Stormwater Management Plan

One Acre Oaks Minnetonka, MN

Prepared by Loucks

April 12, 2024

Loucks Project No. 21509.00

One Acre Oaks Minnetonka, MN

Stormwater Management Plan

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

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Date: 04-12-24

One Acre Oaks Minnetonka, Minnesota

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One Acre Oaks Minnetonka, Minnesota

Stormwater Management Plan

Introduction

This stormwater management plan was created for the One Acre Oaks project located along Plymouth Road in Minnetonka, Minnesota. The project site encompasses 9.51 acres (10.01 acres with the ROW) which is surrounded to the west by Plymouth Road, between Bent Tree Road and Woodbridge Trail and Crescent Ridge Road to the east. The property is surrounded by residential. The parcel to the north is included in modeling as there is a floodplain that encompasses both parcels.

The project generally consists of constructing a residential road with residential lots, stormwater pond, and associated utilities.

Included in this plan are calculations for the proposed discharge of stormwater at the One Acre Oaks property.

Requirements and Methodology

City of Minnetonka and Minnehaha Creek Watershed District Requirements

- 1. Rate Control Runoff rates for the proposed activity shall not exceed existing runoff rates for the 1, 10, and 100-year critical storm events.
- 2. Volume Control 1.1-inch abstraction over the impervious surface. Where soils don't allow the full infiltration, alternative methods are used with infiltration used to the greatest extent possible
- 3. Water Quality Total Phosphorus (TP) removal equivalent to that achieved from infiltration of 1-inch over impervious surface. With alternative design, 90% total suspended solids removal and 60% total phosphorus removal.

Methodology

The stormwater calculations were made utilizing the stormwater-modeling program HydroCAD 10.00. Calculations were performed for the Type II 24-hour Atlas 14 100-year rainfall event of 7.32 inches, 10-year rainfall event of 4.26 inches and 1-year rainfall event of 2.48 inches. For purposes of analyzing the site, a drainage area of about 11.8 acres is included in the hydrologic model to account for all runoff from the site.

Existing Conditions

The existing site is residential with four residences present on the parcels. The property is split into five major drainage areas, with the north split into 2 more drainage areas. Most of the site drains to the north (1S) to a depression within the site with a piped outlet. There are two more drainage areas to the north (10S,11S), there are two small areas to the south (3S, 4S), one to the east (2S) and one to the west (5S).

No treatment is present for the existing impervious surfaces. The depression on site has a HWL of 982.62 in modeling and a floodplain elevation of 982.9 based on City data.

Existing soils are assumed to be type D soils based on the soil borings done. Soil boring data can be found in the Figures section.

The existing site model consists of 11.75 acres with 0.53 acres of impervious surface.

Proposed Conditions

The proposed site consists of a redeveloped residential development with public road and 8 lots with utilities. A proposed pond (10P) is provided for the largest treatment, volume control and rate control prior to discharging to existing storm sewer. Two small catchment basins (3P and 4P) are located on the south side for rate control and rerouting drainage to treatment. The proposed site being analyzed contains 2.70 acres of new impervious surface.

The proposed site is broken up into eleven drainage areas. The six drainage areas (1S, 2S, 3S, 4S, 5S and 10S) going directly off site like existing and the five drainage areas going to the basins onsite for treatment or floodplain depressions before leaving the site. The runoff from the proposed street area is collected by storm sewer and discharged to the treatment pond 10P. This also collects parts of many of the lots that drain to the street. The remainder of the inner back yards sheet drain to the pond 10P.

The depression within the site (between the two parcels), that is part of the City floodplain is broken up close to the property line. The part within the proposed project contains the treatment basin and has a higher HWL with a berm between it and the remainder of the floodplain. The HWL of the onsite floodplain with the treatment basin is 983.87 and the north floodplain has a HWL of 982.19. The overall drainage area to the floodplain is similar with most area going to the onsite section, which now has a treatment system, rates are controlled going to the north floodplain section and total offsite.

The south basins capture the backyard of two of the proposed lots. The basins' main goal is to control rates leaving the site and redirect flow to treatment basin. The basins contain a piped outlet at the bottom and overland overflows with a weir that keeps flow rates and velocities down.

The proposed site model consists of 11.75 acres with 3.23 acres of impervious surface, 2.70 acres of that being new.

Rate Control

The stormwater runoff rate from the proposed site shall be equal to or less than the runoff rate from the existing conditions for the 1-, 10- and 100-year storm events. The only area that does not meet existing is the drainage to Plymouth Road, as most of the addition flow comes from paving new ROW in Plymouth Road for the turn lane.

A NURP pond with filtration bench within the floodplain is used to treat the site development and provide rate control. Disconnected impervious is also used for appropriate areas. Soils maps show soils to be C and D soils mostly. Borings are rough borings currently. With the current boring information, it is assumed large amounts of infiltration cannot be achieved on-site as only type D soils have been found. The site is treated to the extent possible without infiltration while still meeting TSS and TP removals.

Tables 1 and 2 compare the existing and proposed peak runoff rates for the discharge points analyzed.

Table 1 - Existing Peak Runoff Rates

		1-Year	Storm	10-Yea	r Storm	100-Year Storm	
	Area	Rate	Volume	Rate	Volume	Rate	Volume
Drainage Area	acres	cfs	cf	cfs	cf	cfs	cf
11R-North	8.392	8.27	0.728	12.53	1.757	14.37	3.727
2S-East	1.421	1.26	0.098	3.47	0.258	7.71	0.578
3S-Southeast	0.562	0.46	0.039	1.27	0.102	2.82	0.228
4S-South	0.45	0.41	0.033	1.1	0.085	2.4	0.187
5S-West	0.921	1.1	0.071	2.82	0.18	6.06	0.392
Plymouth Road	1.371	1.46	0.104	3.8	0.264	8.19	0.579
North	8.392	8.27	0.728	12.54	1.757	14.37	3.727
East	1.983	1.71	0.136	4.72	0.36	10.48	0.806
Total North							
Plymouth & North	9.763	9.73	0.832	16.33	2.021	22.56	4.306
Total	11.75	11.05	0.968	19.94	2.381	32.7	5.112

Table 2 - Proposed Peak Runoff Rates

		1-Year Storm			r Storm	100-Year Storm		
	Area	Rate	Volume	Rate	Volume	Rate	Volume	
Drainage Area	acres	cfs	cf	cfs	cf	cfs	cf	
1S-North	0.247	0.35	0.021	0.86	0.052	1.77	0.11	
2S-East	1.114	1.14	0.081	3.04	0.21	6.62	0.463	
3S-Southeast	0.036	0.04	0.003	0.11	0.007	0.23	0.015	
4S-South	0.431	0.6	0.04	1.43	0.093	2.91	0.196	
5S-West	0.852	1.02	0.074	2.5	0.178	5.19	0.378	
10S-Northeast	0.048	0.07	0.004	0.18	0.01	0.38	0.021	
10P-Filtration	7.216	1.89	0.824	6.37	1.762	12.22	3.481	
1P-N Floodplain	1.508	1.78	0.124	4.01	0.442	8.07	1.533	
11P - Depression	1.803	2	0.148	4.3	0.501	8.31	1.661	
3P-SW Basin	0.78	0.06	0.06	1.73	0.133	2.02	0.022	
4P-S Basin	0.141	0.34	0.019	0.68	0.038	1.25	0.073	
Plymouth Road	1.283	1.61	0.113	3.89	0.272	8.03	0.574	
North	9.314	3.9	0.997	9.16	2.188	14.21	4.395	
East	1.15	1.18	0.084	3.14	0.216	7.63	0.5	
Total North								
Plymouth & North	10.597	5.51	1.11	13.05	2.46	22.24	4.969	
Total	11.75	6.69	1.194	16.09	2.676	28.88	5.469	

Elevations are evaluated for flooding of the site. All overflows are designed to keep the adjacent buildings from flooding. All flood elevations have at least 2 feet freeboard to the lowest opening elevation.

Volume Control

Based on the soils information we have; most treatment will be by filtration. Soil borings that were taken on site show only D soils, it does not cover the entire site but the natural grade of the site and location of storm sewer to tie into make it unlikely that large amounts of stormwater treatment could take place in another location. Since infiltration cannot be used on this site, alternative methods are being used. With D soils, even meeting the 0.55-inches of infiltration is not feasible on this site without removing all the trees on the site.

Therefore, the site moves to using filtration and sedimentation in treatment trains to reach the total suspended solids and total phosphorus removal requirements. Many of the backyards are disconnected impervious as they will drain through grass and woodland before leaving the site or reaching farther treatment. The existing depression area is to remain the main collection area on the site. It would be split into two depressions to allow for treatment on the proposed parcel while leaving the north parcel untouched. Most of the site and impervious surface is routed to the treatment system. The street drainage has a larger manhole with sump and SAFL baffle to increase sedimentation before entering the sedimentation basin. The woodland and

back yards are directed to a swale that routes drainage to the sedimentation basin. The basin has a wider bench area with draintile and biofiltration media to allow biofiltration of at least the first 1.1-inch of rainfall. For purposes of designing the treatment for possible future impervious surface, was added to each lot for patios in the back yard, which would all be disconnected impervious surface.

The total impervious surface designed for is 2.87 acres of impervious surface for a volume control of 0.263 ac-ft or 11,456 cf.

The proposed storage volume below the outlet for the filtration bench (1P) is **11,679 cubic- feet**. This volume is filtered through the biofiltration media mix in less than 48 hours.

Depth equivalent proposed: 11,679 cf / 7,530 sf(surface area of bench) = 1.55 ftDepth maximum allowed: 1.0 in/hr + 48 hours / 12 in/ft = 4.0 ft

Quality Control

With no infiltration, removals is the main requirement. The site is required to remove the total phosphorus equivalent to infiltration of the 1-inch over the impervious surface and 90% TSS and 60% TP removal. MIDS is used to model the 1.1-inch in1filtration and proposed TSS and TP for the site. The basins are used in the proposed condition to reduce the TSS and TP particulate loads. Disconnected impervious is only used for the back half of building pads draining directly offsite or to the main pond/filtration system. The pond/filtration bench system is used to capture the remainder of removals. The majority of the impervious surface to the main system is pretreated in a sump manhole. The manhole has a SAFL baffle to aid in additional removals before going to the system. SHSAM is used to determine the modeled removal of the SAFL baffle for MIDS (it is rounded down to the nearest 5%). The pond acts as pretreatment for the filtration bench which is designed with biofiltration media. The pond dead volume is designed to meet a minimum of 1800 sf per acre of drainage to the pond, which is 8.535 acres * 1800 = 15,363 cf. The dead storage in the pond is 16,948 cf.

The table below shows the results for infiltration and proposed loads removed from the site. Model data can be found in the Figures section.

Table 3 - Proposed TSS and TP Removals

	1.1-inch			
	Infiltration	Proposed	% Removals	
	Removal	Removals	based on	
	lbs/yr	lbs/yr	yearly load	
TSS	875.5	1298.5	90	
TP	4.82	4.705	60	

<u>Floodplain</u>

There is an existing City floodplain with in the site. The existing flood elevation from the City is 982.9, our modeling shows 982.6, based on a 96-hour 100-year storm event. The difference can be from different modeling platforms or difference in parameters. Our model uses survey data from the site for the drainage area and cover. The drainage area seems similar to the City drainage area and survey data shows that there is an overland overflow below 983. The drainage to the floodplain comes mainly from the site with a small area from outside this site. The proposed condition splits the floodplain into two drainage areas and two depressions. The drainage area north of the proposed berm in the floodplain area is much smaller and the outlet remains the same, the modeled floodplain elevation is 979.23 with an overland overflow elevation of 981.50. Most of the drainage is captured and routed to a main floodplain area, which has a floodplain elevation of 981.62 and an overland overflow of 981.75.

The surveyed floodplain volume for the existing conditions is 57,947 cf. The proposed floodplain in this same area is 75,801 cf of live storage available. This is an increase of 17,854 cf of floodplain storage.

Best Management Practices

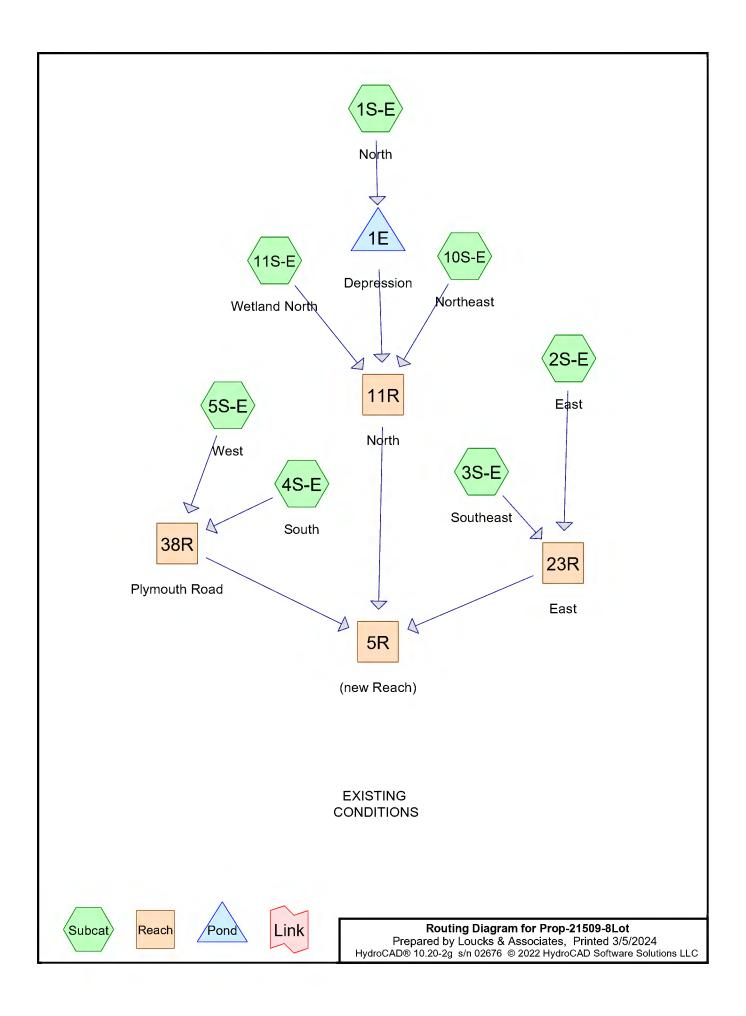
Best management practices (BMP's) will be implemented during construction per the project Stormwater Pollution Prevention Plan. During construction, erosion control measures will include dust control, silt fencing, inlet protection, and a temporary rock construction entrance. Permanent BMP's will include a stormwater pond, a large swale, sump storm sewer structures, surface pavements, and turf establishment (vegetation) of disturbed areas.

Conclusion

The proposed Stormwater Management Plan for the One Acre Oaks property project provides an improved solution for the conveyance of stormwater on this site. The stormwater pond will capture runoff and provide additional water quality treatment on the site.

Appendix A

HydroCAD Report, Existing (1, 10, 100)



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Rainfall Events Listing (selected events)

E۱	/ent#	Event	Storm Type	Curve	Mode	Duration	B/B	Depth	AMC
		Name				(hours)		(inches)	
	1	1-Year	MSE 24-hr	3	Default	24.00	1	2.48	
	2	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	
	3	100-Year base	MSE 24-hr	3	Default	24.00	1	7.32	
	4	100-yr 96hr	PF_Depth_English_PDS 96-hr S1	100-yr	Default	96.00	1	8.51	

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Area Listing (selected nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.532	98	(1S-E, 2S-E, 3S-E, 4S-E, 5S-E, 10S-E, 11S-E)
3.421	79	Woods, Fair, HSG D (2S-E, 3S-E, 4S-E, 5S-E, 10S-E, 11S-E)
7.793	82	Woods/grass comb., Fair, HSG D (1S-E)
11.746	82	TOTAL AREA

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Summary for Subcatchment 1S-E: North

Runoff = 8.64 cfs @ 12.35 hrs, Volume= 0.702 af, Depth= 1.04"

Routed to Pond 1E: Depression

	Area	(ac) C	N Desc	cription					
*	0.	304 9	98						
	7.	793 8	32 Woo	ds/grass c	omb., Fair,	HSG D			
	8.	097 8	33 Weig	Weighted Average					
	7.793 82		32 96.2°	5% Pervio	us Area				
	0.	304	98 3.75	% Impervi	ous Area				
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	14.9	100	0.0570	0.11		Sheet Flow,			
						Woods: Light underbrush n= 0.400 P2= 2.86"			
	1.4	100	0.0550	1.17		Shallow Concentrated Flow,			
						Woodland Kv= 5.0 fps			
	2.6	100	0.0085	0.65		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	4.0	500	0.1700	2.06		Shallow Concentrated Flow,			
_						Woodland Kv= 5.0 fps			
	22.9	800	Total						

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Summary for Subcatchment 2S-E: East

Runoff = 1.26 cfs @ 12.31 hrs, Volume= 0.098 af, Depth= 0.82"

Routed to Reach 23R: East

	Area	(ac)	CN De	escription		
*	0.	.028	98	-		
	1.	393		oods, Fair, l	HSG D	
1.421 79 Weighted Average						
	1.	393	79 98	.03% Pervi	ous Area	
0.028 98 1.97% Impervious Area						
				•		
	Тс	Length	Slop	e Velocity	Capacity	Description
	(min)	(feet) (ft/f	t) (ft/sec)	(cfs)	·
	17.6	100	0.038	0 0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	2.1	100	0.025	0 0.79		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	19.7	200) Total			·

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Summary for Subcatchment 3S-E: Southeast

Runoff = 0.46 cfs @ 12.36 hrs, Volume= 0.039 af, Depth= 0.82"

Routed to Reach 23R: East

	Area	(ac) (CN Des	cription		
*	0.	004	98			
	0.	558	79 Woo	ds, Fair, F	ISG D	
	0.	562	79 Wei	ghted Aver	age	
	0.	558	79 99.2	9% Pervio	us Area	
	0.	004	98 0.71	% Impervi	ous Area	
	Tc	Length	•	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	19.3	100	0.0300	0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	3.7	250	0.0500	1.12		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	23.0	350	Total			

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Summary for Subcatchment 4S-E: South

Runoff = 0.41 cfs @ 12.33 hrs, Volume= 0.033 af, Depth= 0.88"

Routed to Reach 38R: Plymouth Road

	Area	(ac) (CN Des	cription		
*	0.	.021	98			
0.429 79 Woods, Fair, HSG D				ods, Fair, F	ISG D	
0.450 80 Weighted Average				ghted Avei	age	
0.429 79 95.33% Pervious Area					us Area	
	0.021 98 4.67% Impervious Area				ous Area	
	Тс	Length	•	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	20.8	100	0.0250	0.08		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.5	35	0.0650	1.27		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	21.3	135	Total			

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Summary for Subcatchment 5S-E: West

Runoff = 1.10 cfs @ 12.24 hrs, Volume= 0.071 af, Depth= 0.93"

Routed to Reach 38R: Plymouth Road

_	Area	(ac) (CN Des	cription		
*	0.	121	98			
	0.	800	79 Wo	ods, Fair, F	ISG D	
	0.	921	81 Wei	ghted Aver	age	
	0.	800	79 86.8	6% Pervio	us Area	
	0.	121	98 13.1	4% Imper	vious Area	
	т.	ما در می در ا	Clana	Valaaitu	Consoitu	Description
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description
	14.1	100	0.0660	0.12		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.3	30	0.1100	1.66		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	14.4	130	Total			

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Summary for Subcatchment 10S-E: Northeast

Runoff = 0.07 cfs @ 12.17 hrs, Volume= 0.004 af, Depth= 0.98"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac)	CN	Desc	cription		
*	0.	007	98				
	0.	041	79	Woo	ds, Fair, H	ISG D	
	0.048 82 Weighted Average						
	0.041 79 85.42% Pervious Area						
	0.007 98 14.58% Impervious Area					∕ious Area	
	Тс	Lengt		Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	0 (0.1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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Summary for Subcatchment 11S-E: Wetland North

Runoff = 0.35 cfs @ 12.22 hrs, Volume= 0.021 af, Depth= 1.04"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac) (CN	Desc	ription			_
*	0.	047	98					
	0.	200	79	Woo	ds, Fair, <mark></mark>	ISG D		_
					jhted Aver	age		
	0.	200	79	80.9	7% Pervio	us Area		
	0.	047	98	19.03	3% Imper\	ious Area		
	Тс	Length		lope	Velocity	Capacity	Description	
_	(min)	(feet)	((ft/ft)	(ft/sec)	(cfs)		_
	12.8	100	0.0	0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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Summary for Reach 5R: (new Reach)

Inflow Area = 11.746 ac, 4.53% Impervious, Inflow Depth = 0.99" for 1-Year event

Inflow = 11.05 cfs @ 12.35 hrs, Volume= 0.968 af

Outflow = 11.05 cfs @ 12.35 hrs, Volume= 0.968 af, Atten= 0%, Lag= 0.0 min

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Summary for Reach 11R: North

Inflow Area = 8.392 ac, 4.27% Impervious, Inflow Depth = 1.04" for 1-Year event

Inflow = 8.27 cfs @ 12.41 hrs, Volume= 0.728 af

Outflow = 8.27 cfs @ 12.41 hrs, Volume= 0.728 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Reach 23R: East

Inflow Area = 1.983 ac, 1.61% Impervious, Inflow Depth = 0.82" for 1-Year event

Inflow = 1.71 cfs @ 12.32 hrs, Volume= 0.136 af

Outflow = 1.71 cfs @ 12.32 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

MSE 24-hr 3 1-Year Rainfall=2.48"

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Summary for Reach 38R: Plymouth Road

Inflow Area = 1.371 ac, 10.36% Impervious, Inflow Depth = 0.91" for 1-Year event

Inflow = 1.46 cfs @ 12.26 hrs, Volume= 0.104 af

Outflow = 1.46 cfs @ 12.26 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Pond 1E: Depression

Inflow Area = 8.097 ac, 3.75% Impervious, Inflow Depth = 1.04" for 1-Year event

Inflow 8.64 cfs @ 12.35 hrs, Volume= 0.702 af

Outflow 8.07 cfs @ 12.42 hrs, Volume= 0.702 af, Atten= 7%, Lag= 4.1 min

8.07 cfs @ 12.42 hrs, Volume= Primary 0.702 af

Routed to Reach 11R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 980.32' @ 12.42 hrs Surf.Area= 2,529 sf Storage= 562 cf

Plug-Flow detention time= 0.4 min calculated for 0.702 af (100% of inflow)

Center-of-Mass det. time= 0.4 min (832.5 - 832.1)

Volume	Invert A	vail.Storage	Storage	e Description	
#1	978.67'	63,415 cf	Custon	n Stage Data (Pr	rismatic)Listed below (Recalc)
Elevation (feet)	Surf.Are (sq-f		c.Store c-feet)	Cum.Store (cubic-feet)	
978.67	1	0	0	0	
979.00	2	6	6	6	
980.00	21	1	119	124	
981.00	7,47	9	3,845	3,969	
982.00	28,73	6	18,108	22,077	
983.00	53,94	0	41,338	63,415	

Device	Routing	Invert	Outlet Devices			
#1	Primary	978.35'	18.0" Round Culvert L= 275.0' Ke= 0.500			
			Inlet / Outlet Invert= 978.35' / 975.09' S= 0.0119 '/' Cc= 0.900			
			n= 0.013, Flow Area= 1.77 sf			
#2	#2 Device 1 978.67'		18.0" Round Culvert			
			L= 9.0' RCP, end-section conforming to fill, Ke= 0.500			
			Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900			
			n= 0.013, Flow Area= 1.77 sf			

Primary OutFlow Max=8.04 cfs @ 12.42 hrs HW=980.31' TW=0.00' (Dynamic Tailwater)

-1=Culvert (Passes 8.04 cfs of 9.37 cfs potential flow)

2=Culvert (Inlet Controls 8.04 cfs @ 4.55 fps)

Stage-Area-Storage for Pond 1E: Depression

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
978.67	10	0	981.27	13,218	6,764
978.72	12	1	981.32	14,281	7,451
978.77	15	1	981.37	15,344	8,192
978.82	17	2	981.42	16,407	8,985
978.87	20	3	981.47		
978.92	20 22	4	981.52	17,470	9,832 10,732
	25 25	5		18,533	
978.97 979.02	30	6	981.57 981.62	19,595 20,658	11,686
979.02 979.07	30 39	8	981.67	20,038 21,721	12,692 13,752
979.12	48	10	981.72	22,784	14,864
979.17	57	13	981.77	23,847	16,030
979.22	67	16	981.82	24,910	17,249
979.27	76	20	981.87	25,973	18,521
979.32	85	24	981.92	27,035	19,846
979.37	94	28	981.97	28,098	21,224
979.42	104	33	982.02	29,240	22,657
979.47	113	39	982.07	30,500	24,150
979.52	122	44	982.12	31,760	25,707
979.57	131	51	982.17	33,021	27,326
979.62	141	58	982.22	34,281	29,009
979.67	150	65	982.27	35,541	30,754
979.72	159	73	982.32	36,801	32,563
979.77	168	81	982.37	38,061	34,434
979.82	178	89	982.42	39,322	36,369
979.87	187	99	982.47	40,582	38,367
979.92	196	108	982.52	41,842	40,427
979.97	205	118	982.57	43,102	42,551
980.02	356	130	982.62	44,362	44,737
980.07	720	157	982.67	45,623	46,987
980.12	1,083	202	982.72	46,883	49,300
980.17	1,447	265	982.77	48,143	51,675
980.22	1,810	347	982.82	49,403	54,114
980.27	2,173	446	982.87	50,663	56,616
980.32	2,537	564	982.92	51,924	59,180
980.37	2,900	700	982.97	53,184	61,808
980.42	3,264	854			
980.47	3,627	1,026			
980.52	3,990	1,217			
980.57	4,354	1,425			
980.62	4,717	1,652			
980.67	5,081	1,897			
980.72	5,444	2,160			
980.77	5,807	2,442			
980.82	6,171	2,741			
980.87	6,534	3,059			
980.92	6,898 7,261	3,394			
980.97	7,261 7,004	3,748			
981.02 981.07	7,904 8,967	4,123 4,545			
981.07 981.12	8,967 10,030				
981.12 981.17	11,093	5,020 5,548			
981.22	12,156	6,129			
30 1.ZZ	12,100	0,123			
			1		

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Summary for Subcatchment 1S-E: North

Runoff = 21.13 cfs @ 12.33 hrs, Volume= 1.696 af, Depth= 2.51"

Routed to Pond 1E: Depression

	Area	(ac) C	N Des	cription					
*	0.	304 9	98						
	7.	.793 8	32 Woo	ds/grass d	omb., Fair,	HSG D			
_	8.	.097 8	33 Weig	Weighted Average					
	7.		•	5% Pervio	•				
	0.	304 9	98 3.75	% Impervi	ous Area				
				•					
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	14.9	100	0.0570	0.11		Sheet Flow,			
						Woods: Light underbrush n= 0.400 P2= 2.86"			
	1.4	100	0.0550	1.17		Shallow Concentrated Flow,			
						Woodland Kv= 5.0 fps			
	2.6	100	0.0085	0.65		Shallow Concentrated Flow,			
						Short Grass Pasture Kv= 7.0 fps			
	4.0	500	0.1700	2.06		Shallow Concentrated Flow,			
_						Woodland Kv= 5.0 fps			
	22.9	800	Total						

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Summary for Subcatchment 2S-E: East

Runoff = 3.47 cfs @ 12.30 hrs, Volume= 0.258 af, Depth= 2.18"

Routed to Reach 23R: East

	Area	(ac)	CN	Desc	cription		
*	0.	028	98				
	1.	393	79	Woo	ds, Fair, H	ISG D	
	1.421 79 Weighted Average					age	
	1.393 79 98.03% Pervious Area 0.028 98 1.97% Impervious Area						
	Tc (min)	Lengtl (feet		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	17.6	100	0.	0380	0.09		Sheet Flow,
	2.1	100	0.0	0250	0.79		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps
	19.7	200) To	otal			

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Summary for Subcatchment 3S-E: Southeast

Runoff = 1.27 cfs @ 12.34 hrs, Volume= 0.102 af, Depth= 2.18"

Routed to Reach 23R: East

	Area	(ac) C	N Des	cription		
*	0.	004	98			
	0.	558	79 Woo	ds, Fair, F	ISG D	
	0.562 79 Weighted Average					
	0.	558	79 99.2	9% Pervio	us Area	
	0.	004	98 0.71	% Impervi	ous Area	
	Тс	Longth	Slope	Volocity	Consoity	Description
	(min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	19.3	100	0.0300	0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	3.7	250	0.0500	1.12		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	23.0	350	Total			

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Summary for Subcatchment 4S-E: South

Runoff = 1.10 cfs @ 12.32 hrs, Volume= 0.085 af, Depth= 2.26"

Routed to Reach 38R: Plymouth Road

	Area	(ac) (CN Des	cription		
*	0.	.021	98			
	0.	429	79 Wo	ods, Fair, F	ISG D	
	0.	450	80 We	ghted Aver	age	
	0.	429	79 95.3	33% Pervio	us Area	
	0.	.021	98 4.67	7% Impervi	ous Area	
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description
	20.8	100	0.0250	0.08		Sheet Flow,
	0.5	35	0.0650	1.27		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps
	21.3	135	Total			

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Summary for Subcatchment 5S-E: West

Runoff = 2.82 cfs @ 12.23 hrs, Volume= 0.180 af, Depth= 2.34"

Routed to Reach 38R : Plymouth Road

_	Area	(ac) C	N Des	cription		
*	0.	121 9	98			
_	0.	800	⁷ 9 Woo	ds, Fair, F	ISG D	
	0.921 81 Weighted Average				age	
	0.	800	79 86.8	6% Pervio	us Area	
	0.121 98 13.14% Impervious Area				ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.1	100	0.0660	0.12		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.3	30	0.1100	1.66		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	14 4	130	Total			

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Summary for Subcatchment 10S-E: Northeast

Runoff = 0.18 cfs @ 12.17 hrs, Volume= 0.010 af, Depth= 2.43"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac) (CN_	Desc	cription					
*	0.	007	98							
	0.	041	79	Woo	ds, Fair, F	ISG D				
					Weighted Average					
	0.	041	79	85.42	2% Pervio	us Area				
	0.	007	98	14.58	8% Imperv	/ious Area				
	_			_		_				
	Тс	Length		lope	Velocity	Capacity	Description			
_	(min)	(feet)	((ft/ft)	(ft/sec)	(cfs)				
	9.3	90	0.1	1500	0.16		Sheet Flow,			

Woods: Light underbrush n= 0.400 P2= 2.86"

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Summary for Subcatchment 11S-E: Wetland North

Runoff = 0.86 cfs @ 12.21 hrs, Volume= 0.052 af, Depth= 2.51"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac) (CN	Desc	ription			_
*	0.	047	98					
	0.	200	79	Woo	ds, Fair, <mark></mark>	ISG D		_
					jhted Aver	age		
	0.	200	79	80.9	7% Pervio	us Area		
	0.	047	98	19.03	3% Imper\	ious Area		
	Тс	Length		lope	Velocity	Capacity	Description	
_	(min)	(feet)	((ft/ft)	(ft/sec)	(cfs)		_
	12.8	100	0.0	0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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Summary for Reach 5R: (new Reach)

Inflow Area = 11.746 ac, 4.53% Impervious, Inflow Depth = 2.43" for 10-Year event

Inflow = 19.94 cfs @ 12.31 hrs, Volume= 2.381 af

Outflow = 19.94 cfs @ 12.31 hrs, Volume= 2.381 af, Atten= 0%, Lag= 0.0 min

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Summary for Reach 11R: North

Inflow Area = 8.392 ac, 4.27% Impervious, Inflow Depth = 2.51" for 10-Year event

Inflow = 12.54 cfs @ 12.54 hrs, Volume= 1.757 af

Outflow = 12.54 cfs @ 12.54 hrs, Volume= 1.757 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Reach 23R: East

Inflow Area = 1.983 ac, 1.61% Impervious, Inflow Depth = 2.18" for 10-Year event

Inflow = 4.72 cfs @ 12.31 hrs, Volume= 0.360 af

Outflow = 4.72 cfs @ 12.31 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Reach 38R: Plymouth Road

Inflow Area = 1.371 ac, 10.36% Impervious, Inflow Depth = 2.31" for 10-Year event

Inflow = 3.80 cfs @ 12.25 hrs, Volume= 0.264 af

Outflow = 3.80 cfs @ 12.25 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Pond 1E: Depression

Inflow Area = 8.097 ac, 3.75% Impervious, Inflow Depth = 2.51" for 10-Year event

Inflow = 21.13 cfs @ 12.33 hrs, Volume= 1.696 af

Outflow = 12.27 cfs @ 12.58 hrs, Volume= 1.696 af, Atten= 42%, Lag= 14.6 min

Primary = 12.27 cfs @ 12.58 hrs, Volume= 1.696 af

Routed to Reach 11R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 981.50' @ 12.58 hrs Surf.Area= 18,121 sf Storage= 10,378 cf

Plug-Flow detention time= 5.2 min calculated for 1.695 af (100% of inflow)

Center-of-Mass det. time= 5.2 min (819.2 - 814.0)

Volume	Invert Ava	ail.Storage	Storage	e Description	
#1	978.67'	63,415 cf	Custor	n Stage Data (Pı	rismatic)Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)		c.Store c-feet)	Cum.Store (cubic-feet)	
978.67	10		0	0	
979.00	26		6	6	
980.00	211		119	124	
981.00	7,479		3,845	3,969	
982.00	28,736	•	18,108	22,077	
983.00	53,940		11,338	63,415	

Device	Routing	Invert	Outlet Devices			
#1	Primary	978.35'	18.0" Round Culvert L= 275.0' Ke= 0.500			
			Inlet / Outlet Invert= 978.35' / 975.09' S= 0.0119 '/' Cc= 0.900			
			n= 0.013, Flow Area= 1.77 sf			
#2	Device 1	978.67'	18.0" Round Culvert			
			L= 9.0' RCP, end-section conforming to fill, Ke= 0.500			
			Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900			
			n= 0.013, Flow Area= 1.77 sf			

Primary OutFlow Max=12.27 cfs @ 12.58 hrs HW=981.50' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 12.27 cfs of 12.30 cfs potential flow)

2=Culvert (Inlet Controls 12.27 cfs @ 6.94 fps)

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Stage-Area-Storage for Pond 1E: Depression

(feet) (sq-ft) (cubic-feet) (feet) (sq-ft) (cubic-feet) 978.72 10 0 981.27 13.218 7.451 978.72 15 1 981.32 14.281 7.451 978.87 17 2 981.37 15.344 8.192 978.87 20 3 981.47 17.470 9.832 978.87 20 3 981.57 19.595 11.686 979.02 30 6 991.62 20.658 12.692 979.07 39 8 981.67 21.721 13.752 979.17 57 13 981.72 22.784 14.864 979.17 57 13 981.72 22.784 14.864 979.22 67 16 981.82 24.910 17.249 979.27 76 20 981.87 25.973 18.521 979.32 85 24 981.92 27.035 19.846 <	Elevation	Surface	Storage	Elevation	Surface	Storage
978.72						
978.77						
978.82						
978.87 20 3 981.47 17,470 9.832 978.97 25 5 5 981.57 19,595 11,686 979.02 30 6 981.62 20,658 12,692 979.07 39 8 981.67 21,721 13,752 979.12 48 10 981.72 22,784 14,864 979.17 57 13 981.77 23,847 16,03 979.22 67 16 981.82 24,910 17,249 979.27 76 20 981.87 25,973 18,521 979.32 85 24 981.92 27,035 19,846 979.37 94 28 981.97 28,098 21,224 979.42 104 33 982.02 29,240 22,657 979.52 122 44 982.12 31,760 25,707 979.52 122 44 982.12 31,760 25,707 979.57 131 51 982.17 33,021 27,326 979.62 141 58 982.22 34,281 29,009 979.67 150 65 982.27 35,541 30,754 979.72 159 73 962.32 36,801 34,434 979.82 178 89 982.42 39,322 36,801 32,563 979.77 168 81 982.37 38,061 34,434 979.82 178 89 982.42 39,322 36,801 32,563 979.79 196 108 982.52 41,842 40,427 979.97 205 118 982.57 43,102 42,551 980.02 356 130 982.62 44,362 44,737 980.12 1,083 202 982.77 46,183 49,300 980.17 1,447 265 982.77 48,143 51,675 980.22 1,810 347 982.82 49,403 54,114 980.27 2,173 446 92.87 50,663 56,166 980.37 2,900 700 980.77 5,807 2,442 980.87 6,534 3,059 980.97 7,261 3,748 981.07 8,967 4,545 981.02 7,904 4,123 981.07 8,967 4,545 981.02 7,904 4,123 981.07 8,967 4,545 981.12 10,030 5,020 981.17 11,093 5,548						8 085
978.92 22 4 981.52 18.533 10.732 978.97 25 5 5 981.57 19.595 11.686 979.02 30 6 981.62 20.658 12.692 979.07 39 8 981.67 21.721 13.752 979.12 48 10 981.77 23.847 16.030 979.27 76 13 981.87 25.973 18.521 979.32 85 24 981.92 27.035 19.846 979.37 94 28 981.97 28.098 21.224 979.42 104 33 982.02 29.240 22.657 979.47 113 39 982.07 30.500 24.150 979.52 122 44 982.12 31.760 25.707 979.57 131 51 982.17 33.021 25.707 979.62 141 58 982.22 34.281 29.099 979.67 150 65 982.27 35.541 30.754 979.72 159 73 982.32 36.801 32.563 979.77 168 81 992.37 38.061 34.434 979.82 178 89 982.42 39.322 36.369 979.87 187 99 982.47 40.582 38.367 979.98 187 99 982.47 40.582 38.367 979.97 205 118 992.57 43.102 40.427 979.97 205 118 992.57 43.102 42.551 980.02 356 130 982.62 44.362 44.737 980.07 720 157 982.67 45.623 49.80 980.12 1,083 202 982.72 46.883 49.300 980.17 1,447 265 982.77 48.143 51.675 980.22 1,173 446 982.87 50.663 56.616 980.52 3,990 1,217 980.67 5,081 1,897 980.67 5,081 1,897 980.67 5,081 1,897 980.67 5,081 1,897 980.67 5,081 1,897 980.72 5,444 2,160 980.77 5,807 2,442 980.82 6,171 2,741 980.87 6,534 3,059 980.92 6,898 3,394 980.97 7,261 3,748 981.02 7,904 4,123 981.07 1,1093 5,548			2			
978.97						
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Summary for Subcatchment 1S-E: North

Runoff = 43.98 cfs @ 12.33 hrs, Volume=

3.597 af, Depth= 5.33"

Routed to Pond 1E: Depression

	Area	(ac) C	N Des	cription		
*	0.	304	98			
	7.	793	82 Woo	ods/grass o	omb., Fair,	, HSG D
_	8.	097	83 Wei	ghted Aver	age	
	7.		,	5% Pervio	0	
	0.304 98		98 3.75	% Impervi	ous Area	
				•		
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.9	100	0.0570	0.11		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	1.4	100	0.0550	1.17		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	2.6	100	0.0085	0.65		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
	4.0	500	0.1700	2.06		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	22.9	800	Total			

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Summary for Subcatchment 2S-E: East

Runoff = 7.71 cfs @ 12.29 hrs, Volume= 0.578 af, Depth= 4.88"

Routed to Reach 23R: East

	Area	(ac) (CN Des	cription		
*	0.	028	98			
	1.	393	79 Woo	ds, Fair, F	ISG D	
	1.421 79 Weighted Average				age	
	1.	393	79 98.0	3% Pervio	us Area	
	0.	028	98 1.97	'% Impervi	ous Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	17.6	100	0.0380	0.09		Sheet Flow,
	2.1	100	0.0250	0.79		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps
	19.7	200	Total			

Prepared by Loucks & Associates

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Summary for Subcatchment 3S-E: Southeast

Runoff = 2.82 cfs @ 12.33 hrs, Volume= 0.228 af, Depth= 4.88"

Routed to Reach 23R : East

	Area	(ac) (CN De	scription		
*	0.	004	98			
	0.	558	79 Wc	ods, Fair, F	ISG D	
	0.562 79 Weighted Average			ighted Avei	age	
	0.	558	79 99.	29% Pervio	us Area	
	0.	004	98 0.7	1% Impervi	ous Area	
	_					
	Тс	Length	•	•	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	19.3	100	0.0300	0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	3.7	250	0.0500	1.12		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	23.0	350	Total			

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Summary for Subcatchment 4S-E: South

Runoff = 2.40 cfs @ 12.31 hrs, Volume= 0.187 af, Depth= 4.99"

Routed to Reach 38R: Plymouth Road

	Area	(ac) (CN De	scription		
*	0.	021	98			
	0.	429	79 Wo	ods, Fair, F	HSG D	
	0.450 80 Weighted Average				rage	
	0.	429	79 95.	33% Pervio	us Area	
	0.	021	98 4.6	7% Impervi	ous Area	
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	•	(cfs)	Description
	20.8	100	0.0250	0.08		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.5	35	0.0650	1.27		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	21.3	135	Total			

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Summary for Subcatchment 5S-E: West

Runoff = 6.06 cfs @ 12.22 hrs, Volume= 0

0.392 af, Depth= 5.10"

Routed to Reach 38R: Plymouth Road

	Area	(ac) (CN Des	scription		
*	0.	121	98			
	0.	800	79 Wo	ods, Fair, F	ISG D	
	0.921 81 Weighted Average				age	
	0.	800	79 86.	36% Pervio	us Area	
	0.121 98 13.14% Impervious Area					
	Тс	Length	•	•	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	14.1	100	0.0660	0.12		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.3	30	0.1100	1.66		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	14 4	130	Total			

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Summary for Subcatchment 10S-E: Northeast

Runoff = 0.38 cfs @ 12.16 hrs, Volume= 0.021 af, Depth= 5.22"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

_	Area	(ac)	CN	Desc	cription		
*	0.	007	98				
	0.	041	79	Woo	ds, Fair, H	ISG D	
	0.048 82 Weighted Average					age	
	0.041 79 85.42% Pervious Area						
	0.007 98 14.58% Impervious Area					∕ious Area	
	Тс	Lengt		Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	0 (0.1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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Summary for Subcatchment 11S-E: Wetland North

Runoff = 1.77 cfs @ 12.21 hrs, Volume= 0.110 af, Depth= 5.33"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	cription			
*	0.	.047	98					
	0.	200	79	Woo	ds, Fair, H	ISG D		
	0.247 83 Weighted Average					age		
	0.200 79 80.97% Pervious Area							
	0.047 98 19.03% Impervious Area					ious Area/		
							.	
	Тс	Lengt		Slope	Velocity	Capacity	Description	
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)		
	12.8	10	0 0	0.0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

MSE 24-hr 3 100-Year base Rainfall=7.32"

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Summary for Reach 5R: (new Reach)

Inflow Area = 11.746 ac, 4.53% Impervious, Inflow Depth = 5.22" for 100-Year base event

Inflow = 32.70 cfs @ 12.27 hrs, Volume= 5.112 af

Outflow = 32.70 cfs @ 12.27 hrs, Volume= 5.112 af, Atten= 0%, Lag= 0.0 min

MSE 24-hr 3 100-Year base Rainfall=7.32"

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Summary for Reach 11R: North

Inflow Area = 8.392 ac, 4.27% Impervious, Inflow Depth = 5.33" for 100-Year base event

Inflow = 14.37 cfs @ 12.26 hrs, Volume= 3.727 af

Outflow = 14.37 cfs @ 12.26 hrs, Volume= 3.727 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Reach 23R: East

Inflow Area = 1.983 ac, 1.61% Impervious, Inflow Depth = 4.88" for 100-Year base event

Inflow = 10.48 cfs @ 12.30 hrs, Volume= 0.806 af

Outflow = 10.48 cfs @ 12.30 hrs, Volume= 0.806 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

MSE 24-hr 3 100-Year base Rainfall=7.32"

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Summary for Reach 38R: Plymouth Road

1.371 ac, 10.36% Impervious, Inflow Depth = 5.07" for 100-Year base event Inflow Area =

8.19 cfs @ 12.24 hrs, Volume= 0.579 af Inflow

8.19 cfs @ 12.24 hrs, Volume= Outflow = 0.579 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Pond 1E: Depression

Inflow Area = 8.097 ac, 3.75% Impervious, Inflow Depth = 5.33" for 100-Year base event

Inflow = 43.98 cfs @ 12.33 hrs, Volume= 3.597 af

Outflow = 13.63 cfs @ 12.77 hrs, Volume= 3.597 af, Atten= 69%, Lag= 26.7 min

Primary = 13.63 cfs @ 12.77 hrs, Volume= 3.597 af

Routed to Reach 11R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 982.62' @ 12.77 hrs Surf.Area= 44,347 sf Storage= 44,711 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 22.8 min (821.8 - 799.0)

Volume	Inve	rt Avai	l.Storage	Storage	Description		
#1	978.67	7' (63,415 cf	Custon	n Stage Data (Prisma	tic)Listed below	(Recalc)
Elevation (feet)		Surf.Area (sq-ft)		.Store c-feet)	Cum.Store (cubic-feet)		
978.67		10	(2	0	0		
979.00)	26		6	6		
980.00	1	211		119	124		
981.00	1	7,479		3,845	3,969		
982.00	1	28,736	1	8,108	22,077		
983.00	1	53,940	۷	1,338	63,415		
Device I	Routing	In	vert Outle	et Device	es		
#1 I	Primary	978			d Culvert L= 275.0' Invert= 978.35' / 975.0		Cc= 0.900

#1 Primary 978.35' **18.0" Round Culvert** L= 275.0' Ke= 0.500 Inlet / Outlet Invert= 978.35' / 975.09' S= 0.0119 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

#2 Device 1 978.67' **18.0" Round Culvert**L= 9.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.63 cfs @ 12.77 hrs HW=982.62' TW=0.00' (Dynamic Tailwater)

T_**1=Culvert** (Barrel Controls 13.63 cfs @ 7.71 fps)

2=Culvert (Passes 13.63 cfs of 15.22 cfs potential flow)

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Stage-Area-Storage for Pond 1E: Depression

(feet) (sq-ft) (cubic-feet) (feet) (sq-ft) (cubic-feet) 978.72 10 0 981.27 13.218 7.451 978.72 15 1 981.32 14.281 7.451 978.87 17 2 981.37 15.344 8.192 978.87 20 3 981.47 17.470 9.832 978.87 20 3 981.57 19.595 11.686 979.02 30 6 991.62 20.658 12.692 979.07 39 8 981.67 21.721 13.752 979.17 57 13 981.72 22.784 14.864 979.17 57 13 981.72 22.784 14.864 979.22 67 16 981.82 24.910 17.249 979.27 76 20 981.87 25.973 18.521 979.32 85 24 981.92 27.035 19.846 <	Elevation	Surface	Storage	Elevation	Surface	Storage
978.72						
978.77						
978.82						
978.87 20 3 981.47 17,470 9.832 978.97 25 5 5 981.57 19,595 11,686 979.02 30 6 981.62 20,658 12,692 979.07 39 8 981.67 21,721 13,752 979.12 48 10 981.72 22,784 14,864 979.17 57 13 981.77 23,847 16,03 979.22 67 16 981.82 24,910 17,249 979.27 76 20 981.87 25,973 18,521 979.32 85 24 981.92 27,035 19,846 979.37 94 28 981.97 28,098 21,224 979.42 104 33 982.02 29,240 22,657 979.52 122 44 982.12 31,760 25,707 979.52 122 44 982.12 31,760 25,707 979.57 131 51 982.17 33,021 27,326 979.62 141 58 982.22 34,281 29,009 979.67 150 65 982.27 35,541 30,754 979.72 159 73 962.32 36,801 34,434 979.82 178 89 982.42 39,322 36,801 32,563 979.77 168 81 982.37 38,061 34,434 979.82 178 89 982.42 39,322 36,801 32,563 979.79 196 108 982.52 41,842 40,427 979.97 205 118 982.57 43,102 42,551 980.02 356 130 982.62 44,362 44,737 980.12 1,083 202 982.77 46,183 49,300 980.17 1,447 265 982.77 48,143 51,675 980.22 1,810 347 982.82 49,403 54,114 980.27 2,173 446 92.87 50,663 56,166 980.37 2,900 700 980.77 5,807 2,442 980.87 6,534 3,059 980.97 7,261 3,748 981.07 8,967 4,545 981.02 7,904 4,123 981.07 8,967 4,545 981.02 7,904 4,123 981.07 8,967 4,545 981.12 10,030 5,020 981.17 11,093 5,548						8 085
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979.22 67 16 981.82 24.910 17.249 979.27 76 20 981.87 25.973 18.521 979.32 85 24 981.92 27.035 19.846 979.37 94 28 981.97 28.098 21,224 979.42 104 33 982.02 29.240 22.657 979.47 113 39 982.07 30.500 24.150 979.52 122 44 982.12 31,760 25.707 979.57 131 51 982.17 33.021 27.326 979.62 141 58 982.22 34.281 29.009 979.67 150 65 982.27 35.541 30.754 979.72 159 73 982.32 36.801 32.563 979.77 168 81 982.37 35.941 30.754 979.82 178 89 982.42 39.322 36.369 979.87 187 99 982.47 40.582 33.367 979.99 2 196 108 982.52 41.842 40.427 979.97 205 118 982.57 43.102 42.551 980.02 356 130 982.62 44.362 44.362 980.07 720 157 982.67 45.623 46.987 980.12 1,083 202 982.72 46.883 49.300 980.17 1,447 265 982.77 48.143 51.675 980.22 1,810 347 982.82 49.403 54.114 980.27 2,173 446 982.87 50.663 56.616 980.32 2,537 564 982.92 51,924 59,180 980.42 3,264 854 980.47 3,627 1,026 980.57 4,354 1,425 980.67 5,081 1.897 980.72 5,444 2,160 980.77 5,807 2,442 980.87 6,534 3,059 980.92 6,898 3,394 980.97 7,261 3,748 981.02 7,904 4,123 981.02 7,904 4,123 981.07 11,093 5,548	979.12	48	10			
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979.37 94 28 981.97 28,098 21,224 979.42 104 33 982.02 29,240 22,657 979.47 113 39 982.07 30,500 24,150 979.52 122 44 982.12 31,760 25,707 979.57 131 51 982.17 33,021 27,326 979.62 141 58 982.22 34,281 29,009 979.67 150 65 982.27 35,541 30,754 979.72 159 73 982.32 36,801 32,563 979.77 168 81 982.37 38,061 34,434 979.82 178 89 982.42 39,322 36,369 979.87 187 99 982.47 40,582 38,367 979.92 196 108 982.52 41,842 40,427 979.97 205 118 982.57 43,102 42,551 980.02 356 130 982.62 44,362 44,737 980.12 1,083 202 982.62 44,362 44,737 980.17 1,447 265 982.67 45,623 46,987 980.12 1,083 202 982.72 46,883 49,300 980.17 1,447 265 982.77 48,143 51,675 980.22 1,810 347 982.82 49,403 54,114 980.27 2,173 446 982.87 50,663 56,616 980.32 2,537 564 982.92 51,924 59,180 980.42 3,264 854 980.47 3,627 1,026 980.52 3,990 700 982.97 53,184 61,808 980.47 3,627 1,026 980.52 3,990 1,217 980.62 4,717 1,652 980.62 4,717 1,652 980.62 4,717 1,652 980.62 7,904 4,123 981.02 7,904 4,123 981.02 7,904 4,123 981.02 7,904 4,123 981.02 7,904 4,123 981.02 7,904 4,123 981.12 10,030 5,020 981.17 11,093 5,548						
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Summary for Subcatchment 1S-E: North

Runoff = 39.88 cfs @ 48.26 hrs, Volume=

4.363 af, Depth= 6.47"

Routed to Pond 1E: Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac) C	N Des	cription						
*	0.	304	98							
	7.	793 8	32 Woo	Woods/grass comb., Fair, HSG D						
	8.	097 8	33 Weig	ghted Aver	age					
	7.793 82		•	5% Pervio	•					
	0.	304 9	98 3.75	% Impervi	ous Area					
				•						
	Тс	Length	Slope	Velocity	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	14.9	100	0.0570	0.11		Sheet Flow,				
						Woods: Light underbrush n= 0.400 P2= 2.86"				
	1.4	100	0.0550	1.17		Shallow Concentrated Flow,				
						Woodland Kv= 5.0 fps				
	2.6	100	0.0085	0.65		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	4.0	500	0.1700	2.06		Shallow Concentrated Flow,				
_						Woodland Kv= 5.0 fps				
	22.9	800	Total							

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Summary for Subcatchment 2S-E: East

Runoff = 7.03 cfs @ 48.22 hrs, Volume= 0.709 af, Depth= 5.98"

Routed to Reach 23R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac) (CN Des	cription		
*	0.	028	98			
	1.	393	79 Woo	ds, Fair, F	ISG D	
	1.	421	79 Wei	ghted Aver	age	
1.393 79 98.03% Pervious An					us Area	
	0.028 98 1.97% Impervious Area				ous Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	17.6	100	0.0380	0.09		Sheet Flow,
	2.1	100	0.0250	0.79		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps
	19.7	200	Total			

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Summary for Subcatchment 3S-E: Southeast

Runoff = 2.59 cfs @ 48.27 hrs, Volume= 0.280 af, Depth= 5.98"

Routed to Reach 23R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac) (CN De	scription		
*	0.	004	98			
	0.	558	79 Wc	ods, Fair, F	ISG D	
	0.	562	79 We	ighted Avei	age	
	0.558 79 99.29% Perv				us Area	
	0.004 98 0			1% Impervi	ous Area	
	Тс	Length	•	•	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	19.3	100	0.0300	0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	3.7	250	0.0500	1.12		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	23.0	350	Total			

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Summary for Subcatchment 4S-E: South

Runoff = 2.19 cfs @ 48.25 hrs, Volume=

0.229 af, Depth= 6.10"

Routed to Reach 38R: Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac) C	N Des	cription			
*	0.	021	98				
	0.	429	79 Woo	ds, Fair, F	ISG D		
	0.	450	80 Weig	ghted Aver	age		
	0.	429	79 95.3	33% Pervious Area			
0.021 98				% Impervi	ous Area		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	20.8	100	0.0250	0.08		Sheet Flow,	
	0.5	35	0.0650	1.27		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps	
	21.3	135	Total				

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Summary for Subcatchment 5S-E: West

Runoff = 5.42 cfs @ 48.15 hrs, Volume=

0.478 af, Depth= 6.22"

Routed to Reach 38R: Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac) (ON D	escription		
*	0.	121	98			
	0.	800	79 W	oods, Fair, I	HSG D	
	0.921 81			eighted Ave	rage	
	0.800 79			.86% Pervio	ous Area	
	0.121 98		98 13	5.14% Imper	vious Area	
	Tc (min)	Length (feet)	•		Capacity (cfs)	Description
	14.1	100	0.066	0 0.12		Sheet Flow,
	0.3	30	0.110	0 1.66		Woods: Light underbrush n= 0.400 P2= 2.86" Shallow Concentrated Flow, Woodland Kv= 5.0 fps
	14.4	130	Total			

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Summary for Subcatchment 10S-E: Northeast

Runoff = 0.33 cfs @ 48.08 hrs, Volume= 0.025 af, Depth= 6.35"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	CN	Desc	ription		
*	0.	007	98	3			
	0.041 79 Woods, Fair, HSG D						
	0.048 82		. Weig	hted Aver	age		
	0.041 79 85.42% Perv					us Area	
	0.007 98 14.58				8% Imperv	∕ious Area	
	Тс	Leng		Slope	Velocity	Capacity	Description
	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	90	0.1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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Summary for Subcatchment 11S-E: Wetland North

Runoff = 1.56 cfs @ 48.13 hrs, Volume= 0.133 af, Depth= 6.47"

Routed to Reach 11R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac) (CN	Desc	cription			_
*	0.	047	98					
	0.	200	79	Woo	ds, Fair, F	ISG D		_
	0.247 83		83	Weighted Average				
	0.200 79 80.97% P					us Area		
	0.047 98 19.03% Impervious Area					/ious Area		
	Тс	Length		lope	Velocity	Capacity	Description	
_	(min)	(feet)	((ft/ft)	(ft/sec)	(cfs)		_
	12.8	100	0.0	0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

Prop-21509-8Lot *PF_Depth_English_PDS* 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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Summary for Reach 5R: (new Reach)

Inflow Area = 11.746 ac, 4.53% Impervious, Inflow Depth = 6.35" for 100-yr 96hr event

Inflow = 30.68 cfs @ 48.21 hrs, Volume= 6.217 af

Outflow = 30.68 cfs @ 48.21 hrs, Volume= 6.217 af, Atten= 0%, Lag= 0.0 min

PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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Summary for Reach 11R: North

Inflow Area = 8.392 ac, 4.27% Impervious, Inflow Depth = 6.46" for 100-yr 96hr event

Inflow = 14.10 cfs @ 48.53 hrs, Volume= 4.521 af

Outflow = 14.10 cfs @ 48.53 hrs, Volume= 4.521 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

Prop-21509-8Lot *PF_Depth_English_PDS* 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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Summary for Reach 23R: East

Inflow Area = 1.983 ac, 1.61% Impervious, Inflow Depth = 5.98" for 100-yr 96hr event

Inflow = 9.56 cfs @ 48.24 hrs, Volume= 0.989 af

Outflow = 9.56 cfs @ 48.24 hrs, Volume= 0.989 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

Prop-21509-8Lot *PF_Depth_English_PDS* 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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Summary for Reach 38R: Plymouth Road

Inflow Area = 1.371 ac, 10.36% Impervious, Inflow Depth = 6.19" for 100-yr 96hr event

Inflow = 7.37 cfs @ 48.17 hrs, Volume= 0.707 af

Outflow = 7.37 cfs @ 48.17 hrs, Volume= 0.707 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 5R: (new Reach)

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Summary for Pond 1E: Depression

Inflow Area = 8.097 ac, 3.75% Impervious, Inflow Depth = 6.47" for 100-yr 96hr event

Inflow = 39.88 cfs @ 48.26 hrs, Volume= 4.363 af

Outflow = 13.61 cfs @ 48.78 hrs, Volume= 4.363 af, Atten= 66%, Lag= 31.0 min

Primary = 13.61 cfs @ 48.78 hrs, Volume= 4.363 af

Routed to Reach 11R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 982.60' @ 48.78 hrs Surf.Area= 43,963 sf Storage= 44,037 cf

Plug-Flow detention time= 18.2 min calculated for 4.363 af (100% of inflow)

Center-of-Mass det. time= 18.1 min (3,086.2 - 3,068.2)

Volume	Inv	ert Avail.Sto	orage Storage	e Description	
#1	978.6	63,4	15 cf Custor	n Stage Data (Pr	rismatic)Listed below (Recalc)
Elevation	on	Surf.Area	Inc.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)	
978.6	67	10	0	0	
979.0	00	26	6	6	
980.0	00	211	119	124	
981.0	00	7,479	3,845	3,969	
982.0	00	28,736	18,108	22,077	
983.0	00	53,940	41,338	63,415	
Device	Routing	Invert	Outlet Devic	es	
#1	Primary	978.35'	18.0" Roun	d Culvert L= 275	5.0' Ke= 0.500
			Inlet / Outlet	Invert= 978.35' /	975.09' S= 0.0119 '/' Cc= 0.900
			n= 0.013, FI	ow Area= 1.77 sf	
#2	Device 1	978.67'	18.0" Roun	d Culvert	

L= 9.0' RCP, end-section conforming to fill, Ke= 0.500

Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900

Primary OutFlow Max=13.61 cfs @ 48.78 hrs HW=982.60' TW=0.00' (Dynamic Tailwater)

n= 0.013, Flow Area= 1.77 sf

1=Culvert (Barrel Controls 13.61 cfs @ 7.70 fps)

²⁼Culvert (Passes 13.61 cfs of 15.18 cfs potential flow)

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Stage-Area-Storage for Pond 1E: Depression

(feet) (sq-ft) (cubic-feet) (feet) (sq-ft) (cubic-feet) 978.72 10 0 981.27 13.218 7.451 978.72 15 1 981.32 14.281 7.451 978.87 17 2 981.37 15.344 8.192 978.87 20 3 981.47 17.470 9.832 978.87 20 3 981.57 19.595 11.686 979.02 30 6 991.62 20.658 12.692 979.07 39 8 981.67 21.721 13.752 979.17 57 13 981.72 22.784 14.864 979.17 57 13 981.72 22.784 14.864 979.22 67 16 981.82 24.910 17.249 979.27 76 20 981.87 25.973 18.521 979.32 85 24 981.92 27.035 19.846 <	Elevation	Surface	Storage	Elevation	Surface	Storage
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980.97 7,261 3,748 981.02 7,904 4,123 981.07 8,967 4,545 981.12 10,030 5,020 981.17 11,093 5,548						
981.02 7,904 4,123 981.07 8,967 4,545 981.12 10,030 5,020 981.17 11,093 5,548						
981.07 8,967 4,545 981.12 10,030 5,020 981.17 11,093 5,548						
981.12 10,030 5,020 981.17 11,093 5,548						
981.17 11,093 5,548						
	981.22					

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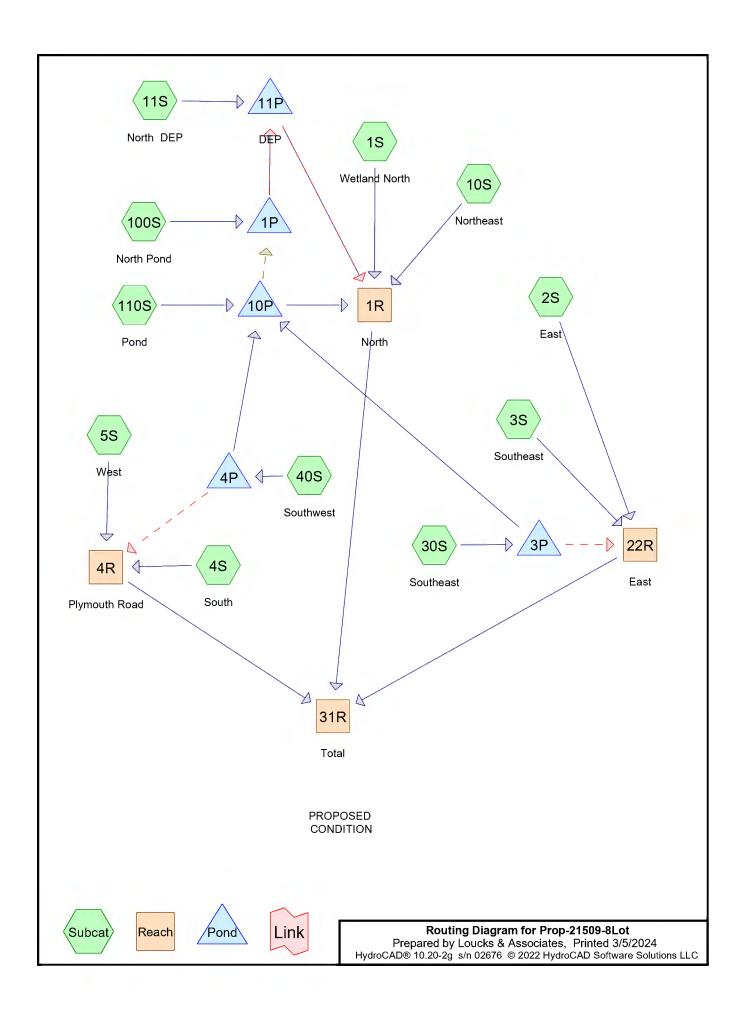
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Appendix B

HydroCAD Report, Proposed (1, 10, 100)



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Rainfall Events Listing (selected events)

Event#		Event	Storm Type	Curve	Mode	Duration	B/B	Depth	AMC
		Name				(hours)		(inches)	
	1	1-Year	MSE 24-hr	3	Default	24.00	1	2.48	
	2	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	
	3	100-Year base	MSE 24-hr	3	Default	24.00	1	7.32	
	4	100-yr 96hr	PF_Depth_English_PDS 96-hr S1	100-yr	Default	96.00	1	8.51	

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Area Listing (selected nodes)

Α	rea CN	Description				
(acr	es)	(subcatchment-numbers)				
2.8	365 98	(1S, 4S, 5S, 10S, 11S, 100S, 110S)				
4.451 80		>75% Grass cover, Good, HSG D (2S, 3S, 4S, 5S, 11S, 30S, 40S, 100S, 110S)				
0.3	303 98	Unconnected pavement, HSG D (30S, 40S)				
0.0	061 98	Unconnected roofs, HSG D (2S)				
0.	780 79	Woods, Fair, HSG D (1S, 3S, 4S, 5S, 10S, 30S)				
3.2	287 79	Woods/grass comb., Good, HSG D (2S, 100S, 110S)				
11.	747 85	TOTAL AREA				

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Summary for Subcatchment 1S: Wetland North

Runoff = 0.35 cfs @ 12.22 hrs, Volume= 0.021 af, Depth= 1.04"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac) (CN	Desc	cription			_
*	0.	047	98					
	0.	200	79	Woo	ds, Fair, F	ISG D		_
	0.247 83		83	Weighted Average				
	0.200 79 80.97% P					us Area		
	0.047 98 19.03% Impervious Area					/ious Area		
	Тс	Length		lope	Velocity	Capacity	Description	
_	(min)	(feet)	((ft/ft)	(ft/sec)	(cfs)		_
	12.8	100	0.0	0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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Summary for Subcatchment 2S: East

Runoff = 1.14 cfs @ 12.28 hrs, Volume= 0.081 af, Depth= 0.88"

Routed to Reach 22R : East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area	(ac) (CN Adj	Descrip	tion						
	0.	061	98	Unconn	Unconnected roofs, HSG D						
	0.	568	80	>75% G	>75% Grass cover, Good, HSG D						
	0.	485	79	Woods/	Woods/grass comb., Good, HSG D						
	1.	114	81 80	Weighte	d Average	, UI Adjusted					
	1.	053	80 80		Pervious A						
	0.	061	98 98	5.48% I	mpervious	Area					
	0.	061		100.00%	6 Unconne	cted					
	Тс	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	15.7	100	0.0500	0.11		Sheet Flow,					
						Woods: Light underbrush n= 0.400 P2= 2.86"					
	1.4	60	0.0200	0.71		Shallow Concentrated Flow,					
						Woodland Kv= 5.0 fps					
	17.1	160	Total	•	•						

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Summary for Subcatchment 3S: Southeast

Runoff = 0.04 cfs @ 12.24 hrs, Volume= 0.003 af, Depth= 0.88"

Routed to Reach 22R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac)	CN	Desc	ription		
	0.	.000	98	Unco	onnected p	avement, l	HSG D
	0.	.015	79	Woo	ds, Fair, H	ISG D	
_	0.	.021	80	>75%	% Grass co	over, Good	I, HSG D
0.036 80 Weighted Average							
	0.	.036	80	100.0	00% Pervi	ous Area	
	Тс	Lengt	h :	Slope	Velocity	Capacity	Description
_	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)	
	14.3	7	0 0	.0280	0.08		Sheet Flow,

n= 0.380 P2= 2.86"

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Summary for Subcatchment 4S: South

Runoff = 0.60 cfs @ 12.25 hrs, Volume= 0.040 af, Depth= 1.10"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area	(ac)	<u>CN</u>	Desc	cription			
*	0.	099	98					
	0.	302	80	>75%	√ Grass co	over, Good	, HSG D	
_	0.	030	79	Woo	ds, Fair, H	SG D		
	0.	431	84	Weig	hted Aver	age		
	0.	332	80	77.0	3% Pervio	us Area		
	0.	099	98	22.9	7% Imperv	ious Area		
	_					_		
	Тс	Length		Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		_
	15.1	85	5 0.	.0420	0.09		Sheet Flow,	
							One Demonder O 440 DO O 00!!	

Grass: Bermuda n= 0.410 P2= 2.86"

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Summary for Subcatchment 5S: West

Runoff = 1.02 cfs @ 12.29 hrs, Volume= 0.074 af, Depth= 1.04"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area	(ac) C	N Desc	cription		
*	0.	177 9	98			
	0.	265 8	30 >759	% Grass c	over, Good	, HSG D
	0.	410	79 Woo	ds, Fair, F	ISG D	
	0.	852 8	33 Weig			
	0.	675	79 79.2	3% Pervio	us Area	
	0.	177 9	98 20.7	7% Imperv	∕ious Area	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	3.5	20	0.0300	0.09		Sheet Flow,
						Grass: Dense n= 0.240 P2= 2.86"
	14.4	80	0.0400	0.09		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 2.86"
	0.5	45	0.0800	1.41		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	18.4	145	Total			

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Summary for Subcatchment 10S: Northeast

Runoff = 0.07 cfs @ 12.17 hrs, Volume= 0.004 af, Depth= 0.98"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac)	CN	Desc	cription		
*	0.	007	98				
	0.	041	79	Woo	ds, Fair, H	ISG D	
	0.	048	82	Weig	hted Aver	age	
	0.	041	79	85.42	2% Pervio	us Area	
	0.	007	98	14.5	8% Imperv	∕ious Area	
	Тс	Lengt		Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	0 (0.1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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Summary for Subcatchment 11S: North DEP

Runoff = 0.50 cfs @ 12.15 hrs, Volume= 0.024 af, Depth= 0.98"

Routed to Pond 11P: DEP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area (a	ac)	CN	Desc	cription					
*	0.0)35	98							
	0.2	260 80 >75% Grass cover, Good, HSG D								
0.000 79 Woods/grass comb., Good, HSG D										
	0.2	295	82	Weig	hted Aver	age				
	0.260 80 88.14% Pervious Area									
	0.0)35	98	11.8	6% Imperv	rious Area				
		Leng	th :	Slope	Velocity	Capacity	·			
_	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)				
	7.0						Discot Fator			

7.0 Direct Entry,

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Summary for Subcatchment 30S: Southeast

Runoff = 0.79 cfs @ 12.31 hrs, Volume= 0.060 af, Depth= 1.29" Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area ((ac)	CN	Desc	ription							
	0.3	220	98	Unco	Unconnected pavement, HSG D							
	0.0	084	79	Woo	Woods, Fair, HSG D							
	0.2	253	80	>75%	>75% Grass cover, Good, HSG D							
	0.	557	87	Weig	Weighted Average							
	0.3	337	80	60.5	0% Pervio	us Area						
	0.2	220	98	39.50	ואס Imper\	/ious Area						
	0.2	220		100.0	00% Unco	nnected						
	Tc (min)	Lengtl (feet		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
	19.1	100	0.0	0280	0.09		Sheet Flow,					
							n= 0.380 P2= 2.86"					
	1.8	15	5 0.0	0400	1.40		Shallow Concentrated Flow,					
_							Short Grass Pasture Kv= 7.0 fps					
	20.9	25	5 To	otal								

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Summary for Subcatchment 40S: Southwest

Runoff = 0.35 cfs @ 12.17 hrs, Volume = 0.019 af, Depth = 1.59" Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

_	Area	(ac)	CN	Desc	ription			
	0.	083	98	Unco	nnected p	avement, l	HSG D	
	0.	000	79	Woo	ds, Fair, H	ISG D		
	0.0	058	80	>75%	% Grass co	over, Good	, HSG D	
	0.	141	91	Weig	hted Aver	age		
	0.0	058	80	41.13	3% Pervio	us Area		
	0.083 98 58.87% Impervious Area							
	0.0	083		100.0	00% Unco	nnected		
	Тс	Length		Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	9.3	65	5 0	.0280	0.12		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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Summary for Subcatchment 100S: North Pond

Runoff = 1.81 cfs @ 12.26 hrs, Volume= 0.124 af, Depth= 0.98" Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area	(ac)	CN	Desc	cription									
*	0.	180	98											
	0.	924		30 >75% Grass cover, Good, HSG D										
		404		Woo	ds/grass o	comb., Goo	d, HSG D							
*		.000	98											
*		.000	80											
		508		•	ghted Aver	•								
		328			6% Pervio									
	0.	180	98	11.9	1.94% Impervious Area									
	Тс	Length	s SI	ope	Velocity	Capacity	Description							
	(min)	(feet		ft/ft)	(ft/sec)	(cfs)	Description							
	13.0	110	0.0	350	0.14		Sheet Flow,							
							Grass: Dense n= 0.240 P2= 2.86"							
	0.3	81	0.0	600	4.97		Shallow Concentrated Flow,							
							Paved Kv= 20.3 fps							
	3.0	641	0.0	060	3.51	2.76	Pipe Channel,							
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'							
_							n= 0.013							
	16.3	832	? Tot	:al										

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Summary for Subcatchment 110S: Pond

Runoff = 10.72 cfs @ 12.22 hrs, Volume= 0.667 af, Depth= 1.23" Routed to Pond 10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 1-Year Rainfall=2.48"

	Area	(ac)	CN	Desc	ription									
*	2.	320	98											
	1.	800	80	>75%	75% Grass cover, Good, HSG D									
	2.	398	79	Woo	Voods/grass comb., Good, HSG D									
*		000	98											
*	0.	000	80											
		518	86	_	jhted Aver	•								
	4.	198	79	64.4	1% Pervio	us Area								
	2.	320	98	35.59	9% Imper\	∕ious Area								
	_			0.1	37 1 20	0 :								
	Tc	Lengt		Slope	Velocity	Capacity	Description							
_	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)								
	11.4	10	0 0.	.0400	0.15		Sheet Flow,							
							Grass: Dense n= 0.240 P2= 2.86"							
	0.9	5	5 0.	.0220	1.04		Shallow Concentrated Flow,							
							Short Grass Pasture Kv= 7.0 fps							
	1.4	17	7 0.	.0850	2.04		Shallow Concentrated Flow,							
_							Short Grass Pasture Kv= 7.0 fps							
	13.7	33	2 T	otal										

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Summary for Reach 1R: North

Inflow Area = 9.314 ac, 31.05% Impervious, Inflow Depth = 1.28" for 1-Year event

Inflow = 3.90 cfs @ 12.28 hrs, Volume= 0.997 af

Outflow = 3.90 cfs @ 12.28 hrs, Volume= 0.997 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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Summary for Reach 4R: Plymouth Road

Inflow Area = 1.283 ac, 21.51% Impervious, Inflow Depth = 1.06" for 1-Year event

Inflow = 1.61 cfs @ 12.27 hrs, Volume= 0.113 af

Outflow = 1.61 cfs @ 12.27 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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Summary for Reach 22R: East

Inflow Area = 1.150 ac, 5.30% Impervious, Inflow Depth = 0.88" for 1-Year event

Inflow = 1.18 cfs @ 12.27 hrs, Volume= 0.084 af

Outflow = 1.18 cfs @ 12.27 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

MSE 24-hr 3 1-Year Rainfall=2.48"

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Summary for Reach 31R: Total

Inflow Area = 11.747 ac, 27.49% Impervious, Inflow Depth = 1.22" for 1-Year event

Inflow = 6.69 cfs @ 12.27 hrs, Volume= 1.194 af

Outflow = 6.69 cfs @ 12.27 hrs, Volume= 1.194 af, Atten= 0%, Lag= 0.0 min

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Summary for Pond 1P:

Inflow Area = 1.508 ac, 11.94% Impervious, Inflow Depth = 0.98" for 1-Year event

Inflow = 1.81 cfs @ 12.26 hrs, Volume= 0.124 af

Outflow = 1.78 cfs @ 12.28 hrs, Volume= 0.124 af, Atten= 2%, Lag= 1.5 min

Primary = 1.78 cfs @ 12.28 hrs, Volume= 0.124 af

Routed to Pond 11P: DEP

Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Pond 11P: DEP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Starting Elev= 978.00' Storage= 0 cf

Peak Elev= 980.18' @ 12.28 hrs Surf.Area= 358 sf Storage= 59 cf

Plug-Flow detention time= 0.4 min calculated for 0.124 af (100% of inflow)

Center-of-Mass det. time= 0.5 min (829.1 - 828.6)

Volume	Invert	Avail.Sto	rage Storage	Description	
#1	979.45'	55,82	25 cf Custom	Stage Data (Pi	rismatic)Listed below (Recalc)
	_				
Elevation		urf.Area	Inc.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)	
979.4	15	10	0	0	
980.0	00	68	21	21	
981.0	00	1,700	884	905	
982.0	00	11,370	6,535	7,440	
983.0	00	25,550	18,460	25,900	
984.0	00	34,300	29,925	55,825	
Device	Routing	Invert	Outlet Devices	S	
#1	Primary	979.45'	12.0" Round	Culvert L= 18.	.0' Ke= 0.500
	-		Inlet / Outlet Ir	nvert= 979.45' /	978.80' S= 0.0361 '/' Cc= 0.900
			n= 0.013, Flo	w Area= 0.79 sf	
#2	Primary	979.45'	0.060 in/hr Ex	cfiltration over	Surface area above 978.00'
	•		Excluded Surf	ace area = 0 sf	
#3	Secondary	981.50'	2.0' long x 2.	0' breadth Bro	ad-Crested Rectangular Weir
	,				0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.5		
					61 2.60 2.66 2.70 2.77 2.89 2.88
			2.85 3.07 3.2		5 - 1.55 - 1.55 - 1.55 - 1.55 - 1.55 - 1.55 - 1.55
			3.0. 0.2		

Primary OutFlow Max=1.76 cfs @ 12.28 hrs HW=980.17' TW=979.31' (Dynamic Tailwater)

1=Culvert (Inlet Controls 1.76 cfs @ 2.89 fps)

—2=Exfiltration (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=979.45' TW=978.67' (Dynamic Tailwater)

3=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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Stage-Area-Storage for Pond 1P:

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
979.45	10	0	982.05	12,079	8,027
979.50	15	1	982.10	12,788	8,648
979.55	21	2 3	982.15	13,497	9,305
979.60	26		982.20	14,206	9,998
979.65	31	4	982.25	14,915	10,726
979.70	36	6	982.30	15,624	11,490
979.75	42	8	982.35	16,333	12,288
979.80	47	10	982.40	17,042	13,123
979.85	52	12	982.45	17,751	13,993
979.90	57	15	982.50	18,460	14,898
979.95	63	18	982.55	19,169	15,839
980.00	68	21	982.60	19,878	16,815
980.05	150	27	982.65	20,587	17,826
980.10	231	36	982.70	21,296	18,874
980.15	313	50	982.75	22,005	19,956
980.20	394	68	982.80	22,714	21,074
980.25	476	89	982.85	23,423	22,227
980.30	558 630	115	982.90	24,132	23,416
980.35	639 72 1	145	982.95	24,841	24,641
980.40	802	179 217	983.00	25,550 25,088	25,900 27,180
980.45 980.50	884	217 259	983.05 983.10	25,988 26,425	27,189 28,499
980.55 980.55	966	306	983.15	26,425 26,863	
980.60	1,047	356	983.20	27,300	29,831 31,185
980.65	1,129	410	983.25	27,738 27,738	32,561
980.70	1,210	469	983.30	28,175	33,959
980.75	1,292	531	983.35	28,613	35,379
980.80	1,374	598	983.40	29,050	36,820
980.85	1,455	669	983.45	29,488	38,284
980.90	1,537	744	983.50	29,925	39,769
980.95	1,618	822	983.55	30,363	41,276
981.00	1,700	905	983.60	30,800	42,805
981.05	2,184	1,003	983.65	31,238	44,356
981.10	2,667	1,124	983.70	31,675	45,929
981.15	3,151	1,269	983.75	32,113	47,524
981.20	3,634	1,439	983.80	32,550	49,140
981.25	4,118	1,633	983.85	32,988	50,779
981.30	4,601	1,851	983.90	33,425	52,439
981.35	5,085	2,093	983.95	33,863	54,121
981.40	5,568	2,359	984.00	34,300	55,825
981.45	6,052	2,650			
981.50	6,535	2,964			
981.55	7,019	3,303			
981.60	7,502	3,666			
981.65	7,986	4,053			
981.70	8,469	4,465			
981.75	8,953	4,900			
981.80	9,436	5,360			
981.85	9,920	5,844			
981.90	10,403	6,352			
981.95	10,887	6,884			
982.00	11,370	7,440			

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Summary for Pond 3P:

Inflow Area = 0.557 ac, 39.50% Impervious, Inflow Depth = 1.29" for 1-Year event Inflow 0.79 cfs @ 12.31 hrs, Volume= 0.060 af Outflow 0.78 cfs @ 12.32 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.6 min Discarded = 0.00 cfs @ 12.32 hrs, Volume= 0.000 af 0.78 cfs @ 12.32 hrs, Volume= 0.060 af Primary Routed to Pond 10P: 0.00 hrs. Volume= 0.000 af

Secondary = 0.00 cfs @

Routed to Reach 22R: East

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,014.22' @ 12.32 hrs Surf.Area= 214 sf Storage= 42 cf

Plug-Flow detention time= 1.6 min calculated for 0.060 af (100% of inflow)

Center-of-Mass det. time= 1.6 min (820.8 - 819.2)

Volume	Invert	Avail.Sto	rage Storage	Description				
#1	1,014.00'	77	79 cf Custom	Stage Data (Pr	rismatic)Listed below (Recalc)			
		. A	. 0	0 01				
Elevatio	n Su	rf.Area	Inc.Store	Cum.Store				
(fee	t)	(sq-ft)	(cubic-feet)	(cubic-feet)				
1,014.0	0	175	0	0				
1,015.0	0	355	265	265				
1,015.50		525	220	485				
1,016.00		650	294	779				
Device	Routing	Invert	Outlet Device	S				
#1	Secondary	1,015.00'	1.2' long x 1.2' breadth Broad-Crested Rectangular Weir					
	•		Head (feet) 0	0.20 0.40 0.60	0.80 1.00 1.20 1.40 1.60 1.80 2.00			
			2.50 3.00					
			Coef. (English	n) 2.66 2.69 2. ⁻	71 2.78 2.89 2.99 3.09 3.20 3.21			
			3.19 3.30 3.3					
#2	Discarded	1,014.00'	0.060 in/hr E	xfiltration over	Surface area			
#3	Device 4	1,014.00'	15.0" Horiz. (Orifice/Grate X	0.60 C= 0.600			
		•	Limited to wei	ir flow at low hea	ads			
#4	Primary	1,011.00'	8.0" Round	Culvert L= 117.	.0' Ke= 0.500			
	•	,		Inlet / Outlet Invert= 1,011.00' / 1,009.71' S= 0.0110 '/' Cc= 0.900				
				ow Area= 0.35 sf	•			

Discarded OutFlow Max=0.00 cfs @ 12.32 hrs HW=1,014.22' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.77 cfs @ 12.32 hrs HW=1,014.22' TW=980.37' (Dynamic Tailwater) **-4=Culvert** (Passes 0.77 cfs of 1.74 cfs potential flow)

1—3=Orifice/Grate (Weir Controls 0.77 cfs @ 0.91 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,014.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Stage-Area-Storage for Pond 3P:

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,014.00	175	0	1,015.04	369	279
1,014.02	179	4	1,015.06	375	287
1,014.04	182	7	1,015.08	382	294
1,014.06	186	11	1,015.10	389	302
1,014.08	189	15	1,015.12	396	310
1,014.10	193	18	1,015.14	403	318
1,014.12	197	22	1,015.16	409	326
1,014.14	200	26	1,015.18	416	334
1,014.16	204	30	1,015.20	423	343
1,014.18	207	34	1,015.22	430	351
1,014.20	211	39	1,015.24	437	360
1,014.22	215	43	1,015.26	443	369
1,014.24	218	47	1,015.28	450	378
1,014.26	222	52	1,015.30	457	387
1,014.28	225	56	1,015.32	464	396
1,014.30	229	61	1,015.34	471	405
1,014.32	233	65	1,015.36	477	415
1,014.34	236	70	1,015.38	484	424
1,014.36	240	75	1,015.40	491	434
1,014.38	243	79	1,015.42	498	444
1,014.40	247	84	1,015.44	505	454
1,014.42	251	89	1,015.46	511	464
1,014.44	254	94	1,015.48	518	475
1,014.46	258	100	1,015.50	525	485
1,014.48	261	105	1,015.52	530	496
1,014.50	265	110	1,015.54	535	506
1,014.52	269	115	1,015.56	540	517
1,014.54	272	121	1,015.58	545	528
1,014.56	276	126	1,015.60	550	539
1,014.58	279	132	1,015.62	555	550
1,014.60	283	137	1,015.64	560	561 570
1,014.62	287	143	1,015.66	565 570	572 504
1,014.64	290	149	1,015.68	570 575	584
1,014.66	294	155	1,015.70	575 500	595
1,014.68	297	161	1,015.72	580	607
1,014.70	301	167	1,015.74	585 500	618
1,014.72 1,014.74	305 308	173	1,015.76	590 595	630 642
1,014.74	312	179 185	1,015.78 1,015.80	600	654
1,014.78	312	191	1,015.82	605	666
1,014.78	319	198	1,015.84	610	678
1,014.82	323	204	1,015.86	615	690
1,014.84	326	211	1,015.88	620	703
1,014.86	330	217	1,015.90	625	703 715
1,014.88	333	224	1,015.92	630	713 728
1,014.90	337	230	1,015.94	635	740
1,014.92	341	237	1,015.94	640	753
1,014.94	344	244	1,015.98	645	766
1,014.96	348	251	1,016.00	650	77 9
1,014.98	351	258	1,510.00	300	,,,
1,015.00	355	265			
1,015.02	362	272			
.,010.02	302	2,2			
			•		

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Summary for Pond 4P:

Inflow Area = 0.141 ac, 58.87% Impervious, Inflow Depth = 1.59" for 1-Year event Inflow 0.35 cfs @ 12.17 hrs, Volume= 0.019 af Outflow 0.34 cfs @ 12.17 hrs, Volume= 0.019 af, Atten= 1%, Lag= 0.5 min Discarded = 0.00 cfs @ 12.17 hrs, Volume= 0.000 af 0.34 cfs @ 12.17 hrs, Volume= 0.019 af Primary Routed to Pond 10P: Secondary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af Routed to Reach 4R: Plymouth Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,020.13' @ 12.17 hrs Surf.Area= 94 sf Storage= 10 cf

Plug-Flow detention time= 0.9 min calculated for 0.019 af (100% of inflow) Center-of-Mass det. time= 0.9 min (796.9 - 796.0)

Volume	Invert	Avail.Sto	rage	Storage	Description	
#1	1,020.00'	76	31 cf	Custon	n Stage Data (Pr	rismatic)Listed below (Recalc)
- 14:	0		1	04	0	
Elevation		rf.Area		.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubi	c-feet)	(cubic-feet)	
1,020.0	00	65		0	0	
1,021.00 295		295		180	180	
1,021.5	1,021.50 590			221	401	
1,022.0	00	850		360	761	
1,022.00 8						
Device	Routing	Invert	Outl	et Device	es	
#1	Secondary	1,021.00'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir			
	•		Hea	d (feet) (0.20 0.40 0.60 (0.80 1.00 1.20 1.40 1.60 1.80 2.00
				` ,	50 4.00 4.50 5	
			Coe	f. (Enalisl	h) 2.34 2.50 2.7	70 2.68 2.68 2.66 2.65 2.65 2.65
					66 2.68 2.70 2.	
#2	Discarded	1,020.00'			xfiltration over	
#3	Primary	1,020.00'			Orifice/Grate X	
		.,-20100			ir flow at low hea	

Discarded OutFlow Max=0.00 cfs @ 12.17 hrs HW=1,020.12' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.33 cfs @ 12.17 hrs HW=1,020.12' TW=979.91' (Dynamic Tailwater) 3=Orifice/Grate (Weir Controls 0.33 cfs @ 0.69 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,020.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Stage-Area-Storage for Pond 4P:

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,020.00	65 70	0	1,021.04	319	192
1,020.02 1,020.04	70 74	1 3	1,021.06 1,021.08	330 342	199 205
1,020.04	74 79	4	1,021.00	354 354	203 212
	83	6	1,021.10	366	220
1,020.08	88	8		378	220 227
1,020.10	93	9	1,021.14	376 389	235
1,020.12 1,020.14	93 97	11	1,021.16 1,021.18	401	243
1,020.14	102	13	1,021.16	413	243 251
1,020.16	102	15	1,021.20	425	259
1,020.10	111	18	1,021.22	437	268
1,020.20	116	20	1,021.24	448	200 277
1,020.22	120	22	1,021.28	460	286
1,020.24	125	25 25	1,021.30	472	295
1,020.28	129	25 27	1,021.30	484	305
1,020.30	134	30	1,021.32	496	314
1,020.32	139	33	1,021.34	507	324
1,020.34	143	35	1,021.38	519	335
1,020.34	148	38	1,021.40	531	345
1,020.38	152	41	1,021.40	543	356
1,020.40	157	44	1,021.44	555	367
1,020.42	162	48	1,021.46	566	378
1,020.44	166	51	1,021.48	578	390
1,020.46	171	54	1,021.50	590	401
1,020.48	175	58	1,021.52	600	413
1,020.50	180	61	1,021.54	611	425
1,020.52	185	65	1,021.56	621	438
1,020.54	189	69	1,021.58	632	450
1,020.56	194	72	1,021.60	642	463
1,020.58	198	76	1,021.62	652	476
1,020.60	203	80	1,021.64	663	489
1,020.62	208	85	1,021.66	673	502
1,020.64	212	89	1,021.68	684	516
1,020.66	217	93	1,021.70	694	530
1,020.68	221	97	1,021.72	704	544
1,020.70	226	102	1,021.74	715	558
1,020.72	231	106	1,021.76	725	572
1,020.74	235	111	1,021.78	736	587
1,020.76	240	116	1,021.80	746	602
1,020.78	244	121	1,021.82	756	617
1,020.80	249	126	1,021.84	767	632
1,020.82	254	131	1,021.86	777	647
1,020.84	258	136	1,021.88	788	663
1,020.86	263	141	1,021.90	798	679
1,020.88	267	146	1,021.92	808	695
1,020.90	272	152	1,021.94	819	711
1,020.92	277	157	1,021.96	829	728
1,020.94	281	163	1,021.98	840	744
1,020.96	286	168	1,022.00	850	761
1,020.98	290 205	174			
1,021.00	295 207	180 186			
1,021.02	307	186			
			I		

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Summary for Pond 10P:

Inflow Area = 7.216 ac, 36.35% Impervious, Inflow Depth = 1.24" for 1-Year event Inflow 11.65 cfs @ 12.22 hrs, Volume= 0.745 af 1.89 cfs @ 12.81 hrs, Volume= 0.824 af, Atten= 84%, Lag= 35.1 min Outflow Primary = 1.89 cfs @ 12.81 hrs, Volume= 0.824 af Routed to Reach 1R: North Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af Routed to Pond 1P: 0.00 hrs, Volume= Tertiary = 0.00 cfs @ 0.000 af

Routed to Pond 1P:

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Starting Elev= 979.50' Surf.Area= 3,765 sf Storage= 12,596 cf Peak Elev= 980.72' 212.81 hrs Surf.Area= 12,575 sf Storage= 24,542 cf (11,946 cf above start)

Plug-Flow detention time= 257.3 min calculated for 0.535 af (72% of inflow) Center-of-Mass det. time= 38.3 min (853.4 - 815.2)

Volume	Inve	rt Avail.S	torage Storag	e Description	
#1	972.0	0' 79	,336 cf Custo	m Stage Data (P	rismatic)Listed below (Recalc)
- 14:		D	l Ot	0	
Elevation		Surf.Area	Inc.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)	
972.0	00	320	0	0	
975.0	00	975	1,943	1,943	
977.0	00	2,225	3,200	5,143	
979.0	00	3,430	5,655	10,798	
979.5	50	3,765	1,799	12,596	
980.0	00	10,595	3,590	16,186	
981.0	00	13,340	11,968	28,154	
982.0	00	15,880	14,610	42,764	
983.0	00	18,360	17,120	59,884	
984.0	00	20,545	19,453	79,336	
Device	Routing	Inve	rt Outlet Device	ces	
#1	Primary	978.28	Inlet / Outle n= 0.013, F	nd Culvert L= 17 t Invert= 978.28' / Tow Area= 0.79 st	977.40' S= 0.0050 '/' Cc= 0.900
		~~~ ~			

			Inlet / Outlet Invert= 978.28' / 977.40' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#2	Device 1	980.70'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Device 1	981.00'	<b>48.0" Horiz. Orifice/Grate X 0.60</b> C= 0.600
			Limited to weir flow at low heads
#4	Device 1	978.50'	8.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500
			Inlet / Outlet Invert= 978.50' / 978.50' S= 0.0000 '/' Cc= 0.900
			n= 0.020, Flow Area= 0.35 sf
#5	Secondary	983.60'	5.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#6	Tertiary	981.05'	<b>12.0" Round Culvert</b> L= 30.0' Ke= 0.500
	•		

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Inlet / Outlet Invert= 981.05' / 980.90' S= 0.0050 '/' Cc= 0.900

n= 0.013. Flow Area= 0.79 sf

#7 Device 6 976.00' **12.0"** Round Culvert L= 50.0' Ke= 0.500

Inlet / Outlet Invert= 976.00' / 975.75' S= 0.0050 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

**48.0" Horiz. Orifice/Grate X 0.60** C= 0.600 #8 Device 6 982.50'

Primary OutFlow Max=1.89 cfs @ 12.81 hrs HW=980.72' TW=0.00' (Dynamic Tailwater)

**-1=Culvert** (Passes 1.89 cfs of 3.63 cfs potential flow)

**--2=Sharp-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.48 fps)

-3=Orifice/Grate (Controls 0.00 cfs)

-4=Culvert (Barrel Controls 1.85 cfs @ 2.65 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=979.50' TW=979.45' (Dynamic Tailwater) 5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=979.50' TW=979.45' (Dynamic Tailwater)

**-6=Culvert** (Controls 0.00 cfs)

-7=Culvert (Controls 0.00 cfs)

-8=Orifice/Grate (Controls 0.00 cfs)

Storage (cubic-feet)

49,314

52,738

56,261

59,884

63,599

67,403

71,293

75,271

79,336

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### **Stage-Area-Storage for Pond 10P:**

Surface

(sq-ft)

16,872

17,368

17,864

18,360

18,797

19,234

19,671

20,108

20,545

Elevation	Surface	Storage	Elevation
(feet)	(sq-ft)	(cubic-feet)	(feet)
972.00	320	0	982.40
972.20	364	68	982.60
972.40	407	145	982.80
972.60	451	231	983.00
972.80	495	326	983.20
973.00	538	429	983.40
973.20	582	541	983.60
973.40	626	662	983.80
973.60	669	791	984.00
973.80	713	930	001.00
974.00	757	1,077	
974.20	800	1,232	
974.40	844	1,397	
974.60	888	1,570	
974.80	931	1,752	
975.00	975	1,943	
975.20	1,100	2,150	
975.40	1,100	2,382	
975.60	1,350	2,640	
975.80	1,475	2,922	
976.00			
	1,600 1,725	3,230	
976.20	1,725	3,563	
976.40	1,850	3,920	
976.60	1,975	4,303 4,710	
976.80 977.00	2,100 2,225	4,710 5 142	
		5,143 5,600	
977.20	2,346	5,600 6,081	
977.40	2,466	6,081	
977.60	2,587	6,586	
977.80	2,707	7,115	
978.00	2,828	7,669	
978.20	2,948	8,246	
978.40	3,068	8,848	
978.60	3,189	9,474	
978.80	3,309	10,124	
979.00	3,430	10,798	
979.20	3,564	11,497	
979.40	3,698	12,223	
979.60	5,131	13,041	
979.80	7,863	14,340	
980.00	10,595	16,186	
980.20	11,144	18,360	
980.40	11,693	20,644	
980.60	12,242	23,037	
980.80	12,791	25,541	
981.00	13,340	28,154	
981.20	13,848	30,873	
981.40	14,356	33,693	
981.60	14,864	36,615	
981.80	15,372	39,639	
982.00	15,880	42,764	
982.20	16,376	45,989	

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### **Summary for Pond 11P: DEP**

Inflow Area = 1.803 ac, 11.92% Impervious, Inflow Depth = 0.98" for 1-Year event

Inflow = 2.00 cfs @ 12.26 hrs, Volume= 0.148 af

Outflow = 2.00 cfs @ 12.27 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.2 min

Primary = 2.00 cfs @ 12.27 hrs, Volume= 0.148 af

Routed to Reach 1R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Peak Elev= 979.32' @ 12.27 hrs Surf.Area= 25 sf Storage= 11 cf

Plug-Flow detention time= 1.3 min calculated for 0.148 af (100% of inflow)

Center-of-Mass det. time= 0.2 min (827.8 - 827.6)

Volume	Inve	ert Avai	il.Storage	Storage l	Description		
#1	978.6	67'	2,228 cf	Custom	Stage Data (Prisr	<b>natic)</b> Listed below (l	Recalc)
Elevation		Surf.Area		.Store	Cum.Store		
(feet)		(sq-ft)	(cubi	c-feet)	(cubic-feet)		
978.67		10		0	0		
980.00		40		33	33		
981.00		770		405	438		
982.00		2,810		1,790	2,228		
Device F	Routing	In	vert Outl	et Devices	6		
#1 F	Primary	978			<b>Culvert</b> L= 9.0' Invert= 978.67' / 978	Ke= 0.500 3.39' S= 0.0311 '/'	Cc= 0.900

n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.99 cfs @ 12.27 hrs HW=979.32' TW=0.00' (Dynamic Tailwater) 1=Culvert (Barrel Controls 1.99 cfs @ 4.03 fps)

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### Stage-Area-Storage for Pond 11P: DEP

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
978.67	10	0	981.27	1,321	721
978.72	11	1	981.32	1,423	789
978.77	12	1	981.37	1,525	863
978.82	13	2	981.42	1,627	942
978.87	15	2	981.47	1,729	1,025
978.92	16	3	981.52	1,831	1,114
978.97	17	4	981.57	1,933	1,209
979.02	18	5	981.62	2,035	1,308
979.02 979.07	19	6		2,033 2,137	
		7	981.67		1,412
979.12	20		981.72	2,239	1,521
979.17	21	8	981.77	2,341	1,636
979.22	22	9	981.82	2,443	1,755
979.27	24	10	981.87	2,545	1,880
979.32	25	11	981.92	2,647	2,010
979.37	26	13	981.97	2,749	2,145
979.42	27	14			
979.47	28	15			
979.52	29	17			
979.57	30	18			
979.62	31	20			
979.67	33	21			
979.72	34	23			
979.77	35	25 25			
979.82	36	26			
979.87	37	28			
979.92	38	30			
979.97	39	32			
980.02	55	34			
980.07	91	38			
980.12	128	43			
980.17	164	51			
980.22	201	60			
980.27	237	71			
980.32	274	83			
980.37	310	98			
980.42	347	114			
980.47	383	133			
980.52	420	153			
980.57	456	175			
980.62	493	198			
980.67	529	224			
980.72	566	251			
980.77	602	280			
980.82	639	311			
980.87	675	344			
980.92	712	379			
	712 748				
980.97		415 454			
981.02	811	454			
981.07	913	497			
981.12	1,015	545			
981.17	1,117	599			
981.22	1,219	657			

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# **Summary for Subcatchment 1S: Wetland North**

Runoff = 0.86 cfs @ 12.21 hrs, Volume= 0.052 af, Depth= 2.51"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

	Area	(ac)	CN	Desc	ription			
*	0.	.047	98					
	0.	200	79	Woo	ds, Fair, H	ISG D		
	0.247 83 Weighted Average							
	0.200 79 80.97% Pervious Area							
	0.	047	98	19.03	3% Imperv	ious Area		
	_	_				_		
	Тс	Lengt		Slope	Velocity	Capacity	Description	
_	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)		
	12.8	10	0 0	.0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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## **Summary for Subcatchment 2S: East**

Runoff = 3.04 cfs @ 12.26 hrs, Volume= 0.210 af, Depth= 2.26"

Routed to Reach 22R : East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

Area	(ac)	CN	Adj	Descript	Description Unconnected roofs, HSG D							
0	.061	98		Unconn	ected roofs	s, HSG D						
0	.568	80		>75% G	rass cover	, Good, HSG D						
0	.485	79		Woods/g	Woods/grass comb., Good, HSG D							
1.114 81 80 Weighted Average, UI Adjusted												
1	.053	80	80	94.52%	Pervious A	rea						
0	.061	98	98	5.48% lı	5.48% Impervious Area							
0	0.061				100.00% Unconnected							
					_							
Тс	Length		Slope	Velocity	Capacity	Description						
(min)	(feet	)	(ft/ft)	(ft/sec)	(cfs)							
15.7	100	0.0	0500	0.11		Sheet Flow,						
						Woods: Light underbrush n= 0.400 P2= 2.86"						
1.4	60	0.0	0200	0.71		Shallow Concentrated Flow,						
						Woodland Kv= 5.0 fps						
17.1	160	) To	otal									

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# **Summary for Subcatchment 3S: Southeast**

Runoff = 0.11 cfs @ 12.23 hrs, Volume= 0.007 af, Depth= 2.26"

Routed to Reach 22R : East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac)	CN	Des	cription							
	0.	000	98	Unc	Inconnected pavement, HSG D							
	0.	015	79	Woo	Voods, Fair, HSG D							
	0.021 80 >75% Grass cover, Good, HSG D											
	0.036 80 Weighted Average											
	0.	036	80	100.	00% Pervi	ous Area						
	Тс	Lengt	h	Slope	Velocity	Capacity	Description					
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)						
	14.3	7	0	0.0280	0.08		Sheet Flow,					
							n= 0.380 P2= 2.86"					

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# **Summary for Subcatchment 4S: South**

Runoff = 1.43 cfs @ 12.24 hrs, Volume= 0.093 af, Depth= 2.60"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac)	CN	Desc	cription						
*	0.	099	98								
	0.	302	80	>75%	% Grass co	over, Good	, HSG D				
_	0.	030	79	Woo	ds, Fair, H	ISG D					
	0.	431	84	Weig	ghted Aver	age					
	0.332 80 77.03% Pervious Area					us Area					
	0.	0.099 98 22.97% Impervious Area				ious Area					
	_										
	Тс	Lengt		Slope	Velocity	Capacity	Description				
	(min)	(feet	t)	(ft/ft)	(ft/sec)	(cfs)					
	15.1	8	5 (	0.0420	0.09		Sheet Flow,				
							O D 1 0 440 D0 0 00"				

Grass: Bermuda n= 0.410 P2= 2.86"

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## **Summary for Subcatchment 5S: West**

Runoff = 2.50 cfs @ 12.27 hrs, Volume= 0.178 af, Depth= 2.51"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac) C	N Des	cription							
*	0.	177	98								
	0.	265	30 >75°	>75% Grass cover, Good, HSG D							
	0.	410	79 Woo	Woods, Fair, HSG D							
	0.	852	33 Wei	ghted Aver	age						
	0.	675 ·	79 79.2	3% Pervio	us Area						
	0.	177 9	98 20.7	7% Imperv	/ious Area						
	Тс	Length	Slope	Velocity	Capacity	Description					
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	3.5	20	0.0300	0.09		Sheet Flow,					
						Grass: Dense n= 0.240 P2= 2.86"					
	14.4	80	0.0400	0.09		Sheet Flow,					
						Woods: Light underbrush n= 0.400 P2= 2.86"					
	0.5	45	0.0800	1.41		Shallow Concentrated Flow,					
_						Woodland Kv= 5.0 fps					
	18.4	145	Total								

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# **Summary for Subcatchment 10S: Northeast**

Runoff = 0.18 cfs @ 12.17 hrs, Volume= 0.010 af, Depth= 2.43"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

_	Area	(ac)	CN	Desc	ription		
*	0.	007	98	3			
	0.	041	79	) Woo	ds, Fair, H	ISG D	
	0.	048	82	. Weig	hted Aver	age	
	0.041 79 85.42% Pervious Area						
	0.007 98			14.5	8% Imperv	∕ious Area	
	Тс	Leng		Slope	Velocity	Capacity	Description
	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	90	0.1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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## Summary for Subcatchment 11S: North DEP

Runoff = 1.24 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 2.43"

Routed to Pond 11P: DEP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (	ac)	CN	Desc	Description							
*	* 0.035 98											
	0.260 80 >75% Grass cover, Good, HSG D											
	0.000 79 Woods/grass comb., Good, HSG D											
	0.2	295	82	Weig	hted Aver	age						
	0.2	260	80	88.14% Pervious Area								
	0.0	)35	98	11.86% Impervious Area								
		Leng	th S	Slope	Velocity	Capacity	· ·					
_	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)						
	7.0						Direct Frates					

7.0

Direct Entry,

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## **Summary for Subcatchment 30S: Southeast**

Runoff = 1.73 cfs @ 12.31 hrs, Volume= 0.134 af, Depth= 2.88"

Routed to Pond 3P:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

	Area	(ac)	CN_	Desc	Description							
	0.220 98 Unconnected pavement, HSG D											
	0.084 79 Woods, Fair, HSG D											
	0.253 80 >75% Grass cover, Good, HSG D											
	0.	557	87	Weig	hted Aver	age						
	0.	337	80	60.5	0% Pervio	us Area						
	0.	220	98	39.5	0% Imperv	∕ious Area						
	0.	220		100.	00% Unco	nnected						
	т.	1 41		N	\/-l:h.	Oit.	Description					
	Tc	Length		Slope	Velocity	Capacity	Description					
_	(min)	(feet		(ft/ft)	(ft/sec)	(cfs)						
	19.1	100	0.0	0280	0.09		Sheet Flow,					
							n= 0.380 P2= 2.86"					
	1.8	155	0.0	0400	1.40		Shallow Concentrated Flow,					
							Short Grass Pasture Kv= 7.0 fps					
	20.9	255	To	ntal								

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# **Summary for Subcatchment 40S: Southwest**

Runoff = 0.69 cfs @ 12.16 hrs, Volume= 0.038 af, Depth= 3.27" Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

Area	(ac)	CN	Desc	Description						
0.	083	98	Unco	nnected p	avement, l	HSG D				
0.	000	79	Woo	ds, Fair, H	SG D					
0.	058	80	>75%	⁶ Grass cα	over, Good	d, HSG D				
0.	141	91	Weig	hted Aver	age					
0.	058	80	41.1	3% Pervio	us Area					
0.	083	98	58.8	7% Imperv	rious Area					
0.083 100.00% Unconnected					nnected					
Тс	Lengt	:h	Slope	Velocity	Capacity	Description				
(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)					
9.3	6	5	0.0280	0.12		Sheet Flow,				

Grass: Dense n= 0.240 P2= 2.86"

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## **Summary for Subcatchment 100S: North Pond**

Runoff = 4.53 cfs @ 12.25 hrs, Volume= 0.305 af, Depth= 2.43" Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

	Area	(ac)	CN	Desc	ription							
*	0.	180	98									
	0.	924	80	>75%	>75% Grass cover, Good, HSG D							
		404	79	Woo	Woods/grass comb., Good, HSG D							
*		000	98									
*		000	80									
		508	82	_	hted Aver	•						
		328	80		6% Pervio							
	0.180		98 11.94% Imper		∕ious Area							
	Тс	Lengt	h :	Slope	Velocity	Capacity	Description					
	(min)	(feet		(ft/ft)	(ft/sec)	(cfs)	2					
	13.0	11	0 0	.0350	0.14		Sheet Flow,					
							Grass: Dense n= 0.240 P2= 2.86"					
	0.3	8	1 0	.0600	4.97		Shallow Concentrated Flow,					
							Paved Kv= 20.3 fps					
	3.0	64	1 0	.0060	3.51	2.76	Pipe Channel,					
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
_							n= 0.013					
	16.3	83	2 T	otal								

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## **Summary for Subcatchment 110S: Pond**

Runoff = 24.04 cfs @ 12.22 hrs, Volume= 1.512 af, Depth= 2.78" Routed to Pond 10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 10-Year Rainfall=4.26"

	Area	(ac)	CN	Desc	Description							
*	2.	320	98									
	1.	800	80	>75%	% Grass cover, Good, HSG D							
	2.	398	79	Woo	Woods/grass comb., Good, HSG D							
*		000	98									
*	0.	000	80									
		518	86		ghted Aver							
	4.	198	79		1% Pervio							
	2.320		98	8 35.59% Impervious Area								
	Тс	Lengtl	. 9	Slope	Velocity	Capacity	Description					
	(min)	(feet		(ft/ft)	(ft/sec)	(cfs)	Description					
	11.4	100	0.0	0400	0.15	, ,	Sheet Flow,					
							Grass: Dense n= 0.240 P2= 2.86"					
	0.9	5	5 0.0	0220	1.04		Shallow Concentrated Flow,					
							Short Grass Pasture Kv= 7.0 fps					
	1.4	17	7 0.0	0850	2.04		Shallow Concentrated Flow,					
							Short Grass Pasture Kv= 7.0 fps					
	13.7	332	2 To	otal								

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## **Summary for Reach 1R: North**

Inflow Area = 9.314 ac, 31.05% Impervious, Inflow Depth = 2.82" for 10-Year event

Inflow = 9.16 cfs @ 12.37 hrs, Volume= 2.188 af

Outflow = 9.16 cfs @ 12.37 hrs, Volume= 2.188 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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## Summary for Reach 4R: Plymouth Road

Inflow Area = 1.283 ac, 21.51% Impervious, Inflow Depth = 2.54" for 10-Year event

Inflow = 3.89 cfs @ 12.26 hrs, Volume= 0.272 af

Outflow = 3.89 cfs @ 12.26 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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## **Summary for Reach 22R: East**

Inflow Area = 1.150 ac, 5.30% Impervious, Inflow Depth = 2.26" for 10-Year event

Inflow = 3.14 cfs @ 12.26 hrs, Volume= 0.216 af

Outflow = 3.14 cfs @ 12.26 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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## **Summary for Reach 31R: Total**

Inflow Area = 11.747 ac, 27.49% Impervious, Inflow Depth = 2.73" for 10-Year event

Inflow = 16.09 cfs @ 12.27 hrs, Volume= 2.676 af

Outflow = 16.09 cfs @ 12.27 hrs, Volume= 2.676 af, Atten= 0%, Lag= 0.0 min

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### **Summary for Pond 1P:**

Inflow Area = 1.508 ac, 11.94% Impervious, Inflow Depth = 3.51" for 10-Year event

Inflow = 4.79 cfs @ 12.30 hrs, Volume= 0.442 af

Outflow = 4.01 cfs @ 12.46 hrs, Volume= 0.442 af, Atten= 16%, Lag= 9.7 min

Primary = 4.01 cfs @ 12.46 hrs, Volume= 0.442 af

Routed to Pond 11P: DEP

Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Pond 11P: DEP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Starting Elev= 978.00' Storage= 0 cf

Peak Elev= 981.07' @ 12.46 hrs Surf.Area= 2,424 sf Storage= 1,060 cf

Plug-Flow detention time= 1.9 min calculated for 0.441 af (100% of inflow)

Center-of-Mass det. time= 1.9 min ( 800.0 - 798.1 )

Volume	Invert	Avail.Stor	age Sto	orage Description	
#1	979.45'	55,82	25 cf <b>Cu</b>	ustom Stage Data (Prismatic)Listed below (Recalc)	
Classatia		wf A va a	lna Cta	one Cure Stone	
Elevation		rf.Area	Inc.Sto		
(fee		(sq-ft)	(cubic-fee	eet) (cubic-feet)	
979.4	15	10		0 0	
980.0	00	68	2	21 21	
981.0	00	1,700	88	384 905	
982.0	00	11,370	6,5	7,440	
983.0	00 :	25,550	18,40	160 25,900	
984.0		34,300	29,92	925 55,825	
		,	,	•	
Device	Routing	Invert	Outlet D	Devices	
#1	Primary	979.45'	12.0" R	Round Culvert L= 18.0' Ke= 0.500	
	,		Inlet / Ou	Outlet Invert= 979.45' / 978.80' S= 0.0361 '/' Cc= 0.900	
				3, Flow Area= 0.79 sf	
#2	Primary	979.45'		n/hr Exfiltration over Surface area above 978.00'	
		0.00		ed Surface area = 0 sf	
#3	Secondary	981.50'		g x 2.0' breadth Broad-Crested Rectangular Weir	
110	Occorridary	001.00	•	eet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00	
			,	00 3.50	
			,	English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88	
			∠.85 3.0	07 3.20 3.32	

Primary OutFlow Max=4.01 cfs @ 12.46 hrs HW=981.07' TW=979.71' (Dynamic Tailwater)

1=Culvert (Inlet Controls 4.01 cfs @ 5.10 fps)

**—2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=979.45' TW=978.67' (Dynamic Tailwater)

3=Broad-Crested Rectangular Weir( Controls 0.00 cfs)

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# **Stage-Area-Storage for Pond 1P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
979.45	10	0	982.05	12,079	8,027
979.50	15	1	982.10	12,788	8,648
979.55	21	2	982.15	13,497	9,305
979.60	26	3	982.20	14,206	9,998
979.65	31	4	982.25	14,915	10,726
979.70	36	6	982.30	15,624	11,490
979.75	42	8	982.35	16,333	12,288
979.80	47	10	982.40	17,042	13,123
979.85	52	12	982.45	17,751	13,993
979.90	57	15	982.50	18,460	14,898
979.95	63	18	982.55	19,169	15,839
980.00	68	21	982.60	19,878	16,815
980.05	150	27	982.65	20,587	17,826
980.10	231	36	982.70	21,296	18,874
980.15	313	50	982.75	22,005	19,956
980.20	394	68	982.80	22,714	21,074
980.25	476	89	982.85	23,423	22,227
980.30	558	115	982.90	24,132	23,416
980.35	639	145	982.95	24,841	24,641
980.40	721	179	983.00	25,550	25,900
980.45	802	217	983.05	25,988	27,189
980.50	884	259	983.10	26,425	28,499
980.55	966	306	983.15	26,863	29,831
980.60	1,047	356	983.20	27,300	31,185
980.65	1,129 1,210	410 469	983.25	27,738 28,175	32,561
980.70 980.75	1,210	531	983.30 983.35	28,175 28,613	33,959 35,379
980.80	1,374	598	983.40	29,050	36,820
980.85	1,455	669	983.45	29,488	38,284
980.90	1,537	744	983.50	29,925	39,769
980.95	1,618	822	983.55	30,363	41,276
981.00	1,700	905	983.60	30,800	42,805
981.05	2,184	1,003	983.65	31,238	44,356
981.10	2,667	1,124	983.70	31,675	45,929
981.15	3,151	1,269	983.75	32,113	47,524
981.20	3,634	1,439	983.80	32,550	49,140
981.25	4,118	1,633	983.85	32,988	50,779
981.30	4,601	1,851	983.90	33,425	52,439
981.35	5,085	2,093	983.95	33,863	54,121
981.40	5,568	2,359	984.00	34,300	55,825
981.45	6,052	2,650		·	•
981.50	6,535	2,964			
981.55	7,019	3,303			
981.60	7,502	3,666			
981.65	7,986	4,053			
981.70	8,469	4,465			
981.75	8,953	4,900			
981.80	9,436	5,360			
981.85	9,920	5,844			
981.90	10,403	6,352			
981.95	10,887	6,884			
982.00	11,370	7,440			
			I		

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### **Summary for Pond 3P:**

Inflow Area = 0.557 ac, 39.50% Impervious, Inflow Depth = 2.88" for 10-Year event Inflow 1.73 cfs @ 12.31 hrs, Volume= 0.134 af Outflow 1.73 cfs @ 12.31 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.6 min Discarded = 0.00 cfs @ 12.32 hrs, Volume= 0.000 af 0.133 af 1.73 cfs @ 12.31 hrs, Volume= Primary Routed to Pond 10P: Secondary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af Routed to Reach 22R: East

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,014.37 @ 12.32 hrs Surf.Area= 241 sf Storage= 77 cf

Plug-Flow detention time= 1.3 min calculated for 0.133 af (100% of inflow) Center-of-Mass det. time= 1.3 min (804.5 - 803.2)

<u>Volume</u>	Invert	Avail.Sto	rage Storag	je Description	
#1	1,014.00'	77	9 cf Custo	m Stage Data (Pr	rismatic)Listed below (Recalc)
Elevatio	n Su	rf.Area	Inc.Store	Cum.Store	
(fee	t)	(sq-ft)	(cubic-feet)	(cubic-feet)	
1,014.0	00	175	0	0	
1,015.0	00	355	265	265	
1,015.5	50	525	220	485	
1,016.0	00	650	294	779	
Device	Routing	Invert	Outlet Device	ces	
#1	Secondary	1,015.00'	1.2' long x	1.2' breadth Bro	ad-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		
			Coef. (Engli	sh) 2.66 2.69 2.	71 2.78 2.89 2.99 3.09 3.20 3.21
			3.19 3.30	3.32	
#2	Discarded	1,014.00'	0.060 in/hr	<b>Exfiltration over</b>	Surface area
#3	Device 4	1,014.00'	15.0" Horiz	. Orifice/Grate X	<b>0.60</b> C= 0.600
			Limited to w	eir flow at low hea	ads
#4	Primary	1,011.00'	8.0" Round	d Culvert L= 117.	.0' Ke= 0.500

Inlet / Outlet Invert= 1,011.00' / 1,009.71' S= 0.0110 '/' Cc= 0.900

**Discarded OutFlow** Max=0.00 cfs @ 12.32 hrs HW=1,014.37' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.71 cfs @ 12.31 hrs HW=1,014.37' TW=981.54' (Dynamic Tailwater)

4=Culvert (Passes 1.71 cfs of 1.78 cfs potential flow)

3=Orifice/Grate (Weir Controls 1.71 cfs @ 1.19 fps)

n= 0.015, Flow Area= 0.35 sf

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,014.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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# **Stage-Area-Storage for Pond 3P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,014.00 1,014.02	175 179	0 4	1,015.04 1,015.06	369 375	279 287
1,014.02	182	7	1,015.08	382	294
1,014.04	186	11	1,015.00	389	302
1,014.08	189	15	1,015.10	396	310
1,014.10	193	18	1,015.12	403	318
1,014.12	197	22	1,015.16	409	326
1,014.14	200	26	1,015.18	416	334
1,014.16	204	30	1,015.20	423	343
1,014.18	207	34	1,015.22	430	351
1,014.20	211	39	1,015.24	437	360
1,014.22	215	43	1,015.26	443	369
1,014.24	218	47	1,015.28	450	378
1,014.26	222	52	1,015.30	457	387
1,014.28	225	56	1,015.32	464	396
1,014.30	229	61	1,015.34	471	405
1,014.32	233	65 70	1,015.36	477	415
1,014.34	236	70 75	1,015.38	484	424
1,014.36 1,014.38	240 243	75 79	1,015.40 1,015.42	491 498	434 444
1,014.30	243 247	79 84	1,015.42	505	454 454
1,014.42	251	89	1,015.46	511	464
1,014.44	254	94	1,015.48	518	475
1,014.46	258	100	1,015.50	525	485
1,014.48	261	105	1,015.52	530	496
1,014.50	265	110	1,015.54	535	506
1,014.52	269	115	1,015.56	540	517
1,014.54	272	121	1,015.58	545	528
1,014.56	276	126	1,015.60	550	539
1,014.58	279	132	1,015.62	555	550
1,014.60	283	137	1,015.64	560	561
1,014.62	287	143	1,015.66	565	572
1,014.64	290	149	1,015.68	570 575	584
1,014.66	294	155	1,015.70	575 500	595
1,014.68 1,014.70	297 301	161 167	1,015.72 1,015.74	580 585	607
1,014.70	305	173	1,015.74	590	618 630
1,014.72	308	179	1,015.76	595	642
1,014.76	312	185	1,015.80	600	654
1,014.78	315	191	1,015.82	605	666
1,014.80	319	198	1,015.84	610	678
1,014.82	323	204	1,015.86	615	690
1,014.84	326	211	1,015.88	620	703
1,014.86	330	217	1,015.90	625	715
1,014.88	333	224	1,015.92	630	728
1,014.90	337	230	1,015.94	635	740
1,014.92	341	237	1,015.96	640	753
1,014.94	344	244	1,015.98	645	766 770
1,014.96	348	251	1,016.00	650	779
1,014.98	351 355	258 265			
1,015.00 1,015.02	362	265 272			
1,013.02	302	212			
			ı		

Volume

Invert

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### **Summary for Pond 4P:**

Inflow Area = 0.141 ac, 58.87% Impervious, Inflow Depth = 3.27" for 10-Year event Inflow 0.69 cfs @ 12.16 hrs, Volume= 0.038 af Outflow 0.68 cfs @ 12.17 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.5 min Discarded = 0.00 cfs @ 12.17 hrs, Volume= 0.000 af 0.68 cfs @ 12.17 hrs, Volume= 0.038 af Primary Routed to Pond 10P: Secondary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af Routed to Reach 4R: Plymouth Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,020.20' @ 12.17 hrs Surf.Area= 111 sf Storage= 17 cf

Plug-Flow detention time= 0.8 min calculated for 0.038 af (100% of inflow) Center-of-Mass det. time= 0.8 min (782.4 - 781.7)

Avail Storage Storage Description

volullie	IIIVEIL	Avaii.Siui	age Sicrage	Description		
#1	1,020.00'	76	1 cf Custom	Stage Data (P	rismatic)Listed below (Recalc)	
Elevatio	n Sur	f.Area	Inc.Store	Cum.Store		
(fee	t)	(sq-ft)	(cubic-feet)	(cubic-feet)		
1,020.0	0	65	0	0		
1,021.0	0	295	180	180		
1,021.5	0	590	221	401		
1,022.0	0	850	360	761		
Device	Routing	Invert	Outlet Device	s		
#1	Secondary	1,021.00'	5.0' long x 5	.0' breadth Bro	oad-Crested Rectangular Weir	
			Head (feet) 0	0.20 0.40 0.60	0.80 1.00 1.20 1.40 1.60 1.80 2.00	
				50 4.00 4.50 5		
			Coef. (English	n) 2.34 2.50 2.	.70 2.68 2.68 2.66 2.65 2.65 2.65	
2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88						
#2	Discarded	1,020.00'	0.060 in/hr E	xfiltration over	Surface area	
#3 Primary 1,020.00' <b>15.0" Horiz. Orifice/Grate X 0.60</b> C= 0.600						
			Limited to weir flow at low heads			

**Discarded OutFlow** Max=0.00 cfs @ 12.17 hrs HW=1,020.19' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.66 cfs @ 12.17 hrs HW=1,020.19' TW=980.79' (Dynamic Tailwater) 3=Orifice/Grate (Weir Controls 0.66 cfs @ 0.87 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,020.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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# **Stage-Area-Storage for Pond 4P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,020.00	65 70	0	1,021.04	319	192
1,020.02 1,020.04	70 74	1 3	1,021.06 1,021.08	330 342	199 205
1,020.04	74 79	4	1,021.00	354 354	203 212
	83	6	1,021.10	366	220
1,020.08	88	8		378	220 227
1,020.10	93	9	1,021.14	376 389	235
1,020.12 1,020.14	93 97	11	1,021.16 1,021.18	401	243
1,020.14	102	13	1,021.16	413	243 251
1,020.16	102	15	1,021.20	425	259
1,020.10	111	18	1,021.22	437	268
1,020.20	116	20	1,021.24	448	200 277
1,020.22	120	22	1,021.28	460	286
1,020.24	125	25 25	1,021.30	472	295
1,020.28	129	25 27	1,021.30	484	305
1,020.30	134	30	1,021.32	496	314
1,020.32	139	33	1,021.34	507	324
1,020.34	143	35	1,021.38	519	335
1,020.34	148	38	1,021.40	531	345
1,020.38	152	41	1,021.40	543	356
1,020.40	157	44	1,021.44	555	367
1,020.42	162	48	1,021.46	566	378
1,020.44	166	51	1,021.48	578	390
1,020.46	171	54	1,021.50	590	401
1,020.48	175	58	1,021.52	600	413
1,020.50	180	61	1,021.54	611	425
1,020.52	185	65	1,021.56	621	438
1,020.54	189	69	1,021.58	632	450
1,020.56	194	72	1,021.60	642	463
1,020.58	198	76	1,021.62	652	476
1,020.60	203	80	1,021.64	663	489
1,020.62	208	85	1,021.66	673	502
1,020.64	212	89	1,021.68	684	516
1,020.66	217	93	1,021.70	694	530
1,020.68	221	97	1,021.72	704	544
1,020.70	226	102	1,021.74	715	558
1,020.72	231	106	1,021.76	725	572
1,020.74	235	111	1,021.78	736	587
1,020.76	240	116	1,021.80	746	602
1,020.78	244	121	1,021.82	756	617
1,020.80	249	126	1,021.84	767	632
1,020.82	254	131	1,021.86	777	647
1,020.84	258	136	1,021.88	788	663
1,020.86	263	141	1,021.90	798	679
1,020.88	267	146	1,021.92	808	695
1,020.90	272	152	1,021.94	819	711
1,020.92	277	157	1,021.96	829	728
1,020.94	281	163	1,021.98	840	744
1,020.96	286	168	1,022.00	850	761
1,020.98	290 205	174			
1,021.00	295 307	180 186			
1,021.02	307	186			
			I		

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### **Summary for Pond 10P:**

Inflow Area = 7.216 ac, 36.35% Impervious, Inflow Depth = 2.80" for 10-Year event Inflow 26.08 cfs @ 12.22 hrs, Volume= 1.683 af 6.37 cfs @ 12.62 hrs, Volume= Outflow 1.762 af, Atten= 76%, Lag= 24.1 min Primary = 4.50 cfs @ 12.62 hrs, Volume= 1.625 af Routed to Reach 1R: North Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af Routed to Pond 1P: 1.88 cfs @ 12.62 hrs, Volume= 0.137 af Tertiary

Routed to Pond 1P:

#6

Tertiary

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Starting Elev= 979.50' Surf.Area= 3,765 sf Storage= 12,596 cf Peak Elev= 981.96' 12.62 hrs Surf.Area= 15,780 sf Storage= 42,141 cf (29,545 cf above start)

Plug-Flow detention time= 169.9 min calculated for 1.472 af (87% of inflow) Center-of-Mass det. time= 62.3 min (861.2 - 798.9)

Invert	Avail.Stor	age Storage	Storage Description		
972.00'	79,33	6 cf Custon	ո Stage Data (Pi	rismatic)Listed below (Recalc)	
		Inc.Store	Cum.Store		
et)	(sq-ft)	(cubic-feet)	(cubic-feet)		
00	320	0	0		
00	975	1,943	1,943		
00	2,225	3,200	5,143		
	3,430	5,655	10,798		
	•	,	•		
	•	•			
	•	•	·		
		•	•		
	,	•	•		
00	20,545	19,453	79,336		
Routing	Invert	Outlet Device	26		
				5 0' Ka= 0 500	
Filliary	970.20	Inlet / Outlet Invert= 978.28' / 977.40' S= 0.0050 '/' Cc= 0.900			
Device 1	980.70'	•			
201.00 1	001.00				
Device 1	978.50'				
Secondary	983.60'	•			
· · · · · · · · · · · ·				0.80 1.00 1.20 1.40 1.60 1.80 2.00	
		` ,			
	972.00' on Subt) 00 00 00 00 00 00 00 00 00 00 00	972.00' 79,33 on Surf.Area et) (sq-ft) 00 320 00 975 00 2,225 00 3,430 50 3,765 00 10,595 00 13,340 00 15,880 00 18,360 00 20,545  Routing Invert Primary 978.28'  Device 1 980.70' Device 1 981.00' Device 1 978.50'	972.00' 79,336 cf Custon  on Surf.Area Inc.Store (sq-ft) (cubic-feet)  00 320 0 00 975 1,943 00 2,225 3,200 00 3,430 5,655 00 3,765 1,799 00 10,595 3,590 00 13,340 11,968 00 15,880 14,610 00 15,880 14,610 00 20,545 19,453  Routing Invert Outlet Device Primary 978.28' 12.0" Round Inlet / Outlet n= 0.013, Flo Device 1 980.70' 4.0' long Sha Device 1 981.00' 48.0" Horiz. Limited to we Device 1 978.50' 8.0" Round Inlet / Outlet n= 0.020, Flo Secondary 983.60' 5.0' long x 5 Head (feet) (	972.00' 79,336 cf Custom Stage Data (Property of Surf.Area Inc.Store Cum.Store (sq-ft) (cubic-feet) (cubic-fe	

Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65

2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

981.05' **12.0" Round Culvert** L= 30.0' Ke= 0.500

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Inlet / Outlet Invert= 981.05' / 980.90' S= 0.0050 '/' Cc= 0.900

n= 0.013. Flow Area= 0.79 sf

#7 Device 6 976.00' **12.0" Round Culvert** L= 50.0' Ke= 0.500

Inlet / Outlet Invert= 976.00' / 975.75' S= 0.0050 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

**48.0" Horiz. Orifice/Grate X 0.60** C= 0.600 #8 Device 6 982.50'

Primary OutFlow Max=4.50 cfs @ 12.62 hrs HW=981.96' TW=0.00' (Dynamic Tailwater)

-1=Culvert (Barrel Controls 4.50 cfs @ 5.72 fps)

**-2=Sharp-Crested Rectangular Weir**(Passes < 17.32 cfs potential flow)

-3=Orifice/Grate (Passes < 23.16 cfs potential flow)

**-4=Culvert** (Passes < 2.48 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=979.50' TW=979.45' (Dynamic Tailwater) 5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Tertiary OutFlow Max=1.87 cfs @ 12.62 hrs HW=981.96' TW=980.97' (Dynamic Tailwater)

**-6=Culvert** (Barrel Controls 1.87 cfs @ 3.28 fps)

-7=Culvert (Passes 1.87 cfs of 3.43 cfs potential flow)

-8=Orifice/Grate (Controls 0.00 cfs)

Storage (cubic-feet)

49,314

52,738

56,261 59,884

63,599

67,403

71,293

75,271

79,336

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### **Stage-Area-Storage for Pond 10P:**

Surface

(sq-ft) 16,872

17,368

17,864

18,360 18,797

19,234

19,671

20,108

20,545

		J	J
Elevation	Surface	Storage	Elevation
(feet)	(sq-ft)	(cubic-feet)	(feet)
972.00	320	0	982.40
972.20	364	68	982.60
972.40	407	145	982.80
972.60	451	231	983.00
972.80	495	326	983.20
973.00	538	429	983.40
973.20	582	541	983.60
973.40	626	662	983.80
973.60	669	791	984.00
973.80	713	930	
974.00	757	1,077	
974.20	800	1,232	
974.40	844	1,397	
974.60	888	1,570	
974.80	931	1,752	
975.00	975	1,943	
975.20	1,100	2,150	
975.40	1,225	2,382	
975.60	1,350	2,640	
975.80	1,475	2,922	
976.00	1,600	3,230	
976.20	1,725	3,563	
976.40	1,850	3,920	
976.60	1,975	4,303	
976.80	2,100	4,710	
977.00	2,225	5,143	
977.20	2,346	5,600	
977.40	2,466	6,081	
977.60	2,587	6,586	
977.80	2,707	7,115	
978.00	2,828	7,669	
978.20	2,948	8,246	
978.40	3,068	8,848	
978.60	3,189	9,474	
978.80	3,309	10,124	
979.00	3,430	10,798	
979.20	3,564	11,497	
979.40	3,698	12,223	
979.60	5,131	13,041	
979.80	7,863	14,340	
980.00	10,595	16,186	
	11,144		
980.20	,	18,360	
980.40	11,693	20,644	
980.60	12,242	23,037	
980.80	12,791	25,541	
981.00	13,340	28,154	
981.20	13,848	30,873	
981.40	14,356	33,693	
981.60	14,864	36,615	
981.80	15,372	39,639	
982.00	15,880	42,764	
982.20	16,376	45,989	
		l	

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### **Summary for Pond 11P: DEP**

Inflow Area = 1.803 ac, 11.92% Impervious, Inflow Depth = 3.34" for 10-Year event

Inflow = 4.29 cfs @ 12.40 hrs, Volume= 0.501 af

Outflow = 4.30 cfs @ 12.40 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.1 min

Primary = 4.30 cfs @ 12.40 hrs, Volume= 0.501 af

Routed to Reach 1R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 979.72' @ 12.40 hrs Surf.Area= 34 sf Storage= 23 cf

Plug-Flow detention time= 0.1 min calculated for 0.501 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (800.3 - 800.2)

Volume	Inv	ert Avail.9	Storage Stor	rage Description			
#1	978.	67' 2	2,228 cf <b>Cus</b>	stom Stage Data (P	rismatic)Listed below (Recalc)		
Elevatio		Surf.Area (sq-ft)	Inc.Stor (cubic-fee				
978.6	37	10		0 0			
980.0	00	40	3	3 33			
981.0	00	770	40	5 438			
982.0	00	2,810	1,79	0 2,228			
Device	Routing	Inve	ert Outlet De	evices			
#1	Primary	978.6	Inlet / Ou	<b>18.0" Round Culvert</b> L= 9.0' Ke= 0.500 Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf			

Primary OutFlow Max=4.30 cfs @ 12.40 hrs HW=979.72' TW=0.00' (Dynamic Tailwater) 1=Culvert (Barrel Controls 4.30 cfs @ 4.59 fps)

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# Stage-Area-Storage for Pond 11P: DEP

Elevation   Surface   (feet)   (sq-ft)   (cubic-feet)     978.67						
978.67						
978.77 12 1 1 981.32 1,423 789 978.77 12 1 981.37 1,525 863 978.82 13 2 981.42 1,627 942 978.87 15 2 981.47 1,729 1,025 978.92 16 3 981.52 1,831 1,114 978.97 17 4 981.57 1,933 1,209 979.02 18 5 981.62 2,035 1,308 979.07 19 6 981.67 2,137 1,412 979.12 20 7 981.77 2,341 1,636 979.17 21 8 981.82 2,443 1,755 979.17 21 8 981.82 2,443 1,755 979.27 24 10 981.87 2,545 1,880 979.32 25 11 981.92 2,647 2,010 979.37 26 13 981.92 2,647 2,010 979.47 28 15 979.42 27 14 979.47 28 15 979.52 29 17 979.57 30 18 979.67 33 21 979.79 39 32 979.77 35 25 979.82 36 26 979.87 37 28 979.97 39 32 980.07 91 38 980.17 164 51 980.22 201 60 980.27 237 71 980.32 274 83 980.17 164 51 980.27 237 71 980.32 274 83 980.17 164 51 980.27 237 71 980.32 274 83 980.17 164 51 980.27 237 71 980.32 274 83 980.17 164 51 980.27 237 71 980.32 274 83 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 98 980.07 91 91 98 980.07 91 91 91 98 980.07 91 91 91 98 980.07 91 91 91 91 91 91 91 91 91 91 91 91 91						
978.77 12 1 981.37 1.525 863 978.82 13 2 981.47 1.627 942 978.87 15 2 981.47 1.729 1.025 978.92 16 3 981.52 1.831 1.114 978.97 17 4 981.57 1.933 1.209 979.02 18 5 981.62 2.035 1.308 979.07 19 6 981.67 2.137 1.412 979.12 20 7 981.72 2.239 1.521 979.17 21 8 981.77 2.341 1.636 979.27 24 10 981.87 2.545 1.880 979.37 26 13 981.92 2.647 2.010 979.42 27 14 979.47 28 15 979.52 29 17 979.57 30 18 979.52 29 17 979.77 35 25 979.82 36 26 979.87 37 28 979.92 38 30 979.97 39 32 29 980.02 55 34 980.07 51 30 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 38 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 98 980.07 91 91 91 91 91 91 91 91 91 91 91 91 91						
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979.87       37       28         979.92       38       30         979.97       39       32         980.02       55       34         980.07       91       38         980.12       128       43         980.17       164       51         980.22       201       60         980.27       237       71         980.32       274       83         980.37       310       98         980.42       347       114         980.47       383       133         980.52       420       153         980.57       456       175         980.62       493       198         980.77       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       748       415         981.02       811       454         981.02       811       454         981.12       1,015       545         981.17       1,117       599						
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980.32						
980.37       310       98         980.42       347       114         980.47       383       133         980.52       420       153         980.57       456       175         980.62       493       198         980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.42       347       114         980.47       383       133         980.52       420       153         980.57       456       175         980.62       493       198         980.67       529       224         980.72       566       251         980.87       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.47       383       133         980.52       420       153         980.57       456       175         980.62       493       198         980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.52       420       153         980.57       456       175         980.62       493       198         980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.57       456       175         980.62       493       198         980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.62       493       198         980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599						
980.67       529       224         980.72       566       251         980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599		493				
980.77       602       280         980.82       639       311         980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599	980.67	529				
980.82     639     311       980.87     675     344       980.92     712     379       980.97     748     415       981.02     811     454       981.07     913     497       981.12     1,015     545       981.17     1,117     599						
980.87       675       344         980.92       712       379         980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599	980.77	602	280			
980.92     712     379       980.97     748     415       981.02     811     454       981.07     913     497       981.12     1,015     545       981.17     1,117     599	980.82	639	311			
980.97       748       415         981.02       811       454         981.07       913       497         981.12       1,015       545         981.17       1,117       599	980.87	675	344			
981.02     811     454       981.07     913     497       981.12     1,015     545       981.17     1,117     599						
981.07 913 497 981.12 1,015 545 981.17 1,117 599						
981.12 1,015 545 981.17 1,117 599						
981.17 1,117 599						
981.22 1,219 657						
	981.22	1,219	657			

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# **Summary for Subcatchment 1S: Wetland North**

Runoff = 1.77 cfs @ 12.21 hrs, Volume= 0.110 af, Depth= 5.33"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	cription			
*	0.	047	98					
	0.	200	79	Woo	ds, Fair, F	ISG D		
	0.	247	83	Weig	hted Aver	age		
	0.	200	79	80.9	7% Pervio	us Area		
	0.	047	98	19.03	3% Imper\	ious Area		
	_		_			_		
	Тс	Length		Slope	Velocity	Capacity	Description	
	(min)	(feet	)	(ft/ft)	(ft/sec)	(cfs)		
	12.8	100	0.	.0300	0.13		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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# **Summary for Subcatchment 2S: East**

Runoff = 6.62 cfs @ 12.26 hrs, Volume= 0.463 af, Depth= 4.99"

Routed to Reach 22R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac) C	N Adj	Descrip	tion						
	0.	061 9	98	Unconn	Inconnected roofs, HSG D						
	0.	568	30	>75% G	75% Grass cover, Good, HSG D						
	0.	485	79	Woods/	grass comb	o., Good, HSG D					
	1.	114 8	31 80	Weighte	ed Average	, UI Adjusted					
	1.	053 8	80	94.52%	Pervious A	Area					
	0.	061 9	98 98	5.48% I	mpervious	Area					
	0.	061		100.009	6 Unconne	cted					
	<b>T</b> -	141-	01	\	0 :6 -	Describetton					
	Tc	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	15.7	100	0.0500	0.11		Sheet Flow,					
						Woods: Light underbrush n= 0.400 P2= 2.86"					
	1.4	60	0.0200	0.71		Shallow Concentrated Flow,					
_						Woodland Kv= 5.0 fps					
	17.1	160	Total								

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# **Summary for Subcatchment 3S: Southeast**

Runoff = 0.23 cfs @ 12.22 hrs, Volume= 0.015 af, Depth= 4.99"

Routed to Reach 22R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

Are	a (ac)	(1)	N Desc	cription		
	0.000	9	8 Unc	onnected p	oavement, l	HSG D
	0.015	7	9 Woo	ds, Fair, F	ISG D	
	0.021	8	0 >759	% Grass co	over, Good	H, HSG D
	0.036	8	0 Weig	ghted Aver	age	
	0.036	8	0 100.	00% Pervi	ous Area	
Т	c Lenç	gth	Slope	Velocity	Capacity	Description
(mir	ı) (fe	et)	(ft/ft)	(ft/sec)	(cfs)	
14.	3	70	0.0280	0.08		Sheet Flow,
						n= 0.380 P2= 2.86"

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# **Summary for Subcatchment 4S: South**

Runoff = 2.91 cfs @ 12.23 hrs, Volume= 0.196 af, Depth= 5.44"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	cription								
*	0.	099	98										
	0.	302	80	>75%	% Grass co	over, Good	, HSG D						
	0.	030	79	Woo	ds, Fair, H	ISG D							
	0.	431	84	Weig	ghted Aver	age							
	0.	332	80	77.0	3% Pervio	us Area							
	0.	099	98	22.9	7% Imperv	ious Area							
	Тс	Lengt	:h	Slope	Velocity	Capacity	Description						
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)							
	15.1	8	5 (	0.0420	0.09		Sheet Flow,	•		•		•	
							·		0.440		0 0011		

Grass: Bermuda n= 0.410 P2= 2.86"

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# **Summary for Subcatchment 5S: West**

Runoff = 5.19 cfs @ 12.27 hrs, Volume= 0.378 af, Depth= 5.33"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac) (	CN De	scription					
*	0.	177	98						
	0.	265	80 >75	5% Grass c	over, Good	, HSG D			
	0.	410	79 Wo	ods, Fair, F	ISG D				
	0.852 83			Weighted Average					
	0.	675	79 79.	23% Pervic	us Area				
	0.	177	98 20.	77% Imper	vious Area				
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	3.5	20	0.0300	0.09		Sheet Flow,			
						Grass: Dense n= 0.240 P2= 2.86"			
	14.4	80	0.0400	0.09		Sheet Flow,			
						Woods: Light underbrush n= 0.400 P2= 2.86"			
	0.5	45	0.0800	1.41		Shallow Concentrated Flow,			
_						Woodland Kv= 5.0 fps			
	18.4	145	Total						

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# **Summary for Subcatchment 10S: Northeast**

Runoff = 0.38 cfs @ 12.16 hrs, Volume= 0.021 af, Depth= 5.22"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	ription		
*	0.	007	98				
	0.	041	79	Woo	ds, Fair, H	ISG D	
	0.	048	82	Weig	hted Aver	age	
	0.	041	79	85.42	2% Pervio	us Area	
	0.	007	98	14.58	8% Imperv	∕ious Area	
	Тс	Lengt		Slope	Velocity	Capacity	Description
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	9	0 0	).1500	0.16		Sheet Flow,

Woods: Light underbrush n= 0.400 P2= 2.86"

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# Summary for Subcatchment 11S: North DEP

Runoff = 2.57 cfs @ 12.14 hrs, Volume= 0.128 af, Depth= 5.22"

Routed to Pond 11P: DEP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area (a	ac)	CN	Desc	cription							
*	0.0	)35	98									
	0.2	260	80	>75%	>75% Grass cover, Good, HSG D							
_	0.0	000	79	Woo	ds/grass c	omb., Goo	od, HSG D					
	0.2	295	82	Weig	hted Aver	age						
	0.2	260	80	88.1	4% Pervio	us Area						
	0.0	)35	98	11.8	6% Imperv	rious Area						
		Leng	th :	Slope	Velocity	Capacity	·					
_	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)						
	7.0						Discot Fator					

7.0 Direct Entry,

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# **Summary for Subcatchment 30S: Southeast**

Runoff = 3.38 cfs @ 12.30 hrs, Volume= 0.269 af, Depth= 5.79" Routed to Pond 3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

Area	(ac)	CN	Desc	ription		
0.	.220	98	Unco	onnected p	oavement, l	HSG D
0.	.084	79	Woo	ds, Fair, F	ISG D	
0.	.253	80	>75%	√ Grass co	over, Good	, HSG D
0.	.557	87	Weig	hted Aver	age	
0.	.337	80	60.5	0% Pervio	us Area	
0.	.220	98	39.50	ואס Imper\	∕ious Area	
0.	.220		100.0	00% Unco	nnected	
Tc (min)	Lengtl (feet		lope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1	100	0.0	0280	0.09	, ,	Sheet Flow,
						n= 0.380 P2= 2.86"
1.8	15	5 0.0	0400	1.40		Shallow Concentrated Flow,
						Short Grass Pasture Kv= 7.0 fps
20.9	25	5 To	tal			

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# **Summary for Subcatchment 40S: Southwest**

Runoff = 1.27 cfs @ 12.16 hrs, Volume= 0.073 af, Depth= 6.25" Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

_	Area	(ac) (	CN De	escription			
	0.	083	98 Ur	nconnected	pavement,	HSG D	
	0.	000	79 W	oods, Fair, F	HSG D		
_	0.	058	80 >7	5% Grass c	over, Good	, HSG D	
	0.	141	91 W	eighted Ave	rage		
	0.	058	80 41	.13% Pervio	us Area		
	0.	083	98 58	.87% Imper	vious Area		
	0.	083	10	0.00% Unco	onnected		
		Length		-	Capacity	Description	
_	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)		
	9.3	65	0.028	0 0.12		Sheet Flow,	

Grass: Dense n= 0.240 P2= 2.86"

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# **Summary for Subcatchment 100S: North Pond**

Runoff = 9.55 cfs @ 12.25 hrs, Volume= 0.656 af, Depth= 5.22" Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	ription		
*	0.	180	98				
	0.	924	80	>75%	% Grass c	over, Good	, HSG D
		404	79	Woo	ds/grass o	comb., Goo	d, HSG D
*		000	98				
*		000	80				
		508	82	_	ted Aver	•	
		328	80		6% Pervio		
	0.	180	98	11.9	4% Imper	∕ious Area	
	Тс	Lengtl	ո Տ	Slope	Velocity	Capacity	Description
	(min)	(feet		(ft/ft)	(ft/sec)	(cfs)	
	13.0	110	0.	.0350	0.14		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.86"
	0.3	8	Ι 0.	.0600	4.97		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps
	3.0	64	Ι 0.	.0060	3.51	2.76	Pipe Channel,
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
_							n= 0.013
	16.3	832	2 T∈	otal			

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## **Summary for Subcatchment 110S: Pond**

Runoff = 47.52 cfs @ 12.21 hrs, Volume= 3.082 af, Depth= 5.67" Routed to Pond 10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs MSE 24-hr 3 100-Year base Rainfall=7.32"

	Area	(ac)	CN	Desc	cription		
*	2.	320	98	3			
	1.	800	80			over, Good	·
		398	79		ds/grass o	omb., Goo	d, HSG D
*		000	98				
*		000	80	)			
		518	86	•	ghted Aver	•	
	4.	198	79		1% Pervio		
	2.	320	98	35.5	9% Imperv	/ious Area	
	т.	1	41_	Ol	\/-l:h.	Oit.	Description
	Tc	Leng		Slope	Velocity	Capacity	Description
_	(min)	(fee		(ft/ft)	(ft/sec)	(cfs)	
	11.4	10	00	0.0400	0.15		Sheet Flow,
		_					Grass: Dense n= 0.240 P2= 2.86"
	0.9	5	55	0.0220	1.04		Shallow Concentrated Flow,
							Short Grass Pasture Kv= 7.0 fps
	1.4	17	7	0.0850	2.04		Shallow Concentrated Flow,
_							Short Grass Pasture Kv= 7.0 fps
	13.7	33	32	Total			

MSE 24-hr 3 100-Year base Rainfall=7.32"

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## **Summary for Reach 1R: North**

Inflow Area = 9.314 ac, 31.05% Impervious, Inflow Depth = 5.66" for 100-Year base event

Inflow = 14.21 cfs @ 12.62 hrs, Volume= 4.395 af

Outflow = 14.21 cfs @ 12.62 hrs, Volume= 4.395 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

MSE 24-hr 3 100-Year base Rainfall=7.32"

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# Summary for Reach 4R: Plymouth Road

Inflow Area = 1.283 ac, 21.51% Impervious, Inflow Depth = 5.37" for 100-Year base event

Inflow = 8.03 cfs @ 12.26 hrs, Volume= 0.574 af

Outflow = 8.03 cfs @ 12.26 hrs, Volume= 0.574 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

MSE 24-hr 3 100-Year base Rainfall=7.32"

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# **Summary for Reach 22R: East**

Inflow Area = 1.150 ac, 5.30% Impervious, Inflow Depth = 5.22" for 100-Year base event

Inflow = 7.63 cfs @ 12.29 hrs, Volume= 0.500 af

Outflow = 7.63 cfs @ 12.29 hrs, Volume= 0.500 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

MSE 24-hr 3 100-Year base Rainfall=7.32"

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# **Summary for Reach 31R: Total**

Inflow Area = 11.747 ac, 27.49% Impervious, Inflow Depth = 5.59" for 100-Year base event

Inflow = 28.88 cfs @ 12.28 hrs, Volume= 5.469 af

Outflow = 28.88 cfs @ 12.28 hrs, Volume= 5.469 af, Atten= 0%, Lag= 0.0 min

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### **Summary for Pond 1P:**

Inflow Area = 1.508 ac, 11.94% Impervious, Inflow Depth = 12.20" for 100-Year base event

Inflow = 13.64 cfs @ 12.27 hrs, Volume= 1.533 af

Outflow = 8.07 cfs @ 12.72 hrs, Volume= 1.533 af, Atten= 41%, Lag= 27.1 min

Primary = 5.15 cfs @ 12.51 hrs, Volume= 1.285 af

Routed to Pond 11P: DEP

Secondary = 2.96 cfs @ 12.74 hrs, Volume= 0.248 af

Routed to Pond 11P: DEP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Starting Elev= 978.00' Storage= 0 cf

Peak Elev= 982.19' @ 12.74 hrs Surf.Area= 14,001 sf Storage= 9,794 cf

Plug-Flow detention time= 12.7 min calculated for 1.532 af (100% of inflow)

Center-of-Mass det. time= 12.7 min (808.0 - 795.3)

Volume	Invert	t Avail.Sto	rage Storag	e Description		
#1	979.45	55,82	25 cf Custo	m Stage Data (P	rismatic)Listed below (Re	ecalc)
Elevatio	on S	urf.Area	Inc.Store	Cum.Store		
(fee	t)	(sq-ft)	(cubic-feet)	(cubic-feet)		
979.4	<b>!</b> 5	10	0	0		
980.0	00	68	21	21		
981.0	00	1,700	884	905		
982.0	00	11,370	6,535	7,440		
983.0	00	25,550	18,460	25,900		
984.0	00	34,300	29,925	55,825		
Device	Routing	Invert	Outlet Device	ces		
#1	Primary	979.45'	12.0" Rour	nd Culvert L= 18	.0' Ke= 0.500	
	,		Inlet / Outlet	t Invert= 979.45' /	978.80' S= 0.0361 '/' C	c= 0.900
			n= 0.013, F	low Area= 0.79 st	f	
#2	Primary	979.45'	0.060 in/hr	<b>Exfiltration</b> over	Surface area above 978	3.00'
	-		Excluded Su	urface area = 0 sf		
#3	Secondary	981.50'	2.0' long x	2.0' breadth Bro	ad-Crested Rectangular	r Weir
			Head (feet)	0.20 0.40 0.60	0.80 1.00 1.20 1.40 1.6	30 1.80 2.00
			2.50 3.00 3	3.50		
			Coef. (Engli	sh) 2.54 2.61 2.	61 2.60 2.66 2.70 2.77	2.89 2.88
			2.85 3.07 3	3.20 3.32		

Primary OutFlow Max=5.10 cfs @ 12.51 hrs HW=982.11' TW=980.30' (Dynamic Tailwater)

-1=Culvert (Inlet Controls 5.08 cfs @ 6.47 fps)

**-2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=2.95 cfs @ 12.74 hrs HW=982.18' TW=980.37' (Dynamic Tailwater)

3=Broad-Crested Rectangular Weir (Weir Controls 2.95 cfs @ 2.16 fps)

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# **Stage-Area-Storage for Pond 1P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
979.45	10	Ő	982.05	12,079	8,027
979.50	15	1	982.10	12,788	8,648
979.55	21	2	982.15	13,497	9,305
979.60	26	3	982.20	14,206	9,998
979.65	31	4	982.25	14,915	10,726
979.70	36	6	982.30	15,624	11,490
979.75 979.75	42	8	982.35	16,333	12,288
979.80	47	10	982.40	17,042	13,123
979.85 979.85	52	12	982.45	17,042 17,751	
979.83 979.90	57	15	982.50	18,460	13,993 14,898
	63				
979.95	68	18	982.55	19,169	15,839
980.00		21	982.60	19,878	16,815
980.05	150	27	982.65	20,587	17,826
980.10	231	36	982.70	21,296	18,874
980.15	313	50	982.75	22,005	19,956
980.20	394	68	982.80	22,714	21,074
980.25	476	89	982.85	23,423	22,227
980.30	558	115	982.90	24,132	23,416
980.35	639	145	982.95	24,841	24,641
980.40	721	179	983.00	25,550	25,900
980.45	802	217	983.05	25,988	27,189
980.50	884	259	983.10	26,425	28,499
980.55	966	306	983.15	26,863	29,831
980.60	1,047	356	983.20	27,300	31,185
980.65	1,129	410	983.25	27,738	32,561
980.70	1,210	469	983.30	28,175	33,959
980.75	1,292	531	983.35	28,613	35,379
980.80	1,374	598	983.40	29,050	36,820
980.85	1,455	669	983.45	29,488	38,284
980.90	1,537	744	983.50	29,925	39,769
980.95	1,618	822	983.55	30,363	41,276
981.00	1,700	905	983.60	30,800	42,805
981.05	2,184	1,003	983.65	31,238	44,356
981.10	2,667	1,124	983.70	31,675	45,929
981.15	3,151	1,269	983.75	32,113	47,524
981.20	3,634	1,439	983.80	32,550	49,140
981.25	4,118	1,633	983.85	32,988	50,779
981.30	4,601	1,851	983.90	33,425	52,439
981.35	5,085	2,093	983.95	33,863	54,121
981.40	5,568	2,359	984.00	34,300	55,825
981.45	6,052	2,650			
981.50	6,535	2,964			
981.55	7,019	3,303			
981.60	7,502	3,666			
981.65	7,986	4,053			
981.70	8,469	4,465			
981.75	8,953	4,900			
981.80	9,436	5,360			
981.85	9,920	5,844			
981.90	10,403	6,352			
981.95	10,887	6,884			
982.00	11,370	7,440			
	,	.,			
			•		

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### **Summary for Pond 3P:**

Inflow Area = 0.557 ac, 39.50% Impervious, Inflow Depth = 5.79" for 100-Year base event Inflow 3.38 cfs @ 12.30 hrs, Volume= 0.269 af Outflow = 3.26 cfs @ 12.35 hrs, Volume= 0.269 af, Atten= 4%, Lag= 3.1 min Discarded = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af 2.02 cfs @ 12.35 hrs, Volume= Primary = 0.246 af Routed to Pond 10P: 1.24 cfs @ 12.35 hrs, Volume= Secondary = 0.022 af

Routed to Reach 22R: East

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,015.53' @ 12.35 hrs Surf.Area= 531 sf Storage= 499 cf

Plug-Flow detention time= 1.8 min calculated for 0.269 af (100% of inflow)

Center-of-Mass det. time= 1.8 min ( 791.1 - 789.3 )

Invert	Avail.Stor	age Storage	Description	
1,014.00'	77	9 cf Custon	ո Stage Data (P	rismatic)Listed below (Recalc)
	rf.Area	Inc.Store		
t)	(sq-ft)	(cubic-feet)	(cubic-feet)	
0	175	0	0	
0	355	265	265	
0	525	220	485	
0	650	294	779	
Routing	Invert	Outlet Device	es	
Secondary	1,015.00'	1.2' long x 1	I.2' breadth Bro	ad-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		
		Coef. (Englis	h) 2.66 2.69 2.	71 2.78 2.89 2.99 3.09 3.20 3.21
		3.19 3.30 3.	32	
Discarded	1,014.00'	0.060 in/hr E	xfiltration over	Surface area
Device 4	1,014.00'	15.0" Horiz.	Orifice/Grate X	<b>0.60</b> C= 0.600
		Limited to we	ir flow at low hea	ads
Primary	1,011.00'	8.0" Round	Culvert L= 117	.0' Ke= 0.500
•	•	Inlet / Outlet I	Invert= 1,011.00	'/1,009.71' S= 0.0110 '/' Cc= 0.900
		n= 0.015. Flo	ow Area= 0.35 st	·
	1,014.00' on Su t) 00 00 Routing Secondary  Discarded Device 4	1,014.00' 77  on Surf.Area t) (sq-ft) 00 175 00 355 00 525 00 650  Routing Invert Secondary 1,015.00'  Discarded 1,014.00' Device 4 1,014.00'	1,014.00' 779 cf Custon  on Surf.Area Inc.Store (t) (sq-ft) (cubic-feet)  00 175 0 00 355 265 00 525 220 00 650 294  Routing Invert Outlet Device Secondary 1,015.00' 1.2' long x 1 Head (feet) 0 2.50 3.00 Coef. (Englis 3.19 3.30 3. Discarded 1,014.00' 0.060 in/hr E Device 4 1,014.00' 15.0" Horiz. Limited to we Primary 1,011.00' 8.0" Round Inlet / Outlet	1,014.00' 779 cf Custom Stage Data (Pon Surf.Area Inc.Store Cum.Store (sq-ft) (cubic-feet) (cubic-feet)  00 175 0 0 00 355 265 265 00 525 220 485 00 650 294 779  Routing Invert Outlet Devices  Secondary 1,015.00' 1.2' long x 1.2' breadth Brown Head (feet) 0.20 0.40 0.60 2.50 3.00  Coef. (English) 2.66 2.69 2.3.19 3.30 3.32  Discarded 1,014.00' 0.060 in/hr Exfiltration over 15.0" Horiz. Orifice/Grate X Limited to weir flow at low head Primary 1,011.00' 8.0" Round Culvert L= 117

**Discarded OutFlow** Max=0.00 cfs @ 12.35 hrs HW=1,015.52' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=2.02 cfs @ 12.35 hrs HW=1,015.52' TW=983.44' (Dynamic Tailwater)

4=Culvert (Barrel Controls 2.02 cfs @ 5.79 fps)

3=Orifice/Grate (Passes 2.02 cfs of 4.38 cfs potential flow)

Secondary OutFlow Max=1.23 cfs @ 12.35 hrs HW=1,015.52' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Weir Controls 1.23 cfs @ 1.96 fps)

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# **Stage-Area-Storage for Pond 3P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,014.00	175	0	1,015.04	369	279
1,014.02	179	4	1,015.06	375	287
1,014.04	182	7	1,015.08	382	294
1,014.06	186	11	1,015.10	389	302
1,014.08	189	15	1,015.12	396	310
1,014.10	193	18	1,015.14	403	318
1,014.12	197 200	22 26	1,015.16	409 416	326
1,014.14 1,014.16	200 204	30	1,015.18 1,015.20	423	334 343
1,014.18	207	34	1,015.20	430	351
1,014.20	211	39	1,015.24	437	360
1,014.22	215	43	1,015.24	443	369
1,014.24	218	47	1,015.28	450	378
1,014.26	222	52	1,015.30	457	387
1,014.28	225	56	1,015.32	464	396
1,014.30	229	61	1,015.34	471	405
1,014.32	233	65	1,015.36	477	415
1,014.34	236	70	1,015.38	484	424
1,014.36	240	75	1,015.40	491	434
1,014.38	243	79	1,015.42	498	444
1,014.40	247	84	1,015.44	505	454
1,014.42	251	89	1,015.46	511	464
1,014.44	254	94	1,015.48	518	475
1,014.46	258	100	1,015.50	525	485
1,014.48	261	105	1,015.52	530	496
1,014.50	265	110	1,015.54	535 540	506
1,014.52	269 272	115 121	1,015.56	540 545	517
1,014.54 1,014.56	272 276	121	1,015.58 1,015.60	545 550	528 539
1,014.58	276 279	132	1,015.62	555 555	550
1,014.60	283	137	1,015.62	560	561
1,014.62	287	143	1,015.66	565	572
1,014.64	290	149	1,015.68	570	584
1,014.66	294	155	1,015.70	575	595
1,014.68	297	161	1,015.72	580	607
1,014.70	301	167	1,015.74	585	618
1,014.72	305	173	1,015.76	590	630
1,014.74	308	179	1,015.78	595	642
1,014.76	312	185	1,015.80	600	654
1,014.78	315	191	1,015.82	605	666
1,014.80	319	198	1,015.84	610	678
1,014.82	323	204	1,015.86	615	690
1,014.84	326	211	1,015.88	620	703
1,014.86	330	217	1,015.90	625	715
1,014.88	333	224	1,015.92	630 635	728 740
1,014.90	337 341	230 237	1,015.94	640	740 753
1,014.92 1,014.94	344	237 244	1,015.96 1,015.98	645	766
1,014.96	348	251	1,016.00	<b>650</b>	779
1,014.98	351	258	1,010.00	000	113
1,015.00	355	265			
1,015.02	362	272			
•					

Volume

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Invert

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### **Summary for Pond 4P:**

Inflow Area = 0.141 ac, 58.87% Impervious, Inflow Depth = 6.25" for 100-Year base event Inflow 1.27 cfs @ 12.16 hrs, Volume= 0.073 af Outflow 1.25 cfs @ 12.17 hrs, Volume= 0.073 af, Atten= 1%, Lag= 0.4 min Discarded = 0.00 cfs @ 12.17 hrs, Volume= 0.000 af 1.25 cfs @ 12.17 hrs, Volume= 0.073 af Primary Routed to Pond 10P: Secondary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af Routed to Reach 4R: Plymouth Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,020.30' @ 12.17 hrs Surf.Area= 134 sf Storage= 30 cf

Plug-Flow detention time= 0.7 min calculated for 0.073 af (100% of inflow) Center-of-Mass det. time= 0.7 min (769.8 - 769.2)

Avail Storage Storage Description

volullie	IIIVEIL	Avaii.Siui	age Sicrage	Description			
#1	1,020.00'	76	1 cf Custom	Stage Data (P	rismatic)Listed below (Recalc)		
Elevatio	n Sur	f.Area	Inc.Store	Cum.Store			
(fee	t)	(sq-ft)	(cubic-feet)	(cubic-feet)			
1,020.0	0	65	0	0			
1,021.0	0	295	180	180			
1,021.5	0	590	221	401			
1,022.0	0	850	360	761			
Device	Routing	Invert	Outlet Device	s			
#1	Secondary	1,021.00'	5.0' long x 5	.0' breadth Bro	ad-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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65				
				66 2.68 2.70 2			
#2	Discarded	1,020.00'					
#3	Primary	1,020.00'		Orifice/Grate X			
			Limited to wei	ir flow at low hea	ads		

**Discarded OutFlow** Max=0.00 cfs @ 12.17 hrs HW=1,020.29' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.22 cfs @ 12.17 hrs HW=1,020.29' TW=982.15' (Dynamic Tailwater) 3=Orifice/Grate (Weir Controls 1.22 cfs @ 1.06 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,020.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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## **Stage-Area-Storage for Pond 4P:**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,020.00	65	0	1,021.04	319	192
1,020.02	70	1	1,021.06	330	199
1,020.04	74	3	1,021.08	342	205
1,020.06	79	4	1,021.10	354	212
1,020.08	83	6	1,021.12	366	220
1,020.10	88	8	1,021.14	378	227
1,020.12	93	9	1,021.16	389	235
1,020.14	97	11	1,021.18	401	243
1,020.16	102	13	1,021.20	413	251
1,020.18	106	15	1,021.22	425	259
1,020.20	111	18	1,021.24	437	268
1,020.22	116	20	1,021.26	448	277
1,020.24	120	22	1,021.28	460	286
1,020.26	125	25	1,021.30	472	295
1,020.28	129	27	1,021.32	484	305
1,020.30	134	30	1,021.34	496	314
1,020.32	139	33	1,021.36	507	324
1,020.34	143	35	1,021.38	519	335
1,020.36	148	38	1,021.40	531	345
1,020.38	152	41	1,021.42	543	356
1,020.40	157	44	1,021.44	555 566	367
1,020.42	162	48 51	1,021.46	566	378
1,020.44	166 171	51 54	1,021.48 1,021.50	578 590	390 401
1,020.46 1,020.48	175	54 58	1,021.50	600	413
1,020.48	180	61	1,021.52	611	425
1,020.52	185	65	1,021.54	621	438
1,020.54	189	69	1,021.58	632	450
1,020.56	194	72	1,021.60	642	463
1,020.58	198	76	1,021.62	652	476
1,020.60	203	80	1,021.64	663	489
1,020.62	208	85	1,021.66	673	502
1,020.64	212	89	1,021.68	684	516
1,020.66	217	93	1,021.70	694	530
1,020.68	221	97	1,021.72	704	544
1,020.70	226	102	1,021.74	715	558
1,020.72	231	106	1,021.76	725	572
1,020.74	235	111	1,021.78	736	587
1,020.76	240	116	1,021.80	746	602
1,020.78	244	121	1,021.82	756	617
1,020.80	249	126	1,021.84	767	632
1,020.82	254	131	1,021.86	777 <b>7</b> 22	647
1,020.84	258	136	1,021.88	788 700	663
1,020.86	263	141	1,021.90	798	679
1,020.88	267	146	1,021.92	808	695
1,020.90	272 277	152 157	1,021.94	819 829	711 728
1,020.92	277 281	163	1,021.96	840	726 744
1,020.94 1,020.96	286	168	1,021.98 1,022.00	8 <b>50</b>	744 761
1,020.98	290	174	1,022.00	0.50	701
1,020.90	295	180			
1,021.02	307	186			
- , - = - · <del>-</del>					

#6

Tertiary

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#### **Summary for Pond 10P:**

Inflow Area = 7.216 ac, 36.35% Impervious, Inflow Depth = 5.66" for 100-Year base event Inflow 50.58 cfs @ 12.21 hrs, Volume= 3.402 af 12.22 cfs @ 12.62 hrs, Volume= Outflow 3.481 af, Atten= 76%, Lag= 24.2 min Primary = 5.57 cfs @ 12.63 hrs, Volume= 2.604 af Routed to Reach 1R: North Secondary = 1.67 cfs @ 12.63 hrs, Volume= 0.048 af Routed to Pond 1P: 5.01 cfs @ 12.53 hrs, Volume= 0.829 af Tertiary Routed to Pond 1P:

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Starting Elev= 979.50' Surf.Area= 3,765 sf Storage= 12,596 cf Peak Elev= 983.87' 2.63 hrs Surf.Area= 20,259 sf Storage= 76,668 cf (64,071 cf above start)

Plug-Flow detention time= 141.8 min calculated for 3.191 af (94% of inflow) Center-of-Mass det. time= 78.1 min (863.3 - 785.1)

Volume	Invert	Avail.Sto	rage Storage	Description	
#1	972.00'	79,33	36 cf <b>Custon</b>	n Stage Data (P	rismatic)Listed below (Recalc)
Elevation	on Su	ırf.Area	Inc.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)	
972.0	00	320	0	0	
975.0	00	975	1,943	1,943	
977.0	-	2,225	3,200	5,143	
979.0		3,430	5,655	10,798	
979.5		3,765	1,799	12,596	
980.0		10,595	3,590	16,186	
981.0		13,340	11,968	28,154	
982.0		15,880	14,610	42,764	
983.0		18,360	17,120	59,884	
984.0	00	20,545	19,453	79,336	
Device	Routing	Invert	Outlet Device	20	
					F 01 - K 0 - 500
#1	Primary	978.28'			5.0' Ke= 0.500
					977.40' S= 0.0050 '/' Cc= 0.900
#2	Device 1	980.70'	•	ow Area= 0.79 st	ctangular Weir 2 End Contraction(s)
#2 #3	Device 1 Device 1	980.70 981.00'		Orifice/Grate X	
#3	Device i	901.00		ir flow at low hea	
#4	Device 1	978.50'			L= 100.0' Ke= 0.500
# <del>4</del>	Device i	970.50			978.50' S= 0.0000 '/' Cc= 0.900
				ow Area= 0.35 st	
#5	Secondary	983.60'	,		ad-Crested Rectangular Weir
#3	Secondary	903.00			0.80 1.00 1.20 1.40 1.60 1.80 2.00
				50 4.00 4.50 5	
			2.00 0.00 0.	55 <del>7</del> .55 <del>7</del> .56 5	

Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65

2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

981.05' **12.0" Round Culvert** L= 30.0' Ke= 0.500

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Inlet / Outlet Invert= 981.05' / 980.90' S= 0.0050 '/' Cc= 0.900

n= 0.013. Flow Area= 0.79 sf

#7 Device 6 976.00' **12.0"** Round Culvert L= 50.0' Ke= 0.500

Inlet / Outlet Invert= 976.00' / 975.75' S= 0.0050 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

**48.0" Horiz. Orifice/Grate X 0.60** C= 0.600 #8 Device 6 982.50'

Primary OutFlow Max=5.57 cfs @ 12.63 hrs HW=983.87' TW=0.00' (Dynamic Tailwater)

-1=Culvert (Barrel Controls 5.57 cfs @ 7.09 fps)

-2=Sharp-Crested Rectangular Weir(Passes < 62.05 cfs potential flow)

-3=Orifice/Grate (Passes < 61.47 cfs potential flow)

**-4=Culvert** (Passes < 3.22 cfs potential flow)

Secondary OutFlow Max=1.65 cfs @ 12.63 hrs HW=983.87' TW=982.17' (Dynamic Tailwater) 5=Broad-Crested Rectangular Weir (Weir Controls 1.65 cfs @ 1.24 fps)

Tertiary OutFlow Max=4.95 cfs @ 12.53 hrs HW=983.83' TW=982.12' (Dynamic Tailwater)

**-6=Culvert** (Inlet Controls 4.95 cfs @ 6.30 fps)

**-7=Culvert** (Passes < 4.71 cfs potential flow)

**-8=Orifice/Grate** (Passes < 41.84 cfs potential flow)

Storage (cubic-feet)

49,314

52,738

56,261

59,884

63,599

67,403

71,293

75,271

79,336

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#### **Stage-Area-Storage for Pond 10P:**

Surface

(sq-ft)

16,872

17,368

17,864

18,360

18,797

19,234

19,671

20,108

20,545

Elevation

(feet)

982.40

982.60

982.80

983.00 983.20

983.40

983.60

983.80

984.00

Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)
972.00	320	0
972.20	364	68
972.40	407	145
972.60	451	231
972.80	495	326
973.00	538	429
973.20	582	541
973.40	626	662
973.60	669	791
973.80	713	930
974.00	757	1,077
974.20	800	1,232
974.40	844	1,397
974.60	888	1,570
974.80	931	1,752
975.00	975	1,943
975.20	1,100	2,150
975.40	1,225	2,382
975.60	1,350	2,640
975.80	1,475	2,922
976.00	1,600	3,230
976.20	1,725	3,563
976.40	1,850	3,920
976.60	1,975	4,303
976.80	2,100	4,710
977.00	2,225	5,143
977.20	2,346	5,600
977.40	2,466	6,081
977.60	2,587	6,586
977.80	2,707	7,115
978.00	2,828	7,669
978.20	2,948	8,246
978.40	3,068	8,848
978.60	3,189	9,474
978.80	3,309	10,124
979.00	3,430	10,798
979.20	3,564	11,497
979.40	3,698	12,223
979.60	5,131	13,041
979.80	7,863	14,340
980.00	10,595	16,186
980.20	11,144	18,360
980.40	11,693	20,644
980.60	12,242	23,037
980.80	12,791	25,541
981.00	13,340	28,154
981.20	13,848	30,873
981.40	14,356	33,693
981.60	14,864	36,615
981.80	15,372	39,639
982.00	15,880 16.376	42,764
982.20	16,376	45,989
		1

#### Prop-21509-8Lot

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#### **Summary for Pond 11P: DEP**

Inflow Area = 1.803 ac, 11.92% Impervious, Inflow Depth = 11.05" for 100-Year base event

Inflow = 8.32 cfs @ 12.71 hrs, Volume= 1.661 af

Outflow = 8.31 cfs @ 12.73 hrs, Volume= 1.661 af, Atten= 0%, Lag= 1.2 min

Primary = 8.31 cfs @ 12.73 hrs, Volume= 1.661 af

Routed to Reach 1R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 980.37' @ 12.73 hrs Surf.Area= 314 sf Storage= 100 cf

Plug-Flow detention time= 0.1 min calculated for 1.660 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (806.4 - 806.3)

Volume	Inver	t Avail.Sto	orage	Storage	Description		
#1	978.67	' 2,2	28 cf	Custom	Stage Data (Pr	ismatic)Listed below (	Recalc)
Elevation (feet)	S	surf.Area (sq-ft)		Store -feet)	Cum.Store (cubic-feet)		
978.67		10		0	0		
980.00		40		33	33		
981.00		770		405	438		
982.00		2,810		1,790	2,228		
Device R	outing	Invert	Outle	et Devices	3		
#1 Pi	rimary	978.67'			Culvert L= 9.0 overt= 978.67' / 9	' Ke= 0.500 978.39' S= 0.0311 '/'	Cc= 0.900

Inlet / Outlet Invert= 978.67' / 978.39' S= 0.0311 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=8.31 cfs @ 12.73 hrs HW=980.37' TW=0.00' (Dynamic Tailwater) 1=Culvert (Inlet Controls 8.31 cfs @ 4.70 fps)

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#### Stage-Area-Storage for Pond 11P: DEP

		J	· ·		
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
978.67	10	0	981.27	1,321	721
978.72	11	1	981.32	1,423	789
978.77	12		981.37	1,525	863
		1			
978.82	13	2	981.42	1,627	942
978.87	15	2	981.47	1,729	1,025
978.92	16	3	981.52	1,831	1,114
978.97	17	4	981.57	1,933	1,209
979.02	18	5	981.62	2,035	1,308
979.07	19	6	981.67	2,137	1,412
979.12	20	7	981.72	2,239	1,521
979.17	21	8	981.77	2,341	1,636
979.22	22	9	981.82	2,443	1,755
979.27	24	10	981.87	2,545	1,880
979.32	25	11	981.92	2,647	2,010
979.37	26	13	981.97	2,749	2,145
979.42	27	14			
979.47	28	15			
979.52	29	17			
979.57	30	18			
979.62	31	20			
979.67	33	21			
979.72	34	23			
979.77	35	25			
979.82	36	26			
979.87	37	28			
979.92	38	30			
979.97	39	32			
980.02	55	34			
980.07	91	38			
980.12	128	43			
980.17	164	51			
980.22	201	60			
980.27	237	71			
980.32	274	83			
980.37	310	98			
980.42	347	114			
980.42	383	133			
980.52	420	153			
980.57	456	175			
	493	198			
980.62 980.67					
	529 566	224			
980.72		251			
980.77	602	280			
980.82	639	311			
980.87	675	344			
980.92	712	379			
980.97	748	415			
981.02	811	454			
981.07	913	497			
981.12	1,015	545			
981.17	1,117	599			
981.22	1,219	657			

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#### **Summary for Subcatchment 1S: Wetland North**

Runoff = 1.56 cfs @ 48.13 hrs, Volume= 0.133 af, Depth= 6.47"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	CN	Desc	cription					
*	0.	047	98							
	0.	200	79	Woo	ds, Fair, F	ISG D				
	0.247 83			Weig	Weighted Average					
	0.200 79				7% Pervio	us Area				
	0.047 98		19.03	3% Imperv	ious Area/					
	_	_				_				
	Тс	Lengt		Slope	Velocity	Capacity	Description			
	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)				
	12.8	10	0 0	0.0300	0.13		Sheet Flow,			

Grass: Dense n= 0.240 P2= 2.86"

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#### **Summary for Subcatchment 2S: East**

Runoff = 5.95 cfs @ 48.19 hrs, Volume= 0.567 af, Depth= 6.10"

Routed to Reach 22R : East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac) C	N Adj	Descrip	Description						
	0.	061	98	Unconn	Unconnected roofs, HSG D						
	0.	568	30	>75% G	>75% Grass cover, Good, HSG D						
	0.	485	79	Woods/	Woods/grass comb., Good, HSG D						
	1.	114	31 80	Weighte	d Average	, UI Adjusted					
	1.	053	80	94.52%	Pervious A	Area					
	0.	061	98 98	5.48% I	mpervious	Area					
	0.	061		100.00%	6 Unconne	cted					
	_										
	Тс	Length	Slope	Velocity	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	15.7	100	0.0500	0.11		Sheet Flow,					
						Woods: Light underbrush n= 0.400 P2= 2.86"					
	1.4	60	0.0200	0.71		Shallow Concentrated Flow,					
_						Woodland Kv= 5.0 fps					
	17.1	160	Total								

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#### **Summary for Subcatchment 3S: Southeast**

Runoff = 0.21 cfs @ 48.15 hrs, Volume= 0.018 af, Depth= 6.10"

Routed to Reach 22R: East

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	CN	Desc	Description							
	0.	.000	98	Unco	onnected p	HSG D						
	0.015 79 Woods, Fair, HSG D											
_	0.	I, HSG D										
	0.	.036	80	Weig	hted Aver	age						
	0.	.036	80	100.0	100.00% Pervious Area							
	Тс	Lengt	h :	Slope	Velocity	Capacity	Description					
_	(min)	(feet	:)	(ft/ft)	(ft/sec)	(cfs)						
	14.3	7	0 0	.0280	0.08		Sheet Flow,					

n= 0.380 P2= 2.86"

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#### **Summary for Subcatchment 4S: South**

Runoff = 2.59 cfs @ 48.16 hrs, Volume= 0.237 af, Depth= 6.59"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	<u>CN</u>	Desc	ription			
*	0.	099	98					
	0.	302	80	>75%	√ Grass co	over, Good	, HSG D	
	0.	030	79	Woo	ds, Fair, H			
	0.	431	84	Weig	hted Aver	age		
	0.332 80 77.03% Pervious Area							
	0.099 98 22.97% Impervious Area					ious Area		
_	Tc (min)	Length (feet		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	15.1	85	5 0	.0420	0.09		Sheet Flow,	
							O D 0 440 DO- 0 00"	

Grass: Bermuda n= 0.410 P2= 2.86"

PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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#### **Summary for Subcatchment 5S: West**

Runoff = 4.64 cfs @ 48.20 hrs, Volume= 0.

0.459 af, Depth= 6.47"

Routed to Reach 4R : Plymouth Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac)	CN [	Desc	cription					
*	0.	177	98							
	0.265 80		80 >	>75% Grass cover, Good, HSG D						
	0.	410	<del>7</del> 9 ١	Woo	ds, Fair, F	ISG D				
	0.	852	83 \	Weig	hted Aver	age				
	0.675 79			79.23% Pervious Area						
	0.177 98 20.77% Impervious									
	Тс	Length		pe	Velocity	Capacity	Description			
_	(min)	(feet	) (f1	t/ft)	(ft/sec)	(cfs)				
	3.5	20	0.03	300	0.09		Sheet Flow,			
							Grass: Dense n= 0.240 P2= 2.86"			
	14.4	80	0.04	100	0.09		Sheet Flow,			
							Woods: Light underbrush n= 0.400 P2= 2.86"			
	0.5	45	0.08	300	1.41		Shallow Concentrated Flow,			
_							Woodland Kv= 5.0 fps			
	18.4	145	Tota	al						

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#### **Summary for Subcatchment 10S: Northeast**

Runoff = 0.33 cfs @ 48.08 hrs, Volume= 0.025 af, Depth= 6.35"

Routed to Reach 1R: North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	CN	Desc	ription						
*	0.	007	98	3							
	0.	041	79	) Woo	ds, Fair, H	ISG D					
	0.048 82			. Weig	Weighted Average						
	0.041 79 85.42% Pervious A										
	0.007 98			14.5	8% Imperv	∕ious Area					
	Тс	Leng		Slope	Velocity	Capacity	Description				
	(min)	(fee	et)	(ft/ft)	(ft/sec)	(cfs)					
	9.3	9	90	0.1500	0.16		Sheet Flow,				

Woods: Light underbrush n= 0.400 P2= 2.86"

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## Summary for Subcatchment 11S: North DEP

Runoff = 2.30 cfs @ 48.05 hrs, Volume= 0.156 af, Depth= 6.35"

Routed to Pond 11P: DEP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area (	(ac)	CN	Desc	cription								
*	0.0	035	98										
	0.2	0.260 80 >75% Grass cover, Good, HSG D											
	0.0	000	79	Woods/grass comb., Good, HSG D									
	0.2	295	82	Weig	hted Aver	age							
	0.2	260	80	88.1	4% Pervio	us Area							
	0.0	035	98	8 11.86% Impervious Area									
		Leng	jth :	Slope	Velocity	Capacity	· ·						
_	(min)	(fee	∋t)	(ft/ft)	(ft/sec)	(cfs)							
	7.0						Direct Frates						

7.0

Direct Entry,

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#### **Summary for Subcatchment 30S: Southeast**

Runoff = 3.02 cfs @ 48.24 hrs, Volume= 0.322 af, Depth= 6.95"

Routed to Pond 3P:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

_	Area	(ac)	CN E	)esc	Description						
0.220 98 Unconnected pavement, HSG D											
0.084 79 Woods, Fair, HSG D											
_	0.	253	80 >	>75% Grass cover, Good, HSG D							
	0.	557	87 V	Weighted Average							
	0.	337	80 6	60.50% Pervious Area							
	0.	220	98 3	39.50% Impervious Area							
	0.220			00.0	00% Unco	nnected					
	Tc (min)	Length (feet)		pe /ft)	Velocity (ft/sec)	Capacity (cfs)	Description				
	19.1	100	0.02	80	0.09		Sheet Flow,				
							n= 0.380 P2= 2.86"				
	1.8	155	0.04	00	1.40		Shallow Concentrated Flow,				
_							Short Grass Pasture Kv= 7.0 fps				
	20.9	255	Tota	ıl							

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#### **Summary for Subcatchment 40S: Southwest**

Runoff = 1.10 cfs @ 48.08 hrs, Volume= 0.087 af, Depth= 7.43" Routed to Pond 4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

Area (	(ac)	CN	Desc	ription					
0.0	083	98	Unco	nnected p	avement, l	HSG D			
0.0	000	79	Woo	ds, Fair, Ĥ	SG D				
0.0	058	80	>75%	⁶ Grass cα	ver, Good	, HSG D			
0.	141	91	Weig	hted Aver	age				
0.0	058	80	41.13% Pervious Area						
0.0	083	98	58.87	7% Imperv	rious Area				
0.0	083		100.0	00% Unco	nnected				
Тс	Lengtl	h S	Slope	Velocity	Capacity	Description			
(min)	(feet	t)	(ft/ft)	/ft) (ft/sec) (cfs)					
9.3	6	5 0.	.0280	0.12		Sheet Flow,			

Grass: Dense n= 0.240 P2= 2.86"

16.3

832 Total

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#### **Summary for Subcatchment 100S: North Pond**

Runoff = 8.53 cfs @ 48.17 hrs, Volume= 0.797 af, Depth= 6.35" Routed to Pond 1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

PF_Depth_English_PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

Area (ac) CN Description

	Area	(ac)	CN	Desc	cription		
*	0.	180	98				
	0.	924	80	>75%	% Grass co	over, Good	, HSG D
	0.	404	79	Woo	ds/grass d	omb., Goo	d, HSG D
*	0.	000	98		Ü	,	<i>'</i>
*	0.	000	80				
	1.	508	82	Weig	hted Aver	age	
	1.	328	80	88.0	6% Pervio	us Area	
	0.	180	98	11.9	4% Imperv	ious Area	
					•		
	Тс	Lengt	th ·	Slope	Velocity	Capacity	Description
_	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	·
	13.0	11	0 0	.0350	0.14		Sheet Flow,
							Grass: Dense n= 0.240 P2= 2.86"
	0.3	8	31 0	.0600	4.97		Shallow Concentrated Flow,
							Paved Kv= 20.3 fps
	3.0	64	1 0	.0060	3.51	2.76	•
							12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
							n= 0.013
_	3.0	64	1 0	.0060	3.51	2.76	

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#### **Summary for Subcatchment 110S: Pond**

41.85 cfs @ 48.14 hrs, Volume= Runoff 3.708 af, Depth= 6.83" Routed to Pond 10P:

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

	Area	(ac) (	CN Des	cription								
*	2.	320	98									
	1.	800		75% Grass cover, Good, HSG D								
	2.	398	79 Wo	ods/grass o	comb., Goo	d, HSG D						
*		000	98									
*	0.	000	80									
		518		ghted Ave	•							
		198		11% Pervic								
	2.	320	98 35.5	59% Imper	vious Area							
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description						
_	11.4	100			(3.5)	Sheet Flow,						
						Grass: Dense n= 0.240 P2= 2.86"						
	0.9	55	0.0220	1.04		Shallow Concentrated Flow,						
						Short Grass Pasture Kv= 7.0 fps						
	1.4	177	0.0850	2.04		Shallow Concentrated Flow,						
_						Short Grass Pasture Kv= 7.0 fps						
	13.7	332	Total									

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#### **Summary for Reach 1R: North**

Inflow Area = 9.314 ac, 31.05% Impervious, Inflow Depth > 6.81" for 100-yr 96hr event

Inflow = 14.21 cfs @ 48.58 hrs, Volume= 5.288 af

Outflow = 14.21 cfs @ 48.58 hrs, Volume= 5.288 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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#### Summary for Reach 4R: Plymouth Road

Inflow Area = 1.283 ac, 21.51% Impervious, Inflow Depth = 6.51" for 100-yr 96hr event

Inflow = 7.14 cfs @ 48.19 hrs, Volume= 0.696 af

Outflow = 7.14 cfs @ 48.19 hrs, Volume= 0.696 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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#### **Summary for Reach 22R: East**

Inflow Area = 1.150 ac, 5.30% Impervious, Inflow Depth = 6.27" for 100-yr 96hr event

Inflow = 6.56 cfs @ 48.23 hrs, Volume= 0.600 af

Outflow = 6.56 cfs @ 48.23 hrs, Volume= 0.600 af, Atten= 0%, Lag= 0.0 min

Routed to Reach 31R: Total

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#### **Summary for Reach 31R: Total**

Inflow Area = 11.747 ac, 27.49% Impervious, Inflow Depth = 6.73" for 100-yr 96hr event

Inflow = 26.41 cfs @ 48.22 hrs, Volume= 6.584 af

Outflow = 26.41 cfs @ 48.22 hrs, Volume= 6.584 af, Atten= 0%, Lag= 0.0 min

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#### **Summary for Pond 1P:**

Inflow Area = 1.508 ac, 11.94% Impervious, Inflow Depth = 13.11" for 100-yr 96hr event

Inflow = 12.27 cfs @ 48.21 hrs, Volume= 1.647 af

Outflow = 8.02 cfs @ 48.74 hrs, Volume= 1.647 af, Atten= 35%, Lag= 31.7 min

Primary = 5.14 cfs @ 48.70 hrs, Volume= 1.417 af

Routed to Pond 11P : DEP

Secondary = 2.89 cfs @ 48.75 hrs, Volume= 0.230 af

Routed to Pond 11P: DEP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Starting Elev= 978.00' Storage= 0 cf

Peak Elev= 982.17' @ 48.75 hrs Surf.Area= 13,851 sf Storage= 9,647 cf

Plug-Flow detention time= 11.3 min calculated for 1.646 af (100% of inflow)

Center-of-Mass det. time= 11.3 min (3,018.7 - 3,007.4)

Volume	Invert	Avail.Sto	rage Stora	ge Description	
#1	979.45'	55,82	25 cf Custo	om Stage Data (P	rismatic)Listed below (Recalc)
Elevation		rf.Area	Inc.Store		
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)	
979.4	15	10	0	0	
980.0	00	68	21	21	
981.0		1,700	884	905	
982.0	00	11,370	6,535	•	
983.0	00 :	25,550	18,460	25,900	
984.0	00	34,300	29,925	55,825	
Device	Routing	Invert	Outlet Devi	ices	
#1	Primary	979.45'	12.0" Rou	ind Culvert L= 18	.0' Ke= 0.500
			Inlet / Outle	et Invert= 979.45' /	978.80' S= 0.0361 '/' Cc= 0.900
			n= 0.013,	Flow Area= 0.79 st	f
#2	Primary	979.45'	0.060 in/hr	r Exfiltration over	Surface area above 978.00'
			Excluded S	Surface area = 0 sf	
#3	Secondary	981.50'			ad-Crested Rectangular Weir
			` '	•	0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00		
			, ,	•	61 2.60 2.66 2.70 2.77 2.89 2.88
			2.85 3.07	3.20 3.32	

Primary OutFlow Max=5.13 cfs @ 48.70 hrs HW=982.17' TW=980.35' (Dynamic Tailwater)

-1=Culvert (Inlet Controls 5.11 cfs @ 6.50 fps)

**—2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=2.89 cfs @ 48.75 hrs HW=982.17' TW=980.35' (Dynamic Tailwater)

3=Broad-Crested Rectangular Weir (Weir Controls 2.89 cfs @ 2.14 fps)

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## **Stage-Area-Storage for Pond 1P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
979.45	10	0	982.05	12,079	8,027
979.50	15	1	982.10	12,788	8,648
979.55	21	2	982.15	13,497	9,305
979.60	26	3	982.20	14,206	9,998
979.65	31	4	982.25	14,915	10,726
979.70	36	6	982.30	15,624	11,490
979.75	42	8	982.35	16,333	12,288
979.80	47	10	982.40	17,042	13,123
979.85	52	12	982.45	17,751	13,993
979.90	57	15	982.50	18,460	14,898
979.95	63	18	982.55	19,169	15,839
980.00	68	21	982.60	19,878	16,815
980.05	150	27	982.65	20,587	17,826
980.10	231	36	982.70	21,296	18,874
980.15	313	50	982.75	22,005	19,956
980.20	394 476	68	982.80	22,714	21,074
980.25	476	89 115	982.85	23,423	22,227
980.30	558 639	115	982.90 982.95	24,132	23,416
980.35 980.40	721	145 179		24,841 25,550	24,641
980.45	802	217	983.00 983.05	25,550 25,088	25,900 27,189
980.45	884	259	983.10	25,988 26,425	28,499
980.55	966	306	983.15	26,863	29,831
980.60	1,047	356	983.20	27,300	31,185
980.65	1,129	410	983.25	27,738	32,561
980.70	1,210	469	983.30	28,175	33,959
980.75	1,292	531	983.35	28,613	35,379
980.80	1,374	598	983.40	29,050	36,820
980.85	1,455	669	983.45	29,488	38,284
980.90	1,537	744	983.50	29,925	39,769
980.95	1,618	822	983.55	30,363	41,276
981.00	1,700	905	983.60	30,800	42,805
981.05	2,184	1,003	983.65	31,238	44,356
981.10	2,667	1,124	983.70	31,675	45,929
981.15	3,151	1,269	983.75	32,113	47,524
981.20	3,634	1,439	983.80	32,550	49,140
981.25	4,118	1,633	983.85	32,988	50,779
981.30	4,601	1,851	983.90	33,425	52,439
981.35	5,085	2,093	983.95	33,863	54,121
981.40	5,568	2,359	984.00	34,300	55,825
981.45	6,052	2,650			
981.50	6,535	2,964			
981.55	7,019	3,303			
981.60	7,502	3,666			
981.65	7,986	4,053			
981.70	8,469	4,465			
981.75	8,953	4,900			
981.80	9,436	5,360 5,844			
981.85	9,920	5,844			
981.90	10,403	6,352			
981.95 982.00	10,887 11,370	6,884 7,440			
902.00	11,370	7,440			
			1		

#4

Primary

1.011.00'

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#### **Summary for Pond 3P:**

Inflow Area = 0.557 ac, 39.50% Impervious, Inflow Depth = 6.95" for 100-yr 96hr event Inflow 3.02 cfs @ 48.24 hrs, Volume= 0.322 af Outflow 2.90 cfs @ 48.30 hrs, Volume= 0.322 af, Atten= 4%, Lag= 3.6 min Discarded = 0.00 cfs @ 48.30 hrs, Volume= 0.001 af Primary 2.00 cfs @ 48.30 hrs, Volume= 0.306 af Routed to Pond 10P: 0.90 cfs @ 48.30 hrs, Volume= Secondary = 0.015 af Routed to Reach 22R: East

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs

Plug-Flow detention time= 1.9 min calculated for 0.322 af (100% of inflow) Center-of-Mass det. time= 1.9 min (3,047.4 - 3,045.4)

Peak Elev= 1,015.43' @ 48.30 hrs Surf.Area= 500 sf Storage= 447 cf

Volume	Invert	Avail.Sto	age Storage	Description	
#1	1,014.00'	77	9 cf Custom	Stage Data (Pr	rismatic)Listed below (Recalc)
Elevatio		rf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
1,014.0		175	0	0	
1,015.0		355	265	265	
1,015.5	50	525	220	485	
1,016.0	00	650	294	779	
Device	Routing	Invert	Outlet Device	S	
#1	Secondary	1,015.00'	Head (feet) 0 2.50 3.00	0.20 0.40 0.60	ad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00 71 2.78 2.89 2.99 3.09 3.20 3.21
#2 #3	Discarded Device 4	•		32 xfiltration over Orifice/Grate X	

n= 0.015, Flow Area= 0.35 sf

Discarded OutFlow Max=0.00 cfs @ 48.30 hrs HW=1,015.42' (Free Discharge)

2=Exfiltration (Exfiltration Controls 0.00 cfs)

Limited to weir flow at low heads

**8.0" Round Culvert** L= 117.0' Ke= 0.500

Inlet / Outlet Invert= 1,011.00' / 1,009.71' S= 0.0110 '/' Cc= 0.900

Primary OutFlow Max=2.00 cfs @ 48.30 hrs HW=1,015.42' TW=983.28' (Dynamic Tailwater)

4=Culvert (Barrel Controls 2.00 cfs @ 5.73 fps)

3=Orifice/Grate (Passes 2.00 cfs of 4.23 cfs potential flow)

Secondary OutFlow Max=0.89 cfs @ 48.30 hrs HW=1,015.42' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.89 cfs @ 1.75 fps)

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## **Stage-Area-Storage for Pond 3P:**

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
1,014.00	175	0	1,015.04	369	279
1,014.02	179	4	1,015.06	375	287
1,014.04	182	7	1,015.08	382	294
1,014.06	186	11	1,015.10	389	302
1,014.08	189	15	1,015.12	396	310
1,014.10	193	18	1,015.14	403	318
1,014.12	197	22	1,015.16	409	326
1,014.14	200	26	1,015.18	416	334
1,014.16	204 207	30	1,015.20	423 430	343
1,014.18 1,014.20	207 211	34 39	1,015.22 1,015.24	430 437	351 360
1,014.20	215	43	1,015.24	443	369
1,014.24	218	43 47	1,015.28	450	378
1,014.26	222	52	1,015.20	457	387
1,014.28	225	56	1,015.32	464	396
1,014.30	229	61	1,015.32	471	405
1,014.32	233	65	1,015.36	477	415
1,014.34	236	70	1,015.38	484	424
1,014.36	240	75	1,015.40	491	434
1,014.38	243	79	1,015.42	498	444
1,014.40	247	84	1,015.44	505	454
1,014.42	251	89	1,015.46	511	464
1,014.44	254	94	1,015.48	518	475
1,014.46	258	100	1,015.50	525	485
1,014.48	261	105	1,015.52	530	496
1,014.50	265	110	1,015.54	535	506
1,014.52	269	115	1,015.56	540	517
1,014.54	272	121	1,015.58	545	528
1,014.56	276	126	1,015.60	550	539
1,014.58	279	132	1,015.62	555 500	550 501
1,014.60	283	137	1,015.64	560	561 570
1,014.62	287 290	143 149	1,015.66	565 570	572 584
1,014.64 1,014.66	290 294	155	1,015.68 1,015.70	570 575	595
1,014.68	294 297	161	1,015.70	580	607
1,014.70	301	167	1,015.72	585	618
1,014.72	305	173	1,015.74	590	630
1,014.74	308	179	1,015.78	595	642
1,014.76	312	185	1,015.80	600	654
1,014.78	315	191	1,015.82	605	666
1,014.80	319	198	1,015.84	610	678
1,014.82	323	204	1,015.86	615	690
1,014.84	326	211	1,015.88	620	703
1,014.86	330	217	1,015.90	625	715
1,014.88	333	224	1,015.92	630	728
1,014.90	337	230	1,015.94	635	740
1,014.92	341	237	1,015.96	640	753
1,014.94	344	244	1,015.98	645	766
1,014.96	348	251	1,016.00	650	779
1,014.98	351	258 265			
1,015.00	355	265 272			
1,015.02	362	272			
			I		

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#### **Summary for Pond 4P:**

Inflow Area = 0.141 ac, 58.87% Impervious, Inflow Depth = 7.43" for 100-yr 96hr event Inflow 1.10 cfs @ 48.08 hrs, Volume= 0.087 af Outflow 1.10 cfs @ 48.09 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.5 min Discarded = 0.00 cfs @ 48.09 hrs, Volume= 0.001 af 1.10 cfs @ 48.09 hrs, Volume= Primary 0.087 af Routed to Pond 10P: Secondary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af

Routed to Reach 4R: Plymouth Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 1,020.27' @ 48.09 hrs Surf.Area= 128 sf Storage= 26 cf

Plug-Flow detention time= 0.8 min calculated for 0.087 af (100% of inflow) Center-of-Mass det. time= 0.8 min (3,010.3 - 3,009.5)

Volume	Invert	Avail.Sto	rage	Storage	Description	
#1	1,020.00'	76	31 cf	Custon	n Stage Data (Pr	rismatic)Listed below (Recalc)
<b>-</b> 14:	0		1	04	0	
Elevation		rf.Area		.Store	Cum.Store	
(fee	et)	(sq-ft)	(cubi	c-feet)	(cubic-feet)	
1,020.0	00	65		0	0	
1,021.0	00	295		180	180	
1,021.5	50	590		221	401	
1,022.0	00	850		360	761	
,						
Device	Routing	Invert	Outl	et Device	es	
#1	Secondary	1,021.00'	5.0'	long x 5	.0' breadth Bro	ad-Crested Rectangular Weir
	•		Hea	d (feet) (	0.20 0.40 0.60 (	0.80 1.00 1.20 1.40 1.60 1.80 2.00
				` ,	50 4.00 4.50 5	
			Coe	f. (Enalisl	h) 2.34 2.50 2.7	70 2.68 2.68 2.66 2.65 2.65 2.65
					66 2.68 2.70 2.	
#2	Discarded	1,020.00'			xfiltration over	
#3	Primary	1,020.00'			Orifice/Grate X	
		.,-20100			ir flow at low hea	

Discarded OutFlow Max=0.00 cfs @ 48.09 hrs HW=1,020.27' (Free Discharge) **1**—2=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.08 cfs @ 48.09 hrs HW=1,020.27' TW=981.97' (Dynamic Tailwater) **T_3=Orifice/Grate** (Weir Controls 1.08 cfs @ 1.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,020.00' TW=0.00' (Dynamic Tailwater) 1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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## **Stage-Area-Storage for Pond 4P:**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
1,020.00	65	0	1,021.04	319	192
1,020.02	70	1	1,021.06	330	199
1,020.04	74	3	1,021.08	342	205
1,020.06	79	4	1,021.10	354	212
1,020.08	83	6	1,021.12	366	220
1,020.10	88	8	1,021.14	378	227
1,020.12	93	9	1,021.16	389	235
1,020.14	97	11	1,021.18	401	243
1,020.16	102	13	1,021.20	413	251
1,020.18	106	15	1,021.22	425	259
1,020.20	111	18	1,021.24	437	268
1,020.22	116	20	1,021.26	448	277
1,020.24	120	22	1,021.28	460	286
1,020.26	125	25	1,021.30	472	295
1,020.28	129	27	1,021.32	484	305
1,020.30	134	30	1,021.34	496	314
1,020.32	139	33	1,021.36	507	324
1,020.34	143	35	1,021.38	519	335
1,020.36	148	38	1,021.40	531	345
1,020.38	152	41	1,021.42	543	356
1,020.40	157	44	1,021.44	555 566	367
1,020.42	162 166	48 51	1,021.46	566 578	378 390
1,020.44 1,020.46	171	51 54	1,021.48 1,021.50	578 590	401
1,020.48	175	58	1,021.50	600	413
1,020.50	180	61	1,021.52	611	425
1,020.52	185	65	1,021.56	621	438
1,020.54	189	69	1,021.58	632	450
1,020.56	194	72	1,021.60	642	463
1,020.58	198	76	1,021.62	652	476
1,020.60	203	80	1,021.64	663	489
1,020.62	208	85	1,021.66	673	502
1,020.64	212	89	1,021.68	684	516
1,020.66	217	93	1,021.70	694	530
1,020.68	221	97	1,021.72	704	544
1,020.70	226	102	1,021.74	715	558
1,020.72	231	106	1,021.76	725	572
1,020.74	235	111	1,021.78	736	587
1,020.76	240	116	1,021.80	746	602
1,020.78	244	121	1,021.82	756 767	617
1,020.80	249 254	126	1,021.84	767	632
1,020.82 1,020.84	25 <del>4</del> 258	131 136	1,021.86 1,021.88	777 788	647 663
1,020.84	263	141	1,021.90	798	679
1,020.88	267	146	1,021.90	808	695
1,020.90	272	152	1,021.94	819	711
1,020.92	277	157	1,021.96	829	728
1,020.94	281	163	1,021.98	840	744
1,020.96	286	168	1,022.00	850	761
1,020.98	290	174	,		
1,021.00	295	180			
1,021.02	307	186			

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#### **Summary for Pond 10P:**

Inflow Area = 7.216 ac, 36.35% Impervious, Inflow Depth = 6.82" for 100-yr 96hr event Inflow 44.67 cfs @ 48.14 hrs, Volume= 4.100 af 12.14 cfs @ 48.65 hrs, Volume= Outflow 4.176 af, Atten= 73%, Lag= 30.8 min Primary = 5.57 cfs @ 48.66 hrs, Volume= 3.326 af Routed to Reach 1R: North Secondary = 1.61 cfs @ 48.66 hrs, Volume= 0.042 af Routed to Pond 1P: 4.99 cfs @ 48.59 hrs, Volume= 0.808 af

Tertiary = 4.99 Routed to Pond 1P:

#6

Tertiary

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Starting Elev= 979.50' Surf.Area= 3,765 sf Storage= 12,596 cf Peak Elev= 983.86' 48.66 hrs Surf.Area= 20,244 sf Storage= 76,530 cf (63,934 cf above start)

Plug-Flow detention time= 224.0 min calculated for 3.885 af (95% of inflow) Center-of-Mass det. time= 37.6 min (3,081.6 - 3,044.1)

Volume	Invert	t Avail.Sto	rage Storage [	Description		
#1	972.00	' 79,33	36 cf <b>Custom</b>	Stage Data (Prisn	natic)Listed below (	Recalc)
Elevation		urf.Area	Inc.Store	Cum.Store		
(feet	)	(sq-ft)	(cubic-feet)	(cubic-feet)		
972.00	_	320	0	0		
975.00		975	1,943	1,943		
977.00		2,225	3,200	5,143		
979.00	_	3,430	5,655	10,798		
979.50		3,765	1,799	12,596		
980.00		10,595	3,590	16,186		
981.00	)	13,340	11,968	28,154		
982.00		15,880	14,610	42,764		
983.00		18,360	17,120	59,884		
984.00	)	20,545	19,453	79,336		
Davida	D	l.s s	Outlet Devices			
	Routing	Invert	Outlet Devices			
#1	Primary	978.28'		Culvert L= 175.0'		
					'.40' S= 0.0050 '/'	Cc = 0.900
			•	v Area= 0.79 sf		
	Device 1	980.70'			ngular Weir 2 End (	Contraction(s)
#3	Device 1	981.00'		rifice/Grate X 0.6	<b>0</b> C= 0.600	
				flow at low heads		
#4	Device 1	978.50'		ulvert X 2.00 L= 1		
					3.50' S= 0.0000 '/'	Cc = 0.900
				v Area= 0.35 sf		
#5	Secondary	983.60'	5.0' long x 5.0	)' breadth Broad-	Crested Rectangu	lar Weir

2.50 3.00 3.50 4.00 4.50 5.00 5.50

981.05' **12.0" Round Culvert** L= 30.0' Ke= 0.500

2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65

Prop-21509-8Lot

PF Depth English PDS 96-hr S1 100-yr 100-yr 96hr Rainfall=8.51"

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Inlet / Outlet Invert= 981.05' / 980.90' S= 0.0050 '/' Cc= 0.900

n= 0.013. Flow Area= 0.79 sf

#7 Device 6 976.00' **12.0"** Round Culvert L= 50.0' Ke= 0.500

Inlet / Outlet Invert= 976.00' / 975.75' S= 0.0050 '/' Cc= 0.900

n= 0.013, Flow Area= 0.79 sf

**48.0" Horiz. Orifice/Grate X 0.60** C= 0.600 #8 Device 6 982.50'

Primary OutFlow Max=5.57 cfs @ 48.66 hrs HW=983.86' TW=0.00' (Dynamic Tailwater)

-1=Culvert (Barrel Controls 5.57 cfs @ 7.09 fps)

**-2=Sharp-Crested Rectangular Weir**(Passes < 61.88 cfs potential flow)

-3=Orifice/Grate (Passes < 61.40 cfs potential flow)

**-4=Culvert** (Passes < 3.21 cfs potential flow)

Secondary OutFlow Max=1.59 cfs @ 48.66 hrs HW=983.86' TW=982.16' (Dynamic Tailwater) 5=Broad-Crested Rectangular Weir (Weir Controls 1.59 cfs @ 1.22 fps)

Tertiary OutFlow Max=4.95 cfs @ 48.59 hrs HW=983.84' TW=982.13' (Dynamic Tailwater)

**-6=Culvert** (Inlet Controls 4.95 cfs @ 6.30 fps)

**-7=Culvert** (Passes < 4.71 cfs potential flow)

**-8=Orifice/Grate** (Passes < 42.02 cfs potential flow)

Surface

(sq-ft)

16,872

17,368

17,864

18,360

18,797

19,234

19,671

20,108

20,545

Storage (cubic-feet)

49,314

52,738

56,261

59,884

63,599

67,403

71,293

75,271

79,336

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## **Stage-Area-Storage for Pond 10P:**

Elevation

(feet)

982.40

982.60

982.80

983.00

983.20

983.40

983.60

983.80

984.00

Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)
972.00	320	0
972.20 972.40	364 407	68 145
972.60	457 451	231
972.80	495	326
973.00	538	429
973.20	582	541
973.40	626	662
973.60	669	791
973.80	713	930
974.00	757	1,077
974.20	800	1,232
974.40	844	1,397
974.60	888	1,570
974.80	931	1,752
975.00	975	1,943
975.20	1,100	2,150
975.40	1,225	2,382
975.60	1,350	2,640
975.80	1,475	2,922
976.00	1,600	3,230
976.20 976.40	1,725 1,850	3,563 3,920
976.60	1,975	4,303
976.80	2,100	4,710
977.00	2,225	5,143
977.20	2,346	5,600
977.40	2,466	6,081
977.60	2,587	6,586
977.80	2,707	7,115
978.00	2,828	7,669
978.20	2,948	8,246
978.40	3,068	8,848
978.60	3,189	9,474
978.80	3,309	10,124
979.00	3,430	10,798
979.20	3,564	11,497
979.40	3,698 5 131	12,223
979.60 979.80	5,131 7,863	13,041 14,340
980.00	7,505 10,595	16,186
980.20	11,144	18,360
980.40	11,693	20,644
980.60	12,242	23,037
980.80	12,791	25,541
981.00	13,340	28,154
981.20	13,848	30,873
981.40	14,356	33,693
981.60	14,864	36,615
981.80	15,372	39,639
982.00	15,880 16.376	42,764
982.20	16,376	45,989
		ı

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#### **Summary for Pond 11P: DEP**

Inflow Area = 1.803 ac, 11.92% Impervious, Inflow Depth = 12.00" for 100-yr 96hr event

Inflow = 8.22 cfs @ 48.72 hrs, Volume= 1.803 af

Outflow = 8.21 cfs @ 48.74 hrs, Volume= 1.803 af, Atten= 0%, Lag= 1.2 min

Primary = 8.21 cfs @ 48.74 hrs, Volume= 1.803 af

Routed to Reach 1R: North

Routing by Dyn-Stor-Ind method, Time Span= 0.00-110.00 hrs, dt= 0.05 hrs Peak Elev= 980.35' @ 48.74 hrs Surf.Area= 297 sf Storage= 93 cf

Plug-Flow detention time= 0.1 min calculated for 1.802 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (3,022.3 - 3,022.1)

Volume	Inve	ert Avai	I.Storage	Storage I	Description		
#1	978.6	67'	2,228 cf	Custom	Stage Data (Pı	rismatic)Listed below (	Recalc)
Elevatio (fee	•	Surf.Area (sq-ft)		:.Store c-feet)	Cum.Store (cubic-feet)		
978.6	-/	10	(odbi	0	0		
980.0		40		33	33		
981.0	0	770		405	438		
982.0	0	2,810		1,790	2,228		
Device	Routing	In	vert Outl	et Devices	<b>;</b>		
#1	Primary	978	Inlet	:/ Outlet In	<b>Culvert</b> L= 9.0 vert= 978.67' / v Area= 1.77 sf	978.39' S= 0.0311 '/'	Cc= 0.900

Primary OutFlow Max=8.21 cfs @ 48.74 hrs HW=980.35' TW=0.00' (Dynamic Tailwater) 1=Culvert (Inlet Controls 8.21 cfs @ 4.65 fps)

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#### Stage-Area-Storage for Pond 11P: DEP

Elevation	Surface	Storage	Elevation	Surface	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
978.67	10	0	981.27	1,321	721
978.72	11	1	981.32	1,423	789
978.77	12	1	981.37	1,525	863
978.82	13	2	981.42	1,627	942
978.87	15	2	981.47	1,729	1,025
978.92	16	3	981.52	1,831	1,114
978.97	17	4	981.57	1,933	1,209
979.02	18	5	981.62	2,035	1,308
979.07	19	6	981.67	2,137	1,412
979.12	20	7	981.72	2,239	1,521
979.17	21	8	981.77	2,341	1,636
979.22	22	9	981.82	2,443	1,755
979.27	24	10	981.87	2,545	1,880
979.32	25	11	981.92	2,647	2,010
979.37	26	13	981.97	2,749	2,145
979.42	27	14			
979.47	28	15			
979.52	29	17			
979.57	30	18			
979.62	31 33	20 21			
979.67 979.72	33 34	23			
979.72 979.77	3 <del>4</del> 35	25 25			
979.77 979.82	36	25 26			
979.87	37	28			
979.92	38	30			
979.97	39	32			
980.02	55	34			
980.07	91	38			
980.12	128	43			
980.17	164	51			
980.22	201	60			
980.27	237	71			
980.32	274	83			
980.37	310	98			
980.42	347	114			
980.47	383	133			
980.52	420	153			
980.57	456	175			
980.62	493	198			
980.67	529	224			
980.72	566	251			
980.77	602	280			
980.82	639	311			
980.87	675	344			
980.92	712	379			
980.97	748	415			
981.02	811	454			
981.07	913	497			
981.12	1,015	545 500			
981.17	1,117	599			
981.22	1,219	657			

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- 35 Subcat 10S: Northeast
- 36 Subcat 11S: North DEP
- 37 Subcat 30S: Southeast
- 38 Subcat 40S: Southwest
- 39 Subcat 100S: North Pond
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- 47 Pond 3P:
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#### 100-Year base Event

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- 59 Subcat 4S: South
- 60 Subcat 5S: West
- 61 Subcat 10S: Northeast
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- 63 Subcat 30S: Southeast
- 64 Subcat 40S: Southwest
- 65 Subcat 100S: North Pond
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# Figures

Existing Drainage Exhibit Proposed Drainage Exhibit MIDS Results SHSAM Results Soil Borings



# DUDYCHA PROPERTY

2511 & 2615 Plymouth Road Minnetonka, MN 55305

LAKE WEST

4525 Highway 7, Suite 265

# LOUCKS

PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL

7200 Hemlock Lane, Suite 300 Maple Grove, MN 55369 763.424.5505 www.loucksinc.com

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## SUBMITTAL/REVISIONS

# PROFESSIONAL SIGNATURE

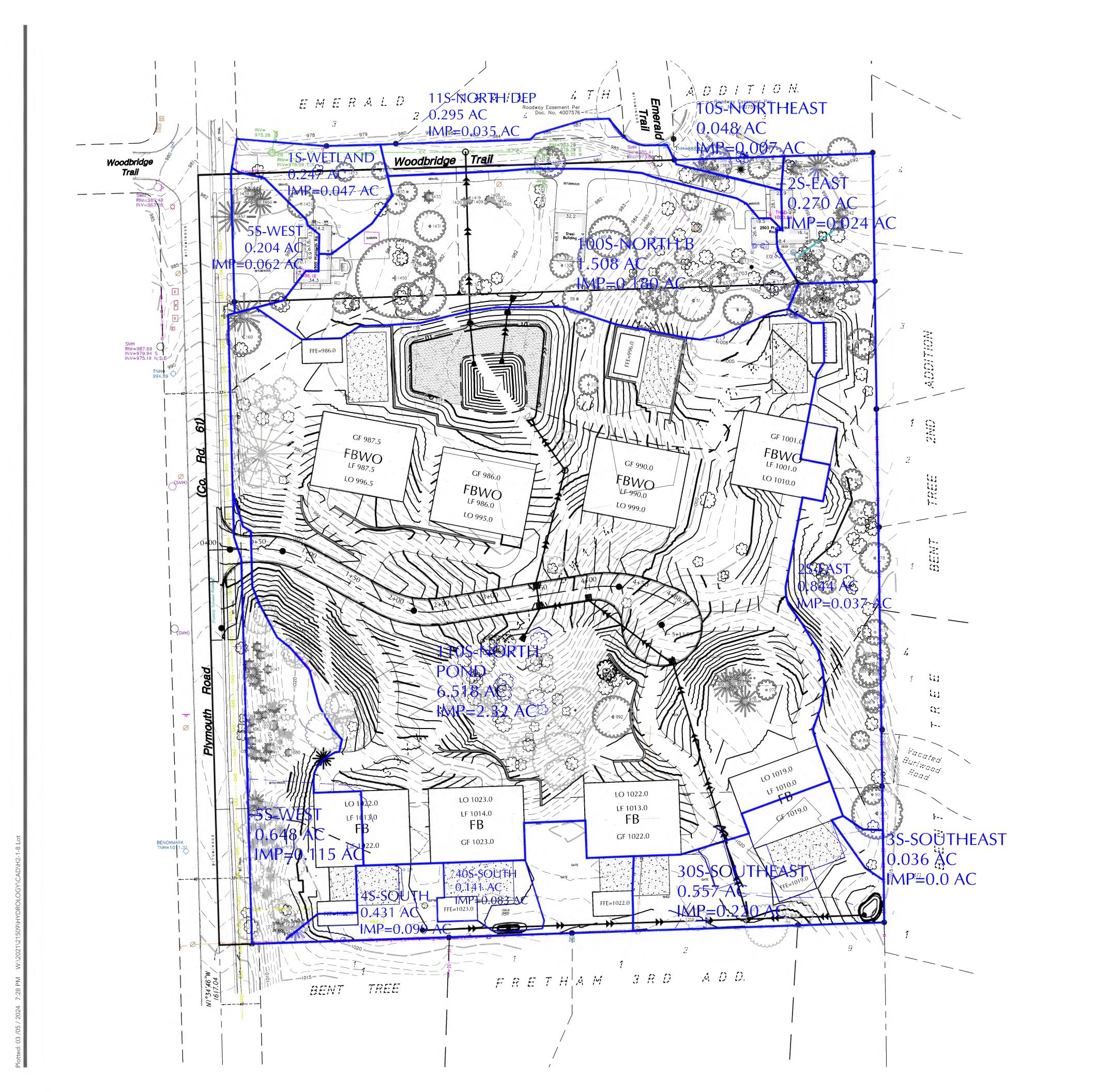
I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.

Chad E. Feigum - LA
License No. 465
Date

QUALITY CONTROL
Loucks Project No. 21509.

Project Lead CEF
Drawn By CEF
Checked By TJG/CEF
Review Date





# DUDYCHA PROPERTY

2511 & 2615 Plymouth Road Minnetonka, MN 55305

LAKE WEST

. 14525 Highway 7, Suite 265

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## SUBMITTAL/REVISIONS

## PROFESSIONAL SIGNATURE

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.

Chad E. Feigum - LA
License No. 46508
Date

Loucks Project No. 21509.0
Project Lead CEF
Drawn By CEF

Checked By

SHEET INDEX

TJG/CEF

PROPOSED DRAINAGE PLAN

# **Project Information**

Calculator Version: Version 4: July 2020

Project Name:

User Name / Company Name:

Date:

Project Description:

Construction Permit?: No

# **Site Information**

Retention Requirement (inches):

Site's Zip Code:

Annual Rainfall (inches):

Phosphorus EMC (mg/l):

TSS EMC (mg/l):

54.5

### **Total Site Area**

A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
, ,	, ,	, ,	0	0
		0	0	0
		Impervious A	Area (acres)	2.873
		Total A	Area (acres)	2.873
		(acres) (acres)	(acres) (acres) (acres)  0  Impervious A	(acres) (acres) (acres) 0

### **Site Areas Routed to BMPs**

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed					0
		lı	mpervious A	rea (acres)	2.873
			Total A	rea (acres)	2.873

# **Summary Information**

# **Performance Goal Requirement**

Performance goal volume retention requirement:	10429	ft3
Volume removed by BMPs towards performance goal:	10429	ft ³
Percent volume removed towards performance goal	100	%
Annual Volume and Pollutant Load Reductions		

Post development annual runoff volume	6.2229	acre-ft
Annual runoff volume removed by BMPs:	5.5777	acre-ft
Percent annual runoff volume removed:	90	%
Post development annual particulate P load:	2.7928	lbs
Annual particulate P removed by BMPs:	2.503	lbs
Post development annual dissolved P load:	2.285	lbs
Annual dissolved P removed by BMPs:	2.048	lbs
Total P removed by BMPs	4.551	lbs
Percent annual total phosphorus removed:	90	%
Post development annual TSS load:	922.5	lbs
Annual TSS removed by BMPs:	826.8	lbs
Percent annual TSS removed:	90	%

# **BMP Summary**

# **Performance Goal Summary**

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	10429	10429	10429	0	100

# **Annual Volume Summary**

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	6.2229	0	5.5777	0.6452	90

# **Particulate Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	2.7928	0	2.5032	0.2896	90

# **Dissolved Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	2.2851	0	2.0482	0.2369	90

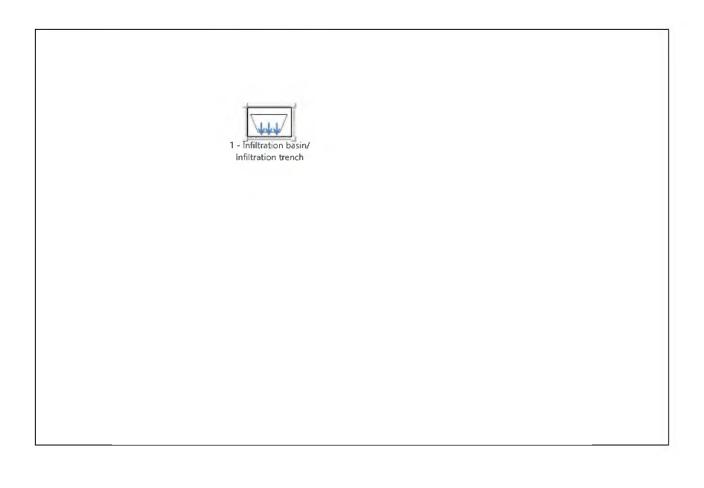
### **Total Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	5.0779	0	4.5514	0.5265	90

# **TSS Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin/Infiltration trench (abo	922.49	0	826.84	95.65	90

# **BMP Schematic**



# **Project Information**

Calculator Version: Version 4: July 2020

Project Name:

User Name / Company Name:

Date:

Project Description:

Construction Permit?: No

# **Site Information**

Retention Requirement (inches): 1.1
Site's Zip Code: 55305
Annual Rainfall (inches): 30.4
Phosphorus EMC (mg/l): 0.3
TSS EMC (mg/l): 54.5

#### **Total Site Area**

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land				2.6	2.6
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			0	4.04	4.04
		1	Impervious A	rea (acres)	2.874
			Total A	rea (acres)	9.514

#### **Site Areas Routed to BMPs**

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land				2.599	2.599
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				4.04	4.04
		I	mpervious A	rea (acres)	2.874
			Total A	rea (acres)	9.513

# **Summary Information**

### **Performance Goal Requirement**

Performance goal volume retention requirement: Volume removed by BMPs towards performance goal: Percent volume removed towards performance goal	11476 4350 <b>38</b>	ft3 ft³ <b>%</b>
Annual Volume and Pollutant Load Reductions		
Post development annual runoff volume	8.8243	acre-ft
Annual runoff volume removed by BMPs:	1.7738	acre-ft
Percent annual runoff volume removed:	20	%
Post development annual particulate P load:	3.9603	lbs
Annual particulate P removed by BMPs:	3.439	lbs
Post development annual dissolved P load:	3.24	lbs
Annual dissolved P removed by BMPs:	1.132	lbs
Total P removed by BMPs	4.571	lbs
Percent annual total phosphorus removed:	63	%

Post development annual TSS load: 1308.1 lbs
Annual TSS removed by BMPs: 1248 lbs
Percent annual TSS removed: 95 %

# **BMP Summary**

# **Performance Goal Summary**

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	2470	9371	2470	6900	26
1 - Stormwater disconnection (Impervious	777	1002	777	225	78
0 - Stormwater disconnection (Impervious	1103	4181	1103	3078	26
1 - Constructed stormwater pond	0	9371	0	9371	0
SAFL Baffle	0	6293	0	6293	0

# **Annual Volume Summary**

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained outflow (acre-ft) (acre-ft)		Percent Retained (%)
1 - Bioretention basin (with underdrain)	0	7.2539	1.2466	6.0073	17
1 - Stormwater disconnection (Impervious	1.2248	0	0.1817	1.0431	15
0 - Stormwater disconnection (Impervious	2.9809	0	0.3455	2.6354	12
1 - Constructed stormwater pond	0	7.2539	0	7.2539	0
SAFL Baffle	4.6185	0	0	4.6185	0

# **Particulate Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	0	0.3219	0.2686	0.0533	83
1 - Stormwater disconnection (Impervious	0.5497	0	0.0815	0.4682	15
0 - Stormwater disconnection (Impervious	1.3378	0	0.155	1.1828	12
1 - Constructed stormwater pond	0	2.0119	1.69	0.3219	84
SAFL Baffle	2.0728	0	1.2437	0.8291	60

### **Dissolved Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	0	2.4505	0.7255	1.725	30
1 - Stormwater disconnection (Impervious	0.4498	0	0.0667	0.3831	15
0 - Stormwater disconnection (Impervious	1.0946	0	0.1269	0.9677	12
1 - Constructed stormwater pond	0	2.6636	0.2131	2.4505	8
SAFL Baffle	1.6959	0	0	1.6959	0

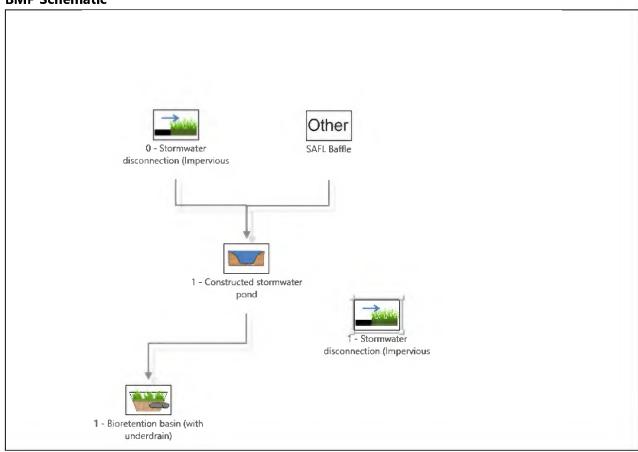
# **Total Phosphorus Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	0	2.7724	0.9941	1.7783	56
1 - Stormwater disconnection (Impervious	0.9995	0	0.1482	0.8513	15
0 - Stormwater disconnection (Impervious	2.4324	0	0.2819	2.1505	12
1 - Constructed stormwater pond	0	4.6755	1.9031	2.7724	46
SAFL Baffle	3.7687	0	1.2437	2.525	30

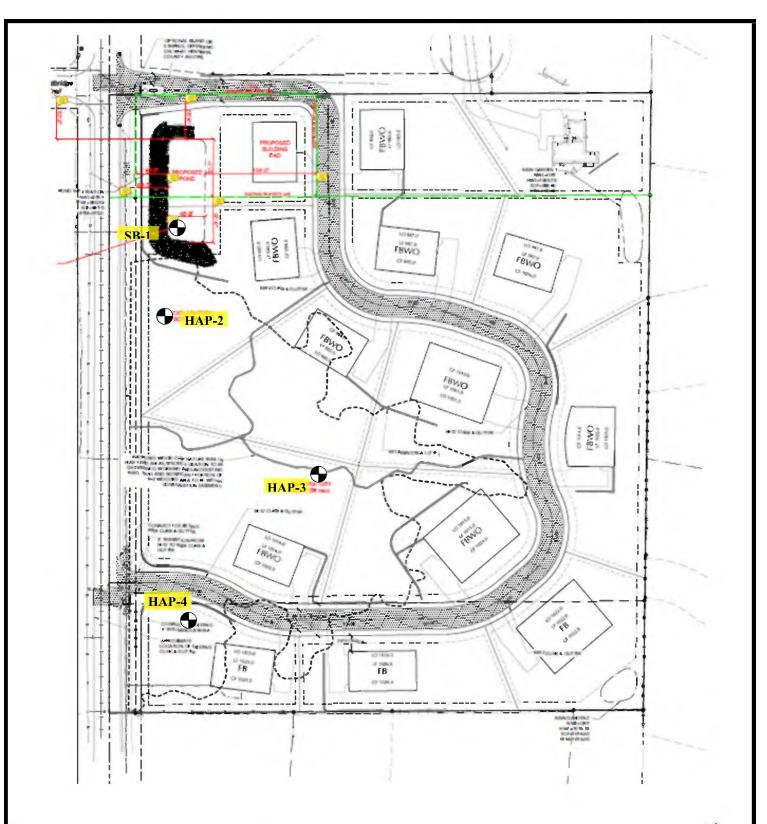
# **TSS Summary**

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	0	63.82	53.25	10.57	83
1 - Stormwater disconnection (Impervious	181.57	0	132.09	49.48	73
0 - Stormwater disconnection (Impervious	441.88	0	316.87	125.01	72
1 - Constructed stormwater pond	0	398.87	335.05	63.82	84
SAFL Baffle	684.64	0	410.78	273.86	60

# **BMP Schematic**



			Total				
			Load	Removal	Model	Model	Pipe
		Total	Removed	Efficiency	Height	Diameter	Diameter
Name	Model	Load (lbs)	(lbs)	(%)	(ft)	(ft)	(inches)
SAFLBaffle	42	10852	1772	16.3	2	4	15
SAFLBaffle	44	10852	3703	34.1	4	4	15
SAFLBaffle	55	10852	6322	58.3	5	5	18
SAFLBaffle	63	10852	7045	64.9	3	6	24
SAFLBaffle	66	10852	8205	75.6	6	6	24
SAFLBaffle	86	10852	9180	84.6	6	8	30
SAFLBaffle	106	10852	9797	90.3	6	10	36



# Legend



Approximate Soil Boring Location

Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed.

This is not a legal document and should not be substituted for a title search, appraisal, survey, or for zoning verification.



Haugo GeoTechnical Services, LLC 2825 Cedar Avenue S. Minneapolis, MN 55407 Soil Boring Location Sketch Fretham 31st Addition Minnetonka, Minnesota Figure #: 1 Drawn By: AH Date: 10-25-2023 Scale: None Project #: 23-0817

# HAUGO

Haugo GeoTechnical Services 2825 Cedar Ave South Minneapolis, MN, 55407

# BORING NUMBER SB-1 PAGE 1 OF 1

SER	VICE	Telephone: 612-729-2959 Fax: 763-445-2238		
CLIEN	NT La	ke West Deveopment	PROJECT NAME Fretham 31st Addition	
PROJ	ECT N	UMBER _23-0817	PROJECT LOCATION _Minnetonka, MN	
DATE	STAR	TED 10/25/23 COMPLETED 10/25/23	GROUND ELEVATION HOLE SIZE 3 1/4 inches	
DRILL	ING C	ONTRACTOR HGTS- 45	GROUND WATER LEVELS:	
DRILL	ING N	ETHOD Hollow Stem Auger/Split Spoon	AT TIME OF DRILLING Not Encountered	
LOGG	ED B	CHECKED BY PG	AT END OF DRILLING Not Encountered	
NOTE	s		AFTER DRILLING Not Encountered	
DEPTH (#)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER NUMBER (RQD) (RQD)  BLOW COUNTS (N VALUE) Moisture Content (%)  BLOW COUNTS (N VALUE)  Moisture Content (%)  BLOW COUNTS (N VALUE)  Moisture Content (%)	30
O DE	GRA	2 2 2 3 3	SAMPLE TYF NUMBER (ROD)  RECOVERY (ROD)  Moisture Counts (%)  Moisture Counts (%)  BLOW (N VALUE)  SAMPLE TYF  ACCOUNTS (ROD)  BLOW (%)  DELINES CONTENT (%)  20 40 60 8  ACCOUNTS (%)  DELINES CONTENT (%)  20 40 60 8	%) □
	12. <u>1. 12.</u>	Clayey Sand, trace Roots, dark brown to black, moist (Top		:
		(CL) Lean Clay, brown w/ Rust Staining, dry to about 10 ft moist, rather stiff to very stiff (Glacial Till)	then AU 1	
			SS 2-4-9 (13)	
5 5			SS 7-20-14	
B B B B B			3 (34)	
			SS 7-10-13 (23)	
-				
10			SS 5-10-14 (24)	
			SS 4-6-9 (15)	
5 2 5 				
15			SS 3-5-7 (12)	
20			SS 4-7-8 (15)	

HAUGO

Haugo GeoTechnical Services 2825 Cedar Ave South Minneapolis, MN, 55407

# BORING NUMBER HAP-2 PAGE 1 OF 1

	RVICE	Telephone: 612-729-2959 Fax: 763-445-2238						
CLIE	NT La	ke West Deveopment	PROJEC	T NAME	Freth	am 31st A	ddition	
PRC	JECT N	UMBER _23-0817	PROJEC	T LOCAT	TION _	Minnetonka	a, MN	
ਰੂ DAT	E STAR	TED 10/25/23 COMPLETED 10/25/23	GROUN	D ELEVA	TION _			HOLE SIZE 3 1/4 inches
₩ DRII	LING C	ONTRACTOR HGTS- 45	GROUN	D WATER	R LEVE	LS:		
B DRII	LING M	ETHOD Hand Auger	A	TIME OF	F DRILL	ING N	lot En	countered
S LOG	GED BY	NC CHECKED BY PG	A	END OF	DRILL	I <b>NG</b> N	ot End	ountered
NOT	ES		AF	TER DRI	LLING	Not Er	ncount	ered
817 B				Ш	%		ŧ	▲ SPT N VALUE ▲
723-0 T				SAMPLE TYPE NUMBER	, ₹	ZE(E)	Moisture Content (%)	20 40 60 80
COJECTS/2 DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		LE .	RECOVERY (RQD)	BLOW COUNTS (N VALUE)	(% G	PL MC LL ⊢ →
	GR.			A P		⊞05 <u>₹</u>	istur	20 40 60 80
0 PP				δ	2	17	Mo	☐ FINES CONTENT (%) ☐ 20 40 60 80
BACK	12. 11.12	Lean Clay, trace Roots, dark brown to black, wet (Topsoil	)	<b>B</b>				: : : :
ECT	1/ 2/1/			AU 6				
PROJ	11111	(CL) Lean Clay dock became to become most (Classic T'')		1	1	^ `		
I L		(CL) Lean Clay, dark brown to brown, wet (Glacial Till)		AU	<b>/</b>			
ESIC				7				
RVIC				AU				
N S				8		>		
Ž		Bottom of borehole at 4.3 feet.	_		1_1	/		<u> </u>
GEOTECH BH PLOTS - GINT STD US LAB.GDT - 10/25/23 13:13 - C:USERSALICE HAUGOHGTS DROPBOXILAB HAUGOHAUGO GEOTECHNICAL SERVICES/GINT PROJECT BACKUPIPROJECTS/23-0817 BORING LOG DRAFT.GPJ  O DEPTH  O DEPTH								

HAUGO GEOTECHNI

Haugo GeoTechnical Services 2825 Cedar Ave South Minneapolis, MN, 55407

# BORING NUMBER HAP-3 PAGE 1 OF 1

CLIENT Lake West [	763-445-2238						
	Deveopment	PROJECT NA	AME_	Fretha	m 31st Ac	dition	
PROJECT NUMBER	23-0817	PROJECT LO					
DATE STARTED 10/	GROUND ELEVATION HOLE SIZE 3 1/4 inches						
DRILLING CONTRAC	TOR HGTS- 45	GROUND WA	ATER L	EVEL	S:		
DRILLING METHOD _		AT TIM	E OF D	DRILL	ING N	lot End	countered
	GGED BY NC CHECKED BY PG				NG No		
NOTES		AFTER	DRILL	ING	Not Er	count	ered
O DEPTH (ft) (ft) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	MATERIAL DESCRIPTION	SAMPI F TYPE		KECOVEKY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)	A SPT N VALUE A  20 40 60 80  PL MC LL  20 40 60 80  □ FINES CONTENT (%) □  20 40 60 80
\(\frac{\int_{1}^{3} \int_{2}^{3}}{\int_{2}^{3} \int_{2}^{3}}\) Lean \(\frac{\int_{1}^{3} \int_{2}^{3}}{\int_{2}^{3} \int_{2}^{3}}\)	Clay w/ Sand, trace Roots, black, wet (Topsoil) Lean Clay w/ Sand, dark brown to brown, wet (Gla	acial Till)	AU AU 5				
				7			

HAUGO GEOTECHNICAL

Haugo GeoTechnical Services 2825 Cedar Ave South Minneapolis, MN, 55407

# BORING NUMBER HAP-4 PAGE 1 OF 1

RVIL							
ENT_L		PROJEC	NAME	Freth	am 31st Ad	ddition	
OJECT	NUMBER 23-0817	PROJEC	LOCA1	ION _	Minnetonka	a, MN	
TE STA	RTED 10/25/23 COMPLETED 10/25/23	GROUND ELEVATION HOLE SIZE 3 1/4 inches					
ILLING	CONTRACTOR HGTS- 45	GROUND	WATER	LEVE	LS:		
ILLING	METHOD _Hand Auger	AT	TIME OF	DRILL	NG N	lot End	countered
GGED E	BY NC CHECKED BY PG	AT	END OF	DRILL	I <b>NG</b> N	ot Enc	ountered
TES _		AF ⁻	TER DRI	LLING	Not Er	ncount	ered
			SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Moisture Content (%)	A SPT N VALUE A  20 40 60 80  PL MC LL  20 40 60 80  □ FINES CONTENT (%) □  20 40 60 80
17.11.	Lean Clay w/ Sand, trace Roots, dark brown to black, wet	(Topsoil)	AU				
	(SC) Clayey Sand, trace Gravel, brown, moist to wet (Gla	cial Till)	AU 2				
		(Glacial	AU				
1.//./	Bottom of borehole at 4.7 feet.	———	3				
	GRAPHIC CRAPHIC CANADA CONTROL	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23 COMPLETED 10/25/23  ILLING CONTRACTOR HGTS- 45  ILLING METHOD Hand Auger  GGED BY NC CHECKED BY PG  TES  MATERIAL DESCRIPTION  (SC) Clayey Sand, trace Roots, dark brown to black, wet wet (Glaver)  (SC) Clayey Sand, trace Gravel, brown, moist to wet (Glaver)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Till)	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23  COMPLETED 10/25/23  GROUND  ILLING CONTRACTOR HGTS- 45  GROUND  ILLING METHOD Hand Auger  AT  TES  MATERIAL DESCRIPTION  MATERIAL DESCRIPTION  (SC) Clayey Sand, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23 COMPLETED 10/25/23 GROUND ELEVA'  ILLING CONTRACTOR HGTS- 45  ILLING METHOD Hand Auger  GGED BY NC CHECKED BY PG AT END OF  TES AFTER DRI   MATERIAL DESCRIPTION  AU  (SC) Clayey Sand, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial AU  Till)	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23 COMPLETED 10/25/23 GROUND ELEVATION ILLING CONTRACTOR HGTS- 45  ILLING METHOD Hand Auger  GGED BY NC CHECKED BY PG AT END OF DRILL AFTER DRILLING  MATERIAL DESCRIPTION  MATERIAL DESCRIPTION  Lean Clay w/ Sand, trace Roots, dark brown to black, wet (Topsoil)  (SC) Clayey Sand, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial AU Till)	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23 COMPLETED 10/25/23 GROUND ELEVATION  ILLING CONTRACTOR HGTS- 45  ILLING METHOD Hand Auger  GGED BY NC CHECKED BY PG  TES  AFTER DRILLING Not End of the control of the co	Fax: 763-445-2238  IENT Lake West Deveopment  OJECT NUMBER 23-0817  TE STARTED 10/25/23 COMPLETED 10/25/23  GROUND ELEVATION  IILLING CONTRACTOR HGTS- 45  IILLING METHOD Hand Auger  GGED BY NC CHECKED BY PG AT END OF DRILLING Not Encount  TES AFTER DRILLING Not Encount  MATERIAL DESCRIPTION  MATERIAL DESCRIPTION  Lean Clay w/ Sand, trace Roots, dark brown to black, wet (Topsoil)  (SC) Clayey Sand, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)  (CL) Sandy Lean Clay, trace Gravel, brown, moist to wet (Glacial Till)



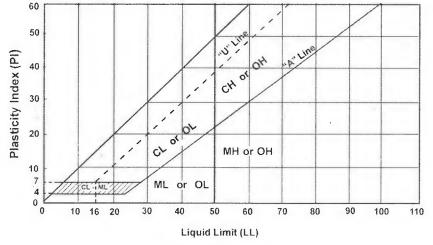
# Descriptive Terminology of Soil



Standard D 2487 - 00 Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a						Soils Classification	
						Group Name ^b	
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines ^e		$C_u \ge 4$ and $1 \le C_c \le 3^c$	GW	Well-graded gravel ^d	
				$C_u \le 4$ and/or $1 > C_c > 3$ c	GP	Poorly graded gravel	
		Gravels with Fines More than 12% fines e		Fines classify as ML or MH	GM	Silty gravel d 1g	
				Fines classify as CL or CH	GC	Clayey gravel dfg	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands 5% or less fines ¹		$C_u \ge 6$ and $1 \le C_c \le 3^c$	SW	Well-graded sand h	
				$C_u < 6$ and/or $1 > C_c > 3$ c	SP	Poorly graded sand h	
		Sands with Fines More than 12%		Fines classify as ML or MH	SM	Silty sand 1gh	
				Fines classify as CL or CH	SC	Clayey sand (ah	
e.	Silts and Clays Liquid limit less than 50	Inorganic	P1 > 7 ar	nd plots on or above "A" line	CL	Lean clay k i m	
Soils ssed the			PI < 4 or	plots below "A" line!	ML	Silt k i m	
Fine-grained So 50% or more passe No. 200 sieve		Organic	Liquid limit - oven dried < 0.75		OL OL	Organic clay k l m n Organic silt k l m c	
	Silts and clays Liquid limit 50 or more	Inorganic -	PI plots on or above "A" line		CH	Fat clay k i m	
			PI plots b	elow "A" line	MH	Elastic silt k I m	
		Organic	Liquid lin	Liquid limit - oven dried		Organic clay k 1 m p	
			Liquid lim	nit - not dried < 0.75	OH OH	Organic silt ik F m q	
Highly	Organic Soils	Primarily org	anic matter	r, dark in color and organic odor	PT	Peat	

- Based on the material passing the 3-in (75mm) sieve.
- b If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name
- $= D_{60} / D_{10} C_{e} = (D_{30})^{2}$ D₁₀ x D₆₀
- If soil contains≥15% sand, add "with sand" to group name
- Gravels with 5 to 12% fines require dual symbols
- GW-GM well-graded gravel with silt GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with sill GP-GC poorly graded gravel with clay
- If fines classify as CL-ML, use dual symbol GC-GM or SC-SM
- If fines are organic, add "with organic fines" to group name.
- If soil contains ≥ 15% gravel, add "with gravel" to group name
- Sands with 5 to 12% fines require dual symbols:
  - SW-SM well-graded sand with silt
  - SW-SC well-graded sand with clay
  - poorly graded sand with silt
  - SP-SC SP-SC poorly graded sand with clay
    If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- If soil contains≥30% plus No. 200, predominantly sand, add "sandy" to group name
- m. If soil contains≥ 30% plus No. 200 predominantly gravel, add 'gravelly" to group name PI ≥ 4 and plots on or above "A" line.
- PI < 4 or plots below "A" line
- PI plots on or above "A" line
- q. Pl plots below "A" line.



Laboratory Tests						
DD	Dry density, pcf	oc	Organic content, %			
WD	Wet density, pcf	S	Percent of saturation, %			
MC	Natural moisture content, %	SG	Specific gravity			
LL	Liqiuid limit, %	C	Cohesion, psf			
PL	Plastic limit, %	Ø	Angle of internal friction			
PI	Plasticity index, %	qu	Unconfined compressive strength, psf			
P200	% passing 200 sieve	qp	Pocket penetrometer strength, tsf			

#### Particle Size Identification

Boulders	over 12"
Cobbies	3" to 12"
Gravel	
Coarse	3/4" to 3"
Fine	No. 4 to 3/4"
Sand	
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Silt	< No. 200, PI < 4 or
	below "A" line
Clay	< No. 200, PI ≥ 4 and
	on or above "A" line

#### Relative Density of Cohesionless Soils

Very loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 BPF
Dense	31 to 50 BPF
Very dense	over 50 BPF

#### Consistency of Cohesive Soils

Very soft	0 to 1 BPF
Soft	2 to 3 BPF
Rather soft	4 to 5 BPF
Medium	6 to 8 BPF
Rather stiff	9 to 12 BPF
Stiff	13 to 16 BPF
Very stiff	17 to 30 BPF
Hard	over 30 BPF

#### **Drilling Notes**

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" 1D hollow-stem augers unless noted otherwise, Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuousflight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix

BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards