City of Indianapolis Stormwater Quality Unit (SQU) Selection Guide

For current Selection Guide, check:
https://www.indy.gov/activity/public-works-specifications-and-manuals

Performance Matrix for manufactured SQUs that are approved for use as post-construction water quality units in the City of Indianapolis and in compliance with the Stormwater Design and Construction Specifications Manual. Only current NJDEP certified units listed below are considered "Approved". If NJDEP Certification lapses for an approved manufactured SQU, it will no longer be considered an approved SQU for the City of Indianapolis regardless of being shown on the list below.

Table 1. Approved Rate Based SQUs

Manufactured SQU	SQU System Model	Max Treatment Flow (cfs)	Max 10-yr On-Line Flow Rate (cfs)	Cleanout Depth (Inches)
AquaShield Aqua-Swirl Xcelerator	XC-2	0.57	1.16	6
	XC-3	1.13	2.3	6
	XC-4	1.86	3.79	6
	XC-5	2.78	5.66	6
	XC-6	3.88	7.9	6
	XC-7	5.17	10.52	6
	XC-8	6.64	13.51	6
	XC-9	8.29	16.87	6
	XC-10	10.13	20.62	6
	XC-11	12.15	24.73	6
	XC-12	14.35	29.2	6
	XC-13	15.53	31.6	6
Bio Clean SciCloneX	SCX-4	1.82	3.68	12
	SCX-6	4.09	8.26	12
	SCX-8	7.27	14.69	12
	SCX-10	11.36	22.95	12
	SCX-12	16.35	33.03	12
Hydro International First Defense Optimum	3-ft	1.02	2.3	9
	4-ft	1.81	4.07	9
	5-ft	2.83	6.37	9
	6-ft	4.07	9.16	9
	7-ft	5.53	12.44	9
	8-ft	7.23	16.27	9
	10-ft	11.33	25.49	9
Contech Cascade Separator	CS-3	1.02	2.27	9
	CS-4	1.8	4.03	9
	CS-5	2.81	6.29	9
	CS-6	4.05	9.07	9
	CS-8	7.2	16.1	9
	CS-10	11.3	25.3	9
	CS-12	16.2	36.3	9

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Manufactured SQU	SQU System Model	Max Treatment Flow (cfs)	Max 10-yr On-Line Flow Rate (cfs)	Cleanout Depth (Inches)
BioClean Debris Separating Baffle Box (DSBB)	2-4	0.7	1.53	6
	2.5-5	1.1	2.4	6
	3-6	1.59	3.47	6
	4-6	2.11	4.6	6
	4-8	2.82	6.15	6
	5-10	4.4	9.6	6
	6-12	6.34	13.83	6
	7-14	8.63	18.83	6
	8-14	9.86	21.51	6
	8-16	11.27	24.59	6
	9-18	14.27	31.13	6
	10-18	15.85	34.58	6
	10-20	17.61	38.42	6
	10-22	19.37	42.26	6
	11-22	21.31	46.49	6
	11-24	23.25	50.73	6
	12-24	25.36	55.33	6
StormTrap SiteSaver	STSS-1	1.08	2.33	6
	STSS-2	2.16	4.67	6
	STSS-3	3.24	7	6
	STSS-4	4.32	9.33	6
	STSS-5	5.4	11.66	6
	STSS-6	6.48	14	6
	STSS-7	7.56	16.33	6
	STSS-8	8.64	18.66	6
	STSS-9	9.72	21	6
	STSS-10	10.8	23.33	6
	STSS-11	11.88	25.66	6
	STSS-12	12.96	27.99	6
	STSS-13	14.04	30.33	6
	STSS-14	15.12	32.66	6
	STSS-15	16.2	34.99	6
	STSS-16	17.28	37.32	6
	STSS-17	18.36	39.66	6
	STSS-18	19.44	41.99	6

Table 2. SQUs Removed from Approved List

NJDEP/NJCAT Certification has expired and no longer meet the City of Indianapolis Requirements

~~Hydro International Downstream Defender~~	~~4 ft~~	~~1.12~~	~~2.95~~	~~9~~
	~~6 ft~~	~~2.52~~	~~6.63~~	~~12~~
	~~8 ft~~	~~4.49~~	~~11.81~~	~~15~~
	~~10 ft~~	~~7~~	~~18.4~~	~~18~~
	~~12 ft~~	~~10.08~~	~~26.51~~	~~21~~
~~Hydro International First Defense High Capacity~~	~~3 ft~~	~~0.85~~	~~1.84~~	~~9~~
	~~4 ft~~	~~1.5~~	~~3.24~~	~~9~~
	~~5 ft~~	~~2.35~~	~~5.08~~	~~9~~
	~~6 ft~~	~~3.38~~	~~7.3~~	~~9~~
	~~7 ft~~	~~4.6~~	~~9.94~~	~~9~~
	~~8 ft~~	~~6~~	~~12.96~~	~~9~~
~~**SciClone**~~	~~SC-3~~	~~0.39~~	~~0.78~~	~~9~~
	~~SC-4~~	~~0.7~~	~~1.4~~	~~9~~
	~~SC-5~~	~~1.09~~	~~2.18~~	~~9~~
	~~SC-6~~	~~1.57~~	~~3.14~~	~~9~~
	~~SC-7~~	~~2.14~~	~~4.28~~	~~9~~
	~~SC-8~~	~~2.8~~	~~5.6~~	~~9~~
	~~SC-9~~	~~3.54~~	~~7.08~~	~~9~~
	~~SC-10~~	~~4.37~~	~~8.74~~	~~9~~
	~~SC-11~~	~~5.29~~	~~10.58~~	~~9~~
	~~SC-12~~	~~6.3~~	~~12.6~~	~~9~~
~~CDS Technologies~~	~~CDS-3~~	~~0.52~~	~~1.04~~	~~9~~
	~~CDS-4~~	~~0.93~~	~~1.86~~	~~9~~
	~~CDS-5~~	~~1.5~~	~~3~~	~~9~~
	~~CDS-6~~	~~2.1~~	~~4.2~~	~~9~~
	~~CDS-7~~	~~2.8~~	~~5.6~~	~~9~~
	~~CDS-8~~	~~3.7~~	~~7.4~~	~~9~~
	~~CDS-10~~	~~5.8~~	~~11.6~~	~~9~~
	~~CDS-12~~	~~8.4~~	~~16.8~~	~~9~~
~~**DVS**~~	~~DVS-36C~~	~~0.56~~	~~1.12~~	~~9~~
	~~DVS-48C~~	~~1~~	~~2~~	~~9~~
	~~DVS-60C~~	~~1.56~~	~~3.12~~	~~9~~
	~~DVS-72C~~	~~2.25~~	~~4.5~~	~~9~~
	~~DVS-84C~~	~~3.06~~	~~6.12~~	~~9~~
	~~DVS-96C~~	~~4~~	~~8~~	~~9~~
	~~DVS-120C~~	~~6.25~~	~~12.5~~	~~9~~
	~~DVS-144C~~	~~9~~	~~18~~	~~9~~

HydroStorm by Hydroworks, LLC	HS-3	0.5	1	6
	HS-4	0.88	1.76	6
	HS-5	1.37	2.74	6
	HS-6	1.98	3.96	6
	HS-7	2.69	5.38	6
	HS-8	3.52	7.04	6
	HS-9	4.45	8.9	6
	HS-10	5.49	10.98	6
	HS-11	6.65	13.3	6
	HS-12	7.91	15.82	6
Oldcastle NSBB HVT	2-4	0.62	2.57	6
	3-6	1.4	5.8	6
	3-8	1.87	7.75	6
	4-8	2.49	10.31	6
	5-10	3.89	16.11	6
	6-12	5.6	23.19	6
	6-13.75	6.42	26.59	6
	7-14	7.62	31.56	6
	7-15	8.17	33.84	6
	8-14	8.71	36.08	6
	8-16	9.96	41.25	6
	9-18	12.6	52.19	6
	10-17	13.22	54.76	6
	10-20	15.56	64.45	6
	12-21	19.6	81.18	6
	12-24	22.4	92.78	6
AquaShield Aqua Swirl Concentrator	AS-2	0.36	0.73	7
	AS-3	0.71	1.44	7
	AS-4	1.18	2.39	7
	AS-5	1.46	2.96	7
	AS-6	2.11	4.28	7
	AS-7	2.87	5.82	7
	AS-8	3.74	7.59	7
	AS-9	4.73	9.59	7
	AS-10	5.84	11.84	7
	AS-11	7.07	14.34	7
	AS-12	8.42	17.08	7
	AS-13	9.87	20.02	7
ADS Barracuda	S3	0.7	1.4	10
	S4	1.25	2.5	10
	S5	1.95	3.9	10
	S6	2.8	5.6	10
	S8	5	10	10
	S10	7.8	15.6	10

Stormwater Quality Unit Configuration Policy

Multiple Inlet Configurations:

Stormwater Quality Units (SQU) may not be installed on-line or off-line with multiple inlets unless the SQU has been tested and approved by NJCAT/NJDEP using the exact multiple inlet configuration proposed. Multiple inlet configurations include more than one pipe providing inflow directly to the SQU or a combination of inflow pipe and an open grate casting on the SQU.

On-line and Off-line Configurations

SQUs are generally tested in the laboratory with the inlet and outlet pipe 180 degrees apart. Inlet – outlet configurations different than those verified and certified by NJCAT/NJDEP may reduce the performance of the SQU in removing or retaining the desired pollutant without testing to verify performance. On-line units must be installed with the inlet-outlet pipe configured as tested and approved by NJCAT/NJDEP. The NJCAT/NJDEP certification establishes the minimum performance during events where the stormwater flows exceed the manufacturer's treatment flow rate (MTFR). Engineers must verify their proposed on-line design is consistent with the NJCAT/NJDEP certified on-line configuration. Off-line SQUs (where the water quality flow is diverted to the SQU by a weir or other means) may not vary from the NJCAT/NJDEP tested configuration.

PLEASE NOTE: *On-line units must document the peak 10-year flow (per the Stormwater Design and Construction Specification Manual) is less than the approved maximum10-yr flow rate.*

Appendix I

Design Treatment Flow Rate Determination for Stormwater Quality Flow Rate Determination – Table 1 SQUs

The design flow rate for manufactured stormwater quality units (SQUs) shall be determined using the SCS runoff methodology as outlined below.

1. Delineate the watershed basin(s) to be served by the proposed SQU(s). Tabulate the total impervious and pervious areas. Please note impervious and pervious area runoff rates MUST be calculated as separate basins. The sizing calculation assumes the impervious area is connected directly to the SQU and the Tc calculation must be adjusted for this assumption (i.e. no flow over grass) for the impervious basin. This can be accomplished by creating two basins, one with an area equivalent to the total impervious area and the other with an area equivalent to the total pervious area of the delineated watershed to be served by the SQU.

2. Determine the time-of-concentration (Tc) using the TR-55 methodology (Worksheet 3, Chapter 200 Appendix of the City of Indianapolis Stormwater Specifications Manual) for each basin. A minimum 5-minute Tc may be assumed for the impervious basin.

3. Calculate the curve numbers (CN) for each basin, using CN=98 for the impervious basin.

4. Determine the peak discharge from the 0.3-inch storm using the appropriate Huff, 50% rainfall distribution (Storm duration 0 up to and including 6 hrs – 1st Quartile, 6.1 to 12 hrs – 2nd Quartile, 12.1 to 24 hrs – 3rd Quartile. See Table below for Huff ordinates.). A single hydrograph for each basin should be determined and all basin hydrographs added to determine the peak flow. Storm durations of 15-, 30- and 45 minutes as well as 1-, 2-, 3- 6- 12- and 24- hours should be checked to determine the peak SQU flow.

Table IA. Huff Ordinates

% Storm Time	Indianapolis Huff Quartile			
	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
0	0	0	0	0
10	20	6.5	5.26	6.67
20	40.8	18.13	11.55	14.25
30	54.95	35.85	17.06	20
40	62.5	52.94	24.24	26.09
50	68.75	67.86	37.78	33.33
60	76.67	76.52	58.33	40
70	83.05	83.81	78.03	50
80	89.7	90.67	88.68	68.57
90	95	95.89	95.29	88.37
100	100	100	100	100

Appendix II

O&M Manual Checklist

In addition to the requirements listed in Section 102.06 of the Stormwater Specifications Manual, the following notes / maintenance items should be included in the Operations and Maintenance Manual (O & M Manual):

____ 1 Graphical and written description of sediment measuring procedure. This should include the use of a dipstick tube equipped with a ball valve (e.g. Sludge Judge®).

____ 2 Oil and other floatable materials removal procedure during routine cleanout.

____ 3 The O & M Manual should specify if entry into the SQU should be considered an OSHA confined space and guidelines followed.

____ 4 Detail drawing of proposed SQU, including floating debris capture device where applicable, should be included.

____ 5 Note in the manual to clean unit immediately if there is a hydrocarbon spill (e.g. gasoline or oil).

____ 6 The use of adsorbents should be addressed as appropriate.

____ 7 A note should be provided indicating disposal of all sediment must be in accordance with all federal, state and local requirements and should NOT be dumped into the storm sewer or a sanitary sewer.

____ 8 Other specific requirements per the manufacturer's recommendations.

Plan Checklist

The following items should be specified on all plans referencing a SQU submitted for approval by the City of Indianapolis:

____ 1 The minimum cover requirement as specified by the Stormwater Specifications Manual should be shown on the details for all connecting pipes.

____ 2 A minimum 6" stone base should be shown on the detail.

____ 3 The backfill should be specified as required by the manufacturer.

____ 4 Detail drawing of each SQU model, including floating debris capture device as applicable, per the manufacturer should be included on plans.

____ 5 Detail of connecting structures and diversion for off-line configurations should be included.

____ 6 A minimum 24" access opening must be shown.

____ 7 All construction plans shall show the SQUs installed with one inlet and one outlet pipe approximately 180 degrees apart unless the design report includes documentation the unit was tested by NJCAT and certified by NJDEP for the proposed layout. The inclusion of surface inlets must also include the testing and certification documentation.

Technical Information Report/Drainage Report Checklist

The following requirements should be addressed in Technical Information Report/Drainage design reports:

____ 1 The design storm must not create a hydraulic tailwater condition on the SQU. A first flush hydraulic gradeline evaluation should be included in the report.

____ 2 The design storm should be the peak runoff for a 0.3-inch rainfall depth using the appropriate Huff, 50% rainfall distribution. The contributing watershed should be modeled with the pervious and impervious areas inputted as separate areas (i.e. not combined using a single curve number.)

____ 3 The 10-yr pipe capacity up- and downstream of all water quality structures should be documented with calculations to demonstrate the water surface for the 10-yr storm is below the crown of the pipe as required by the Stormwater Specifications Manual.

____ 4 Diversion structure design should be documented with calculations as appropriate.

____ 5 Buoyancy shall be addressed in the report.

____ 6 Traffic loading requirements should be addressed in the report.