state of Florida requires said details for regulatory approval.



Enterococcus faecalis enumeration

Further reading and research examples

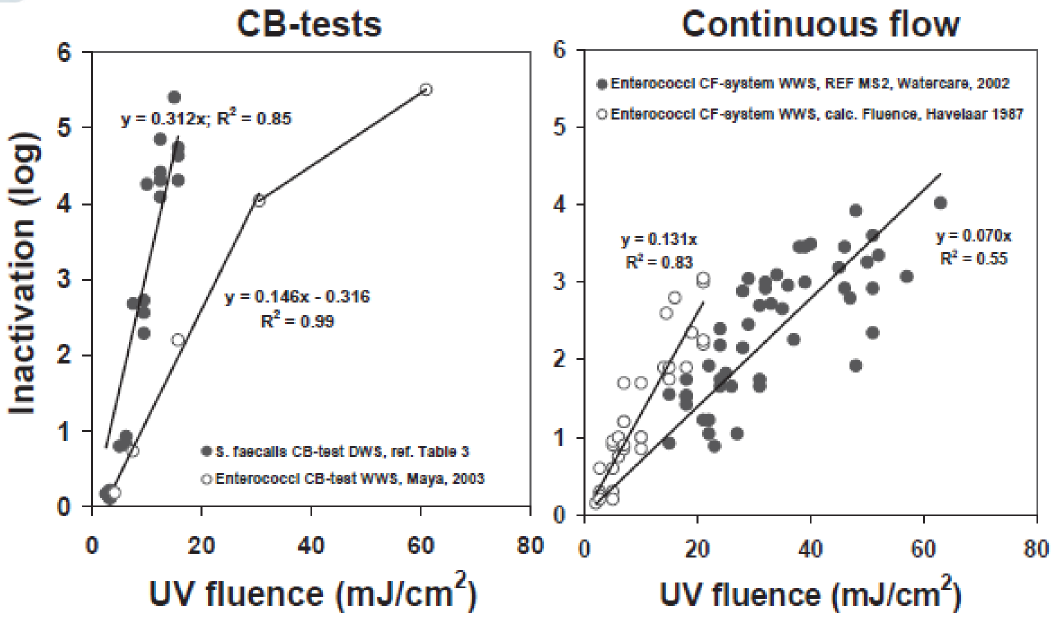


Figure 9 UV fluence-response curves for seeded and environmental enterococci determined under different conditions

Hijnan et al 2006 Water Research

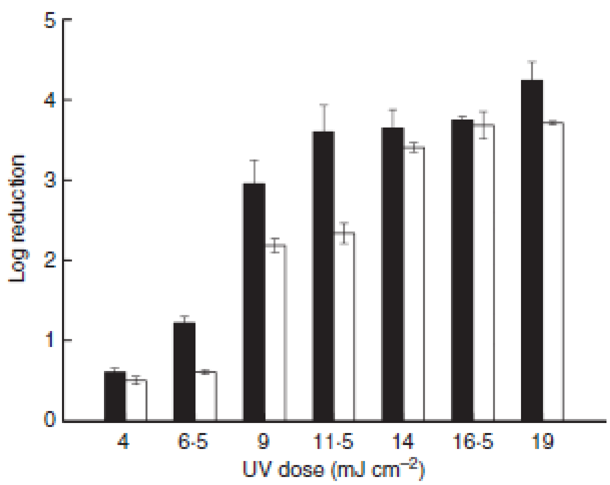


Figure 1 UV inactivation of *Enterococcus faecalis* by medium-pressure (■) and low-pressure (□) UV disinfection in sterile distilled water. Error bars represent standard deviations of three experiments.

Chen, Chu et al 2015 JAMB

aquionics

Virginia Department of Environmental Quality

Office of Wastewater Engineering
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

To: ~~Tom Stanton (tjsa@tjstantonassociates.com)~~
~~TJ Stanton Associates, Inc~~

From: Marcia Degen, Ph.D., P.E. - Technical Program Manager
OWE - Roanoke Phone: 540-562-3500 Email: mjdegen@deq.virginia.gov

Date: April 6, 2006

RE: Aquionics Inline Closed Vessel Ultraviolet Unit with Medium Pressure Lamps

Cc: Brian McGough - Thompson & Litton, OWE Area Engineers

The Aquionics Inline Closed Vessel Ultraviolet Unit with medium pressure lamps is reported by the manufacturer as providing a more efficient dose because the flow across the bulbs is controlled and all of the wastewater receives an adequate dose.

This claim is based on computational fluid dynamics (CFD) and supported by independent bioassay. Like some other medium pressure units, the power to the unit can be varied producing a dose that matches the flow and effluent quality producing a cost savings to the user.

The Aquionics Inline Closed Vessel unit with medium pressure lamps has been piloted at two facilities in Virginia: Emporia and Abingdon. The first pilot was run at the Emporia sewage treatment works. Emporia is a 1.5 MGD oxidation ditch facility (no filtration) with average flows at 1.0 MGD. This unit has been operational since 2001. A review of the monthly DMR data from April 2001 through February 2006 indicates that the geometric mean of the effluent fecal coliform ranged from 7 to 185.

The average influent TSS during the same time period ranged from 3.48 mg/l to 27.2 mg/l. Some difficulties were experienced because the original unit did not have an automatic wiping system and grease in the influent was fouling the lamps. That problem was eliminated with the addition of automatic wipers to the unit.

The dose at Emporia is reported by the Aquionics engineer as 18,000 µW-sec/cm^2.

A second pilot was run at the Abingdon sewage treatment plant in January and February 2002. The pilot was run in preparation for an upgrade from 2.75 MGD to 4.5 MGD. The plant has screening, grit removal, eq, primary clarification, aeration tanks with diffused and mechanical aeration, secondary clarification, and post aeration. The existing chlorination/dechlorination system is to be replaced with the inline UV unit.

The Abingdon pilot was run at a variety of dosages ranging from 15,000 to 46,000 µW-sec/cm^2.

The influent to the UV unit was of poor quality with the influent TSS ranging from 8.9 to 58.3 mg/l. (It should be noted that data collected on 3/6/2002 has been dropped from the data set due to extreme TSS concentration from clarifier cleaning operations.) The effluent fecal count ranged from <2 to 300 col/100 ml with all but one value <200 col/100 ml. The geometric mean was <200 col/100 ml for the pilot period.

The design dose for the full scale installation is 26,000 μW-sec/cm^2. It should be noted that tertiary cloth disk filters will be installed with the expansion.

Aquionics is requesting a formal reduction in design dosage at the end of lamp life from 50,000 μW-sec/cm^2 to 25,000 μW-sec/cm^2 for secondary effluents (30/30) based on the results of these pilots and their work in other states. No additional reduction is proposed for filtered effluent.

The Office of Wastewater Engineering will allow this variance to the Sewage Collection and Treatment Regulations. The variance is based on the following information:

1. This variance is limited to the Aquionics Inline Closed Vessel Medium Pressure lamp unit.
2. The units must be equipped with an automatic cleaning system.
3. The manufacturer must demonstrate in the design calculations that a minimum dose of 25,000 μW-sec/cm^2 at peak design flow can be delivered after one year of operation (ie. at the end of lamp life).
4. This variance applies to a minimum secondary effluent with 30/30 quality and a bacterial limit equivalent to fishable/swimmable standards.
5. No additional reduction is allowed for filtered effluent.
6. Bacterial monitoring (species in compliance with VPDES permit requirements) must be conducted a minimum of 3 days/wk to verify compliance.