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March 21, 2025

Ms. Meredith Badalucca, CZEO
Assistant Planner
Town of Montville
310 Norwich-New London Turnpike
Uncasville, CT 06382

**Re: 25SITE1 – John Dempsey – Homes R Us
2 & 8 Enterprise Lane, Oakdale, CT
Site Development Plan Modifications Review**

Dear Ms. Badalucca,

Per your request Boundaries LLC has completed a review of the revised site plans for the proposed commercial building and associated access driveways and loading dock located at 2 & 8 Enterprise Lane (Map 2, Lot 5-B and Map 2, Lot 5-C) prepared by Green Site Design, LLC. The following documents were received on March 21, 2025 as part of the application package:

- PVC Direct Revised Site Plan, 2 & 8 Enterprise Lane, Oakdale, CT, Map/Block/Lot: 002-005-00B & 002-005-00C, revised March 21, 2025.

The review comments provided on March 7, 2025 have been responded to by the applicant's engineer except for the following item:

- The oil-grit separator is shown in an off-line configuration as requested, however, based on the flow rates reported in the project stormwater management reports and the proposed pipe diameters and invert elevations, flows up to the 10-year storm event will flow through the oil-water separator. Procedures from the 2004 Water Quality Manual for configuring the diversion structure are attached. The pipe sizes or invert elevations should be adjusted to ensure that flows in excess of the water quality flow are bypassed around the treatment structure.

Please do not hesitate to contact me with any questions.

Sincerely,

David C. McKay, P.E.

Attachment: Water Quality Flow and Flow Diversion Guidance from the 2004 Stormwater Quality Manual

B

Appendix B
Water Quality Flow (WQF)
and Flow Diversion Guidance

Water Quality Flow Calculation

The water quality flow (WQF) is the peak flow rate associated with the water quality design storm. This section describes the recommended procedure for calculating the water quality flow (WQF) for the design of:

❍ *Grass drainage channels (not water quality swales, which should be designed based on water quality volume - WQV)*

❍ *Pre-manufactured stormwater treatment devices (e.g., hydrodynamic separators, catch basin inserts, and media filters)*

❍ *Flow diversion structures for off-line stormwater treatment practices*

The WQF should be calculated using the WQV described in Chapter Seven. This WQV, converted to watershed inches, should be substituted for the runoff depth (*Q*) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 Graphical Peak Discharge Method. The procedure is based on the approach described in Claytor and Schueler, 1996.

1. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using **Figure 2-1** from TR-55 (USDA, 1986) (reproduced below):

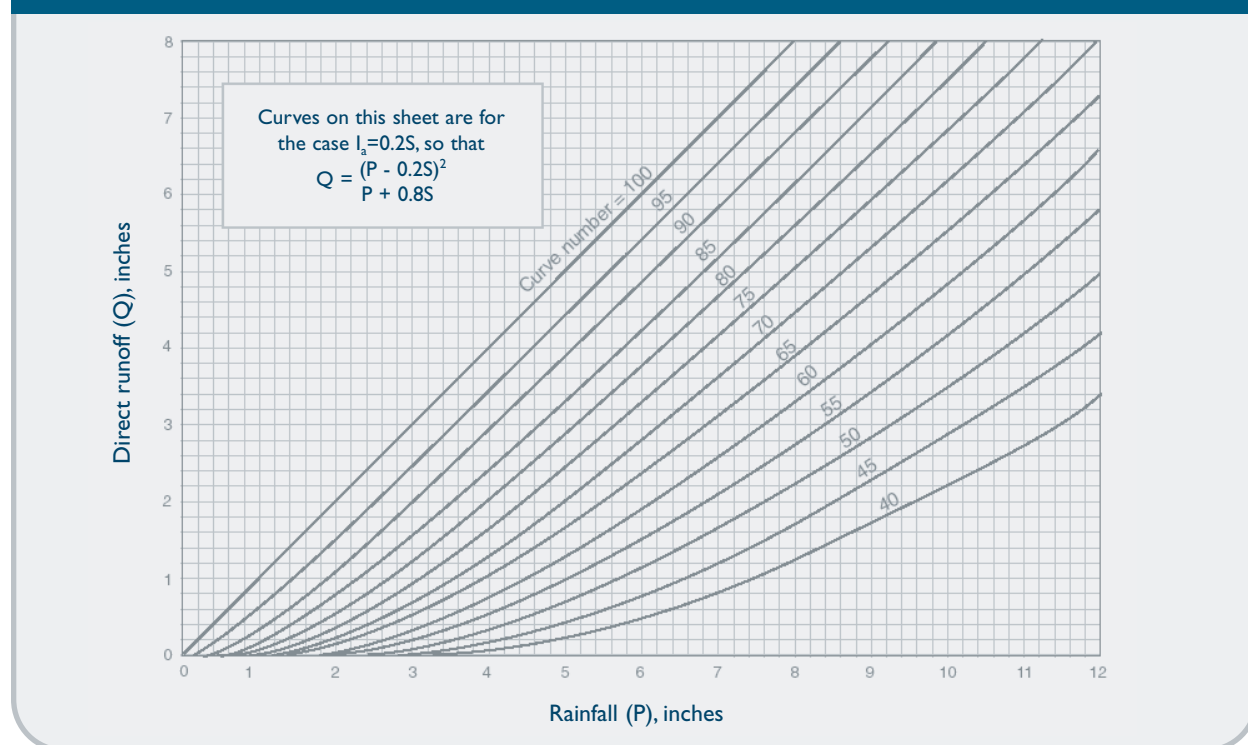$$CN = \frac{1000}{[10 + 5P + 10Q - 10(Q^2 + 1.25QP)^{1/2}]}$$

where: CN = Runoff Curve Number
P = design precipitation, inches
(1" for water quality storm)
Q = runoff depth (in watershed inches)

$$= \frac{[WQV(acre-feet] \times [12(inches/foot)]}{Drainage\ Area\ (acres)}$$

Figure 2-1 Solution of Runoff Equation

2. Compute the time of concentration (t_c) based on the methods described in Chapter 3 of TR-55. A minimum value of 0.167 hours (10 minutes) should be used. For sheet flow, the flow path should not be longer than 300 feet.

3. Using the computed CN, t_c, and drainage area (A) in acres, compute the peak discharge for the water quality storm (i.e., the water quality flow [WQF]), based on the procedures described in Chapter 4 of TR-55.
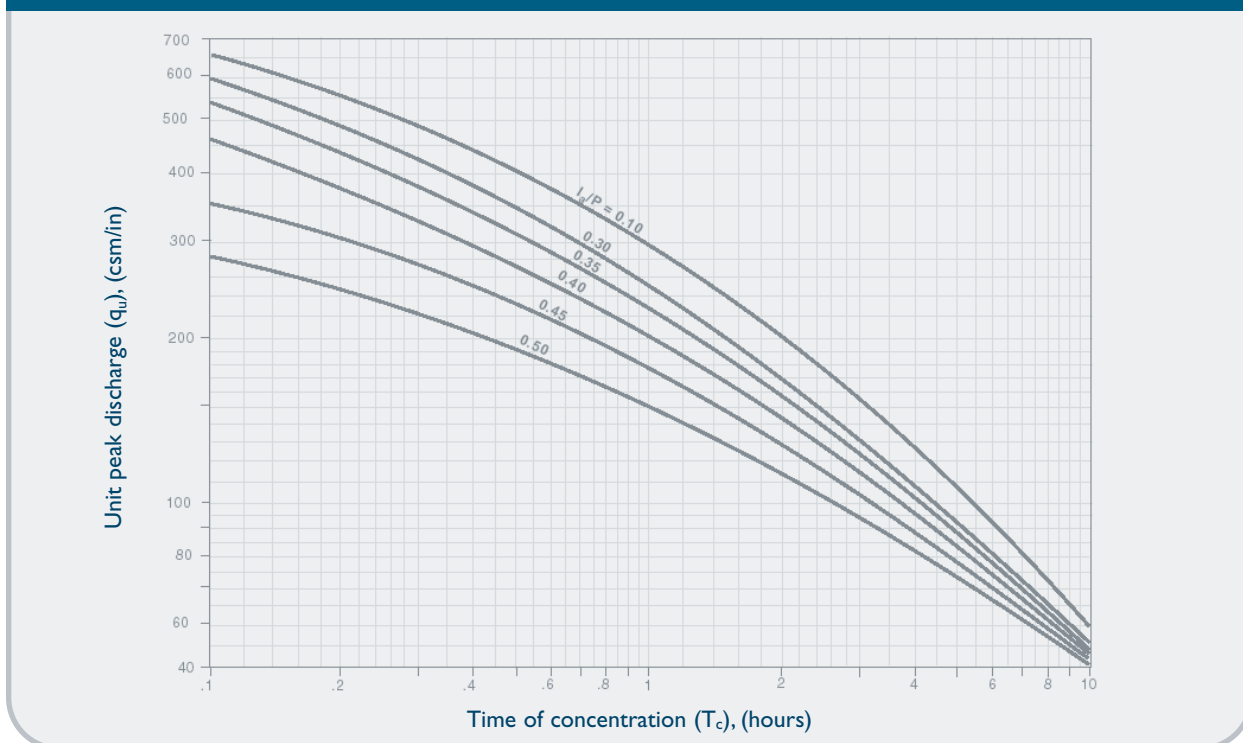
   ❍ *Read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55 (reproduced below); compute I_a/P*

Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	55	1.636	70	0.857	85	0.353
41	2.878	56	1.571	71	0.817	86	0.326
42	2.762	57	1.509	72	0.778	87	0.299
43	2.651	58	1.448	73	0.740	88	0.273
44	2.545	59	1.390	74	0.703	89	0.247
45	2.444	60	1.333	75	0.667	90	0.222
46	2.348	61	1.279	76	0.632	91	0.198
47	2.255	62	1.226	77	0.597	92	0.174
48	2.167	63	1.175	78	0.564	93	0.151
49	2.082	64	1.125	79	0.532	94	0.128
50	2.000	65	1.077	80	0.500	95	0.105
51	1.922	66	1.030	81	0.469	96	0.083
52	1.846	67	0.985	82	0.439	97	0.062
53	1.774	68	0.941	83	0.410	98	0.041
54	1.704	69	0.899	84	0.381		

   ❍ *Read the unit peak discharge (q_u) from Exhibit 4-III in Chapter 4 of TR-55 (reproduced below) for appropriate t_c*

Exhibit 4-III   Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution

Unit peak discharge (q_u), (csm/in) vs. Time of concentration (T_c), (hours); curves labeled $I_a/P = 0.10$, 0.30, 0.35, 0.40, 0.45, 0.50

○ *Substituting the water quality volume (WQV), converted to watershed inches, for runoff depth (Q), compute the water quality flow (WQF) from the following equation:*

$$WQF = (q_u)(A)(Q)$$

where: WQV = water quality flow (cfs)
q_u = unit peak discharge (cfs/mi2/inch)
A = drainage area (mi2)
Q = runoff depth (in watershed inches)
$= \dfrac{[WQV(acre-feet] \times [12(inches/foot)]}{Drainage\ Area\ (acres)}$

Other peak flow calculation methods may be used for determining the WQF, such as those recommended by manufacturers of proprietary treatment systems, provided that the WQF calculated by other methods is equal to or greater than the WQF calculated using the above NRCS Graphical Peak Discharge Method.
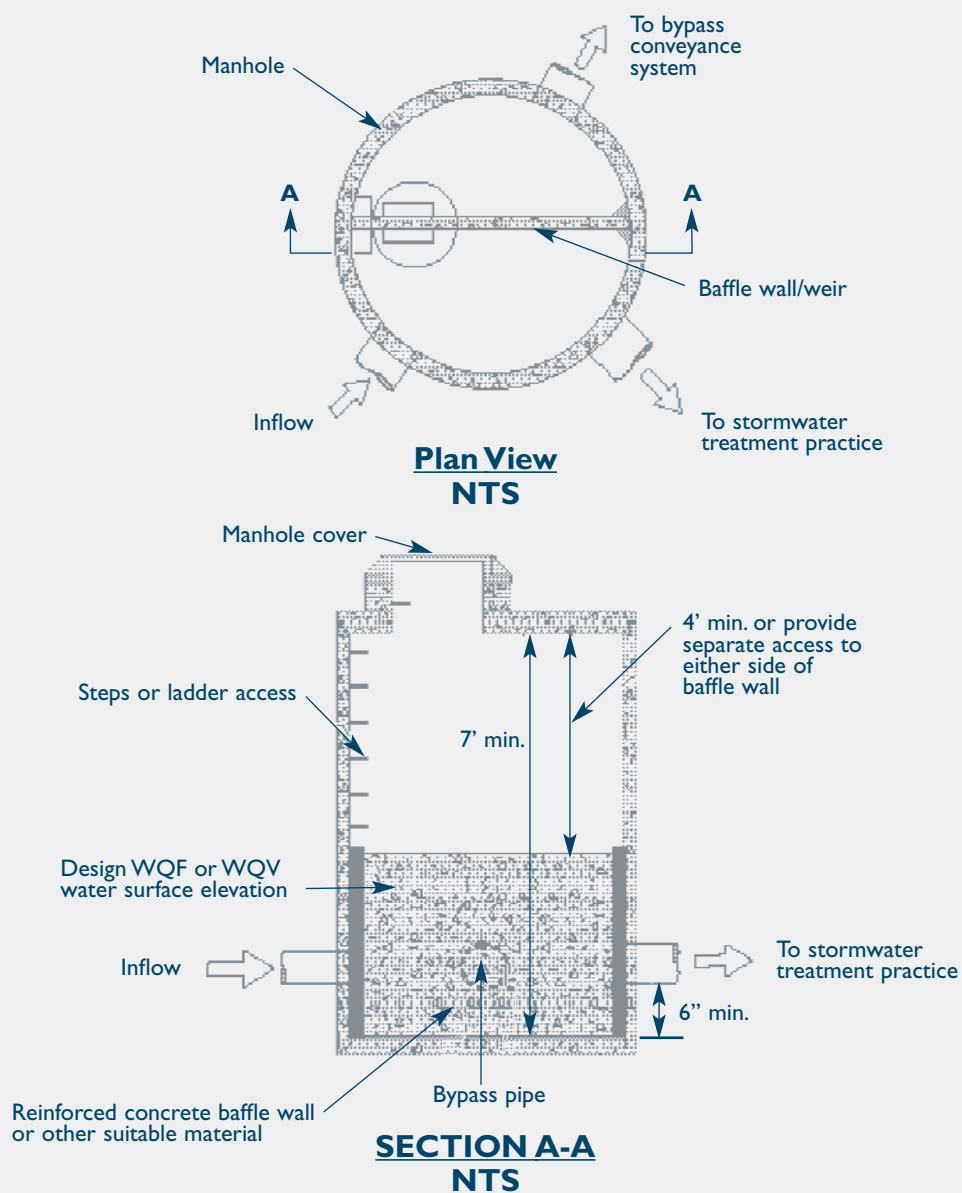
Flow Diversion Structures

Flow diversion structures, also called flow splitters, are designed to deliver flows up to the design water quality flow (WQF) or water quality volume (WQV) to off-line stormwater treatment practices. Flows in excess of the WQF or WQV are diverted around the treatment facility with minimal increase in head at the flow diversion structure to avoid surcharging the treatment facility under higher flow conditions. Flow diversion structures are typically manholes or vaults equipped with weirs, orifices, or pipes to bypass excess runoff. A number of design options exist. **Figures B-1** through **B-3** show common examples of flow diversion structures for use upstream of stormwater treatment practices. Other equivalent designs that achieve the result of diverting flows in excess of the WQF or WQV around the treatment facility, including bypasses or overflows located inside the facility, are also acceptable.

The following general procedures are recommended for design of flow diversion structures:

○ *Locate the top of the weir or overflow structure at the maximum water surface elevation associated with the WQF, or the water surface elevation in the treatment practice when the entire WQV is being held, whichever is higher.*

○ *Determine the diversion structure dimensions required to divert flows in excess of the WQF using standard equations for a rectangular sharp-crested weir, uniform flow in pipes or channels, or orifice depending on the type of diversion structure.*

○ *Provide sufficient freeboard in the stormwater treatment practice and flow splitter to accommodate flow over the diversion structure.*

○ *Limit the maximum head over the flow diversion structure to avoid surcharging the stormwater treatment practice under high flow conditions. Flow to the stormwater treatment practice at the 100-year water surface elevation should not increase the WQF by more than 10 percent.*

○ *Design diversion structures to withstand the effects of freezing, frost in foundations, erosion, and flotation due to high water conditions. These structures should be designed to minimize clogging potential and to allow for ease of inspection and maintenance.*
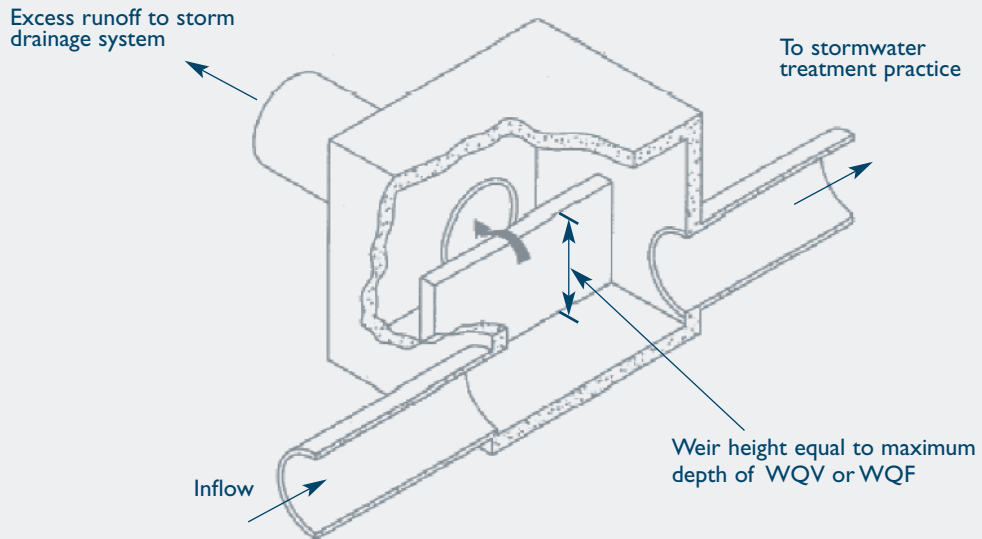
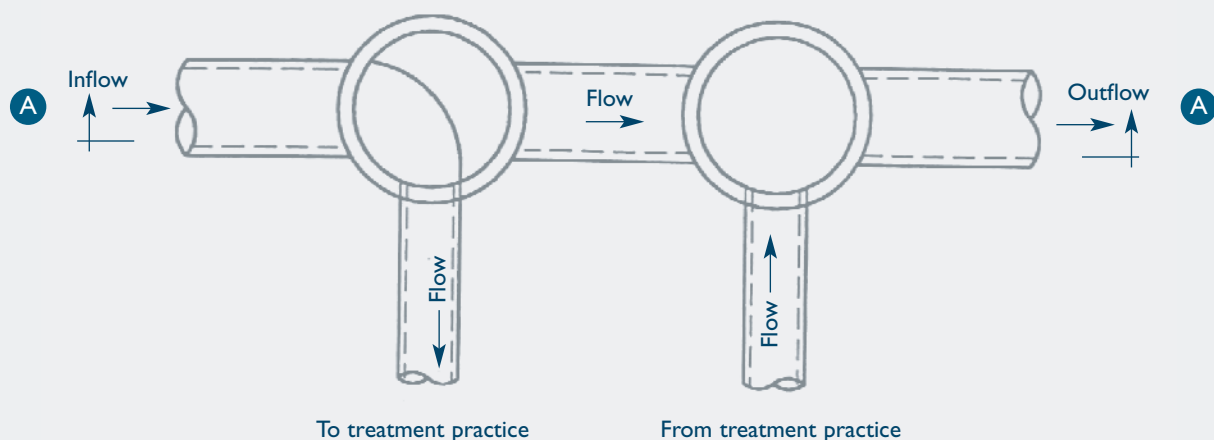## Figure B-1 Flow Diversion Structure Design Option 1

Manhole

To bypass conveyance system

A   A

Baffle wall/weir

Inflow

To stormwater treatment practice

**Plan View
NTS**

Manhole cover

4' min. or provide separate access to either side of baffle wall

Steps or ladder access

7' min.

Design WQF or WQV water surface elevation

Inflow

To stormwater treatment practice

6" min.

Reinforced concrete baffle wall or other suitable material

Bypass pipe

**SECTION A-A
NTS**

Source: Adapted from Washington, 2000.

Figure B-2 Flow Diversion Structure Design Option 2

Excess runoff to storm
drainage system

To stormwater
treatment practice

Weir height equal to maximum
depth of WQV or WQF

Inflow

Source: Adapted from City of Sacramento, 2000.

Figure B-3 Flow Diversion Structure Design Option 3

Inflow

A

Flow

Outflow

A

Flow

To treatment practice

Flow

From treatment practice

Plan

Manhole

Manhole

Inflow

Outflow

Set invert at WQF or WQV
water surface elevation
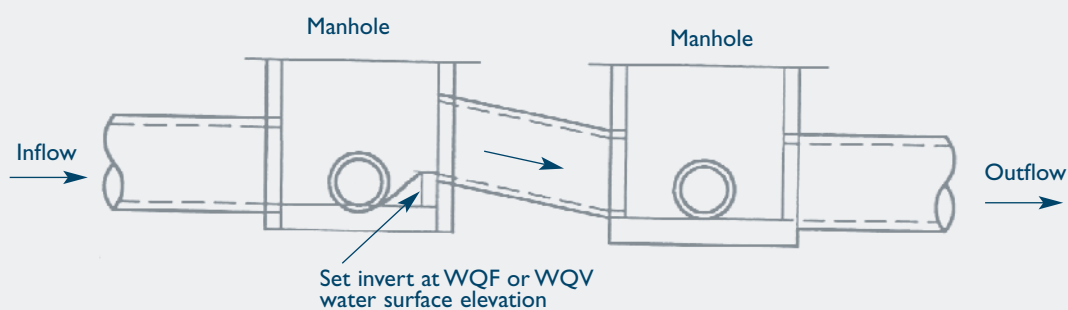
Section A–A

References

U.S. Department of Agriculture, Natural Resources Conservation Service (formerly Soil Conservation Service), *Urban Hydrology for Small Watersheds, Technical Release No. 55*, Washington, D.C., June 1986.

Claytor, R.A. and T.R. Schueler, Design of Stormwater Filtering Systems, The Center for Watershed Protection, Silver Spring, Maryland, December 1996.