Storm Water Management Report

84 Lumber Company

(Non-Residential Site Plan)

Project Location:
Tax Map 145, Lot 15
3 Sullivan Road
Hudson, NH

Prepared for:
84 Lumber Company
1019 Route 519, Building 4
Eighty Four, PA 15330

Date: August 2, 2022
Revised: January 6, 2023

STATE OF NEW HAMPSHIRE – CHAD E. BRANON No. 12191 LICENSED PROFESSIONAL ENGINEER –

1/11/23

Surveying ⌖ Engineering ⌖ Land Planning ⌖ Permitting ⌖ Septic Designs

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STORM WATER MANAGEMENT REPORT
84 LUMBER COMPANY
MAP 145, LOT 15 – 3 SULLIVAN ROAD
HUDSON, NEW HAMPSHIRE

Prepared for:
84 Lumber Company
Revised: December 28, 2022

I) INTRODUCTION

The following are storm water drainage calculations for a proposed Site Plan Development for a lumber yard off Sullivan Street in Hudson, NH. The project area is bordered by single family residential to the north, east, and south and a vacant lot to the west. The project involves a single tax parcel (145-3) totaling 30.962 acres. The proposed development will consist of constructing 55,500 square feet, over two phases of construction. The terrain alteration associated with the proposed buildings and infrastructure is 435,000± square feet. The increase in impervious area, including the roadway, driveways, sidewalks and roof area is 342,000± square feet.

The proposed lumber sales use of the site requires large areas of impervious areas for truck maneuvering, building access, and storage. The infiltration basin providing a net reduction in storm water runoff and landscaped islands in the parking area to disconnect impervious areas are the proposed low impact development strategies used for this project.

The purpose of this report is to analyze the qualitative and quantitative impacts of the proposed development. The objective of the proposed storm water management system for this project is to mitigate any increases resulting from the proposed development and to meet the drainage guidelines set forth in the Town of Hudson's storm water regulations.

II) SITE DESCRIPTION

The project consists of an existing 30.962-acre single family residential lot at the corner of Sullivan Road and Central Street with two curb cuts on Sullivan Road. The site is relatively level on the northern section of the lot where the existing house and curb cuts are located. A large wetland crosses the center of the lot, flowing west to east. At the south side of the lot the site is wooded and steeper with 8 to 15% grades. There is a few trails through the wooded area and a 50' gas easement. The area north of the wetlands, where all the proposed improvements are located, consists of Windsor Loamy Sand with a hydrologic soil group (HSG) rating "A".

There are two (2) observation points for the project. A small section of the northwest corner of the site drains into the closed drainage system in the Town right-of-way (OP1). The majority of the site drains south towards the wetlands in the center of the site (OP1).

NRCS soil survey maps indicated that the dominate soils present on the site consist of well-drained Windsor loamy sand. This is a Hydrologic Soil Group (HSG) "A" soil. There are no wetland or wetland buffer impacts proposed on the project. There will an increase of approximately 7.85± acres of impervious area as a result of the proposed development.

III) METHODOLOGY

The quantity of runoff and the conveyance of that flow through the site are determined using the software package HydroCAD r 10.0 by HydroCAD Software Solutions, LLC. HydroCAD is a computer aided design program for modeling storm water hydrology based on the Soil Conservation Service (SCS) TR-20 method combined with standard hydraulics calculations.

Storm water management systems and erosion control outlet protection aprons (riprap aprons) are designed in accordance with the methodology for the "Best Management Practices" (BMP's), as outlined in the New Hampshire Storm Water Manual, Volume 2.

IV) DRAINAGE DESIGN

In accordance with the Town of Hudson Storm water Regulations require that the two (2), ten (10), twenty-five (25) and fifty (50) year frequency storm events also be evaluated. These design storms have therefore been analyzed to compare the pre and post-development peak flow rates for the site (see attached comparison tables).

Pre-Development Drainage Conditions:
As can be seen on the Pre-Development Drainage Plan, approximately 90% of project area drains southerly to wetlands on-site (OP1). The remaining 10% of the site drains northwesterly to one of two catch basins in the Central Street right-of-way.

Post-Development Drainage Conditions:
As can be seen on the Post-Development Drainage Plans, the drainage for the proposed improvements flows to the east end of the site and is collected in a large stormwater basin. Subcatchments S301 to S313 are captures in catch basins, outlet into sediment forebays for pretreatment, and then into the infiltration basin where runoff is treated and recharged to the groundwater. The front of the site subcatchments S101 and S201 remain largely unchanged from predevelopment conditions.

The net result is that all new paved areas will receive qualitative treatment and, due to the detention capability of the stormwater basin, there will be a reduction of peak rates of runoff leaving this site for all storm events.

V) SUMMARY

The intent of the storm water management system for this project is to address the qualitative and quantitative aspects of the storm water runoff so that there are no downstream adverse impacts created by the project. Due to the proposed stormwater management system there are no increases in storm water runoff resulting from the proposed development.

The storm water management design for this project therefore complies with the stormwater standards set forth in the Town of Hudson and the Alteration of Terrain regulations.

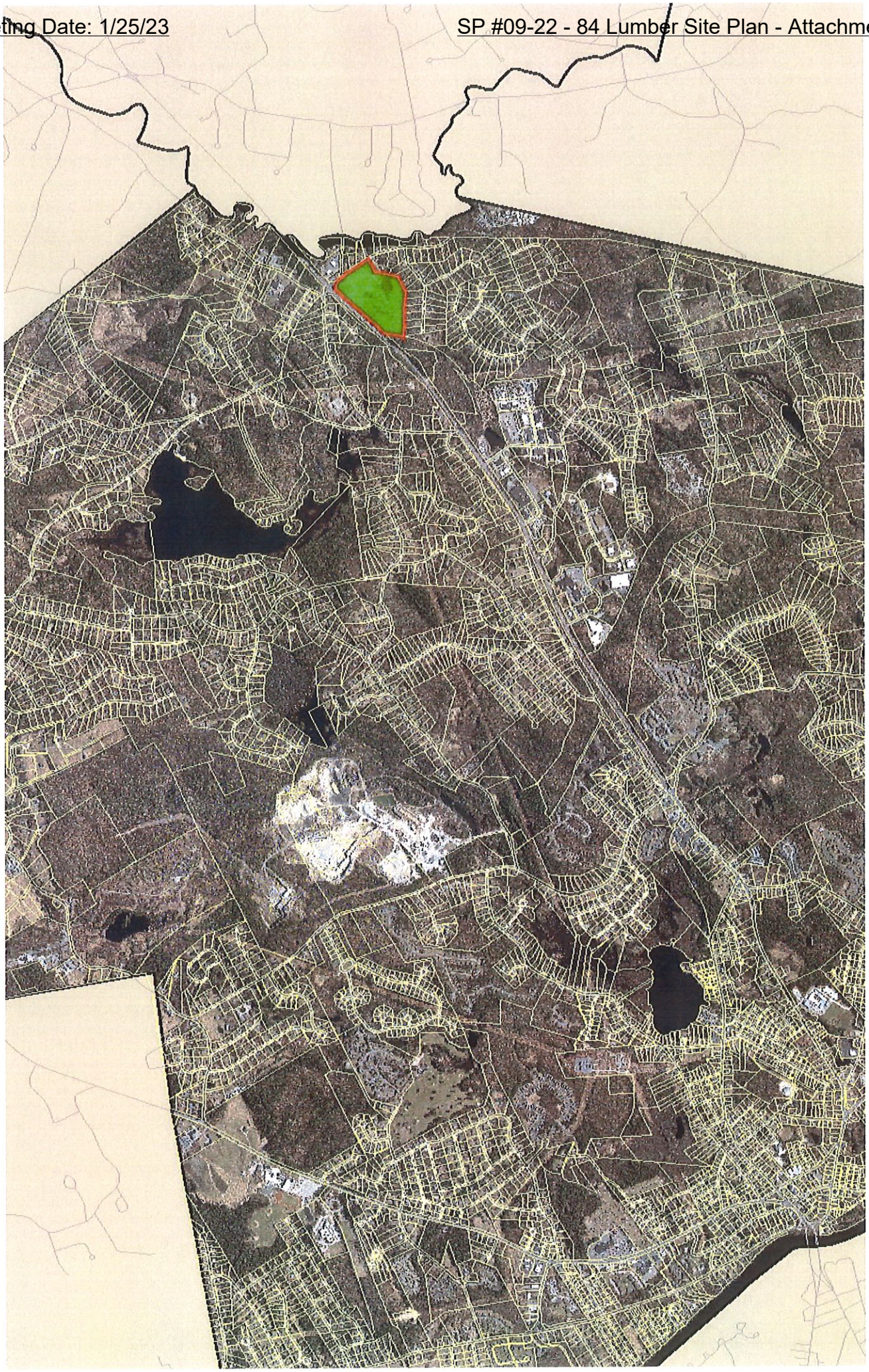
The following tables are a summary of the attached calculations and show a comparison of the peak flow rates at the outlet point for the site. The values presented are based on pre- and post-development conditions.

Table 1: Peak flow rates to OP1

STORM FREQUENCY	PRE-DEVELOPMENT (CFS/AF)	POST-DEVELOPMENT (CFS/AF)	CHANGE (CFS/AF)
2-YEAR	0.03/0.011	0.03/0.008	0.00/-0.003
10-YEAR	0.52/0.056	0.41/0.044	-0.11/-0.012
25-YEAR	1.36/0.108	1.07/0.085	-0.29/-0.023
50-YEAR	2.30/0.168	1.81/0.132	-0.49/-0.036

Table 2: Peak flow rates to OP2

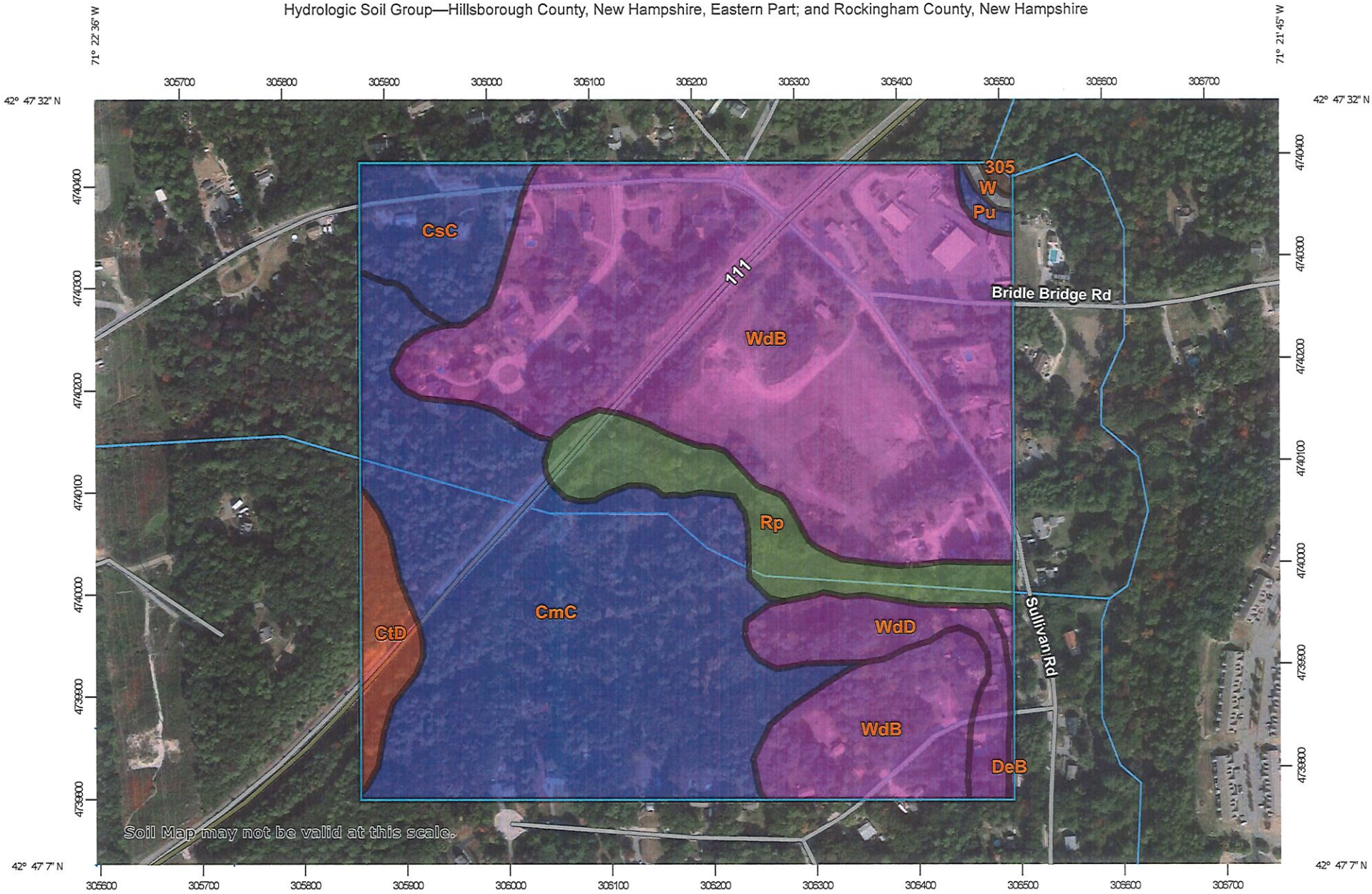
STORM FREQUENCY	PRE-DEVELOPMENT (CFS/AF)	POST-DEVELOPMENT (CFS/AF)	CHANGE (CFS/AF)
2-YEAR	0.00/0.000	0.00/0.000	0.00/0.000
10-YEAR	0.16/0.072	0.08/0.031	-0.08/-0.041
25-YEAR	1.02/0.304	0.71/0.303	-0.31/-0.001
50-YEAR	3.37/0.640	2.86/0.849	-0.51/0.209



Meeting Date: 1/25/23

SP #09-22 - 84 Lumber Site Plan - Attachment H

Hydrologic Soil Group—Hillsborough County, New Hampshire, Eastern Part; and Rockingham County, New Hampshire



Map Scale: 1:5,290 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N 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 scales ranging from 1:20,000 to 1:24,000.

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: Hillsborough County, New Hampshire, Eastern Part
Survey Area Data: Version 24, Aug 31, 2021

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 24, Aug 31, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: May 22, 2020—Sep 25, 2020

MAP LEGEND

MAP INFORMATION

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
CmC	Canton fine sandy loam, 8 to 15 percent slopes, very stony	B	32.1	32.5%
CsC	Chatfield-Hollis complex, 8 to 15 percent slopes, rocky	B	5.1	5.1%
CtD	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	D	2.5	2.5%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	A	0.3	0.3%
Pu	Pootatuck fine sandy loam	B	0.4	0.4%
Rp	Rippowam fine sandy loam	A/D	6.3	6.4%
W	Water (less than 40 acres)		0.2	0.2%
WdB	Windsor loamy sand, 3 to 8 percent slopes	A	47.4	48.0%
WdD	Windsor loamy sand, 15 to 35 percent slopes	A	4.3	4.3%
Subtotals for Soil Survey Area			**98.6**	**99.8%**
Totals for Area of Interest			**98.8**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
305	Lim-Pootatuck complex	B/D	0.2	0.2%
Subtotals for Soil Survey Area			**0.2**	**0.2%**
Totals for Area of Interest			**98.8**	**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

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.370 degrees West
Latitude	42.788 degrees North
Elevation	0 feet
Date/Time	Tue, 19 Jul 2022 11:15:00 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.68	0.85	1.07	**1yr**	0.73	1.01	1.23	1.55	1.96	2.48	2.71	**1yr**	2.19	2.60	3.03	3.71	4.33	**1yr**
2yr	0.33	0.51	0.63	0.84	1.05	1.32	**2yr**	0.91	1.21	1.53	1.91	2.38	2.97	3.29	**2yr**	2.63	3.16	3.67	4.39	4.99	**2yr**
5yr	0.39	0.61	0.76	1.02	1.31	1.66	**5yr**	1.13	1.51	1.93	2.42	3.02	3.76	4.19	**5yr**	3.33	4.03	4.66	5.52	6.25	**5yr**
10yr	0.44	0.69	0.88	1.19	1.55	1.99	**10yr**	1.34	1.79	2.31	2.90	3.62	4.50	5.04	**10yr**	3.98	4.85	5.58	6.56	7.41	**10yr**
25yr	0.52	0.83	1.06	1.46	1.93	2.50	**25yr**	1.67	2.24	2.92	3.68	4.60	5.70	6.43	**25yr**	5.04	6.18	7.09	8.26	9.28	**25yr**
50yr	0.59	0.94	1.21	1.70	2.29	3.00	**50yr**	1.98	2.66	3.52	4.44	5.53	6.82	7.74	**50yr**	6.04	7.44	8.50	9.83	11.02	**50yr**
100yr	0.68	1.09	1.41	1.99	2.72	3.57	**100yr**	2.35	3.15	4.20	5.31	6.62	8.17	9.31	**100yr**	7.23	8.96	10.19	11.71	13.08	**100yr**
200yr	0.77	1.25	1.63	2.33	3.22	4.27	**200yr**	2.78	3.74	5.04	6.38	7.95	9.79	11.22	**200yr**	8.67	10.79	12.23	13.95	15.53	**200yr**
500yr	0.92	1.52	1.98	2.88	4.05	5.40	**500yr**	3.49	4.70	6.39	8.11	10.11	12.45	14.35	**500yr**	11.02	13.80	15.56	17.59	19.51	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.43	0.58	0.71	0.82	**1yr**	0.61	0.80	1.08	1.31	1.67	2.20	2.54	**1yr**	1.95	2.44	2.70	3.03	3.87	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.17	1.37	1.79	2.30	2.84	3.17	**2yr**	2.52	3.05	3.55	4.24	4.82	**2yr**
5yr	0.36	0.55	0.69	0.94	1.20	1.42	**5yr**	1.03	1.39	1.62	2.10	2.68	3.52	3.78	**5yr**	3.11	3.64	4.22	5.06	5.73	**5yr**
10yr	0.39	0.61	0.75	1.05	1.36	1.61	**10yr**	1.17	1.58	1.83	2.37	3.02	4.07	4.31	**10yr**	3.60	4.14	4.83	5.77	6.49	**10yr**
25yr	0.45	0.68	0.85	1.21	1.60	1.89	**25yr**	1.38	1.85	2.16	2.79	3.51	4.92	5.12	**25yr**	4.36	4.93	5.77	6.91	7.58	**25yr**
50yr	0.49	0.75	0.93	1.33	1.80	2.15	**50yr**	1.55	2.10	2.46	3.17	3.95	5.70	5.86	**50yr**	5.04	5.64	6.64	7.92	8.50	**50yr**
100yr	0.54	0.82	1.02	1.48	2.03	2.43	**100yr**	1.75	2.38	2.79	3.60	4.44	5.75	6.72	**100yr**	5.09	6.46	7.66	9.11	9.54	**100yr**
200yr	0.60	0.90	1.14	1.65	2.30	2.76	**200yr**	1.98	2.70	3.14	4.10	5.02	6.49	7.71	**200yr**	5.74	7.41	8.86	10.49	10.68	**200yr**
500yr	0.68	1.02	1.31	1.90	2.70	3.28	**500yr**	2.33	3.21	3.72	4.87	5.92	7.59	9.33	**500yr**	6.72	8.97	10.77	12.69	12.42	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.47	0.58	0.77	0.95	1.11	**1yr**	0.82	1.09	1.26	1.64	2.08	2.72	2.87	**1yr**	2.41	2.76	3.40	4.13	4.83	**1yr**
2yr	0.35	0.54	0.66	0.90	1.11	1.30	**2yr**	0.96	1.27	1.48	1.92	2.46	3.12	3.49	**2yr**	2.76	3.35	3.84	4.58	5.27	**2yr**
5yr	0.43	0.67	0.83	1.14	1.45	1.66	**5yr**	1.25	1.62	1.89	2.43	3.05	4.04	4.66	**5yr**	3.58	4.48	5.10	6.03	6.79	**5yr**
10yr	0.53	0.81	1.00	1.40	1.81	2.02	**10yr**	1.56	1.97	2.28	2.91	3.63	5.01	5.84	**10yr**	4.43	5.62	6.34	7.45	8.35	**10yr**
25yr	0.68	1.04	1.29	1.84	2.42	2.61	**25yr**	2.09	2.56	2.94	3.69	4.53	6.65	7.89	**25yr**	5.89	7.59	8.45	9.82	11.02	**25yr**
50yr	0.83	1.26	1.57	2.25	3.03	3.19	**50yr**	2.61	3.12	3.57	4.42	5.36	8.25	9.92	**50yr**	7.30	9.54	10.48	12.08	13.59	**50yr**
100yr	1.01	1.53	1.91	2.76	3.79	3.89	**100yr**	3.27	3.80	4.34	5.30	6.36	11.36	12.46	**100yr**	10.06	11.98	12.99	14.89	16.79	**100yr**
200yr	1.23	1.86	2.35	3.40	4.75	4.74	**200yr**	4.10	4.63	5.26	6.34	7.54	14.33	15.61	**200yr**	12.68	15.01	16.08	18.34	20.74	**200yr**
500yr	1.62	2.40	3.09	4.49	6.39	6.15	**500yr**	5.51	6.01	6.81	8.05	9.45	19.50	21.05	**500yr**	17.26	20.24	21.33	24.15	27.44	**500yr**

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Northeast Regional Climate Center

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.06)

Type/Node Name: _____

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← yes
7.45	ac	A = Area draining to the practice	
5.89	ac	A_I = Impervious area draining to the practice	
0.79	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.76	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
5.67	ac-in	WQV= 1" x Rv x A	
20,595	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
5,149	cf	25% x WQV (check calc for sediment forebay volume)	
f		Method of pretreatment? (not required for clean or roof runoff)	
5,407	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
55,500	cf	V = Volume[1] (attach a stage-storage table)	≥ WQV
23,950	sf	A_{SA} = Surface area of the bottom of the pond	
6.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
1.7	hours	I_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
181.00	feet	E_{BTM} = Elevation of the bottom of the basin	
178.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
178.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.00	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
3.0	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ 24"
	ft	D_T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←yes
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← yes
Y	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥3:1
183.43	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
184.81	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
186.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: _____

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION (Env-Wq 1507.04)

3.66	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.40	inches	Rd = Weighted groundwater recharge depth	
1.463	ac-in	GRV = AI * Rd	
5,311	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

The above calculation only represents 1/2 the proposed area of HSG A soil that was replaced with impervious cover. The total GRV required is 10,622 cubic feet. The proposed infiltration basin has a storage of 55,700 cubic feet below the lowest invert out of the basin. All that stormwater will be infiltrated back into the ground.

Summary for Pond 15P: FOREBAY 3

Volume	Invert	Avail.Storage	Storage Description
#1	181.50'	2,116 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.50	340	0	0
182.00	510	213	213
184.00	888	1,398	1,611
184.50	1,132	505	2,116

Summary for Pond 16P: FOREBAY 2

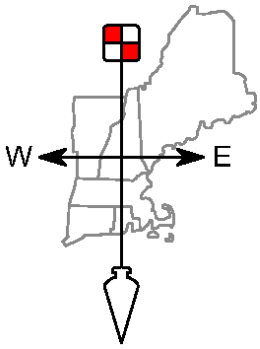
Volume	Invert	Avail.Storage	Storage Description
#1	181.50'	2,134 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.50	35	0	0
182.00	485	130	130
184.00	955	1,440	1,570
184.50	1,299	564	2,134

Summary for Pond 17P: FOREBAY 1

Volume	Invert	Avail.Storage	Storage Description
#1	181.50'	1,744 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.50	270	0	0
182.00	410	170	170
184.00	740	1,150	1,320
184.50	955	424	1,744



FIELDSTONE LAND CONSULTANTS, PLLC
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INFILTRATION FEASIBILITY REPORT
84 LUMBER, SINGLE FAMILY RESIDENTIAL
NASHUA, NEW HAMPSHIRE

The project proposes one system that incorporates an infiltration component. This system is identified on the plans as Infiltration Basins 1 (IB1).

I. Location of the practice

Infiltration Basin 1 – this practice is located in southeast end of the lot. This is a basin that receives runoff from the proposed buildings and impervious surfaces. This basin discharges approximately 100 feet from the on-site wetlands in the center of the lot. The discharge from the closed drainage system (CB6, 9, and 12) is being pre-treated with forebays upstream of the practice.

II. Existing topography at the location of the practices

Infiltration Basins 1 (IB1) - This infiltration basin is situated at the lower end of the site in nearly flat area. The site currently slopes gently towards this area at a 3-8% grade. This area is at the low point between the subject parcel and abutting property. The low point also slopes west towards the wetlands on site. The area is mostly cleared with some areas of vegetation.

III. Test pit or boring locations

In accordance with Env-Wq 1504.13(c), several test pits have been performed on-site.

Infiltration Basin 1 (IB1) – this basin has a bottom area of 17,800 square feet in area and therefore a minimum of three test pits are required in the location of the proposed practice. Four (4) test pits were performed in this location and are identified as TP-3, TP-4, TP-5, and TP-6 on the attached plans.

IV. Seasonal high-water table (SHWT) and bedrock elevations

The following test pit data was collected on October 13, 2022.

Infiltration Basin 1 (IB1) – Bottom of Pond Elevation = 181.0'

TP-3: Existing Surface Elevation of TP = 183.2'
SHWT => 176.8'
BEDROCK= > 176.8'
Deepest Elevation of TP = 176.8'

Infiltration Basin 2 (IB2) – Bottom of Pond Elevation = 188.0'

TP-4: Existing Surface Elevation of TP = 183.8
SHWT =>178.0'
BEDROCK= > 178.0'
Deepest Elevation of TP = 178.0'

TP-5: Existing Surface Elevation of TP = 183.4
SHWT =>176.7'
BEDROCK= > 176.7'
Deepest Elevation of TP = 176.7'

TP-6: Existing Surface Elevation of TP = 182.8
SHWT =>177.1'
BEDROCK= > 177.1'
Deepest Elevation of TP = 177.1'

V. Profile descriptions

Test Pit #3
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-76"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None Observed Water = None Ledge/Boulders = 76" Roots = None

Test Pit #4
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-70"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None Observed Water = None Ledge/Boulders = 70" Roots = None

Test Pit #5
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-80"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None Observed Water = None Ledge/Boulders = None Roots = 6"

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Test Pit #6

0-15"- 10YR 3/3 dark brown, loamy sand, granular, friable

15-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose

24-68"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose

ESHWT = None Observed Water = None Ledge/Boulders = 68" Roots = None

VI. Soil plan in the area of the proposed practice(s)

See attached plan sheets.

VII. Summary of Field-Testing data used to determine the infiltration rate

Infiltration Basins 1 – the infiltration rate was determined using the Default Values method described in Env-Wq 1504.14.

The basins are located within native material identified in the Soil Series Survey as Windsor loamy sand.

Using Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No.5, September 2009, the weighted value under the basin floor elevation is: 6 inch per hour.

After applying a factor of safety, the design rate used in the drainage analysis is 3 inches per hour.

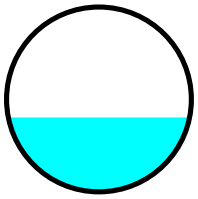
Summary for Reach 2R: CB1

Inflow Area = 0.348 ac, 61.78% Impervious, Inflow Depth > 2.82" for 25-Year event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 0.082 af
Outflow = 1.21 cfs @ 12.10 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.6 min
Routed to Reach 3R : CB2

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 2.1 min

Peak Storage= 59 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.40' , Surface Width= 0.98'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.56 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 200.0' Slope= 0.0100 '/'
Inlet Invert= 192.90', Outlet Invert= 190.90'



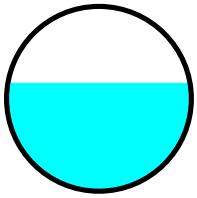
Summary for Reach 3R: CB2

Inflow Area = 0.609 ac, 66.83% Impervious, Inflow Depth > 3.10" for 25-Year event
Inflow = 2.31 cfs @ 12.10 hrs, Volume= 0.157 af
Outflow = 2.30 cfs @ 12.10 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.4 min
Routed to Reach 4R : CB3

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.82 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 1.3 min

Peak Storage= 67 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.59' , Surface Width= 0.99'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.56 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 190.80', Outlet Invert= 189.40'



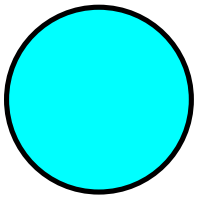
Summary for Reach 4R: CB3

Inflow Area = 1.060 ac, 67.83% Impervious, Inflow Depth > 3.18" for 25-Year event
Inflow = 4.11 cfs @ 12.10 hrs, Volume= 0.281 af
Outflow = 3.59 cfs @ 12.13 hrs, Volume= 0.281 af, Atten= 13%, Lag= 1.6 min
Routed to Reach 5R : CB4

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.13 fps, Avg. Travel Time= 1.2 min

Peak Storage= 120 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.56 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 150.0' Slope= 0.0100 '/'
Inlet Invert= 189.30', Outlet Invert= 187.80'



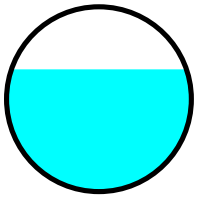
Summary for Reach 5R: CB4

Inflow Area = 1.313 ac, 74.03% Impervious, Inflow Depth > 3.54" for 25-Year event
Inflow = 4.93 cfs @ 12.10 hrs, Volume= 0.387 af
Outflow = 5.00 cfs @ 12.11 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.3 min
Routed to Reach 6R : CB5

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.26 fps, Avg. Travel Time= 1.1 min

Peak Storage= 129 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.83' , Surface Width= 1.18'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.46 cfs

15.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 150.0' Slope= 0.0100 '/'
Inlet Invert= 187.70', Outlet Invert= 186.20'



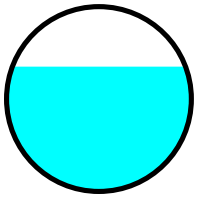
Summary for Reach 6R: CB5

Inflow Area = 1.935 ac, 82.38% Impervious, Inflow Depth > 4.03" for 25-Year event
Inflow = 8.36 cfs @ 12.10 hrs, Volume= 0.649 af
Outflow = 8.38 cfs @ 12.11 hrs, Volume= 0.649 af, Atten= 0%, Lag= 0.6 min
Routed to Reach 7R : CB6

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.60 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.65 fps, Avg. Travel Time= 1.8 min

Peak Storage= 368 cf @ 12.11 hrs
Average Depth at Peak Storage= 1.01' , Surface Width= 1.41'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.50 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 290.0' Slope= 0.0100 '/'
Inlet Invert= 186.10', Outlet Invert= 183.20'



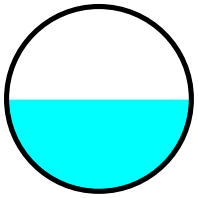
Summary for Reach 7R: CB6

Inflow Area = 2.447 ac, 86.06% Impervious, Inflow Depth > 4.24" for 25-Year event
Inflow = 11.13 cfs @ 12.10 hrs, Volume= 0.865 af
Outflow = 11.13 cfs @ 12.10 hrs, Volume= 0.865 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.17 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.80 fps, Avg. Travel Time= 0.1 min

Peak Storage= 31 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.99' , Surface Width= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 183.10', Outlet Invert= 182.90'



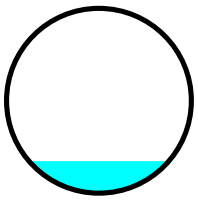
Summary for Reach 8R: CB7

Inflow Area = 0.052 ac,100.00% Impervious, Inflow Depth > 5.06" for 25-Year event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af, Atten= 1%, Lag= 0.9 min
Routed to Reach 9R : CB8

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 3.1 min

Peak Storage= 20 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 0.75'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.36 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 220.0' Slope= 0.0150 '/'
Inlet Invert= 189.00', Outlet Invert= 185.70'



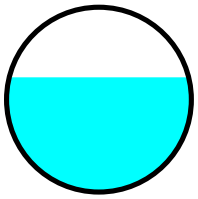
Summary for Reach 9R: CB8

Inflow Area = 0.841 ac,100.00% Impervious, Inflow Depth > 5.06" for 25-Year event
Inflow = 4.58 cfs @ 12.09 hrs, Volume= 0.354 af
Outflow = 4.56 cfs @ 12.10 hrs, Volume= 0.354 af, Atten= 0%, Lag= 0.7 min
Routed to Reach 10R : CB9

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.71 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.31 fps, Avg. Travel Time= 2.2 min

Peak Storage= 240 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.77' , Surface Width= 1.21'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.46 cfs

15.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 300.0' Slope= 0.0100 '/'
Inlet Invert= 185.60', Outlet Invert= 182.60'



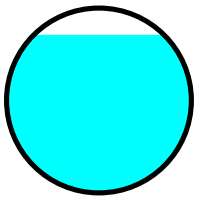
Summary for Reach 10R: CB9

Inflow Area = 2.006 ac,100.00% Impervious, Inflow Depth > 5.05" for 25-Year event
Inflow = 10.88 cfs @ 12.09 hrs, Volume= 0.845 af
Outflow = 10.89 cfs @ 12.09 hrs, Volume= 0.845 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.76 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.92 fps, Avg. Travel Time= 0.1 min

Peak Storage= 32 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.28' , Surface Width= 1.06'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.50 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 182.50', Outlet Invert= 182.30'



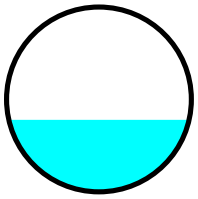
Summary for Reach 11R: CB10

Inflow Area = 0.401 ac, 69.58% Impervious, Inflow Depth > 3.29" for 25-Year event
Inflow = 1.61 cfs @ 12.09 hrs, Volume= 0.110 af
Outflow = 1.61 cfs @ 12.10 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.7 min
Routed to Reach 12R : CB11

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.70 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 2.3 min

Peak Storage= 85 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 0.97'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.04 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 300.0' Slope= 0.0200 '/'
Inlet Invert= 191.50', Outlet Invert= 185.50'



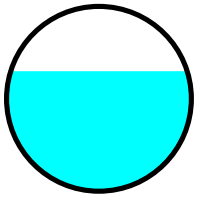
Summary for Reach 12R: CB11

Inflow Area = 1.576 ac, 91.31% Impervious, Inflow Depth > 4.55" for 25-Year event
Inflow = 7.96 cfs @ 12.09 hrs, Volume= 0.598 af
Outflow = 7.93 cfs @ 12.10 hrs, Volume= 0.597 af, Atten= 0%, Lag= 0.6 min
Routed to Reach 13R : CB12

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.53 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 1.9 min

Peak Storage= 364 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.97' , Surface Width= 1.43'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.50 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 300.0' Slope= 0.0100 '/'
Inlet Invert= 185.40', Outlet Invert= 182.40'



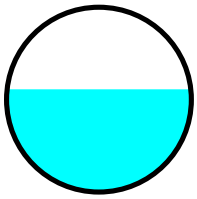
Summary for Reach 13R: CB12

Inflow Area = 2.729 ac, 87.65% Impervious, Inflow Depth > 4.36" for 25-Year event
Inflow = 13.46 cfs @ 12.10 hrs, Volume= 0.991 af
Outflow = 13.46 cfs @ 12.10 hrs, Volume= 0.991 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.51 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.89 fps, Avg. Travel Time= 0.1 min

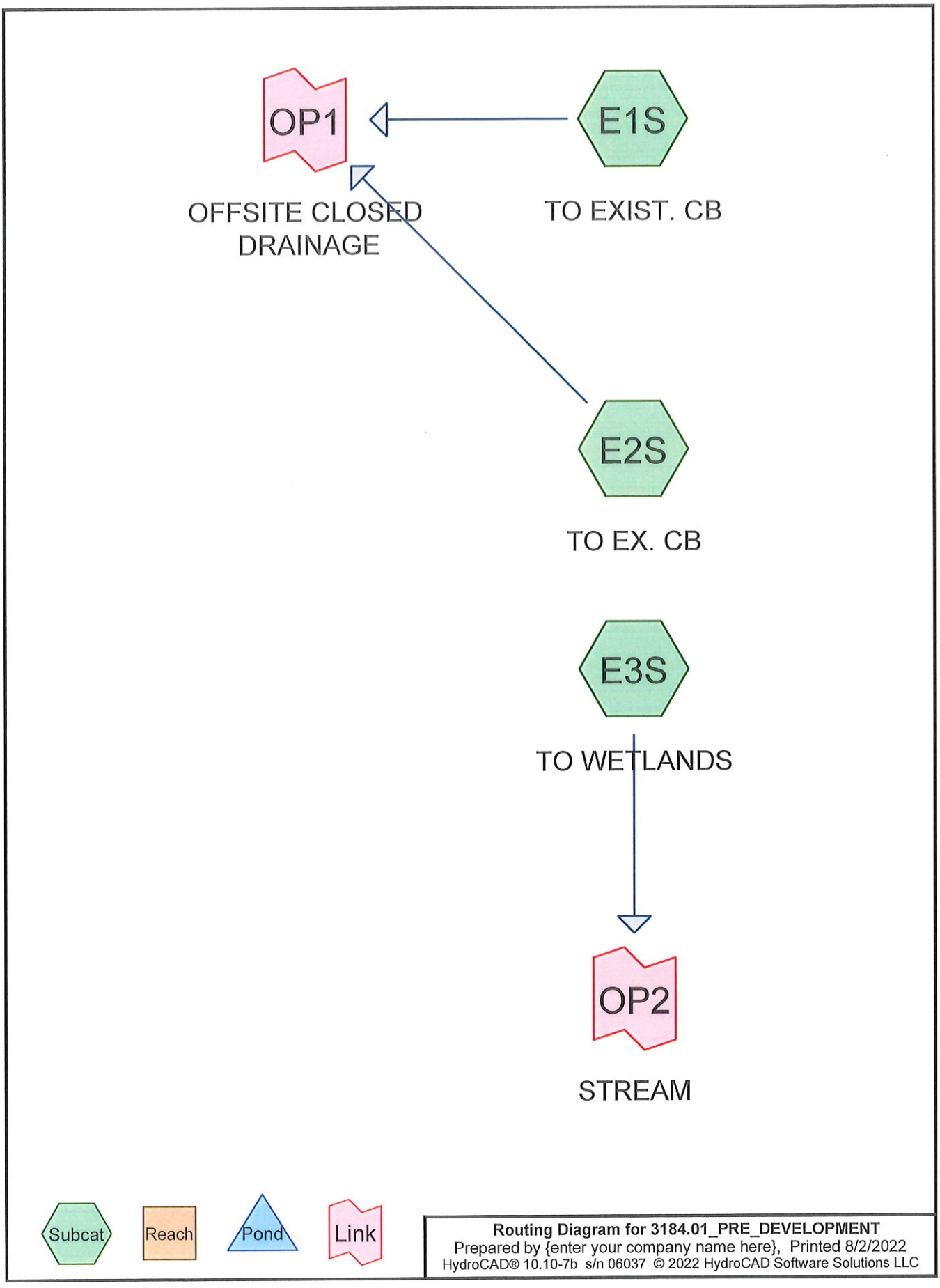
Peak Storage= 36 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.11' , Surface Width= 1.99'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 182.30', Outlet Invert= 182.10'



Section 1.1

Existing Conditions
2, 25, 50 Year Storm Node List


OP1
OFFSITE CLOSED DRAINAGE
E1S
TO EXIST. CB
E2S
TO EX. CB
E3S
TO WETLANDS
OP2
STREAM
Subcat
Reach
Pond
Link
Routing Diagram for 3184.01_PRE_DEVELOPMENT
Prepared by {enter your company name here}, Printed 8/2/2022
HydroCAD® 10.10-7b s/n 06037 © 2022 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
10.519	39	>75% Grass cover, Good, HSG A (E1S, E2S, E3S)
0.106	76	Gravel roads, HSG A (E1S, E3S)
0.643	98	Paved parking, HSG A (E1S, E2S, E3S)
4.388	30	Woods, Good, HSG A (E1S, E2S, E3S)
15.656	**39**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
15.656	HSG A	E1S, E2S, E3S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
15.656		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
10.519	0.000	0.000	0.000	0.000	10.519	>75% Grass cover, Good	E1S, E2S, E3S
0.106	0.000	0.000	0.000	0.000	0.106	Gravel roads	E1S, E3S
0.643	0.000	0.000	0.000	0.000	0.643	Paved parking	E1S, E2S, E3S
4.388	0.000	0.000	0.000	0.000	4.388	Woods, Good	E1S, E2S, E3S
15.656	**0.000**	**0.000**	**0.000**	**0.000**	**15.656**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.670 ac 25.97% Impervious Runoff Depth>0.13"
Tc=6.0 min CN=54 Runoff=0.03 cfs 0.007 af

Subcatchment E2S: TO EX. CB Runoff Area=0.603 ac 19.40% Impervious Runoff Depth>0.07"
Tc=6.0 min CN=50 Runoff=0.01 cfs 0.003 af

Subcatchment E3S: TO WETLANDS Runoff Area=14.383 ac 2.45% Impervious Runoff Depth=0.00"
Flow Length=750' Tc=25.6 min CN=38 Runoff=0.00 cfs 0.000 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=0.03 cfs 0.011 af
Primary=0.03 cfs 0.011 af

Link OP2: STREAM Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.656 ac Runoff Volume = 0.011 af Average Runoff Depth = 0.01"
95.89% Pervious = 15.013 ac 4.11% Impervious = 0.643 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.670 ac 25.97% Impervious Runoff Depth>1.14"
Tc=6.0 min CN=54 Runoff=0.84 cfs 0.064 af

Subcatchment E2S: TO EX. CB Runoff Area=0.603 ac 19.40% Impervious Runoff Depth>0.88"
Tc=6.0 min CN=50 Runoff=0.52 cfs 0.044 af

Subcatchment E3S: TO WETLANDS Runoff Area=14.383 ac 2.45% Impervious Runoff Depth>0.25"
Flow Length=750' Tc=25.6 min CN=38 Runoff=1.02 cfs 0.304 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=1.36 cfs 0.108 af
Primary=1.36 cfs 0.108 af

Link OP2: STREAM Inflow=1.02 cfs 0.304 af
Primary=1.02 cfs 0.304 af

Total Runoff Area = 15.656 ac Runoff Volume = 0.412 af Average Runoff Depth = 0.32"
95.89% Pervious = 15.013 ac 4.11% Impervious = 0.643 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.670 ac 25.97% Impervious Runoff Depth>1.74"
Tc=6.0 min CN=54 Runoff=1.36 cfs 0.097 af

Subcatchment E2S: TO EX. CB Runoff Area=0.603 ac 19.40% Impervious Runoff Depth>1.41"
Tc=6.0 min CN=50 Runoff=0.94 cfs 0.071 af

Subcatchment E3S: TO WETLANDS Runoff Area=14.383 ac 2.45% Impervious Runoff Depth>0.53"
Flow Length=750' Tc=25.6 min CN=38 Runoff=3.37 cfs 0.640 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=2.30 cfs 0.168 af
Primary=2.30 cfs 0.168 af

Link OP2: STREAM Inflow=3.37 cfs 0.640 af
Primary=3.37 cfs 0.640 af

Total Runoff Area = 15.656 ac Runoff Volume = 0.808 af Average Runoff Depth = 0.62"
95.89% Pervious = 15.013 ac 4.11% Impervious = 0.643 ac

Section 1.2

Existing Conditions
10 Year Storm Full Summary

Summary for Subcatchment E1S: TO EXIST. CB

Runoff = 0.37 cfs @ 12.12 hrs, Volume= 0.034 af, Depth> 0.61"
Routed to Link OP1 : OFFSITE CLOSED DRAINAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.131	30	Woods, Good, HSG A
0.029	76	Gravel roads, HSG A
0.174	98	Paved parking, HSG A
0.336	39	>75% Grass cover, Good, HSG A
0.670	54	Weighted Average
0.496		74.03% Pervious Area
0.174		25.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E2S: TO EX. CB

Runoff = 0.17 cfs @ 12.16 hrs, Volume= 0.022 af, Depth> 0.43"
Routed to Link OP1 : OFFSITE CLOSED DRAINAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.050	30	Woods, Good, HSG A
0.117	98	Paved parking, HSG A
0.436	39	>75% Grass cover, Good, HSG A
0.603	50	Weighted Average
0.486		80.60% Pervious Area
0.117		19.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment E3S: TO WETLANDS

Runoff = 0.16 cfs @ 15.29 hrs, Volume= 0.072 af, Depth> 0.06"
Routed to Link OP2 : STREAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
4.207	30	Woods, Good, HSG A
0.077	76	Gravel roads, HSG A
0.352	98	Paved parking, HSG A
9.747	39	>75% Grass cover, Good, HSG A
14.383	38	Weighted Average
14.031		97.55% Pervious Area
0.352		2.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	85	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
5.4	390	0.0300	1.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7	275	0.0500	6.60	13.20	**Parabolic Channel, C-D** W=4.00' D=0.75' Area=2.0 sf Perim=4.3' n= 0.030 Earth, grassed & winding
25.6	750	Total			

Summary for Link OP1: OFFSITE CLOSED DRAINAGE

Inflow Area = 1.273 ac, 22.86% Impervious, Inflow Depth > 0.52" for 10-Year event
Inflow = 0.52 cfs @ 12.13 hrs, Volume= 0.056 af
Primary = 0.52 cfs @ 12.13 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

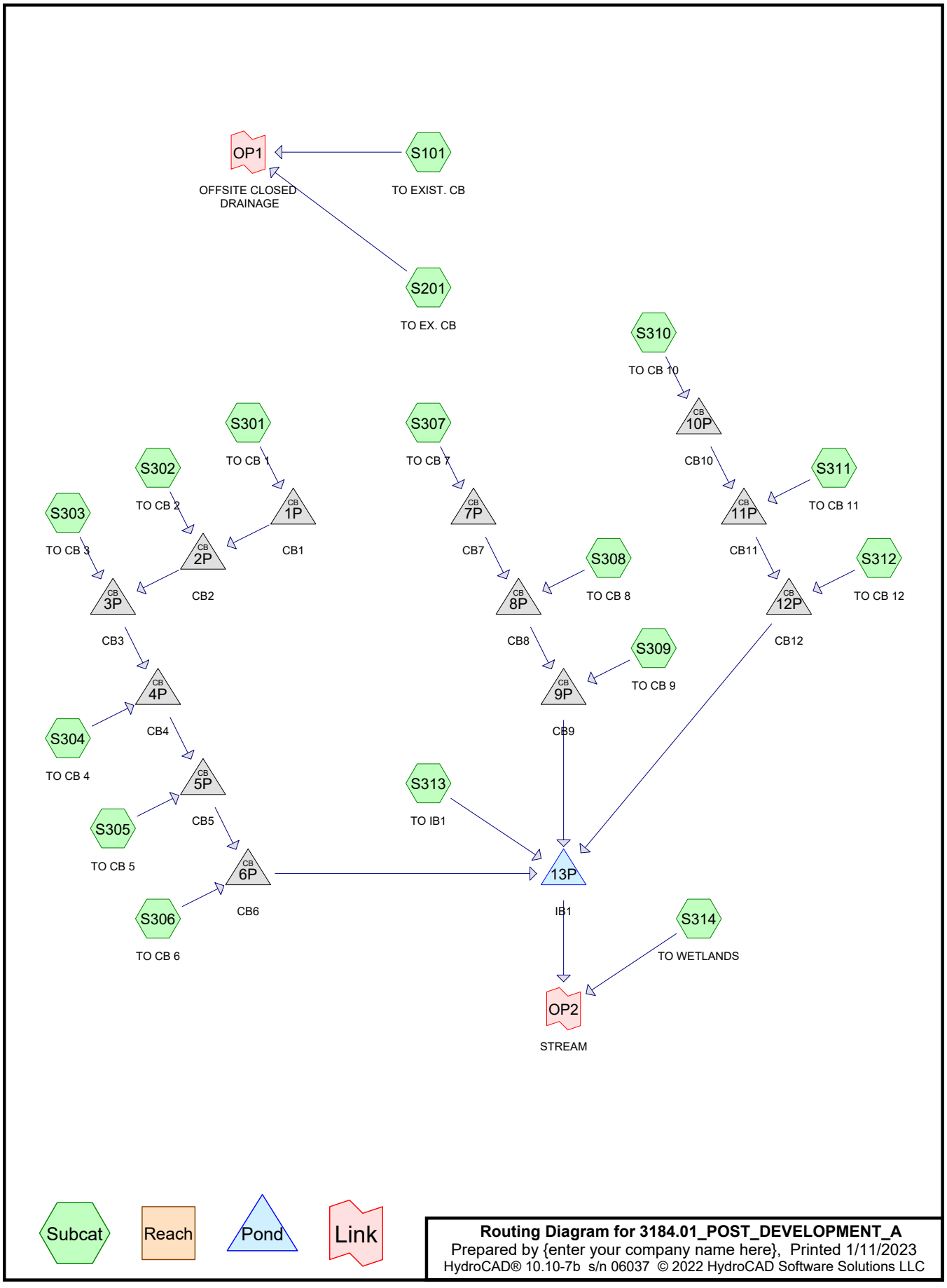
Summary for Link OP2: STREAM

Inflow Area = 14.383 ac, 2.45% Impervious, Inflow Depth > 0.06" for 10-Year event
Inflow = 0.16 cfs @ 15.29 hrs, Volume= 0.072 af
Primary = 0.16 cfs @ 15.29 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Section 2.1

Proposed Conditions
2, 25, 50 Year Storm Node List



Routing Diagram for 3184.01_POST_DEVELOPMENT_A
Prepared by {enter your company name here}, Printed 1/11/2023
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Prepared by {enter your company name here} Printed 1/11/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.854	39	>75% Grass cover, Good, HSG A (S101, S201, S301, S302, S303, S310, S311, S312, S313, S314)
0.052	76	Gravel roads, HSG A (S101, S314)
6.567	98	Paved parking, HSG A (S101, S201, S301, S302, S303, S304, S305, S306, S307, S308, S309, S310, S311, S312, S313, S314)
1.445	98	Roofs, HSG A (S301, S302, S303, S304, S305, S306, S307, S308, S309, S311, S312, S313)
1.738	30	Woods, Good, HSG A (S101, S201, S314)
15.656	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
15.656	HSG A	S101, S201, S301, S302, S303, S304, S305, S306, S307, S308, S309, S310, S311, S312, S313, S314
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
15.656		**TOTAL AREA**

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
5.854	0.000	0.000	0.000	0.000	5.854	>75% Grass cover, Good	S101, S201, S301, S302, S303, S310, S311, S312, S313, S314
0.052	0.000	0.000	0.000	0.000	0.052	Gravel roads	S101, S314
6.567	0.000	0.000	0.000	0.000	6.567	Paved parking	S101, S201, S301, S302, S303, S304, S305, S306, S307, S308, S309, S310, S311, S312, S313, S314
1.445	0.000	0.000	0.000	0.000	1.445	Roofs	S301, S302, S303, S304, S305, S306, S307, S308, S309, S311, S312, S313
1.738	0.000	0.000	0.000	0.000	1.738	Woods, Good	S101, S201, S314

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Ground Covers (selected nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
15.656	**0.000**	**0.000**	**0.000**	**0.000**	**15.656**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: TO EXIST. CB Runoff Area=0.523 ac 26.00% Impervious Runoff Depth>0.13"
Tc=6.0 min CN=54 Runoff=0.03 cfs 0.006 af

Subcatchment S201: TO EX. CB Runoff Area=0.479 ac 19.42% Impervious Runoff Depth>0.07"
Tc=6.0 min CN=50 Runoff=0.01 cfs 0.003 af

Subcatchment S301: TO CB 1 Runoff Area=0.348 ac 61.78% Impervious Runoff Depth>0.86"
Tc=6.0 min CN=75 Runoff=0.36 cfs 0.025 af

Subcatchment S302: TO CB 2 Runoff Area=0.261 ac 73.56% Impervious Runoff Depth>1.25"
Tc=6.0 min CN=82 Runoff=0.40 cfs 0.027 af

Subcatchment S303: TO CB 3 Runoff Area=0.451 ac 69.18% Impervious Runoff Depth>1.13"
Tc=6.0 min CN=80 Runoff=0.63 cfs 0.043 af

Subcatchment S304: TO CB 4 Runoff Area=0.253 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=0.71 cfs 0.054 af

Subcatchment S305: TO CB 5 Runoff Area=0.622 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=1.75 cfs 0.133 af

Subcatchment S306: TO CB 6 Runoff Area=0.512 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=1.44 cfs 0.109 af

Subcatchment S307: TO CB 7 Runoff Area=0.052 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.011 af

Subcatchment S308: TO CB 8 Runoff Area=0.789 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=2.22 cfs 0.168 af

Subcatchment S309: TO CB 9 Runoff Area=1.165 ac 100.00% Impervious Runoff Depth>2.56"
Tc=6.0 min CN=98 Runoff=3.27 cfs 0.249 af

Subcatchment S310: TO CB 10 Runoff Area=0.401 ac 69.58% Impervious Runoff Depth>1.13"
Tc=6.0 min CN=80 Runoff=0.56 cfs 0.038 af

Subcatchment S311: TO CB 11 Runoff Area=1.175 ac 98.72% Impervious Runoff Depth>2.47"
Tc=6.0 min CN=97 Runoff=3.25 cfs 0.242 af

Subcatchment S312: TO CB 12 Runoff Area=1.153 ac 82.65% Impervious Runoff Depth>1.68"
Tc=6.0 min CN=88 Runoff=2.37 cfs 0.161 af

Subcatchment S313: TO IB1 Runoff Area=2.020 ac 56.73% Impervious Runoff Depth>0.71"
Tc=6.0 min CN=72 Runoff=1.67 cfs 0.120 af

Subcatchment S314: TO WETLANDS Runoff Area=5.452 ac 2.44% Impervious Runoff Depth=0.00"
Flow Length=750' Tc=25.6 min CN=38 Runoff=0.00 cfs 0.000 af

Pond 1P: CB1 Peak Elev=193.23' Inflow=0.36 cfs 0.025 af
12.0" Round Culvert n=0.013 L=200.0' S=0.0100 '/' Outflow=0.36 cfs 0.025 af

Pond 2P: CB2 Peak Elev=190.42' Inflow=0.76 cfs 0.052 af
12.0" Round Culvert n=0.013 L=140.0' S=0.0029 '/' Outflow=0.76 cfs 0.052 af

Pond 3P: CB3 Peak Elev=190.02' Inflow=1.39 cfs 0.095 af
12.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=1.39 cfs 0.095 af

Pond 4P: CB4 Peak Elev=188.52' Inflow=2.10 cfs 0.149 af
15.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=2.10 cfs 0.149 af

Pond 5P: CB5 Peak Elev=187.19' Inflow=3.84 cfs 0.282 af
18.0" Round Culvert n=0.013 L=290.0' S=0.0100 '/' Outflow=3.84 cfs 0.282 af

Pond 6P: CB6 Peak Elev=184.30' Inflow=5.28 cfs 0.391 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=5.28 cfs 0.391 af

Pond 7P: CB7 Peak Elev=189.21' Inflow=0.15 cfs 0.011 af
12.0" Round Culvert n=0.013 L=220.0' S=0.0150 '/' Outflow=0.15 cfs 0.011 af

Pond 8P: CB8 Peak Elev=186.49' Inflow=2.36 cfs 0.180 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=2.36 cfs 0.180 af

Pond 9P: CB9 Peak Elev=183.96' Inflow=5.64 cfs 0.428 af
18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=5.64 cfs 0.428 af

Pond 10P: CB10 Peak Elev=191.93' Inflow=0.56 cfs 0.038 af
12.0" Round Culvert n=0.013 L=300.0' S=0.0200 '/' Outflow=0.56 cfs 0.038 af

Pond 11P: CB11 Peak Elev=186.48' Inflow=3.80 cfs 0.280 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=3.80 cfs 0.280 af

Pond 12P: CB12 Peak Elev=183.62' Inflow=6.17 cfs 0.441 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=6.17 cfs 0.441 af

Pond 13P: IB1 Peak Elev=182.73' Storage=27,723 cf Inflow=18.73 cfs 1.381 af
Discarded=1.39 cfs 1.120 af Primary=0.00 cfs 0.000 af Outflow=1.39 cfs 1.120 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=0.03 cfs 0.008 af
Primary=0.03 cfs 0.008 af

Link OP2: STREAM Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 15.656 ac Runoff Volume = 1.389 af Average Runoff Depth = 1.06"
48.82% Pervious = 7.644 ac 51.18% Impervious = 8.012 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: TO EXIST. CB Runoff Area=0.523 ac 26.00% Impervious Runoff Depth>1.14"
Tc=6.0 min CN=54 Runoff=0.66 cfs 0.050 af

Subcatchment S201: TO EX. CB Runoff Area=0.479 ac 19.42% Impervious Runoff Depth>0.88"
Tc=6.0 min CN=50 Runoff=0.42 cfs 0.035 af

Subcatchment S301: TO CB 1 Runoff Area=0.348 ac 61.78% Impervious Runoff Depth>2.82"
Tc=6.0 min CN=75 Runoff=1.21 cfs 0.082 af

Subcatchment S302: TO CB 2 Runoff Area=0.261 ac 73.56% Impervious Runoff Depth>3.48"
Tc=6.0 min CN=82 Runoff=1.10 cfs 0.076 af

Subcatchment S303: TO CB 3 Runoff Area=0.451 ac 69.18% Impervious Runoff Depth>3.29"
Tc=6.0 min CN=80 Runoff=1.81 cfs 0.124 af

Subcatchment S304: TO CB 4 Runoff Area=0.253 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=1.38 cfs 0.107 af

Subcatchment S305: TO CB 5 Runoff Area=0.622 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=3.39 cfs 0.262 af

Subcatchment S306: TO CB 6 Runoff Area=0.512 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=2.79 cfs 0.216 af

Subcatchment S307: TO CB 7 Runoff Area=0.052 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.022 af

Subcatchment S308: TO CB 8 Runoff Area=0.789 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=4.30 cfs 0.332 af

Subcatchment S309: TO CB 9 Runoff Area=1.165 ac 100.00% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=98 Runoff=6.35 cfs 0.491 af

Subcatchment S310: TO CB 10 Runoff Area=0.401 ac 69.58% Impervious Runoff Depth>3.29"
Tc=6.0 min CN=80 Runoff=1.61 cfs 0.110 af

Subcatchment S311: TO CB 11 Runoff Area=1.175 ac 98.72% Impervious Runoff Depth>4.98"
Tc=6.0 min CN=97 Runoff=6.37 cfs 0.488 af

Subcatchment S312: TO CB 12 Runoff Area=1.153 ac 82.65% Impervious Runoff Depth>4.10"
Tc=6.0 min CN=88 Runoff=5.56 cfs 0.394 af

Subcatchment S313: TO IB1 Runoff Area=2.020 ac 56.73% Impervious Runoff Depth>2.55"
Tc=6.0 min CN=72 Runoff=6.37 cfs 0.429 af

Subcatchment S314: TO WETLANDS Runoff Area=5.452 ac 2.44% Impervious Runoff Depth>0.25"
Flow Length=750' Tc=25.6 min CN=38 Runoff=0.39 cfs 0.115 af

Pond 1P: CB1 Peak Elev=193.56' Inflow=1.21 cfs 0.082 af
12.0" Round Culvert n=0.013 L=200.0' S=0.0100 '/' Outflow=1.21 cfs 0.082 af

Pond 2P: CB2 Peak Elev=192.84' Inflow=2.32 cfs 0.158 af
12.0" Round Culvert n=0.013 L=140.0' S=0.0029 '/' Outflow=2.32 cfs 0.158 af

Pond 3P: CB3 Peak Elev=192.31' Inflow=4.13 cfs 0.281 af
12.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=4.13 cfs 0.281 af

Pond 4P: CB4 Peak Elev=189.99' Inflow=5.51 cfs 0.388 af
15.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=5.51 cfs 0.388 af

Pond 5P: CB5 Peak Elev=188.60' Inflow=8.90 cfs 0.650 af
18.0" Round Culvert n=0.013 L=290.0' S=0.0100 '/' Outflow=8.90 cfs 0.650 af

Pond 6P: CB6 Peak Elev=185.09' Inflow=11.69 cfs 0.866 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=11.69 cfs 0.866 af

Pond 7P: CB7 Peak Elev=189.30' Inflow=0.28 cfs 0.022 af
12.0" Round Culvert n=0.013 L=220.0' S=0.0150 '/' Outflow=0.28 cfs 0.022 af

Pond 8P: CB8 Peak Elev=187.42' Inflow=4.59 cfs 0.354 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=4.59 cfs 0.354 af

Pond 9P: CB9 Peak Elev=185.88' Inflow=10.94 cfs 0.845 af
18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=10.94 cfs 0.845 af

Pond 10P: CB10 Peak Elev=192.30' Inflow=1.61 cfs 0.110 af
12.0" Round Culvert n=0.013 L=300.0' S=0.0200 '/' Outflow=1.61 cfs 0.110 af

Pond 11P: CB11 Peak Elev=187.56' Inflow=7.98 cfs 0.598 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=7.98 cfs 0.598 af

Pond 12P: CB12 Peak Elev=184.84' Inflow=13.54 cfs 0.991 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=13.54 cfs 0.991 af

Pond 13P: IB1 Peak Elev=184.84' Storage=77,248 cf Inflow=42.51 cfs 3.131 af
Discarded=1.93 cfs 1.625 af Primary=0.39 cfs 0.188 af Outflow=2.33 cfs 1.813 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=1.07 cfs 0.085 af
Primary=1.07 cfs 0.085 af

Link OP2: STREAM Inflow=0.71 cfs 0.303 af
Primary=0.71 cfs 0.303 af

Total Runoff Area = 15.656 ac Runoff Volume = 3.332 af Average Runoff Depth = 2.55"
48.82% Pervious = 7.644 ac 51.18% Impervious = 8.012 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment S101: TO EXIST. CB Runoff Area=0.523 ac 26.00% Impervious Runoff Depth>1.74"
Tc=6.0 min CN=54 Runoff=1.06 cfs 0.076 af

Subcatchment S201: TO EX. CB Runoff Area=0.479 ac 19.42% Impervious Runoff Depth>1.41"
Tc=6.0 min CN=50 Runoff=0.75 cfs 0.056 af

Subcatchment S301: TO CB 1 Runoff Area=0.348 ac 61.78% Impervious Runoff Depth>3.73"
Tc=6.0 min CN=75 Runoff=1.59 cfs 0.108 af

Subcatchment S302: TO CB 2 Runoff Area=0.261 ac 73.56% Impervious Runoff Depth>4.47"
Tc=6.0 min CN=82 Runoff=1.40 cfs 0.097 af

Subcatchment S303: TO CB 3 Runoff Area=0.451 ac 69.18% Impervious Runoff Depth>4.25"
Tc=6.0 min CN=80 Runoff=2.32 cfs 0.160 af

Subcatchment S304: TO CB 4 Runoff Area=0.253 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=1.65 cfs 0.128 af

Subcatchment S305: TO CB 5 Runoff Area=0.622 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=4.06 cfs 0.315 af

Subcatchment S306: TO CB 6 Runoff Area=0.512 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=3.34 cfs 0.259 af

Subcatchment S307: TO CB 7 Runoff Area=0.052 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.026 af

Subcatchment S308: TO CB 8 Runoff Area=0.789 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=5.15 cfs 0.399 af

Subcatchment S309: TO CB 9 Runoff Area=1.165 ac 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=7.61 cfs 0.590 af

Subcatchment S310: TO CB 10 Runoff Area=0.401 ac 69.58% Impervious Runoff Depth>4.25"
Tc=6.0 min CN=80 Runoff=2.07 cfs 0.142 af

Subcatchment S311: TO CB 11 Runoff Area=1.175 ac 98.72% Impervious Runoff Depth>6.01"
Tc=6.0 min CN=97 Runoff=7.65 cfs 0.588 af

Subcatchment S312: TO CB 12 Runoff Area=1.153 ac 82.65% Impervious Runoff Depth>5.12"
Tc=6.0 min CN=88 Runoff=6.86 cfs 0.492 af

Subcatchment S313: TO IB1 Runoff Area=2.020 ac 56.73% Impervious Runoff Depth>3.42"
Tc=6.0 min CN=72 Runoff=8.54 cfs 0.576 af

Subcatchment S314: TO WETLANDS Runoff Area=5.452 ac 2.44% Impervious Runoff Depth>0.53"
Flow Length=750' Tc=25.6 min CN=38 Runoff=1.28 cfs 0.242 af

Pond 1P: CB1 Peak Elev=195.98' Inflow=1.59 cfs 0.108 af
12.0" Round Culvert n=0.013 L=200.0' S=0.0100 '/' Outflow=1.59 cfs 0.108 af

Pond 2P: CB2 Peak Elev=195.81' Inflow=3.00 cfs 0.205 af
12.0" Round Culvert n=0.013 L=140.0' S=0.0029 '/' Outflow=3.00 cfs 0.205 af

Pond 3P: CB3 Peak Elev=195.05' Inflow=5.32 cfs 0.365 af
12.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=5.32 cfs 0.365 af

Pond 4P: CB4 Peak Elev=191.87' Inflow=6.97 cfs 0.493 af
15.0" Round Culvert n=0.013 L=150.0' S=0.0100 '/' Outflow=6.97 cfs 0.493 af

Pond 5P: CB5 Peak Elev=189.65' Inflow=11.03 cfs 0.808 af
18.0" Round Culvert n=0.013 L=290.0' S=0.0100 '/' Outflow=11.03 cfs 0.808 af

Pond 6P: CB6 Peak Elev=185.54' Inflow=14.38 cfs 1.067 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=14.38 cfs 1.067 af

Pond 7P: CB7 Peak Elev=189.48' Inflow=0.34 cfs 0.026 af
12.0" Round Culvert n=0.013 L=220.0' S=0.0150 '/' Outflow=0.34 cfs 0.026 af

Pond 8P: CB8 Peak Elev=189.43' Inflow=5.49 cfs 0.426 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=5.49 cfs 0.426 af

Pond 9P: CB9 Peak Elev=187.34' Inflow=13.10 cfs 1.015 af
18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=13.10 cfs 1.015 af

Pond 10P: CB10 Peak Elev=192.47' Inflow=2.07 cfs 0.142 af
12.0" Round Culvert n=0.013 L=300.0' S=0.0200 '/' Outflow=2.07 cfs 0.142 af

Pond 11P: CB11 Peak Elev=188.35' Inflow=9.71 cfs 0.730 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=9.71 cfs 0.730 af

Pond 12P: CB12 Peak Elev=185.51' Inflow=16.57 cfs 1.222 af
24.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=16.57 cfs 1.222 af

Pond 13P: IB1 Peak Elev=185.39' Storage=93,072 cf Inflow=52.57 cfs 3.881 af
Discarded=2.11 cfs 1.766 af Primary=1.97 cfs 0.607 af Outflow=4.07 cfs 2.372 af

Link OP1: OFFSITE CLOSED DRAINAGE Inflow=1.81 cfs 0.132 af
Primary=1.81 cfs 0.132 af

Link OP2: STREAM Inflow=2.86 cfs 0.849 af
Primary=2.86 cfs 0.849 af

Total Runoff Area = 15.656 ac Runoff Volume = 4.256 af Average Runoff Depth = 3.26"
48.82% Pervious = 7.644 ac 51.18% Impervious = 8.012 ac

Section 2.2

Proposed Conditions
10 Year Storm Full Summary

Summary for Subcatchment S101: TO EXIST. CB

Runoff = 0.29 cfs @ 12.12 hrs, Volume= 0.026 af, Depth> 0.61"
Routed to Link OP1 : OFFSITE CLOSED DRAINAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.102	30	Woods, Good, HSG A
0.023	76	Gravel roads, HSG A
0.136	98	Paved parking, HSG A
0.262	39	>75% Grass cover, Good, HSG A
0.523	54	Weighted Average
0.387		74.00% Pervious Area
0.136		26.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S201: TO EX. CB

Runoff = 0.13 cfs @ 12.16 hrs, Volume= 0.017 af, Depth> 0.43"
Routed to Link OP1 : OFFSITE CLOSED DRAINAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.040	30	Woods, Good, HSG A
0.093	98	Paved parking, HSG A
0.346	39	>75% Grass cover, Good, HSG A
0.479	50	Weighted Average
0.386		80.58% Pervious Area
0.093		19.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S301: TO CB 1

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.055 af, Depth> 1.90"
Routed to Pond 1P : CB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.000	30	Woods, Good, HSG A
0.115	98	Roofs, HSG A
0.100	98	Paved parking, HSG A
0.133	39	>75% Grass cover, Good, HSG A
0.348	75	Weighted Average
0.133		38.22% Pervious Area
0.215		61.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S302: TO CB 2

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 2.46"
Routed to Pond 2P : CB2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.096	98	Roofs, HSG A
0.096	98	Paved parking, HSG A
0.069	39	>75% Grass cover, Good, HSG A
0.261	82	Weighted Average
0.069		26.44% Pervious Area
0.192		73.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S303: TO CB 3

Runoff = 1.28 cfs @ 12.09 hrs, Volume= 0.086 af, Depth> 2.29"
Routed to Pond 3P : CB3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.131	98	Roofs, HSG A
0.181	98	Paved parking, HSG A
0.139	39	>75% Grass cover, Good, HSG A
0.451	80	Weighted Average
0.139		30.82% Pervious Area
0.312		69.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S304: TO CB 4

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 0.084 af, Depth> 3.96"
Routed to Pond 4P : CB4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.060	98	Roofs, HSG A
0.193	98	Paved parking, HSG A
0.000	39	>75% Grass cover, Good, HSG A
0.253	98	Weighted Average
0.253		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S305: TO CB 5

Runoff = 2.67 cfs @ 12.09 hrs, Volume= 0.205 af, Depth> 3.96"
Routed to Pond 5P : CB5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.072	98	Roofs, HSG A
0.550	98	Paved parking, HSG A
0.622	98	Weighted Average
0.622		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S306: TO CB 6

Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.169 af, Depth> 3.96"
Routed to Pond 6P : CB6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.112	98	Roofs, HSG A
0.400	98	Paved parking, HSG A
0.512	98	Weighted Average
0.512		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S307: TO CB 7

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 3.96"
Routed to Pond 7P : CB7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.026	98	Roofs, HSG A
0.026	98	Paved parking, HSG A
0.052	98	Weighted Average
0.052		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S308: TO CB 8

Runoff = 3.39 cfs @ 12.09 hrs, Volume= 0.261 af, Depth> 3.96"
Routed to Pond 8P : CB8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.150	98	Roofs, HSG A
0.639	98	Paved parking, HSG A
0.789	98	Weighted Average
0.789		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S309: TO CB 9

Runoff = 5.00 cfs @ 12.09 hrs, Volume= 0.385 af, Depth> 3.96"
Routed to Pond 9P : CB9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.270	98	Roofs, HSG A
0.895	98	Paved parking, HSG A
1.165	98	Weighted Average
1.165		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S310: TO CB 10

Runoff = 1.13 cfs @ 12.09 hrs, Volume= 0.077 af, Depth> 2.29"
Routed to Pond 10P : CB10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.122	39	>75% Grass cover, Good, HSG A
0.000	98	Roofs, HSG A
0.279	98	Paved parking, HSG A
0.401	80	Weighted Average
0.122		30.42% Pervious Area
0.279		69.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S311: TO CB 11

Runoff = 5.00 cfs @ 12.09 hrs, Volume= 0.380 af, Depth> 3.88"
Routed to Pond 11P : CB11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.015	39	>75% Grass cover, Good, HSG A
0.035	98	Roofs, HSG A
1.125	98	Paved parking, HSG A
1.175	97	Weighted Average
0.015		1.28% Pervious Area
1.160		98.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S312: TO CB 12

Runoff = 4.15 cfs @ 12.09 hrs, Volume= 0.289 af, Depth> 3.01"
Routed to Pond 12P : CB12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.200	39	>75% Grass cover, Good, HSG A
0.103	98	Roofs, HSG A
0.850	98	Paved parking, HSG A
1.153	88	Weighted Average
0.200		17.35% Pervious Area
0.953		82.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S313: TO IB1

Runoff = 4.16 cfs @ 12.10 hrs, Volume= 0.282 af, Depth> 1.68"
Routed to Pond 13P : IB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
0.275	98	Roofs, HSG A
0.871	98	Paved parking, HSG A
0.874	39	>75% Grass cover, Good, HSG A
2.020	72	Weighted Average
0.874		43.27% Pervious Area
1.146		56.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment S314: TO WETLANDS

Runoff = 0.06 cfs @ 15.29 hrs, Volume= 0.027 af, Depth> 0.06"
Routed to Link OP2 : STREAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (ac)	CN	Description
1.596	30	Woods, Good, HSG A
0.029	76	Gravel roads, HSG A
0.133	98	Paved parking, HSG A
3.694	39	>75% Grass cover, Good, HSG A
5.452	38	Weighted Average
5.319		97.56% Pervious Area
0.133		2.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	85	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
5.4	390	0.0300	1.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7	275	0.0500	6.60	13.20	**Parabolic Channel, C-D** W=4.00' D=0.75' Area=2.0 sf Perim=4.3' n= 0.030 Earth, grassed & winding
25.6	750	Total			

Summary for Pond 1P: CB1

Inflow Area = 0.348 ac, 61.78% Impervious, Inflow Depth > 1.90" for 10-Year event
Inflow = 0.82 cfs @ 12.10 hrs, Volume= 0.055 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Primary = 0.82 cfs @ 12.10 hrs, Volume= 0.055 af
Routed to Pond 2P : CB2

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 193.43' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	192.90'	**12.0" Round Culvert** L= 200.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 192.90' / 190.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.10 hrs HW=193.42' TW=190.92' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.80 cfs @ 1.94 fps)

Summary for Pond 2P: CB2

Inflow Area = 0.609 ac, 66.83% Impervious, Inflow Depth > 2.14" for 10-Year event
Inflow = 1.60 cfs @ 12.09 hrs, Volume= 0.109 af
Outflow = 1.60 cfs @ 12.09 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 1.60 cfs @ 12.09 hrs, Volume= 0.109 af
Routed to Pond 3P : CB3

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 191.01' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	189.80'	**12.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 189.80' / 189.40' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.13 cfs @ 12.09 hrs HW=190.92' TW=190.70' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.13 cfs @ 1.61 fps)

Summary for Pond 3P: CB3

Inflow Area = 1.060 ac, 67.83% Impervious, Inflow Depth > 2.21" for 10-Year event
Inflow = 2.88 cfs @ 12.09 hrs, Volume= 0.195 af
Outflow = 2.88 cfs @ 12.09 hrs, Volume= 0.195 af, Atten= 0%, Lag= 0.0 min
Primary = 2.88 cfs @ 12.09 hrs, Volume= 0.195 af
Routed to Pond 4P : CB4

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 190.73' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	189.30'	**12.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 189.30' / 187.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.84 cfs @ 12.09 hrs HW=190.70' TW=189.02' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.84 cfs @ 3.61 fps)

Summary for Pond 4P: CB4

Inflow Area = 1.313 ac, 74.03% Impervious, Inflow Depth > 2.54" for 10-Year event
Inflow = 3.97 cfs @ 12.09 hrs, Volume= 0.278 af
Outflow = 3.97 cfs @ 12.09 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min
Primary = 3.97 cfs @ 12.09 hrs, Volume= 0.278 af
Routed to Pond 5P : CB5

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 189.04' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	187.70'	**15.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 187.70' / 186.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.88 cfs @ 12.09 hrs HW=189.02' TW=187.79' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.88 cfs @ 3.17 fps)

Summary for Pond 5P: CB5

Inflow Area = 1.935 ac, 82.38% Impervious, Inflow Depth > 3.00" for 10-Year event
Inflow = 6.63 cfs @ 12.09 hrs, Volume= 0.484 af
Outflow = 6.63 cfs @ 12.09 hrs, Volume= 0.484 af, Atten= 0%, Lag= 0.0 min
Primary = 6.63 cfs @ 12.09 hrs, Volume= 0.484 af
Routed to Pond 6P : CB6

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 187.82' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	186.10'	**18.0" Round Culvert** L= 290.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 186.10' / 183.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.48 cfs @ 12.09 hrs HW=187.78' TW=184.73' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 6.48 cfs @ 3.67 fps)

Summary for Pond 6P: CB6

Inflow Area = 2.447 ac, 86.06% Impervious, Inflow Depth > 3.20" for 10-Year event
Inflow = 8.83 cfs @ 12.09 hrs, Volume= 0.653 af
Outflow = 8.83 cfs @ 12.09 hrs, Volume= 0.653 af, Atten= 0%, Lag= 0.0 min
Primary = 8.83 cfs @ 12.09 hrs, Volume= 0.653 af
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 184.75' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	183.10'	**24.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 183.10' / 182.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.62 cfs @ 12.09 hrs HW=184.73' TW=182.73' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 8.62 cfs @ 4.30 fps)

Summary for Pond 7P: CB7

Inflow Area = 0.052 ac,100.00% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
Routed to Pond 8P : CB8

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 189.26' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	189.00'	**12.0" Round Culvert** L= 220.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 189.00' / 185.70' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 12.09 hrs HW=189.26' TW=186.78' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.22 cfs @ 1.36 fps)

Summary for Pond 8P: CB8

Inflow Area = 0.841 ac,100.00% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 3.61 cfs @ 12.09 hrs, Volume= 0.278 af
Outflow = 3.61 cfs @ 12.09 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min
Primary = 3.61 cfs @ 12.09 hrs, Volume= 0.278 af
Routed to Pond 9P : CB9

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 186.81' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	185.60'	**15.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 185.60' / 182.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.52 cfs @ 12.09 hrs HW=186.78' TW=184.81' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.52 cfs @ 2.93 fps)

Summary for Pond 9P: CB9

Inflow Area = 2.006 ac,100.00% Impervious, Inflow Depth > 3.96" for 10-Year event
Inflow = 8.61 cfs @ 12.09 hrs, Volume= 0.662 af
Outflow = 8.61 cfs @ 12.09 hrs, Volume= 0.662 af, Atten= 0%, Lag= 0.0 min
Primary = 8.61 cfs @ 12.09 hrs, Volume= 0.662 af
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 184.89' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	182.50'	**18.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 182.50' / 182.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.38 cfs @ 12.09 hrs HW=184.81' TW=182.72' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 8.38 cfs @ 4.74 fps)

Summary for Pond 10P: CB10

Inflow Area = 0.401 ac, 69.58% Impervious, Inflow Depth > 2.29" for 10-Year event
Inflow = 1.13 cfs @ 12.09 hrs, Volume= 0.077 af
Outflow = 1.13 cfs @ 12.09 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.09 hrs, Volume= 0.077 af
Routed to Pond 11P : CB11

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 192.14' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	191.50'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 191.50' / 185.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.11 cfs @ 12.09 hrs HW=192.13' TW=186.95' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.11 cfs @ 2.14 fps)

Summary for Pond 11P: CB11

Inflow Area = 1.576 ac, 91.31% Impervious, Inflow Depth > 3.48" for 10-Year event
Inflow = 6.14 cfs @ 12.09 hrs, Volume= 0.457 af
Outflow = 6.14 cfs @ 12.09 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min
Primary = 6.14 cfs @ 12.09 hrs, Volume= 0.457 af
Routed to Pond 12P : CB12

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 186.98' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	185.40'	**18.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 185.40' / 182.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.97 cfs @ 12.09 hrs HW=186.94' TW=184.09' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.97 cfs @ 3.38 fps)

Summary for Pond 12P: CB12

Inflow Area = 2.729 ac, 87.65% Impervious, Inflow Depth > 3.28" for 10-Year event
Inflow = 10.29 cfs @ 12.09 hrs, Volume= 0.746 af
Outflow = 10.29 cfs @ 12.09 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min
Primary = 10.29 cfs @ 12.09 hrs, Volume= 0.746 af
Routed to Pond 13P : IB1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 184.13' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	182.30'	**24.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 182.30' / 182.10' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.03 cfs @ 12.09 hrs HW=184.10' TW=182.73' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 10.03 cfs @ 4.46 fps)

Summary for Pond 13P: IB1

Inflow Area = 9.202 ac, 83.13% Impervious, Inflow Depth > 3.06" for 10-Year event
Inflow = 31.87 cfs @ 12.09 hrs, Volume= 2.344 af
Outflow = 1.70 cfs @ 14.34 hrs, Volume= 1.416 af, Atten= 95%, Lag= 135.3 min
Discarded = 1.68 cfs @ 14.34 hrs, Volume= 1.412 af
Primary = 0.03 cfs @ 14.34 hrs, Volume= 0.004 af
Routed to Link OP2 : STREAM

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 184.00' @ 14.34 hrs Surf.Area= 24,138 sf Storage= 55,670 cf

Plug-Flow detention time= 188.9 min calculated for 1.416 af (60% of inflow)
Center-of-Mass det. time= 109.1 min (864.9 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1	181.00'	112,359 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
#2	177.00'	179 cf	**3.00'W x 40.00'L x 4.00'H Prismatoid** 480 cf Overall - 31 cf Embedded = 449 cf x 40.0% Voids
#3	178.00'	31 cf	**12.0" Round Pipe Storage** Inside #2 L= 40.0'
		112,570 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
181.00	10,000	0	0	10,000
182.00	17,800	13,714	13,714	17,811
184.00	24,000	41,646	55,360	24,095
186.00	33,250	56,999	112,359	33,422

Device	Routing	Invert	Outlet Devices
#1	Discarded	177.00'	**3.000 in/hr Exfiltration over Surface area**
#2	Primary	185.33'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#3	Primary	183.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.00' / 182.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	183.90'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 3	184.80'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.68 cfs @ 14.34 hrs HW=184.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.68 cfs)

Primary OutFlow Max=0.03 cfs @ 14.34 hrs HW=184.00' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Passes 0.03 cfs of 2.69 cfs potential flow)
  ├**4=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.10 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link OP1: OFFSITE CLOSED DRAINAGE

Inflow Area = 1.002 ac, 22.85% Impervious, Inflow Depth > 0.52" for 10-Year event
Inflow = 0.41 cfs @ 12.13 hrs, Volume= 0.044 af
Primary = 0.41 cfs @ 12.13 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link OP2: STREAM

Inflow Area = 14.654 ac, 53.11% Impervious, Inflow Depth > 0.03" for 10-Year event
Inflow = 0.08 cfs @ 14.71 hrs, Volume= 0.031 af
Primary = 0.08 cfs @ 14.71 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Section 3.1

Inspection & Maintenance Manual

84 Lumber Company
3 Sullivan Road, Hudson, New Hampshire
Storm Water Management System
Inspection and Maintenance Manual

Introduction

The operation and maintenance of a storm water management system and its individual components is as critical to system performance as the design. Without proper maintenance, best management practices (BMPs) are likely to become functionally impaired or to fail, providing reduced or no treatment of storm water. Proper operation and maintenance will ensure that the storm water system and individual BMPs will remain effective at removing pollutants as designed and meeting New Hampshire's water quality objectives. Proper maintenance will:

- Maintain the volume of storm water treated over the long term;
- Sustain the pollutant removal efficiency of the BMP;
- Reduce the risk of re-suspending sediment and other pollutants captured by the BMP;
- Prevent structural deterioration of the BMP and minimize the need for expensive repairs;
- Decrease the potential for failure of the BMP.

The NH Department of Environmental Services Alteration of Terrain (AoT) regulations (Env-Wq 1500) require the long term maintenance of storm water practices, and stipulate the establishment of a mechanism to provide for ongoing inspections and maintenance.

In accordance with Env-Wq 1507.08 Long-Term Maintenance the mechanism for providing long-term maintenance practices for this development are as follows:

Responsible Maintenance Party:

Owner: 84 Lumber Company
1019 Route 519, Building 4
Eighty Four, PA 15330

Report Information:

- 84 Lumber Company will be the entity responsible for implementing the required reporting, inspection, and maintenance activities identified in the I & M manual.
- 84 Lumber Company will maintain all record keeping required by the I & M manual. Any transfer of responsibility for I & M activities or transfer in ownership shall be documented to the DES in writing.
- Inspection and maintenance reports shall be completed after each inspection. Copies of the report forms to be completed by the inspector are attached at the end of this manual, including:
    - Inspection checklist to be used during each inspection;
    - Inspection and maintenance logs to document each inspection and maintenance activity;

- A plan showing the locations of all the storm water practices described in the I&M manual is attached at the end of this manual.

Maintenance Recommendations for Best Management Practices:

The following recommendations are to be used as a guide for the inspection and maintenance of the permanent erosion and sediment control measures.

In-Ground Infiltration Basin

- Removal of debris from inlet and outlet structures.
- Removal of accumulated sediment.
- Inspection and repair of outlet structures and appurtenances.
- Inspection of infiltration components at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Periodic mowing of embankments.
- Removal of woody vegetation form embankments.
- Inspection and repair of embankments and spillways.
- If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.
- Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.

Sediment Forebays

- Inspect Forebays monthly for first year to determine sediment load. If sediment load is heavy then maintain monthly inspections. If sediment load is light then reduce inspection accordingly but inspect at least semi-annually.
- Remove trash upon inspection and accumulated sedimentation when sediments have accumulated to within 6 inches of the outlet and/or when there is evidence of excessive sediment being conveyed to downstream BMP.
- Repair any damage in the forebay as a result of erosion immediately after the inspection to minimize sediment transport.
- Dispose of sediments and other wastes in conformance with applicable local, state and federal regulations.

Drainage Catch Basins

- Inspect basins at least semi-annually.
- Vacuum the sediment basins when the sediment reaches one-half the depth from the bottom of the catch basin to the invert of the outlet pipe.
- Repair damaged basin grates immediately after the inspection.
- Repair pavement damage around the basins immediately after the inspection to prevent further damage to the structure or paved area.
- Dispose of sediments and other wastes in conformance with applicable local, state and federal regulations

Outlet Protection - Riprap Aprons

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- Remove debris from apron area.

Inspection Checklist /Maintenance Logs

- The inspection checklist and maintenance logs following this report shall be used as a guide for the inspection reporting for this project.

Inspection Checklist

- ☐ Infiltration Basins
- ☐ Sediment Forebays
- ☐ Catch Basin
- ☐ Headwall Inlets
- ☐ Headwall Outlets/Aprons

Inspection and Maintenance Log					
	BMP	**Inspection Date**	**Inspected By**	**Maintenance Required?**	**Maintenance Performed**
1				❑Yes ❑No	
2				❑Yes ❑No	
3				❑Yes ❑No	
4				❑Yes ❑No	
5				❑Yes ❑No	
6				❑Yes ❑No	
7				❑Yes ❑No	
8				❑Yes ❑No	
9				❑Yes ❑No	

Winter Deicing Operations

The use of deicing materials on-site shall be minimized. The use of deicing materials on-site shall be in compliance with the requirements of Town of Merrimack's Aquifer Conservation District and Well Head Protection Area. The individual overseeing the winter maintenance operations shall receive and maintain the New Hampshire Green Snowpro certification as offered by the New Hampshire Technology Center at the University of New Hampshire, Durham, NH.

A log of winter deicing operations, tracking the type and amount of deicing materials applied on site, shall be maintained by the entity responsible for on-site winter maintenance operations. A copy of the completed logs for each season shall be filed with the BMP Inspection and Maintenance Logs.

Winter Maintenance Basics

- Anti-ice before the storm.
- Remove snow from surfaces as quickly as possible to reduce compaction.
  No snow should be plowed over the proposed infiltration basin.
- Plow before applying deicers to avoid dilution of the salt.
- Minimize deicer use during the storm.
- Never plow or blow snow into bodies of water, wetlands, traffic or into streets.
- Minimize back-up maneuvers to reduce chance of accidents.
- Limit use of salt and sand during the storm; use only to reduce bonding.
- Do not use salt to burn off snow.
- Use application rate chart to determine how much salt to use.
- Don't apply dry salt (sodium chloride) below 15º F pavement temperature. It will not melt fast enough to help.
- Below 15° F, use a wetted salt.
- For extreme cold, skip melting and use sand.
- Clean up spills.
- Accurately record the material used at each site.
- Pay attention to its effectiveness and record observations.
- Use only what is needed based on proper application rates for the conditions.
- Put extra back in salt pile or return extra bags.

Deicing Application Rate Guidelines for Parking Lots and Sidewalks

These rates are based on road application guidelines (LRRB 2012). Develop specific application rates by adjusting the current rates incrementally downward toward the guidelines. Where temperature categories overlap, select the rate most applicable to the present situation.

Pavement Temp. (ºF) and Trend (↑↓)	Weather Condition	Maintenance Actions	Application Rate in lbs./per 1000 square foot area			
			Salt Pre-wetted/ Pretreated With Salt Brine	Salt Pre-wetted/ Pretreated With Other Blends	Dry Salt	Winter Sand (abrasives)
>30º ↑	Snow	Plow, treat intersections only	0.75	0.5	0.75	not recommended
	Frz. Rain	Apply chemical	1.25	1.0	1.5	not recommended
30º ↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75.	not recommended
25 - 30º ↑	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.5	1.25	1.75	not recommended
25 - 30º ↓	Snow	Plow & apply chemical	1.25	1.0	1.5	not recommended
	Frz. Rain	Apply chemical	1.75	1.5	2.25	3.25
20 - 25º ↑	Snow or Frz. Rain	Plow & apply chemical	1.75	1.5	2.25	3.25 for frz. rain
20 - 25º ↓	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15º to 20º ↑	Snow	Plow & apply chemical	2.0	2.0	2.75	not recommended
	Frz. Rain	Apply chemical	2.5	2.0	3.0	3.25
15º to 20º ↓	Snow or Frz. Rain	Plow & apply chemical	2.5	2.0	3.0	3.25 for frz. rain
0 to 15º ↑ ↓	Snow	Plow, treat with blends, sand hazardous areas	not recommended	3.0	not recommended	5.0 spot treat as needed
< 0º	Snow	Plow, treat with blends, sand hazardous areas	not recommended	4.5	not recommended	5.0 spot treat as needed

Instructions for using application rate table for calibrated spreaders

1. Using Deicing Application Rate Guidelines for Parking Lots and Sidewalks. Select the row (⟶) with the appropriate pavement temperature, temperature trend, and weather conditions.
2. Select the column (↓) that has the type of material used.
3. Find the box where the row (⟶) and columns (↓) intersect to find the application rate.
4. Compare those values to the calibration chart for the spreader.*
5. Select the correct spreader setting for the rate calculated.

Example:

1. Parking lot is 54,000 sq. ft.
2. Temperature: 22ºF and falling. It has finished snowing. (⟶)
3. Using salt pretreated with salt brine. (↓)
4. Find the 20 – 25º ↓ box. Follow it to the right to the column labeled "Salt Pre-wetted/pretreated with salt brine." Read the rate in the box. The box where the column and row intersect shows a rate of 2.0 /1000 square feet. (⟶↓)
5. Refer to the calibration chart in the vehicle and set the spreader to the setting that most closely matches the 2.0 lbs. /1000 square feet.
6. The mixture is ready to apply.

Instructions for using application rate table for spreaders that are NOT calibrated

Using the example above:

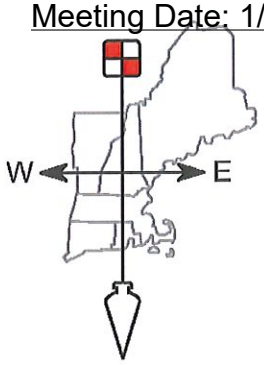
1. Calculate size factor: Divide the parking lot size (54,000 sq. ft.) by 1,000 sq. ft. 54,000/1,000 = 54. The size factor is 54.
2. Find application rate (2.0).
3. Multiply application rate by size factor 2 x 54 = 108.
4. The amount needed for the entire lot is 108 lbs. pre-wetted/pretreated salt brine.
5. Because the spreader is not calibrated, the setting is unknown.
6. Although the calibration setting is not known, this establishes the amount of salt to use and increases efficiency.
7. Determine the best method to spread the 108 pounds evenly across the parking lot.

Pavement area of the proposed Commerce Park R&D = 338,000 sq.ft.

Deicing Log					
Air Temp.	**Weather Conditions**	**Date of Application**	**Type of Deicer Used**	**Amount of Deicer Used**	**Deicer Applied By**

Section 3.2

Test Pit Data



FIELDSTONE
LAND CONSULTANTS, PLLC
Surveying ⌖ Engineering
Land Planning ⌖ Septic Designs
206 Elm Street, Milford, NH 03055 - Phone: 603-672-5456 - Fax: 603-413-5456
www.FieldstoneLandConsultants.com

Test Pit Data
Map 145 Lot 15
3 Sullivan Road
Hudson, NH

10/13/22
Test Pit #1
0-6"- 10YR 3/3 dark brown, loamy sand, granular, friable
6-12"- 10YR 5/6 yellowish brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = 12"** **Roots = None**

Test Pit #2
0-7"- 10YR 3/3 dark brown, loamy sand, granular, friable
7-72"- 10YR 5/6 yellowish brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

Test Pit #3
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-76"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = 76"** **Roots = None**

Test Pit #4
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-70"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = 70"** **Roots = None**

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Test Pit #5
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-80"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = 6"**

Test Pit #6
0-15"- 10YR 3/3 dark brown, loamy sand, granular, friable
15-24"- 10YR 4/4 dark yellowish brown, loamy medium to coarse sand, single grain, loose
24-68"- 2.5Y 6/6 olive brown, gravelly medium to coarse sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = 68"** **Roots = None**

Test Pit #7
0-9"- 10YR 3/3 dark brown, loamy fine sand, granular, friable
9-16"- 10YR 5/6 yellowish brown, loamy fine sand, massive, friable
16"- 2.5Y 6/3 light yellowish brown, loamy fine sand, massive, friable
ESHWT = 66" **Observed Water = None** **Ledge/Boulders = None** **Roots = 4"**

Test Pit #8
0-56"- 10YR 3/3 dark brown, gravelly sandy loam, massive, friable *fill
56-78"- 2.5Y 6/3 light yellowish brown, loamy fine sand, massive, friable
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

Test Pit #9
0-26"- 10YR 3/3 dark brown, sandy loam, massive, friable *fill
26-44"- 10YR 4/6 dark yellowish brown, stony/gravelly sandy loam, massive, friable
44-72" - 2.5Y 5/3 light olive brown, stony/gravelly sandy loam, massive, firm
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

Test Pit #10
0-6"- 10YR 3/3 dark brown, loamy sand, granular, friable
6-19"- 10YR 5/6 yellowish brown, loamy sand, massive, friable
19-32"- 2.5Y 6/3 light olive brown, medium to coarse sand, single grain, loose
32-80"- 2.5Y 6/4 light olive brown, fine to medium sand, single grain, loose
ESHWT = 64" **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

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Test Pit #11
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-24"- 10YR 5/6 yellowish brown, loamy sand, massive, friable
24-36"- 2.5Y 6/4 light yellowish brown, sandy loam, massive, friable
36-76"- 2.5Y 5/4 light olive brown, silty loam, massive, friable
ESHWT = 60" **Observed Water = None** **Ledge/Boulders = None** **Roots = 22"**

Test Pit #12
0-36"- 10YR 3/3 dark brown, stony sandy loam, granular, friable *fill
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

Test Pit #12A
0-12"- 10YR 3/3 dark brown, loamy sand, granular, friable
12-23"- 10YR 5/6 yellowish brown, loamy sand, massive, friable
23-36"- 2.5Y 6/4 light yellowish brown, sandy loam, massive, friable
36-68"- 2.5Y 5/4 light olive brown, silty loam, massive, friable
ESHWT = 60" **Observed Water = None** **Ledge/Boulders = None** **Roots = 24"**

Test Pit #13
0-36"- 10YR 3/3 dark brown, sandy loam, massive, friable *fill
36-48"- 10YR 4/6 dark yellowish brown, stony/gravelly sandy loam, massive, friable
48-80" - 2.5Y 5/3 light olive brown, stony/gravelly sandy loam, massive, firm
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

Test Pit #14
0-12"- 10YR 3/3 dark brown, loamy sand, massive, friable *fill
12-48"- 2.5Y 6/3 light yellowish brown, medium to coarse sand, single grain, loose
48-72" - 2.5Y 6/3 light yellowish brown, fine to medium sand, single grain, loose
ESHWT = None **Observed Water = None** **Ledge/Boulders = None** **Roots = None**

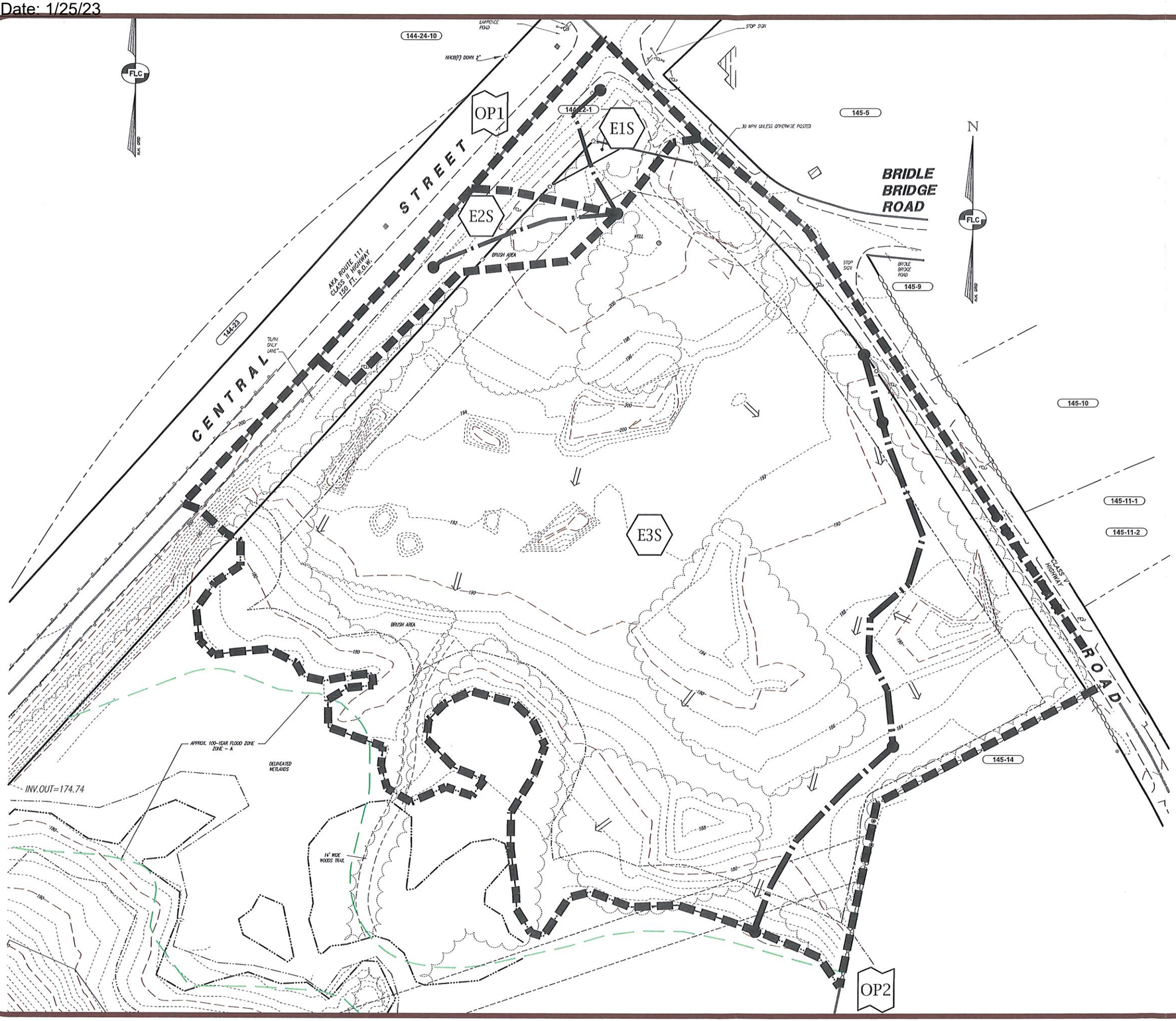
FIELDSTONE
LAND CONSULTANTS, PLLC

Logged By: Christopher Guida

Christopher A. Guida, CSS, CWS
Certified Soil & Wetland Scientist
NH Licensed Designer #1401

Section 3.3

Drainage Plans



LEGEND:

DRAINAGE ANALYSIS

- E1P — POND OR PIPE
- E1S — SUBCATCHMENT
- E1R — REACH
- OP1 — OBSERVATION POINTS
- HYDROLOGIC PATH
- WATERSHED BOUNDARY
- SURFACE WATER FLOW

GRAPHIC SCALE

50' 25' 0 50' 100' 150'

IMPERIAL: 1"=50'

REV.	DATE	DESCRIPTION	C/O	DR	CK

PRE-DEVELOPMENT DRAINAGE PLAN

TAX MAP 145 LOT 15
(3 SULLIVAN ROAD)
HUDSON, NEW HAMPSHIRE

PREPARED FOR:

84 LUMBER COMPANY
1019 ROUTE 519, BUILDING 4 EIGHTY FOUR, PA 15330

SCALE: 1" = 50' MARCH 22, 2022

Surveying ◆ Engineering ◆ Land Planning ◆ Permitting ◆ Septic Designs

FIELDSTONE LAND CONSULTANTS, PLLC

206 Elm Street, Milford, NH 03055
Phone: (603) 672-5456 Fax: (603) 413-5456
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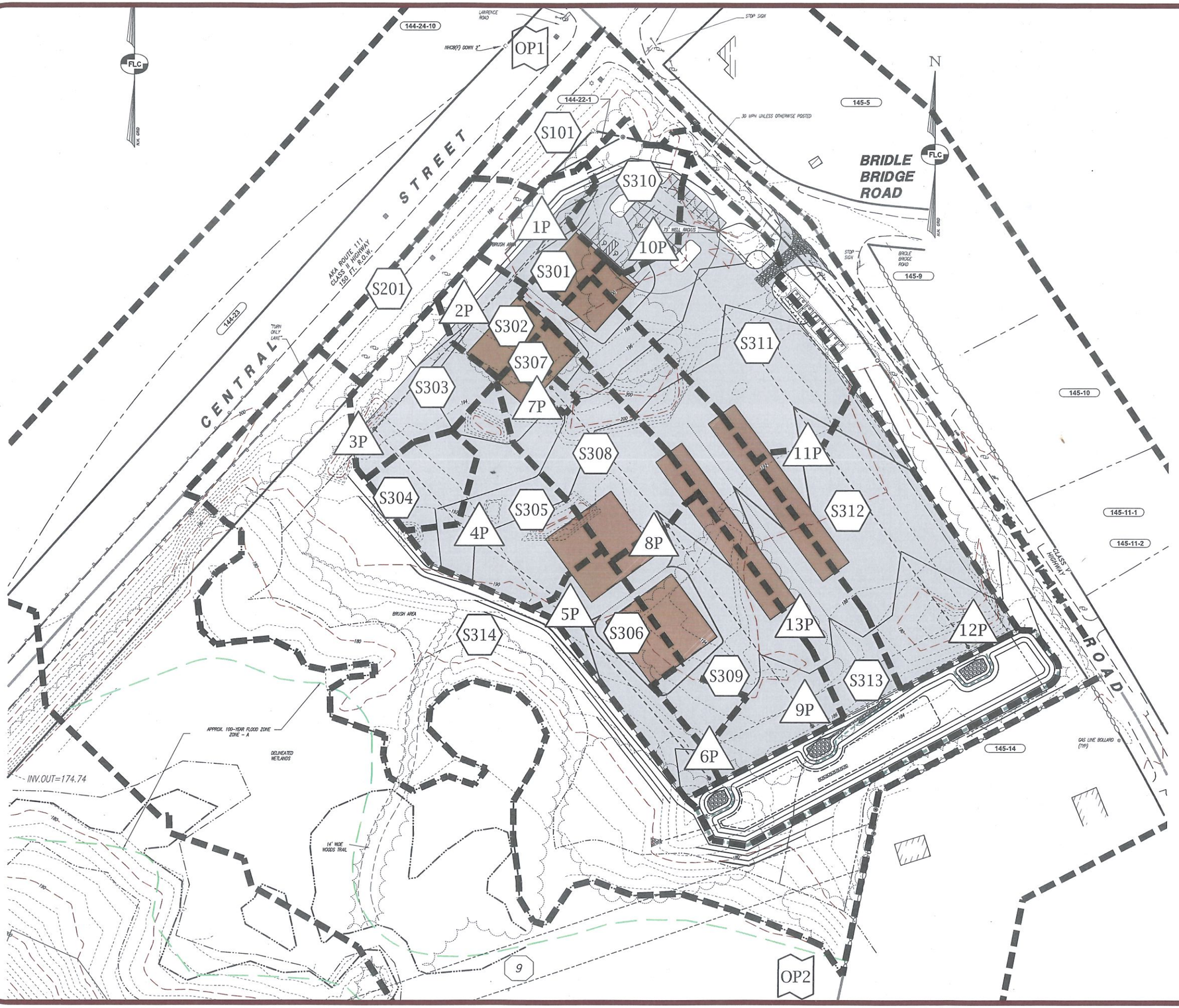

LEGEND:

DRAINAGE ANALYSIS

- E1P — POND OR PIPE
- E1S — SUBCATCHMENT
- E1R — REACH
- OP1 — OBSERVATION POINTS
- HYDROLOGIC PATH
- WATERSHED BOUNDARY
- ⟹ SURFACE WATER FLOW

GRAPHIC SCALE

60' 30' 0 60' 120' 180'

IMPERIAL: 1"=60'

REV.	DATE	DESCRIPTION	C/O	DR	CK
	DATE	DESC.	---	TJB	MDP

POST-DEVELOPMENT DRAINAGE PLAN

TAX MAP 145 LOT 15
(3 SULLIVAN ROAD)
HUDSON, NEW HAMPSHIRE

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