STORMWATER MANAGEMENT REPORT

570 Meriden Waterbury Turnpike
Southington, Connecticut

Prepared For
AA Denorfia Building & Development
HEC Project #2235

July 15, 2022

By

Harry E. Cole & Son

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Barton N. Bovee, P.E. #13653
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SEAL IS AFFIXED HERETO.

Table of Contents

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 respectably, 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 slight reduction in peak flows will be achieved with the designed drainage system, and the conveyance systems will adequately convey runoff for all design storms. 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.

V. TECHNICAL CRITERIA & METHODOLOGY

5.1 Technical Criteria

Design Element	Design Frequency
-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	Design Storm
-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

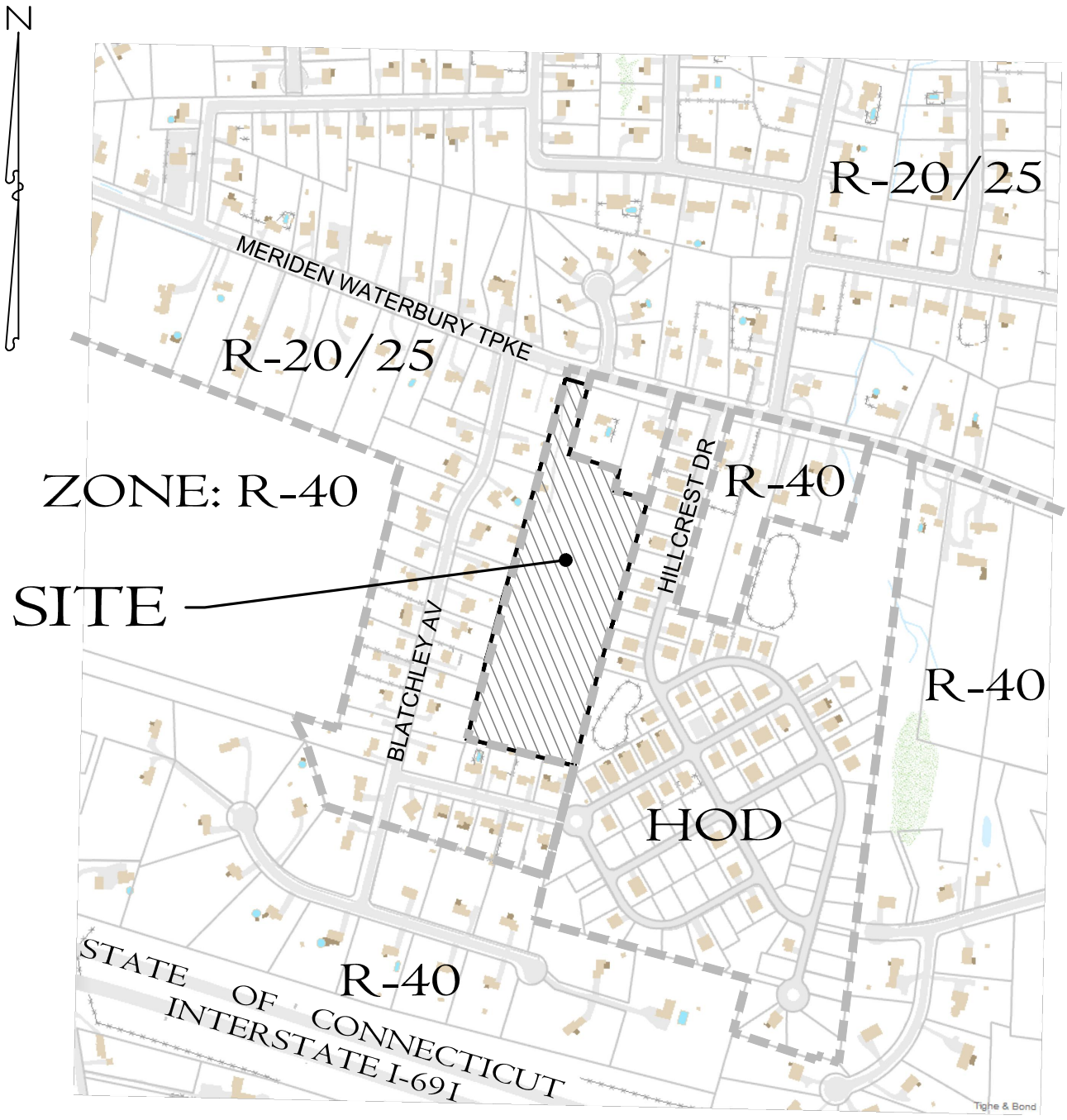
4) 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, Connecticut Council on Soil and Water Conservation, 79 Elm Street, Hartford, Connecticut.

5) 2000 Drainage Manual, Connecticut Department of Transportation,

APPENDICES TABLE OF CONTENTS

APPENDIX 'A'

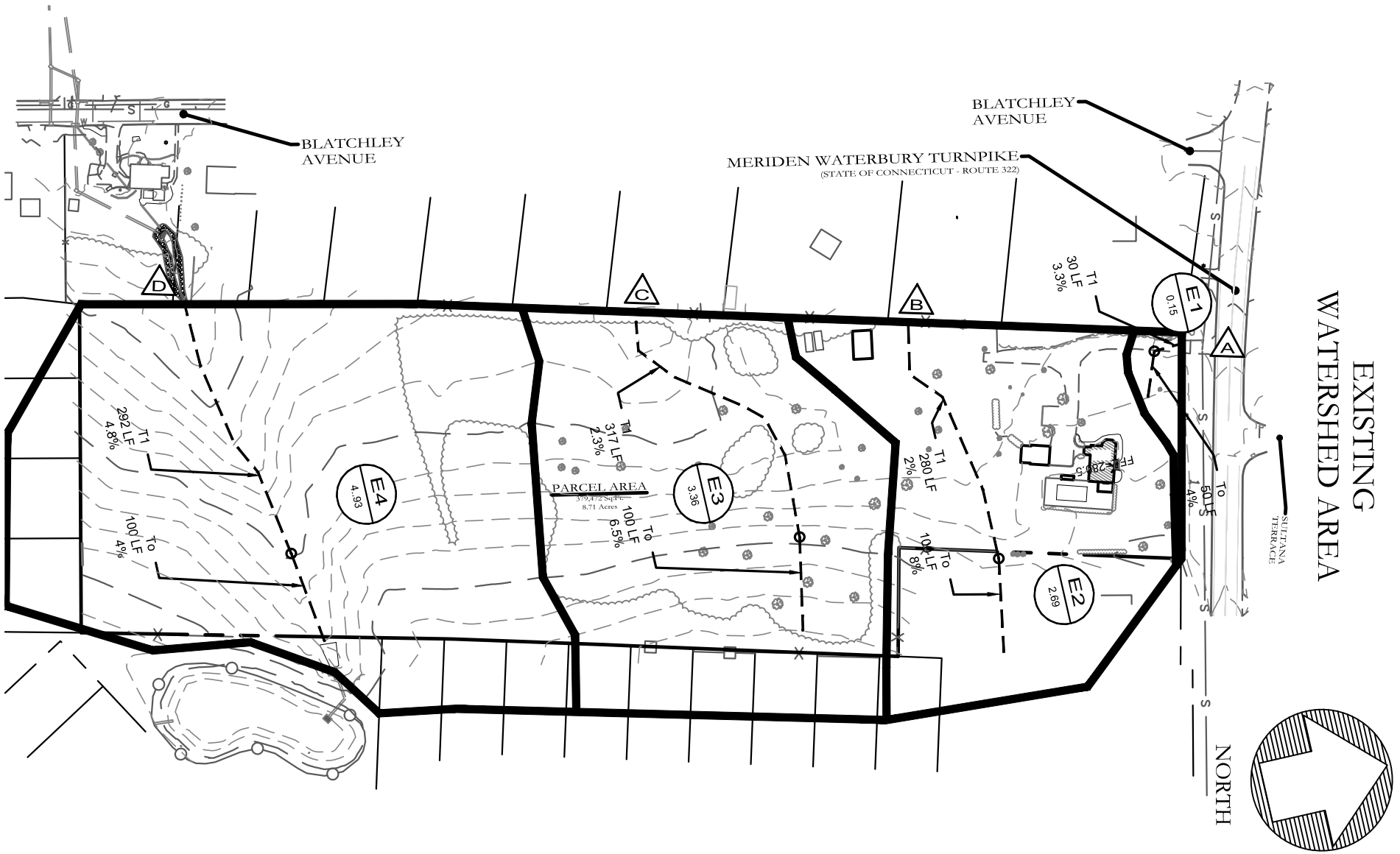
FIGURES



KEY MAP

SCALE: 1"=500'

DRAWING NAME: P:\Land Projects\2235-AA Denorfia Building & Development, LLC-570 Meriden Waterbury Turnpike, Southington CT\Stormwater Management\Figures\2235 - Drainage - Watershed Areas.dwg
LAYOUT: 02 PLOT DATE: Jul 15, 2022 - 12:24pm OPERATOR: panico



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

Scale: 1" = 150'
Date: May 9, 2022
Project #: 2235

02

DRAWING NAME: P:\Land Projects\2235-AA Denorfia Building & Development, LLC-570 Meriden Waterbury Turnpike, Southington CT\Stormwater Management\Figures\2235 - Drainage - Prop Watershed Areas.dwg
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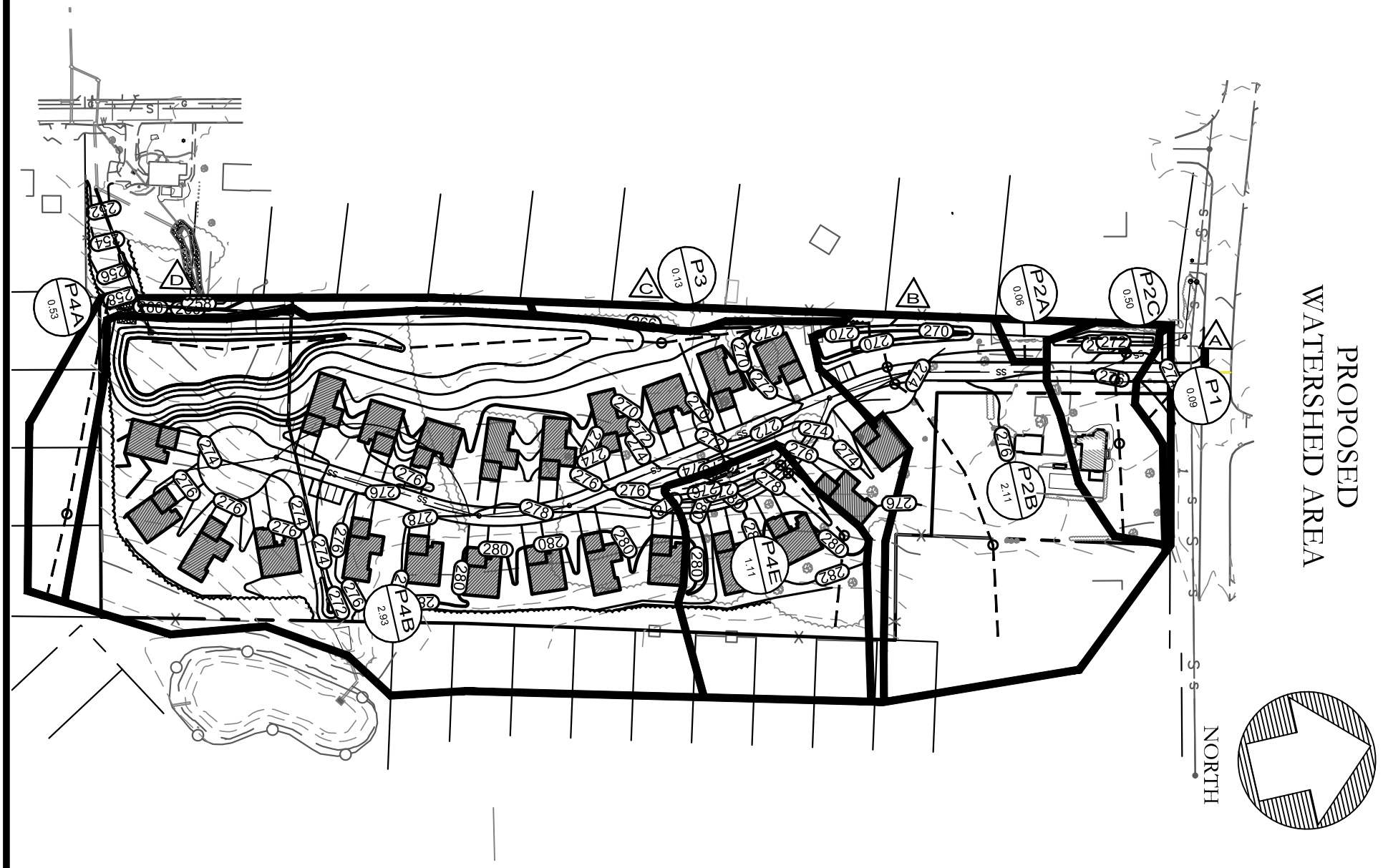

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570 Meriden Waterbury Turnpike
POST DEVELOPMENT
WATERSHED AREA MAP
Southington, Connecticut

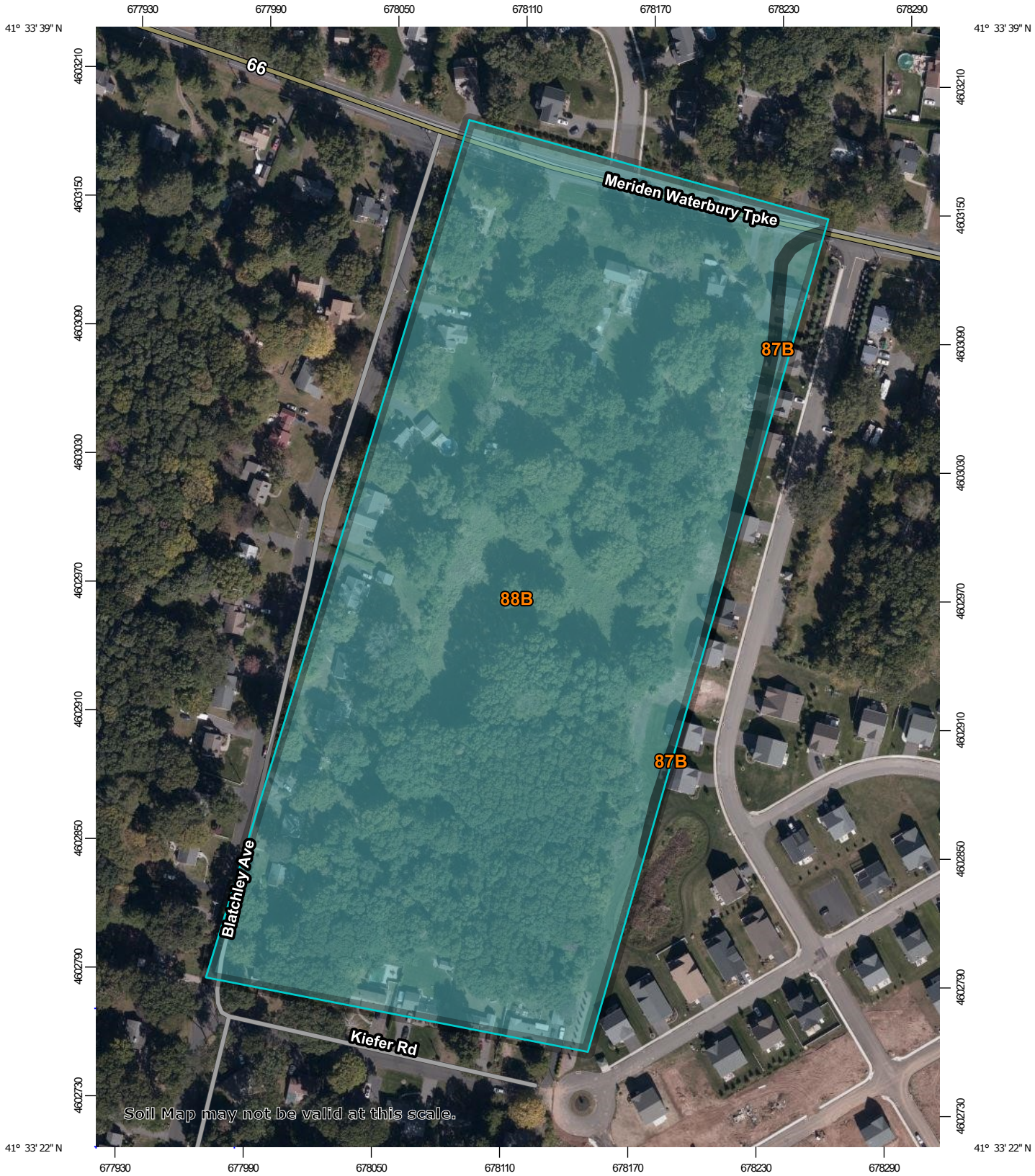
Scale: 1" = 150'

Date: June 6, 2022

Project #: 2235

03

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



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

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

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

NATIONAL FLOOD INSURAI
FLOOD INSURANCE RATE M

National Flood Insurance Program

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

FEMA

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

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 (NDDB) from a variety of data sources . Exact locations of species have been buffered to produce the generalized locations.

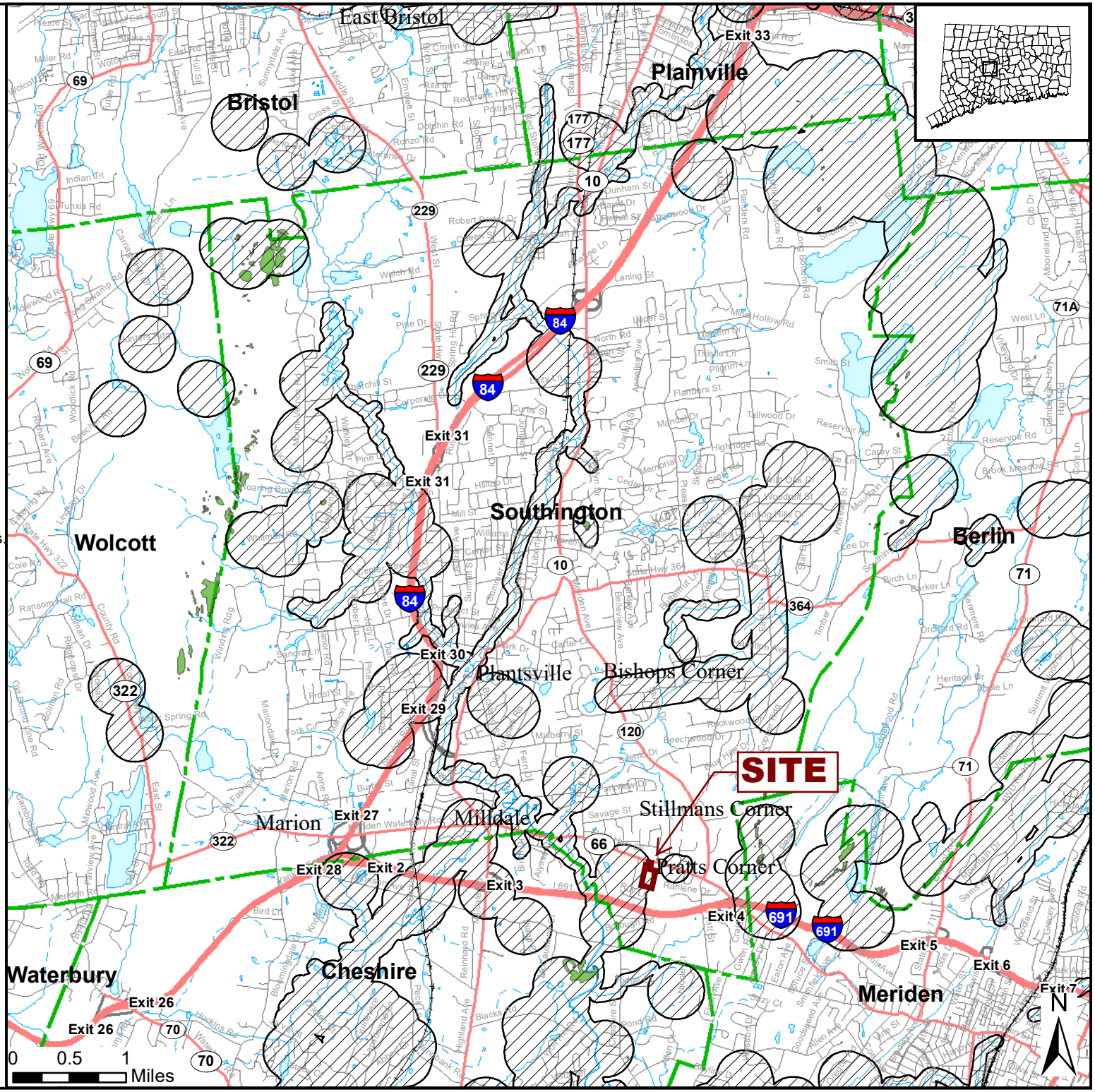
This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For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

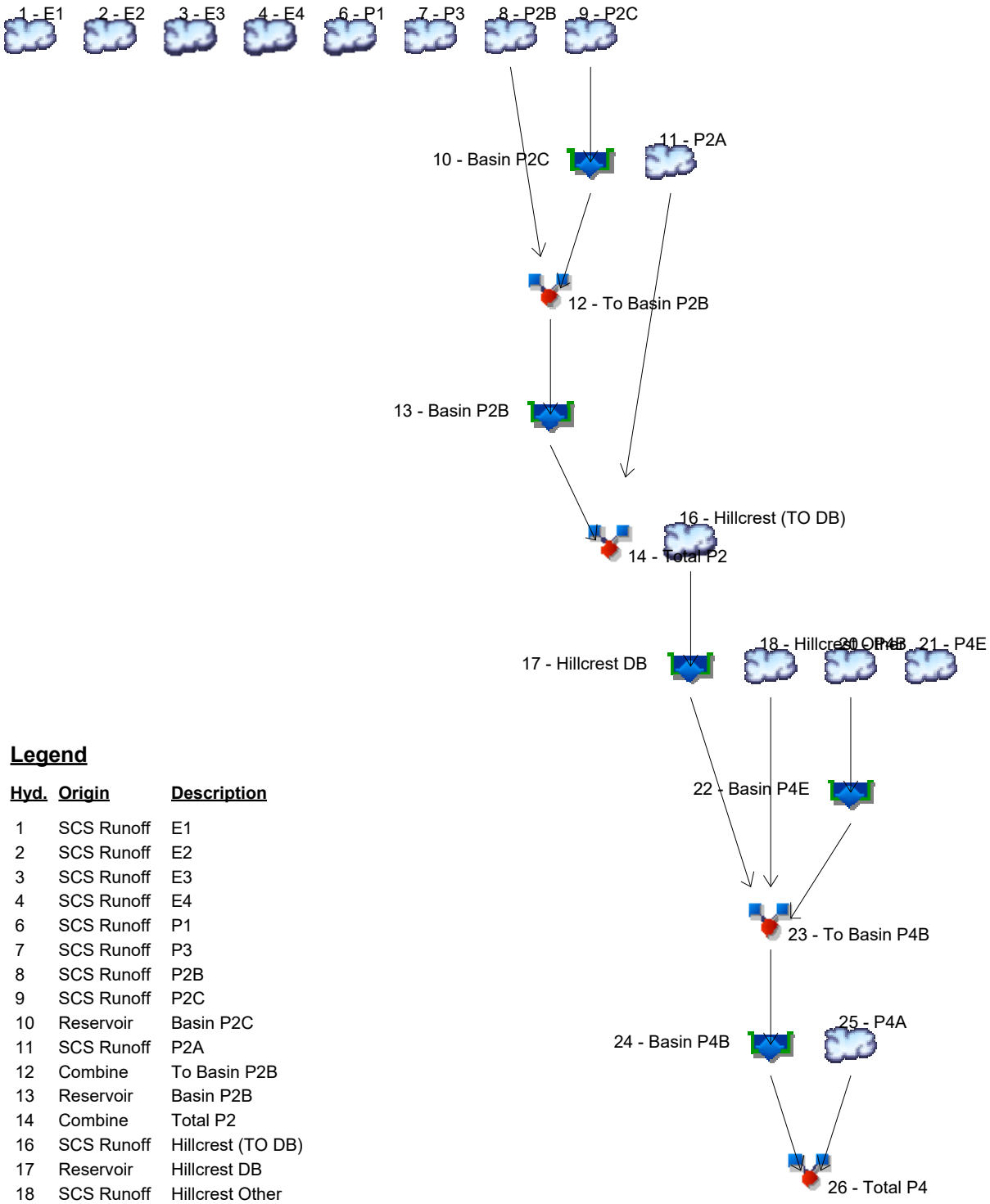
Design Point	Design Storm	Existing Peak Flow (cfs)	Proposed Peak Flow (cfs)	Change in Peak Flow (cfs)	
DP A (Meriden Waterbury Tpke)	2	0.22	0.17	-0.04	
	5	0.34	0.26	-0.08	
	10	0.45	0.34	-0.11	
	25	0.51	0.38	-0.13	
	50	0.65	0.48	-0.17	
	100	0.74	0.54	-0.20	
DP B (Properties to the West)	2	3.46	0.45	-3.01	See note #1 Below
	5	5.43	3.13	-2.30	
	10	7.17	5.41	-1.76	
	25	8.27	7.21	-1.06	
	50	10.51	9.75	-0.76	
	100	11.87	11.05	-0.82	
DP C (Properties to the West)	2	2.94	0.13	-2.81	
	5	5.05	0.24	-4.82	
	10	6.98	0.33	-6.64	
	25	8.23	0.39	-7.84	
	50	10.83	0.52	-10.31	
	100	12.42	0.60	-11.82	
DP D (Existing Storm System)	2	3.97	3.71	-0.26	See note #2 Below
	5	6.82	6.24	-0.58	
	10	9.43	8.69	-0.74	
	25	11.12	11.00	-0.12	
	50	14.61	22.91	8.30	
	100	16.77	31.56	14.79	

Notes:

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

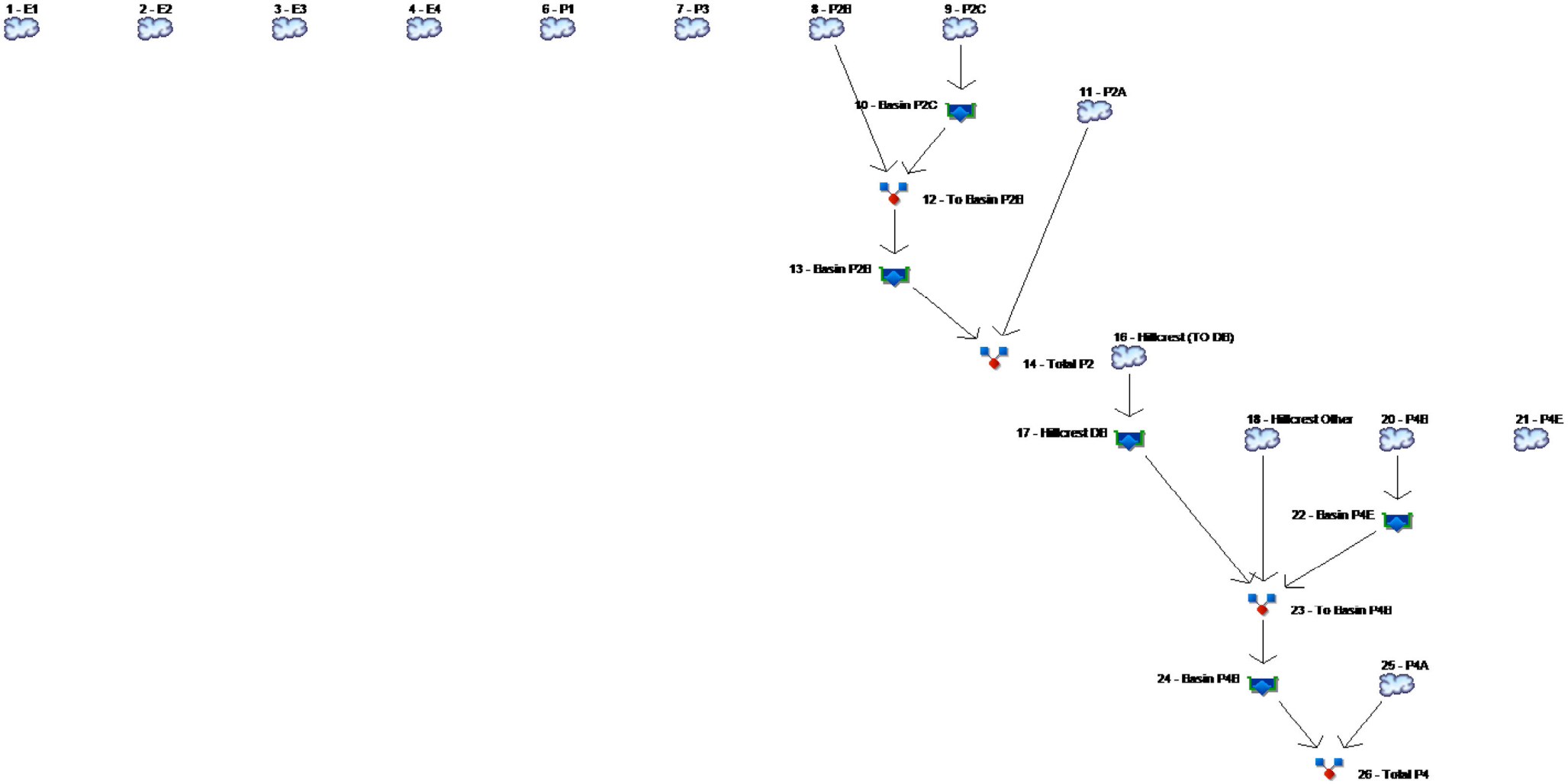
2. Proposed Peak flows at Design Point D are a summation of the detention pond release(s) and drainage basin P4A

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	E1
2	SCS Runoff	E2
3	SCS Runoff	E3
4	SCS Runoff	E4
6	SCS Runoff	P1
7	SCS Runoff	P3
8	SCS Runoff	P2B
9	SCS Runoff	P2C
10	Reservoir	Basin P2C
11	SCS Runoff	P2A
12	Combine	To Basin P2B
13	Reservoir	Basin P2B
14	Combine	Total P2
16	SCS Runoff	Hillcrest (TO DB)
17	Reservoir	Hillcrest DB
18	SCS Runoff	Hillcrest Other
20	SCS Runoff	P4B
21	SCS Runoff	P4E
22	Reservoir	Basin P4E
23	Combine	To Basin P4B
24	Reservoir	Basin P4B
25	SCS Runoff	P4A
26	Combine	Total P4


1 - E1
2 - E2
3 - E3
4 - E4
6 - P1
7 - P3
8 - P2B
9 - P2C
10 - Basin P2C
11 - P2A
12 - To Basin P2B
13 - Basin P2B
14 - Total P2
16 - Hillcrest (TO DB)
17 - Hillcrest DB
18 - Hillcrest Oliver
20 - P4B
21 - P4E
22 - Basin P4E
23 - To Basin P4B
24 - Basin P4B
25 - P4A
26 - Total P4

Hydrograph Return Period Recap

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	------	-------	0.216	-------	0.338	0.446	0.514	0.653	0.737	E1
2	SCS Runoff	------	-------	3.459	-------	5.429	7.166	8.272	10.51	11.87	E2
3	SCS Runoff	------	-------	2.940	-------	5.050	6.975	8.232	10.83	12.42	E3
4	SCS Runoff	------	-------	3.971	-------	6.819	9.429	11.12	14.61	16.77	E4
6	SCS Runoff	------	-------	0.172	-------	0.260	0.335	0.383	0.479	0.537	P1
7	SCS Runoff	------	-------	0.132	-------	0.235	0.331	0.393	0.522	0.602	P3
8	SCS Runoff	------	-------	2.572	-------	4.092	5.440	6.301	8.050	9.109	P2B
9	SCS Runoff	------	-------	0.572	-------	0.897	1.185	1.368	1.741	1.966	P2C
10	Reservoir	9	-------	0.069	-------	0.511	1.110	1.356	1.735	1.959	Basin P2C
11	SCS Runoff	------	-------	0.067	-------	0.114	0.156	0.183	0.238	0.272	P2A
12	Combine	8, 10,	-------	2.572	-------	4.092	5.440	7.220	9.634	10.90	To Basin P2B
13	Reservoir	12	-------	0.442	-------	3.075	5.332	7.104	9.560	10.83	Basin P2B
14	Combine	11, 13	-------	0.453	-------	3.131	5.410	7.212	9.746	11.05	Total P2
16	SCS Runoff	------	-------	11.11	-------	16.24	20.63	23.39	28.90	32.20	Hillcrest (TO DB)
17	Reservoir	16	-------	3.412	-------	4.184	4.710	7.803	15.89	20.58	Hillcrest DB
18	SCS Runoff	------	-------	3.821	-------	6.346	8.636	10.12	13.15	15.00	Hillcrest Other
20	SCS Runoff	------	-------	7.841	-------	12.00	15.64	17.94	22.59	25.40	P4B
21	SCS Runoff	------	-------	1.427	-------	2.240	2.957	3.413	4.338	4.897	P4E
22	Reservoir	20	-------	7.827	-------	11.98	15.63	17.94	22.60	25.40	Basin P4E
23	Combine	17, 18, 22	-------	14.53	-------	21.87	28.24	32.29	45.51	56.10	To Basin P4B
24	Reservoir	23	-------	3.645	-------	6.125	8.509	10.76	22.51	30.98	Basin P4B
25	SCS Runoff	------	-------	0.693	-------	1.074	1.409	1.622	2.051	2.311	P4A
26	Combine	24, 25	-------	3.707	-------	6.238	8.686	11.00	22.91	31.56	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	0.216	1	727	748	------	------	------	E1
2	SCS Runoff	3.459	1	729	13,211	------	------	------	E2
3	SCS Runoff	2.940	1	731	12,379	------	------	------	E3
4	SCS Runoff	3.971	1	734	17,956	------	------	------	E4
6	SCS Runoff	0.172	1	725	532	------	------	------	P1
7	SCS Runoff	0.132	1	725	442	------	------	------	P3
8	SCS Runoff	2.572	1	729	9,878	------	------	------	P2B
9	SCS Runoff	0.572	1	733	2,466	------	------	------	P2C
10	Reservoir	0.069	1	817	995	9	273.71	1,485	Basin P2C
11	SCS Runoff	0.067	1	726	227	------	------	------	P2A
12	Combine	2.572	1	729	10,873	8, 10,	------	------	To Basin P2B
13	Reservoir	0.442	1	769	6,002	12	271.78	4,978	Basin P2B
14	Combine	0.453	1	769	6,230	11, 13	------	------	Total P2
16	SCS Runoff	11.11	1	732	47,166	------	------	------	Hillcrest (TO DB)
17	Reservoir	3.412	1	759	45,771	16	277.95	17,012	Hillcrest DB
18	SCS Runoff	3.821	1	737	18,666	------	------	------	Hillcrest Other
20	SCS Runoff	7.841	1	735	36,156	------	------	------	P4B
21	SCS Runoff	1.427	1	729	5,451	------	------	------	P4E
22	Reservoir	7.827	1	736	36,155	20	275.79	776	Basin P4E
23	Combine	14.53	1	737	100,592	17, 18, 22	------	------	To Basin P4B
24	Reservoir	3.645	1	850	100,285	23	261.28	37,101	Basin P4B
25	SCS Runoff	0.693	1	731	2,771	------	------	------	P4A
26	Combine	3.707	1	848	103,057	24, 25	------	------	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	0.338	1	727	1,158	------	------	------	E1
2	SCS Runoff	5.429	1	729	20,445	------	------	------	E2
3	SCS Runoff	5.050	1	731	20,400	------	------	------	E3
4	SCS Runoff	6.819	1	733	29,591	------	------	------	E4
6	SCS Runoff	0.260	1	725	800	------	------	------	P1
7	SCS Runoff	0.235	1	725	746	------	------	------	P3
8	SCS Runoff	4.092	1	729	15,438	------	------	------	P2B
9	SCS Runoff	0.897	1	733	3,817	------	------	------	P2C
10	Reservoir	0.511	1	748	2,346	9	273.80	1,581	Basin P2C
11	SCS Runoff	0.114	1	726	370	------	------	------	P2A
12	Combine	4.092	1	729	17,784	8, 10,	------	------	To Basin P2B
13	Reservoir	3.075	1	737	12,913	12	271.85	5,270	Basin P2B
14	Combine	3.131	1	737	13,283	11, 13	------	------	Total P2
16	SCS Runoff	16.24	1	732	69,091	------	------	------	Hillcrest (TO DB)
17	Reservoir	4.184	1	761	67,696	16	278.90	26,037	Hillcrest DB
18	SCS Runoff	6.346	1	737	30,088	------	------	------	Hillcrest Other
20	SCS Runoff	12.00	1	735	54,904	------	------	------	P4B
21	SCS Runoff	2.240	1	729	8,437	------	------	------	P4E
22	Reservoir	11.98	1	736	54,904	20	275.91	950	Basin P4E
23	Combine	21.87	1	737	152,688	17, 18, 22	------	------	To Basin P4B
24	Reservoir	6.125	1	812	152,367	23	261.90	50,947	Basin P4B
25	SCS Runoff	1.074	1	730	4,248	------	------	------	P4A
26	Combine	6.238	1	810	156,615	24, 25	------	------	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	0.446	1	727	1,525	------	------	------	E1
2	SCS Runoff	7.166	1	729	26,930	------	------	------	E2
3	SCS Runoff	6.975	1	731	27,814	------	------	------	E3
4	SCS Runoff	9.429	1	733	40,347	------	------	------	E4
6	SCS Runoff	0.335	1	725	1,037	------	------	------	P1
7	SCS Runoff	0.331	1	725	1,030	------	------	------	P3
8	SCS Runoff	5.440	1	729	20,445	------	------	------	P2B
9	SCS Runoff	1.185	1	732	5,027	------	------	------	P2C
10	Reservoir	1.110	1	737	3,556	9	273.83	1,613	Basin P2C
11	SCS Runoff	0.156	1	726	502	------	------	------	P2A
12	Combine	5.440	1	729	24,002	8, 10,	------	------	To Basin P2B
13	Reservoir	5.332	1	736	19,131	12	271.90	5,447	Basin P2B
14	Combine	5.410	1	736	19,633	11, 13	------	------	Total P2
16	SCS Runoff	20.63	1	732	88,236	------	------	------	Hillcrest (TO DB)
17	Reservoir	4.710	1	763	86,840	16	279.63	34,247	Hillcrest DB
18	SCS Runoff	8.636	1	736	40,533	------	------	------	Hillcrest Other
20	SCS Runoff	15.64	1	735	71,554	------	------	------	P4B
21	SCS Runoff	2.957	1	729	11,112	------	------	------	P4E
22	Reservoir	15.63	1	735	71,554	20	275.99	1,072	Basin P4E
23	Combine	28.24	1	736	198,927	17, 18, 22	------	------	To Basin P4B
24	Reservoir	8.509	1	786	198,595	23	262.36	62,353	Basin P4B
25	SCS Runoff	1.409	1	730	5,566	------	------	------	P4A
26	Combine	8.686	1	783	204,161	24, 25	------	------	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	0.514	1	727	1,762	------	------	------	E1
2	SCS Runoff	8.272	1	729	31,111	------	------	------	E2
3	SCS Runoff	8.232	1	730	32,673	------	------	------	E3
4	SCS Runoff	11.12	1	733	47,396	------	------	------	E4
6	SCS Runoff	0.383	1	725	1,189	------	------	------	P1
7	SCS Runoff	0.393	1	725	1,217	------	------	------	P3
8	SCS Runoff	6.301	1	729	23,682	------	------	------	P2B
9	SCS Runoff	1.368	1	732	5,808	------	------	------	P2C
10	Reservoir	1.356	1	734	4,337	9	273.84	1,626	Basin P2C
11	SCS Runoff	0.183	1	726	588	------	------	------	P2A
12	Combine	7.220	1	732	28,019	8, 10,	------	------	To Basin P2B
13	Reservoir	7.104	1	733	23,148	12	271.93	5,569	Basin P2B
14	Combine	7.212	1	733	23,736	11, 13	------	------	Total P2
16	SCS Runoff	23.39	1	732	100,414	------	------	------	Hillcrest (TO DB)
17	Reservoir	7.803	1	756	99,019	16	279.95	37,879	Hillcrest DB
18	SCS Runoff	10.12	1	736	47,339	------	------	------	Hillcrest Other
20	SCS Runoff	17.94	1	735	82,238	------	------	------	P4B
21	SCS Runoff	3.413	1	729	12,838	------	------	------	P4E
22	Reservoir	17.94	1	735	82,238	20	276.03	1,136	Basin P4E
23	Combine	32.29	1	736	228,596	17, 18, 22	------	------	To Basin P4B
24	Reservoir	10.76	1	775	228,257	23	262.73	72,099	Basin P4B
25	SCS Runoff	1.622	1	730	6,413	------	------	------	P4A
26	Combine	11.00	1	774	234,670	24, 25	------	------	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	0.653	1	727	2,248	------	------	------	E1
2	SCS Runoff	10.51	1	729	39,691	------	------	------	E2
3	SCS Runoff	10.83	1	730	42,785	------	------	------	E3
4	SCS Runoff	14.61	1	732	62,063	------	------	------	E4
6	SCS Runoff	0.479	1	724	1,499	------	------	------	P1
7	SCS Runoff	0.522	1	725	1,609	------	------	------	P3
8	SCS Runoff	8.050	1	729	30,339	------	------	------	P2B
9	SCS Runoff	1.741	1	732	7,409	------	------	------	P2C
10	Reservoir	1.735	1	733	5,939	9	273.86	1,646	Basin P2C
11	SCS Runoff	0.238	1	726	767	------	------	------	P2A
12	Combine	9.634	1	729	36,277	8, 10,	------	------	To Basin P2B
13	Reservoir	9.560	1	730	31,407	12	271.97	5,722	Basin P2B
14	Combine	9.746	1	730	32,173	11, 13	------	------	Total P2
16	SCS Runoff	28.90	1	732	125,120	------	------	------	Hillcrest (TO DB)
17	Reservoir	15.89	1	747	123,725	16	280.24	41,642	Hillcrest DB
18	SCS Runoff	13.15	1	736	61,432	------	------	------	Hillcrest Other
20	SCS Runoff	22.59	1	734	104,072	------	------	------	P4B
21	SCS Runoff	4.338	1	729	16,378	------	------	------	P4E
22	Reservoir	22.60	1	735	104,072	20	276.12	1,260	Basin P4E
23	Combine	45.51	1	743	289,228	17, 18, 22	------	------	To Basin P4B
24	Reservoir	22.51	1	762	288,878	23	263.37	89,943	Basin P4B
25	SCS Runoff	2.051	1	730	8,148	------	------	------	P4A
26	Combine	22.91	1	761	297,026	24, 25	------	------	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	0.737	1	727	2,546	------	------	------	E1
2	SCS Runoff	11.87	1	729	44,946	------	------	------	E2
3	SCS Runoff	12.42	1	730	49,051	------	------	------	E3
4	SCS Runoff	16.77	1	732	71,153	------	------	------	E4
6	SCS Runoff	0.537	1	724	1,688	------	------	------	P1
7	SCS Runoff	0.602	1	725	1,853	------	------	------	P3
8	SCS Runoff	9.109	1	729	34,423	------	------	------	P2B
9	SCS Runoff	1.966	1	732	8,390	------	------	------	P2C
10	Reservoir	1.959	1	733	6,920	9	273.87	1,657	Basin P2C
11	SCS Runoff	0.272	1	726	877	------	------	------	P2A
12	Combine	10.90	1	729	41,343	8, 10,	------	------	To Basin P2B
13	Reservoir	10.83	1	730	36,472	12	271.99	5,795	Basin P2B
14	Combine	11.05	1	730	37,349	11, 13	------	------	Total P2
16	SCS Runoff	32.20	1	732	140,112	------	------	------	Hillcrest (TO DB)
17	Reservoir	20.58	1	745	138,717	16	280.38	43,479	Hillcrest DB
18	SCS Runoff	15.00	1	736	70,129	------	------	------	Hillcrest Other
20	SCS Runoff	25.40	1	734	117,401	------	------	------	P4B
21	SCS Runoff	4.897	1	729	18,547	------	------	------	P4E
22	Reservoir	25.40	1	735	117,401	20	276.16	1,323	Basin P4E
23	Combine	56.10	1	741	326,246	17, 18, 22	------	------	To Basin P4B
24	Reservoir	30.98	1	758	325,887	23	263.65	98,294	Basin P4B
25	SCS Runoff	2.311	1	730	9,209	------	------	------	P4A
26	Combine	31.56	1	757	335,096	24, 25	------	------	Total P4

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	19.5488	3.8000	0.7163	--------
2	23.2475	3.7000	0.7135	--------
3	0.0000	0.0000	0.0000	--------
5	29.7031	3.6000	0.7158	--------
10	37.2329	4.0000	0.7298	--------
25	44.8352	3.9000	0.7295	--------
50	51.5093	4.0000	0.7333	--------
100	55.5061	3.8000	0.7239	--------

File name: NOAA-SOUTHINGTON (DOUGLAS ST).IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.12	2.98	2.39	2.02	1.76	1.57	1.42	1.30	1.21	1.13	1.06	1.00
2	4.97	3.59	2.88	2.43	2.12	1.89	1.71	1.57	1.45	1.36	1.27	1.20
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.37	4.59	3.66	3.09	2.69	2.40	2.17	1.99	1.84	1.72	1.61	1.52
10	7.49	5.43	4.34	3.66	3.19	2.84	2.57	2.35	2.18	2.03	1.90	1.79
25	9.10	6.57	5.25	4.43	3.85	3.43	3.10	2.84	2.63	2.45	2.29	2.16
50	10.28	7.44	5.95	5.01	4.36	3.88	3.51	3.21	2.97	2.76	2.59	2.44
100	11.50	8.30	6.64	5.59	4.87	4.34	3.93	3.60	3.33	3.10	2.91	2.74

Tc = time in minutes. Values may exceed 60.

Precip. file name: CONNDOT.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.25	0.00	4.20	5.00	5.50	6.50	7.10
SCS 6-Hr	0.00	2.35	0.00	2.95	3.45	4.00	4.55	5.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

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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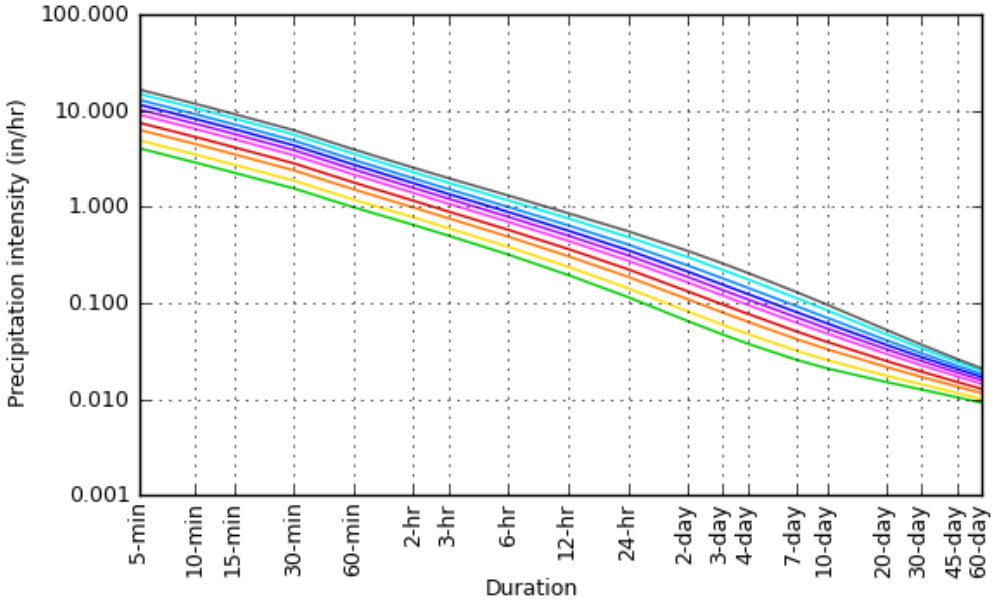
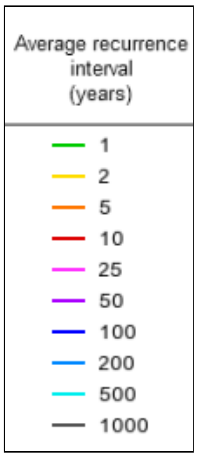
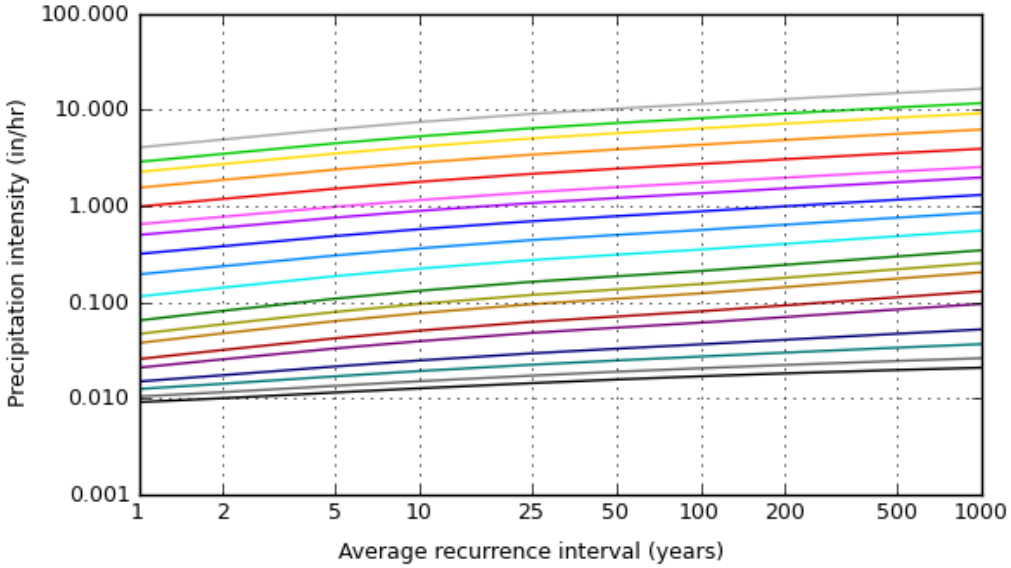
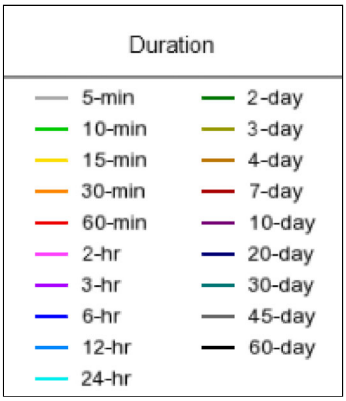
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 41.5599°, Longitude: -72.8635°









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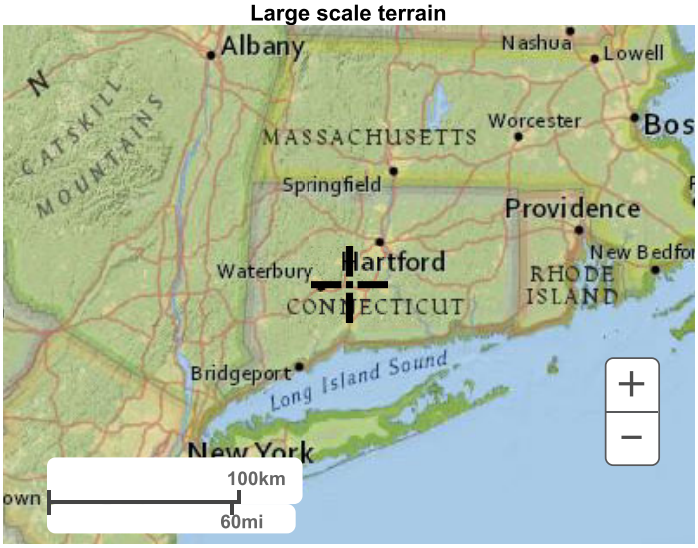
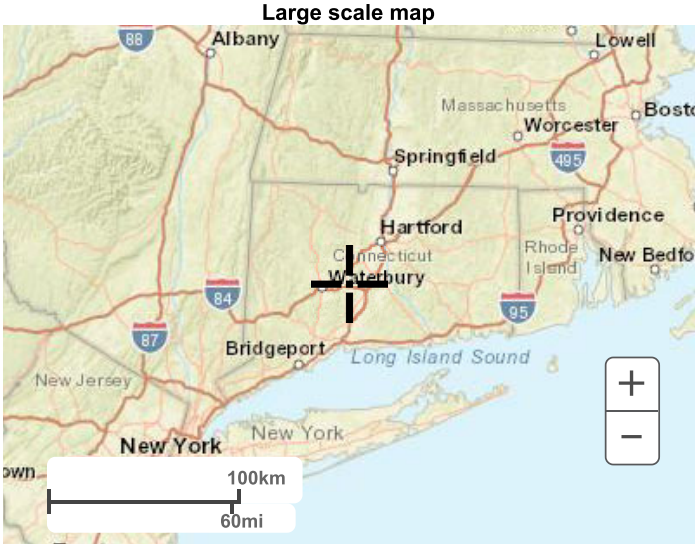
Maps & aerials

Small scale terrain

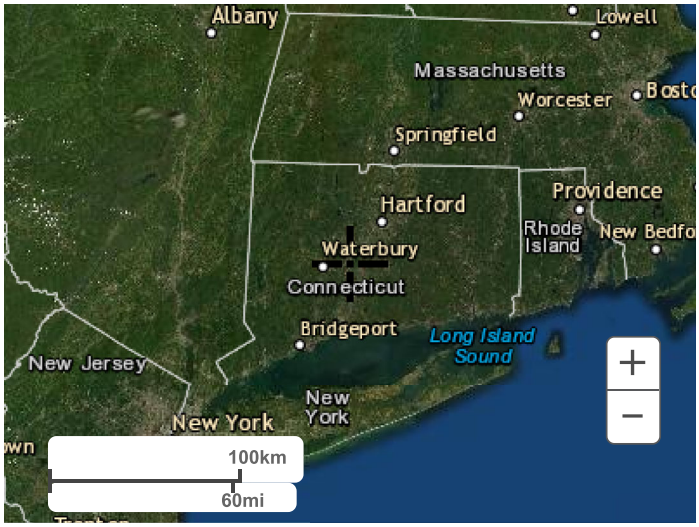
Large scale terrain



Large scale map



Large scale aerial



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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)[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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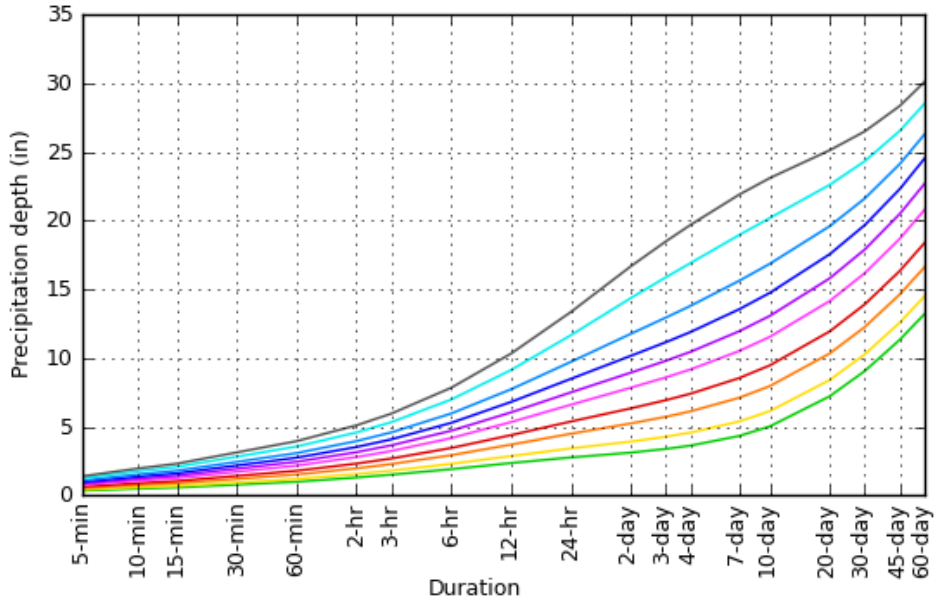
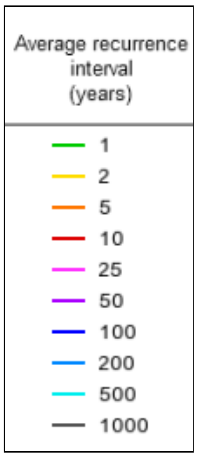
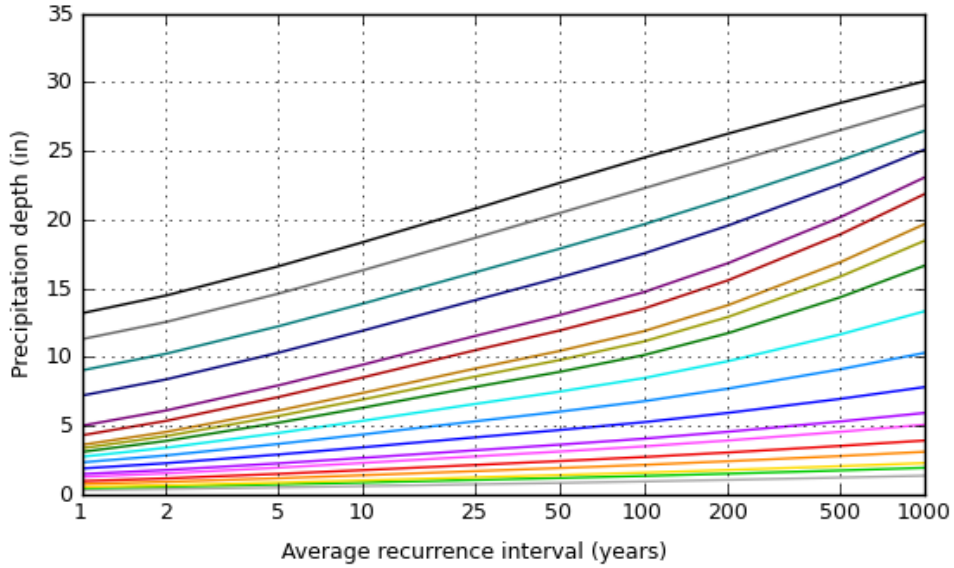
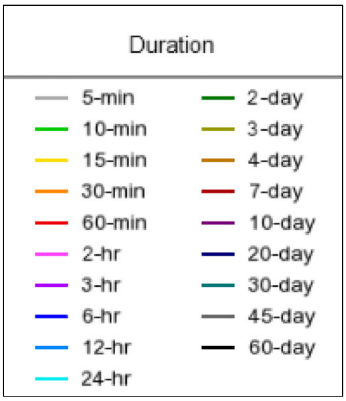
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 41.5599°, Longitude: -72.8635°









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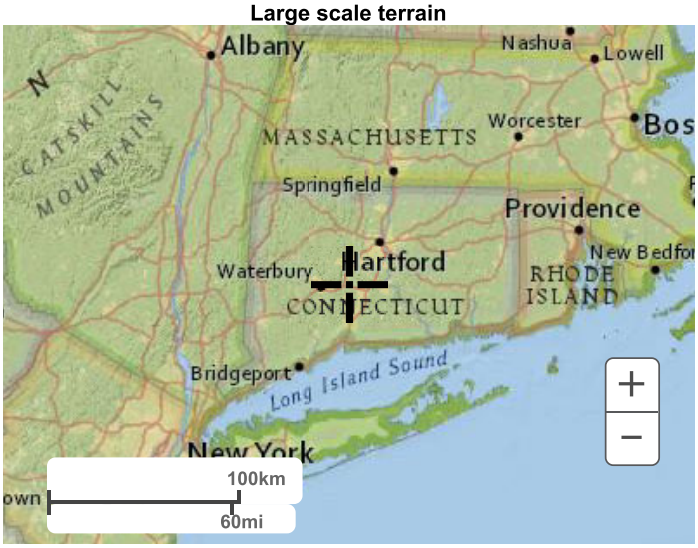
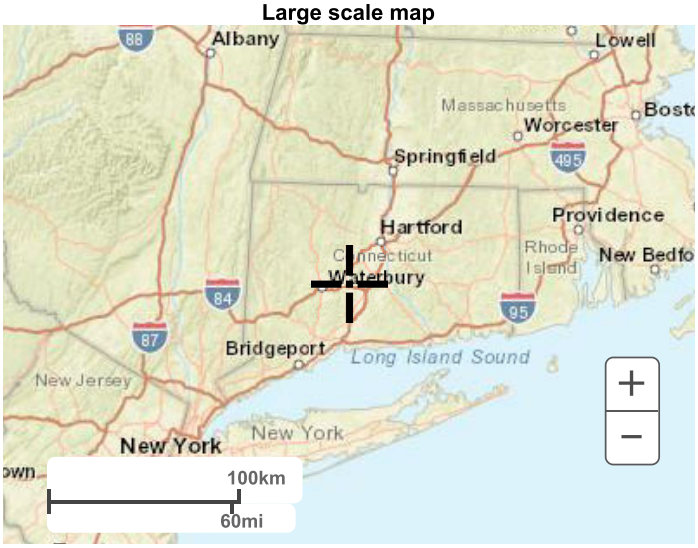
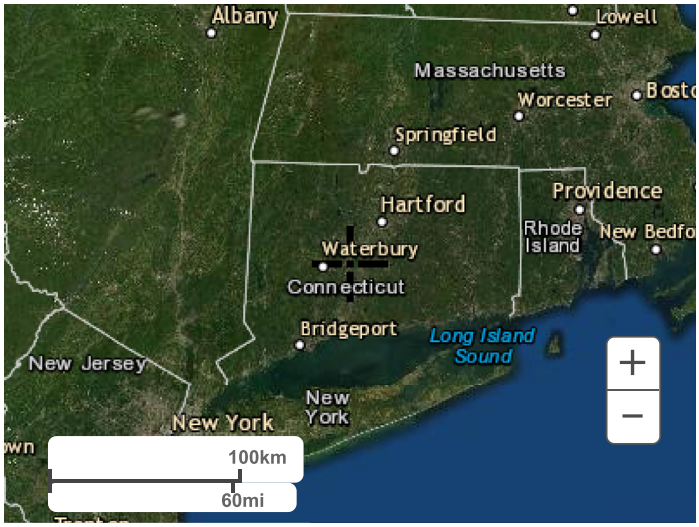
Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55					**Totals:** 0.15	11.59

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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	1.34	2.04	2.55	3.24	3.86	4.49
Volume of Runoff: (cu-ft)	712	1089	1355	1723	2054	2392

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55					**Totals:** 2.69	212.69

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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	1.34	2.04	2.55	3.24	3.86	4.49
Volume of Runoff: (cu-ft)	13064	19985	24874	31632	37712	43909

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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)= $\frac{\text{Total Product}}{}$ = **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
Volume of Runoff: (cu-ft)	11787	19246	24674	32323	39315	46524

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55					**Totals:** 4.93	358.26

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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	2.02	2.65	3.23	3.82
Volume of Runoff: (cu-ft)	17286	28234	36201	47432	57698	68283

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	0.09	7.58

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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. . . . . ln	1.55	2.30	2.82	3.54	4.18	4.84
Volume of Runoff: (cu-ft)	518	770	945	1186	1401	1619

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	0.06	4.66

CN (weighted)= $\frac{\text{Total Product}}{}$ = **Use C:** 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
Volume of Runoff: (cu-ft)	237	382	486	633	767	904

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

$\frac{100}{0}$ -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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55					**Totals:** 2.11	164.57

CN (weighted)= $\frac{\text{Total Product}}{}$ = **Use C:** 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
Volume of Runoff: (cu-ft)	9743	15054	18822	24046	28757	33567

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

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

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	0.50	39.79

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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	1.33	2.04	2.53	3.23	3.85	4.48
Volume of Runoff: (cu-ft)	2433	3727	4641	5905	7042	8202

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

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

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	0.13	9.34

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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
Volume of Runoff: (cu-ft)	414	692	896	1187	1453	1730

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

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

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	0.57	45.43

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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
Volume of Runoff: (cu-ft)	2818	4300	5345	6789	8087	9410

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

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

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55					**Totals:** 6.54	529.11

CN (weighted)= $\frac{\text{Total Product}}{}$ = **Use C:** 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
Volume of Runoff: (cu-ft)	34760	52223	64457	81275	96342	111656

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

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

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 Table 2-2	CN Table 2-3	CN Table 2-4	Area (Acres)	Product of C x Area
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
Table 2-2, 2-3 & Figure 2-4: Urban Hydrology for Small Watersheds TR-55				**Totals:**	1.11	88.13

CN (weighted)= $\frac{\text{Total Product}}{}$ = **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
Volume of Runoff: (cu-ft)	5478	8354	10382	13183	15701	18266

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

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

TIME OF CONCENTRATION COMPUTATIONS

Project: Denorfia
Meriden-Waterbury Turnpike

Calculations By: BTP
Date: 5/11/2022

Overland Flow: (Maximum 150 FT)

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$ (TR-55 Equation 3-3)

T_t=Travel Time (Hr)
n=Manning's Roughness (TR-55 Table 3-1)
L=Flow Length (ft)
P_2= 2 Year, 24-hour Ranfall (in)
s=slope (ft/ft)

Shallow Concentrated Flow:

Unpaved: $V=16.1345(s)^{0.5}$
Paved: $V=20.3284(s)^{0.5}$
$T_t = L / 60V$
(Conn DOT Equations 6.C.4 & C.C.5)

T_t=Travel Time (min)
V=Velocity (ft/s)
s=slope (ft/ft)

Common Manning n Values for overland flow

Woods	0.400	Light Underbrush
Pavement	0.011	
Grass	0.350	Standard
Dense Grass	0.240	Weeping Lovegrass, Bluegrass, Buffalo & Native

Open Channel\Swale Flow:

$$V = \frac{1.49 r^{\frac{2}{3}} s^{\frac{1}{2}}}{n}$$ (TR-55 Equation 3-4)

T_t=Travel Time (min)
n=Manning's Roughness
L=Flow Length (ft)
V=Velocity (ft/s)
s=slope (ft/ft)
r= hydraulic radius (a/pw)
a=cross-section area (ft^2)
p_w=wetted perimeter (ft)

$T_t = L / 60V$

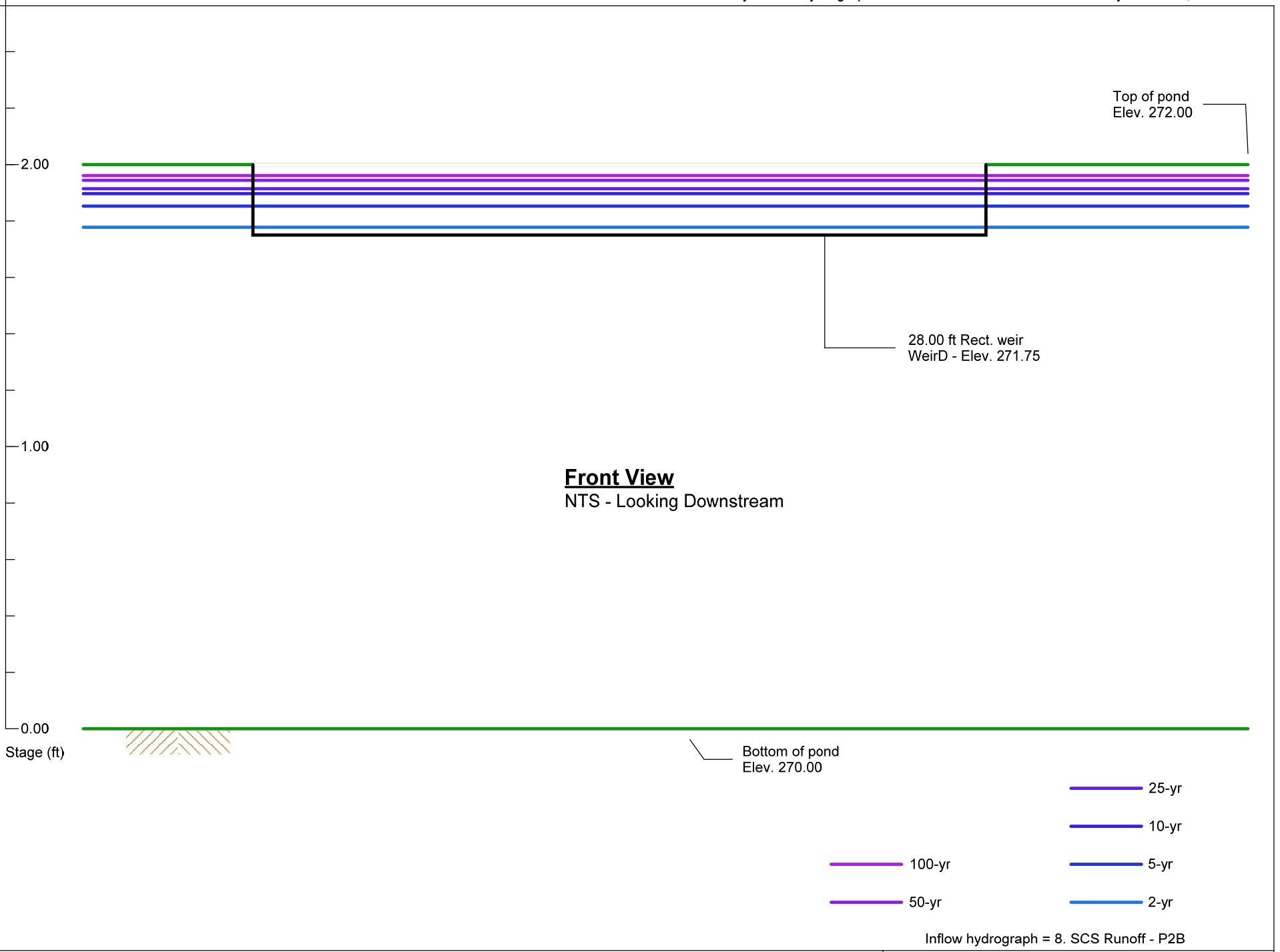
Minimum allowable T_c = 5.00 min.

		Overland Sheet Flow				Shallow Flow					Swale Flow								Pipe Flow					Total
Design Point	Basin(s)	n	L (ft)	S (%)	T_o (min)	Paved (Y or N)	L (ft)	S (%)	V (ft/s)	T_1 (min)	n	Area (s.f.)	Wet. Perim. (ft)	S (%)	V(full flow) (ft/s)	L (ft)	Ts (min)	Dia. (in)	L (ft)	S (%)	V(full flow) (ft/s)	Tp (min)	T (min)
A	P1	0.350	40	6.25	5.88																		
				Subtotal	5.88				Subtotal	0.00						Subtotal	0.00				Subtotal	0.00	5.88
B	P2	0.350	47	7.45	6.23	N	280	1.96	2.26	2.06													
				Subtotal	6.23				Subtotal	2.06						Subtotal	0.00				Subtotal	0.00	8.30
C	P3	Use minimum 5 minutes per inch																					5.00
D	P4A	0.350	100	5.50	12.88	N	239	5.50	3.78	1.05													
				Subtotal	12.88				Subtotal	1.05						Subtotal	0.00				Subtotal	0.00	13.93
D	P4B	0.350	100	3.00	16.41	N	559	1.25	1.81	5.16													
				Subtotal	16.41				Subtotal	5.16						Subtotal	0.00				Subtotal	0.00	21.57
D	P4E	0.350	100	7.00	11.69	N	91	2.20	2.39	0.63													
						Y	12	2.00	2.87	0.07													
						N	57	1.00	1.61	0.59													
				Subtotal	11.69				Subtotal	0.70						Subtotal	0.00				Subtotal	0.00	12.40
D	P2B	0.350	100	8.00	11.08	N	209	1.67	2.09	1.67													
						Y	20	2.00	2.87	0.12													
						N	100	1.00	1.61	1.03													
				Subtotal	11.08				Subtotal	1.78						Subtotal	0.00				Subtotal	0.00	12.87
D	P2C	0.350	100	3.00	16.41	N	67	2.24	2.41	0.46													
						Y	34	2.00	2.87	0.20													
						N	61	1.00	1.61	0.63													
				Subtotal	16.41				Subtotal	0.66						Subtotal	0.00				Subtotal	0.00	17.07

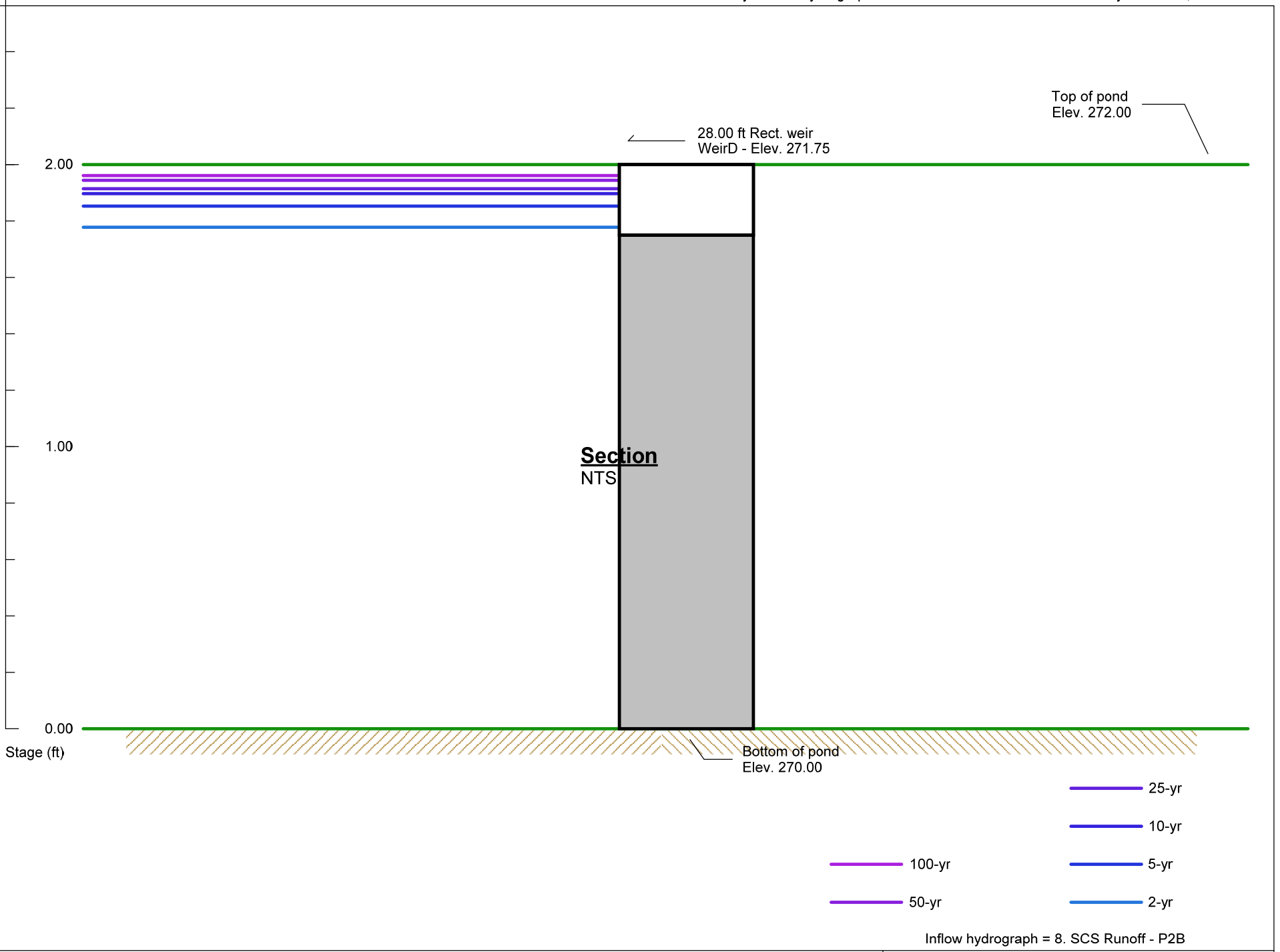
APPENDIX 'C'

DETENTION DESIGN

Pond No. 7 - P2B

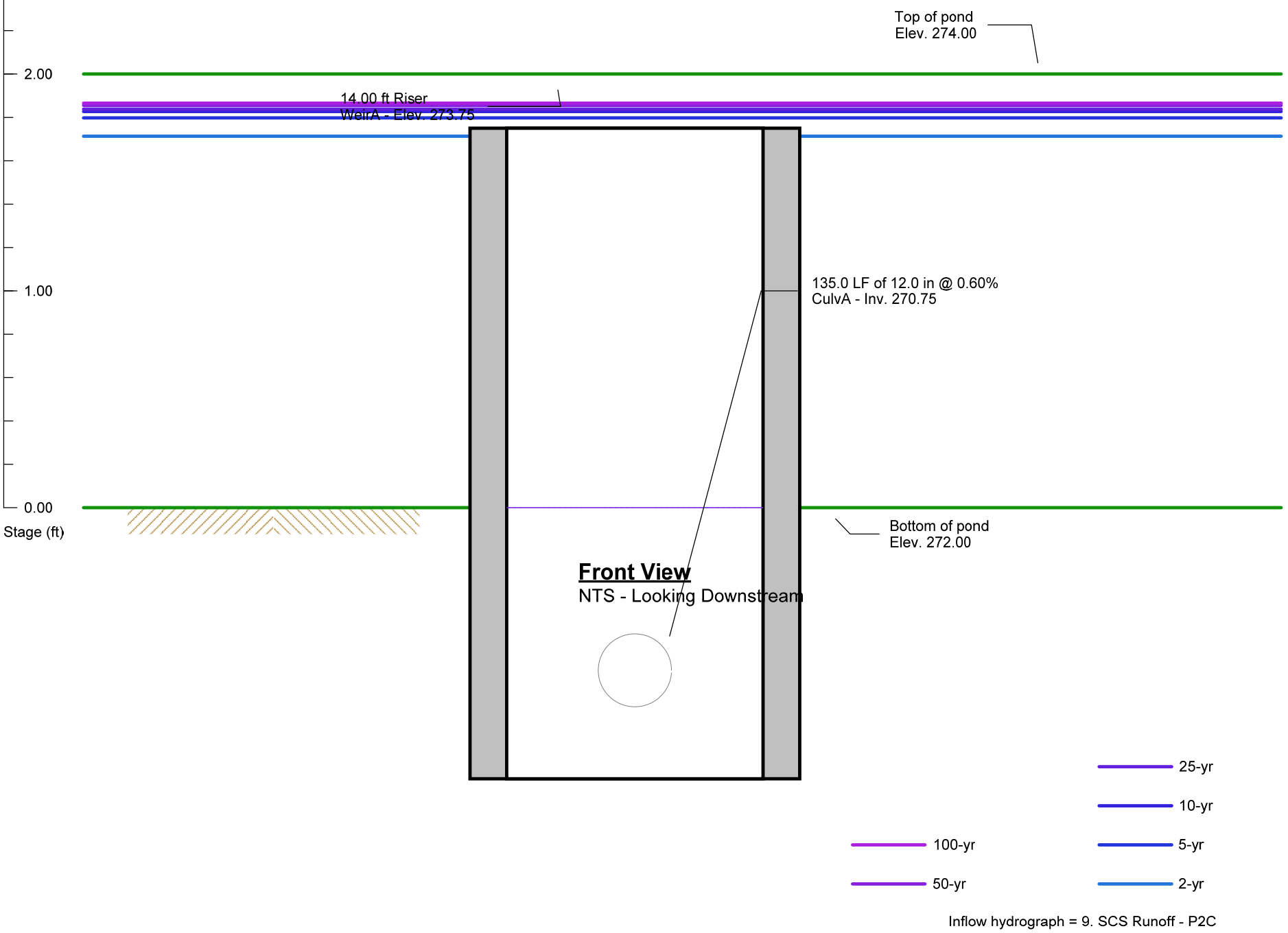

Top of pond
Elev. 272.00
2.00
28.00 ft Rect. weir
WeirD - Elev. 271.75
1.00
Front View
NTS - Looking Downstream
0.00
Stage (ft)
Bottom of pond
Elev. 270.00
25-yr
10-yr
100-yr
5-yr
50-yr
2-yr
Inflow hydrograph = 8. SCS Runoff - P2B

Pond No. 7 - P2B



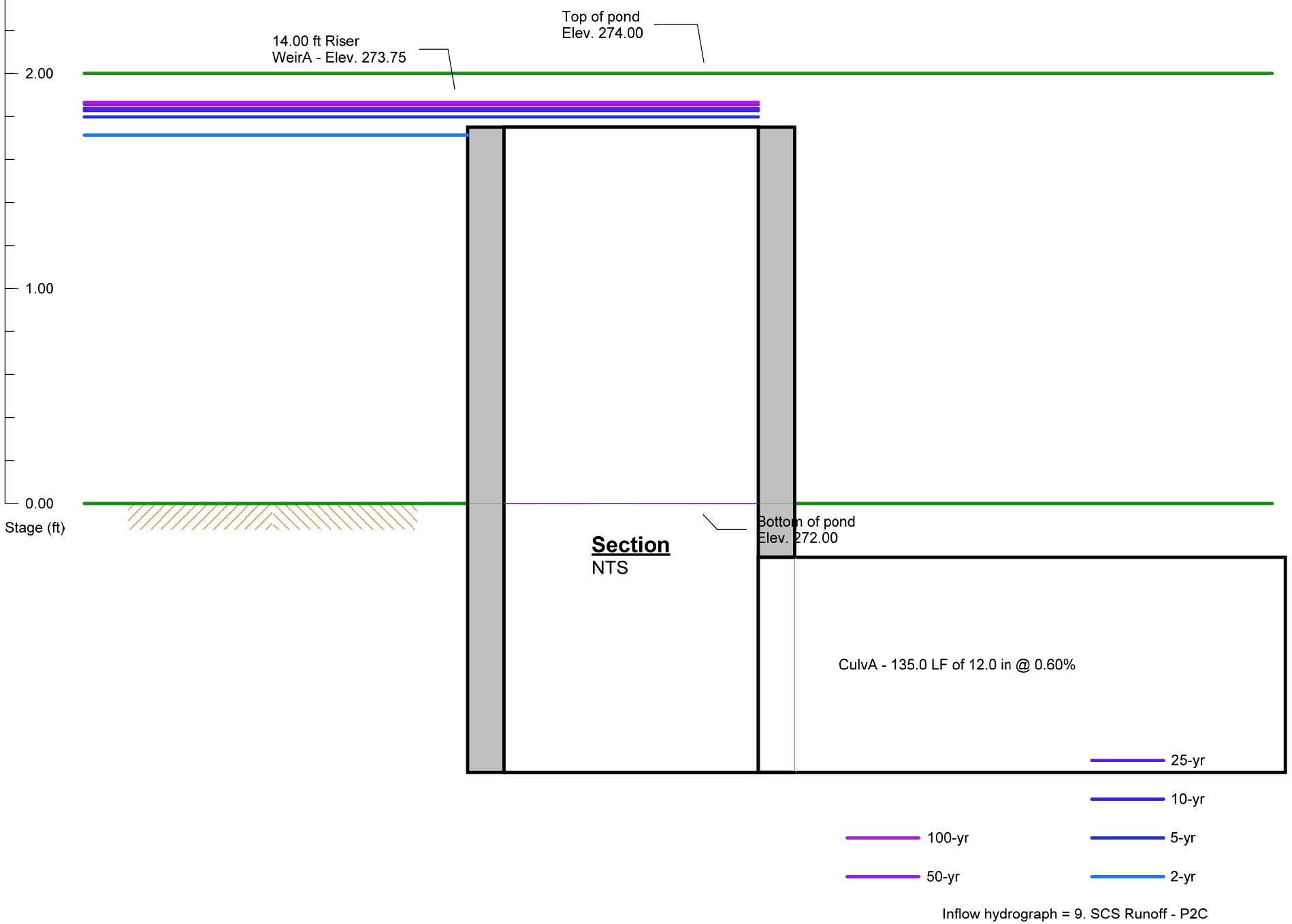
Inflow hydrograph = 8. SCS Runoff - P2B

Pond No. 8 - P2C



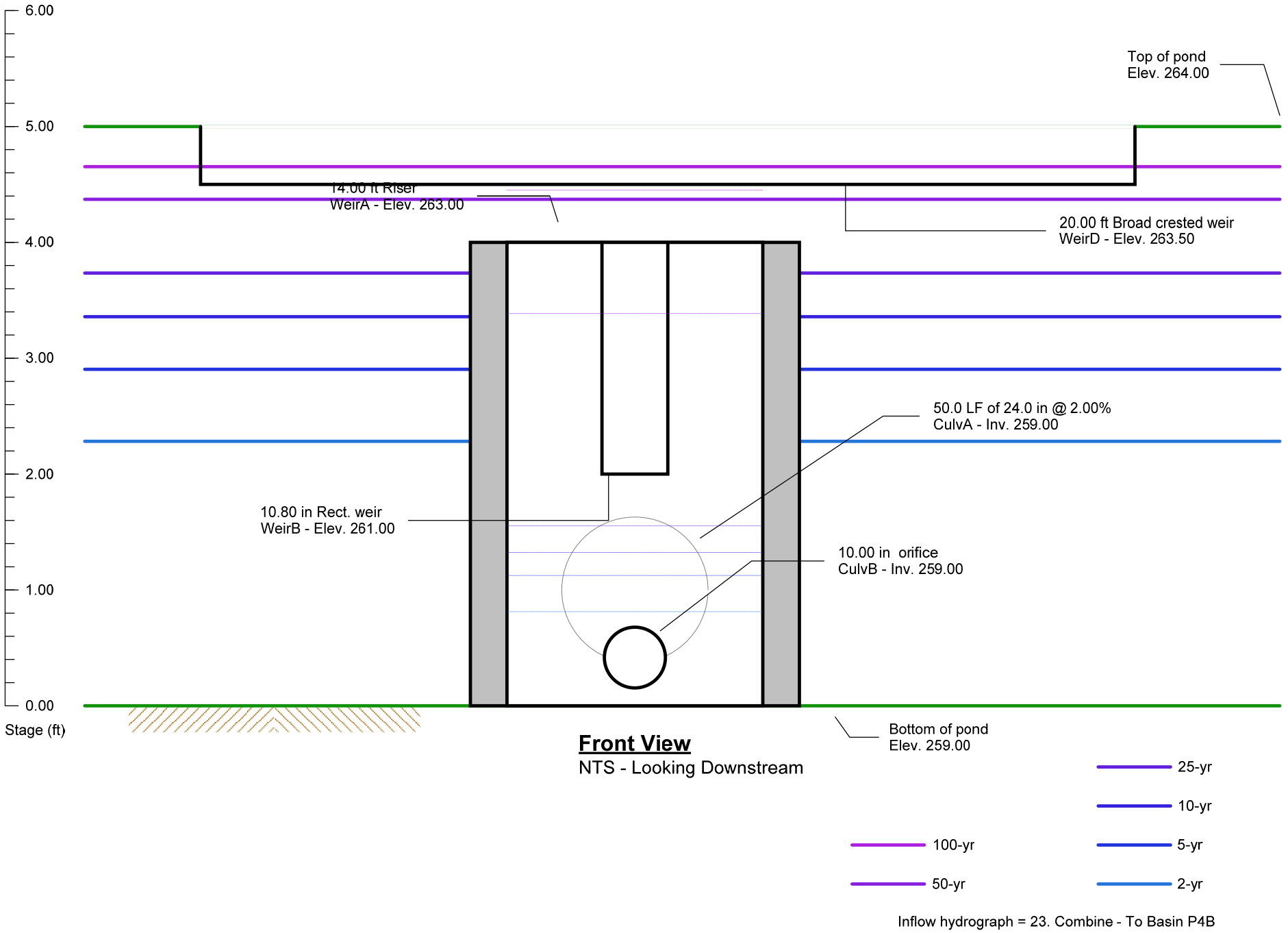
Inflow hydrograph = 9. SCS Runoff - P2C

Pond No. 8 - P2C



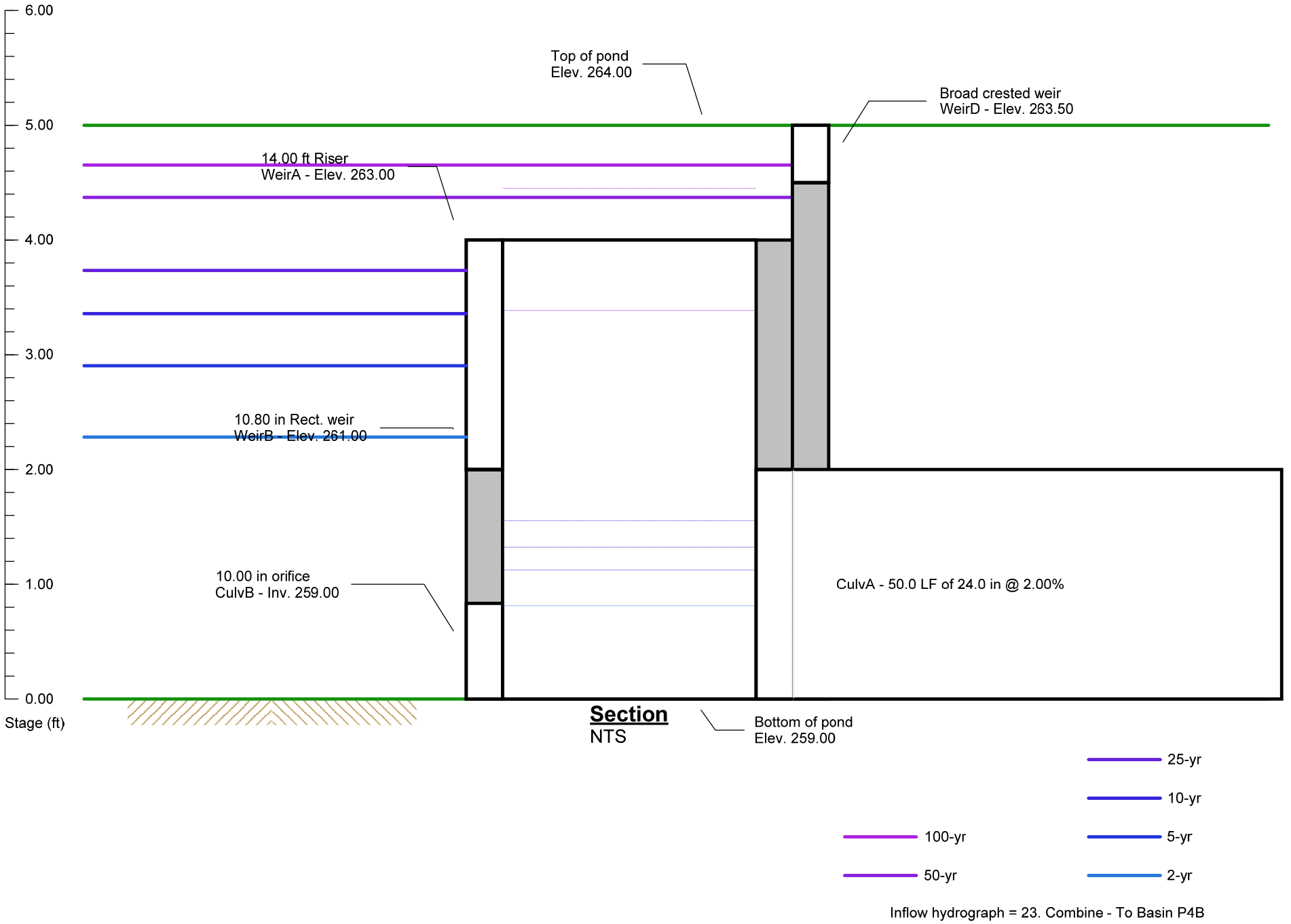
Inflow hydrograph = 9. SCS Runoff - P2C

Pond No. 3 - P4B (Southwest)



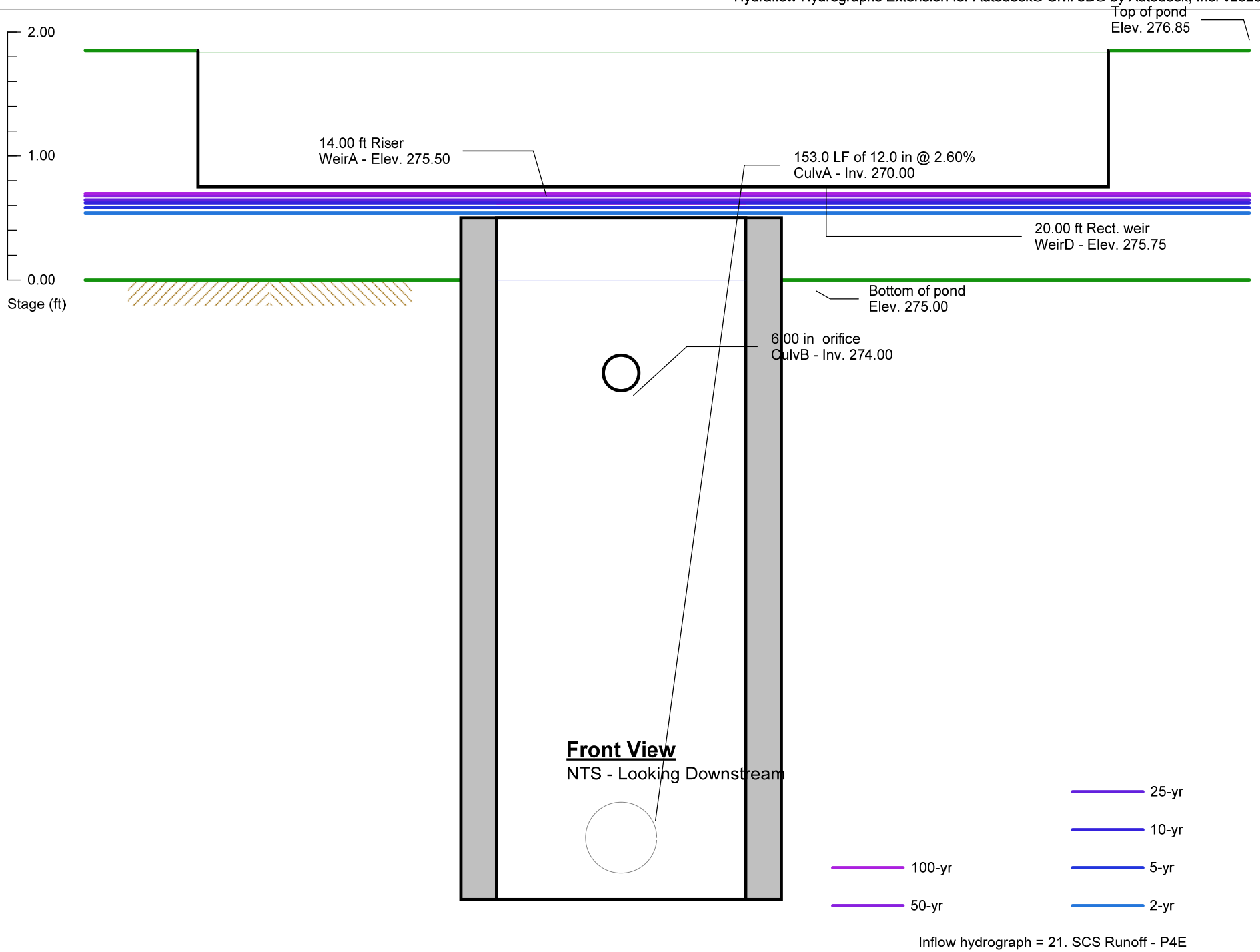
Inflow hydrograph = 23. Combine - To Basin P4B

Pond No. 3 - P4B (Southwest)



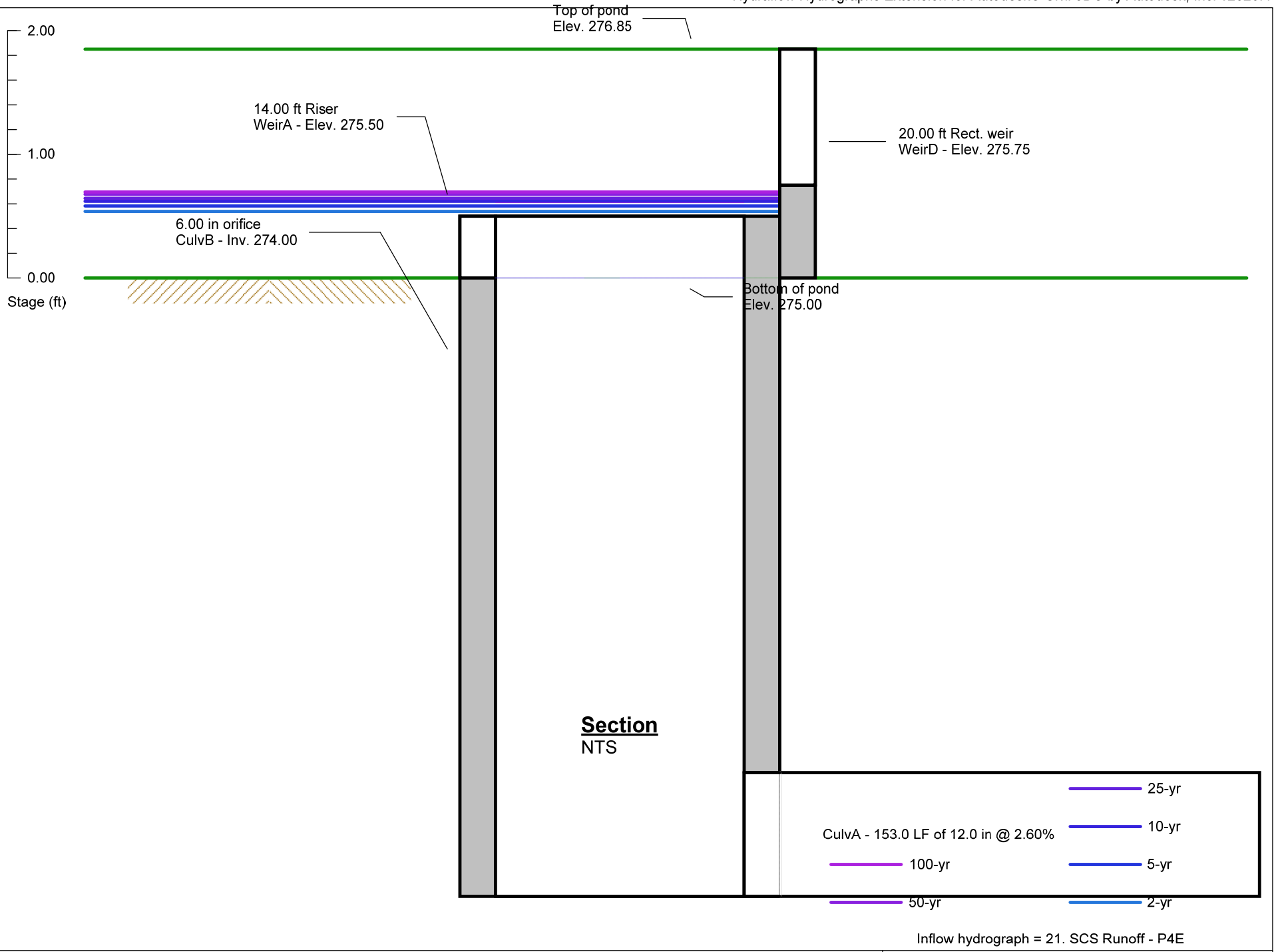
Inflow hydrograph = 23. Combine - To Basin P4B

Pond No. 6 - P4E



Inflow hydrograph = 21. SCS Runoff - P4E

Pond No. 6 - P4E


Top of pond
Elev. 276.85
2.00
1.00
0.00
Stage (ft)
14.00 ft Riser
WeirA - Elev. 275.50
20.00 ft Rect. weir
WeirD - Elev. 275.75
6.00 in orifice
CulvB - Inv. 274.00
Bottom of pond
Elev. 275.00
Section
NTS
CulvA - 153.0 LF of 12.0 in @ 2.60%
25-yr
10-yr
100-yr
5-yr
50-yr
2-yr
Inflow hydrograph = 21. SCS Runoff - P4E

Pond Report

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

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

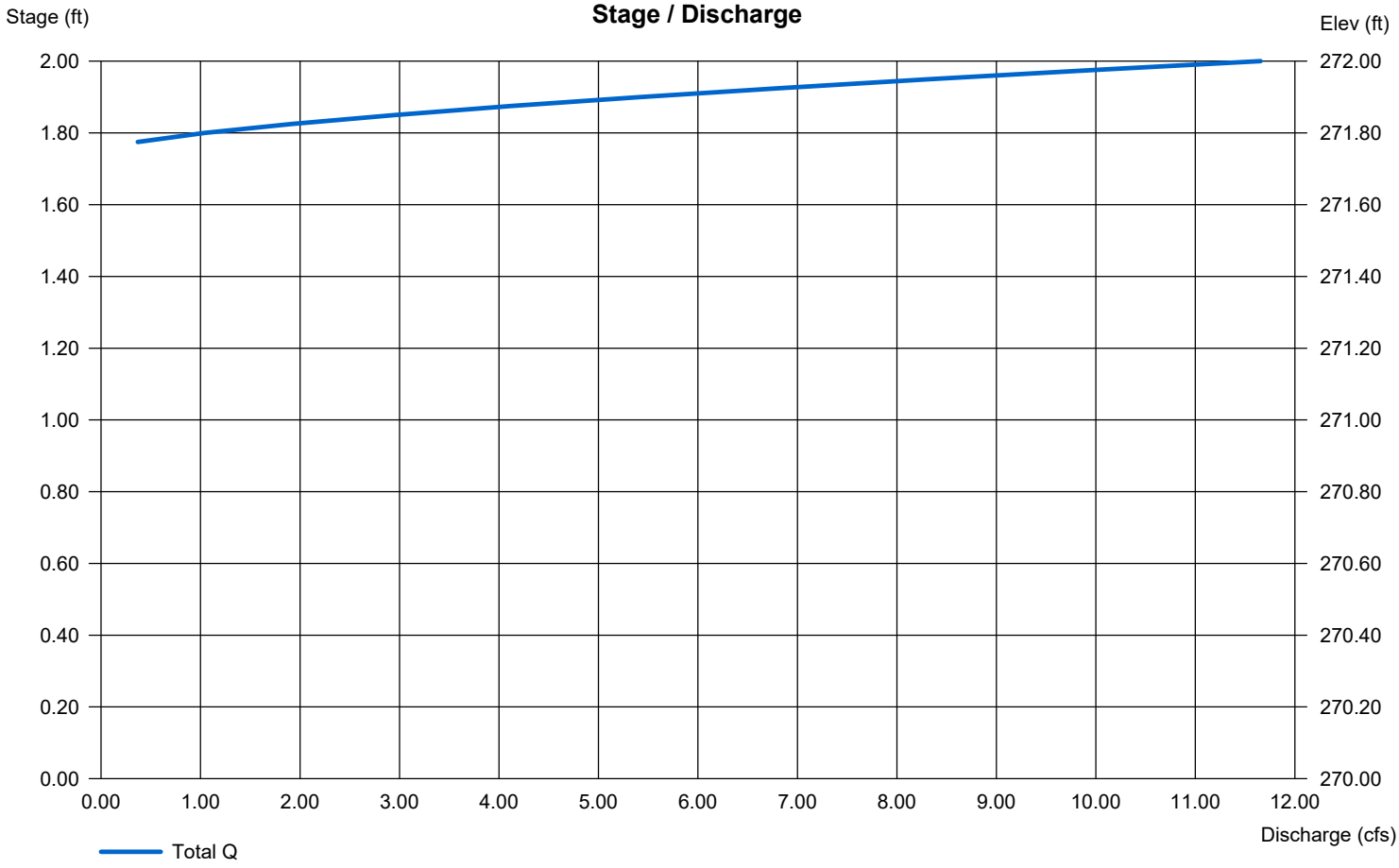
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	28.00
Crest El. (ft)	= 0.00	0.00	0.00	271.75
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 Report

Pond No. 8 - P2C

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 272.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	272.00	484	0	0
1.00	273.00	902	682	682
2.00	274.00	1,367	1,126	1,808

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 270.75	0.00	0.00	0.00
Length (ft)	= 135.00	0.00	0.00	0.00
Slope (%)	= 0.60	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	No	No	No

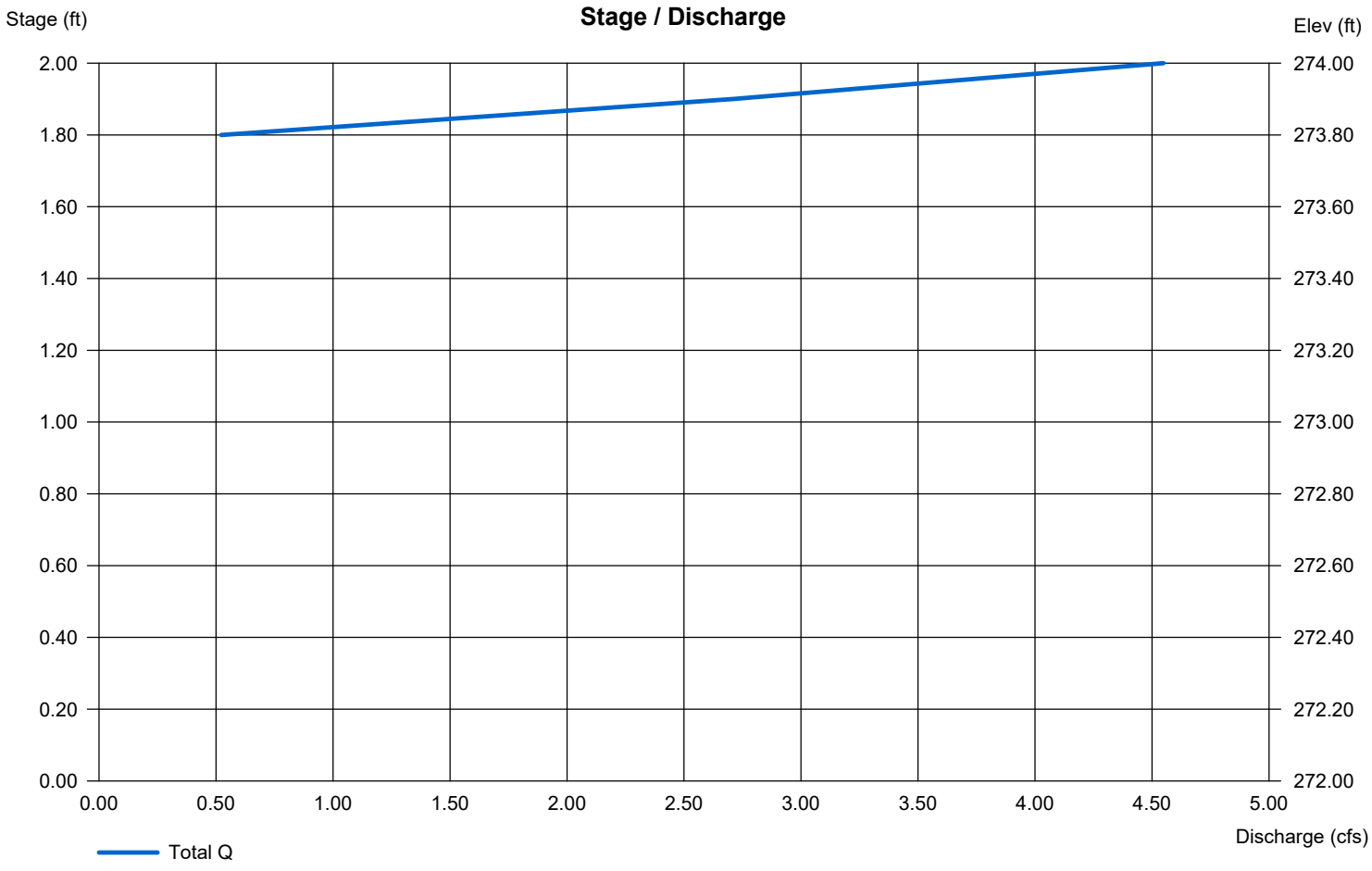
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	0.00	0.00	0.00
Crest El. (ft)	= 273.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	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 Report

Pond No. 1 - KJA MOD STORM WATER #2

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	1,000	0	0
0.60	275.60	3,940	1,385	1,385
1.00	276.00	5,310	1,843	3,228
2.00	277.00	7,140	6,202	9,430
3.00	278.00	8,800	7,955	17,384
4.00	279.00	10,560	9,666	27,050
5.00	280.00	12,220	11,379	38,429
6.00	281.00	14,110	13,152	51,581
7.00	282.00	16,230	15,156	66,737

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	10.00	Inactive	0.00
Span (in)	= 24.00	10.00	12.00	0.00
No. Barrels	= 1	1	2	0
Invert El. (ft)	= 275.49	275.59	277.50	0.00
Length (ft)	= 56.00	0.00	0.00	0.00
Slope (%)	= 3.50	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

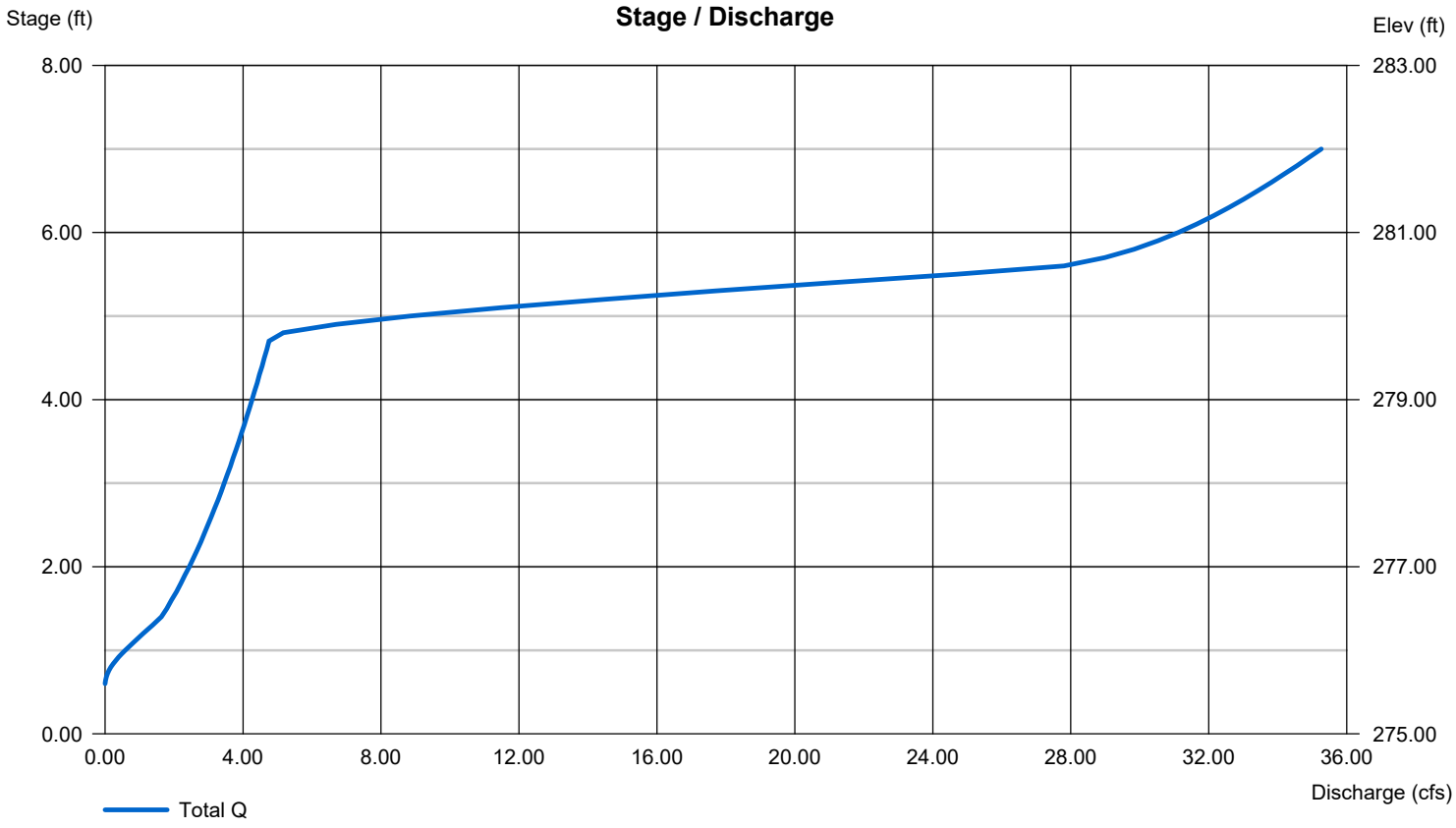
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 279.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
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 Report

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

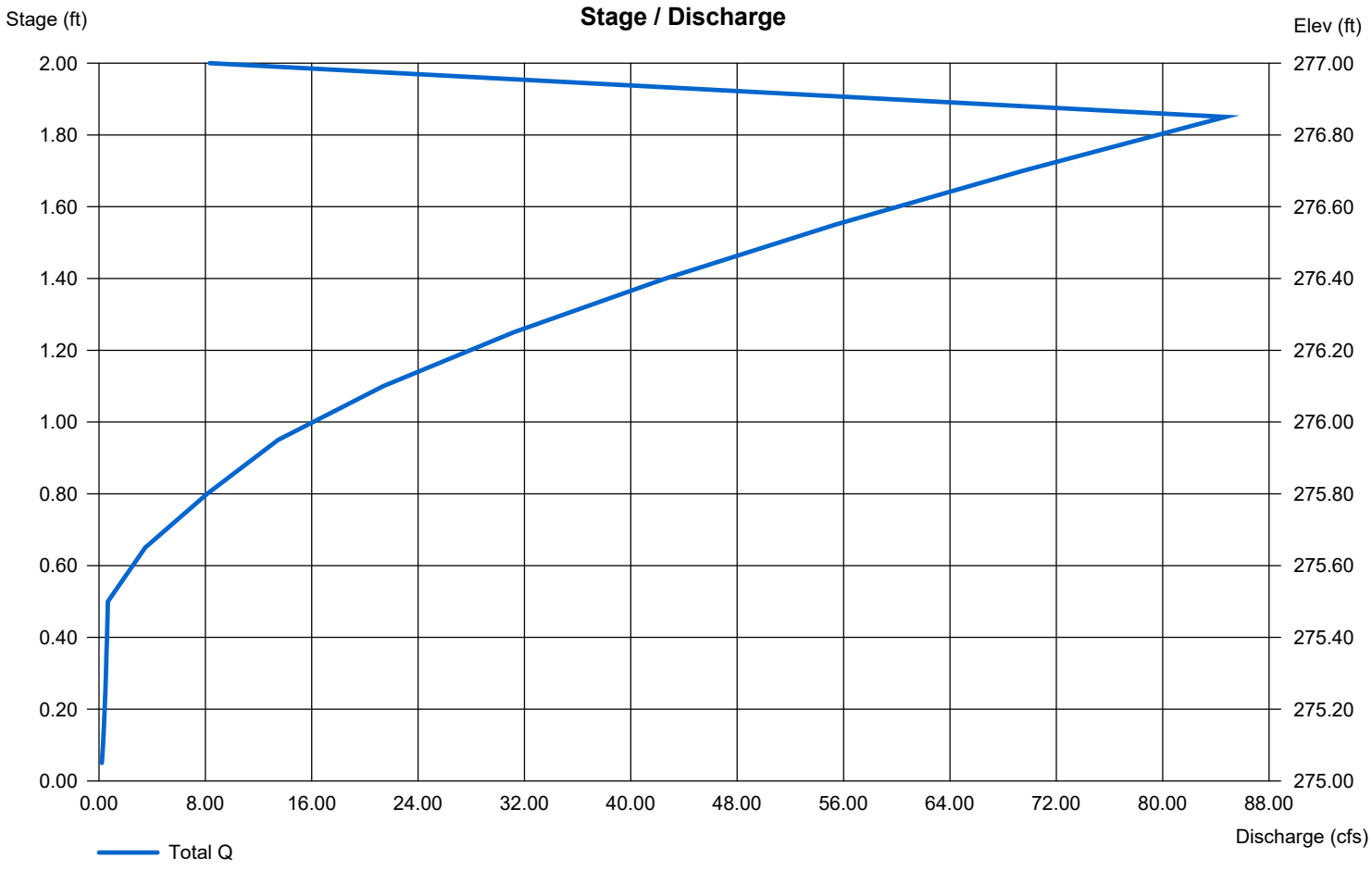
Weir Structures

	[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 Report

Pond No. 3 - P4B (Southwest)

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 259.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	259.00	7,471	0	0
1.00	260.00	17,160	11,983	11,983
2.00	261.00	20,525	18,815	30,799
3.00	262.00	24,089	22,281	53,079
4.00	263.00	27,729	25,885	78,964
5.00	264.00	31,453	29,568	108,533

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	10.00	0.00	0.00
Span (in)	= 24.00	10.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 259.00	259.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	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	Yes	No	No

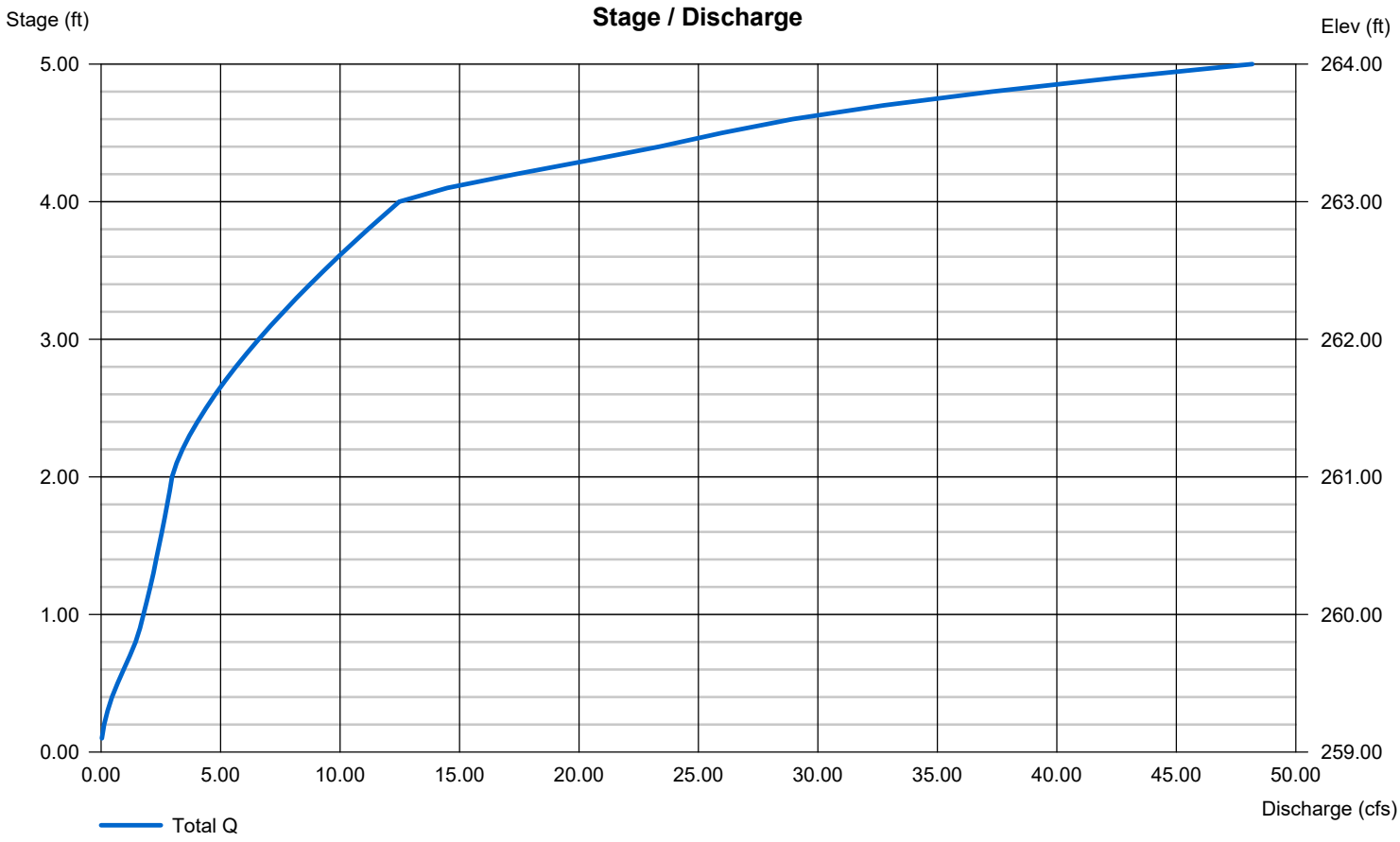
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	0.90	0.00	20.00
Crest El. (ft)	= 263.00	261.00	0.00	263.50
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= 1	Rect	---	Broad
Multi-Stage	= Yes	Yes	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).



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)
259.00	7,471.39	N/A	N/A	0	N/A	0
260.00	17,160.41	1.00	12316	12316	11985	11985
261.00	20,524.50	1.00	18842	31158	18817	30802
262.00	24,089.12	1.00	22307	53465	22283	53085
263.00	27,729.13	1.00	25909	79374	25888	78973
264.00	31,452.54	1.00	29591	108965	29571	108544

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
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 = Volumemetric Runoff Coefficient = 0.05+0.009 (I)
I = Percent Impervious Cover
A = Site Area in Acres

					Required		Main Area		Outlet Area		Total	
	Site Area "A"	Impervious Area	Impervious Cover "I"	Runoff Coefficient	Calculated WQV		Provided WQV	Provided WQV	Provided WQV	Provided WQV	Provided WQV	Provided WQV
Basin #	(acres)	(acres)	(%)	"R"	(ac-ft)	(cu-ft)	(cu-ft)	(%)	(cu-ft)	(%)	(cu-ft)	(%)
P4B & P4E	7.65	1.81	23.7	0.263	0.168	7,301.75	11985	164%	0	0%	11985	164%
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

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jun 6 2022

Emeergency Spillway - Proposed Pond P4B

Trapezoidal

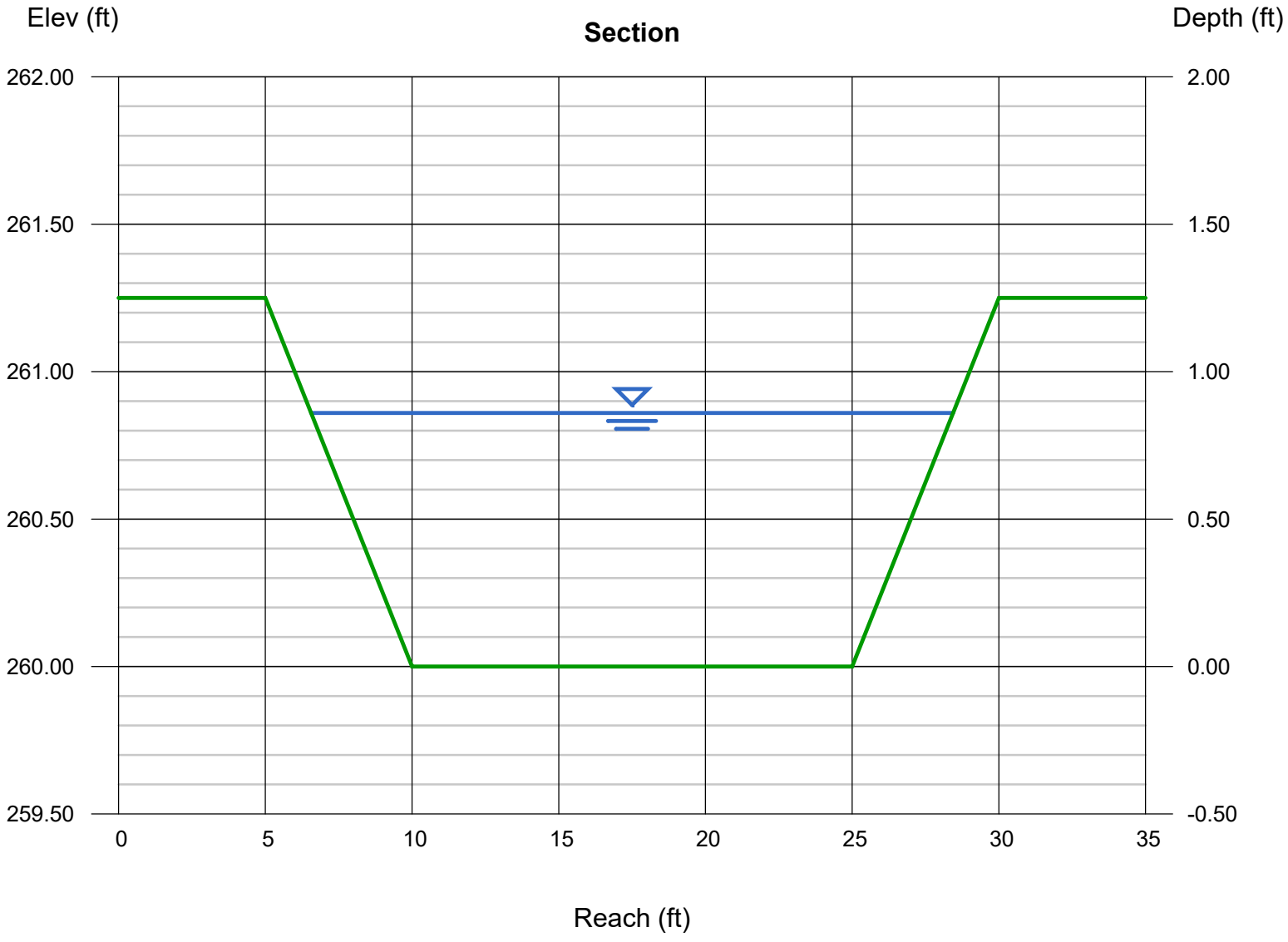
Bottom Width (ft)	= 15.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 260.00
Slope (%)	= 6.00
N-Value	= 0.350

Calculations

Compute by:	Known Q
Known Q (cfs)	= 13.00

Highlighted

Depth (ft)	= 0.86
Q (cfs)	= 13.00
Area (sqft)	= 15.86
Velocity (ft/s)	= 0.82
Wetted Perim (ft)	= 22.09
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 21.88
EGL (ft)	= 0.87



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jun 6 2022

<Name>

Trapezoidal

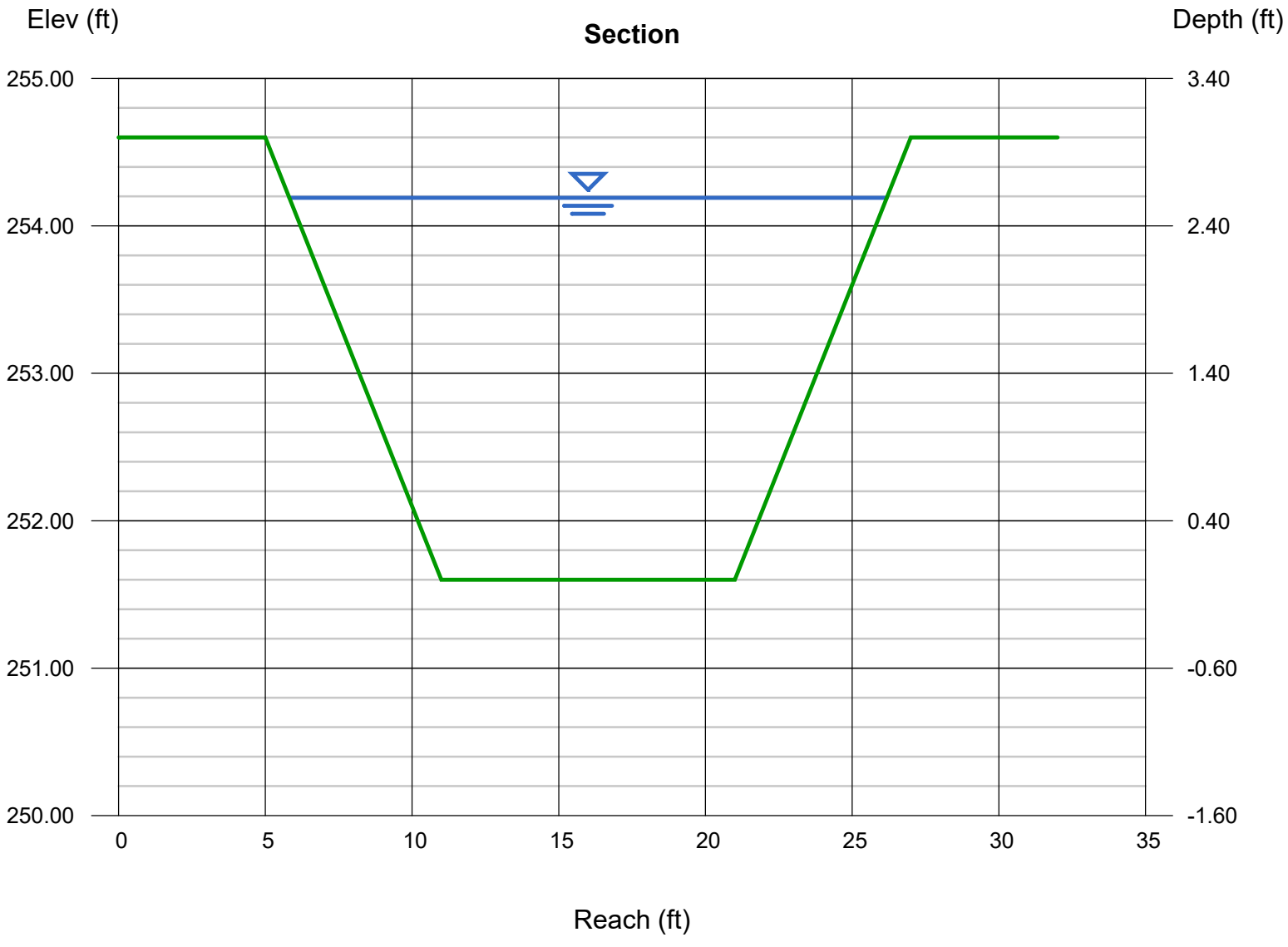
Bottom Width (ft)	= 10.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 251.60
Slope (%)	= 3.00
N-Value	= 0.350

Calculations

Compute by:	Known Q
Known Q (cfs)	= 43.00

Highlighted

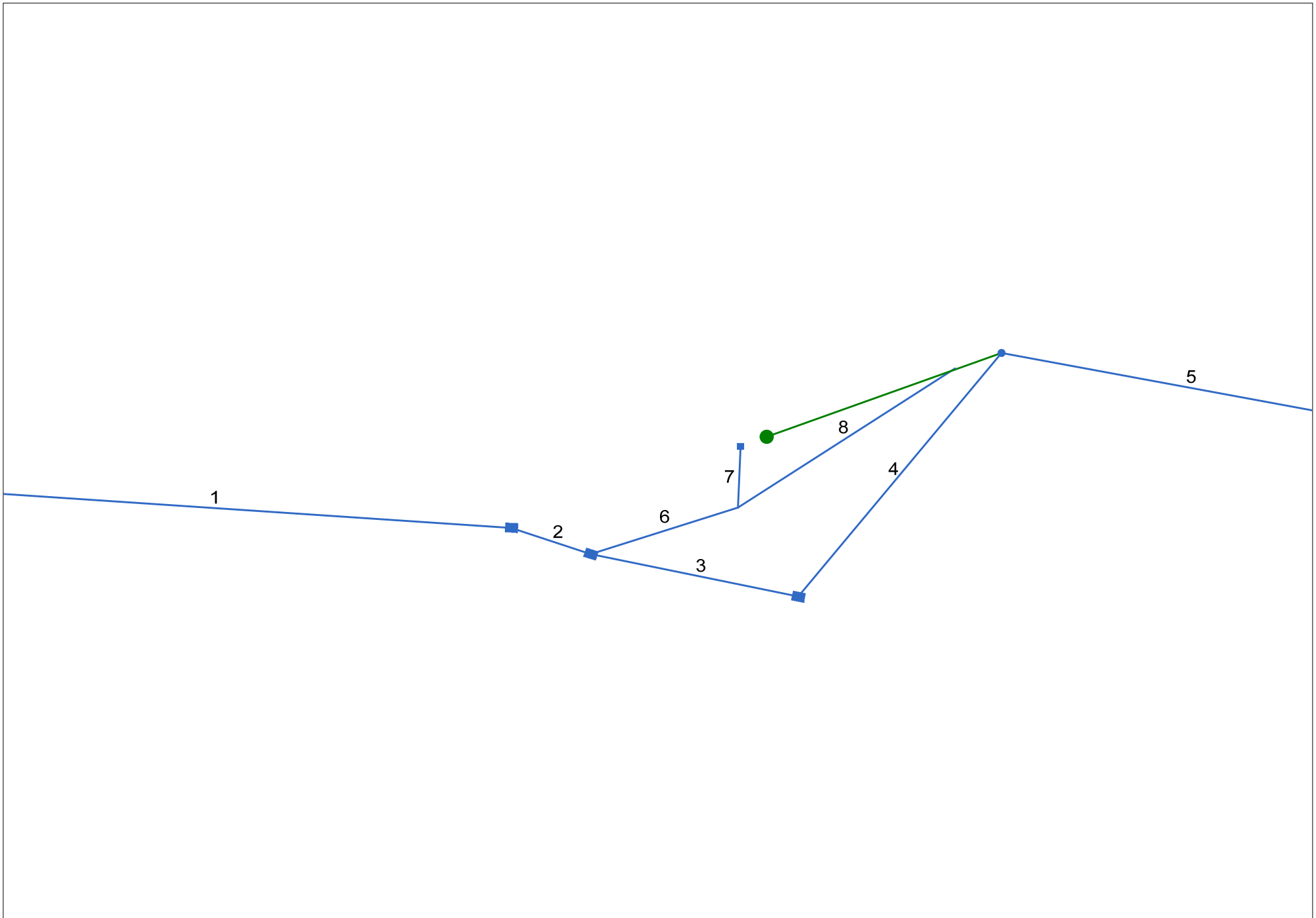
Depth (ft)	= 2.59
Q (cfs)	= 43.00
Area (sqft)	= 39.32
Velocity (ft/s)	= 1.09
Wetted Perim (ft)	= 21.58
Crit Depth, Yc (ft)	= 0.79
Top Width (ft)	= 20.36
EGL (ft)	= 2.61



APPENDIX "D"

COLLECTION SYSTEM ANALYSIS

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



Project File: 2235 - Outlet Control - larger pond.stm	Number of lines: 8	Date: 9/1/2022

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)	32.05	24	Cir	195.871	238.27	244.52	3.191	240.16	246.41	0.85	246.41	End	Combination
2	Pipe - (22)	32.05	24	Cir	27.132	244.74	245.23	1.806	246.41	247.12	1.62	247.12	1	Combination
3	Pipe - (23)	32.03	24	Cir	68.643	245.36	246.87	2.200	247.12	248.76	2.28	248.76	2	Grate
4	Pipe - (12)	32.01	24	Cir	102.975	246.87	249.29	2.350	248.76	251.18	1.50	251.18	3	Manhole
5	Pipe - (12) (1)	32.00	24	Cir	121.000	249.30	258.00	7.190	251.18	259.89	1.69	259.89	4	OpenHeadwall
6	Pipe - (24)	0.00	12	Cir	50.000	245.66	247.00	2.680	247.12	247.12	0.00	247.12	2	None
7		0.58	4	Cir	20.000	247.50	248.60	5.500	247.83*	249.40*	0.68	250.08	6	Grate
8		0.00	12	Cir	83.528	247.00	249.29	2.742	247.12	250.29	0.00	250.29	6	None

Project File: 2235 - Outlet Control - larger pond.stm | Number of lines: 8 | Run Date: 9/1/2022

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

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	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	109339.4	0.0	32.05	43.77	10.43	24	3.19	238.27	244.52	240.16	246.41	238.27	248.68	Pipe - (21)
2	1	27.132	10.00	10.54	0.40	4.00	4.15	30.0	109339.4	0.0	32.05	32.93	10.93	24	1.81	244.74	245.23	246.41	247.12	248.68	248.59	Pipe - (22)
3	2	68.643	0.10	0.28	0.40	0.04	0.07	10.0	758.4	0.5	32.03	36.34	10.68	24	2.20	245.36	246.87	247.12	248.76	248.59	251.61	Pipe - (23)
4	3	102.975	0.18	0.18	0.17	0.03	0.03	18.0	758.2	0.5	32.01	34.67	10.42	24	2.35	246.87	249.29	248.76	251.18	251.61	257.38	Pipe - (12)
5	4	121.000	0.00	0.00	0.00	0.00	0.00	758.0	758.0	0.0	32.00	60.65	10.43	24	7.19	249.30	258.00	251.18	259.89	257.38	261.92	Pipe - (12) (1)
6	2	50.000	0.00	0.26	0.00	0.00	0.08	0.0	109338.3	0.0	0.00	6.32	0.01	12	2.68	245.66	247.00	247.12	247.12	248.59	250.00	Pipe - (24)
7	6	20.000	0.26	0.26	0.32	0.08	0.08	14.0	14.0	6.9	0.58	0.48	6.61	4	5.50	247.50	248.60	247.83	249.40	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	247.12	250.29	250.00	254.00	

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

Number of lines: 8

Run Date: 9/1/2022

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	0.000	0.37	15.45	0.37	15.45	0.0	Off
2	Structure - (32)	17.40	0.16	17.56	0.00	Comb	3.5	3.15	4.59	3.15	1.68	Sag	2.00	0.050	0.020	0.013	0.98	46.09	0.98	46.09	0.0	Off
3	Structure - (14)	0.33	0.00	0.17	0.16	Grate	0.0	0.00	0.00	3.00	2.00	2.000	2.00	0.050	0.020	0.013	0.05	0.92	0.04	0.71	0.0	2
4	A1	0.18	0.00	0.00	0.18	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	32.00*	0.00	32.00	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		0.58	0.18	0.76	0.00	Grate	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.17	5.56	0.17	5.56	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: 9/1/2022

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	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	24	32.05	238.27	240.16	1.89	3.07	10.43	1.69	241.85	0.000	195.871	244.52	246.41	1.89**	3.07	10.43	1.69	248.10	0.000	0.000	n/a	0.50	0.85
2	24	32.05	244.74	246.41	1.67	2.80	11.44	1.69	248.10	0.000	27.132	245.23	247.12	1.89**	3.07	10.43	1.69	248.81	0.000	0.000	n/a	0.96	1.62
3	24	32.03	245.36	247.12	1.76	2.93	10.94	1.69	248.81	0.000	68.643	246.87	248.76	1.89**	3.07	10.42	1.69	250.45	0.000	0.000	n/a	1.35	2.28
4	24	32.01	246.87	248.76	1.89	3.07	10.42	1.69	250.45	0.000	102.975	249.29	251.18	1.89**	3.07	10.42	1.69	252.87	0.000	0.000	n/a	0.89	1.50
5	24	32.00	249.30	251.18	1.88	3.06	10.44	1.69	252.87	0.000	121.000	258.00	259.89	1.89**	3.07	10.41	1.69	261.57	0.000	0.000	n/a	1.00	1.69
6	12	0.00	245.66	247.12	1.00	0.79	0.00	0.00	247.12	0.000	50.000	247.00	247.12	0.12	0.05	0.02	0.00	247.12	0.000	0.000	0.000	0.95	0.00
7	4	0.58	247.50	247.83	0.33*	0.09	6.61	0.68	248.51	7.822	20.000	248.60	249.40	0.33**	0.09	6.61	0.68	250.08	7.848	7.835	1.567	1.00	0.68
8	12	0.00	247.00	247.12	0.12	0.05	0.00	0.00	247.12	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: 9/1/2022

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

Hydraflow HGL Computation Procedure

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 x 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).

Hydraflow HGL Computation Procedure

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).

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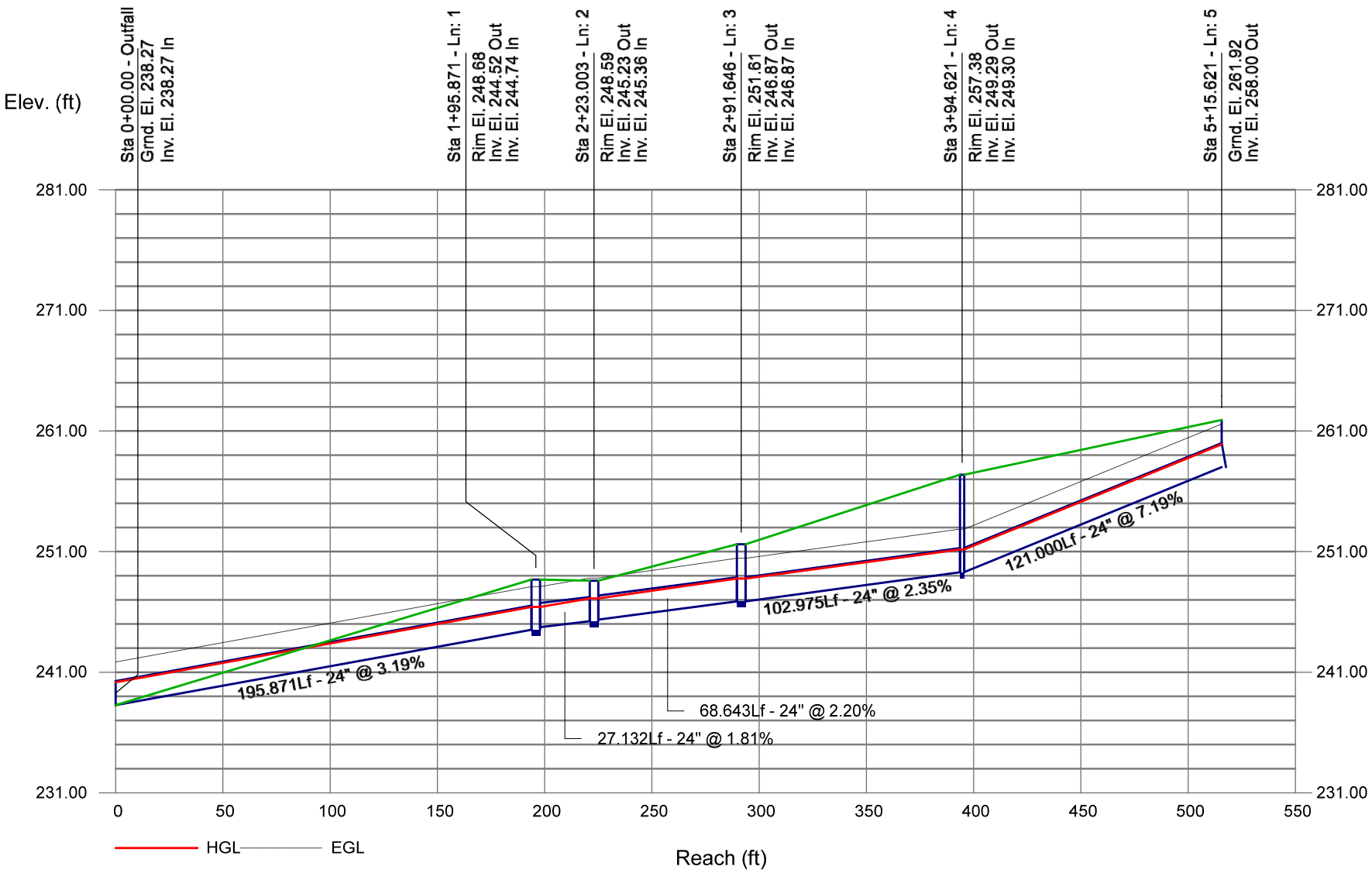
Col. 23 The junction loss coefficient (K).

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).

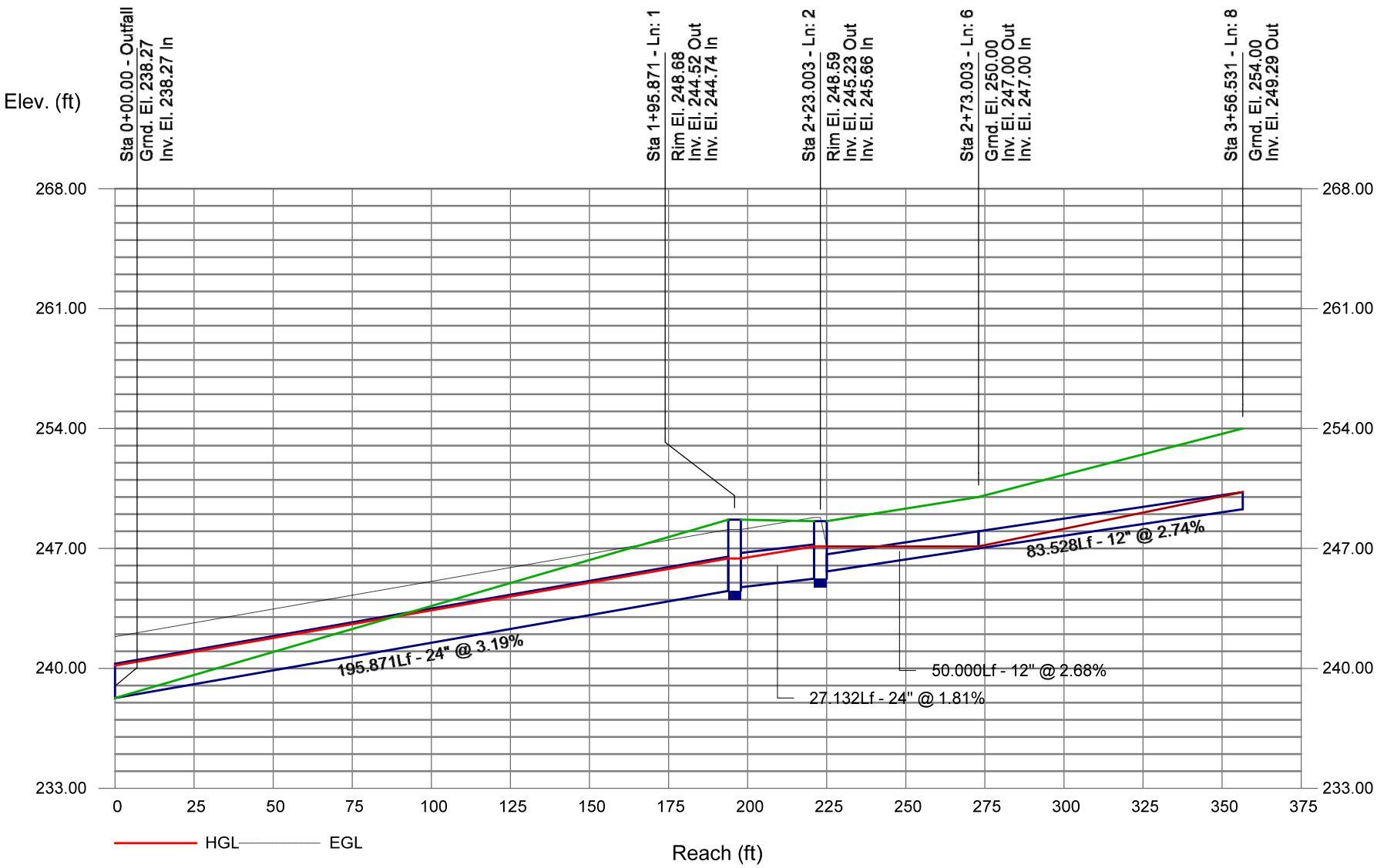
Storm Sewer Profile

Proj. file: 2235 - Outlet Control - larger pond.stm



Storm Sewer Profile

Proj. file: 2235 - Outlet Control - larger pond.stm



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 I 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 I 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 I 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.