

STORMWATER MANAGEMENT REPORT

570 Meriden Waterbury Turnpike
Southington, Connecticut

Prepared For
AA Denorfia Building & Development
HEC Project #2235

July 15, 2022
Revised: October 18, 2022

By

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Barton N. Bovee, P.E. #13653
NOT VALID UNLESS EMBOSSED
SEAL IS AFFIXED HERETO.

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Report Revisions October 18, 2022

- Reduce the height of the berm on Pond P4B and update stage storage volumes
- Modify outlet control structure on P4B to best reduce flows to Town collection system while still maintaining 100-year storm volume within the pond, having no flows through the emergency spillway
 - Change weir sizes
 - Change/add orifices
 - Change to Type II CB & top
- Redesigned the emergency spillway to keep in natural soil and minimize impact to neighboring property
- Include all flows from Hillcrest development in existing condition calculations to provide most accurate reductions in peak flow rates

I. INTRODUCTION

1.1 Objective

The intent of this report is to summarize the engineering drainage analysis and technical findings for 570 Meriden Waterbury Turnpike. The development team desires to present to the Town of Southington all of the pertinent site factors which have influenced the plan; thereby making a joint effort to solidify a design proposal that ensures a balance of quality, technical adequacy, and conservation. This document will demonstrate that the proposed Stormwater Management plan will comply with the Town of Southington drainage criteria, and that there will be no significant impact on downstream properties.

To achieve these objectives Harry E. Cole & Son (HEC) conducted an evaluation of regulatory criteria, existing site conditions, and the proposed development plan. Specific to this mission were the assessment of Stormwater Management opportunities, constraints, and the various competing site factors, which are important to the design and layout of the project. Elements that were most critical in developing a stormwater plan, included the following:

- A.) An inventory and inspection of the site soils and surficial geology, wetland/watercourses, surface drainage and runoff patterns, general forms of vegetation, wildlife, and habitat values, topography-shapes, slopes and orientation, physical constraints, surroundings.
- B.) Site background and history.
- C.) Zoning and land use regulations.
- D.) Infrastructure capacity and demands.
- E.) Off-site impacts, engineering and construction practices.
- F.) Previous Drainage Calculations.

II. EXISTING CONDITIONS

2.1 Site Location

The 8.7± acre subject site is located at 570 Meriden Waterbury Turnpike in Southington Connecticut.

2.2 Site Description

The current 8.71± acre project is comprised of one existing parcel currently zoned ARCHZ. Town Water and Sewage mains are located in Meriden Waterbury Turnpike at the north of the property. Drainage for the property is divided into four basins. Basin E1 is comprised of 0.15 acres and slopes at grades of 1-20% to the north towards Meriden Waterbury Turnpike. Basin E2 and E3, 2.69 and 3.36 acres respectively, drain westerly across existing property to the residential lots on Blatchley Ave. Lastly basin E4 is comprised of 4.93 acres with which drain westerly to a riprap channel which flows through two lots on Blatchley Avenue and connects to the town storm sewers. Soils on the site have a predominate hydrologic rating of C. These soils composed of Wethersfield Loam have slow infiltration rates.

III. POST-DEVELOPMENT CONDITIONS

3.1 Proposed Facilities

The proposed plan will construct 23 single family age restricted housing units. A private drive with turn-around will be installed to provide access to the 23 units off of Meriden Waterbury Turnpike. Water and sewer mains will be extended into the property to accommodate service connections. Three small and one large detention basin are proposed to collect flows onsite and release regulated flows to the surrounding areas, matching existing watersheds. The large basin is proposed to connect to the existing drainage system in Blatchley Ave with some modifications to the existing infrastructure. Additionally, the detention basins have been sized to provide adequate water quality volume within their bottoms.

3.2 Detention

Detention for the site will be provided in the form of a series of detention basin. Slopes for this basin are a maximum of 3:1 on the sides with a 0.5% minimum bottom slope. This basin will receive runoff from the unit roofs, driveways, surplus parking, private road and immediate surrounding area. Flows from the detention basins are regulated and released with peaks meeting ZIRO. A summary of the site flows is located in Appendix B. The summary table depicts an overall decrease in runoff to all watershed areas.

3.3 Collection System

This project utilizes low impact development strategies and BMPs and eliminated catch basins and pipe within the roadways and shoulders. Instead, the water sheet flows through yards and to swales which direct it to the basins. There are some areas where structures and pipe are utilized. These areas include the point discharge of the pond uphill of the development in Hillcrest. A 24" pipe and DG Endwall are used in conjunction with a swale/depression to collect all flows out of this basins outlet and transfer them through the project to the proposed detention basin. This pipe system and swale design ensure that the large velocity and volume flows from the basin will not negatively impact the proposed site. The other location pipe and structures are utilized is the Outlet control structure for the main large basin on site. The outlet control structure will connect to a 24" pipe which conveys flows to the existing drainage system downstream. The existing swale and flared end offsite are proposed to be removed and a manhole is proposed to connect the two systems. After modeling the flows and reducing the peak flows to this system through the large basin the existing system will adequately convey the stormwater without impact to the downstream neighbors. The large pond delays the flows to the existing collection system in Blatchley Ave. allowing flows to pass through the existing system before flows from this site enter it. These offset peaks better allow the existing drainage system to handle the flow of water from both areas. The collection system has been adequately sized to accommodate all design storms, and sizing for the system can be found in Appendix D.

IV. FINDINGS & CONCLUSION

Overall, a reduction in peak flows will be achieved with the designed drainage system, and the conveyance systems will convey runoff for all design storms without surcharging out of the top of the structures. In summary, we believe the proposed stormwater management plan has satisfied the Town of Southington's drainage criteria and significant impacts to downstream properties should not occur. The design and strategies used provide an improvement to the current situation and improve the functionality of the Town's drainage system downstream.

V. TECHNICAL CRITERIA & METHODOLOGY

5.1 Technical Criteria

<u>Design Element</u>	<u>Design Frequency</u>
-Storm Drainage from Pond	100 Year
-Detention Basin Sizing	2, 5, 10, 25, 50, & 100 Year
-Water Quality Basin	2004 CT Stormwater Manual

5.2 Methodology

	<u>Design Storm</u>
-Detention Volume	24-Hour Type III from NOAA Atlas Precipitation Frequency Data Serve
-Peak infrastructure flow	Rational Method with NOAA Atlas Precipitation Frequency Data Serve IDF tables.

Time of Concentration: Interpreted from topography with the aid of computer software. Based on calculations from the State of Connecticut, Department of Transportation equations for Sheet-Flow (6.C.2), Shallow Concentrated Flow (6.C.4) and Open Channel Flow (6.C.6).

Areas: Estimates from computer software (Land Desktop) and results of surveying.

REFERENCES

- 1) Rules and Regulations Controlling Subdivision of Land, Town of Southington, Connecticut
- 2) Town of Southington Zoning Regulations
- 3) 2004 Connecticut Stormwater Quality Manual, Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, Connecticut
- 4) 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, Connecticut Council on Soil and Water Conservation, 79 Elm Street, Hartford, Connecticut.
- 5) 2000 Drainage Manual, Connecticut Department of Transportation,

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- #2 Pre-Development Watershed Area
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- #4 Soil Map (4 Sheets)
- #5 Flood Insurance Rate Map
- #6 Natural Diversity Database (NDDB) Map

B

PRE AND POST DEVELOPMENT ANALYSIS

C

DETENTION DESIGN DETAILS

D

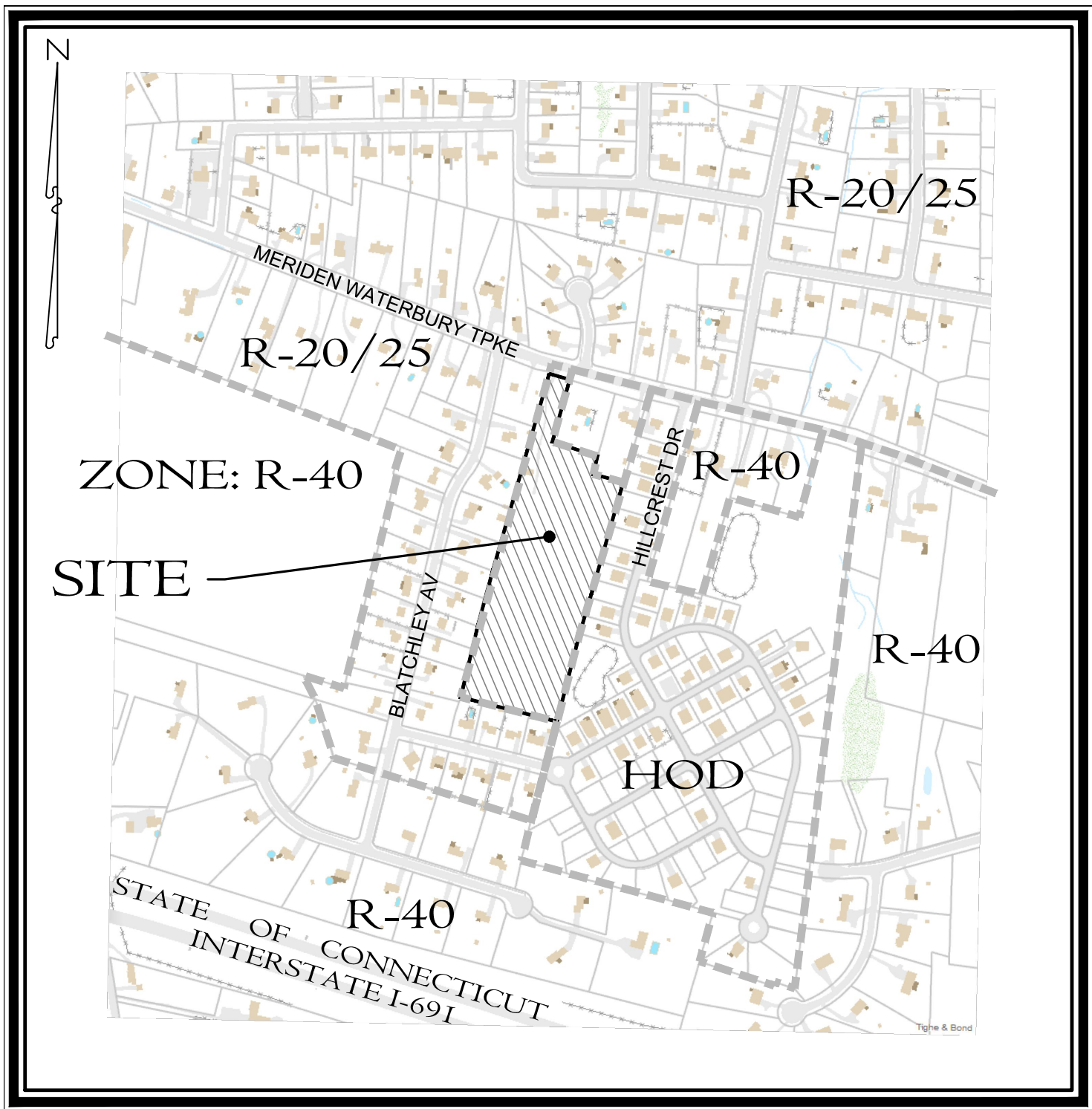
COLLECTION SYSTEM

E

STORMWATER MANAGEMENT MAINTENANCE SCHEDULE

APPENDIX 'A'

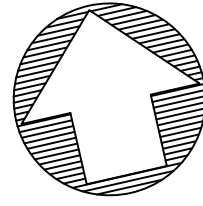
FIGURES



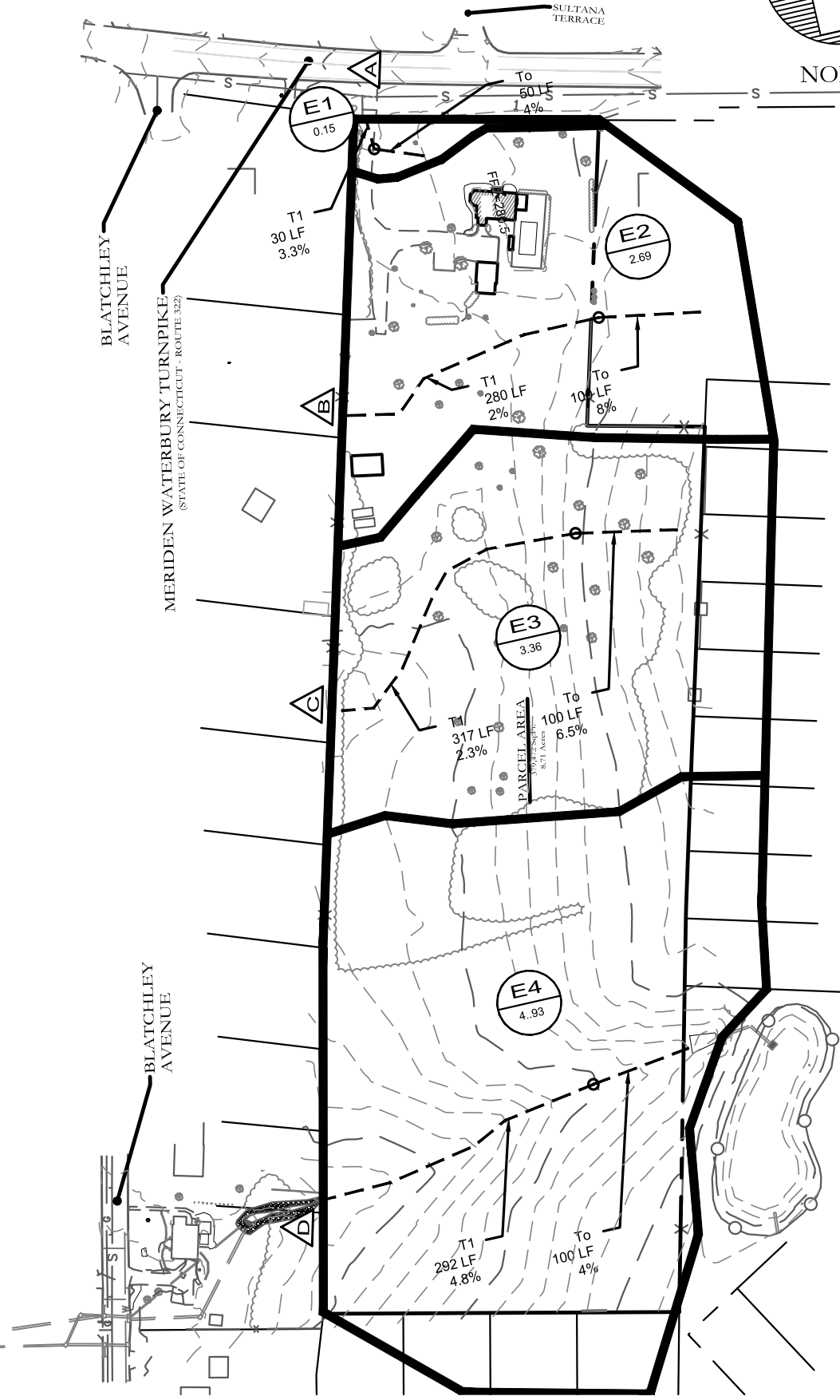
KEY MAP

SCALE: 1"=500'

EXISTING WATERSHED AREA



NORTH



02

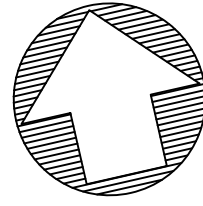
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Date: May 9, 2022
Project #: 2235

570 Meriden Waterbury Turnpike
 PRE DEVELOPMENT
 WATERSHED AREA MAP
 Southington, Connecticut

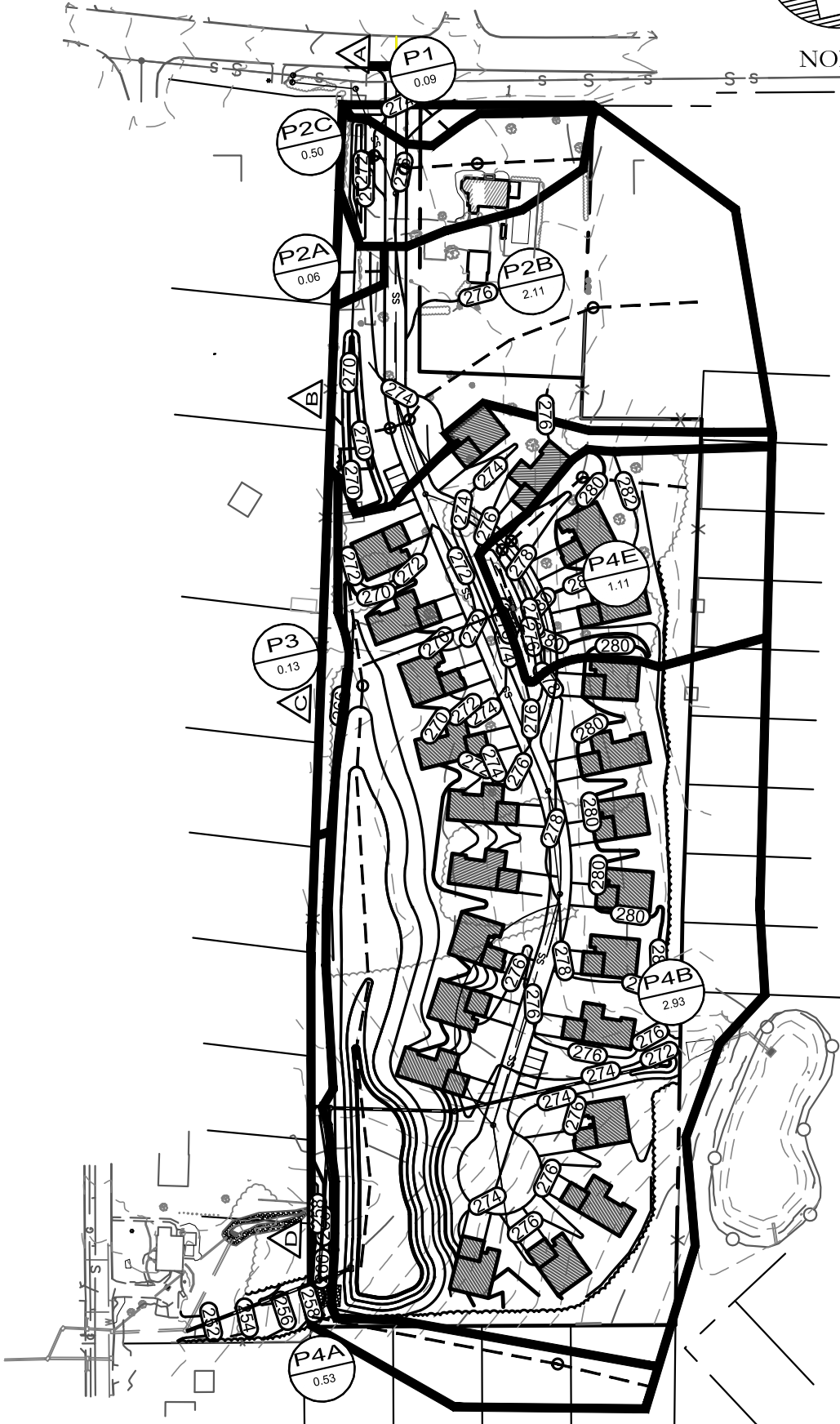
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cole
 engineering. surveying. planning.

PROPOSED WATERSHED AREA



NORTH



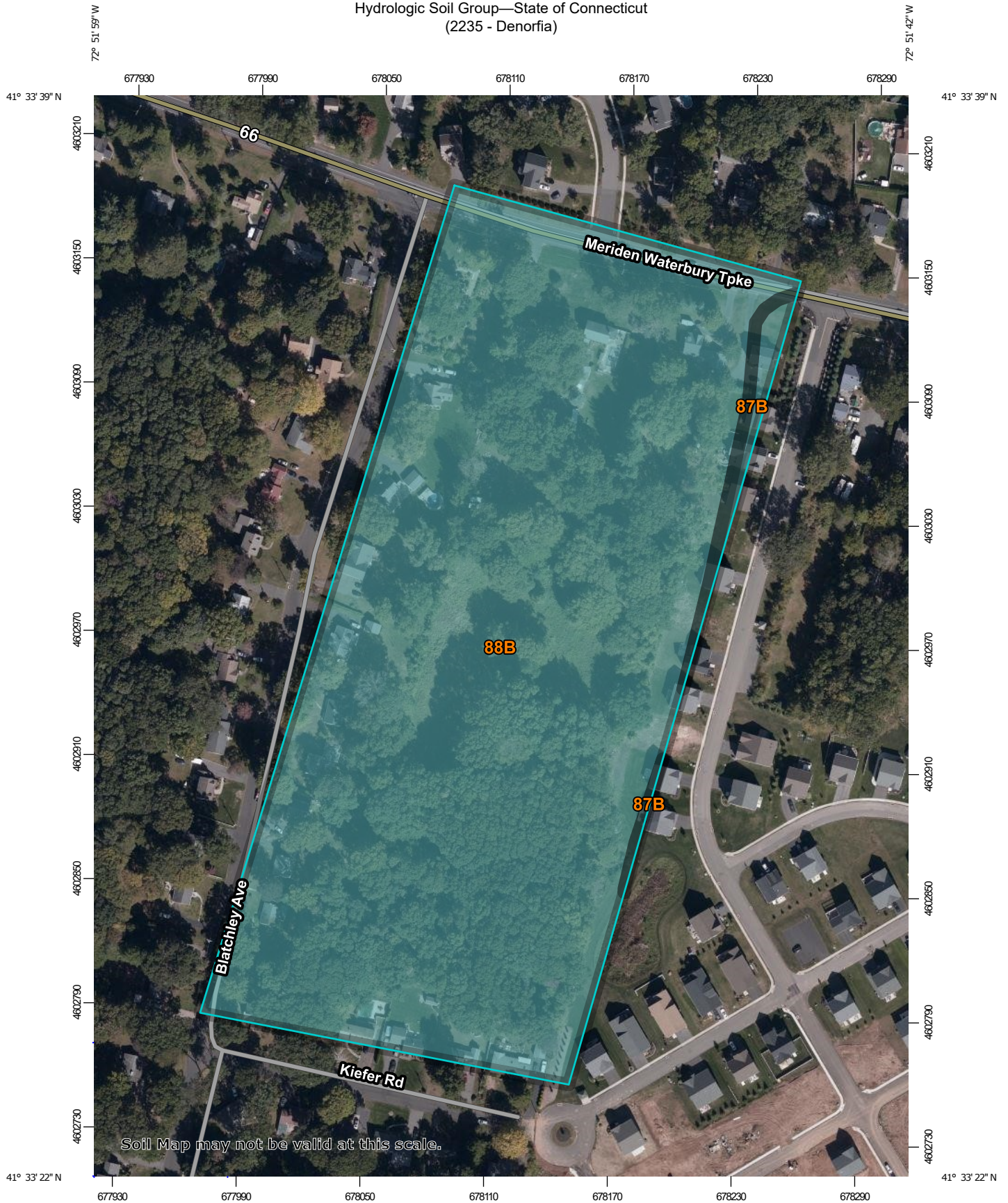
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Date: June 6, 2022
Project #: 2235

570 Meriden Waterbury Turnpike
 POST DEVELOPMENT
 WATERSHED AREA MAP
 Southington, Connecticut

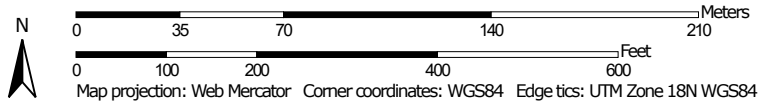
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03

Hydrologic Soil Group—State of Connecticut
(2235 - Denorfia)



Map Scale: 1:2,550 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
 Survey Area Data: Version 21, Sep 7, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 30, 2019—Oct 15, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
87B	Wethersfield loam, 3 to 8 percent slopes	C	0.3	1.7%
88B	Wethersfield loam, 3 to 8 percent slopes, very stony	C	17.8	98.3%
Totals for Area of Interest			18.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Southington, CT 06087

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Hartford County, CT
 (ALL JURISDICTIONS)
 PANEL 0611 OF 0675



Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
SOUTHINGTON, TOWN OF	090037	0611	G

VERSION NUMBER
 2.3.3.2

MAP NUMBER
 09003C0611G




MAP REVISED
 May 16, 2017

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.

Natural Diversity Data Base Areas

SOUTHINGTON, CT

December 2021

-  State and Federal Listed Species
-  Critical Habitat
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDDB) from a variety of data sources. Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.

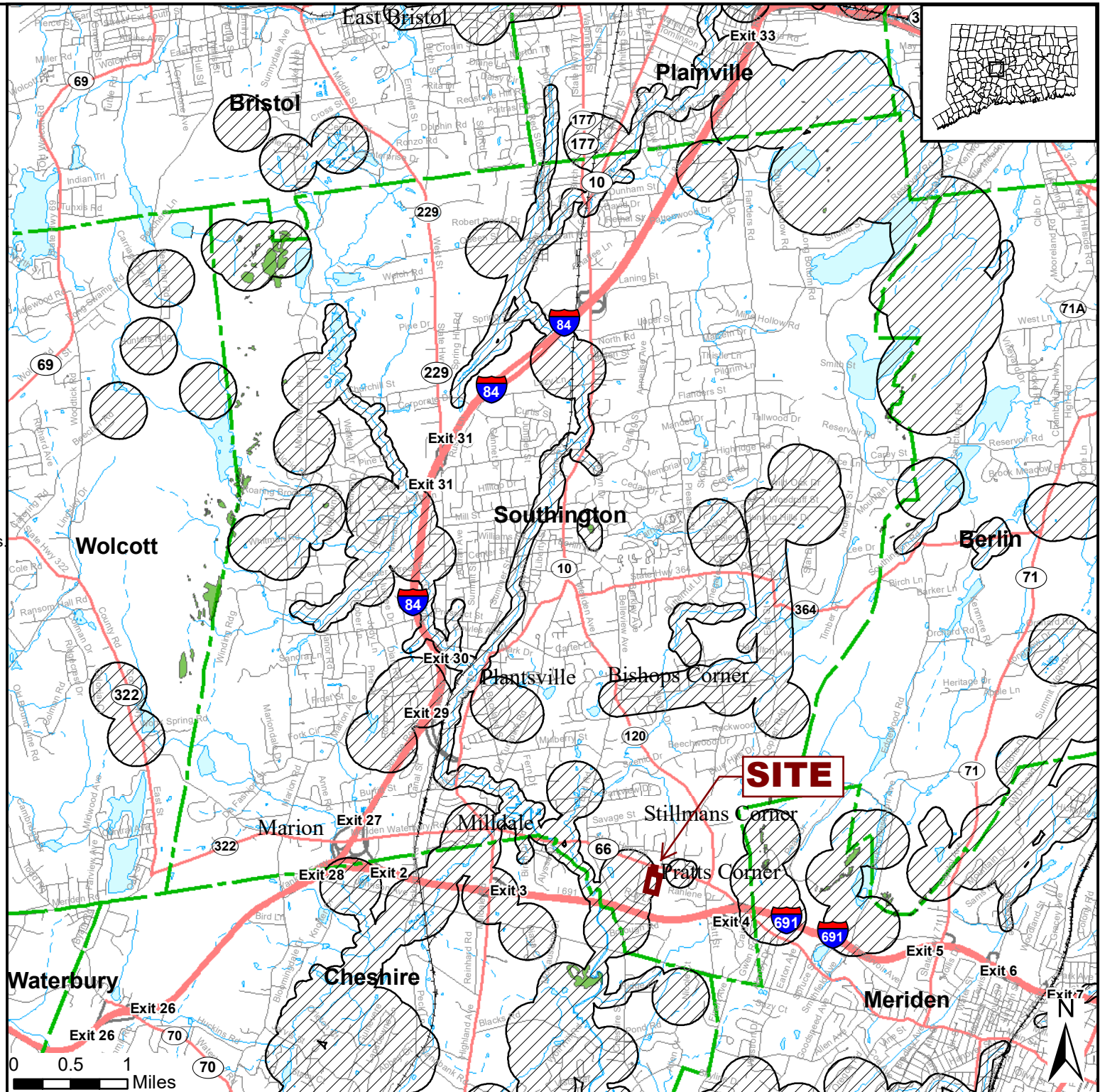
www.ct.gov/deep/nddbrequest

Use the CTECO Interactive Map Viewers at <http://cteco.uconn.edu> to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011



Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Wildlife Division



APPENDIX 'B'

PRE AND POST DEVELOPMENT ANALYSIS

Pre and Post Development Summary Table

Design Point	Design Storm	Existing Peak Flow (cfs)	Proposed Peak Flow (cfs)	Change in Peak Flow (cfs)
DP A (Meriden Waterbury Tpke)	2	0.24	0.19	-0.05
	5	0.38	0.29	-0.09
	10	0.50	0.37	-0.13
	25	0.67	0.49	-0.18
	50	0.79	0.58	-0.22
	100	0.93	0.67	-0.26
DP B (Properties to the West)	2	3.78	0.41	-3.37
	5	6.05	3.33	-2.73
	10	7.98	6.72	-1.26
	25	10.74	9.97	-0.77
	50	12.75	11.88	-0.87
	100	15.00	14.04	-0.96
DP C (Properties to the West)	2	3.28	0.15	-3.13
	5	5.74	0.27	-5.47
	10	7.90	0.38	-7.53
	25	11.09	0.54	-10.56
	50	13.46	0.65	-12.81
	100	16.14	0.79	-15.35
DP D (Existing Storm System)	2	11.53	10.78	-0.75
	5	18.40	15.75	-2.65
	10	24.29	19.64	-4.65
	25	38.54	27.31	-11.23
	50	52.72	31.77	-20.95
	100	66.93	35.94	-30.99

See note #1 Below

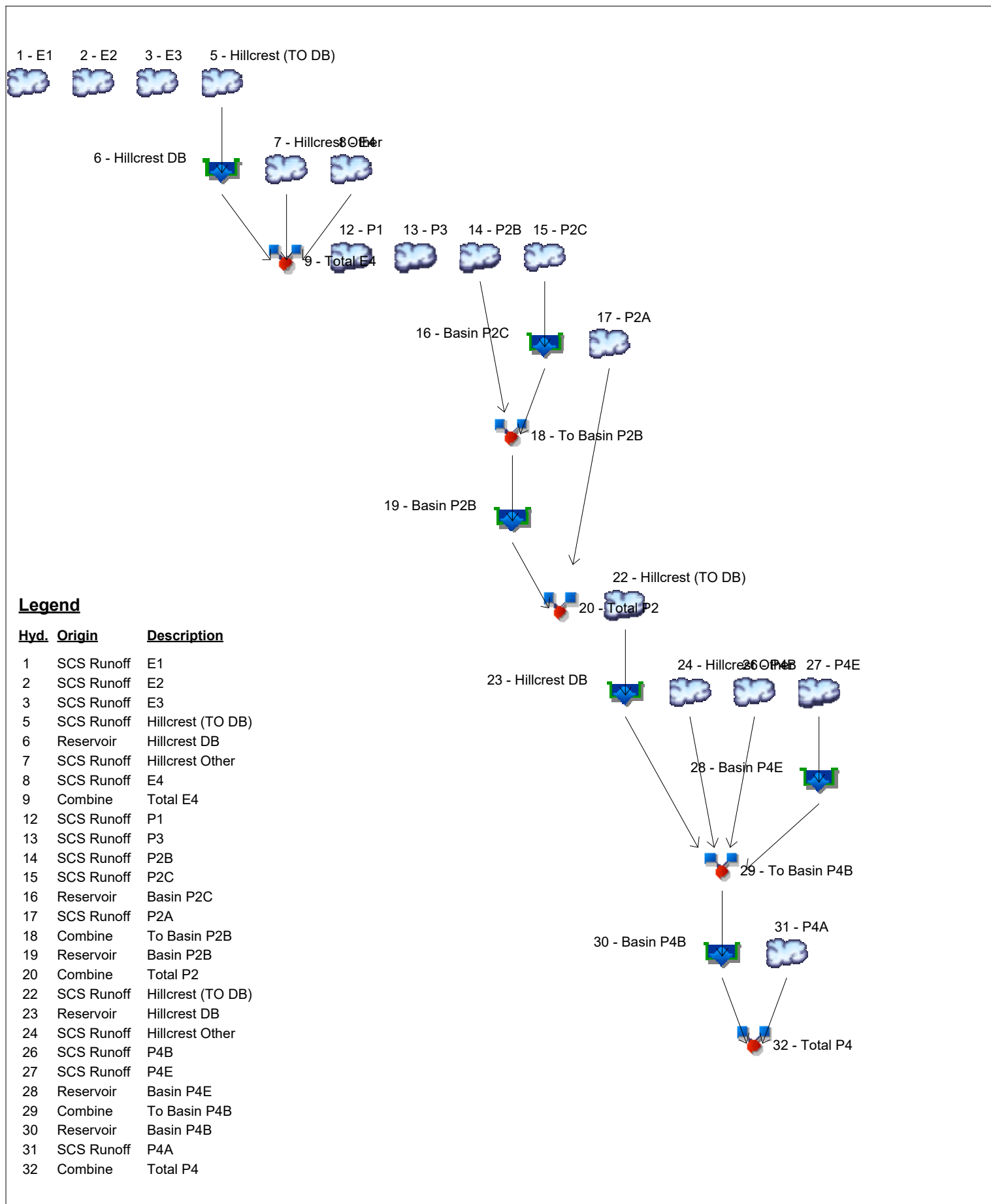
See note #2 Below

Notes:

1. Proposed Peak flows at Design Point B are a summation of the detention pond release(s) and drainage basin P2A
2. Proposed Peak flows at Design Point D are a summation of the detention pond release(s) and drainage basin P4A

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4



Legend

Hyd. Origin	Description
1	SCS Runoff E1
2	SCS Runoff E2
3	SCS Runoff E3
5	SCS Runoff Hillcrest (TO DB)
6	Reservoir Hillcrest DB
7	SCS Runoff Hillcrest Other
8	SCS Runoff E4
9	Combine Total E4
12	SCS Runoff P1
13	SCS Runoff P3
14	SCS Runoff P2B
15	SCS Runoff P2C
16	Reservoir Basin P2C
17	SCS Runoff P2A
18	Combine To Basin P2B
19	Reservoir Basin P2B
20	Combine Total P2
22	SCS Runoff Hillcrest (TO DB)
23	Reservoir Hillcrest DB
24	SCS Runoff Hillcrest Other
26	SCS Runoff P4B
27	SCS Runoff P4E
28	Reservoir Basin P4E
29	Combine To Basin P4B
30	Reservoir Basin P4B
31	SCS Runoff P4A
32	Combine Total P4

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	0.236	-----	0.377	0.496	0.667	0.792	0.931	E1
2	SCS Runoff	-----	-----	3.781	-----	6.053	7.983	10.74	12.75	15.00	E2
3	SCS Runoff	-----	-----	3.278	-----	5.735	7.902	11.09	13.46	16.14	E3
5	SCS Runoff	-----	-----	11.97	-----	17.83	22.67	29.45	34.35	39.78	Hillcrest (TO DB)
6	Reservoir	5	-----	3.551	-----	4.384	6.644	16.67	23.49	28.90	Hillcrest DB
7	SCS Runoff	-----	-----	4.229	-----	7.161	9.729	13.46	16.21	19.31	Hillcrest Other
8	SCS Runoff	-----	-----	4.425	-----	7.748	10.68	14.97	18.18	21.80	E4
9	Combine	6, 7, 8	-----	11.53	-----	18.40	24.29	38.54	52.72	66.93	Total E4
12	SCS Runoff	-----	-----	0.187	-----	0.287	0.370	0.489	0.575	0.671	P1
13	SCS Runoff	-----	-----	0.148	-----	0.269	0.377	0.535	0.654	0.788	P3
14	SCS Runoff	-----	-----	2.819	-----	4.575	6.076	8.226	9.800	11.56	P2B
15	SCS Runoff	-----	-----	0.625	-----	1.000	1.320	1.778	2.113	2.486	P2C
16	Reservoir	15	-----	0.095	-----	0.781	1.299	1.772	2.105	2.477	Basin P2C
17	SCS Runoff	-----	-----	0.075	-----	0.129	0.176	0.244	0.295	0.352	P2A
18	Combine	14, 16,	-----	2.819	-----	4.575	6.820	9.845	11.73	13.84	To Basin P2B
19	Reservoir	18	-----	0.404	-----	3.274	6.622	9.778	11.65	13.77	Basin P2B
20	Combine	17, 19	-----	0.412	-----	3.327	6.719	9.968	11.88	14.04	Total P2
22	SCS Runoff	-----	-----	11.97	-----	17.83	22.67	29.45	34.35	39.78	Hillcrest (TO DB)
23	Reservoir	22	-----	3.551	-----	4.384	6.644	16.67	23.49	28.90	Hillcrest DB
24	SCS Runoff	-----	-----	4.229	-----	7.161	9.729	13.46	16.21	19.31	Hillcrest Other
26	SCS Runoff	-----	-----	8.526	-----	13.31	17.34	23.06	27.24	31.89	P4B
27	SCS Runoff	-----	-----	1.560	-----	2.498	3.294	4.431	5.262	6.188	P4E
28	Reservoir	27	-----	1.530	-----	2.460	3.247	4.406	5.230	6.151	Basin P4E
29	Combine	23, 24, 26, 28	-----	17.02	-----	26.26	34.03	49.44	65.82	82.56	To Basin P4B
30	Reservoir	29	-----	10.54	-----	15.37	19.21	26.81	31.19	35.29	Basin P4B
31	SCS Runoff	-----	-----	0.755	-----	1.195	1.566	2.095	2.480	2.909	P4A
32	Combine	30, 31	-----	10.78	-----	15.75	19.64	27.31	31.77	35.94	Total P4

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.236	1	727	815	----	----	----	E1
2	SCS Runoff	3.781	1	729	14,384	----	----	----	E2
3	SCS Runoff	3.278	1	731	13,655	----	----	----	E3
5	SCS Runoff	11.97	1	732	50,777	----	----	----	Hillcrest (TO DB)
6	Reservoir	3.551	1	759	49,382	5	278.11	18,466	Hillcrest DB
7	SCS Runoff	4.229	1	737	20,496	----	----	----	Hillcrest Other
8	SCS Runoff	4.425	1	734	19,808	----	----	----	E4
9	Combine	11.53	1	737	89,685	6, 7, 8	----	----	Total E4
12	SCS Runoff	0.187	1	725	576	----	----	----	P1
13	SCS Runoff	0.148	1	725	490	----	----	----	P3
14	SCS Runoff	2.819	1	729	10,777	----	----	----	P2B
15	SCS Runoff	0.625	1	733	2,685	----	----	----	P2C
16	Reservoir	0.095	1	787	1,214	15	273.72	1,491	Basin P2C
17	SCS Runoff	0.075	1	726	250	----	----	----	P2A
18	Combine	2.819	1	729	11,991	14, 16,	----	----	To Basin P2B
19	Reservoir	0.404	1	802	5,663	18	272.11	6,394	Basin P2B
20	Combine	0.412	1	802	5,913	17, 19	----	----	Total P2
22	SCS Runoff	11.97	1	732	50,777	----	----	----	Hillcrest (TO DB)
23	Reservoir	3.551	1	759	49,382	22	278.11	18,466	Hillcrest DB
24	SCS Runoff	4.229	1	737	20,496	----	----	----	Hillcrest Other
26	SCS Runoff	8.526	1	735	39,212	----	----	----	P4B
27	SCS Runoff	1.560	1	729	5,935	----	----	----	P4E
28	Reservoir	1.530	1	731	5,935	27	275.55	416	Basin P4E
29	Combine	17.02	1	736	115,024	23, 24, 26, 28	----	----	To Basin P4B
30	Reservoir	10.54	1	756	115,004	29	254.95	21,121	Basin P4B
31	SCS Runoff	0.755	1	731	3,011	----	----	----	P4A
32	Combine	10.78	1	755	118,015	30, 31	----	----	Total P4
2235 - Model SCS REVISED 10-4-2022.gpw					Return Period: 2 Year			Tuesday, 10 / 18 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.377	1	727	1,289	-----	-----	-----	E1
2	SCS Runoff	6.053	1	729	22,762	-----	-----	-----	E2
3	SCS Runoff	5.735	1	731	23,029	-----	-----	-----	E3
5	SCS Runoff	17.83	1	732	75,974	-----	-----	-----	Hillcrest (TO DB)
6	Reservoir	4.384	1	762	74,579	5	279.17	28,953	Hillcrest DB
7	SCS Runoff	7.161	1	736	33,802	-----	-----	-----	Hillcrest Other
8	SCS Runoff	7.748	1	733	33,406	-----	-----	-----	E4
9	Combine	18.40	1	735	141,787	6, 7, 8	-----	-----	Total E4
12	SCS Runoff	0.287	1	725	885	-----	-----	-----	P1
13	SCS Runoff	0.269	1	725	846	-----	-----	-----	P3
14	SCS Runoff	4.575	1	729	17,225	-----	-----	-----	P2B
15	SCS Runoff	1.000	1	733	4,249	-----	-----	-----	P2C
16	Reservoir	0.781	1	742	2,778	15	273.81	1,596	Basin P2C
17	SCS Runoff	0.129	1	726	417	-----	-----	-----	P2A
18	Combine	4.575	1	729	20,003	14, 16,	-----	-----	To Basin P2B
19	Reservoir	3.274	1	742	13,675	18	272.18	6,731	Basin P2B
20	Combine	3.327	1	742	14,092	17, 19	-----	-----	Total P2
22	SCS Runoff	17.83	1	732	75,974	-----	-----	-----	Hillcrest (TO DB)
23	Reservoir	4.384	1	762	74,579	22	279.17	28,953	Hillcrest DB
24	SCS Runoff	7.161	1	736	33,802	-----	-----	-----	Hillcrest Other
26	SCS Runoff	13.31	1	735	60,866	-----	-----	-----	P4B
27	SCS Runoff	2.498	1	729	9,393	-----	-----	-----	P4E
28	Reservoir	2.460	1	730	9,392	27	275.60	489	Basin P4E
29	Combine	26.26	1	735	178,640	23, 24, 26, 28	-----	-----	To Basin P4B
30	Reservoir	15.37	1	755	178,618	29	255.84	32,679	Basin P4B
31	SCS Runoff	1.195	1	730	4,719	-----	-----	-----	P4A
32	Combine	15.75	1	754	183,337	30, 31	-----	-----	Total P4
2235 - Model SCS REVISED 10-4-2022.gpw					Return Period: 5 Year			Tuesday, 10 / 18 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.496	1	727	1,700	----	----	----	E1
2	SCS Runoff	7.983	1	729	30,016	----	----	----	E2
3	SCS Runoff	7.902	1	730	31,396	----	----	----	E3
5	SCS Runoff	22.67	1	732	97,235	----	----	----	Hillcrest (TO DB)
6	Reservoir	6.644	1	758	95,839	5	279.90	37,254	Hillcrest DB
7	SCS Runoff	9.729	1	736	45,552	----	----	----	Hillcrest Other
8	SCS Runoff	10.68	1	733	45,542	----	----	----	E4
9	Combine	24.29	1	735	186,933	6, 7, 8	----	----	Total E4
12	SCS Runoff	0.370	1	725	1,150	----	----	----	P1
13	SCS Runoff	0.377	1	725	1,168	----	----	----	P3
14	SCS Runoff	6.076	1	729	22,834	----	----	----	P2B
15	SCS Runoff	1.320	1	732	5,603	----	----	----	P2C
16	Reservoir	1.299	1	734	4,133	15	273.84	1,623	Basin P2C
17	SCS Runoff	0.176	1	726	565	----	----	----	P2A
18	Combine	6.820	1	732	26,966	14, 16,	----	----	To Basin P2B
19	Reservoir	6.622	1	734	20,638	18	272.23	6,980	Basin P2B
20	Combine	6.719	1	734	21,204	17, 19	----	----	Total P2
22	SCS Runoff	22.67	1	732	97,235	----	----	----	Hillcrest (TO DB)
23	Reservoir	6.644	1	758	95,839	22	279.90	37,254	Hillcrest DB
24	SCS Runoff	9.729	1	736	45,552	----	----	----	Hillcrest Other
26	SCS Runoff	17.34	1	735	79,443	----	----	----	P4B
27	SCS Runoff	3.294	1	729	12,386	----	----	----	P4E
28	Reservoir	3.247	1	730	12,386	27	275.64	551	Basin P4E
29	Combine	34.03	1	735	233,220	23, 24, 26, 28	----	----	To Basin P4B
30	Reservoir	19.21	1	757	233,198	29	256.53	43,133	Basin P4B
31	SCS Runoff	1.566	1	730	6,191	----	----	----	P4A
32	Combine	19.64	1	755	239,388	30, 31	----	----	Total P4

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.667	1	727	2,298	----	----	----	E1
2	SCS Runoff	10.74	1	729	40,562	----	----	----	E2
3	SCS Runoff	11.09	1	730	43,820	----	----	----	E3
5	SCS Runoff	29.45	1	732	127,611	----	----	----	Hillcrest (TO DB)
6	Reservoir	16.67	1	747	126,216	5	280.27	41,960	Hillcrest DB
7	SCS Runoff	13.46	1	736	62,870	----	----	----	Hillcrest Other
8	SCS Runoff	14.97	1	732	63,565	----	----	----	E4
9	Combine	38.54	1	743	252,651	6, 7, 8	----	----	Total E4
12	SCS Runoff	0.489	1	724	1,530	----	----	----	P1
13	SCS Runoff	0.535	1	725	1,649	----	----	----	P3
14	SCS Runoff	8.226	1	729	31,015	----	----	----	P2B
15	SCS Runoff	1.778	1	732	7,572	----	----	----	P2C
16	Reservoir	1.772	1	733	6,101	15	273.86	1,647	Basin P2C
17	SCS Runoff	0.244	1	726	785	----	----	----	P2A
18	Combine	9.845	1	729	37,117	14, 16,	----	----	To Basin P2B
19	Reservoir	9.778	1	730	30,788	18	272.27	7,176	Basin P2B
20	Combine	9.968	1	730	31,573	17, 19	----	----	Total P2
22	SCS Runoff	29.45	1	732	127,611	----	----	----	Hillcrest (TO DB)
23	Reservoir	16.67	1	747	126,216	22	280.27	41,960	Hillcrest DB
24	SCS Runoff	13.46	1	736	62,870	----	----	----	Hillcrest Other
26	SCS Runoff	23.06	1	734	106,283	----	----	----	P4B
27	SCS Runoff	4.431	1	729	16,737	----	----	----	P4E
28	Reservoir	4.406	1	730	16,737	27	275.68	613	Basin P4E
29	Combine	49.44	1	742	312,106	23, 24, 26, 28	----	----	To Basin P4B
30	Reservoir	26.81	1	759	312,084	29	257.88	66,250	Basin P4B
31	SCS Runoff	2.095	1	730	8,324	----	----	----	P4A
32	Combine	27.31	1	758	320,408	30, 31	----	----	Total P4
2235 - Model SCS REVISED 10-4-2022.gpw					Return Period: 25 Year			Tuesday, 10 / 18 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.792	1	727	2,742	----	----	----	E1
2	SCS Runoff	12.75	1	729	48,396	----	----	----	E2
3	SCS Runoff	13.46	1	730	53,189	----	----	----	E3
5	SCS Runoff	34.35	1	732	149,910	----	----	----	Hillcrest (TO DB)
6	Reservoir	23.49	1	743	148,514	5	280.47	44,567	Hillcrest DB
7	SCS Runoff	16.21	1	736	75,860	----	----	----	Hillcrest Other
8	SCS Runoff	18.18	1	732	77,155	----	----	----	E4
9	Combine	52.72	1	740	301,528	6, 7, 8	----	----	Total E4
12	SCS Runoff	0.575	1	724	1,812	----	----	----	P1
13	SCS Runoff	0.654	1	725	2,014	----	----	----	P3
14	SCS Runoff	9.800	1	729	37,107	----	----	----	P2B
15	SCS Runoff	2.113	1	732	9,035	----	----	----	P2C
16	Reservoir	2.105	1	733	7,564	15	273.87	1,665	Basin P2C
17	SCS Runoff	0.295	1	726	950	----	----	----	P2A
18	Combine	11.73	1	729	44,671	14, 16,	----	----	To Basin P2B
19	Reservoir	11.65	1	730	38,343	18	272.30	7,285	Basin P2B
20	Combine	11.88	1	730	39,292	17, 19	----	----	Total P2
22	SCS Runoff	34.35	1	732	149,910	----	----	----	Hillcrest (TO DB)
23	Reservoir	23.49	1	743	148,514	22	280.47	44,567	Hillcrest DB
24	SCS Runoff	16.21	1	736	75,860	----	----	----	Hillcrest Other
26	SCS Runoff	27.24	1	734	126,137	----	----	----	P4B
27	SCS Runoff	5.262	1	729	19,970	----	----	----	P4E
28	Reservoir	5.230	1	730	19,970	27	275.71	652	Basin P4E
29	Combine	65.82	1	740	370,480	23, 24, 26, 28	----	----	To Basin P4B
30	Reservoir	31.19	1	759	370,457	29	258.82	84,837	Basin P4B
31	SCS Runoff	2.480	1	730	9,905	----	----	----	P4A
32	Combine	31.77	1	758	380,363	30, 31	----	----	Total P4
2235 - Model SCS REVISED 10-4-2022.gpw					Return Period: 50 Year			Tuesday, 10 / 18 / 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.931	1	727	3,243	----	----	----	E1
2	SCS Runoff	15.00	1	729	57,253	----	----	----	E2
3	SCS Runoff	16.14	1	730	63,881	----	----	----	E3
5	SCS Runoff	39.78	1	732	174,928	----	----	----	Hillcrest (TO DB)
6	Reservoir	28.90	1	742	173,533	5	280.69	47,537	Hillcrest DB
7	SCS Runoff	19.31	1	736	90,635	----	----	----	Hillcrest Other
8	SCS Runoff	21.80	1	732	92,666	----	----	----	E4
9	Combine	66.93	1	737	356,833	6, 7, 8	----	----	Total E4
12	SCS Runoff	0.671	1	724	2,128	----	----	----	P1
13	SCS Runoff	0.788	1	725	2,433	----	----	----	P3
14	SCS Runoff	11.56	1	729	44,004	----	----	----	P2B
15	SCS Runoff	2.486	1	732	10,688	----	----	----	P2C
16	Reservoir	2.477	1	733	9,217	15	273.89	1,684	Basin P2C
17	SCS Runoff	0.352	1	726	1,138	----	----	----	P2A
18	Combine	13.84	1	729	53,221	14, 16,	----	----	To Basin P2B
19	Reservoir	13.77	1	730	46,893	18	272.32	7,396	Basin P2B
20	Combine	14.04	1	730	48,030	17, 19	----	----	Total P2
22	SCS Runoff	39.78	1	732	174,928	----	----	----	Hillcrest (TO DB)
23	Reservoir	28.90	1	742	173,533	22	280.69	47,537	Hillcrest DB
24	SCS Runoff	19.31	1	736	90,635	----	----	----	Hillcrest Other
26	SCS Runoff	31.89	1	734	148,520	----	----	----	P4B
27	SCS Runoff	6.188	1	729	23,625	----	----	----	P4E
28	Reservoir	6.151	1	730	23,625	27	275.74	696	Basin P4E
29	Combine	82.56	1	737	436,312	23, 24, 26, 28	----	----	To Basin P4B
30	Reservoir	35.29	1	760	436,289	29	259.81	106,878	Basin P4B
31	SCS Runoff	2.909	1	730	11,690	----	----	----	P4A
32	Combine	35.94	1	758	447,979	30, 31	----	----	Total P4



NOAA Atlas 14, Volume 10, Version 3
 Location name: Southington, Connecticut, USA*
 Latitude: 41.5599°, Longitude: -72.8635°
 Elevation: 280.06 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.07 (3.18-5.12)	4.92 (3.84-6.20)	6.32 (4.92-8.00)	7.49 (5.80-9.53)	9.08 (6.80-12.1)	10.3 (7.54-14.1)	11.5 (8.22-16.5)	12.9 (8.72-18.9)	15.0 (9.68-22.8)	16.6 (10.5-25.8)
10-min	2.88 (2.26-3.63)	3.49 (2.72-4.40)	4.49 (3.49-5.68)	5.31 (4.11-6.76)	6.44 (4.82-8.60)	7.29 (5.35-9.98)	8.18 (5.82-11.7)	9.17 (6.19-13.4)	10.6 (6.86-16.1)	11.7 (7.43-18.3)
15-min	2.26 (1.77-2.85)	2.74 (2.14-3.45)	3.52 (2.74-4.44)	4.16 (3.22-5.30)	5.05 (3.78-6.75)	5.72 (4.19-7.82)	6.42 (4.56-9.14)	7.20 (4.85-10.5)	8.31 (5.38-12.6)	9.21 (5.83-14.3)
30-min	1.55 (1.21-1.95)	1.87 (1.46-2.36)	2.39 (1.86-3.03)	2.83 (2.19-3.60)	3.42 (2.56-4.58)	3.87 (2.84-5.30)	4.34 (3.09-6.19)	4.87 (3.28-7.13)	5.63 (3.65-8.56)	6.24 (3.95-9.72)
60-min	0.987 (0.772-1.24)	1.19 (0.927-1.50)	1.52 (1.18-1.92)	1.79 (1.38-2.28)	2.16 (1.62-2.89)	2.44 (1.79-3.35)	2.74 (1.95-3.91)	3.07 (2.07-4.50)	3.55 (2.30-5.40)	3.94 (2.49-6.14)
2-hr	0.648 (0.510-0.810)	0.774 (0.608-0.970)	0.982 (0.769-1.23)	1.15 (0.898-1.46)	1.39 (1.05-1.85)	1.57 (1.16-2.14)	1.76 (1.26-2.50)	1.97 (1.34-2.87)	2.29 (1.49-3.46)	2.55 (1.62-3.94)
3-hr	0.500 (0.395-0.623)	0.598 (0.472-0.746)	0.759 (0.596-0.950)	0.892 (0.697-1.12)	1.08 (0.813-1.43)	1.21 (0.898-1.65)	1.36 (0.977-1.93)	1.53 (1.03-2.21)	1.77 (1.16-2.68)	1.98 (1.26-3.06)
6-hr	0.318 (0.253-0.394)	0.383 (0.304-0.474)	0.488 (0.386-0.607)	0.575 (0.453-0.720)	0.696 (0.530-0.917)	0.785 (0.586-1.06)	0.881 (0.639-1.25)	0.994 (0.677-1.43)	1.16 (0.761-1.75)	1.31 (0.834-2.01)
12-hr	0.195 (0.156-0.240)	0.237 (0.190-0.292)	0.306 (0.244-0.378)	0.364 (0.288-0.452)	0.443 (0.339-0.581)	0.501 (0.377-0.675)	0.564 (0.413-0.796)	0.641 (0.438-0.919)	0.757 (0.496-1.13)	0.856 (0.548-1.31)
24-hr	0.115 (0.093-0.140)	0.142 (0.115-0.174)	0.187 (0.150-0.229)	0.224 (0.178-0.276)	0.275 (0.212-0.360)	0.312 (0.237-0.420)	0.353 (0.261-0.499)	0.405 (0.277-0.578)	0.486 (0.319-0.720)	0.556 (0.357-0.842)
2-day	0.065 (0.053-0.078)	0.082 (0.066-0.099)	0.109 (0.088-0.133)	0.132 (0.106-0.162)	0.163 (0.127-0.213)	0.186 (0.142-0.250)	0.211 (0.158-0.300)	0.245 (0.168-0.348)	0.299 (0.197-0.441)	0.347 (0.224-0.523)
3-day	0.047 (0.038-0.057)	0.059 (0.048-0.072)	0.079 (0.064-0.096)	0.096 (0.077-0.117)	0.119 (0.093-0.155)	0.136 (0.104-0.182)	0.155 (0.116-0.219)	0.180 (0.124-0.254)	0.220 (0.146-0.324)	0.257 (0.166-0.385)
4-day	0.038 (0.031-0.045)	0.048 (0.039-0.057)	0.064 (0.052-0.077)	0.077 (0.062-0.094)	0.095 (0.075-0.124)	0.109 (0.084-0.146)	0.124 (0.093-0.175)	0.144 (0.099-0.203)	0.176 (0.117-0.258)	0.205 (0.132-0.307)
7-day	0.026 (0.021-0.031)	0.032 (0.026-0.038)	0.042 (0.035-0.051)	0.051 (0.041-0.061)	0.062 (0.049-0.080)	0.071 (0.055-0.094)	0.081 (0.061-0.112)	0.093 (0.064-0.130)	0.113 (0.075-0.164)	0.130 (0.084-0.194)
10-day	0.021 (0.017-0.025)	0.026 (0.021-0.031)	0.033 (0.027-0.040)	0.039 (0.032-0.048)	0.048 (0.038-0.061)	0.054 (0.042-0.072)	0.061 (0.046-0.085)	0.070 (0.049-0.098)	0.084 (0.056-0.122)	0.096 (0.062-0.143)
20-day	0.015 (0.012-0.018)	0.017 (0.014-0.021)	0.022 (0.018-0.026)	0.025 (0.020-0.030)	0.029 (0.023-0.037)	0.033 (0.025-0.043)	0.037 (0.027-0.049)	0.041 (0.029-0.057)	0.047 (0.031-0.068)	0.052 (0.034-0.077)
30-day	0.013 (0.010-0.015)	0.014 (0.012-0.017)	0.017 (0.014-0.020)	0.019 (0.016-0.023)	0.022 (0.018-0.028)	0.025 (0.019-0.032)	0.027 (0.020-0.036)	0.030 (0.021-0.041)	0.034 (0.023-0.048)	0.037 (0.024-0.054)
45-day	0.010 (0.009-0.012)	0.012 (0.010-0.014)	0.014 (0.011-0.016)	0.015 (0.013-0.018)	0.017 (0.014-0.021)	0.019 (0.015-0.024)	0.021 (0.015-0.027)	0.022 (0.016-0.031)	0.025 (0.017-0.035)	0.026 (0.017-0.038)
60-day	0.009 (0.008-0.011)	0.010 (0.008-0.012)	0.012 (0.010-0.014)	0.013 (0.011-0.015)	0.014 (0.011-0.018)	0.016 (0.012-0.020)	0.017 (0.013-0.022)	0.018 (0.013-0.025)	0.020 (0.013-0.028)	0.021 (0.014-0.031)

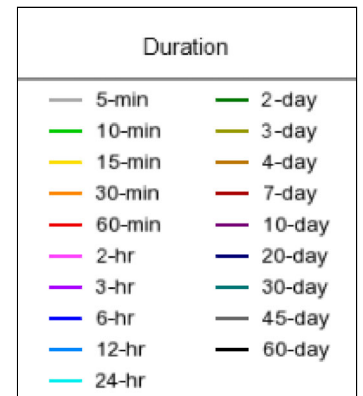
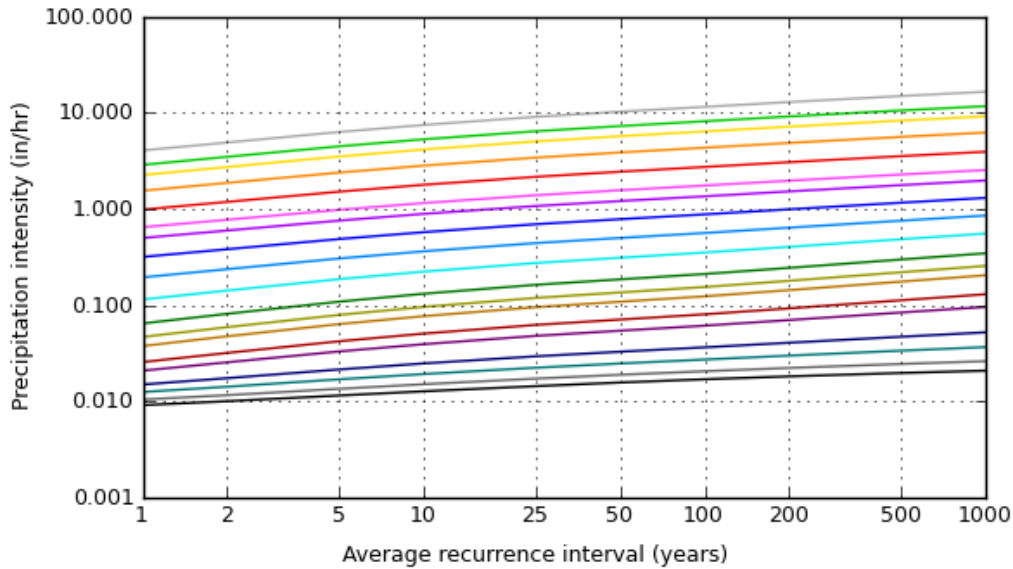
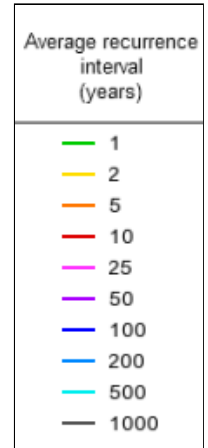
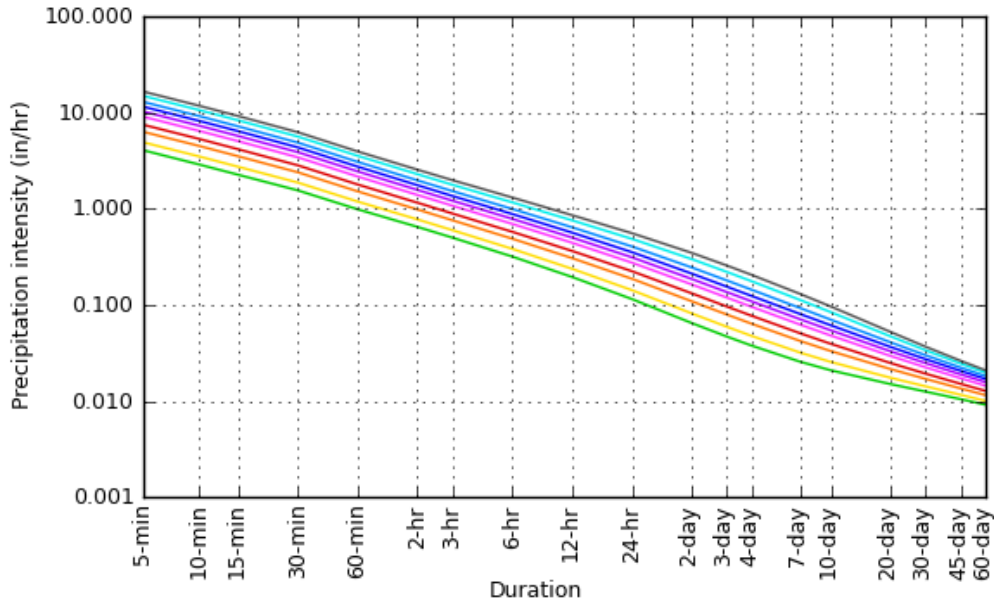
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based intensity-duration-frequency (IDF) curves

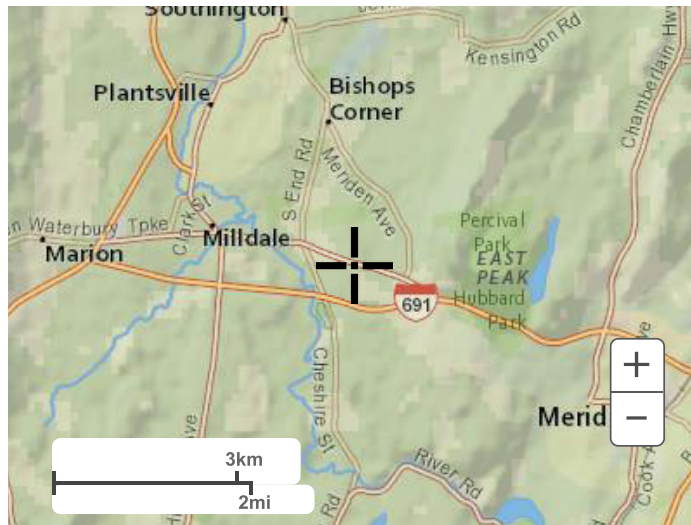
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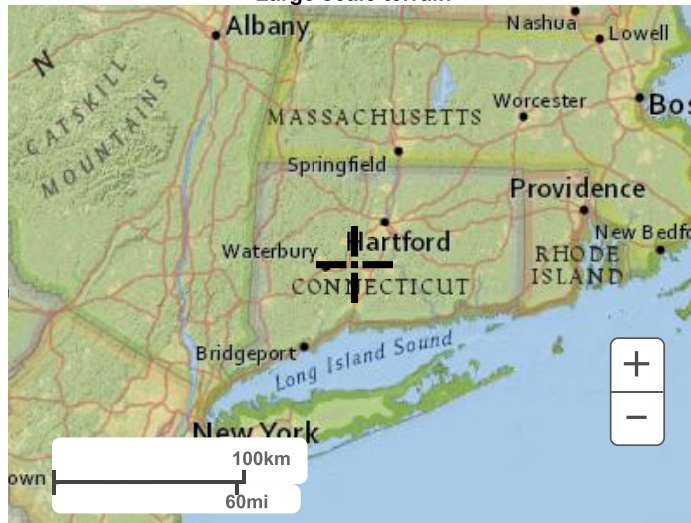
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Maps & aerials

Small scale terrain



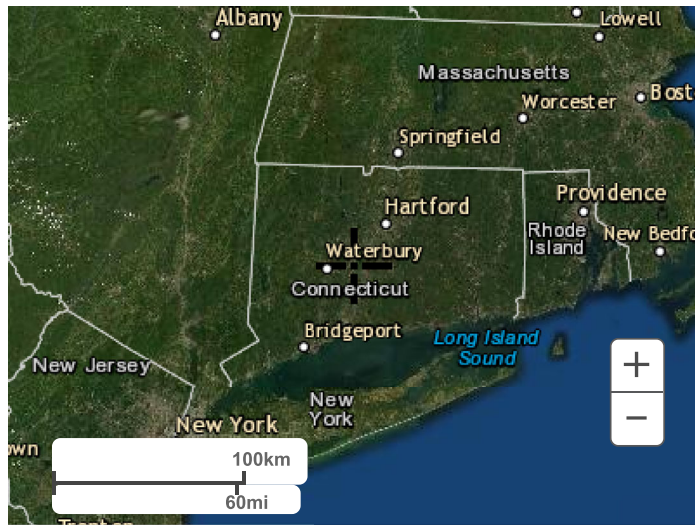
Large scale terrain



Large scale map



Large scale aerial



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POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

PF tabular

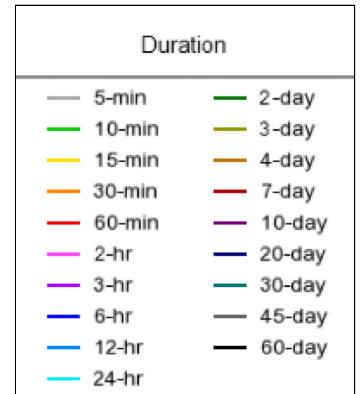
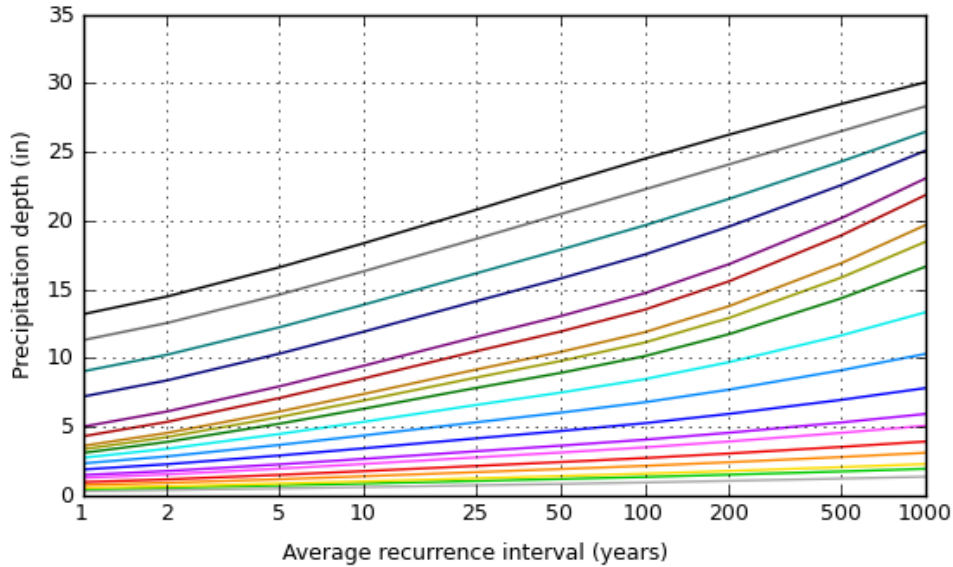
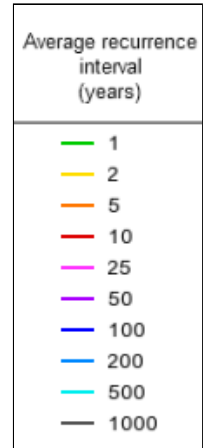
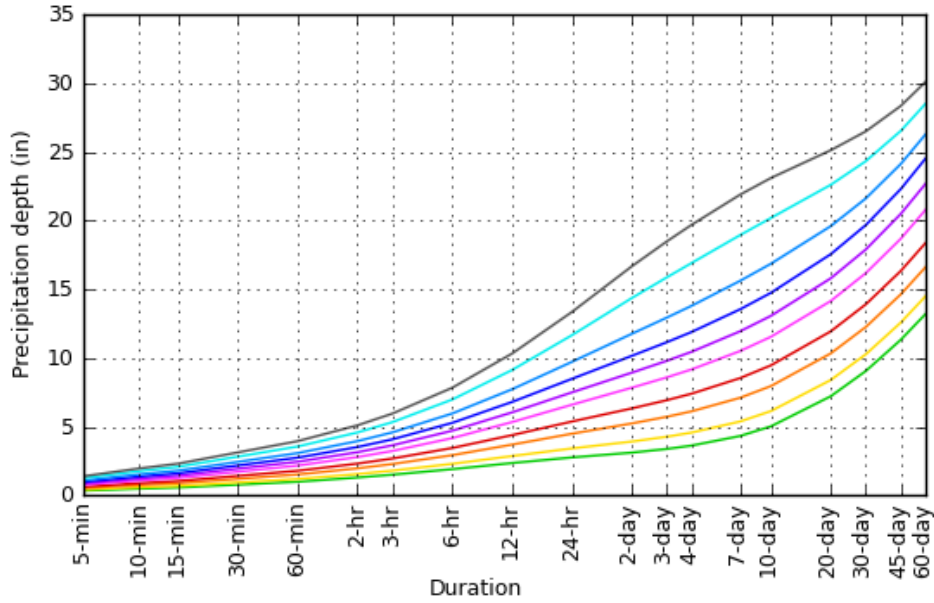
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.339 (0.265-0.427)	0.410 (0.320-0.517)	0.527 (0.410-0.667)	0.624 (0.483-0.794)	0.757 (0.567-1.01)	0.857 (0.628-1.17)	0.962 (0.685-1.37)	1.08 (0.727-1.58)	1.25 (0.807-1.90)	1.38 (0.875-2.15)
10-min	0.480 (0.376-0.605)	0.582 (0.454-0.733)	0.748 (0.582-0.946)	0.885 (0.685-1.13)	1.07 (0.803-1.43)	1.22 (0.891-1.66)	1.36 (0.970-1.94)	1.53 (1.03-2.24)	1.77 (1.14-2.69)	1.96 (1.24-3.05)
15-min	0.565 (0.442-0.712)	0.684 (0.534-0.862)	0.879 (0.684-1.11)	1.04 (0.804-1.32)	1.26 (0.944-1.69)	1.43 (1.05-1.96)	1.60 (1.14-2.29)	1.80 (1.21-2.64)	2.08 (1.35-3.16)	2.30 (1.46-3.59)
30-min	0.776 (0.607-0.977)	0.936 (0.731-1.18)	1.20 (0.931-1.52)	1.41 (1.09-1.80)	1.71 (1.28-2.29)	1.94 (1.42-2.65)	2.17 (1.55-3.10)	2.44 (1.64-3.57)	2.81 (1.82-4.28)	3.12 (1.98-4.86)
60-min	0.987 (0.772-1.24)	1.19 (0.927-1.50)	1.52 (1.18-1.92)	1.79 (1.38-2.28)	2.16 (1.62-2.89)	2.44 (1.79-3.35)	2.74 (1.95-3.91)	3.07 (2.07-4.50)	3.55 (2.30-5.40)	3.94 (2.49-6.14)
2-hr	1.30 (1.02-1.62)	1.55 (1.22-1.94)	1.96 (1.54-2.47)	2.31 (1.80-2.92)	2.78 (2.10-3.70)	3.14 (2.32-4.28)	3.51 (2.52-4.99)	3.95 (2.67-5.74)	4.57 (2.97-6.92)	5.09 (3.23-7.88)
3-hr	1.50 (1.19-1.87)	1.80 (1.42-2.24)	2.28 (1.79-2.85)	2.68 (2.09-3.38)	3.23 (2.44-4.28)	3.64 (2.70-4.94)	4.08 (2.94-5.78)	4.58 (3.11-6.65)	5.33 (3.47-8.03)	5.95 (3.78-9.17)
6-hr	1.91 (1.52-2.36)	2.29 (1.82-2.84)	2.92 (2.31-3.63)	3.45 (2.71-4.31)	4.17 (3.17-5.49)	4.70 (3.51-6.36)	5.28 (3.83-7.46)	5.96 (4.05-8.59)	6.97 (4.56-10.5)	7.83 (5.00-12.0)
12-hr	2.35 (1.88-2.89)	2.86 (2.29-3.52)	3.69 (2.94-4.56)	4.38 (3.47-5.45)	5.33 (4.09-7.00)	6.04 (4.54-8.14)	6.80 (4.97-9.59)	7.72 (5.27-11.1)	9.12 (5.98-13.6)	10.3 (6.60-15.7)
24-hr	2.76 (2.22-3.37)	3.41 (2.75-4.17)	4.49 (3.60-5.50)	5.37 (4.28-6.64)	6.60 (5.10-8.63)	7.49 (5.68-10.1)	8.48 (6.27-12.0)	9.72 (6.66-13.9)	11.7 (7.66-17.3)	13.3 (8.57-20.2)
2-day	3.11 (2.52-3.77)	3.91 (3.17-4.75)	5.23 (4.22-6.38)	6.33 (5.08-7.76)	7.83 (6.10-10.2)	8.93 (6.83-12.0)	10.2 (7.59-14.4)	11.8 (8.08-16.7)	14.4 (9.46-21.2)	16.7 (10.7-25.1)
3-day	3.38 (2.75-4.08)	4.26 (3.47-5.16)	5.72 (4.64-6.94)	6.92 (5.58-8.46)	8.58 (6.72-11.2)	9.79 (7.52-13.1)	11.1 (8.37-15.8)	12.9 (8.91-18.3)	15.9 (10.5-23.3)	18.5 (11.9-27.7)
4-day	3.62 (2.96-4.36)	4.57 (3.73-5.51)	6.12 (4.97-7.40)	7.40 (5.98-9.01)	9.17 (7.19-11.9)	10.4 (8.05-14.0)	11.9 (8.95-16.8)	13.8 (9.52-19.5)	16.9 (11.2-24.8)	19.7 (12.7-29.5)
7-day	4.32 (3.55-5.17)	5.37 (4.41-6.44)	7.10 (5.80-8.54)	8.53 (6.93-10.3)	10.5 (8.26-13.5)	11.9 (9.21-15.8)	13.5 (10.2-18.9)	15.6 (10.8-21.9)	18.9 (12.6-27.6)	21.9 (14.2-32.6)
10-day	5.02 (4.14-5.99)	6.13 (5.05-7.32)	7.95 (6.52-9.53)	9.46 (7.71-11.4)	11.5 (9.09-14.8)	13.1 (10.1-17.2)	14.7 (11.1-20.4)	16.8 (11.7-23.5)	20.2 (13.4-29.3)	23.1 (15.0-34.3)
20-day	7.21 (5.99-8.54)	8.39 (6.96-9.95)	10.3 (8.53-12.3)	11.9 (9.79-14.3)	14.1 (11.2-17.8)	15.8 (12.2-20.4)	17.5 (13.1-23.7)	19.6 (13.7-27.1)	22.6 (15.1-32.6)	25.1 (16.3-37.0)
30-day	9.04 (7.54-10.7)	10.3 (8.54-12.1)	12.2 (10.2-14.5)	13.9 (11.4-16.6)	16.2 (12.8-20.2)	17.9 (13.8-22.9)	19.7 (14.6-26.2)	21.6 (15.2-29.8)	24.3 (16.3-34.9)	26.5 (17.3-38.9)
45-day	11.3 (9.47-13.3)	12.6 (10.5-14.8)	14.6 (12.2-17.3)	16.3 (13.5-19.4)	18.7 (14.8-23.1)	20.5 (15.8-26.0)	22.3 (16.5-29.3)	24.1 (17.0-33.0)	26.5 (17.9-37.9)	28.3 (18.5-41.5)
60-day	13.2 (11.1-15.5)	14.5 (12.2-17.0)	16.6 (13.9-19.6)	18.4 (15.2-21.8)	20.8 (16.5-25.6)	22.7 (17.5-28.6)	24.5 (18.2-32.0)	26.3 (18.6-35.9)	28.5 (19.2-40.5)	30.1 (19.7-43.9)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

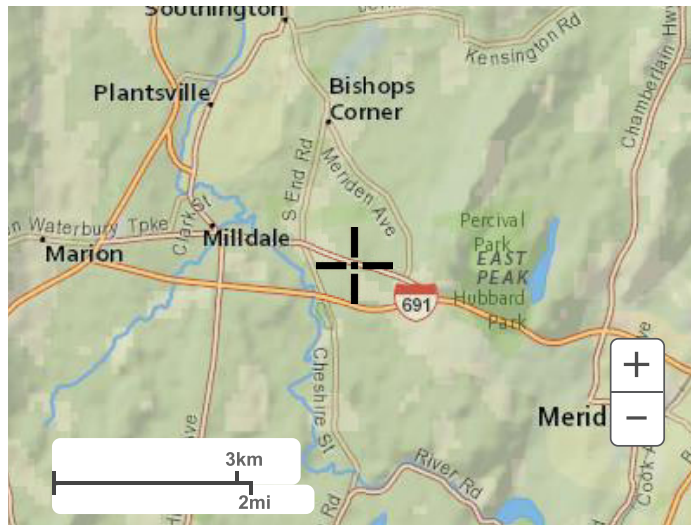
PDS-based depth-duration-frequency (DDF) curves
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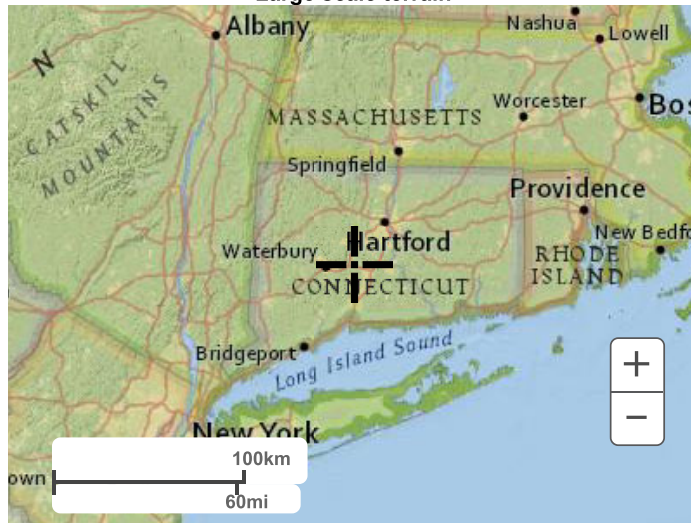
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Maps & aerials

Small scale terrain



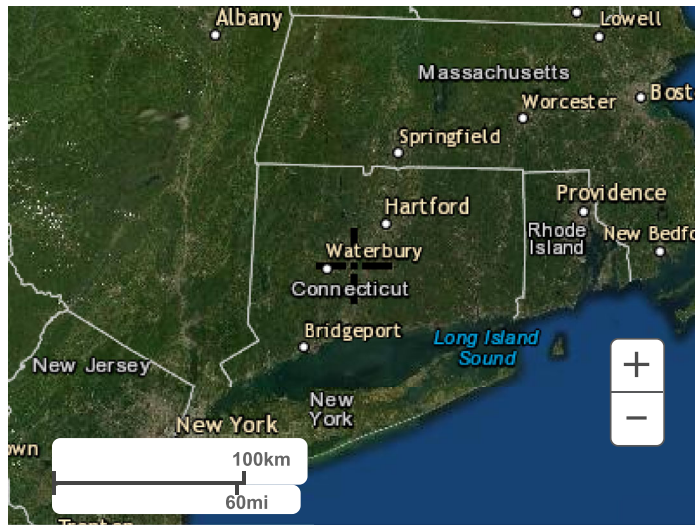
Large scale terrain



Large scale map



Large scale aerial



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E1

Project 2235 - Denorfia	BY: BTP	Date: 4-20-2022
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0	0.00
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0.15	11.59
Rating C	Open Space (Lawn Good Condition)	74			0	0.00
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0	0.00
						0.00
						0.00
						0.00
Totals:					0.15	11.59

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{79}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. In	1.34	2.04	2.55	3.24	3.86	4.49
$\frac{(P-0.2S)^2}{(P+0.8S)}$						
Volume of Runoff: (cu-ft)	712	1089	1355	1723	2054	2392
$\frac{100}{Q} - 10.00$						

E2

Project 2235 - Denorfia	BY: BTP	Date: 4-20-2022
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0	0.00
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			2.69	212.69
Rating C	Open Space (Lawn Good Condition)	74			0	0.00
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0	0.00
						0.00
						0.00
						0.00
Totals:					2.69	212.69

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{79}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. In	1.34	2.04	2.55	3.24	3.86	4.49
$\frac{(P-0.2S)^2}{(P+0.8S)}$	13064	19985	24874	31632	37712	43909
Volume of Runoff: (cu-ft)						
$\frac{100}{Q} - 10.00$						

E3

Project 2235 - Denorfia	BY: BTP	Date: 4-20-2022
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0.00	0.00
Rating B	Woods (Good Condition)	55			0.00	0.00
Rating C	Woods (Good Condition)	70			0.59	41.18
Rating C	Meadow (Good Condition)	71			2.24	158.84
Rating C	Residential (1/4 Acre Lots)	83			0.53	43.99
Rating C	Residential (1/2 - 1 Acre Lots)	79			0.00	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.00	0.00
Rating D	Open Space (Lawn Good Condition)	80			0.00	0.00
Rating A	Gravel Surface	76			0.00	0.00
Rating A	Dirt Surface	72			0.00	0.00
	Impervious Surface (roofs, pavement)	98			0.00	0.00
						0.00
						0.00
						0.00

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55 **Totals:** 3.36 244.01

CN (weighted)= $\frac{\text{Total Product}}{\text{Area}}$ = Use C: 73

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	4	4	4	4	4	4
Runoff, Q. In	0.97	1.58	2.03	2.65	3.23	3.82
$\frac{(P-0.2S)^2}{(P+0.8S)}$	11787	19246	24674	32323	39315	46524
Volume of Runoff: (cu-ft)						
$\frac{100}{Q} - 10.00$						

E4

Project 2235 - Denorfia	BY: BTP	Date: 4-20-2022
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0.00	0.00
Rating B	Woods (Good Condition)	55			0.00	0.00
Rating C	Woods (Good Condition)	70			3.52	246.44
Rating C	Meadow (Good Condition)	71			0.42	29.81
Rating C	Residential (1/4 Acre Lots)	83			0.99	82.01
Rating C	Residential (1/2 - 1 Acre Lots)	79			0.00	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.00	0.00
Rating D	Open Space (Lawn Good Condition)	80			0.00	0.00
Rating A	Gravel Surface	76			0.00	0.00
Rating A	Dirt Surface	72			0.00	0.00
	Impervious Surface (roofs, pavement)	98			0.00	0.00
						0.00
						0.00
						0.00
Totals:					4.93	358.26

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$CN \text{ (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{73}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	4	4	4	4	4	4
Runoff, Q. In	0.97	1.58	2.02	2.65	3.23	3.82
$\frac{(P-0.2S)^2}{(P+0.8S)}$						
Volume of Runoff: (cu-ft)	17286	28234	36201	47432	57698	68283
$\frac{100}{Q} - 10.00$						

P1

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0	0.00
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0
Rating C	Open Space (Lawn Good Condition)	74			0.077	6.09
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0.015	1.48
						0.00
						0.00
						0.00
Totals:					0.09	7.58

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

CN (weighted) = $\frac{\text{Total Product}}{\text{Area}}$ = Use C: 82

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	2	2	2	2	2	2
Runoff, Q. in	1.55	2.30	2.82	3.54	4.18	4.84
Volume of Runoff:	518	770	945	1186	1401	1619
(cu-ft)						

$$\frac{(P-0.2S)^2}{(P+0.8S)}$$

$$\frac{100}{0} - 10.00$$

P2A

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0	0.00
Rating C	Meadow (Good Condition)	71			0.00	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.06	4.66
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0.00	0.00
						0.00
						0.00
						0.00
Totals:					0.06	4.66

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{74}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	4	4	4	4	4	4
Runoff, Q. in	1.04	1.67	2.13	2.77	3.35	3.96
$\frac{(P-0.2S)^2}{(P+0.8S)}$						
Volume of Runoff: (cu-ft)	237	382	486	633	767	904
$\frac{100}{Q} - 10.00$						

P2B

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0.01	0.53
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0.95	74.70
Rating C	Open Space (Lawn Good Condition)	74			1.00	74.26
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0.15	15.07
						0.00
						0.00
						0.00
Totals:					2.11	164.57

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$CN \text{ (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{78}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. in	1.27	1.96	2.46	3.14	3.75	4.38
$\frac{(P-0.2S)^2}{(P+0.8S)}$	Volume of Runoff:					
$\frac{100}{Q} - 10.00$	9743	15054	18822	24046	28757	33567
	(cu-ft)					

P2C

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0.00	0.00
Rating B	Woods (Good Condition)	55			0.00	0.00
Rating C	Woods (Good Condition)	70			0.00	0.00
Rating C	Meadow (Good Condition)	71			0.00	0.00
Rating C	Residential (1/4 Acre Lots)	83			0.00	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0.00	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.40	29.73
Rating D	Open Space (Lawn Good Condition)	80			0.00	0.00
Rating A	Gravel Surface	76			0.00	0.00
Rating A	Dirt Surface	72			0.00	0.00
	Impervious Surface (roofs, pavement)	98			0.10	10.05
						0.00
						0.00
						0.00
Totals:					0.50	39.79

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{79}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. In	1.33	2.04	2.53	3.23	3.85	4.48
$\frac{(P-0.2S)^2}{(P+0.8S)}$						
$\frac{100}{Q} - 10.00$						
Volume of Runoff: (cu-ft)	2433	3727	4641	5905	7042	8202

P3

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0.11	7.63
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0	0.00
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.02	1.71
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0	0.00
						0.00
						0.00
						0.00
Totals:					0.13	9.34

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

CN (weighted) = $\frac{\text{Total Product}}{\text{Area}}$ = Use C: 71

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	4	4	4	4	4	4
Runoff, Q. In	0.86	1.44	1.87	2.48	3.03	3.61
$\frac{(P-0.2S)^2}{(P+0.8S)}$						
$\frac{100}{Q} - 10.00$						
Volume of Runoff: (cu-ft)	414	692	896	1187	1453	1730

P4A

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0.08	5.74
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0.37	30.94
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.12	8.75
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0	0.00
						0.00
						0.00
						0.00
Totals:					0.57	45.43

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

CN (weighted) = $\frac{\text{Total Product}}{\text{Area}}$ = Use C: 79

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. In	1.35	2.07	2.57	3.26	3.89	4.52
$\frac{(P-0.2S)^2}{(P+0.8S)}$ $\frac{100}{Q} - 10.00$	Volume of Runoff: 2818 4300 5345 6789 8087 9410					
	(cu-ft)					

P4B

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0.47	32.83
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0.82	68.09
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0.00
Rating C	Open Space (Lawn Good Condition)	74			3.59	265.48
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			1.66	162.71
						0.00
						0.00
						0.00
Totals:					6.54	529.11

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Area}} = \text{Use C: } \boxed{81}$$

2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	2	2	2	2	2	2
Runoff, Q. In	1.46	2.20	2.72	3.42	4.06	4.71
$\frac{(P-0.2S)^2}{(P+0.8S)}$	34760	52223	64457	81275	96342	111656
$\frac{100}{Q} - 10.00$						
Volume of Runoff: (cu-ft)						

P4E

Project 2235 - Denorfia	BY: BTP	Date: 4-13-12
Location: 570 Meriden Waterbury Turnpike	BY:	Date:

1. Runoff Curve Number

Soil name and hydrologic group	Cover Description	CN			Area (Acres)	Product of C x Area
		Table 2-2	Table 2-3	Table 2-4		
Rating A	Woods (Good Condition)	30			0	0.00
Rating B	Woods (Good Condition)	55			0	0.00
Rating C	Woods (Good Condition)	70			0.11	7.73
Rating C	Meadow (Good Condition)	71			0	0.00
Rating C	Residential (1/4 Acre Lots)	83			0.30	25.25
Rating C	Residential (1/2 - 1 Acre Lots)	79			0	0.00
Rating C	Open Space (Lawn Good Condition)	74			0.54	40.32
Rating D	Open Space (Lawn Good Condition)	80			0	0.00
Rating A	Gravel Surface	76			0	0.00
Rating A	Dirt Surface	72			0	0.00
	Impervious Surface (roofs, pavement)	98			0.15	14.84
						0.00
						0.00
						0.00
Totals:					1.11	88.13

Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55

CN (weighted) = $\frac{\text{Total Product}}{\text{Area}}$ = Use C: 79

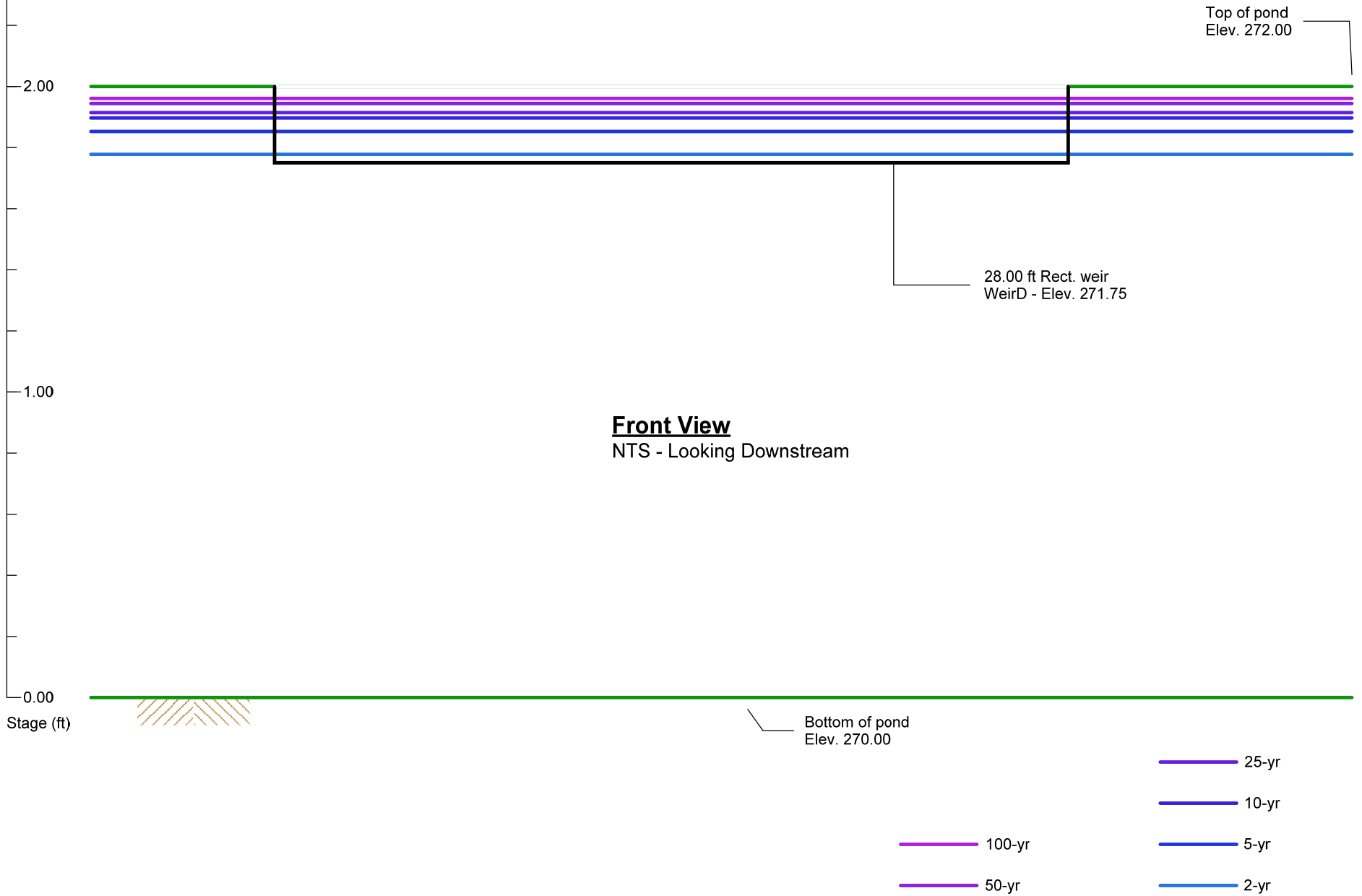
2. Runoff

Frequency yr	2	5	10	25	50	100
Hartford County Rainfall, P (24 Hour). in	3.20	4.10	4.70	5.50	6.20	6.90
S	3	3	3	3	3	3
Runoff, Q. In	1.36	2.07	2.57	3.27	3.89	4.53
$\frac{(P-0.2S)^2}{(P+0.8S)}$	Volume of Runoff:					
$\frac{100}{Q} - 10.00$	5478	8354	10382	13183	15701	18266
	(cu-ft)					

APPENDIX 'C'

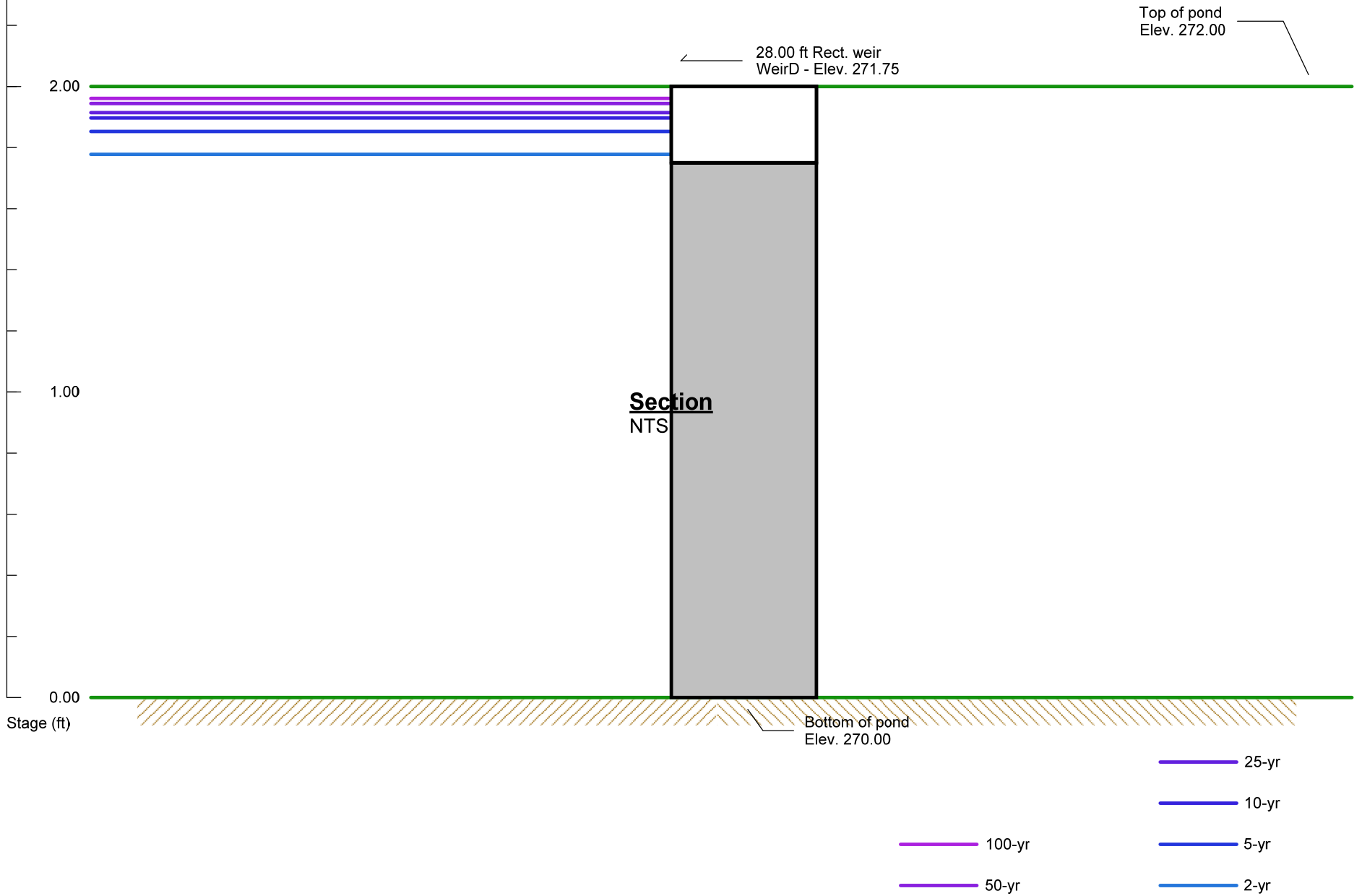
DETENTION DESIGN

Pond No. 7 - P2B



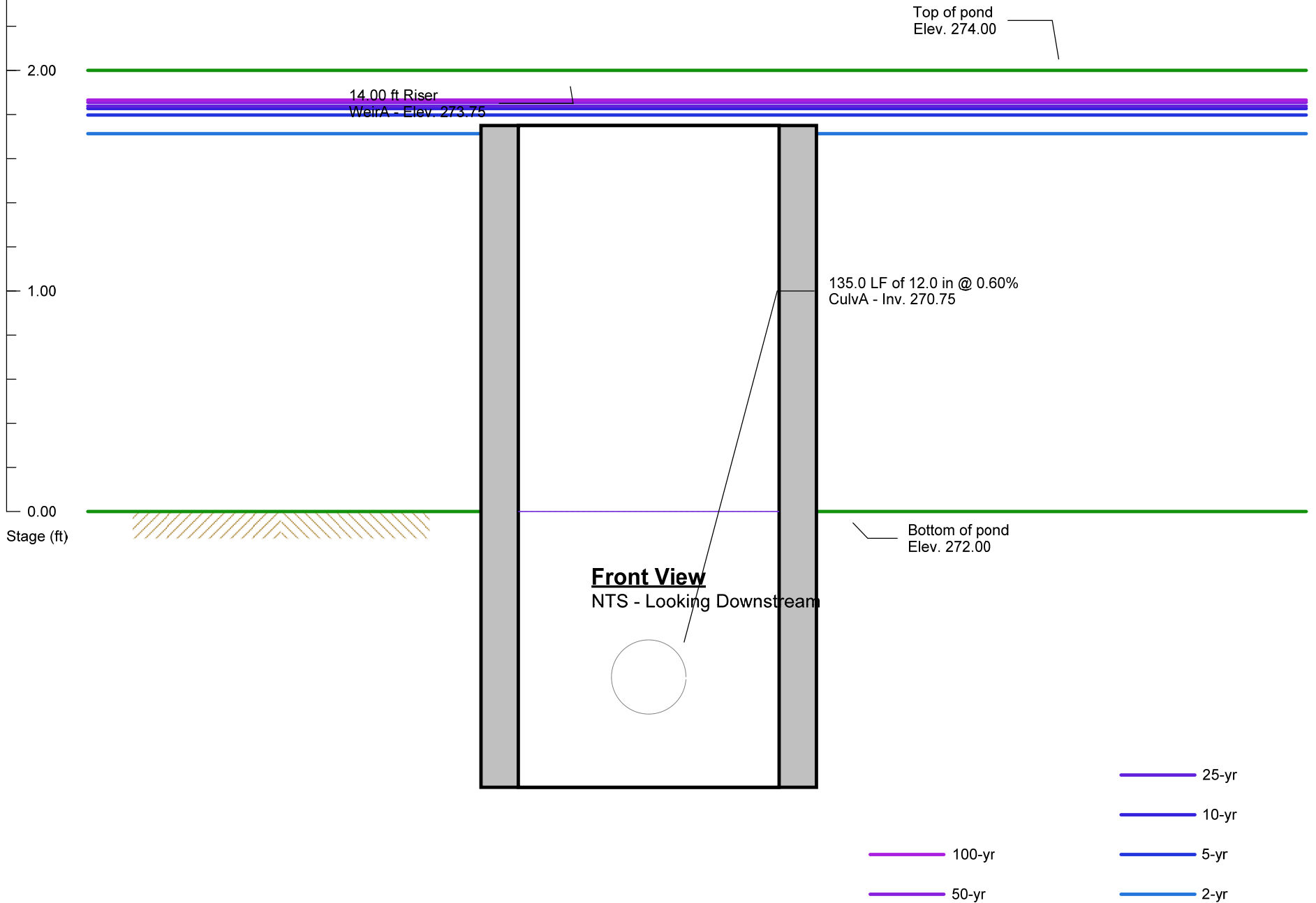
Inflow hydrograph = 8. SCS Runoff - P2B

Pond No. 7 - P2B



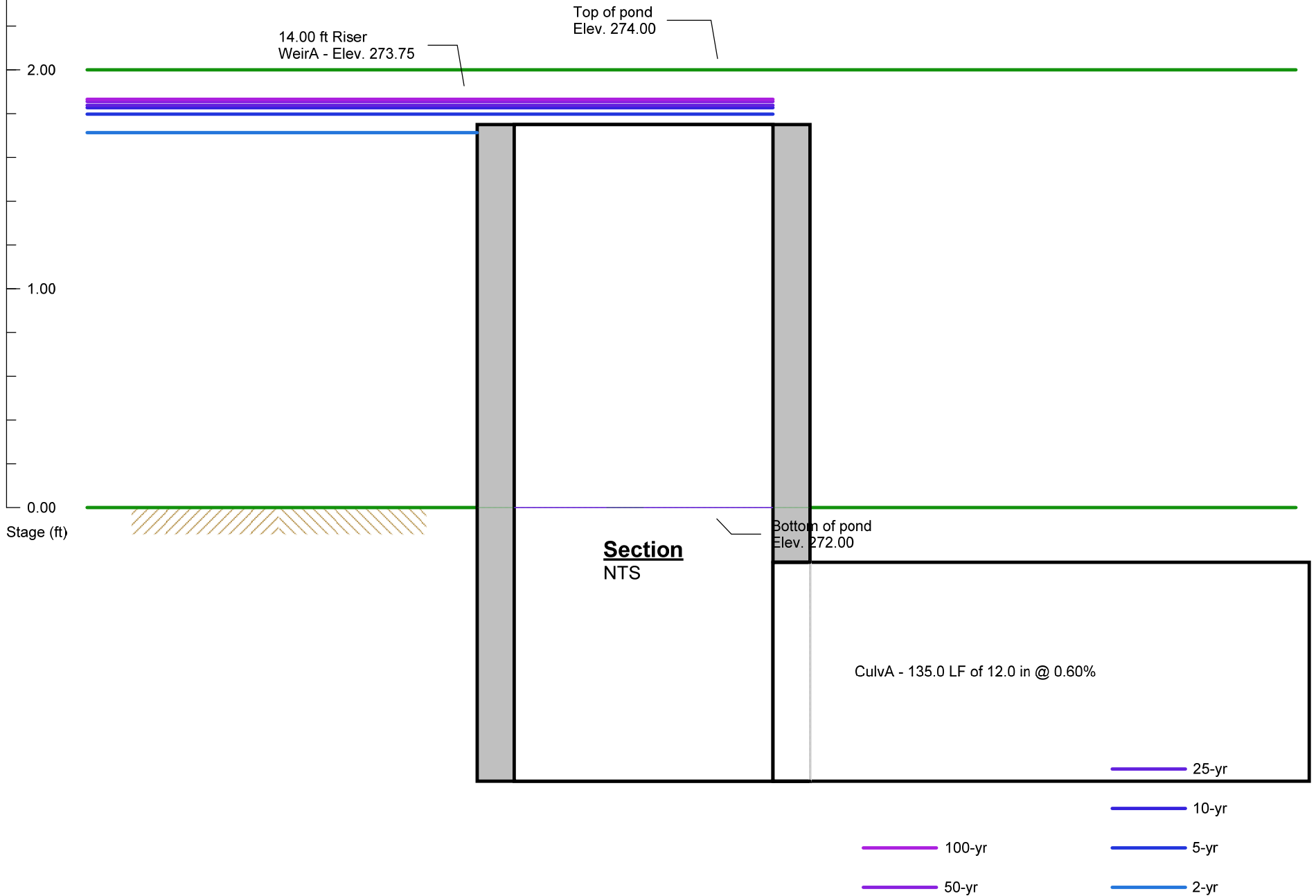
Inflow hydrograph = 8. SCS Runoff - P2B

Pond No. 8 - P2C



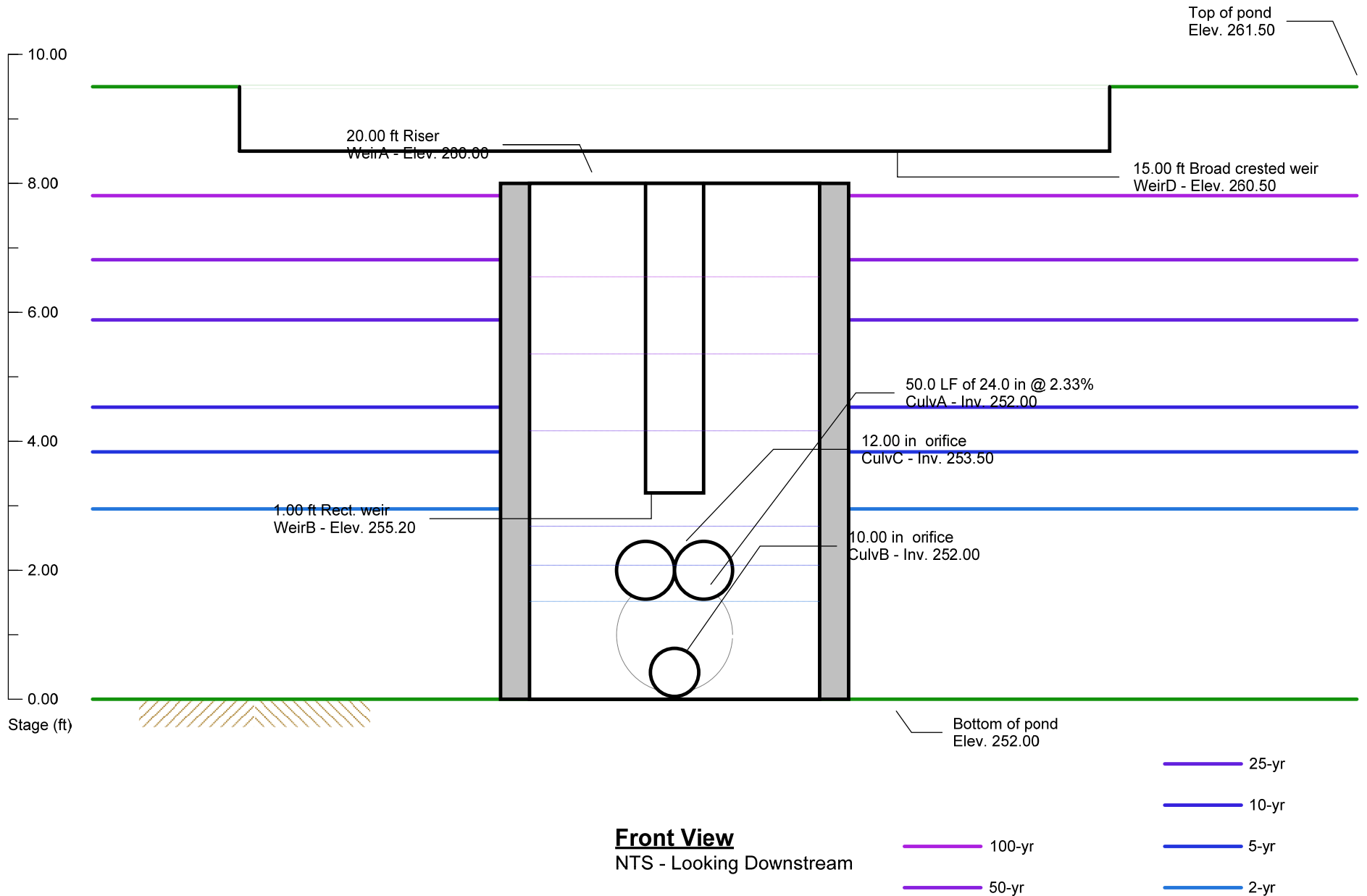
Inflow hydrograph = 9. SCS Runoff - P2C

Pond No. 8 - P2C



Inflow hydrograph = 9. SCS Runoff - P2C

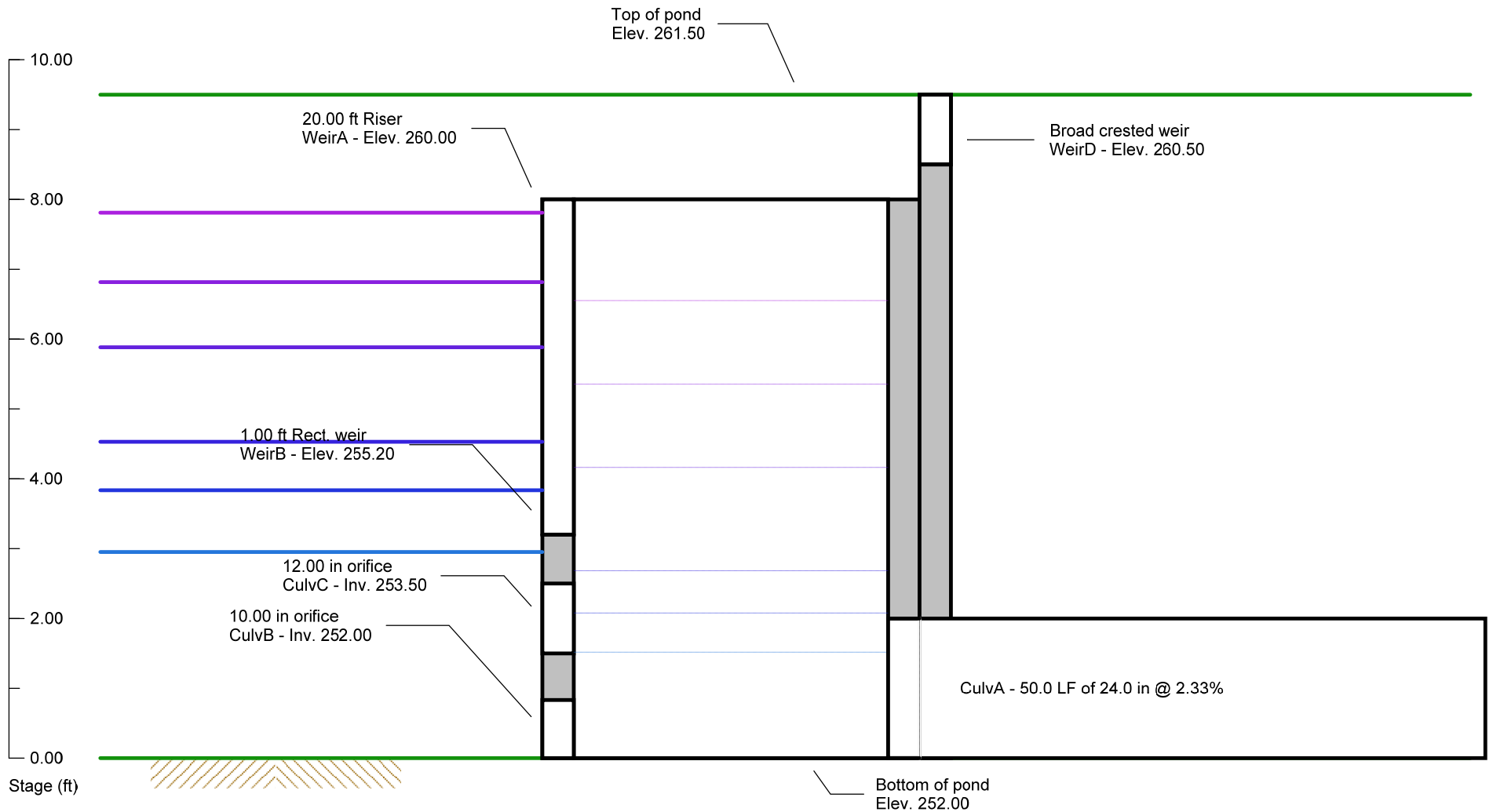
Pond No. 3 - P4B (Southwest)



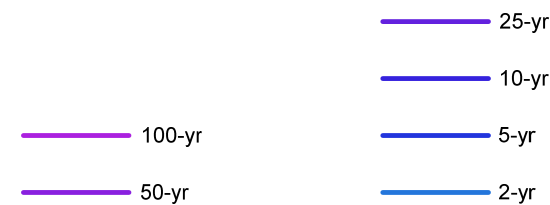
Front View
NTS - Looking Downstream

Inflow hydrograph = 29. Combine - To Basin P4B

Pond No. 3 - P4B (Southwest)

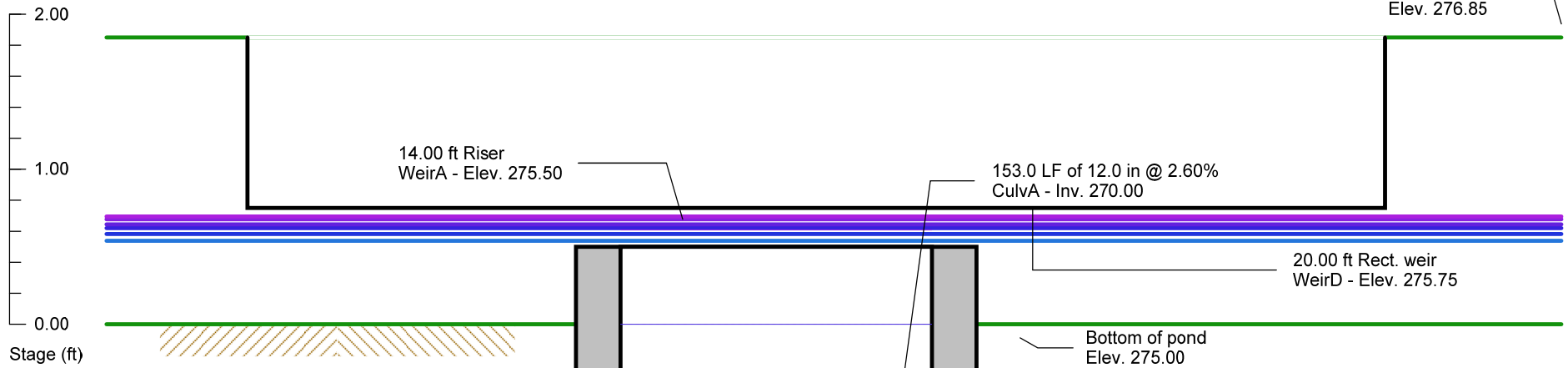


Section
NTS



Inflow hydrograph = 29. Combine - To Basin P4B

Pond No. 6 - P4E

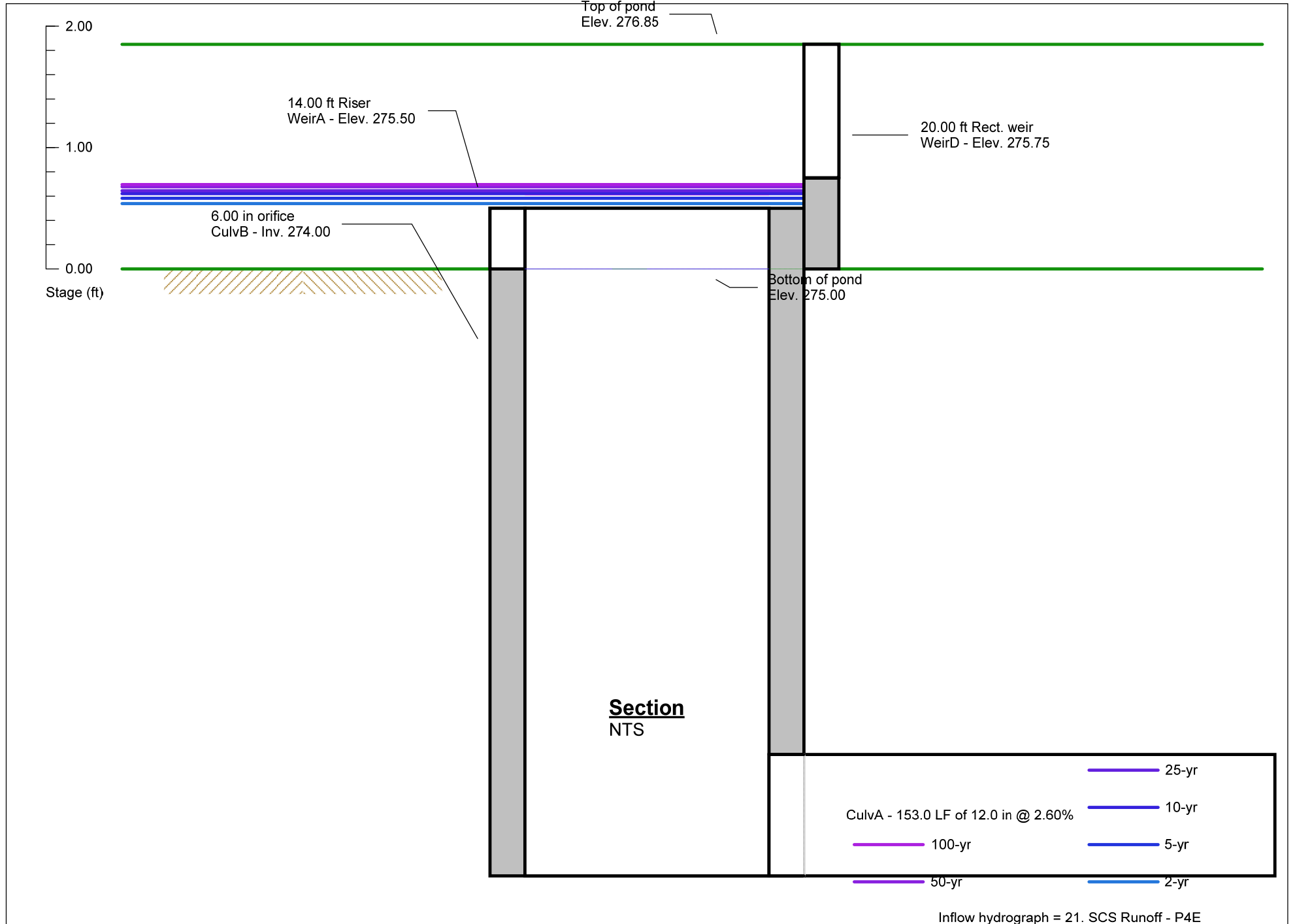


Front View
NTS - Looking Downstream



Inflow hydrograph = 21. SCS Runoff - P4E

Pond No. 6 - P4E



Inflow hydrograph = 21. SCS Runoff - P4E

Pond No. 7 - P2B

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 270.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	270.00	1,867	0	0
1.00	271.00	2,946	2,385	2,385
1.75	271.75	3,696	2,485	4,871
2.00	272.00	4,081	972	5,842
2.50	272.50	5,683	2,430	8,272

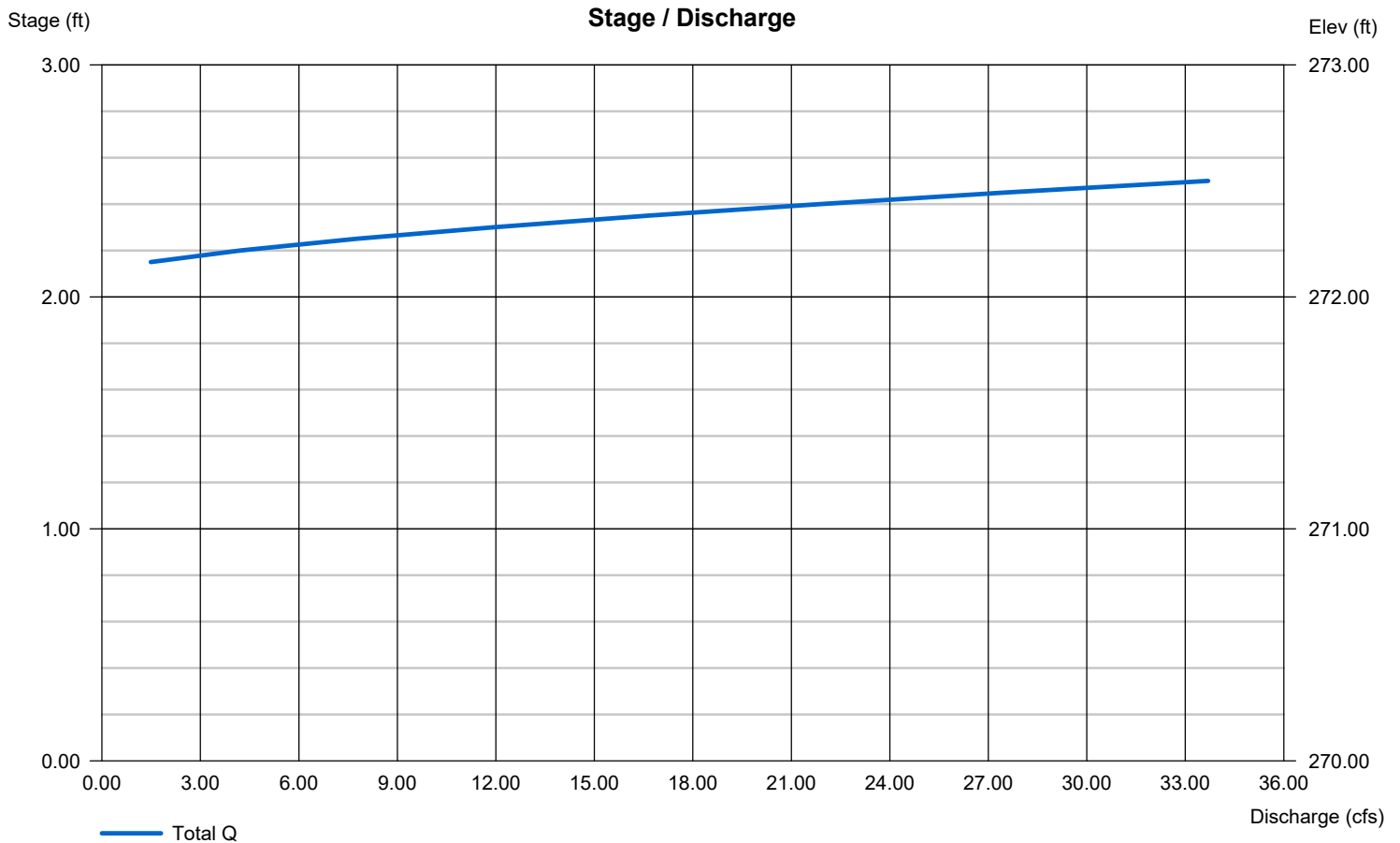
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	40.00
Crest El. (ft)	= 0.00	0.00	0.00	272.10
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	Rect
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond No. 6 - P4E

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 275.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	275.00	363	0	0
0.50	275.50	1,094	348	348
2.00	276.00	1,892	2,212	2,560

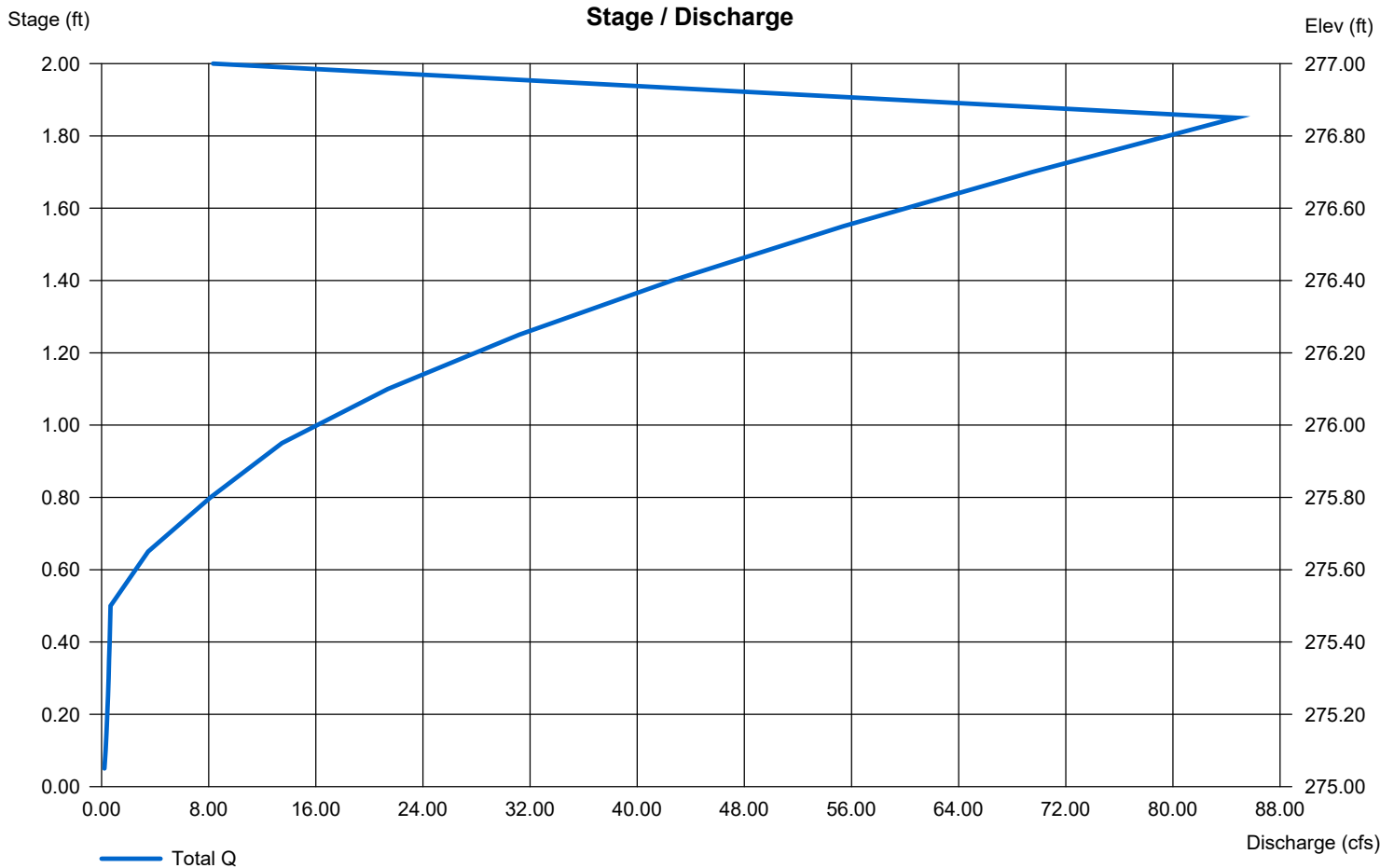
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 270.00	274.00	0.00	0.00
Length (ft)	= 153.00	0.00	0.00	0.00
Slope (%)	= 2.60	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	0.00	0.00	20.00
Crest El. (ft)	= 275.50	0.00	0.00	275.75
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	Rect
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Pond No. 3 - P4B (Southwest)

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 252.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	252.00	5,243	0	0
1.00	253.00	6,085	5,658	5,658
2.00	254.00	7,004	6,538	12,196
3.00	255.00	11,982	9,381	21,578
4.00	256.00	14,608	13,272	34,850
5.00	257.00	16,660	15,621	50,471
6.00	258.00	19,142	17,885	68,356
7.00	259.00	21,293	20,206	88,562
8.00	260.00	23,954	22,608	111,170
9.00	261.00	26,588	25,257	136,427
9.50	261.50	27,747	13,581	150,008

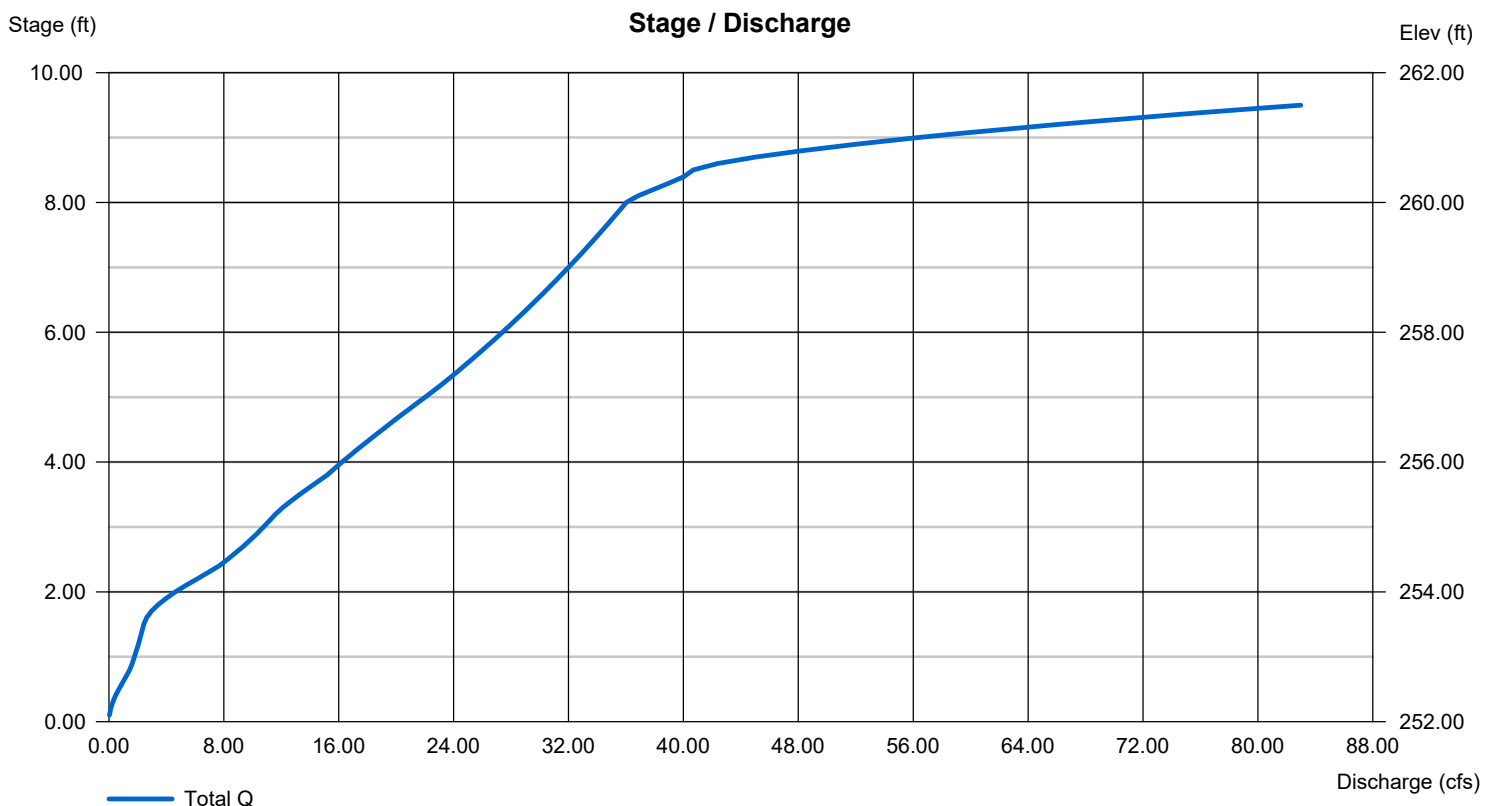
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	10.00	12.00	0.00
Span (in)	= 24.00	10.00	12.00	0.00
No. Barrels	= 1	1	2	0
Invert El. (ft)	= 252.00	252.00	253.50	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.33	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	1.00	Inactive	15.00
Crest El. (ft)	= 260.00	255.20	256.00	260.50
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= 1	Rect	Rect	Broad
Multi-Stage	= Yes	Yes	Yes	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Stage Storage

Project: Denorfia

Basin Description: Basin P4B (Large Pond SW)

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Incremental Volume Conic (cu. ft)	Cumulative Volume Conic (cu. ft)
252.00	5,243.30	N/A	N/A	0	N/A	0
253.00	6,084.82	1.00	5664	5664	5659	5659
254.00	7,004.15	1.00	6544	12209	6539	12198 ← WQV = 253.5 = +/- 8,000 cu. ft.
255.00	11,982.37	1.00	9493	21702	9383	21580
256.00	14,607.90	1.00	13295	34997	13273	34854
257.00	16,660.34	1.00	15634	50631	15623	50477
258.00	19,141.70	1.00	17901	68532	17887	68364
259.00	21,293.23	1.00	20217	88750	20208	88571
260.00	23,954.33	1.00	22624	111373	22611	111182
261.00	26,588.76	1.00	25272	136645	25260	136442

Basin Description: Basin P4E

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Incremental Volume Conic (cu. ft)	Cumulative Volume Conic (cu. ft)
274.000	363.16	N/A	N/A	0.00	N/A	0.00
275.000	1,094.23	1.000	728.70	728.70	695.93	695.93
276.000	1,891.80	1.000	1493.02	2221.71	1474.94	2170.86

Basin Description: Basin P2B

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Incremental Volume Conic (cu. ft)	Cumulative Volume Conic (cu. ft)
270.000	1,866.65	N/A	N/A	0.00	N/A	0.00
271.000	2,945.60	1.000	2406.13	2406.13	2385.71	2385.71
271.750	3,696.32	0.750	2490.72	4896.85	2485.40	4871.11
272.000	4,081.11	0.250	972.18	5869.03	971.78	5842.89

Basin Description: Basin P2C

Contour Elevation	Contour Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Incremental Volume Conic (cu. ft)	Cumulative Volume Conic (cu. ft)
272.000	484.18	N/A	N/A	0.00	N/A	0.00
273.000	902.11	1.000	693.14	693.14	682.39	682.39
274.000	1,366.72	1.000	1134.41	1827.56	1126.40	1808.79

Water Quality Volume (WQV)

Project: 2235
 Meriden Waterbury Turnpike
 Southington, CT

Project #: 2235
 Date: 7/15/2022
 Rev: 10/18/2022
 By: BTP

Equation:

$$WQV = (1")R(A)/12$$

Section 7.4.1 of 2004 Connecticut Stormwater Quality Manual

WQV= Water Quality Volume (ac-ft)

R = Volumetric Runoff Coefficient = 0.05+0.009 (I)

I = Percent Impervious Cover

A = Site Area in Acres

Basin #	Site Area "A" (acres)	Impervious Area (acres)	Impervious Cover "I" (%)	Runoff Coefficient "R"	Required		Main Area		Outlet Area		Total	
					Calculated		Provided WQV (cu-ft)	Provided WQV (%)	Provided WQV (cu-ft)	Provided WQV (%)	Provided WQV (cu-ft)	Provided WQV (%)
					WQV (ac-ft)	WQV (cu-ft)						
P4B & P4E	7.65	1.81	23.7	0.263	0.168	7,301.75	8000	110%	0	0%	8000	110%
P2B	2.11	0.15	7.1	0.114	0.020	873.02	2385	273%	1	0%	4871	558%
P2C	0.5	0.1	20.0	0.230	0.010	417.45	682	163%	2	0%	684	164%

Note: WQV provided in detention basin.

Channel Report

Emergency Spillway - Proposed Pond P4B

Trapezoidal

Bottom Width (ft) = 15.00
Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 1.25
Invert Elev (ft) = 252.00
Slope (%) = 4.60
N-Value = 0.350

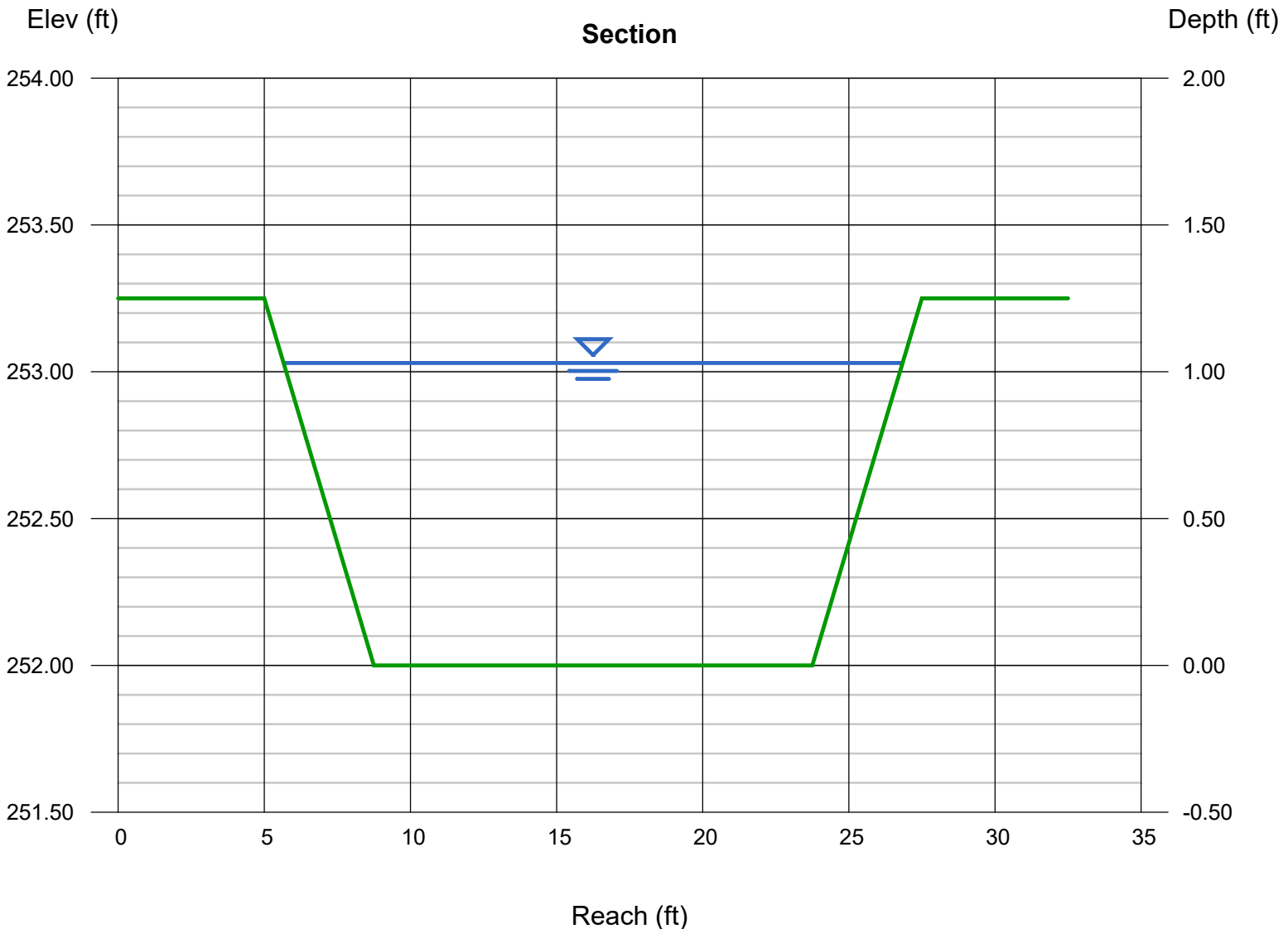
Highlighted

Depth (ft) = 1.03
Q (cfs) = 15.20
Area (sqft) = 18.63
Velocity (ft/s) = 0.82
Wetted Perim (ft) = 21.51
Crit Depth, Yc (ft) = 0.32
Top Width (ft) = 21.18
EGL (ft) = 1.04

Calculations

Compute by: Known Q
Known Q (cfs) = 15.20

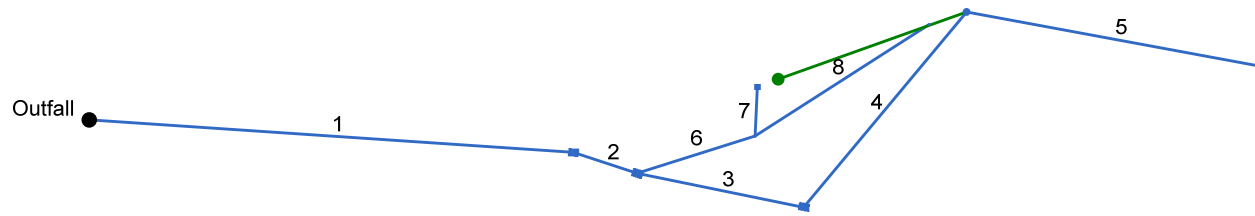
(13.79 Known Q at spillway wier with 10% safety factor)



APPENDIX ‘D’

COLLECTION SYSTEM ANALYSIS

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	195.871	3.840	Comb	0.00	0.32	0.95	5.0	238.27	3.19	244.52	24	Cir	0.012	0.50	248.68	Pipe - (21)
2	1	27.132	14.456	Comb	0.00	10.00	0.40	10.0	244.74	1.81	245.23	24	Cir	0.012	0.96	248.59	Pipe - (22)
3	2	68.643	-6.665	Grate	0.00	0.10	0.40	7.0	245.36	2.20	246.87	24	Cir	0.012	1.35	251.61	Pipe - (23)
4	3	102.975	-61.929	MH	0.00	0.18	0.17	7.0	246.87	2.35	249.29	24	Cir	0.013	0.89	257.38	Pipe - (12)
5	4	121.000	60.816	Hdwl	35.30	0.00	0.00	757.0	249.30	2.23	252.00	24	Cir	0.013	1.00	261.92	Pipe - (12) (1)
6	2	50.000	-35.864	None	0.00	0.00	0.00	0.0	245.66	2.68	247.00	12	Cir	0.012	0.95	250.00	Pipe - (24)
7	6	20.000	-70.000	Grate	0.00	0.26	0.32	5.0	247.50	5.50	248.60	4	Cir	0.012	1.00	249.33	
8	6	83.528	-15.183	None	0.00	0.00	0.00	0.0	247.00	2.74	249.29	12	Cir	0.012	1.00	254.00	

Project File: 2235 - Outlet Control - larger pond.stm

Number of lines: 8

Date: 10/18/2022

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	Structure - (31)	Combination	248.68	Rect	4.00	3.00	24	Cir	244.52	24	Cir	244.74
2	Structure - (32)	Combination	248.59	Rect	4.00	3.00	24	Cir	245.23	24 12	Cir Cir	245.36 245.66
3	Structure - (14)	Grate	251.61	Rect	4.00	3.00	24	Cir	246.87	24	Cir	246.87
4	A1	Manhole	257.38	Cir	2.00	2.00	24	Cir	249.29	24	Cir	249.30
5	A2	OpenHeadwall	261.92	n/a	n/a	n/a	24	Cir	252.00			
6	Structure - (33)	None	250.00	n/a	n/a	n/a	12	Cir	247.00	4 12	Cir Cir	247.50 247.00
7		Grate	249.33	Rect	2.00	2.00	4	Cir	248.60			
8		None	254.00	n/a	n/a	n/a	12	Cir	249.29			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (21)	35.35	24	Cir	195.871	238.27	244.52	3.191	239.63	246.44	1.01	246.44	End	Combination
2	Pipe - (22)	35.35	24	Cir	27.132	244.74	245.23	1.806	246.58	247.15	1.94	247.15	1	Combination
3	Pipe - (23)	35.33	24	Cir	68.643	245.36	246.87	2.200	247.15	248.79	n/a	248.79	2	Grate
4	Pipe - (12)	35.31	24	Cir	102.975	246.87	249.29	2.350	248.79	251.21	1.79	251.21	3	Manhole
5	Pipe - (12) (1)	35.30	24	Cir	121.000	249.30	252.00	2.231	251.21	253.92	2.01	253.92	4	OpenHeadwall
6	Pipe - (24)	0.00	12	Cir	50.000	245.66	247.00	2.680	247.15	247.15	0.00	247.15	2	None
7		0.96	4	Cir	20.000	247.50	248.60	5.500	247.83*	252.20*	1.90	254.10	6	Grate
8		0.00	12	Cir	83.528	247.00	249.29	2.742	247.15	250.29	0.00	250.29	6	None

Project File: 2235 - Outlet Control - larger pond.stm

Number of lines: 8

Run Date: 10/18/2022

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown).

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	195.871	0.32	10.86	0.95	0.30	4.46	5.0	109339	0.0	35.35	43.77	13.45	24	3.19	238.27	244.52	239.63	246.44	238.27	248.68	Pipe - (21)
2	1	27.132	10.00	10.54	0.40	4.00	4.15	10.0	109338	0.0	35.35	32.93	11.54	24	1.81	244.74	245.23	246.58	247.15	248.68	248.59	Pipe - (22)
3	2	68.643	0.10	0.28	0.40	0.04	0.07	7.0	757.3	0.5	35.33	36.34	11.65	24	2.20	245.36	246.87	247.15	248.79	248.59	251.61	Pipe - (23)
4	3	102.975	0.18	0.18	0.17	0.03	0.03	7.0	757.2	0.5	35.31	34.67	11.39	24	2.35	246.87	249.29	248.79	251.21	251.61	257.38	Pipe - (12)
5	4	121.000	0.00	0.00	0.00	0.00	0.00	757.0	757.0	0.0	35.30	33.79	11.40	24	2.23	249.30	252.00	251.21	253.92	257.38	261.92	Pipe - (12) (1)
6	2	50.000	0.00	0.26	0.00	0.00	0.08	0.0	109338	0.0	0.00	6.32	0.01	12	2.68	245.66	247.00	247.15	247.15	248.59	250.00	Pipe - (24)
7	6	20.000	0.26	0.26	0.32	0.08	0.08	5.0	5.0	11.6	0.96	0.48	11.04	4	5.50	247.50	248.60	247.83	252.20	250.00	249.33	
8	6	83.528	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	6.39	0.00	12	2.74	247.00	249.29	247.15	250.29	250.00	254.00	

Project File: 2235 - Outlet Control - larger pond.stm

Number of lines: 8

Run Date: 10/18/2022

NOTES: Intensity = 56.35 / (Inlet time + 3.80) ^ 0.73; Return period = Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
1	Structure - (31)	3.52	0.00	3.52	0.00	Comb	3.5	3.15	4.59	3.15	1.68	Sag	2.00	0.050	0.020	0.013	0.37	15.45	0.37	15.45	0.0	Off
2	Structure - (32)	33.39	0.22	33.61	0.00	Comb	3.5	3.15	4.59	3.15	1.68	Sag	2.00	0.050	0.020	0.013	1.31	62.64	1.31	62.64	0.0	Off
3	Structure - (14)	0.40	0.00	0.18	0.22	Grate	0.0	0.00	0.00	3.00	2.00	2.000	2.00	0.050	0.020	0.013	0.05	0.99	0.04	0.79	0.0	2
4	A1	0.31	0.00	0.00	0.31	MH	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.00	0.00	0.00	0.00	0.0	7
5	A2	35.30*	0.00	35.30	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
6	Structure - (33)	0.00	0.00	0.00	0.00	None	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.00	0.00	0.00	0.00	0.0	Off
7		0.96	0.31	1.27	0.00	Grate	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.22	8.02	0.22	8.02	0.0	6
8		0.00*	0.00	0.00	0.00	None	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.00	0.00	0.00	0.00	0.0	6

Project File: 2235 - Outlet Control - larger pond.stm

Number of lines: 8

Run Date: 10/18/2022

NOTES: Inlet N-Values = 0.016; Intensity = 56.35 / (Inlet time + 3.80) ^ 0.73; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	24	35.35	238.27	239.63	1.36	2.28	15.50	2.02	241.65	0.000	195.87	244.52	246.44	1.92**	3.10	11.40	2.02	248.46	0.000	0.000	n/a	0.50	1.01
2	24	35.35	244.74	246.58	1.84*	3.03	11.68	2.02	248.60	0.000	27.132	245.23	247.15	1.92**	3.10	11.40	2.02	249.17	0.000	0.000	n/a	0.96	1.94
3	24	35.33	245.36	247.15	1.79	2.97	11.90	2.02	249.17	0.000	68.643	246.87	248.79	1.92**	3.10	11.39	2.02	250.81	0.000	0.000	n/a	1.35	n/a
4	24	35.31	246.87	248.79	1.92	3.10	11.39	2.02	250.81	0.000	102.975	249.29	251.21	1.92**	3.10	11.39	2.02	253.23	0.000	0.000	n/a	0.89	1.79
5	24	35.30	249.30	251.21	1.91	3.09	11.41	2.01	253.23	0.000	121.000	252.00	253.92	1.92**	3.10	11.38	2.01	255.94	0.000	0.000	n/a	1.00	2.01
6	12	0.00	245.66	247.15	1.00	0.79	0.00	0.00	247.15	0.000	50.000	247.00	247.15	0.15	0.08	0.01	0.00	247.15	0.000	0.000	0.000	0.95	0.00
7	4	0.96	247.50	247.83	0.33*	0.09	11.04	1.90	249.73	21.801	20.000	248.60	252.20	0.33**	0.09	11.04	1.90	254.10	21.873	21.837	4.367	1.00	1.90
8	12	0.00	247.00	247.15	0.15	0.08	0.00	0.00	247.15	0.000	83.528	249.29	250.29	1.00**	0.79	0.00	0.00	250.29	0.000	0.000	n/a	1.00	0.00

Project File: 2235 - Outlet Control - larger pond.stm

Number of lines: 8

Run Date: 10/18/2022

Notes: * depth assumed; ** Critical depth. ; c = cir e = ellip b = box

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.

Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.

Col. 3 Total flow rate in the line.

Col. 4 The elevation of the downstream invert.

Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.

Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 7 Cross-sectional area of the flow at the downstream end.

Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).

Col. 9 Velocity head (Velocity squared / 2g).

Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).

Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).

Col. 12 The line length.

Col. 13 The elevation of the upstream invert.

Col. 14 Elevation of the hydraulic grade line at the upstream end.

Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 16 Cross-sectional area of the flow at the upstream end.

Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).

Col. 18 Velocity head (Velocity squared / 2g).

Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .

Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).

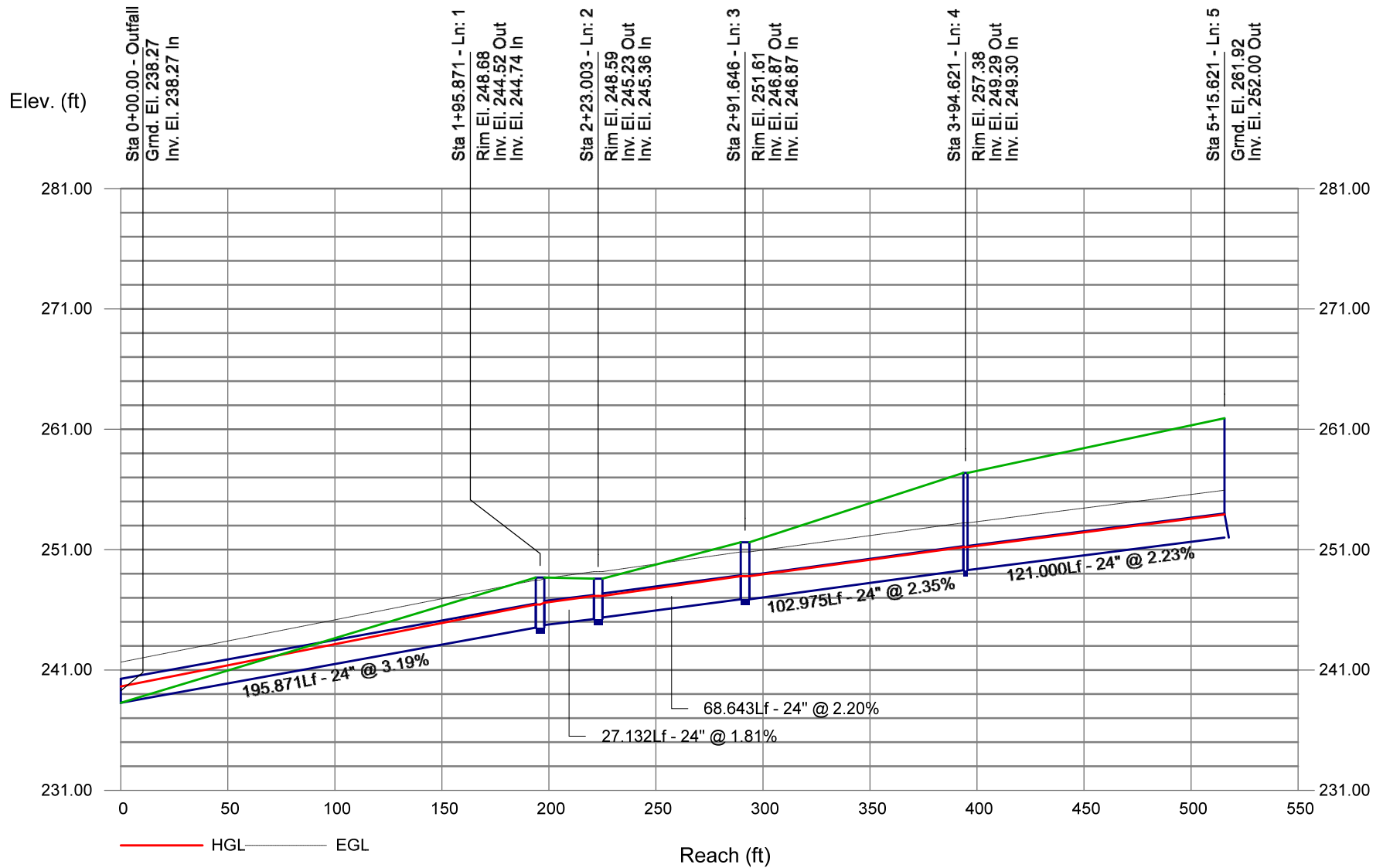
Col. 21 The average of the downstream and upstream friction slopes.

Col. 22 Energy loss. Average $Sf/100 \times \text{Line Length}$ (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.

Col. 23 The junction loss coefficient (K).

Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

Storm Sewer Profile



APPENDIX “E”

STORMWATER
MANAGEMENT
MAINTENANCE
SCHEDULE

STORMWATER MANAGEMENT MAINTENANCE SCHEDULE

SOUTHINGTON, CONNECTICUT

The following are the required maintenance and monitoring procedures:

Riprap and Discharge Aprons - Shall be cleared of all sediment deposits and invasive plant species and are to be inspected for rip-rap damage and deterioration. These procedures to be conducted yearly between May 1 and before September 15.

Outlet Control Structure - Shall be cleaned of all sediment, trash and debris and is to be inspected for structural integrity. These procedures to be conducted yearly between May 1 and September 15. Structure shall be inspected two times a year and after significant rainfall events. Additional maintenance, beyond scheduled maintenance, may be required based upon inspections. Repairs shall be executed immediately.

Emergency Spillway - Shall be cleared of all sediment deposits and invasive plant species and are to be inspected for riprap damage and deterioration. These procedures to be conducted yearly between May 1 and September 15. Repairs shall be executed immediately.

Catch Basins - All basin rim areas and sumps shall be cleaned of all sediment, trash and debris. These procedures to be conducted yearly anytime after May 1 and before September 15.

Swales - all swales be cleared of all sediment deposits, invasive plant species and debris. Any erosion shall be repaired. These procedures to be conducted annually. Swales shall be inspected two times a year and after significant rainfall events. Additional maintenance, beyond schedule maintenance, may be required based upon inspections.

Detention Basin - Basin shall be cleared of all sediment deposits, invasive plant species and debris. These procedures to be conducted yearly between May 1 and September 15. Basin shall be inspected two times a year and after significant rainfall events. Additional maintenance, beyond scheduled maintenance, may be required based upon inspections.

Slopes - Slope erosion control blankets and vegetation shall be inspected twice a year and after significant rainfall events. Additional maintenance, beyond schedule maintenance, may be required based upon inspections. Any rills or channeling shall be repaired immediately

Drive Sweeping - Use mechanical sweeping on paved areas where dust and fine materials accumulate. These procedures to be conducted yearly anytime after May 1 and before September 15. All sediment deposits, trash and debris shall be removed to a location off-site and disposed of in an environmentally acceptable manner.

All sediment deposits, trash and debris shall be removed to a location off-site and disposed of in an environmentally acceptable manner.