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STORMWATER MANAGEMENT ANALYSIS REPORT

Tiki Plaza

Tax Map 128 Block 252 Lot 3.1

64 Endicott Street

Laconia, New Hampshire

Date:

March 31, 2023

Revised: January 13, 2025

Prepared for:

Tiki Plaza LLC

34 Lucerne Ave

Laconia, New Hampshire 03246

STORMWATER MANAGEMENT REPORT
Tiki Plaza - Map: 128 Block 252 Lot: 3.1

Overview of the Project:

The Proposed Site Plan is to construct a 2,700 square foot building in the rear of the existing building located at 64 Endicott Street

Methodology

In order to take various characteristics and physical properties into account when preparing a model of actual conditions, and to better manage the numerous values and specific information for each watershed, computer aided design software was used. HydroCAD (v10.0) software was used to model specific watershed areas and provide a complete set of calculations to demonstrate the performance of these areas under a variety of conditions. The software is based on the widely accepted and practiced SCS TR-20 model and is used to develop peak rates of runoff, perform stage-storage-discharge calculations, and other hydraulic analysis for various rainfall events. All calculations are carried to the control points, which are intended to simulate a positive outfall in order to accurately compare and account for project impacts.

The analysis was performed using the 2-, 25-, and 50-year storm frequencies over a Type III 24-hour storm duration. The hydraulic conditions that result from rainfall associated with these events were analyzed for a comparison of the existing peak rate and volume of runoff to post-development conditions.

The storm event rainfall amounts are derived using the Northeast Regional Climate Center, Extreme Precipitation Tables (attached herewith) provided by Cornell University.

Evaluation of Existing Conditions

An on-ground survey was conducted by this office to obtain the existing topography in conjunction with lidar provided by UNH. The soils were mapped using the USDA Natural Recourses Conservation Service, Web Soil Survey.

The site consists of one parcel known as Tax Map 128 Block 252 Lot 3.1 located off at 64 Endicott Street, Laconia, NH. The site cover is currently mostly impervious with a consistent slope from east to west. The soils on site consist of Henniker fine sandy loam and Metacomet fine sandy loam. Both of these soils are classified as hydraulic soil group C.

The site naturally drains from east to west, running off site onto two abutting properties. A point of analysis has been created for each of the abutters. Stormwater runoff is analyzed at the subject parcel property line to ensure there is no adverse effects on the abutting properties.

STORMWATER MANAGEMENT REPORT
Tiki Plaza - Map: 128 Block 252 Lot: 3.1

Evaluation of Proposed Conditions

The proposed work to be done is the erection of a 60' x 45' (2,700 sf) garage building. The existing driveway and parking area associated with the proposed building will be regraded to ensure the stormwater overland flow will enter the proposed stormwater management basin.

The general flow direction of the stormwater flow remains unchanged from the existing condition to the proposed post construction condition.

Table 1: Summary of Flow Rates

REACH -1
Western Property Line

Storm Frequency	Pre-development Peak Flow (c.f.s)	Post-development Peak Flow (c.f.s)
2-Year	2.62	0.54
25-Year	5.31	4.25
50-Year	6.37	5.88

REACH -2
Northern Property Line

Storm Frequency	Pre-development Peak Flow (c.f.s)	Post-development Peak Flow (c.f.s)
2-Year	0.93	0.81
25-Year	2.01	1.72
50-Year	2.44	2.07

STORMWATER MANAGEMENT REPORT
Tiki Plaza - Map: 128 Block 252 Lot: 3.1

Summary

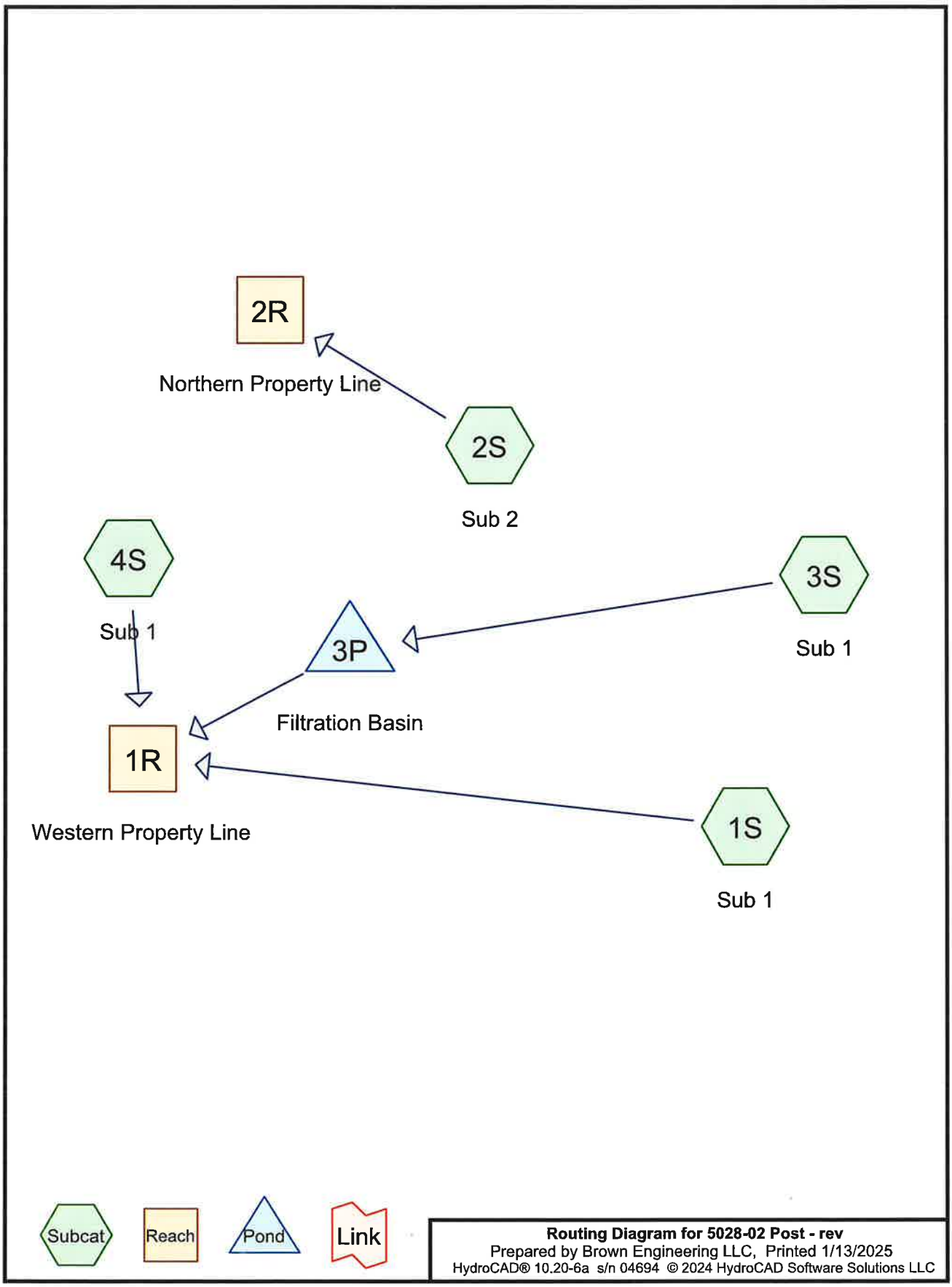
STORMWATER BASINS:

The type of stormwater basin implemented in the site design is a filtration basin. The filtration basin has been sized for the 25-year storm event and can handle a 50-year storm event without overtopping. In order to account for the slow percolation rate of the parent material, the pond has been enlarged to increase the surface area, ultimately increasing the infiltration abilities of the pond.

The proposed pond will treat the stormwater runoff and is effective in phosphorous and nitrogen load reductions. The pond will also act as a detention basin which is instrumental in the balancing of flow rates between the existing conditions and the proposed conditions.

CONCLUSION:

The proposed site development by Tiki Plaza LLC. will not create any adverse effects downstream in storm water flow rates or quality.



Routing Diagram for 5028-02 Post - rev
Prepared by Brown Engineering LLC, Printed 1/13/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	2.73	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.468	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S)
1.233	98	Impervious (1S, 2S, 3S)
1.702	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.468	HSG C	1S, 2S, 3S, 4S
0.000	HSG D	
1.233	Other	1S, 2S, 3S
1.702		**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
0.000	0.000	0.468	0.000	0.000	0.468	>75% Grass cover, Good	1S, 2S, 3S, 4S
0.000	0.000	0.000	0.000	1.233	1.233	Impervious	1S, 2S, 3S
0.000	**0.000**	**0.468**	**0.000**	**1.233**	**1.702**	**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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Sub 1 Runoff Area=10,587 sf 36.67% Impervious Runoff Depth>1.14"
Tc=6.0 min CN=83 Runoff=0.34 cfs 0.023 af

Subcatchment2S: Sub 2 Runoff Area=17,730 sf 67.54% Impervious Runoff Depth>1.63"
Tc=6.0 min CN=90 Runoff=0.81 cfs 0.055 af

Subcatchment3S: Sub 1 Runoff Area=45,163 sf 83.83% Impervious Runoff Depth>1.97"
Tc=6.0 min CN=94 Runoff=2.40 cfs 0.171 af

Subcatchment4S: Sub 1 Runoff Area=646 sf 0.00% Impervious Runoff Depth>0.67"
Tc=6.0 min CN=74 Runoff=0.01 cfs 0.001 af

Reach 1R: Western Property Line Inflow=0.54 cfs 0.102 af
Outflow=0.54 cfs 0.102 af

Reach 2R: Northern Property Line Inflow=0.81 cfs 0.055 af
Outflow=0.81 cfs 0.055 af

Pond 3P: Filtration Basin Peak Elev=718.93' Storage=3,948 cf Inflow=2.40 cfs 0.171 af
Discarded=0.04 cfs 0.032 af Primary=0.44 cfs 0.078 af Outflow=0.48 cfs 0.109 af

Total Runoff Area = 1.702 ac Runoff Volume = 0.250 af Average Runoff Depth = 1.76"
27.53% Pervious = 0.468 ac 72.47% Impervious = 1.233 ac

Summary for Subcatchment 1S: Sub 1

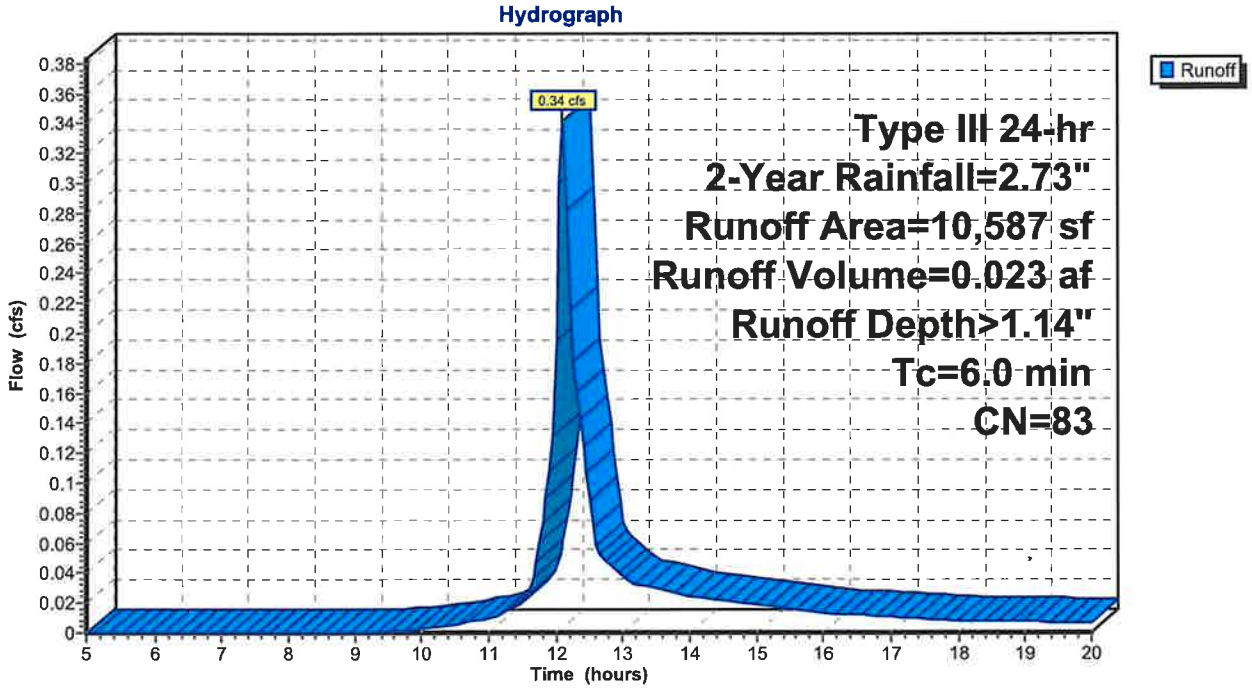
Runoff = 0.34 cfs @ 12.10 hrs, Volume= 0.023 af, Depth> 1.14"
Routed to Reach 1R : Western Property Line

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 2-Year Rainfall=2.73"

	Area (sf)	CN	Description
*	3,882	98	Impervious
	6,705	74	>75% Grass cover, Good, HSG C
	10,587	83	Weighted Average
	6,705		63.33% Pervious Area
	3,882		36.67% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

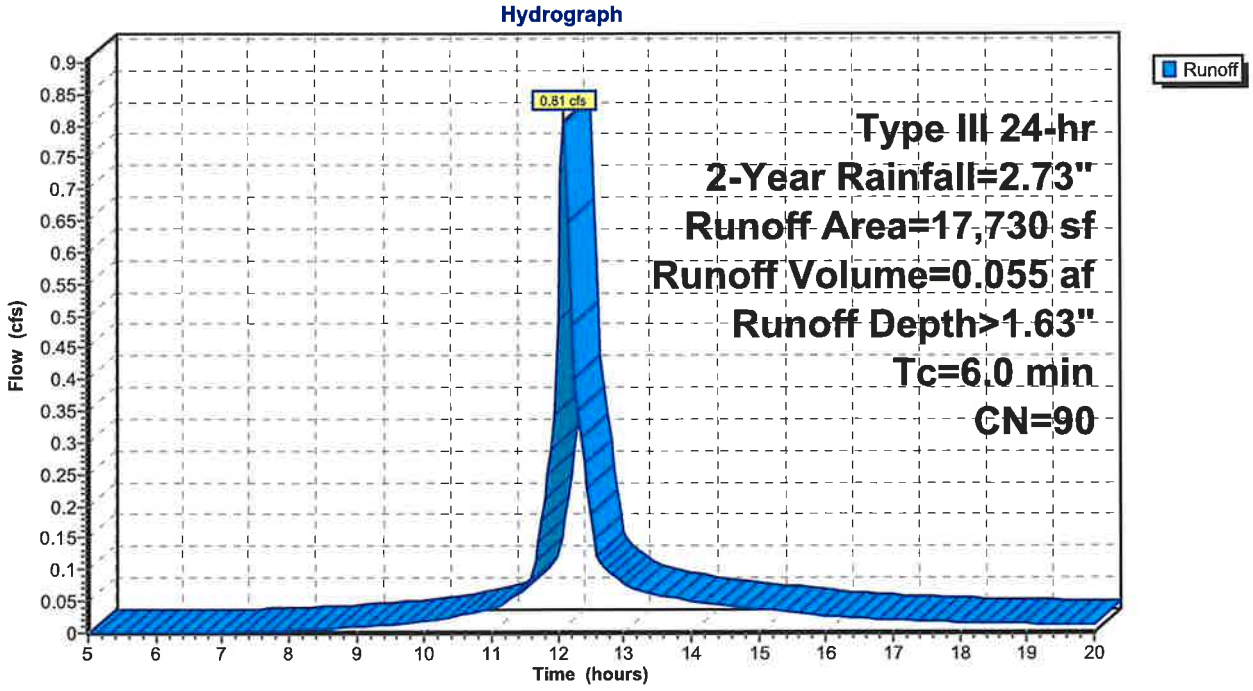
Runoff = 0.81 cfs @ 12.09 hrs, Volume= 0.055 af, Depth> 1.63"
Routed to Reach 2R : Northern Property Line

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 2-Year Rainfall=2.73"

	Area (sf)	CN	Description
*	11,975	98	Impervious
	5,755	74	>75% Grass cover, Good, HSG C
	17,730	90	Weighted Average
	5,755		32.46% Pervious Area
	11,975		67.54% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 1

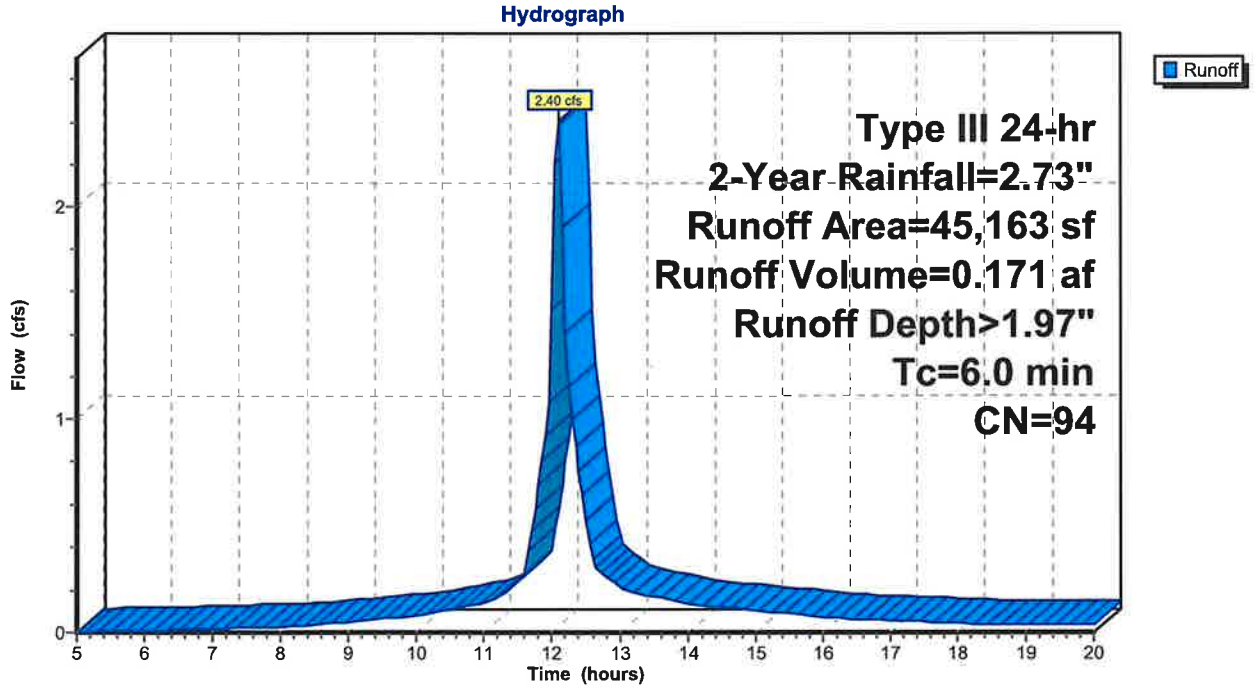
Runoff = 2.40 cfs @ 12.09 hrs, Volume= 0.171 af, Depth> 1.97"
Routed to Pond 3P : Filtration Basin

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 2-Year Rainfall=2.73"

	Area (sf)	CN	Description
*	37,862	98	Impervious
	7,301	74	>75% Grass cover, Good, HSG C
	45,163	94	Weighted Average
	7,301		16.17% Pervious Area
	37,862		83.83% Impervious Area

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

Subcatchment 3S: Sub 1



Summary for Subcatchment 4S: Sub 1

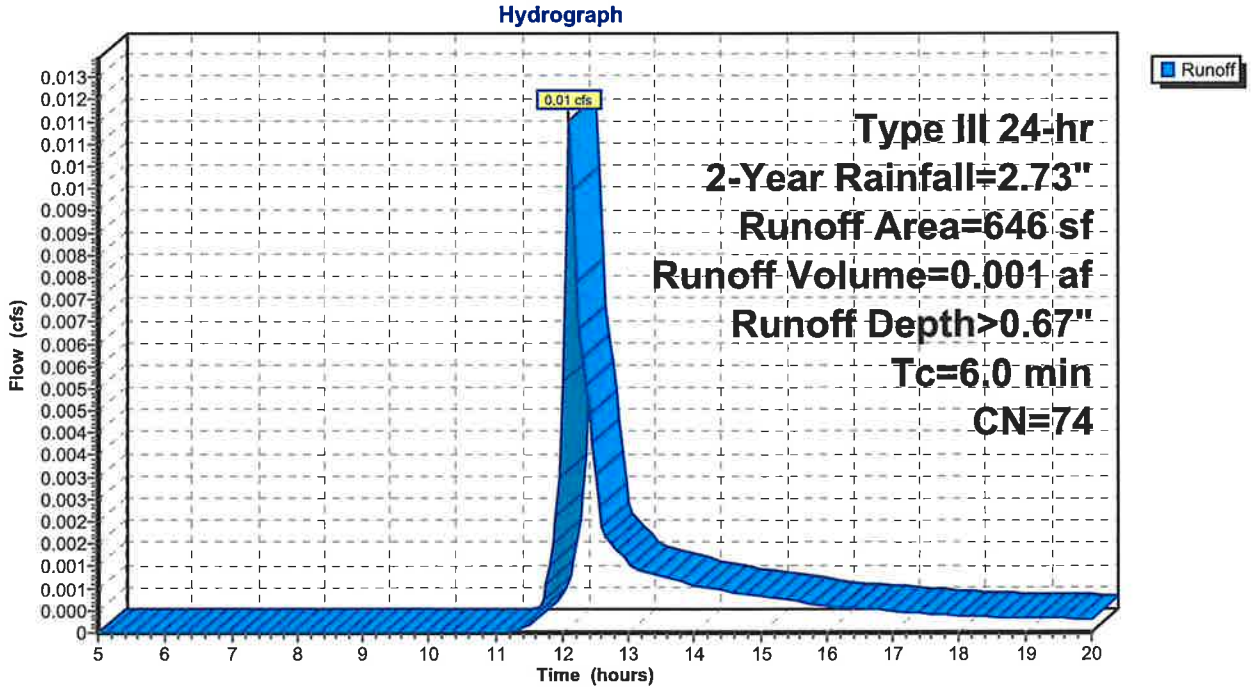
Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 0.67"
Routed to Reach 1R : Western Property Line

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 2-Year Rainfall=2.73"

Area (sf)	CN	Description
646	74	>75% Grass cover, Good, HSG C
646		100.00% Pervious Area

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

Subcatchment 4S: Sub 1



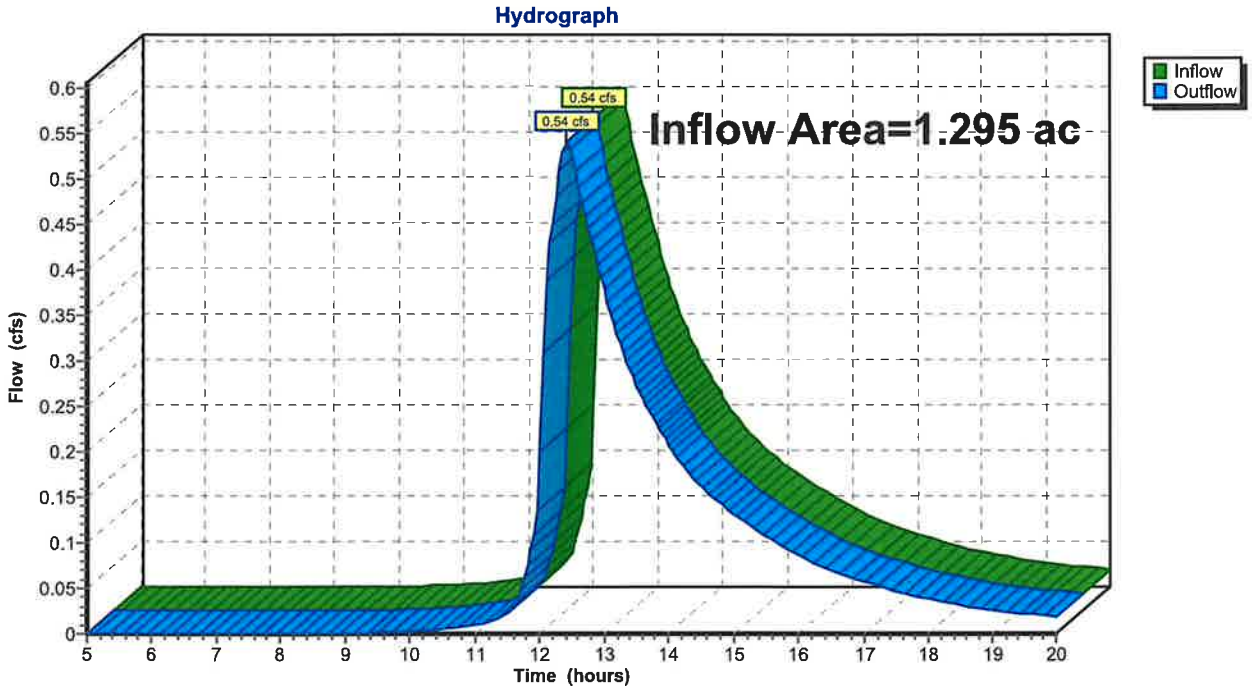
Summary for Reach 1R: Western Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.295 ac, 74.02% Impervious, Inflow Depth > 0.94" for 2-Year event
Inflow = 0.54 cfs @ 12.42 hrs, Volume= 0.102 af
Outflow = 0.54 cfs @ 12.42 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 1R: Western Property Line



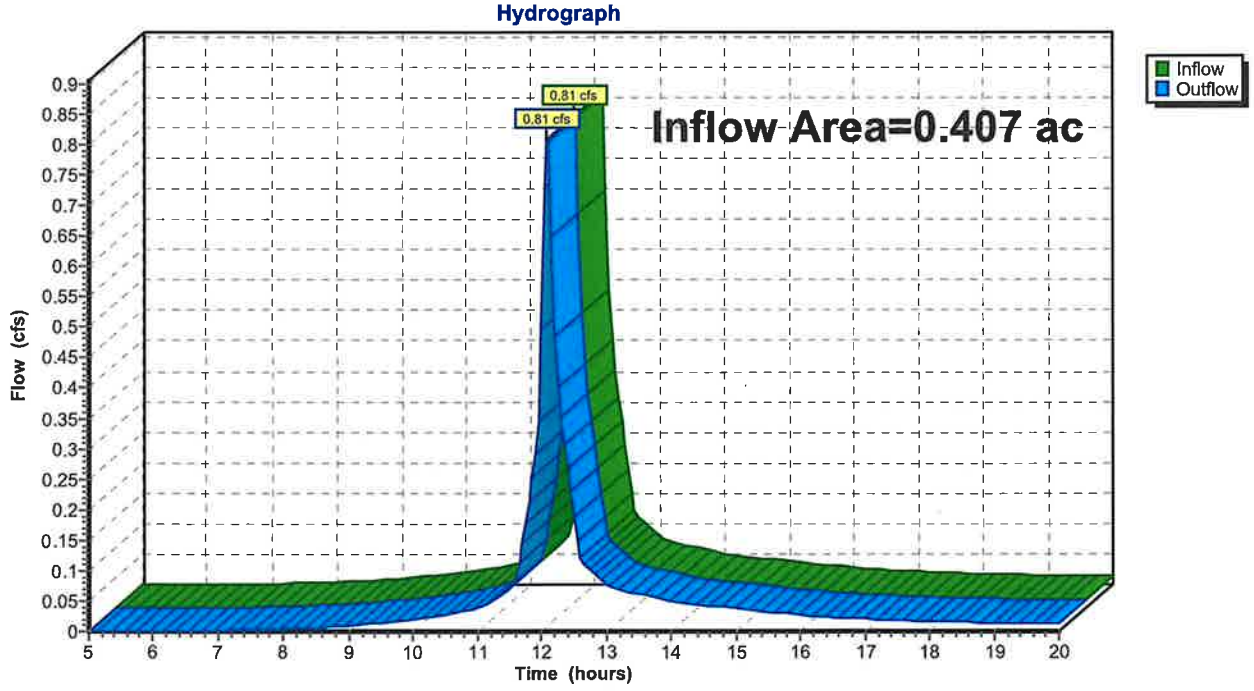
Summary for Reach 2R: Northern Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.407 ac, 67.54% Impervious, Inflow Depth > 1.63" for 2-Year event
Inflow = 0.81 cfs @ 12.09 hrs, Volume= 0.055 af
Outflow = 0.81 cfs @ 12.09 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 2R: Northern Property Line



Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.037 ac, 83.83% Impervious, Inflow Depth > 1.97" for 2-Year event
Inflow = 2.40 cfs @ 12.09 hrs, Volume= 0.171 af
Outflow = 0.48 cfs @ 12.52 hrs, Volume= 0.109 af, Atten= 80%, Lag= 26.1 min
Discarded = 0.04 cfs @ 12.52 hrs, Volume= 0.032 af
Primary = 0.44 cfs @ 12.52 hrs, Volume= 0.078 af
Routed to Reach 1R : Western Property Line

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 718.93' @ 12.52 hrs Surf.Area= 2,864 sf Storage= 3,948 cf

Plug-Flow detention time= 158.2 min calculated for 0.109 af (64% of inflow)
Center-of-Mass det. time= 87.0 min (849.3 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	5,193 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	715.50'	951 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,378 cf Overall x 40.0% Voids
		6,144 cf	Total Available Storage

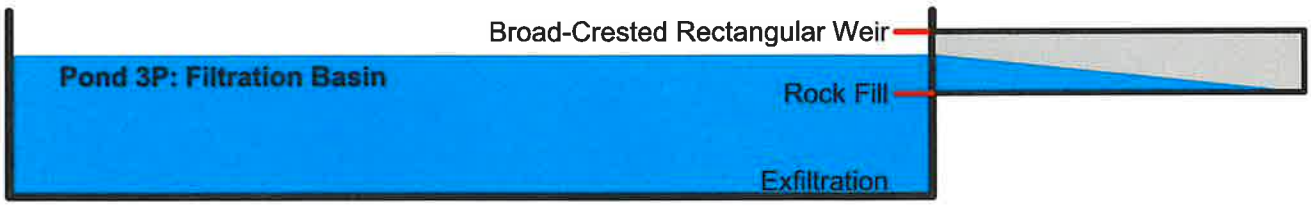
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	332	0	0
718.00	1,266	1,598	1,598
720.00	2,329	3,595	5,193

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.50	332	0	0
716.50	1,106	719	719
718.00	1,106	1,659	2,378

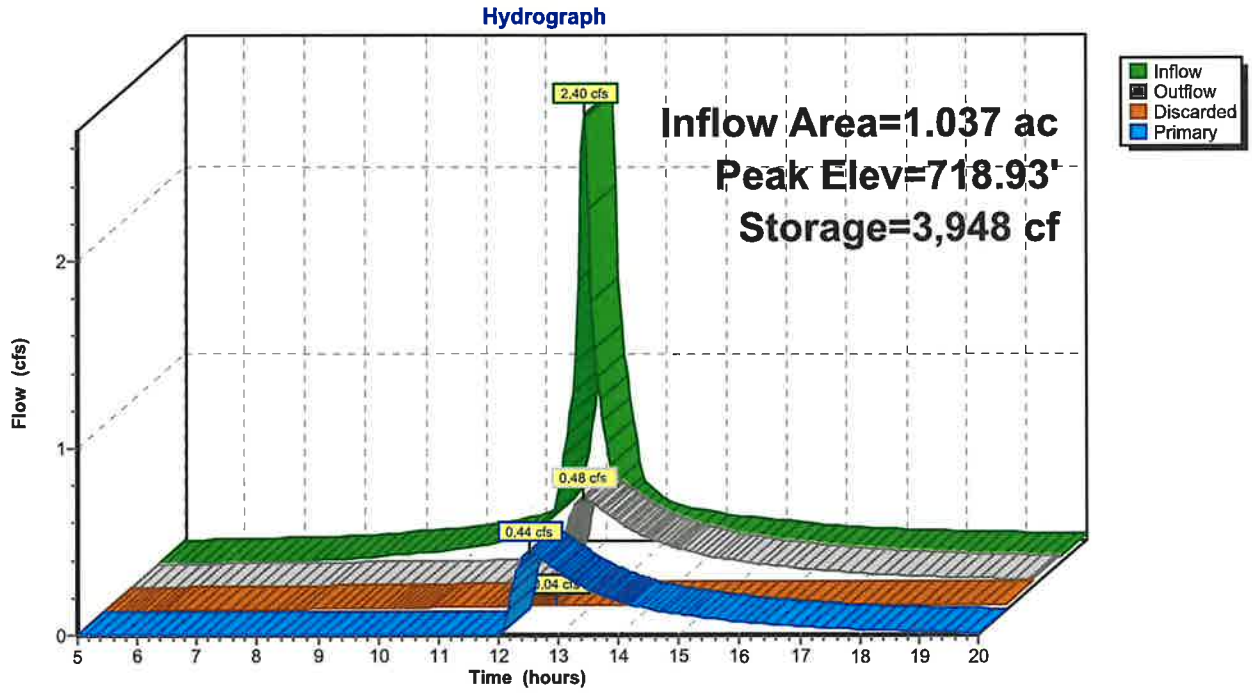
Device	Routing	Invert	Outlet Devices
#1	Discarded	715.50'	**0.600 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Primary	719.50'	**6.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (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	718.00'	**6.00' long x 11.00' breadth x 1.50' high Rock Fill** Rock Diam.= 3.000", S.D.= 2.000", Voids= 40.0%

Discarded OutFlow Max=0.04 cfs @ 12.52 hrs HW=718.92' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.44 cfs @ 12.52 hrs HW=718.92' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
—**3=Rock Fill** (Rockfill Controls 0.44 cfs @ 0.16 fps)



Pond 3P: Filtration Basin



Summary for Subcatchment 1S: Sub 1

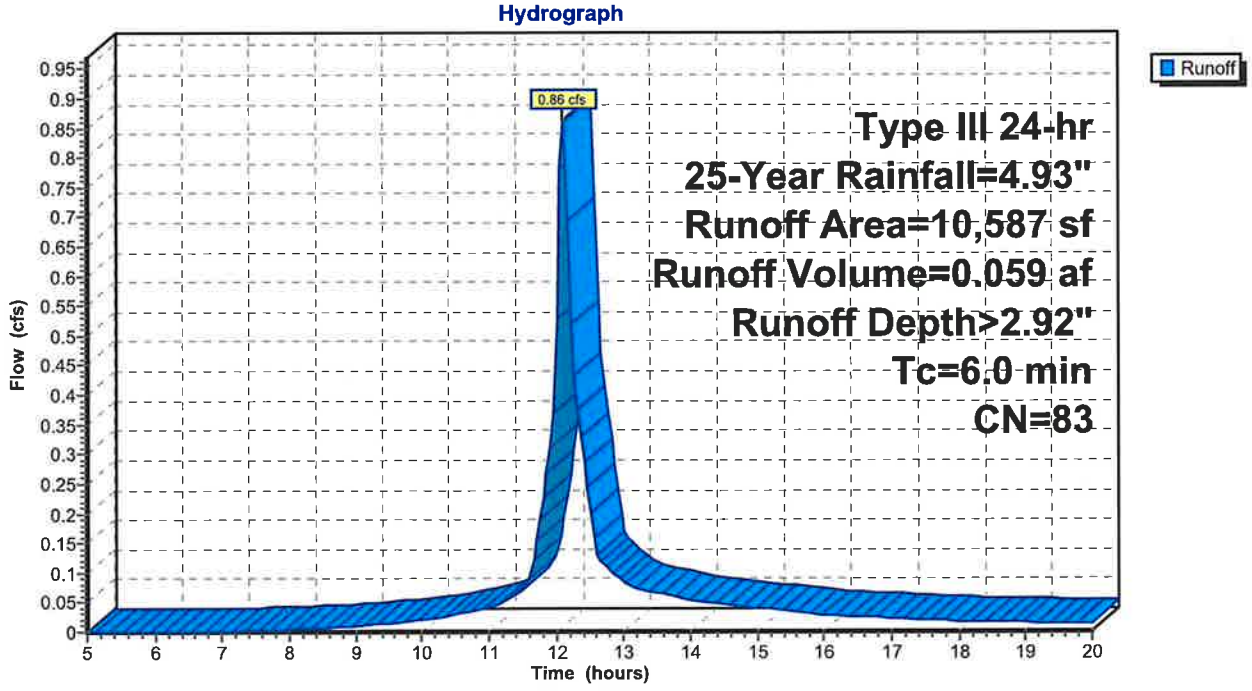
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 2.92"
Routed to Reach 1R : Western Property Line

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 25-Year Rainfall=4.93"

	Area (sf)	CN	Description
*	3,882	98	Impervious
	6,705	74	>75% Grass cover, Good, HSG C
	10,587	83	Weighted Average
	6,705		63.33% Pervious Area
	3,882		36.67% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

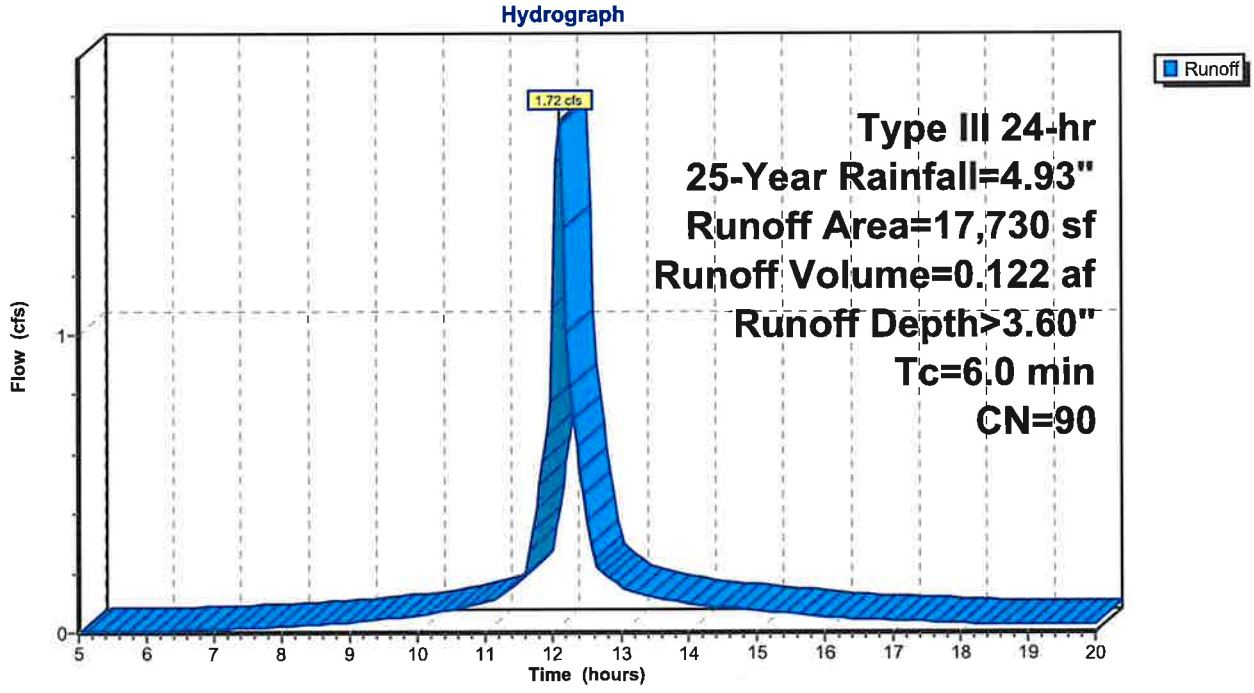
Runoff = 1.72 cfs @ 12.09 hrs, Volume= 0.122 af, Depth> 3.60"
Routed to Reach 2R : Northern Property Line

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 25-Year Rainfall=4.93"

	Area (sf)	CN	Description
*	11,975	98	Impervious
	5,755	74	>75% Grass cover, Good, HSG C
	17,730	90	Weighted Average
	5,755		32.46% Pervious Area
	11,975		67.54% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 1

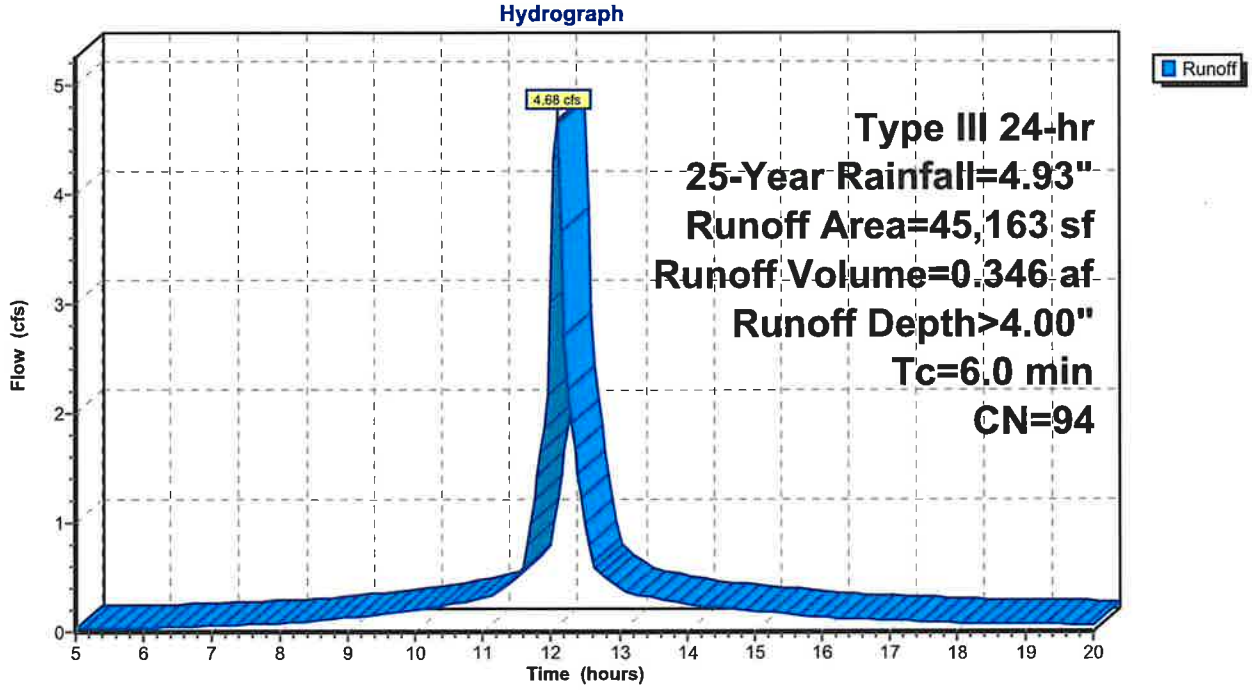
Runoff = 4.68 cfs @ 12.09 hrs, Volume= 0.346 af, Depth> 4.00"
Routed to Pond 3P : Filtration Basin

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 25-Year Rainfall=4.93"

	Area (sf)	CN	Description
*	37,862	98	Impervious
	7,301	74	>75% Grass cover, Good, HSG C
	45,163	94	Weighted Average
	7,301		16.17% Pervious Area
	37,862		83.83% Impervious Area

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

Subcatchment 3S: Sub 1



Summary for Subcatchment 4S: Sub 1

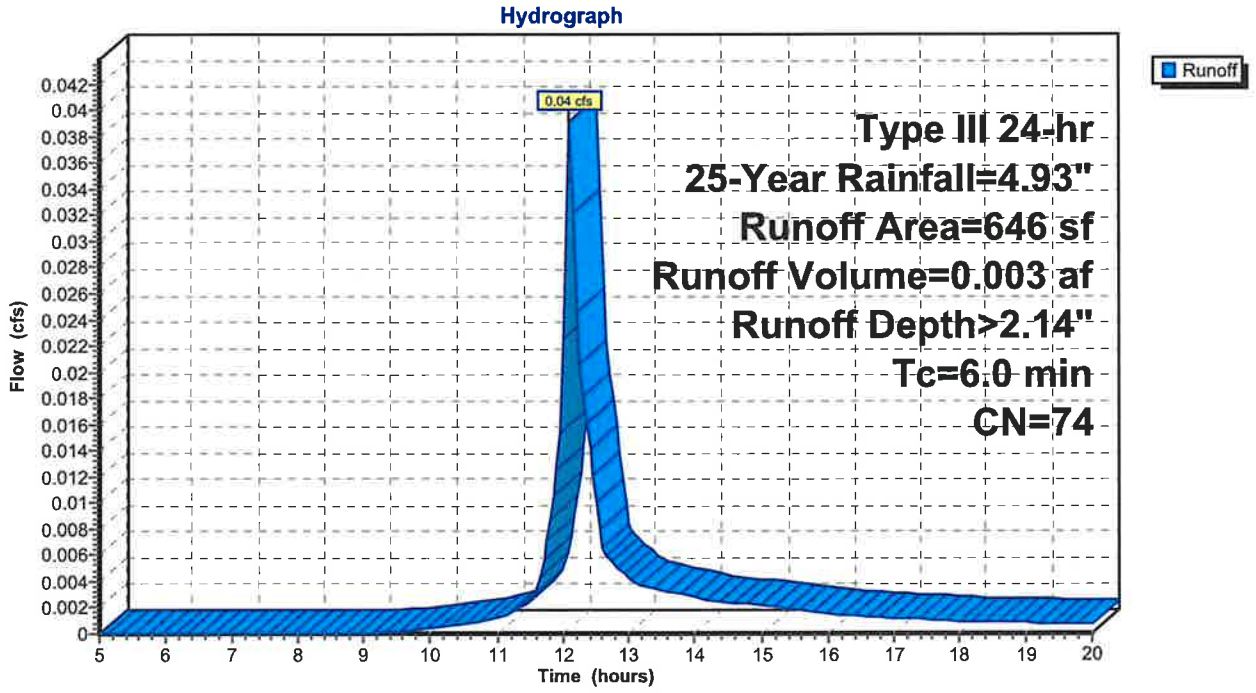
Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth> 2.14"
Routed to Reach 1R : Western Property Line

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 25-Year Rainfall=4.93"

Area (sf)	CN	Description
646	74	>75% Grass cover, Good, HSG C
646		100.00% Pervious Area

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

Subcatchment 4S: Sub 1



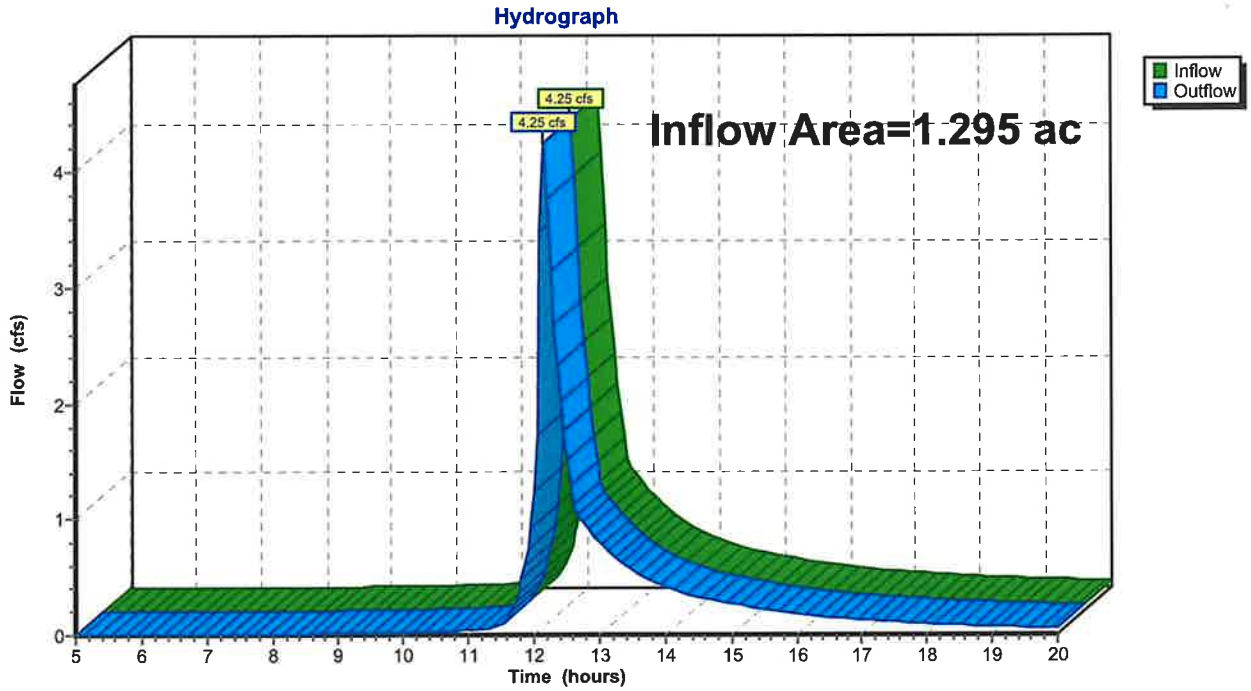
Summary for Reach 1R: Western Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.295 ac, 74.02% Impervious, Inflow Depth > 2.82" for 25-Year event
Inflow = 4.25 cfs @ 12.16 hrs, Volume= 0.305 af
Outflow = 4.25 cfs @ 12.16 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 1R: Western Property Line



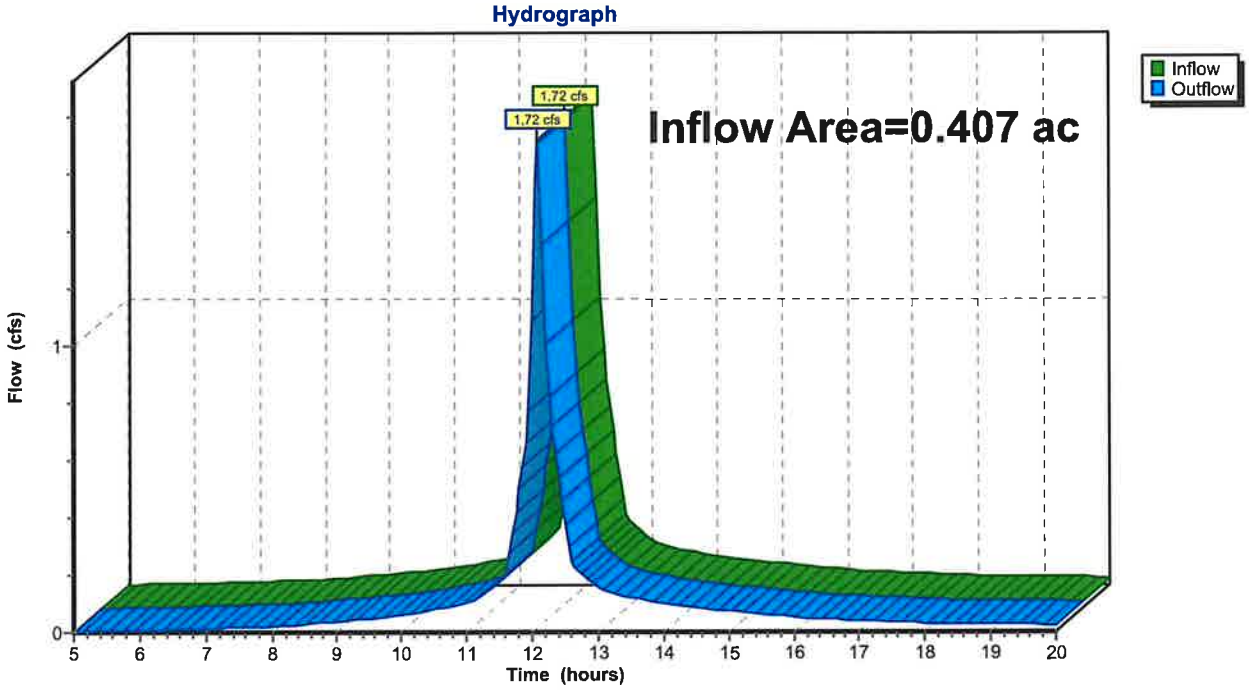
Summary for Reach 2R: Northern Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.407 ac, 67.54% Impervious, Inflow Depth > 3.60" for 25-Year event
Inflow = 1.72 cfs @ 12.09 hrs, Volume= 0.122 af
Outflow = 1.72 cfs @ 12.09 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 2R: Northern Property Line



Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.037 ac, 83.83% Impervious, Inflow Depth > 4.00" for 25-Year event
Inflow = 4.68 cfs @ 12.09 hrs, Volume= 0.346 af
Outflow = 3.60 cfs @ 12.16 hrs, Volume= 0.281 af, Atten= 23%, Lag= 4.5 min
Discarded = 0.05 cfs @ 12.16 hrs, Volume= 0.038 af
Primary = 3.56 cfs @ 12.16 hrs, Volume= 0.243 af
Routed to Reach 1R : Western Property Line

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 719.81' @ 12.16 hrs Surf.Area= 3,334 sf Storage= 5,710 cf

Plug-Flow detention time= 115.3 min calculated for 0.280 af (81% of inflow)
Center-of-Mass det. time= 64.2 min (812.7 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	5,193 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	715.50'	951 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
			2,378 cf Overall x 40.0% Voids
		6,144 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	332	0	0
718.00	1,266	1,598	1,598
720.00	2,329	3,595	5,193

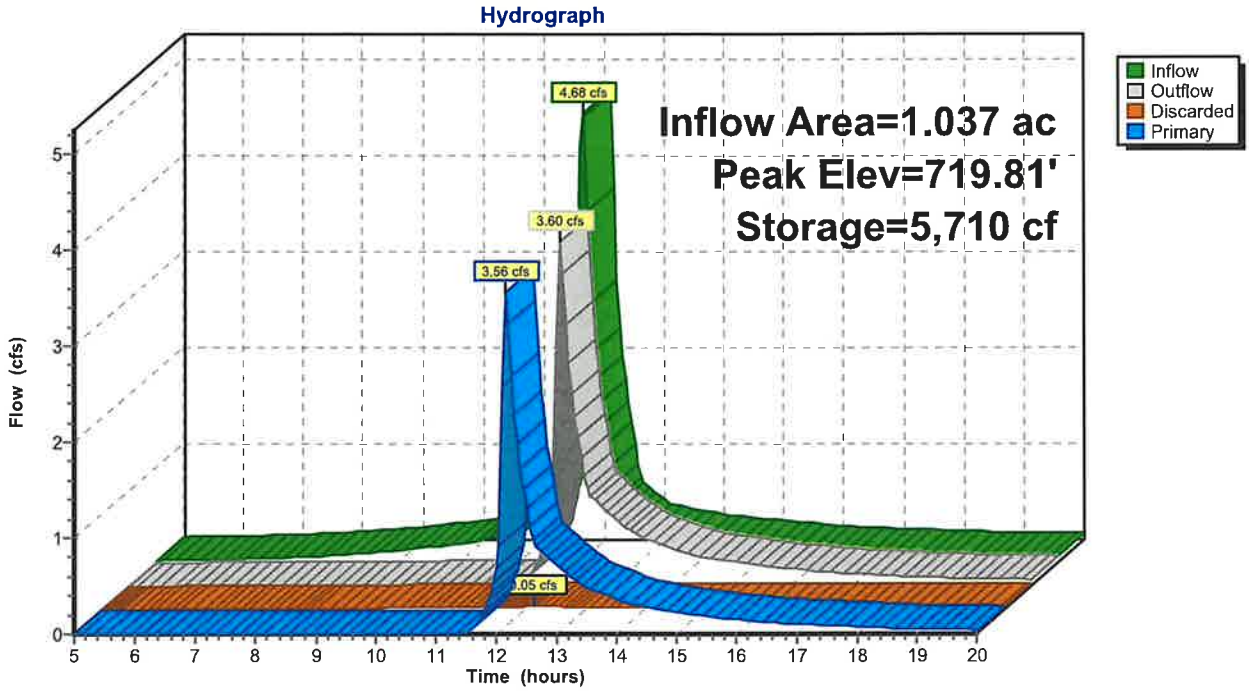
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.50	332	0	0
716.50	1,106	719	719
718.00	1,106	1,659	2,378

Device	Routing	Invert	Outlet Devices
#1	Discarded	715.50'	**0.600 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Primary	719.50'	**6.0' 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	718.00'	**6.00' long x 11.00' breadth x 1.50' high Rock Fill** Rock Diam.= 3.000", S.D.= 2.000", Voids= 40.0%

Discarded OutFlow Max=0.05 cfs @ 12.16 hrs HW=719.80' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=3.43 cfs @ 12.16 hrs HW=719.80' (Free Discharge)
├**2=Broad-Crested Rectangular Weir** (Weir Controls 2.43 cfs @ 1.35 fps)
└**3=Rock Fill** (Rockfill Controls 1.01 cfs @ 0.22 fps)

Pond 3P: Filtration Basin



Summary for Subcatchment 1S: Sub 1

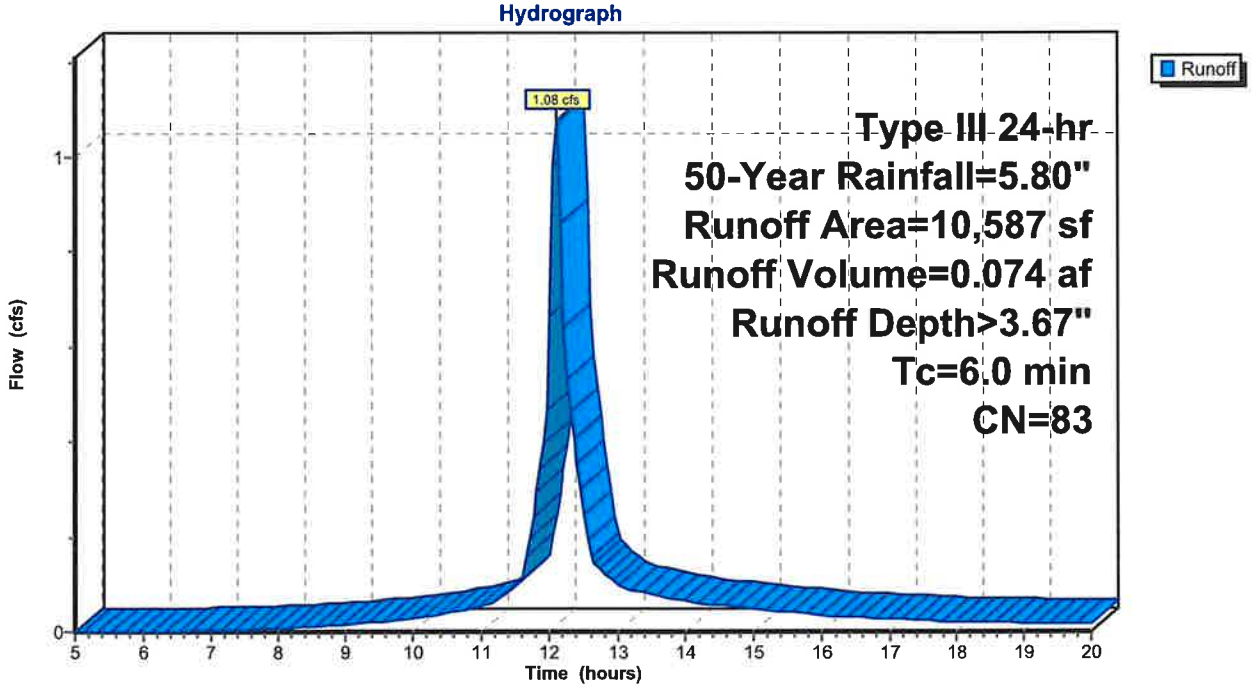
Runoff = 1.08 cfs @ 12.09 hrs, Volume= 0.074 af, Depth> 3.67"
Routed to Reach 1R : Western Property Line

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 50-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,882	98	Impervious
	6,705	74	>75% Grass cover, Good, HSG C
	10,587	83	Weighted Average
	6,705		63.33% Pervious Area
	3,882		36.67% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

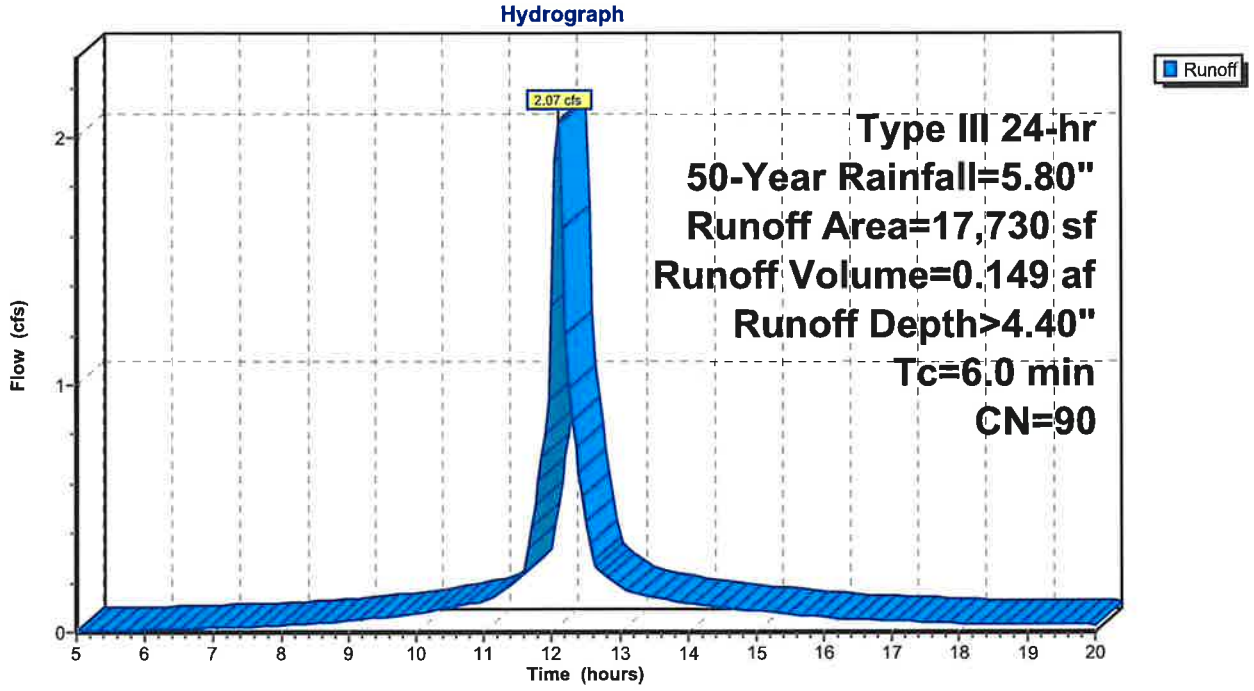
Runoff = 2.07 cfs @ 12.09 hrs, Volume= 0.149 af, Depth> 4.40"
Routed to Reach 2R : Northern Property Line

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 50-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	11,975	98	Impervious
	5,755	74	>75% Grass cover, Good, HSG C
	17,730	90	Weighted Average
	5,755		32.46% Pervious Area
	11,975		67.54% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 1

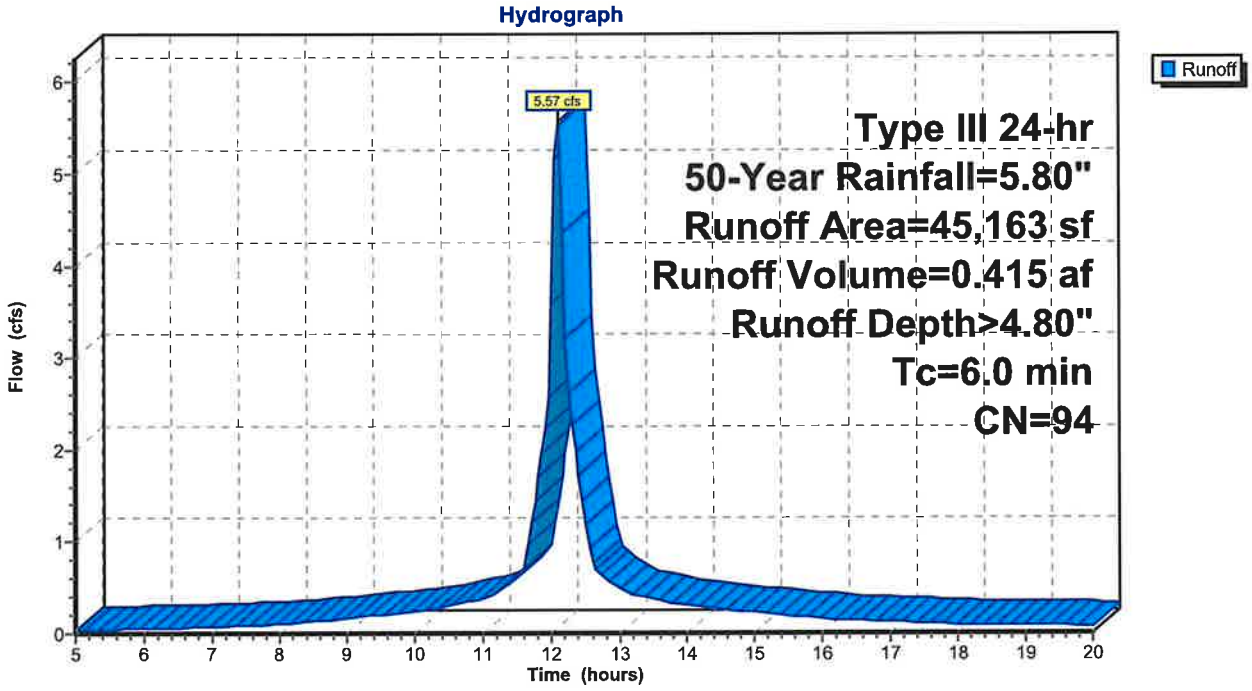
Runoff = 5.57 cfs @ 12.09 hrs, Volume= 0.415 af, Depth> 4.80"
Routed to Pond 3P : Filtration Basin

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 50-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	37,862	98	Impervious
	7,301	74	>75% Grass cover, Good, HSG C
	45,163	94	Weighted Average
	7,301		16.17% Pervious Area
	37,862		83.83% Impervious Area

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

Subcatchment 3S: Sub 1



Summary for Subcatchment 4S: Sub 1

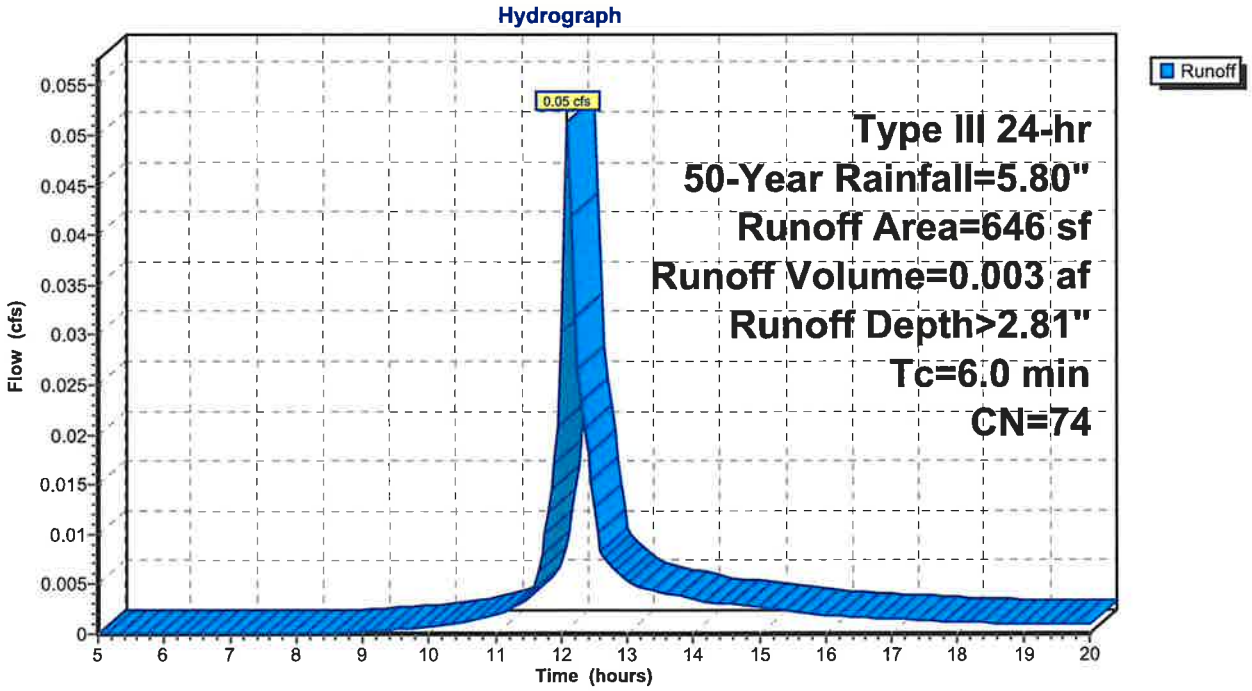
Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.003 af, Depth> 2.81"
Routed to Reach 1R : Western Property Line

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 50-Year Rainfall=5.80"

Area (sf)	CN	Description
646	74	>75% Grass cover, Good, HSG C
646		100.00% Pervious Area

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

Subcatchment 4S: Sub 1



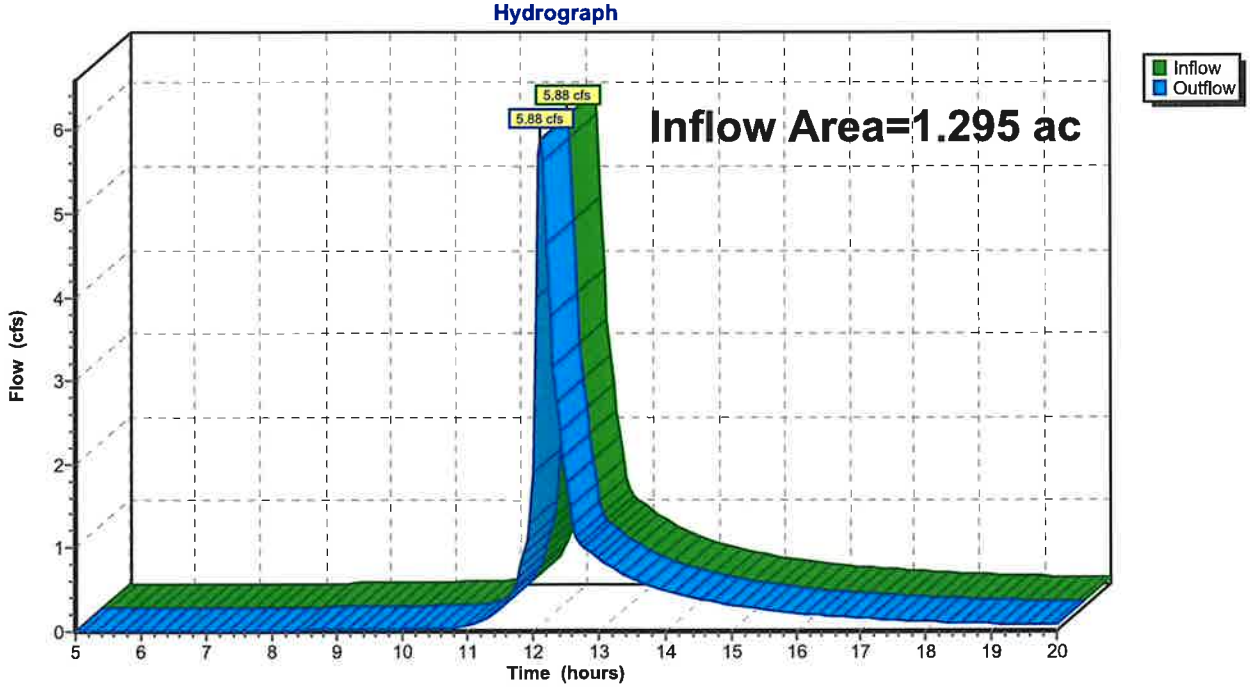
Summary for Reach 1R: Western Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.295 ac, 74.02% Impervious, Inflow Depth > 3.59" for 50-Year event
Inflow = 5.88 cfs @ 12.12 hrs, Volume= 0.388 af
Outflow = 5.88 cfs @ 12.12 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 1R: Western Property Line



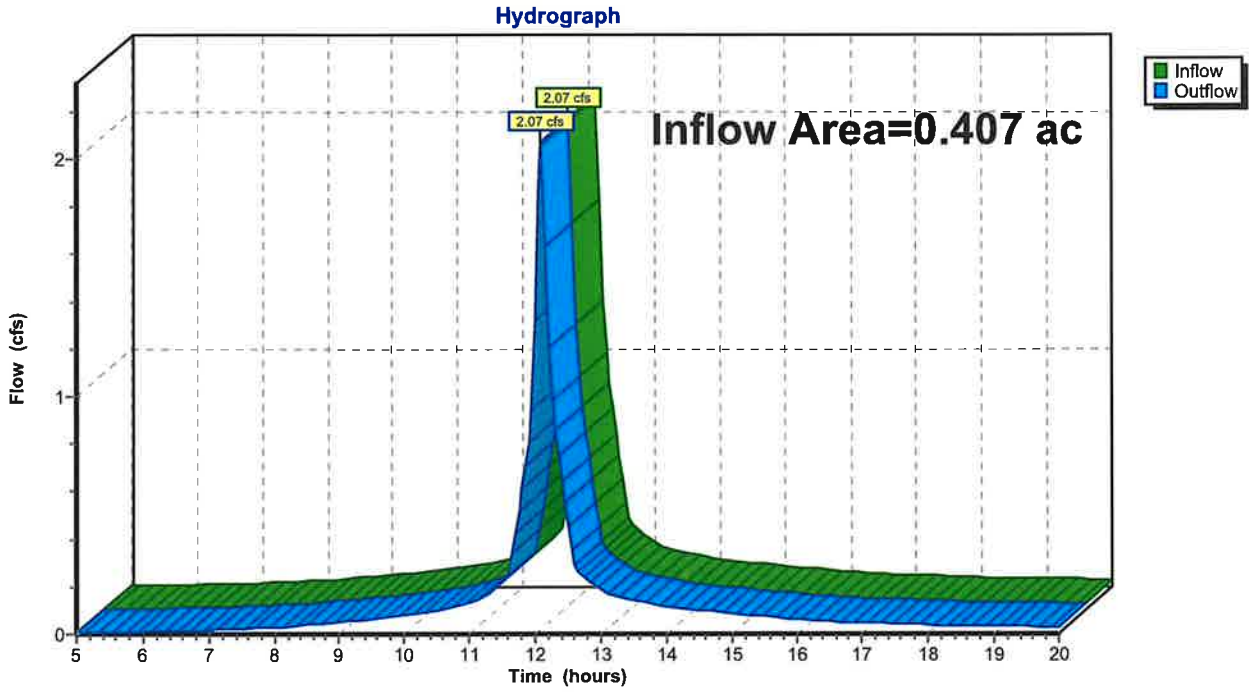
Summary for Reach 2R: Northern Property Line

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.407 ac, 67.54% Impervious, Inflow Depth > 4.40" for 50-Year event
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.149 af
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 5R

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

Reach 2R: Northern Property Line



Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.037 ac, 83.83% Impervious, Inflow Depth > 4.80" for 50-Year event
Inflow = 5.57 cfs @ 12.09 hrs, Volume= 0.415 af
Outflow = 4.82 cfs @ 12.13 hrs, Volume= 0.349 af, Atten= 13%, Lag= 2.8 min
Discarded = 0.05 cfs @ 12.13 hrs, Volume= 0.039 af
Primary = 4.78 cfs @ 12.13 hrs, Volume= 0.310 af
Routed to Reach 1R : Western Property Line

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 719.89' @ 12.13 hrs Surf.Area= 3,378 sf Storage= 5,897 cf

Plug-Flow detention time= 105.6 min calculated for 0.348 af (84% of inflow)
Center-of-Mass det. time= 59.6 min (805.3 - 745.6)

Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	5,193 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	715.50'	951 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,378 cf Overall x 40.0% Voids
		6,144 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	332	0	0
718.00	1,266	1,598	1,598
720.00	2,329	3,595	5,193

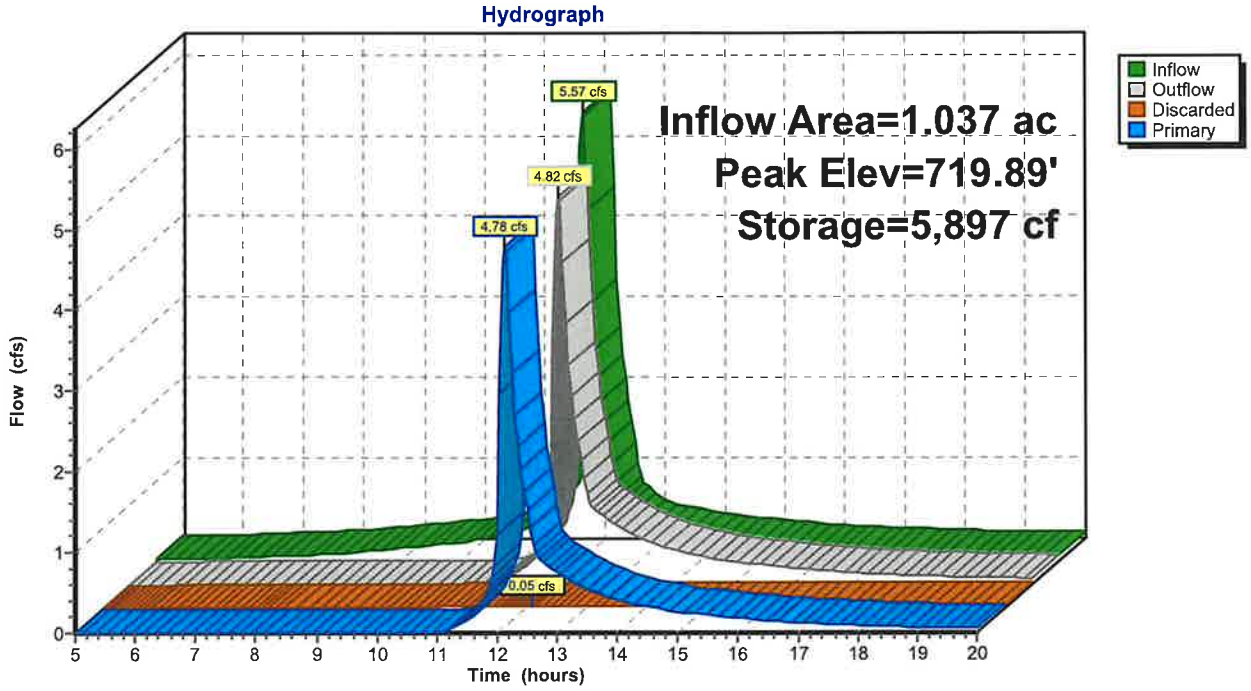
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
715.50	332	0	0
716.50	1,106	719	719
718.00	1,106	1,659	2,378

Device	Routing	Invert	Outlet Devices
#1	Discarded	715.50'	**0.600 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Primary	719.50'	**6.0' 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	718.00'	**6.00' long x 11.00' breadth x 1.50' high Rock Fill** Rock Diam.= 3.000", S.D.= 2.000", Voids= 40.0%

Discarded OutFlow Max=0.05 cfs @ 12.13 hrs HW=719.89' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=4.67 cfs @ 12.13 hrs HW=719.89' (Free Discharge)
├**2=Broad-Crested Rectangular Weir** (Weir Controls 3.64 cfs @ 1.57 fps)
└**3=Rock Fill** (Rockfill Controls 1.03 cfs @ 0.23 fps)

Pond 3P: Filtration Basin



BROWN ENGINEERING
63 West Street – P.O. Box 703, Ashland, New Hampshire, 03217
Phone (603) 744-1044
www.brownengineeringllc.com

Ethan Wood, Esq.
Normandin, Cheney & O'Neil, PLLC
213 Union Avenue
P.O.Box 575
Laconia, NH 03247

Date: July 17, 2024

RE: Tiki Plaza "New Building"
Tax Map 128 Block 252 Lot 3.1
Enicott Street North, Laconia NH

A test pit was dug today in the location of the proposed filtration basin in the rear of the Tiki Plaza lot, see attachment plan for location. The intent of the test pit was to comply with item 6 & 7 of the Pine Hollow and Tiki Plaza LLC settlement agreement, dated March 19, 2024.

Brown Engineering conducted the test pit in the presence of the property owner, Mr Gagnon, the abutter, Mr. Heavey and the abutters attorney.

The test pit data log is as follows:

0-10"
7.5yr 3-1, coarse sand texture, weak coarse structure, loose consistency
Notes: Soil was moist, fine roots to 8"
10-39"
7.5 yr 5-6, coarse sand texture, weak single grain structure, loose consistency
Notes: 10% medium gravels, evidence of fill material (asphalt)

39-84"
10 yr 3-2, fine sandy loam, moderate fine granular structure, friable consistency
Notes: apparent buried A horizon, substantial root system,

84-99"
Data not logged, excavation for evidence of water only

Depth of Pit: 8 feet 3 inches
Water Observed: NO Ledge Observed: NO ESHWT: None observed

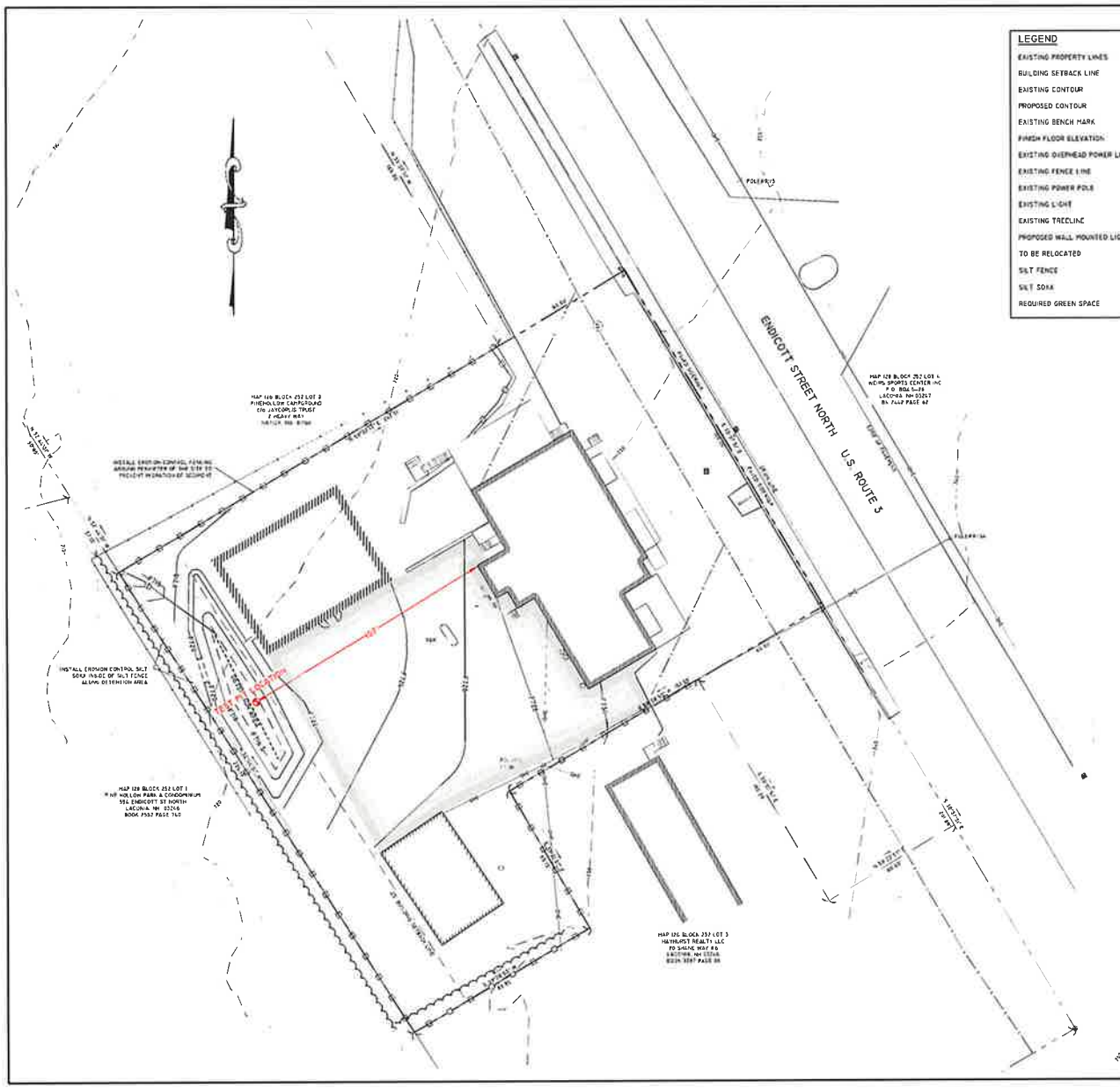
Summary:

We estimate there is approximately 3 feet of fill over native material. The fill material was very granular coarse sand. At 39" of depth, we encountered what appears to be a buried A horizon, we believe this is the virgin ground, native material. This material appeared to be consistent with the soils expected in this area, which is Henniker fine sand loam according to Natural Resources Conservation Service, Web Soil Survey. At approximately 84" in depth, the soil horizon changed and was observed from outside of the pit. The tailings indicated the material to be a fine sand.

There was no presence of water throughout the duration of the test pit. No redox features were observed coupled with the presence of a dense root system was evidence of no restrictive layer, and therefore no estimated seasonal high water table was logged.

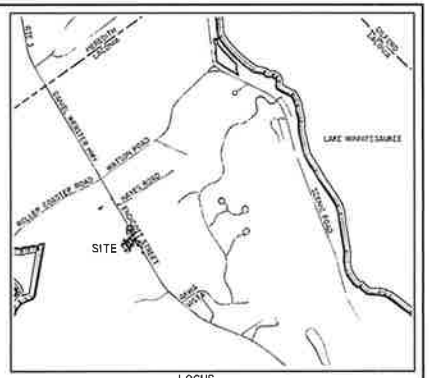
Per item 7 of the settlement agreement, there was no water observed 5 feet below the current surface elevation, and no water observed 5 feet below the original natural surface elevation.

8F
7F .6
7F .7
7F .8
7F .9
8F .1
8F .2



LEGEND

EXISTING PROPERTY LINES	
BUILDING SETBACK LINE	
EXISTING CONTOUR	—570—
PROPOSED CONTOUR	F570
EXISTING BENCH MARK	
FINISH FLOOR ELEVATION	FF=XXXX.XX
EXISTING OVERHEAD POWER LINES	OHE
EXISTING FENCE LINE	
EXISTING POWER POLE	PP
EXISTING LIGHT	
EXISTING TREELINE	
PROPOSED WALL MOUNTED LIGHT	
TO BE RELOCATED	TBR
SILT FENCE	
SILT SOCK	
REQUIRED GREEN SPACE	



LOCUS
SCALE: 1" = 1000'

GENERAL NOTES

1. PROPERTY IS 1.4696 +/- 63,753 SF AS SHOWN ON MAP 128 BLOCK 252 LOT 3.1 OF THE LACONIA TAX MAPS
2. THE PROPERTY OWNER OF RECORD IS
   TIKI PLAZA LLC
   46 LUCERNE AVENUE
   LACONIA NH 03246
   BOOK 3673 PAGE 195 BELKNAP COUNTY REGISTRY OF DEEDS
3. THE PROPERTY IS ZONED COMMERCIAL RESORT (CR) WITH MUNICIPAL SEWER
4. BUILDING SETBACKS
   0' FRONT SETBACK
   0' SIDE SETBACK
   20' REAR SETBACK
   25% MINIMUM GREEN AREA
5. NO PORTION OF THE SITE IS WITHIN 100 YEAR FLOOD ZONE ACCORDING TO THE NATIONAL FLOOD INSURANCE PROGRAM FIRM MAP PANEL NUMBER 330005 0008 DATED AUGUST 15 1980
6. ONSITE CONDITIONS AS DEPICTED ARE THE RESULT OF A FIELD SURVEY PERFORMED IN NOVEMBER 2022 AND DEPENDENT ON THE PLANS REFERENCED BELOW NOT A BOUNDARY SURVEY THE BEARINGS ARE BASED UPON GPS OBSERVATIONS ON THIS DATE ELEVATIONS ARE BASED ON NGVD 88 SEE PLANS OF REFERENCE NOTE #1
7. GREEN SPACE REQUIRED IS 25% GREEN SPACE SHOWN IS 26%
8. SITE IS SERVED BY TOWN SEWER AND PRIVATE WELL

TEST PIT WORKSHEET

TAX MAP 128 BLOCK 252 LOT 3.1
604 ENDICOTT STREET NORTH LACONIA, N.H.

PREPARED FOR
TIKI PLAZA LLC
46 LUCERNE AVE
LACONIA, NH 03246
BK 3673 PG 195

PREPARED BY
BROWN ENGINEERING LLC.
63 WEST STREET
ASHLAND, NH 03217
TEL. (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

GRAPHIC SCALE
20 10 0 20
SCALE 1" = 20'

BROWN ENGINEERING
CIVIL ENGINEERS

DATE:
JULY 17, 2024

JOB NO. 5028-02