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STORMWATER SUMMARY

Project: Effingham Gas Station

Issue Date: August 26, 2022

Applicant : Meena LLC

Revised: April 12, 2023

Project No : 220473

Location : 41 Route 25, Effingham, NH

PID : Map 401, Lot 5

Methodology : TR-20 using HydroCAD® 10.20-2f

Assumption(s):

- The “Existing Site Conditions” are the conditions that the site was in prior to the construction of the gas pumps, tank and canopy.
- Storm events have been used in these calculations under fully thawed ground conditions, antecedent moisture content two.

Approach:

- Review and verify, stormwater runoff flows from the concrete pads and parking lots.
- Identify potential oil and spill sources and install devices to keep fugitive oil from reaching the adjacent wetlands.
- Note that the site is all within Champlain Soils that are considered excessively well drained, and a droughty soil per NRCS Soils Mapping and Classification. The Hydrologic Soils Group for Colton soils is group A.
- Stormwater analysis completed was to determine the amount of flow to the NHDOT right of way and design an infiltration trench to treat the runoff from the canopy.
- The analysis is limited to the watershed on the project site.

Summary of Analysis:

Analysis

Point	2yr	10yr	25yr	50yr
POA1 EX	2.27cfs	3.33cfs	4.14cfs	5.16cfs
POST	2.00cfs	3.04cfs	3.79cfs	4.97cfs

Town of Effingham Performance Standards:

The following in *italics* are the Zoning performance standards listed in Section 2210 and our narrative discussing how the project meets the standards is list directly below the standard:

2210 - 1. For any use that will render impervious more than 15% or more than 2,500 square feet of the groundwater protection district area of any lot, whichever is greater, a stormwater management plan shall be prepared which the planning board determines is consistent with New Hampshire Stormwater Manual Volumes 1-3, NH Department of Environmental Services December 2008 or any subsequent revisions.

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The site has more than 15% impervious and 2,500 SF of impervious area within the groundwater protection district. Therefore, a stormwater/source control plan, narrative is included in this response, see attached revised SPCC & Source Control Plan.

- 2210 - 2. *Special uses, as defined under Section 2208, Special Uses, shall develop stormwater management and pollution prevention plans and include information consistent with Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, US EPA #833R06004, May 2007 or any subsequent revisions. The plan shall demonstrate that the use will: a. Meet minimum stormwater discharge setbacks between water supply wells and constructed stormwater practices as found within Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, Section 2.1 Permanent (Post-Construction) Stormwater Management, (DES, 2008 or later edition); b. Minimize, through a source control plan that identifies pollution prevention measures, the release of regulated substances into stormwater; c. Stipulate that expansion or redevelopment activities shall require an amended stormwater plan and may not infiltrate stormwater through areas containing contaminated soils without completing a Phase I Assessment in conformance with ASTM E 1527-05, also referred to as All Appropriate Inquiry (AAI); d. Maintain the following minimum vertical separation between the bottom of a stormwater practice and the average seasonal highwater table as determined by a licensed hydrogeologist, soil scientist, engineer or other qualified professional as determined by the Planning Board: four-foot vertical separation for a practice that infiltrates stormwater; one-foot vertical separation for a practice that filters stormwater.*

The revised plans and reports include a stormwater management plan, source control plan and a pollution prevention plan. We have removed the infiltration system and replaced it with a new bioretention basin per North Points recommendations, and the new system maintains the required one-foot of separation to the average seasonal high water elevation.

- 2210 - 3. *Animal manures, fertilizers, and compost must be stored in accordance with Manual of Best Management Practices for Agriculture in New Hampshire, NH Department of Agriculture, Markets, and Food, July 2008 and any subsequent revisions.*

The project is a fueling station and does not anticipate or plan on storing manure, fertilizers, or composts at the project site. No above ground fuel storage.

- 2210 - 4. *All regulated substances stored in containers with a capacity of five gallons or more must be stored in product-tight containers on an impervious surface designed and maintained to prevent flow to exposed soils, floor drains, and outside drains;*

The project does not propose to store regulated substances in above ground containers that are larger than 5 gallons. Fueling stations are protected with concrete slabs that include Positive Limiting Barriers (PLB), that will direct excessive spills, should this occur to a series of additional protective stormwater devices; deep sump catch basins, oil water separator, and lined bioretention system. Runoff from the canopy goes to the infiltration trench. Treatment devices are in accordance with Stormwater Manuals and Source Control Plans.

- 2210 - 5. *Facilities where regulated substances are stored must be secured against unauthorized entry by means of a door and/or gate that is locked when authorized personnel are not present and must be inspected weekly by the facility owner;*

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There are no special facilities or above ground storage containers proposed, and the main building will be locked, or under employee supervision at all times and shall be inspected by the facility owner.

- 2210 - 6. *Outdoor storage areas for regulated substances, associated material or waste must be protected from exposure to precipitation and must be located at least 50 feet from surface water or storm drains, at least 75 feet from private wells, and outside the sanitary protective radius of wells used by public water systems.*

The project does not propose outdoor, above ground storage containers for regulated substances. A screened in solid waste dumpster is proposed at a location that not within the sanitary protective radius of wells used by the public water system.

- 2210 - 7. *Secondary containment must be provided for outdoor storage of regulated substances in regulated containers and the containment structure must include a cover to minimize accumulation of water in the containment area and contact between precipitation and storage container(s);*

The project does not propose outdoor, above ground storage containers for regulated substances, and therefore secondary containment is not provided. Fueling stations are protected with a concrete slab that includes PLB. Precipitation runoff will be directed to a series of stormwater devices; deep sump catch basin, oil water separator, and a bioretention system.

- 2210 - 8. *Containers in which regulated substances are stored must be clearly and visibly labeled and must be kept closed and sealed when material is not being transferred from one container to another;*

There are no outdoor, above ground storage containers/areas proposed at the project site. Fueling stations, and the solid waste dumpster will be clearly labeled, and kept closed and sealed when material is not being transferred.

- 2210 - 9. *Prior to any land disturbing activities, all inactive wells on the property not in use or properly maintained at the time the plan is submitted shall be considered abandoned and must be decommissioned in accordance with We 604, or must be properly maintained in accordance with We 603 of the New Hampshire Water Well Board Rules. Rev 3/11/22 57 of 70*

There are no inactive wells on the project site.

- 2210 - 10. *Blasting activities shall be planned and conducted to minimize groundwater contamination. Excavation activities should be planned and conducted to minimize adverse impacts to hydrology and the dewatering of nearby drinking water supply wells.*

The project does not anticipate requiring blasting activities during construction.

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2210 - 11. All transfers of petroleum from delivery trucks and storage containers over five gallons in capacity shall be conducted over an impervious surface having a positive limiting barrier at its perimeter.

The fueling pads have positive limiting barriers at their perimeters.

Conclusions:

- Stormwater runoff from the parking lot and buildings is directed to deep sump catch basins and an oil water separator. These are intended to capture the runoff and prevent any fugitive oil from reaching the adjacent wetlands. The runoff from the proposed canopy is directed to an infiltration trench, where the runoff will be captured, infiltrated and treated. There will be a post development decrease in peak rate at the analysis point due to the construction of the infiltration trench and bioretention basin and no change in impervious surfaces. Additionally, infiltration trench, catch basins, and bio-retention basin will add a level of protection not previously available.

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Certification

This document contains engineering data including calculations of the post development surface drainage characteristics of this property. The engineering aspects of this document have been prepared by me and by those under my direct supervision; every such engineering aspect shown herein is based upon my best knowledge and opinion thereof.

2-year, 10-year, 25- year and 50- year storm events has been used in these calculations under fully thawed ground conditions, antecedent moisture content two. HydroCAD© 10.20-2f software has been used to perform the calculations.

This document does not constitute any guarantees but has been prepared with usual and customary standards of care. All references are submitted for general information and regulatory review purposes only.

Issue Date: 08/26/2022
Revision Date: 04/01/2023

Mark Lucy, P.E., C.P.E.S.C.



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James Hayden

From: Perry, C. Bradley <cbradley.perry@eversource.com>
Sent: Thursday, October 13, 2022 11:29 AM
To: James Hayden
Subject: RE: Meena Effingham

James, I don't foresee any issue with the tank or trench. And as I indicated this morning, the pole is set deeper than normal, so I don't believe the amount of material you indicated will be removed will have any effect. But again, should any questions or concerns arise during any phase of construction, please don't hesitate to call.

Brad

From: James Hayden <jhayden@horizonsengineering.com>
Sent: Thursday, October 13, 2022 11:02 AM
To: Perry, C. Bradley <cbradley.perry@eversource.com>
Cc: Jim <jdoucet@worldpath.net>
Subject: Meena Effingham

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Good Morning Brad,

Thank you for taking the time to meet with us on site at the Meena project this morning. I wanted to confirm what we discussed on site, in that Eversource does not have an issue with the underground tank, infiltration trench and bio-retention rain garden in the easement, and that the pole within the side slope of the stormwater pond does not need to be moved. Thanks again

James Hayden
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Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.788 degrees North
Longitude	71.088 degrees West
Elevation	120 feet
Date/Time	Sun Apr 02 2023 16:46:39 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.25	0.38	0.47	0.62	0.78	0.99	1yr	0.67	0.94	1.15	1.47	1.90	2.48	2.74	1yr	2.19	2.64
2yr	0.31	0.48	0.60	0.79	0.99	1.25	2yr	0.85	1.15	1.45	1.83	2.32	2.95	3.32	2yr	2.61	3.19
5yr	0.37	0.57	0.72	0.96	1.23	1.56	5yr	1.06	1.42	1.82	2.30	2.89	3.65	4.16	5yr	3.23	4.00
10yr	0.41	0.65	0.82	1.11	1.44	1.86	10yr	1.25	1.68	2.17	2.74	3.43	4.29	4.93	10yr	3.79	4.74
25yr	0.48	0.77	0.98	1.35	1.79	2.32	25yr	1.55	2.09	2.72	3.43	4.29	5.31	6.18	25yr	4.70	5.94
50yr	0.55	0.88	1.13	1.57	2.12	2.76	50yr	1.83	2.47	3.23	4.08	5.07	6.25	7.34	50yr	5.53	7.06
100yr	0.62	1.00	1.29	1.84	2.50	3.29	100yr	2.16	2.93	3.86	4.85	6.01	7.36	8.71	100yr	6.51	8.38
200yr	0.71	1.16	1.50	2.15	2.96	3.90	200yr	2.55	3.47	4.58	5.76	7.11	8.66	10.36	200yr	7.67	9.96
500yr	0.85	1.39	1.82	2.64	3.70	4.90	500yr	3.19	4.34	5.77	7.23	8.88	10.76	13.02	500yr	9.52	12.5

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.22	0.34	0.41	0.55	0.68	0.84	1yr	0.59	0.82	0.97	1.26	1.39	2.04	2.45	1yr	1.80	2.35



FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name:

p-5 Bioretention basin

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.29	ac	A = Area draining to the practice	
0.24	ac	A _I = Impervious area draining to the practice	
0.83	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.79	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.23	ac-in	WQV = 1" x R _v x A	
837	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
209	cf	25% x WQV (check calc for sediment forebay volume)	
628	cf	75% x WQV (check calc for surface sand filter volume)	
Deep sump CBs		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
45	sf	A _{SA} = Surface area of the practice	
10.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ¹	
If K _{sat} (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?			
yes	Yes/No	(Use the calculations below)	
22.3	hours	T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
	ft	E _{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q _{WQV} = Discharge at the E _{WQV} (attach stage-discharge table)	
-	hours	T _{DRAIN} = Drain time = 2WQV/Q _{WQV}	≤ 72-hrs
416.50	feet	E _{FC} = Elevation of the bottom of the filter course material ²	
415.50	feet	E _{UD} = Invert elevation of the underdrain (UD), if applicable	
415.50	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
412.25	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D _{FC to UD} = Depth to UD from the bottom of the filter course	≥ 1'
4.25	feet	D _{FC to ROCK} = Depth to bedrock from the bottom of the filter course	≥ 1'
1.00	feet	D _{FC to SHWT} = Depth to SHWT from the bottom of the filter course	≥ 1'
421.69	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
422.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
	cf	V = Volume of storage ³ (attach a stage-storage table)	≥ 75%WQV
	inches	D _{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes/No		Access grate provided?	← yes

YES	ac	Drainage Area no larger than 5 ac?	← yes
884	cf	V = Volume of storage ³ (attach a stage-storage table)	≥ WQV
24.0	inches	D _{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	SMP1.02	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	SMP1.02	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
	acres	Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.) A _{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
	inches	D _{FC} = Filter course thickness	12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	mod. 304.1 (see spec)

1. Rate of the limiting layer (either the filter course or the underlying soil). K_{sat_design} includes factor of safety. See Env-Wq 1504.14 for guidance on determining the infiltration rate.
2. See lines 34, 40 and 48 for required depths of filter media.
3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet structure, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond P-5: Bio retention basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
415.50	45	0	416.02	45	9
415.51	45	0	416.03	45	10
415.52	45	0	416.04	45	10
415.53	45	1	416.05	45	10
415.54	45	1	416.06	45	10
415.55	45	1	416.07	45	10
415.56	45	1	416.08	45	10
415.57	45	1	416.09	45	11
415.58	45	1	416.10	45	11
415.59	45	2	416.11	45	11
415.60	45	2	416.12	45	11
415.61	45	2	416.13	45	11
415.62	45	2	416.14	45	12
415.63	45	2	416.15	45	12
415.64	45	3	416.16	45	12
415.65	45	3	416.17	45	12
415.66	45	3	416.18	45	12
415.67	45	3	416.19	45	12
415.68	45	3	416.20	45	13
415.69	45	3	416.21	45	13
415.70	45	4	416.22	45	13
415.71	45	4	416.23	45	13
415.72	45	4	416.24	45	13
415.73	45	4	416.25	45	14
415.74	45	4	416.26	45	14
415.75	45	5	416.27	45	14
415.76	45	5	416.28	45	14
415.77	45	5	416.29	45	14
415.78	45	5	416.30	45	14
415.79	45	5	416.31	45	15
415.80	45	5	416.32	45	15
415.81	45	6	416.33	45	15
415.82	45	6	416.34	45	15
415.83	45	6	416.35	45	15
415.84	45	6	416.36	45	15
415.85	45	6	416.37	45	16
415.86	45	6	416.38	45	16
415.87	45	7	416.39	45	16
415.88	45	7	416.40	45	16
415.89	45	7	416.41	45	16
415.90	45	7	416.42	45	17
415.91	45	7	416.43	45	17
415.92	45	8	416.44	45	17
415.93	45	8	416.45	45	17
415.94	45	8	416.46	45	17
415.95	45	8	416.47	45	17
415.96	45	8	416.48	45	18
415.97	45	8	416.49	45	18
415.98	45	9	416.50	90	18
415.99	45	9	416.51	90	18
416.00	45	9	416.52	90	18
416.01	45	9	416.53	90	18

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
416.54	90	18	417.06	90	23
416.55	90	18	417.07	90	23
416.56	90	19	417.08	90	23
416.57	90	19	417.09	90	23
416.58	90	19	417.10	90	23
416.59	90	19	417.11	90	23
416.60	90	19	417.12	90	24
416.61	90	19	417.13	90	24
416.62	90	19	417.14	90	24
416.63	90	19	417.15	90	24
416.64	90	19	417.16	90	24
416.65	90	19	417.17	90	24
416.66	90	19	417.18	90	24
416.67	90	20	417.19	90	24
416.68	90	20	417.20	90	24
416.69	90	20	417.21	90	24
416.70	90	20	417.22	90	24
416.71	90	20	417.23	90	25
416.72	90	20	417.24	90	25
416.73	90	20	417.25	90	25
416.74	90	20	417.26	90	25
416.75	90	20	417.27	90	25
416.76	90	20	417.28	90	25
416.77	90	20	417.29	90	25
416.78	90	21	417.30	90	25
416.79	90	21	417.31	90	25
416.80	90	21	417.32	90	25
416.81	90	21	417.33	90	25
416.82	90	21	417.34	90	26
416.83	90	21	417.35	90	26
416.84	90	21	417.36	90	26
416.85	90	21	417.37	90	26
416.86	90	21	417.38	90	26
416.87	90	21	417.39	90	26
416.88	90	21	417.40	90	26
416.89	90	22	417.41	90	26
416.90	90	22	417.42	90	26
416.91	90	22	417.43	90	26
416.92	90	22	417.44	90	26
416.93	90	22	417.45	90	27
416.94	90	22	417.46	90	27
416.95	90	22	417.47	90	27
416.96	90	22	417.48	90	27
416.97	90	22	417.49	90	27
416.98	90	22	417.50	90	27
416.99	90	22	417.51	90	27
417.00	90	23	417.52	90	27
417.01	90	23	417.53	90	27
417.02	90	23	417.54	90	27
417.03	90	23	417.55	90	27
417.04	90	23	417.56	90	28
417.05	90	23	417.57	90	28

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
417.58	90	28	418.10	90	32
417.59	90	28	418.11	90	32
417.60	90	28	418.12	90	33
417.61	90	28	418.13	90	33
417.62	90	28	418.14	90	33
417.63	90	28	418.15	90	33
417.64	90	28	418.16	90	33
417.65	90	28	418.17	90	33
417.66	90	28	418.18	90	33
417.67	90	29	418.19	90	33
417.68	90	29	418.20	90	33
417.69	90	29	418.21	90	33
417.70	90	29	418.22	90	33
417.71	90	29	418.23	90	34
417.72	90	29	418.24	90	34
417.73	90	29	418.25	90	34
417.74	90	29	418.26	90	34
417.75	90	29	418.27	90	34
417.76	90	29	418.28	90	34
417.77	90	29	418.29	90	34
417.78	90	30	418.30	90	34
417.79	90	30	418.31	90	34
417.80	90	30	418.32	90	34
417.81	90	30	418.33	90	34
417.82	90	30	418.34	90	35
417.83	90	30	418.35	90	35
417.84	90	30	418.36	90	35
417.85	90	30	418.37	90	35
417.86	90	30	418.38	90	35
417.87	90	30	418.39	90	35
417.88	90	30	418.40	90	35
417.89	90	31	418.41	90	35
417.90	90	31	418.42	90	35
417.91	90	31	418.43	90	35
417.92	90	31	418.44	90	35
417.93	90	31	418.45	90	36
417.94	90	31	418.46	90	36
417.95	90	31	418.47	90	36
417.96	90	31	418.48	90	36
417.97	90	31	418.49	90	36
417.98	90	31	418.50	135	36
417.99	90	31	418.51	136	36
418.00	90	32	418.52	136	37
418.01	90	32	418.53	137	37
418.02	90	32	418.54	138	38
418.03	90	32	418.55	139	38
418.04	90	32	418.56	139	39
418.05	90	32	418.57	140	39
418.06	90	32	418.58	141	40
418.07	90	32	418.59	142	40
418.08	90	32	418.60	142	41
418.09	90	32	418.61	143	41

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
418.62	144	42	419.14	191	82
418.63	145	42	419.15	193	83
418.64	145	43	419.16	194	84
418.65	146	44	419.17	195	85
418.66	147	44	419.18	196	86
418.67	148	45	419.19	197	87
418.68	149	45	419.20	198	88
418.69	149	46	419.21	199	89
418.70	150	46	419.22	200	90
418.71	151	47	419.23	201	91
418.72	152	48	419.24	202	92
418.73	153	48	419.25	203	93
418.74	154	49	419.26	205	95
418.75	154	50	419.27	206	96
418.76	155	50	419.28	207	97
418.77	156	51	419.29	208	98
418.78	157	52	419.30	209	99
418.79	158	52	419.31	210	100
418.80	159	53	419.32	211	102
418.81	160	54	419.33	213	103
418.82	160	54	419.34	214	104
418.83	161	55	419.35	215	105
418.84	162	56	419.36	216	107
418.85	163	56	419.37	217	108
418.86	164	57	419.38	218	109
418.87	165	58	419.39	220	110
418.88	166	59	419.40	221	112
418.89	167	59	419.41	222	113
418.90	168	60	419.42	223	114
418.91	169	61	419.43	225	116
418.92	170	62	419.44	226	117
418.93	170	63	419.45	227	118
418.94	171	63	419.46	228	120
418.95	172	64	419.47	229	121
418.96	173	65	419.48	231	123
418.97	174	66	419.49	232	124
418.98	175	67	419.50	233	125
418.99	176	68	419.51	234	127
419.00	177	68	419.52	236	128
419.01	178	69	419.53	237	130
419.02	179	70	419.54	238	131
419.03	180	71	419.55	240	133
419.04	181	72	419.56	241	134
419.05	182	73	419.57	242	136
419.06	183	74	419.58	243	137
419.07	184	75	419.59	245	139
419.08	185	76	419.60	246	140
419.09	186	77	419.61	247	142
419.10	187	78	419.62	249	144
419.11	188	79	419.63	250	145
419.12	189	80	419.64	251	147
419.13	190	81	419.65	253	148

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
419.66	254	150	420.18	345	256
419.67	255	152	420.19	347	259
419.68	257	153	420.20	350	261
419.69	258	155	420.21	352	264
419.70	259	157	420.22	355	266
419.71	261	158	420.23	357	269
419.72	262	160	420.24	360	272
419.73	264	162	420.25	362	274
419.74	265	164	420.26	365	277
419.75	266	165	420.27	367	280
419.76	268	167	420.28	370	283
419.77	269	169	420.29	373	286
419.78	271	171	420.30	375	288
419.79	272	173	420.31	378	291
419.80	273	174	420.32	380	294
419.81	275	176	420.33	383	297
419.82	276	178	420.34	386	300
419.83	278	180	420.35	388	303
419.84	279	182	420.36	391	306
419.85	281	184	420.37	393	309
419.86	282	186	420.38	396	312
419.87	284	188	420.39	399	315
419.88	285	189	420.40	401	318
419.89	286	191	420.41	404	321
419.90	288	193	420.42	407	325
419.91	289	195	420.43	410	328
419.92	291	197	420.44	412	331
419.93	292	199	420.45	415	334
419.94	294	201	420.46	418	337
419.95	295	203	420.47	421	341
419.96	297	206	420.48	423	344
419.97	298	208	420.49	426	347
419.98	300	210	420.50	429	351
419.99	301	212	420.51	432	354
420.00	303	214	420.52	435	358
420.01	305	216	420.53	438	361
420.02	307	218	420.54	440	365
420.03	310	220	420.55	443	368
420.04	312	223	420.56	446	372
420.05	314	225	420.57	449	375
420.06	317	227	420.58	452	379
420.07	319	229	420.59	455	382
420.08	321	232	420.60	458	386
420.09	324	234	420.61	461	390
420.10	326	236	420.62	464	393
420.11	328	239	420.63	467	397
420.12	331	241	420.64	470	401
420.13	333	244	420.65	473	405
420.14	335	246	420.66	476	409
420.15	338	248	420.67	479	413
420.16	340	251	420.68	482	416
420.17	343	253	420.69	485	420

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
420.70	488	424	421.22	662	675
420.71	491	428	421.23	665	681
420.72	494	432	421.24	669	686
420.73	497	436	421.25	673	692
420.74	500	440	421.26	676	698
420.75	503	445	421.27	680	704
420.76	506	449	421.28	684	710
420.77	509	453	421.29	688	716
420.78	512	457	421.30	691	722
420.79	515	461	421.31	695	728
420.80	519	466	421.32	699	734
420.81	522	470	421.33	703	740
420.82	525	474	421.34	706	746
420.83	528	479	421.35	710	752
420.84	531	483	421.36	714	759
420.85	535	487	421.37	718	765
420.86	538	492	421.38	722	771
420.87	541	496	421.39	725	778
420.88	544	501	421.40	729	784
420.89	548	505	421.41	733	790
420.90	551	510	421.42	737	797
420.91	554	515	421.43	741	803
420.92	557	519	421.44	745	810
420.93	561	524	421.45	749	816
420.94	564	529	421.46	753	823
420.95	567	534	421.47	757	830
420.96	571	538	421.48	761	836
420.97	574	543	421.49	765	843
420.98	577	548	421.50	769	850
420.99	581	553	421.51	773	857
421.00	584	558	421.52	776	863
421.01	588	563	421.53	781	870
421.02	591	568	421.54	785	877
421.03	594	573	421.55	789	884
421.04	598	578	421.56	793	891
421.05	601	583	421.57	797	898
421.06	605	588	421.58	801	905
421.07	608	593	421.59	805	912
421.08	612	598	421.60	809	920
421.09	615	604	421.61	813	927
421.10	619	609	421.62	817	934
421.11	622	614	421.63	821	941
421.12	626	620	421.64	825	949
421.13	629	625	421.65	830	956
421.14	633	630	421.66	834	964
421.15	636	636	421.67	838	971
421.16	640	641	421.68	842	978
421.17	644	647	421.69	846	986
421.18	647	652	421.70	850	994
421.19	651	658	421.71	855	1,001
421.20	654	664	421.72	859	1,009
421.21	658	669	421.73	863	1,017

Stage-Area-Storage for Pond P-5: Bio retention basin (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
421.74	867	1,024
421.75	872	1,032
421.76	876	1,040
421.77	880	1,048
421.78	884	1,056
421.79	889	1,064
421.80	893	1,072
421.81	897	1,080
421.82	902	1,088
421.83	906	1,096
421.84	911	1,104
421.85	915	1,112
421.86	919	1,121
421.87	924	1,129
421.88	928	1,137
421.89	933	1,146
421.90	937	1,154
421.91	941	1,163
421.92	946	1,171
421.93	950	1,180
421.94	955	1,189
421.95	959	1,197
421.96	964	1,206
421.97	968	1,215
421.98	973	1,223
421.99	977	1,232
422.00	982	1,241

Calculations 25 year storm

Project:	Meena Route 25 Effingham
Performed By:	JFH
Checked By:	DEB
Date:	4/1/2023

Apron Length

When Tail water depth at pipe outlet is **less (<)** than 1/2 the dia. pipe
 use **Eq 1:**
$$La = \frac{1.8 \times Q}{D^{3/2}} + 7 \times D$$

When Tail water depth at pipe outlet is **greater (>)** than 1/2 the dia. pipe
 use **Eq 2:**
$$La = \frac{3 \times Q}{D^{3/2}} + 7 \times D$$

Apron Width at Outlet = 3 x D **Eq3** or channel bottom width, when there is a well defined channel

Downstream Apron Width when there is **NO** well defined channel at pipe outlet

and the Tailwater Depth is less (<) than the elevation of the center of the pipe use **Eq 4**

$$W = 3D + La$$

or if the Tailwater Depth is greater (>) than the elevation of the center of the pipe use **Eq 5**

$$W = 3D + 0.4 \times La$$

Where

D= pipe Diameter

La= apron length

W= apron width

Q=Discharge from pipe CFS

Tw=Tailwater

Gravel Wetland outlet node 2P

Data:	Q= $\frac{\text{CFS}}{0.63}$	D= $\frac{\text{Feet}}{1}$	Tw= $\frac{\text{Feet}}{0.28}$	Channel (Y or N) n
-------	------------------------------	----------------------------	--------------------------------	--------------------------

1) Apron Width at Outlet

Use Eq 3

3 Feet

2) Apron Length

Use Eq 1

8 Feet

3) Downstream Apron Width

Use Eq 4

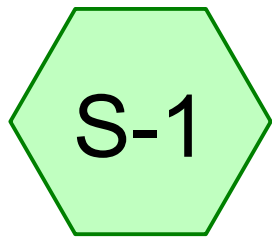
11 Feet

4) Stone Size

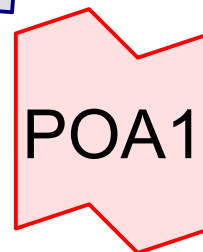
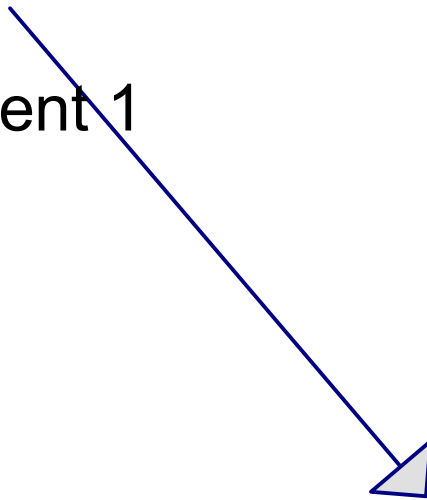
$$d_{50} = \frac{0.02 \times Q}{Tw \times D^{4/3}}$$

0.04 Feet

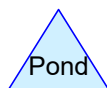
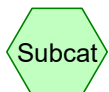
Use NHDOT Class C Stone Fill



Subcatchment 1



Point of Analysis



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year	TYPE II 24-hr		Default	24.00	1	2.95	2
2	10 Year	TYPE II 24-hr		Default	24.00	1	4.29	2
3	25 Year	TYPE II 24-hr		Default	24.00	1	5.31	2
4	50 Year	TYPE II 24-hr		Default	24.00	1	6.25	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.898	39	>75% Grass cover, Good, HSG A (S-1)
0.464	98	Paved parking, HSG A (S-1)
0.080	98	Roofs, HSG A (S-1)
1.442	61	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.442	HSG A	S-1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.442		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.898	0.000	0.000	0.000	0.000	0.898	>75% Grass cover, Good	S-1
0.464	0.000	0.000	0.000	0.000	0.464	Paved parking	S-1
0.080	0.000	0.000	0.000	0.000	0.080	Roofs	S-1
1.442	0.000	0.000	0.000	0.000	1.442	TOTAL AREA	

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TYPE II 24-hr 2 Year Rainfall=2.95"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1

Runoff Area=62,829 sf 37.74% Impervious Runoff Depth=1.03"

Flow Length=224' Slope=0.1200 '/' Tc=5.9 min CN=WQ Runoff=2.27 cfs 0.123 af

Link POA1: Point of Analysis

Inflow=2.27 cfs 0.123 af

Primary=2.27 cfs 0.123 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.123 af Average Runoff Depth = 1.03"
62.26% Pervious = 0.898 ac 37.74% Impervious = 0.544 ac

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TYPE II 24-hr 10 Year Rainfall=4.29"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1

Runoff Area=62,829 sf 37.74% Impervious Runoff Depth=1.58"

Flow Length=224' Slope=0.1200 '/' Tc=5.9 min CN=WQ Runoff=3.33 cfs 0.190 af

Link POA1: Point of Analysis

Inflow=3.33 cfs 0.190 af

Primary=3.33 cfs 0.190 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.190 af Average Runoff Depth = 1.58"
62.26% Pervious = 0.898 ac 37.74% Impervious = 0.544 ac

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TYPE II 24-hr 25 Year Rainfall=5.31"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1

Runoff Area=62,829 sf 37.74% Impervious Runoff Depth=2.08"

Flow Length=224' Slope=0.1200 '/' Tc=5.9 min CN=WQ Runoff=4.14 cfs 0.250 af

Link POA1: Point of Analysis

Inflow=4.14 cfs 0.250 af

Primary=4.14 cfs 0.250 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.250 af Average Runoff Depth = 2.08"
62.26% Pervious = 0.898 ac 37.74% Impervious = 0.544 ac

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TYPE II 24-hr 50 Year Rainfall=6.25"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1

Runoff Area=62,829 sf 37.74% Impervious Runoff Depth=2.59"

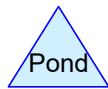
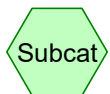
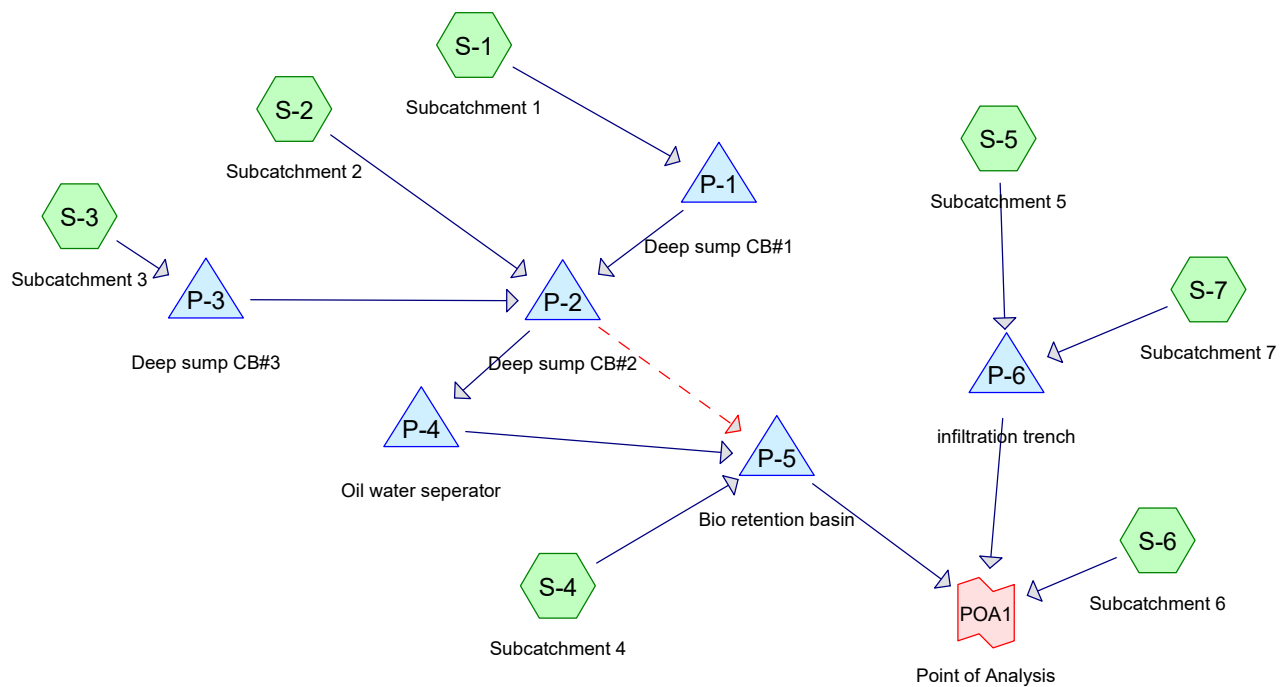
Flow Length=224' Slope=0.1200 '/' Tc=5.9 min CN=WQ Runoff=5.16 cfs 0.312 af

Link POA1: Point of Analysis

Inflow=5.16 cfs 0.312 af

Primary=5.16 cfs 0.312 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.312 af Average Runoff Depth = 2.59"
62.26% Pervious = 0.898 ac 37.74% Impervious = 0.544 ac



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year	TYPE II 24-hr		Default	24.00	1	2.95	2
2	10 Year	TYPE II 24-hr		Default	24.00	1	4.29	2
3	25 Year	TYPE II 24-hr		Default	24.00	1	5.31	2
4	50 Year	TYPE II 24-hr		Default	24.00	1	6.25	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.904	39	>75% Grass cover, Good, HSG A (S-3, S-4, S-6)
0.451	98	Paved parking, HSG A (S-1, S-2, S-3, S-6)
0.087	98	Roofs, HSG A (S-2, S-3, S-5, S-6, S-7)
1.442	61	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.442	HSG A	S-1, S-2, S-3, S-4, S-5, S-6, S-7
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.442		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.904	0.000	0.000	0.000	0.000	0.904	>75% Grass cover, Good	S-3, S-4, S-6
0.451	0.000	0.000	0.000	0.000	0.451	Paved parking	S-1, S-2, S-3, S-6
0.087	0.000	0.000	0.000	0.000	0.087	Roofs	S-2, S-3, S-5, S-6, S-7
1.442	0.000	0.000	0.000	0.000	1.442	TOTAL AREA	

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1	Runoff Area=483 sf 100.00% Impervious Runoff Depth=2.72" Tc=6.0 min CN=98 Runoff=0.05 cfs 0.003 af
Subcatchment S-2: Subcatchment 2	Runoff Area=3,855 sf 100.00% Impervious Runoff Depth=2.72" Tc=6.0 min CN=WQ Runoff=0.37 cfs 0.020 af
Subcatchment S-3: Subcatchment 3	Runoff Area=6,781 sf 93.23% Impervious Runoff Depth=2.53" Tc=6.0 min CN=WQ Runoff=0.60 cfs 0.033 af
Subcatchment S-4: Subcatchment 4	Runoff Area=1,430 sf 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment S-5: Subcatchment 5	Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=2.72" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.12 cfs 0.005 af
Subcatchment S-6: Subcatchment 6	Runoff Area=48,824 sf 23.24% Impervious Runoff Depth=0.63" Tc=6.0 min CN=WQ Runoff=1.08 cfs 0.059 af
Subcatchment S-7: Subcatchment 7	Runoff Area=384 sf 100.00% Impervious Runoff Depth=2.72" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.04 cfs 0.002 af
Pond P-1: Deep sump CB#1	Peak Elev=420.61' Storage=1 cf Inflow=0.05 cfs 0.003 af 12.0" Round Culvert n=0.012 L=39.0' S=0.0128 '/' Outflow=0.05 cfs 0.003 af
Pond P-2: Deep sump CB#2	Peak Elev=420.04' Storage=18 cf Inflow=1.02 cfs 0.055 af Primary=0.95 cfs 0.055 af Secondary=0.07 cfs 0.000 af Outflow=1.02 cfs 0.055 af
Pond P-3: Deep sump CB#3	Peak Elev=420.94' Storage=6 cf Inflow=0.60 cfs 0.033 af 12.0" Round Culvert n=0.012 L=46.0' S=0.0109 '/' Outflow=0.60 cfs 0.033 af
Pond P-4: Oil water seperator	Peak Elev=419.24' Storage=153 cf Inflow=0.95 cfs 0.055 af 12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0097 '/' Outflow=0.95 cfs 0.052 af
Pond P-5: Bio retention basin	Peak Elev=421.61' Storage=929 cf Inflow=1.02 cfs 0.052 af Discarded=0.01 cfs 0.009 af Primary=0.96 cfs 0.027 af Outflow=0.97 cfs 0.035 af
Pond P-6: infiltration trench	Peak Elev=420.80' Storage=168 cf Inflow=0.16 cfs 0.007 af Discarded=0.00 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.007 af
Link POA1: Point of Analysis	Inflow=2.00 cfs 0.086 af Primary=2.00 cfs 0.086 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.122 af Average Runoff Depth = 1.01"
62.67% Pervious = 0.904 ac 37.33% Impervious = 0.538 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1	Runoff Area=483 sf 100.00% Impervious Runoff Depth=4.05" Tc=6.0 min CN=98 Runoff=0.07 cfs 0.004 af
Subcatchment S-2: Subcatchment 2	Runoff Area=3,855 sf 100.00% Impervious Runoff Depth=4.05" Tc=6.0 min CN=WQ Runoff=0.54 cfs 0.030 af
Subcatchment S-3: Subcatchment 3	Runoff Area=6,781 sf 93.23% Impervious Runoff Depth=3.79" Tc=6.0 min CN=WQ Runoff=0.88 cfs 0.049 af
Subcatchment S-4: Subcatchment 4	Runoff Area=1,430 sf 0.00% Impervious Runoff Depth=0.08" Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment S-5: Subcatchment 5	Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=4.05" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.17 cfs 0.008 af
Subcatchment S-6: Subcatchment 6	Runoff Area=48,824 sf 23.24% Impervious Runoff Depth=1.00" Tc=6.0 min CN=WQ Runoff=1.59 cfs 0.094 af
Subcatchment S-7: Subcatchment 7	Runoff Area=384 sf 100.00% Impervious Runoff Depth=4.05" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.06 cfs 0.003 af
Pond P-1: Deep sump CB#1	Peak Elev=420.64' Storage=2 cf Inflow=0.07 cfs 0.004 af 12.0" Round Culvert n=0.012 L=39.0' S=0.0128 '/' Outflow=0.07 cfs 0.004 af
Pond P-2: Deep sump CB#2	Peak Elev=420.24' Storage=21 cf Inflow=1.49 cfs 0.083 af Primary=1.12 cfs 0.079 af Secondary=0.37 cfs 0.003 af Outflow=1.49 cfs 0.083 af
Pond P-3: Deep sump CB#3	Peak Elev=421.05' Storage=7 cf Inflow=0.88 cfs 0.049 af 12.0" Round Culvert n=0.012 L=46.0' S=0.0109 '/' Outflow=0.88 cfs 0.049 af
Pond P-4: Oil water seperator	Peak Elev=419.28' Storage=155 cf Inflow=1.12 cfs 0.079 af 12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0097 '/' Outflow=1.12 cfs 0.076 af
Pond P-5: Bio retention basin	Peak Elev=421.65' Storage=954 cf Inflow=1.49 cfs 0.080 af Discarded=0.01 cfs 0.009 af Primary=1.46 cfs 0.054 af Outflow=1.47 cfs 0.063 af
Pond P-6: infiltration trench	Peak Elev=422.55' Storage=273 cf Inflow=0.24 cfs 0.011 af Discarded=0.00 cfs 0.009 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.009 af
Link POA1: Point of Analysis	Inflow=3.04 cfs 0.147 af Primary=3.04 cfs 0.147 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.56"
62.67% Pervious = 0.904 ac 37.33% Impervious = 0.538 ac

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

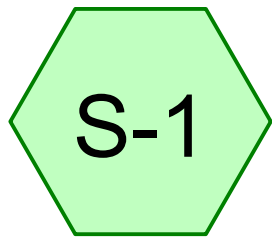
Subcatchment S-1: Subcatchment 1	Runoff Area=483 sf 100.00% Impervious Runoff Depth=5.07" Tc=6.0 min CN=98 Runoff=0.08 cfs 0.005 af
Subcatchment S-2: Subcatchment 2	Runoff Area=3,855 sf 100.00% Impervious Runoff Depth=5.07" Tc=6.0 min CN=WQ Runoff=0.67 cfs 0.037 af
Subcatchment S-3: Subcatchment 3	Runoff Area=6,781 sf 93.23% Impervious Runoff Depth=4.75" Tc=6.0 min CN=WQ Runoff=1.10 cfs 0.062 af
Subcatchment S-4: Subcatchment 4	Runoff Area=1,430 sf 0.00% Impervious Runoff Depth=0.27" Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af
Subcatchment S-5: Subcatchment 5	Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=5.07" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.22 cfs 0.010 af
Subcatchment S-6: Subcatchment 6	Runoff Area=48,824 sf 23.24% Impervious Runoff Depth=1.38" Tc=6.0 min CN=WQ Runoff=1.98 cfs 0.129 af
Subcatchment S-7: Subcatchment 7	Runoff Area=384 sf 100.00% Impervious Runoff Depth=5.07" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.08 cfs 0.004 af
Pond P-1: Deep sump CB#1	Peak Elev=420.66' Storage=2 cf Inflow=0.08 cfs 0.005 af 12.0" Round Culvert n=0.012 L=39.0' S=0.0128 ' Outflow=0.08 cfs 0.005 af
Pond P-2: Deep sump CB#2	Peak Elev=420.36' Storage=22 cf Inflow=1.85 cfs 0.104 af Primary=1.21 cfs 0.097 af Secondary=0.64 cfs 0.007 af Outflow=1.85 cfs 0.104 af
Pond P-3: Deep sump CB#3	Peak Elev=421.13' Storage=8 cf Inflow=1.10 cfs 0.062 af 12.0" Round Culvert n=0.012 L=46.0' S=0.0109 ' Outflow=1.10 cfs 0.062 af
Pond P-4: Oil water seperator	Peak Elev=419.29' Storage=156 cf Inflow=1.21 cfs 0.097 af 12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0097 ' Outflow=1.21 cfs 0.094 af
Pond P-5: Bio retention basin	Peak Elev=421.67' Storage=973 cf Inflow=1.85 cfs 0.101 af Discarded=0.01 cfs 0.009 af Primary=1.82 cfs 0.075 af Outflow=1.82 cfs 0.084 af
Pond P-6: infiltration trench	Peak Elev=423.00' Storage=300 cf Inflow=0.29 cfs 0.014 af Discarded=0.00 cfs 0.009 af Primary=0.03 cfs 0.001 af Outflow=0.04 cfs 0.011 af
Link POA1: Point of Analysis	Inflow=3.79 cfs 0.205 af Primary=3.79 cfs 0.205 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.248 af Average Runoff Depth = 2.06"
62.67% Pervious = 0.904 ac 37.33% Impervious = 0.538 ac

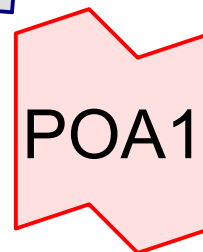
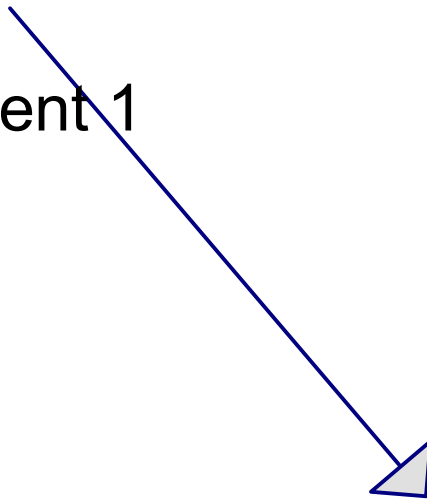
Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1	Runoff Area=483 sf 100.00% Impervious Runoff Depth=6.01" Tc=6.0 min CN=98 Runoff=0.10 cfs 0.006 af
Subcatchment S-2: Subcatchment 2	Runoff Area=3,855 sf 100.00% Impervious Runoff Depth=6.01" Tc=6.0 min CN=WQ Runoff=0.79 cfs 0.044 af
Subcatchment S-3: Subcatchment 3	Runoff Area=6,781 sf 93.23% Impervious Runoff Depth=5.64" Tc=6.0 min CN=WQ Runoff=1.30 cfs 0.073 af
Subcatchment S-4: Subcatchment 4	Runoff Area=1,430 sf 0.00% Impervious Runoff Depth=0.52" Tc=6.0 min CN=39 Runoff=0.02 cfs 0.001 af
Subcatchment S-5: Subcatchment 5	Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=6.01" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.25 cfs 0.012 af
Subcatchment S-6: Subcatchment 6	Runoff Area=48,824 sf 23.24% Impervious Runoff Depth=1.80" Tc=6.0 min CN=WQ Runoff=2.62 cfs 0.168 af
Subcatchment S-7: Subcatchment 7	Runoff Area=384 sf 100.00% Impervious Runoff Depth=6.01" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.09 cfs 0.004 af
Pond P-1: Deep sump CB#1	Peak Elev=420.67' Storage=2 cf Inflow=0.10 cfs 0.006 af 12.0" Round Culvert n=0.012 L=39.0' S=0.0128 ' Outflow=0.10 cfs 0.006 af
Pond P-2: Deep sump CB#2	Peak Elev=420.46' Storage=23 cf Inflow=2.18 cfs 0.123 af Primary=1.28 cfs 0.112 af Secondary=0.91 cfs 0.011 af Outflow=2.18 cfs 0.123 af
Pond P-3: Deep sump CB#3	Peak Elev=421.19' Storage=9 cf Inflow=1.30 cfs 0.073 af 12.0" Round Culvert n=0.012 L=46.0' S=0.0109 ' Outflow=1.30 cfs 0.073 af
Pond P-4: Oil water seperator	Peak Elev=419.31' Storage=156 cf Inflow=1.28 cfs 0.112 af 12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0097 ' Outflow=1.28 cfs 0.109 af
Pond P-5: Bio retention basin	Peak Elev=421.69' Storage=988 cf Inflow=2.19 cfs 0.121 af Discarded=0.01 cfs 0.010 af Primary=2.16 cfs 0.094 af Outflow=2.17 cfs 0.104 af
Pond P-6: infiltration trench	Peak Elev=423.02' Storage=301 cf Inflow=0.35 cfs 0.017 af Discarded=0.00 cfs 0.009 af Primary=0.42 cfs 0.003 af Outflow=0.43 cfs 0.013 af
Link POA1: Point of Analysis	Inflow=4.97 cfs 0.265 af Primary=4.97 cfs 0.265 af

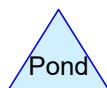
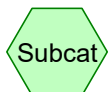
Total Runoff Area = 1.442 ac Runoff Volume = 0.309 af Average Runoff Depth = 2.57"
62.67% Pervious = 0.904 ac 37.33% Impervious = 0.538 ac



Subcatchment 1



Point of Analysis



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 Year	TYPE II 24-hr		Default	24.00	1	4.29	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.898	39	>75% Grass cover, Good, HSG A (S-1)
0.464	98	Paved parking, HSG A (S-1)
0.080	98	Roofs, HSG A (S-1)
1.442	61	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.442	HSG A	S-1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.442		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.898	0.000	0.000	0.000	0.000	0.898	>75% Grass cover, Good	S-1
0.464	0.000	0.000	0.000	0.000	0.464	Paved parking	S-1
0.080	0.000	0.000	0.000	0.000	0.080	Roofs	S-1
1.442	0.000	0.000	0.000	0.000	1.442	TOTAL AREA	

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TYPE II 24-hr 10 Year Rainfall=4.29"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1

Runoff Area=62,829 sf 37.74% Impervious Runoff Depth=1.58"

Flow Length=224' Slope=0.1200 '/' Tc=5.9 min CN=WQ Runoff=3.33 cfs 0.190 af

Link POA1: Point of Analysis

Inflow=3.33 cfs 0.190 af

Primary=3.33 cfs 0.190 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.190 af Average Runoff Depth = 1.58"
62.26% Pervious = 0.898 ac 37.74% Impervious = 0.544 ac

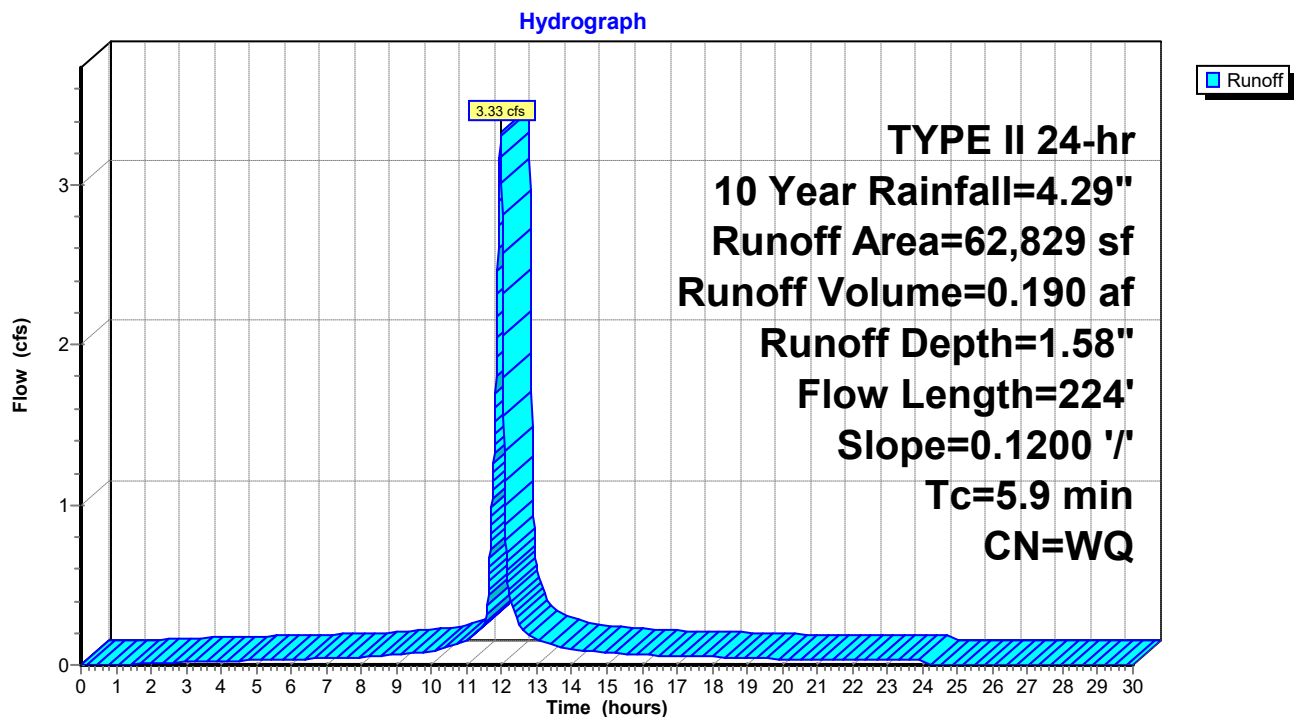
Summary for Subcatchment S-1: Subcatchment 1

Runoff = 3.33 cfs @ 11.97 hrs, Volume= 0.190 af, Depth= 1.58"
 Routed to Link POA1 : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
3,500	98	Roofs, HSG A
20,212	98	Paved parking, HSG A
39,117	39	>75% Grass cover, Good, HSG A
62,829		Weighted Average
39,117		62.26% Pervious Area
23,712		37.74% Impervious Area

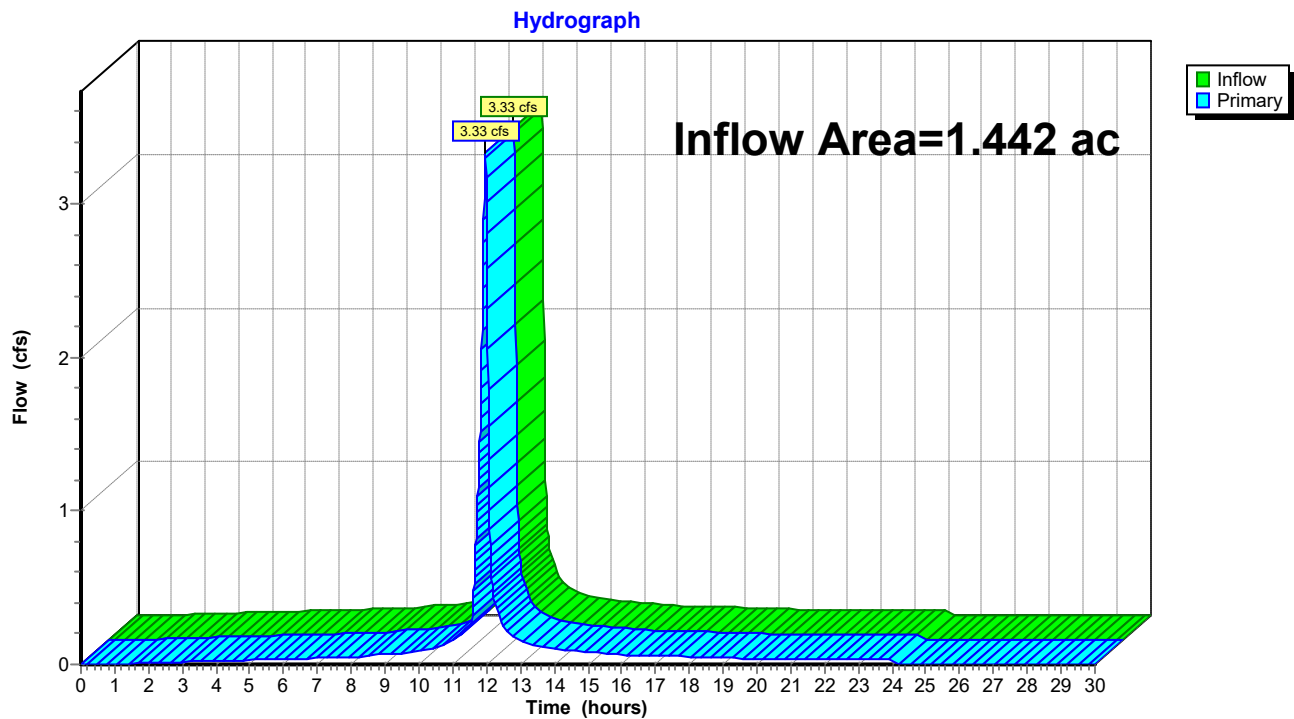
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1200	0.33		Sheet Flow, 100
					Grass: Short n= 0.150 P2= 2.93"
0.9	124	0.1200	2.42		Shallow Concentrated Flow, Segment 2
					Short Grass Pasture Kv= 7.0 fps
5.9	224	Total			

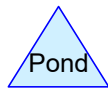
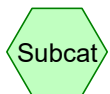
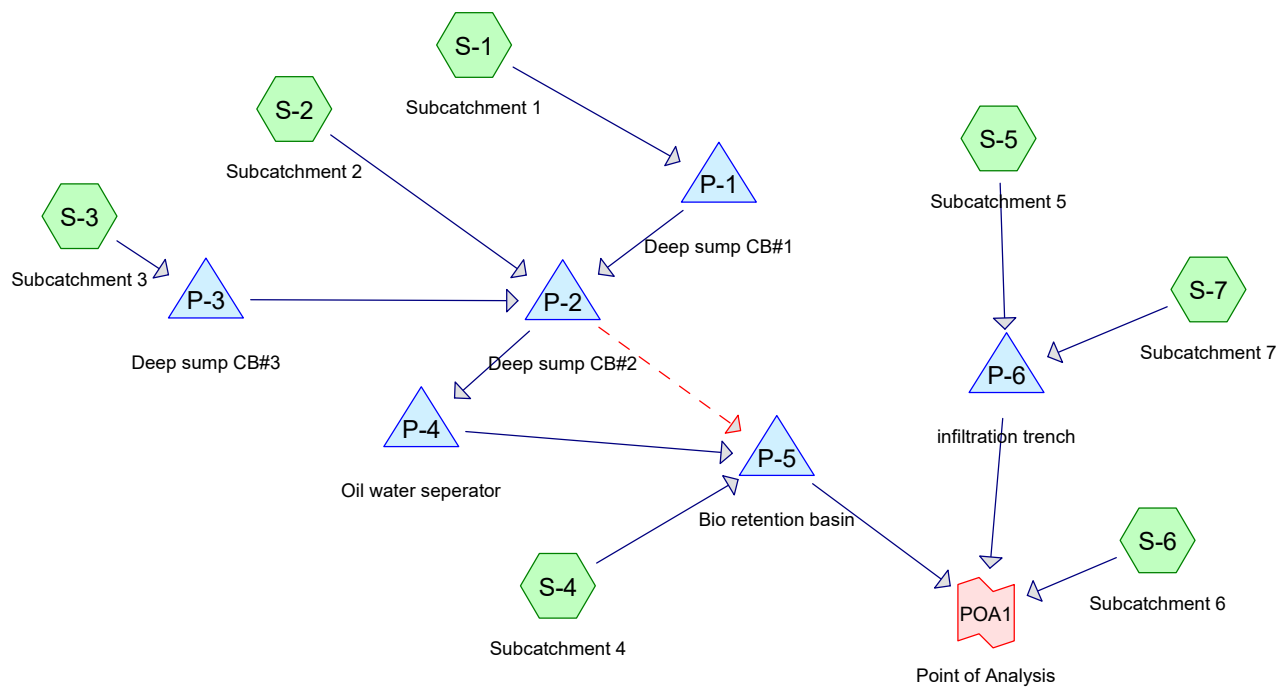
Subcatchment S-1: Subcatchment 1

Summary for Link POA1: Point of Analysis

Inflow Area = 1.442 ac, 37.74% Impervious, Inflow Depth = 1.58" for 10 Year event
Inflow = 3.33 cfs @ 11.97 hrs, Volume= 0.190 af
Primary = 3.33 cfs @ 11.97 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link POA1: Point of Analysis



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10 Year	TYPE II 24-hr		Default	24.00	1	4.29	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.904	39	>75% Grass cover, Good, HSG A (S-3, S-4, S-6)
0.451	98	Paved parking, HSG A (S-1, S-2, S-3, S-6)
0.087	98	Roofs, HSG A (S-2, S-3, S-5, S-6, S-7)
1.442	61	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.442	HSG A	S-1, S-2, S-3, S-4, S-5, S-6, S-7
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.442		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.904	0.000	0.000	0.000	0.000	0.904	>75% Grass cover, Good	S-3, S-4, S-6
0.451	0.000	0.000	0.000	0.000	0.451	Paved parking	S-1, S-2, S-3, S-6
0.087	0.000	0.000	0.000	0.000	0.087	Roofs	S-2, S-3, S-5, S-6, S-7
1.442	0.000	0.000	0.000	0.000	1.442	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	S-5	0.00	0.00	80.0	0.0100	0.012	0.0	6.0	0.0
2	S-7	0.00	0.00	80.0	0.0100	0.012	0.0	6.0	0.0
3	P-1	420.50	420.00	39.0	0.0128	0.012	0.0	12.0	0.0
4	P-2	419.20	419.10	7.0	0.0143	0.012	0.0	8.0	0.0
5	P-2	419.90	418.50	40.0	0.0350	0.012	0.0	12.0	0.0
6	P-3	420.50	420.00	46.0	0.0109	0.012	0.0	12.0	0.0
7	P-4	418.85	418.50	36.0	0.0097	0.012	0.0	12.0	0.0

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: Subcatchment 1	Runoff Area=483 sf 100.00% Impervious Runoff Depth=4.05" Tc=6.0 min CN=98 Runoff=0.07 cfs 0.004 af
Subcatchment S-2: Subcatchment 2	Runoff Area=3,855 sf 100.00% Impervious Runoff Depth=4.05" Tc=6.0 min CN=WQ Runoff=0.54 cfs 0.030 af
Subcatchment S-3: Subcatchment 3	Runoff Area=6,781 sf 93.23% Impervious Runoff Depth=3.79" Tc=6.0 min CN=WQ Runoff=0.88 cfs 0.049 af
Subcatchment S-4: Subcatchment 4	Runoff Area=1,430 sf 0.00% Impervious Runoff Depth=0.08" Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment S-5: Subcatchment 5	Runoff Area=1,056 sf 100.00% Impervious Runoff Depth=4.05" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.17 cfs 0.008 af
Subcatchment S-6: Subcatchment 6	Runoff Area=48,824 sf 23.24% Impervious Runoff Depth=1.00" Tc=6.0 min CN=WQ Runoff=1.59 cfs 0.094 af
Subcatchment S-7: Subcatchment 7	Runoff Area=384 sf 100.00% Impervious Runoff Depth=4.05" Flow Length=100' Tc=0.7 min CN=98 Runoff=0.06 cfs 0.003 af
Pond P-1: Deep sump CB#1	Peak Elev=420.64' Storage=2 cf Inflow=0.07 cfs 0.004 af 12.0" Round Culvert n=0.012 L=39.0' S=0.0128 '/' Outflow=0.07 cfs 0.004 af
Pond P-2: Deep sump CB#2	Peak Elev=420.24' Storage=21 cf Inflow=1.49 cfs 0.083 af Primary=1.12 cfs 0.079 af Secondary=0.37 cfs 0.003 af Outflow=1.49 cfs 0.083 af
Pond P-3: Deep sump CB#3	Peak Elev=421.05' Storage=7 cf Inflow=0.88 cfs 0.049 af 12.0" Round Culvert n=0.012 L=46.0' S=0.0109 '/' Outflow=0.88 cfs 0.049 af
Pond P-4: Oil water seperator	Peak Elev=419.28' Storage=155 cf Inflow=1.12 cfs 0.079 af 12.0" Round Culvert x 2.00 n=0.012 L=36.0' S=0.0097 '/' Outflow=1.12 cfs 0.076 af
Pond P-5: Bio retention basin	Peak Elev=421.65' Storage=954 cf Inflow=1.49 cfs 0.080 af Discarded=0.01 cfs 0.009 af Primary=1.46 cfs 0.054 af Outflow=1.47 cfs 0.063 af
Pond P-6: infiltration trench	Peak Elev=422.55' Storage=273 cf Inflow=0.24 cfs 0.011 af Discarded=0.00 cfs 0.009 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.009 af
Link POA1: Point of Analysis	Inflow=3.04 cfs 0.147 af Primary=3.04 cfs 0.147 af

Total Runoff Area = 1.442 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.56"
62.67% Pervious = 0.904 ac 37.33% Impervious = 0.538 ac

Summary for Subcatchment S-1: Subcatchment 1

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 0.004 af, Depth= 4.05"
 Routed to Pond P-1 : Deep sump CB#1

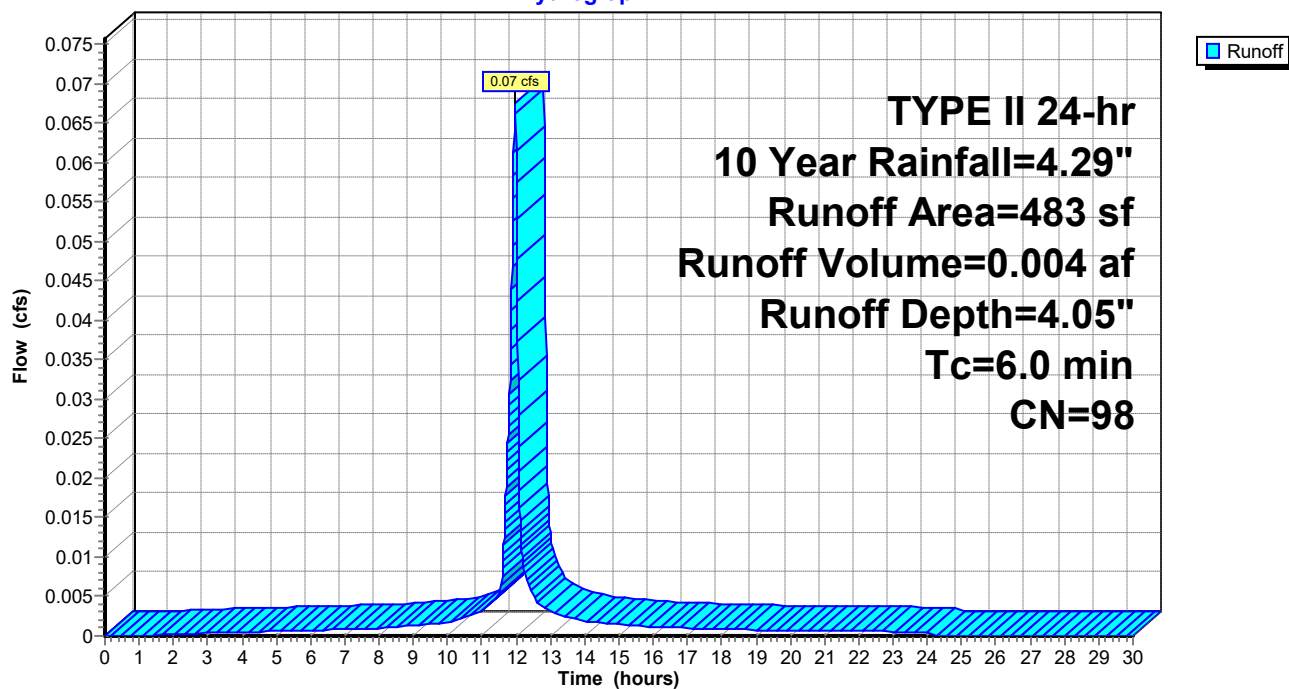
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
483	98	Paved parking, HSG A
483		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-1: Subcatchment 1

Hydrograph



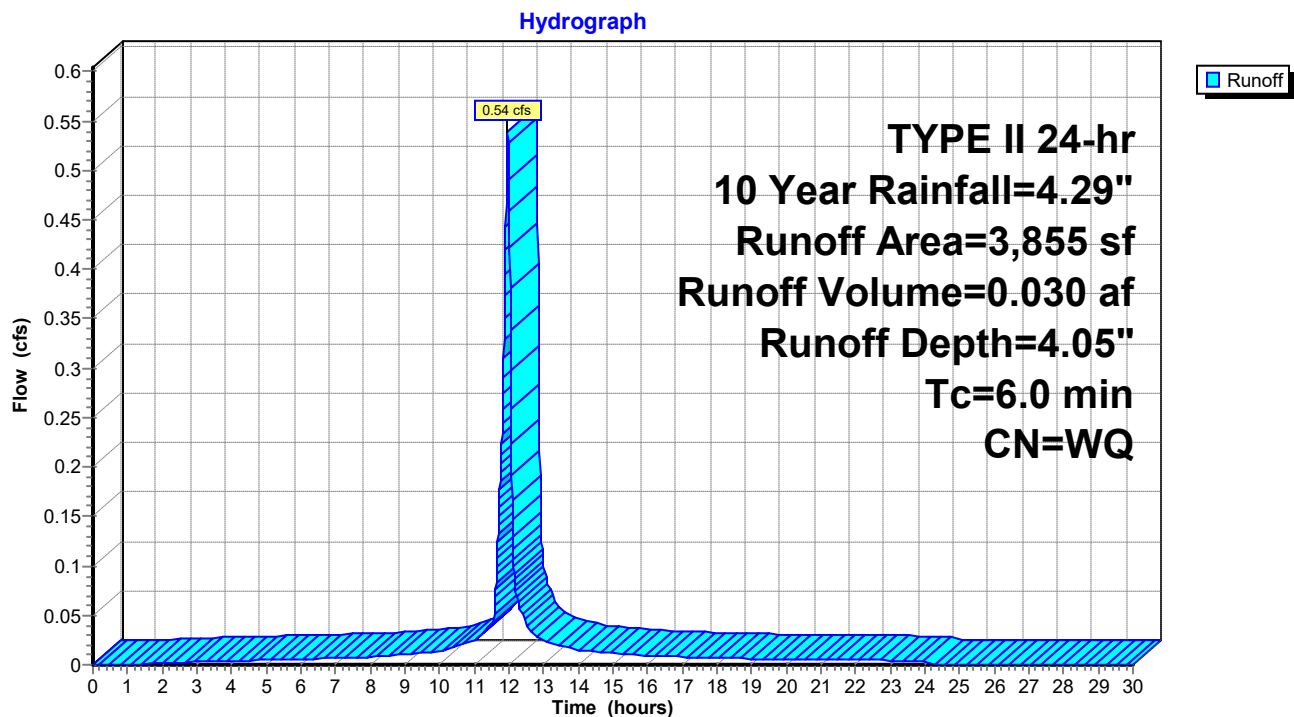
Summary for Subcatchment S-2: Subcatchment 2

Runoff = 0.54 cfs @ 11.97 hrs, Volume= 0.030 af, Depth= 4.05"
 Routed to Pond P-2 : Deep sump CB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
468	98	Roofs, HSG A
3,387	98	Paved parking, HSG A
3,855		Weighted Average
3,855		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-2: Subcatchment 2

Summary for Subcatchment S-3: Subcatchment 3

Runoff = 0.88 cfs @ 11.97 hrs, Volume= 0.049 af, Depth= 3.79"
 Routed to Pond P-3 : Deep sump CB#3

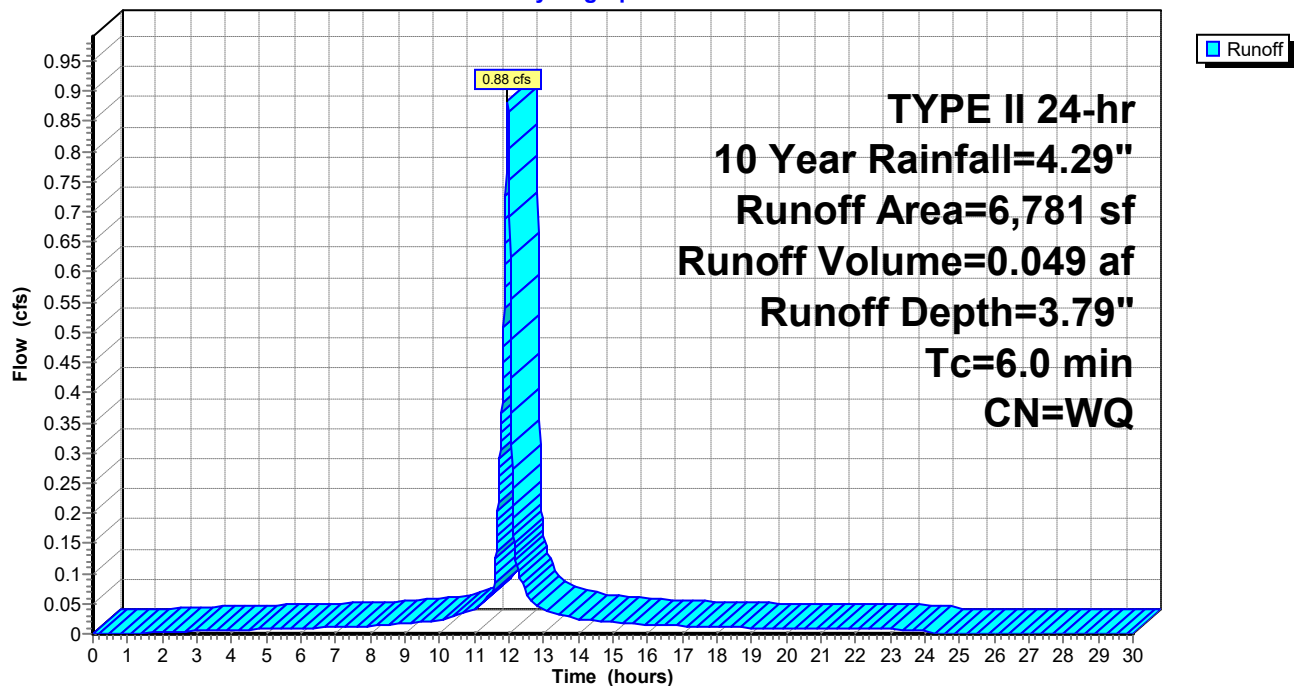
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

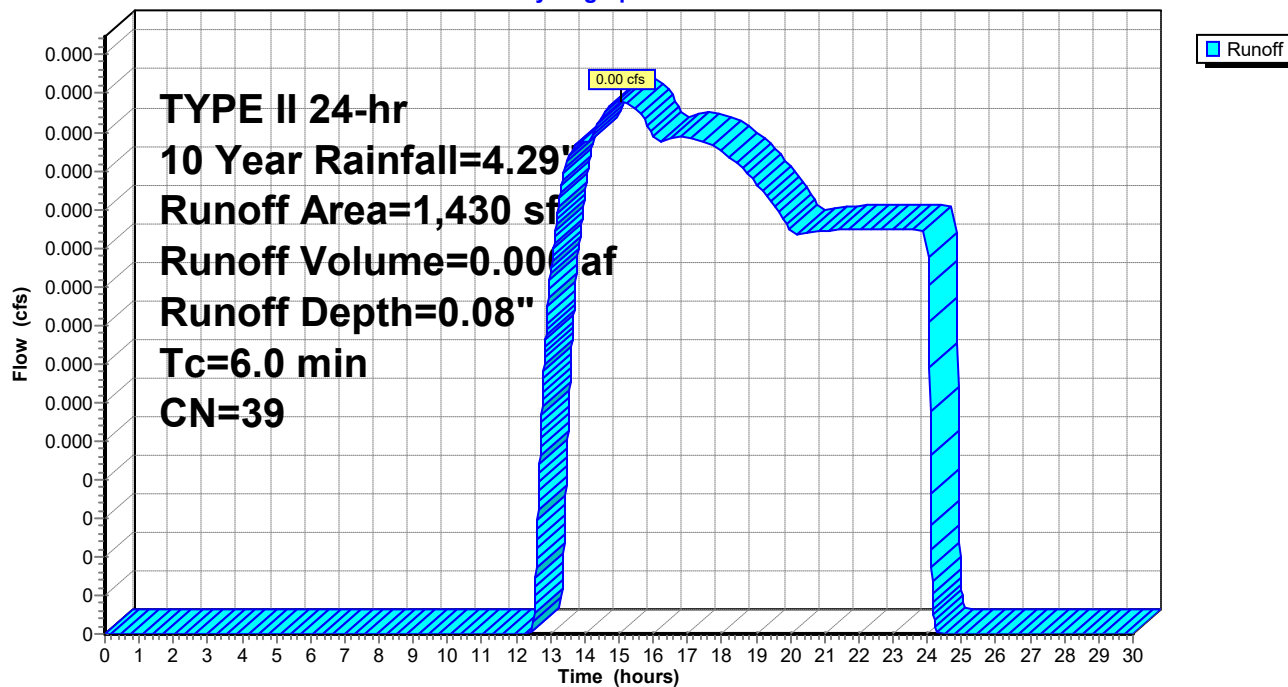
Area (sf)	CN	Description
1,258	98	Roofs, HSG A
5,064	98	Paved parking, HSG A
459	39	>75% Grass cover, Good, HSG A
6,781		Weighted Average
459		6.77% Pervious Area
6,322		93.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-3: Subcatchment 3

Hydrograph





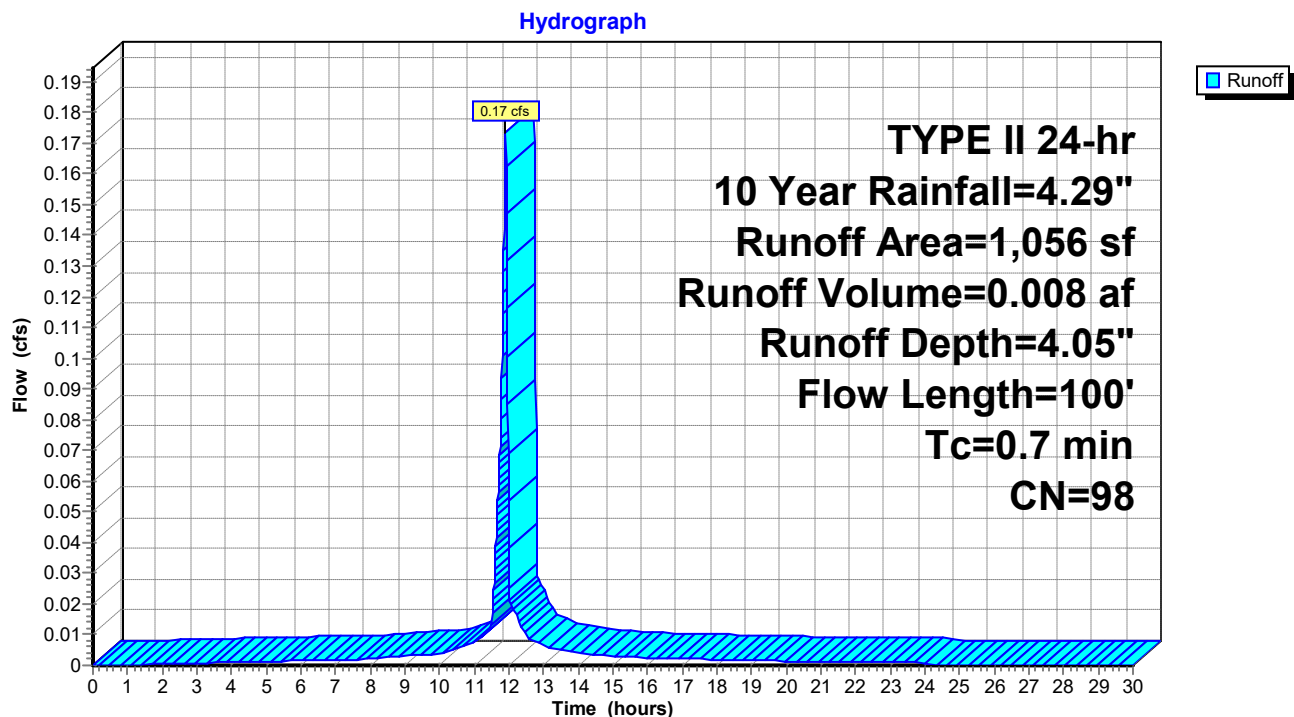
Summary for Subcatchment S-5: Subcatchment 5[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.17 cfs @ 11.91 hrs, Volume= 0.008 af, Depth= 4.05"
 Routed to Pond P-6 : infiltration trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, $dt=0.01$ hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
1,056	98	Roofs, HSG A
1,056		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.95		Sheet Flow, Segment 1 Smooth surfaces $n=0.011$ $P2=2.93"$
0.4	80	0.0100	3.10	0.61	Pipe Channel, Segment 2 6.0" Round Area= 0.2 sf Perim= 1.6' $r=0.13'$ $n=0.012$ Corrugated PP, smooth interior
0.7	100	Total			

Subcatchment S-5: Subcatchment 5

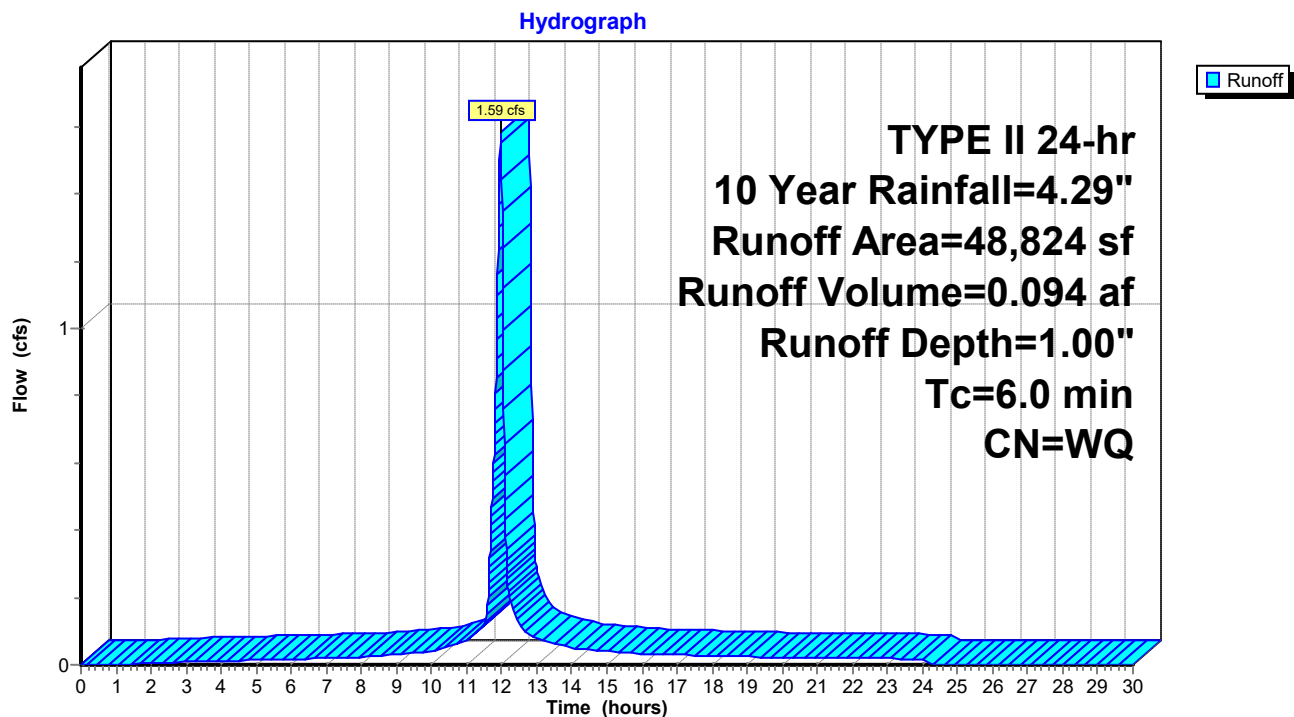
Summary for Subcatchment S-6: Subcatchment 6

Runoff = 1.59 cfs @ 11.97 hrs, Volume= 0.094 af, Depth= 1.00"
 Routed to Link POA1 : Point of Analysis

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
10,722	98	Paved parking, HSG A
623	98	Roofs, HSG A
37,479	39	>75% Grass cover, Good, HSG A
48,824		Weighted Average
37,479		76.76% Pervious Area
11,345		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Segment 1

Subcatchment S-6: Subcatchment 6

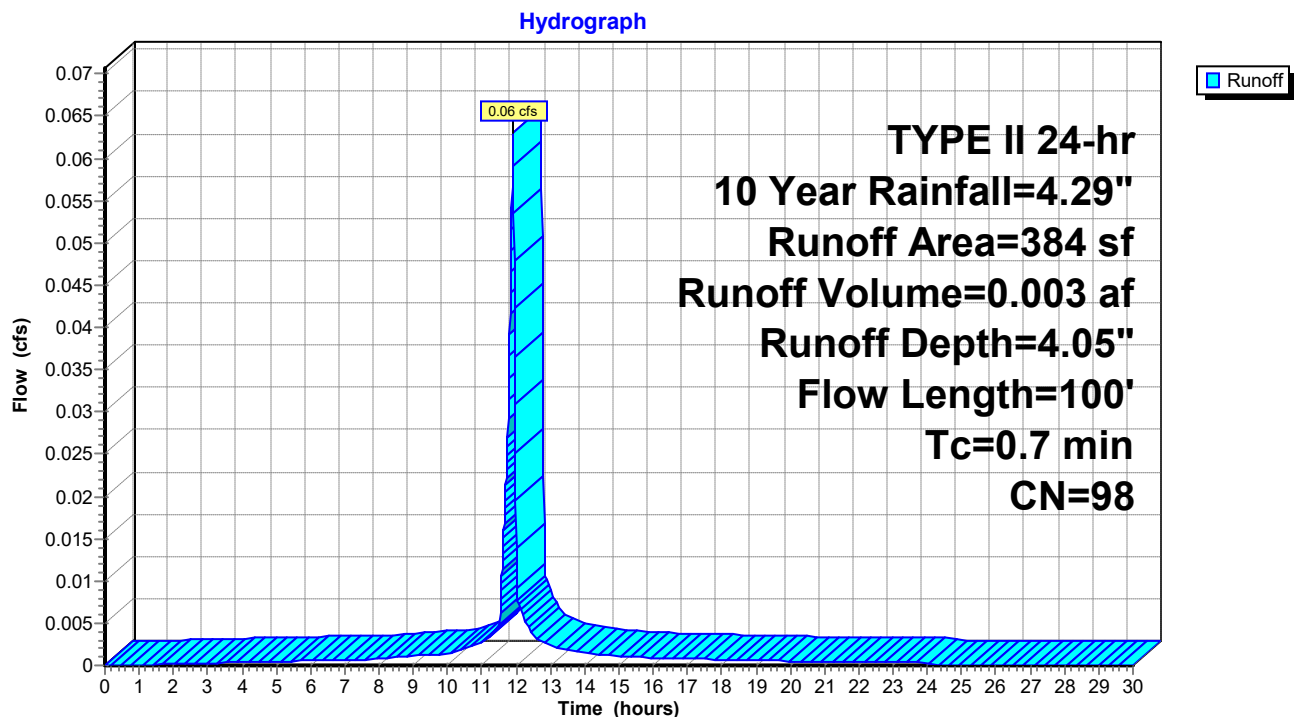
Summary for Subcatchment S-7: Subcatchment 7[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.06 cfs @ 11.91 hrs, Volume= 0.003 af, Depth= 4.05"
 Routed to Pond P-6 : infiltration trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, $dt=0.01$ hrs
 TYPE II 24-hr 10 Year Rainfall=4.29"

Area (sf)	CN	Description
384	98	Roofs, HSG A
384		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0200	0.95		Sheet Flow, Segment 1 Smooth surfaces $n=0.011$ $P2=2.93"$
0.4	80	0.0100	3.10	0.61	Pipe Channel, Segment 2 6.0" Round Area= 0.2 sf Perim= 1.6' $r=0.13'$ $n=0.012$ Corrugated PP, smooth interior
0.7	100	Total			

Subcatchment S-7: Subcatchment 7

Summary for Pond P-1: Deep sump CB#1

Inflow Area = 0.011 ac, 100.00% Impervious, Inflow Depth = 4.05" for 10 Year event
 Inflow = 0.07 cfs @ 11.97 hrs, Volume= 0.004 af
 Outflow = 0.07 cfs @ 11.97 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.2 min
 Primary = 0.07 cfs @ 11.97 hrs, Volume= 0.004 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 420.64' @ 11.97 hrs Surf.Area= 13 sf Storage= 2 cf

Flood Elev= 423.50' Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= 1.3 min calculated for 0.004 af (100% of inflow)

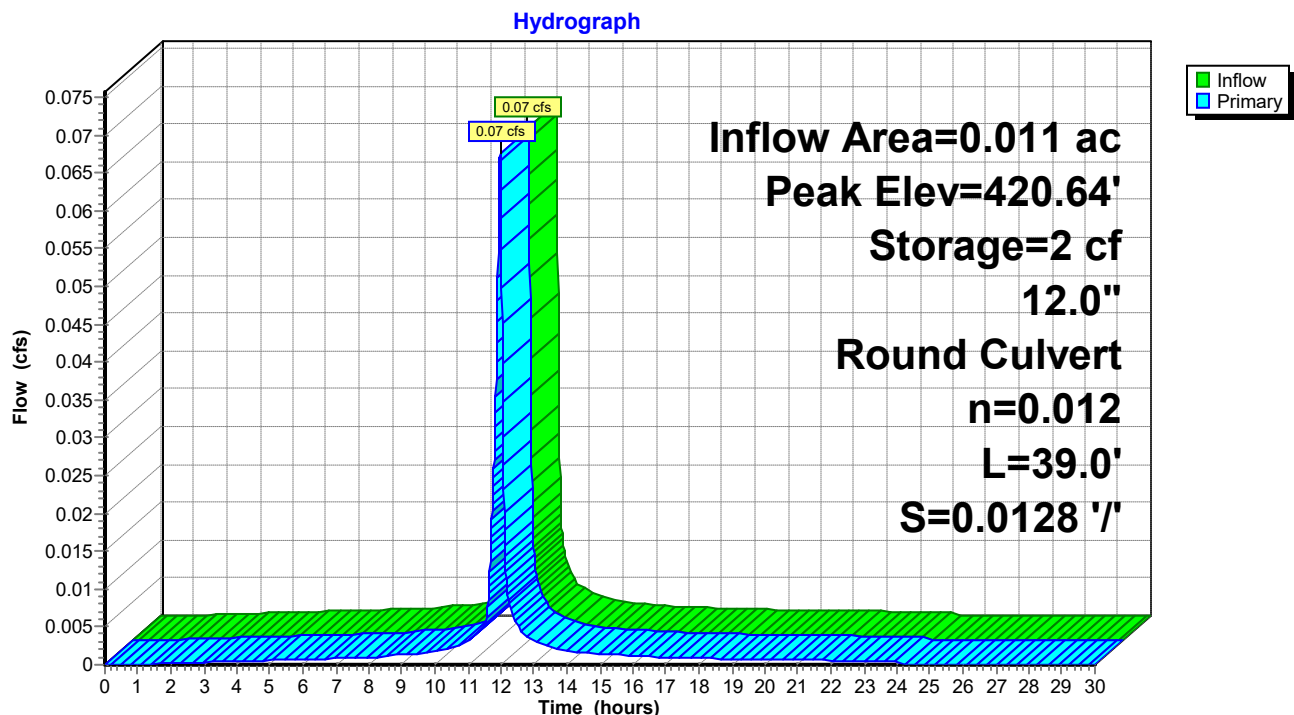
Center-of-Mass det. time= 1.3 min (748.0 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1	420.50'	38 cf	4.00'D x 3.00'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.50'	12.0" Round 12" hdpe L= 39.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.50' / 420.00' S= 0.0128 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 11.97 hrs HW=420.64' (Free Discharge)

←1=12" hdpe (Inlet Controls 0.07 cfs @ 1.00 fps)

Pond P-1: Deep sump CB#1

Summary for Pond P-2: Deep sump CB#2

[79] Warning: Submerged Pond P-1 Primary device # 1 OUTLET by 0.24'

[79] Warning: Submerged Pond P-3 Primary device # 1 OUTLET by 0.24'

Inflow Area = 0.255 ac, 95.87% Impervious, Inflow Depth = 3.89" for 10 Year event
 Inflow = 1.49 cfs @ 11.97 hrs, Volume= 0.083 af
 Outflow = 1.49 cfs @ 11.97 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.12 cfs @ 11.97 hrs, Volume= 0.079 af
 Routed to Pond P-4 : Oil water seperator
 Secondary = 0.37 cfs @ 11.97 hrs, Volume= 0.003 af
 Routed to Pond P-5 : Bio retention basin

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 420.24' @ 11.97 hrs Surf.Area= 13 sf Storage= 21 cf

Flood Elev= 423.50' Surf.Area= 13 sf Storage= 62 cf

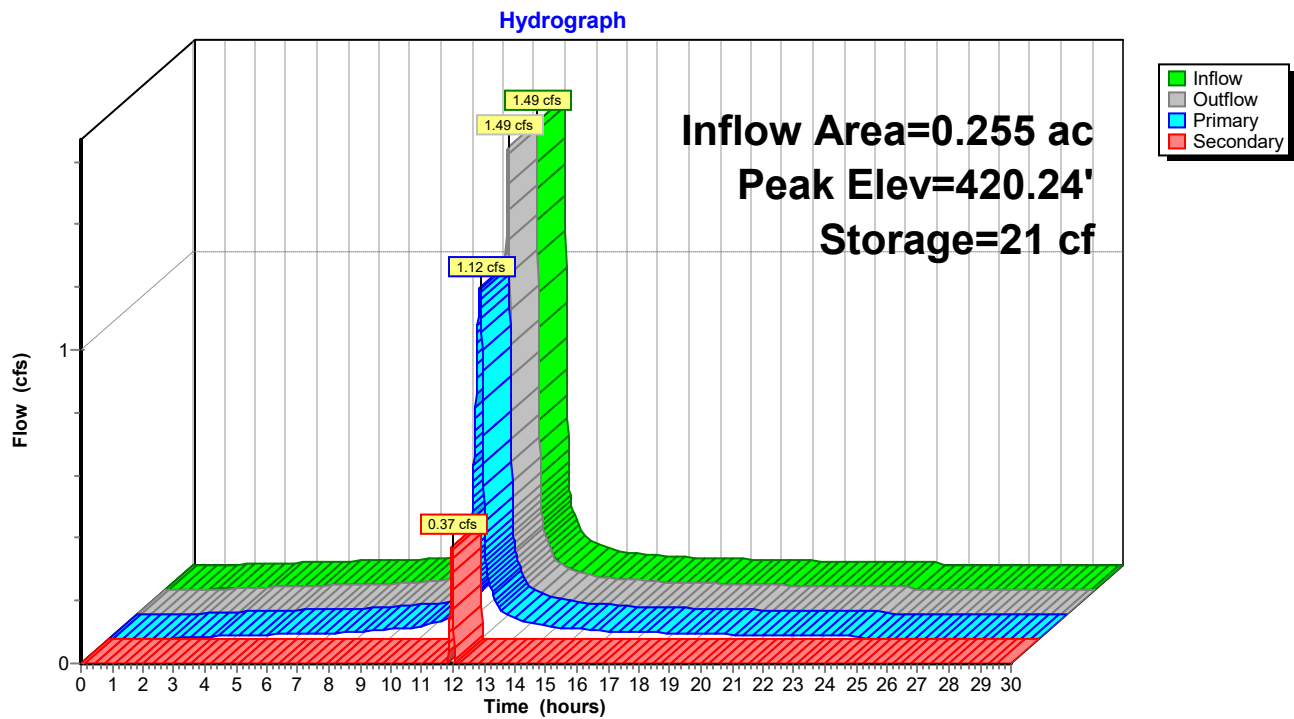
Plug-Flow detention time= 3.3 min calculated for 0.083 af (100% of inflow)

Center-of-Mass det. time= 1.8 min (749.2 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1	418.60'	62 cf	4.00'D x 4.90'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	419.20'	8.0" Round 8" hdpe L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 419.20' / 419.10' S= 0.0143 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Secondary	419.90'	12.0" Round 12" hdpe L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 419.90' / 418.50' S= 0.0350 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.12 cfs @ 11.97 hrs HW=420.24' (Free Discharge)↑**1=8" hdpe** (Inlet Controls 1.12 cfs @ 3.20 fps)**Secondary OutFlow** Max=0.37 cfs @ 11.97 hrs HW=420.24' (Free Discharge)↑**2=12" hdpe** (Inlet Controls 0.37 cfs @ 1.57 fps)

Pond P-2: Deep sump CB#2

Summary for Pond P-3: Deep sump CB#3

Inflow Area = 0.156 ac, 93.23% Impervious, Inflow Depth = 3.79" for 10 Year event
 Inflow = 0.88 cfs @ 11.97 hrs, Volume= 0.049 af
 Outflow = 0.88 cfs @ 11.97 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.88 cfs @ 11.97 hrs, Volume= 0.049 af
 Routed to Pond P-2 : Deep sump CB#2

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 421.05' @ 11.97 hrs Surf.Area= 13 sf Storage= 7 cf

Flood Elev= 423.50' Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= 0.5 min calculated for 0.049 af (100% of inflow)

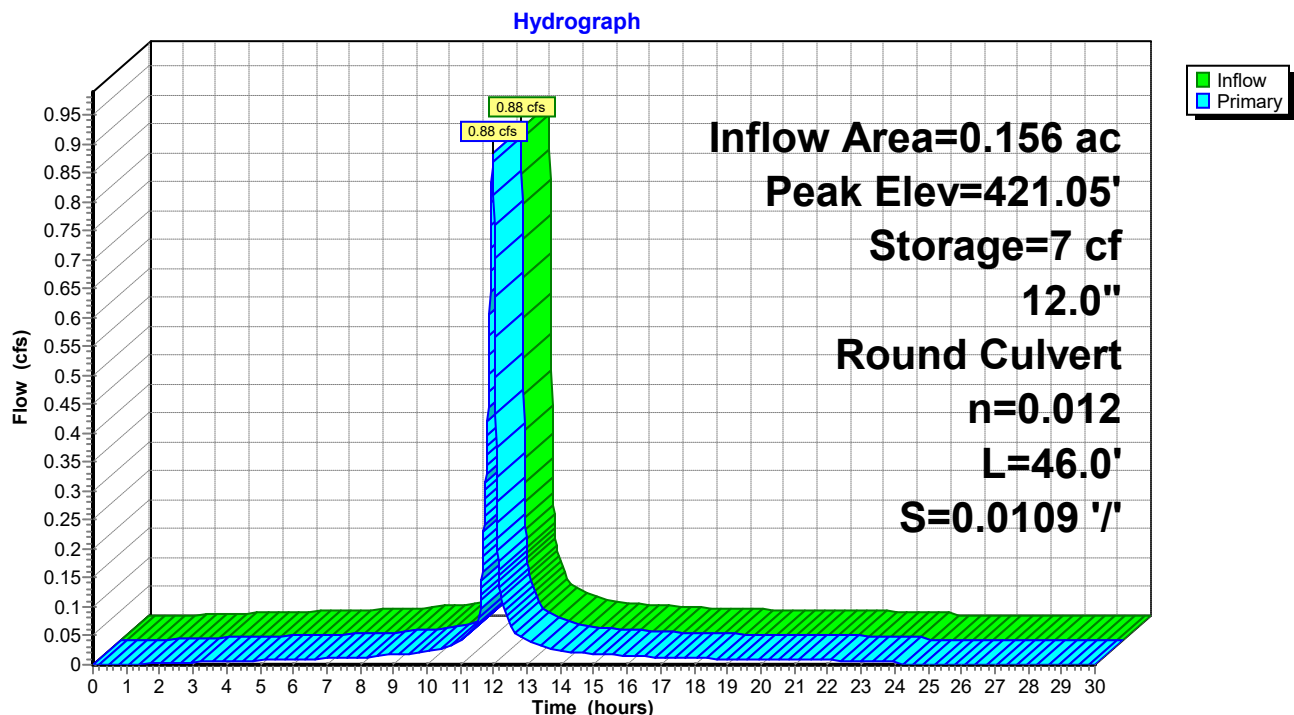
Center-of-Mass det. time= 0.5 min (747.7 - 747.1)

Volume	Invert	Avail.Storage	Storage Description
#1	420.50'	38 cf	4.00'D x 3.00'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	420.50'	12.0" Round 12" hdpe L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 420.50' / 420.00' S= 0.0109 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.88 cfs @ 11.97 hrs HW=421.05' (Free Discharge)

←1=12" hdpe (Inlet Controls 0.88 cfs @ 1.99 fps)

Pond P-3: Deep sump CB#3

Summary for Pond P-4: Oil water seperator

[79] Warning: Submerged Pond P-2 Primary device # 1 INLET by 0.08'

Inflow Area = 0.255 ac, 95.87% Impervious, Inflow Depth = 3.73" for 10 Year event
 Inflow = 1.12 cfs @ 11.97 hrs, Volume= 0.079 af
 Outflow = 1.12 cfs @ 11.97 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.2 min
 Primary = 1.12 cfs @ 11.97 hrs, Volume= 0.076 af
 Routed to Pond P-5 : Bio retention basin

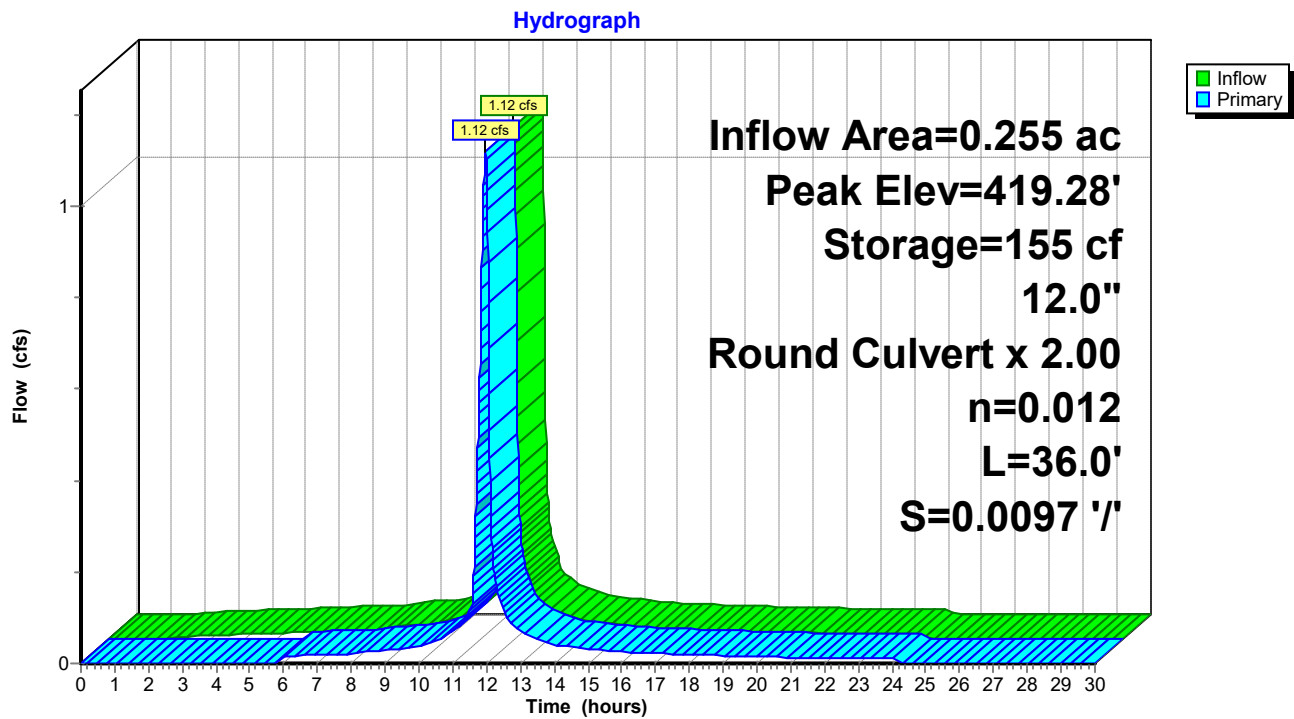
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 419.28' @ 11.97 hrs Surf.Area= 47 sf Storage= 155 cf
 Flood Elev= 424.00' Surf.Area= 47 sf Storage= 197 cf

Plug-Flow detention time= 45.7 min calculated for 0.076 af (96% of inflow)
 Center-of-Mass det. time= 21.1 min (771.6 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1	416.00'	90 cf	5.30'D x 4.10'H Chamber 1
#2	416.00'	90 cf	5.30'D x 4.10'H Chamber 2
#3	416.00'	16 cf	2.00'D x 5.10'H Chamber 3
		197 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	418.85'	12.0" Round 8" hdpe X 2.00 L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 418.85' / 418.50' S= 0.0097 ' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.11 cfs @ 11.97 hrs HW=419.27' (Free Discharge)
 ↑ **1=8" hdpe** (Inlet Controls 1.11 cfs @ 1.75 fps)

Pond P-4: Oil water seperator

Summary for Pond P-5: Bio retention basin

[81] Warning: Exceeded Pond P-2 by 2.30' @ 24.34 hrs

[81] Warning: Exceeded Pond P-4 by 2.64' @ 24.38 hrs

Inflow Area = 0.288 ac, 84.95% Impervious, Inflow Depth = 3.32" for 10 Year event
 Inflow = 1.49 cfs @ 11.97 hrs, Volume= 0.080 af
 Outflow = 1.47 cfs @ 11.98 hrs, Volume= 0.063 af, Atten= 1%, Lag= 0.8 min
 Discarded = 0.01 cfs @ 11.98 hrs, Volume= 0.009 af
 Primary = 1.46 cfs @ 11.98 hrs, Volume= 0.054 af

Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 421.65' @ 11.98 hrs Surf.Area= 828 sf Storage= 954 cf

Flood Elev= 422.00' Surf.Area= 982 sf Storage= 1,241 cf

Plug-Flow detention time= 168.7 min calculated for 0.063 af (79% of inflow)

Center-of-Mass det. time= 86.8 min (857.1 - 770.2)

Volume	Invert	Avail.Storage	Storage Description
#1	415.50'	18 cf	stone (Irregular) Listed below (Recalc) 45 cf Overall x 40.0% Voids
#2	416.50'	18 cf	Bio-media (Irregular) Listed below (Recalc) 90 cf Overall x 20.0% Voids
#3	418.50'	1,205 cf	Open water storage (Irregular) Listed below (Recalc)
		1,241 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
415.50	45	44.0	0	0	45
416.50	45	44.0	45	45	89

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
416.50	45	44.0	0	0	45
418.50	45	44.0	90	90	133

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
418.50	45	44.0	0	0	45
420.00	213	81.0	178	178	425
422.00	892	201.0	1,027	1,205	3,132

Device	Routing	Invert	Outlet Devices
#1	Primary	421.50'	10.0' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	415.50'	0.300 in/hr Exfiltration over Surface area

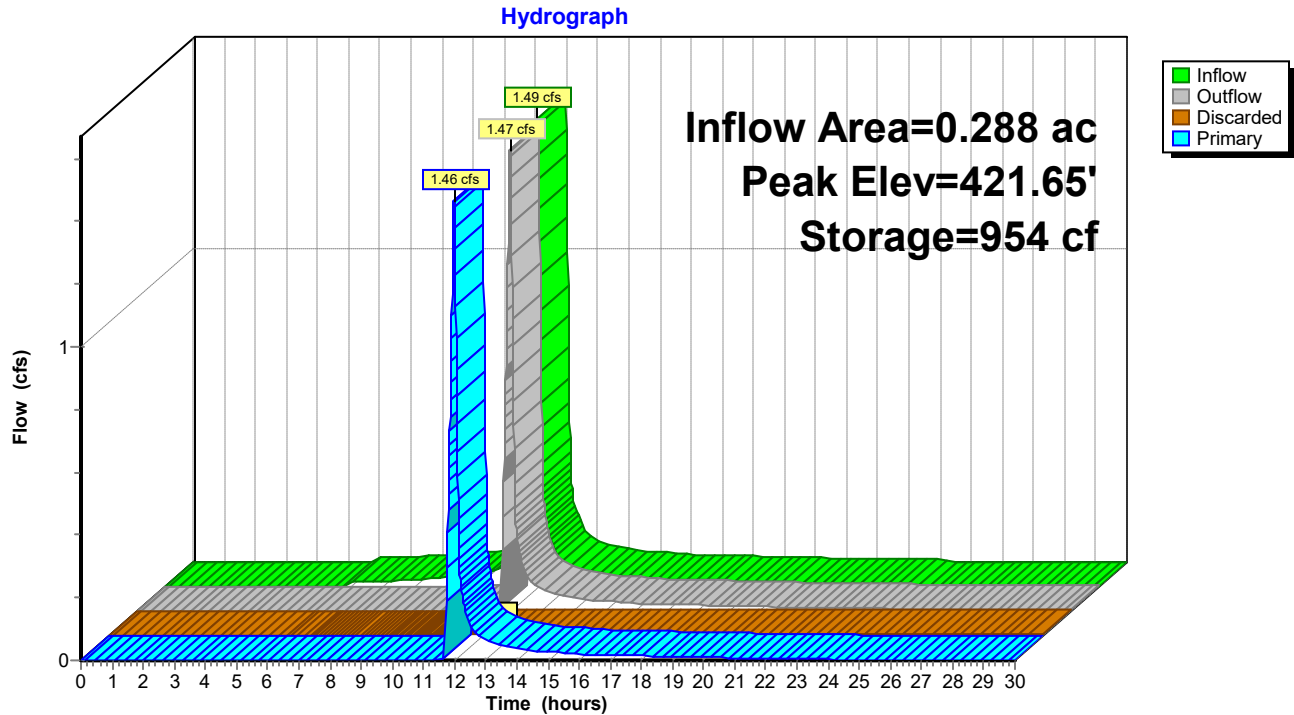
Discarded OutFlow Max=0.01 cfs @ 11.98 hrs HW=421.65' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.44 cfs @ 11.98 hrs HW=421.65' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.44 cfs @ 0.97 fps)

Pond P-5: Bio retention basin



Summary for Pond P-6: infiltration trench

Inflow Area = 0.033 ac, 100.00% Impervious, Inflow Depth = 4.05" for 10 Year event
 Inflow = 0.24 cfs @ 11.91 hrs, Volume= 0.011 af
 Outflow = 0.00 cfs @ 10.26 hrs, Volume= 0.009 af, Atten= 98%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 10.26 hrs, Volume= 0.009 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link POA1 : Point of Analysis

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 422.55' @ 14.77 hrs Surf.Area= 150 sf Storage= 273 cf
 Flood Elev= 423.50' Surf.Area= 150 sf Storage= 330 cf

Plug-Flow detention time= 427.3 min calculated for 0.009 af (79% of inflow)
 Center-of-Mass det. time= 343.4 min (1,085.1 - 741.7)

Volume	Invert	Avail.Storage	Storage Description
#1	418.00'	330 cf	Stone (Irregular) Listed below (Recalc) 825 cf Overall x 40.0% Voids

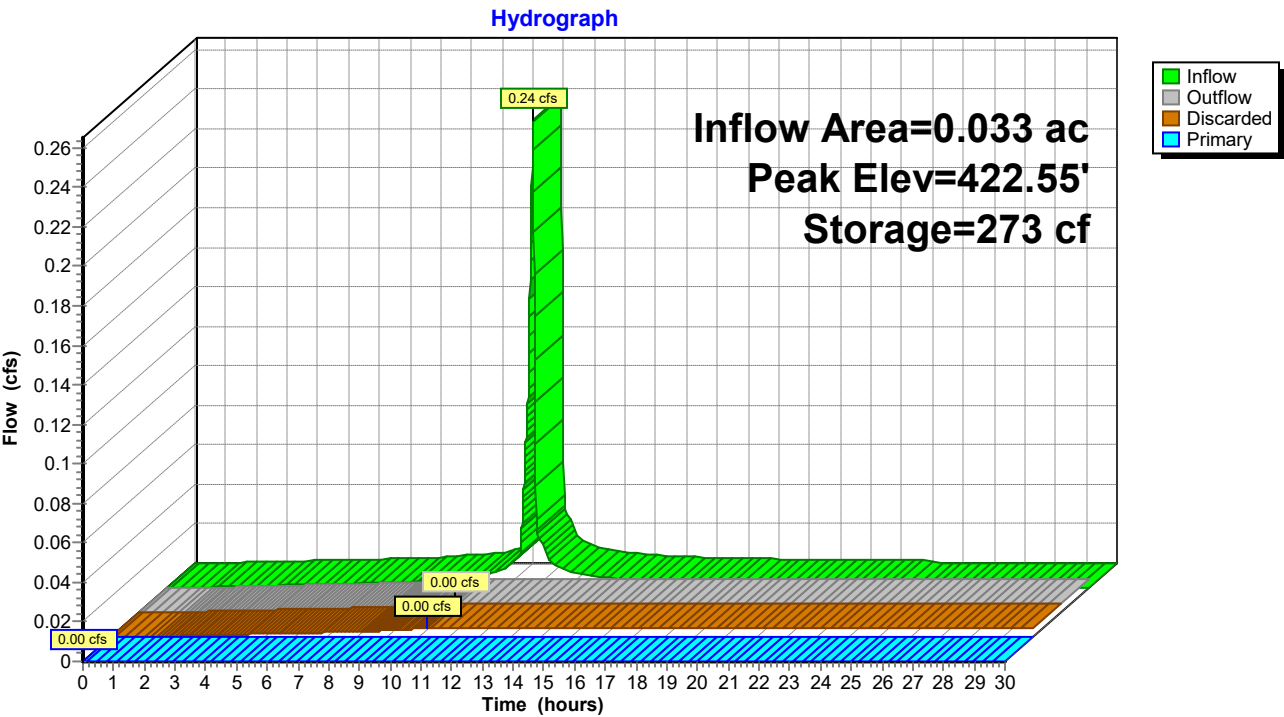
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
418.00	150	79.0	0	0	150
419.00	150	79.0	150	150	229
420.00	150	79.0	150	300	308
421.00	150	79.0	150	450	387
422.00	150	79.0	150	600	466
423.50	150	79.0	225	825	585

Device	Routing	Invert	Outlet Devices
#1	Discarded	418.00'	1.300 in/hr Exfiltration over Surface area Phase-In= 0.20'
#2	Primary	423.00'	40.0' 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

Discarded OutFlow Max=0.00 cfs @ 10.26 hrs HW=418.22' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=418.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

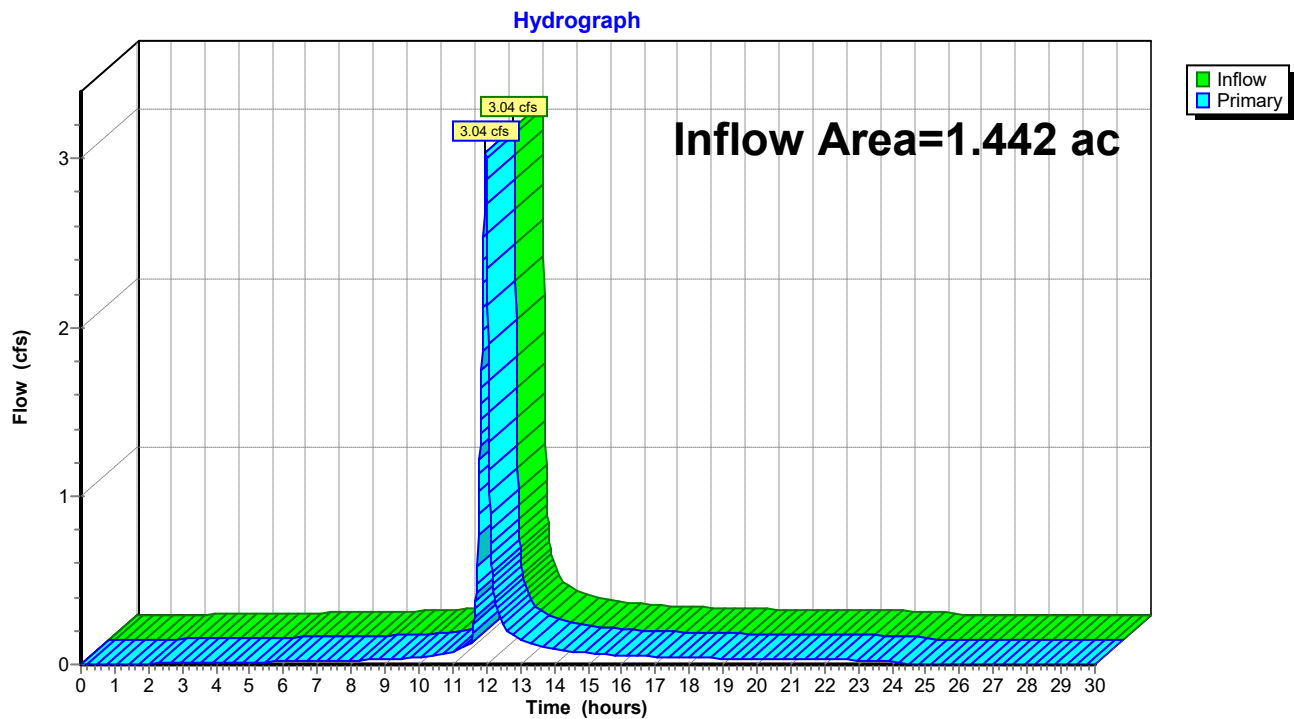
Pond P-6: infiltration trench

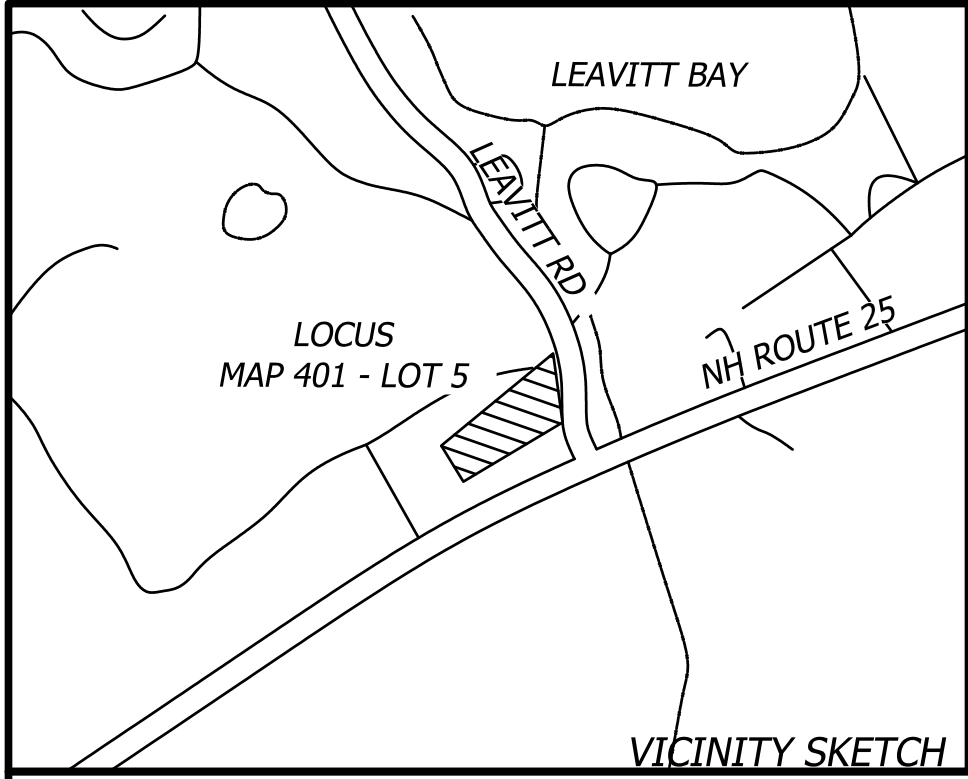


Summary for Link POA1: Point of Analysis

Inflow Area = 1.442 ac, 37.33% Impervious, Inflow Depth = 1.23" for 10 Year event
Inflow = 3.04 cfs @ 11.97 hrs, Volume= 0.147 af
Primary = 3.04 cfs @ 11.97 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link POA1: Point of Analysis



LEGEND

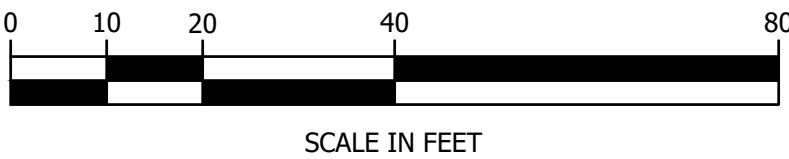
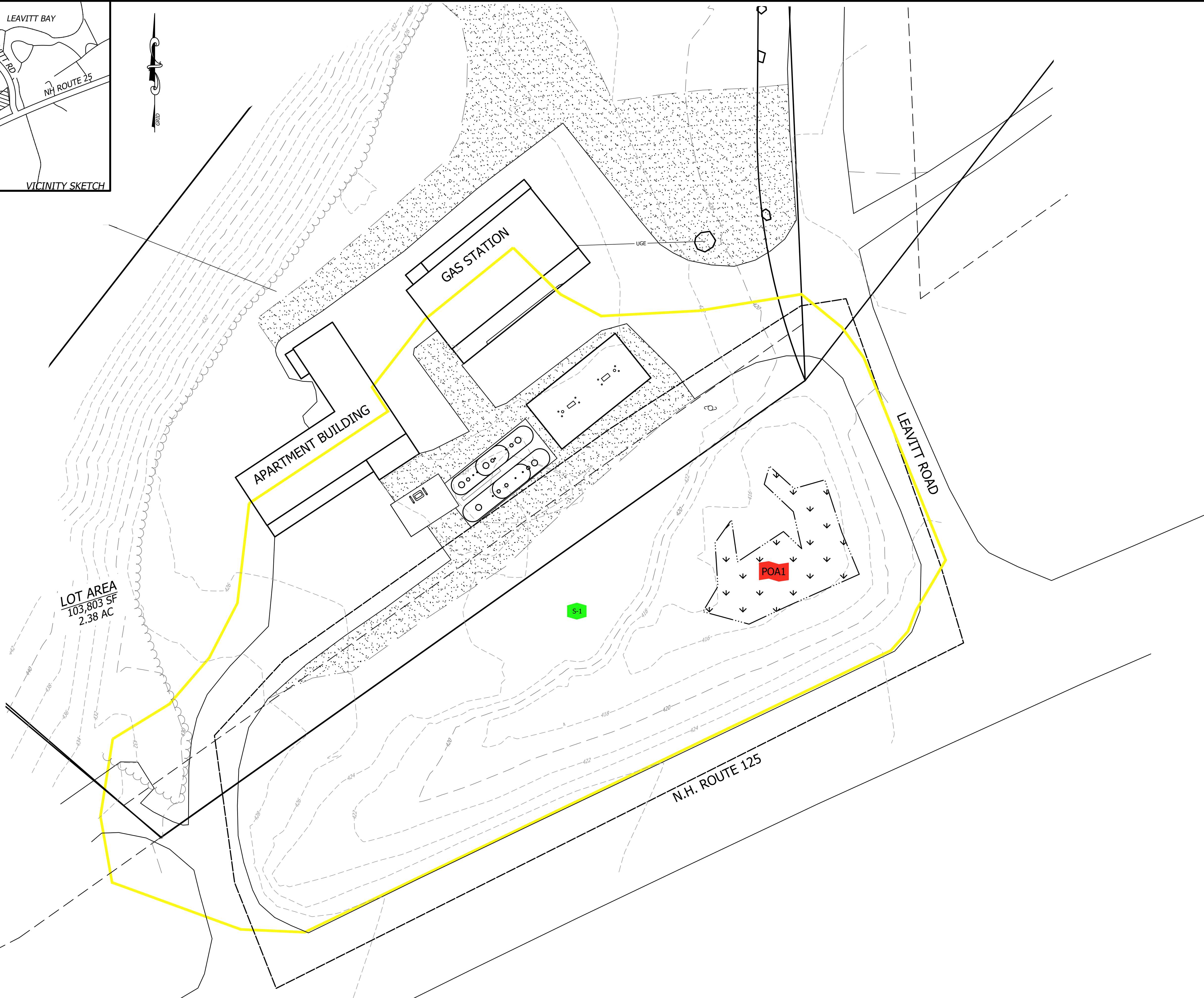
S-1

SUBCATCHMENT

POA1

POINT OF ANALYSIS

DRAINAGE AREA BOUNDARY



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MEENA LLC

41 NH ROUTE 25

EFFINGHAM, NEW HAMPSHIRE

EXISTING CONDITION DRAINAGE PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG

DATE:
7/7/22

PROJECT #:
220473

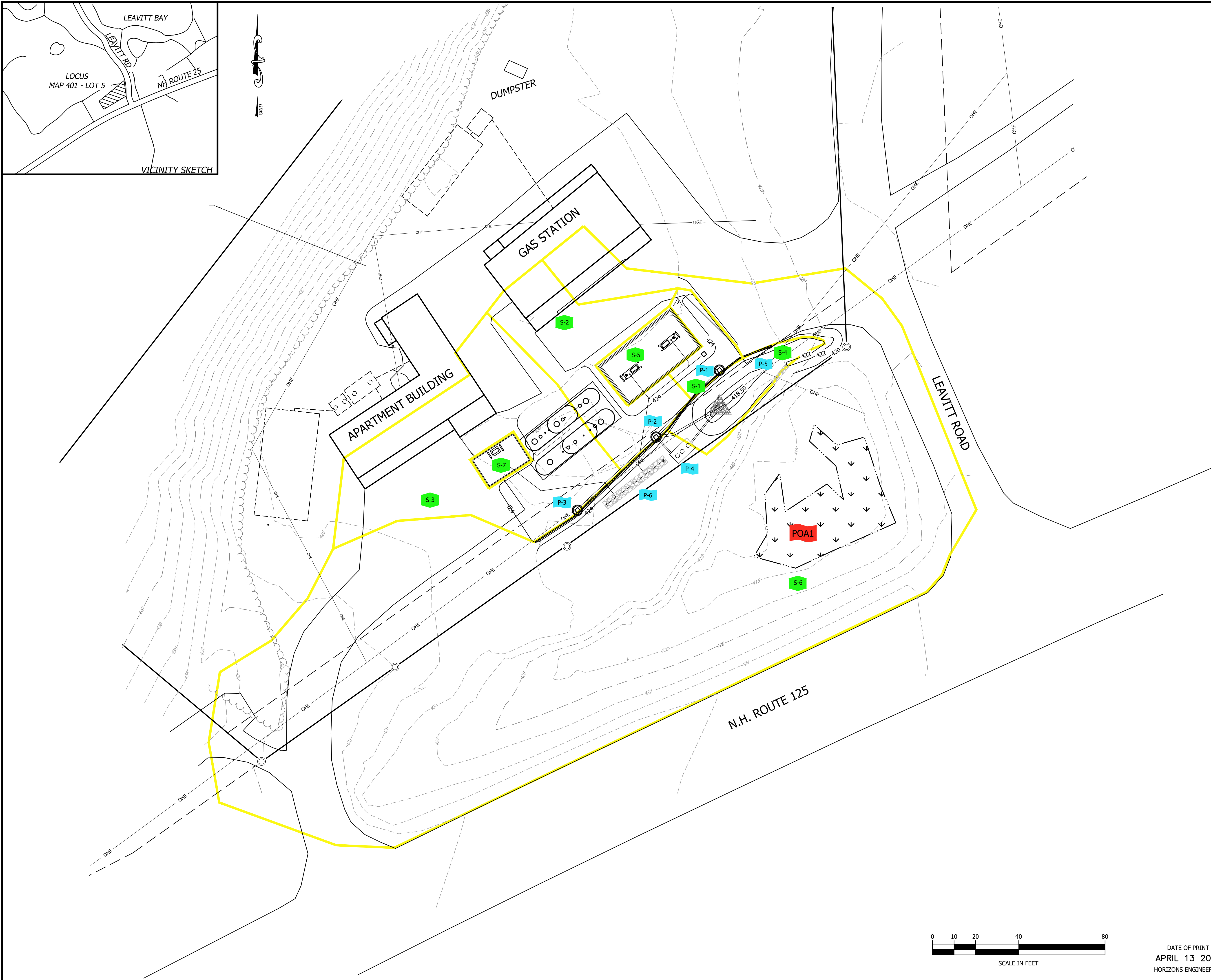
ENG'D BY:
JFH

DRAWN BY:
JFH

CHECK'D BY:
ML

ARCHIVE #:
H-___

DR 1.01



LEGEND

S-5

SUBCATCHMENT

P-2

POND

POA1

POINT OF ANALYSIS

SUBCATCHMENT BOUNDARY



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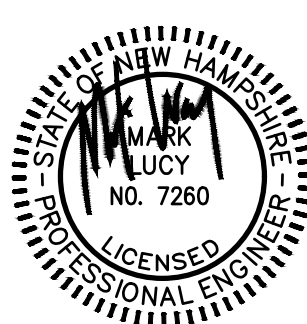
MEENA LLC

41 NH ROUTE 25

EFFINGHAM, NEW HAMPSHIRE

POST DEVELOPMENT DRAINAGE PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG
1	9/08/22	REVISED PER PEER REVIEW	JH	WWS
2	4/12/23	REVISED PER PEER REVIEW	ML	JFH



DATE: 7/7/22	PROJECT #: 220473
ENG'D BY: JFH	DRAWN BY: JFH
CHECK'D BY: ML	ARCHIVE #: H-___

DR 1.02