STORMWATER EVALUATION

for

FALMOUTH 3 ME 175 Falmouth Road

Falmouth, ME 04105



Prepared for:



400 Friberg Parkway Westborough, MA 01581

DANIEL P

No. 10344

10-20

Dated: June 10, 2016

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SECTION 1

DRAINAGE REPORT



PROJECT LOCATION & PURPOSE

The site and project of concern is located at 175 Falmouth Road and will be accessed from the intersection of Falmouth Road and Fall Road in Falmouth, ME. The proposed personal cellular communications antenna tower and compound will be located approximately 3,000 feet northeast from Falmouth Road entrance, and can be generally located at 43° 43′ 42.05″ N and 70° 15′ 45.75″ W on the Portland West, ME USGS quadrangle (1978).

The proposed Verizon Wireless communications facility and antenna tower will consist of a 100'x100' lease area, 75'x75' crushed stone surface compound with chain-link perimeter security fence, 12'x16' concrete pad with exterior mounted communications equipment, and additional supporting infrastructure. The proposed cellular communications antenna tower will consist of a 90' monopole with Verizon antenna equipment at 87' above ground level. The proposed compound and antenna tower can accommodate additional commercial carriers or Town of Falmouth first responder's communications equipment.

The purpose of this Stormwater Analysis and Drainage Report was to determine the stormwater or rain event peak flows for the pre-construction and post-construction condition for the areas of concern, design appropriate mitigation measures as applicable, and present the results. The analyses were completed using HydroCAD 9.1, a hydrology and hydraulics or stormwater modeling program. For the drainage analyses, we utilized Natural Resource Conservation Service (NRCS) soil maps and tables, internet-based GIS maps, and existing conditions topographic plans.



METHOD OF DRAINAGE ANALYISIS

The Natural Resource Conservation Service (formerly Soil Conservation Service, or SCS) method of analysis was utilized for this project. The SCS method is based on TR-55 and TR-20 and is widely accepted as standard engineering practice within the civil engineering profession for storm water runoff or hydrology analysis. In general, the SCS method of hydrology analysis utilizes the drainage area, hydraulic length, average terrain slope, and soil conditions of a watershed or catchment as input to calculate peak flows and the total volume of runoff for specific rain events.

HDG modeled the 2, 10, and 25 year statistical rain events for both the pre and post construction condition scenarios. The total rainfall per 24-hour period for the 2, 10, and 25-year statistical rain events appear to be to be 3.0 inches, 4.7 inches, and 5.5 inches, respectively. Based on the State of Maine Department of Environmental Protection (DEP) Stormwater Management mapping, the statistical rainfall for the project location is considered a Type III SCS distribution.

USDA-NRCS SOIL DATA

Based on review of the USDA, Natural Resource Conservation Service (NRCS) Soil Survey for Cumberland County, ME, HDG determined that the soils mapped within the project parcel consist of primarily of Hollis Fine Sandy Loam and Hollis very Rocky Fine Sandy Loam, with varying degrees of ground slope, and relatively small areas of Scantic Silt Loam, primarily located at or near delineated wetlands.

The hydrologic soil group (HSG) rating or classification for the Hollis Fine Sandy Loam and Hollis very Rocky Fine Sandy Loam are both listed as D. HSG D soils have a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table,



soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission through the ground. The NRCS reported depth to water table and any restrictive layer are 78 inches and 18 inches below grade, respectively.

Based on further on-line or internet based review of the USDA-NRCS soil survey data, the Hollis Fine Sandy Loam and Hollis Very Rocky Fine Sandy Loam have a reported sand, silt, and clay content of 52%, 42%, and 6%, respectively.

EXISTING DRAINAGE CONDITIONS

The catchments or drainage areas of interest for the Existing Drainage Conditions were modeled according to terrain or topography. The parcel contains 82 acres of land with 21 acres of the soil being identified as Hollis Fine Sandy Loam, 3%-8% ground slope (HrB), and 45 acres of Hollis Very Rocky Fine Sandy Loam, 8%-20% ground slope (HsC).

As can be seen in the Site Plan and attached Existing Drainage Conditions sheet, there are essentially six (6) catchments or drainage areas that appear to route stormwater runoff from a relatively higher elevation to a lower elevation of terrain. Five (5) of the six catchments appear to route runoff toward a forested wetlands and eventually further down gradient and off the parcel of interest.

PROPOSED DRAINAGE CONDITIONS

The proposed wireless communications facility or compound and gravel access drive has a total permanent impact area of 1.66 acres, or 2% of the total land, which includes a 12 foot wide gravel driveway with an assumed 22 foot wide



grading width, and a 100 foot by 100 foot crushed stone surface within the communications compound.

Although the project parcel contains 82 acres, only 38 acres (+/-) are potentially impacted or affected by the placement of the gravel access driveway and crushed stone surface communications compound as the attached modeling demonstrates. The modeling is based on the drainage divides, terrain or topography, and location of wetlands.

Based on Maine DEP Stormwater Rules, Regulations, Best Management Practices, and Gravel Road Maintenance Manual (2016), it is highly desired to maintain the current or existing stormwater runoff flow patterns or routes to the maximum extent practicable. As such, the six (6) drainage areas or catchments will remain the same for the Proposed Drainage Conditions and they are for the Existing Drainage conditions in the HydroCAD modeling, with modifications to the surface type and runoff curve number (CN) or coefficient by the placement of the driveway within each affected catchment or drainage basin.

As part of our plan for driveway construction, HDG proposes sandwiched gravel driveway sections, shallow culverts, and mitigation measures such as swales, runoff turnouts, and water bars or rubber razor bars as appropriate to ensure continued surface and shallow groundwater flow patterns as well as to minimize erosion and sediment transport.

RESULTS

Table 1 and Table 2 list the peak runoff and stormwater flows for the existing condition and post construction condition scenarios, respectively.



STORM EVENT	RAINFALL (in.)	Catchment 1 (cfs)	Catchment 2 (cfs)	Catchment 3 (cfs)	Catchment 4 (cfs)	Catchment 5 (cfs)	Catchment 6 (cfs)
2-year	3.0	1.76	4.92	10.52	12.44	13.33	11.59
10-year	4.7	3.85	10.32	22.52	26.05	28.46	24.82
25-year	5.5	4.92	12.98	28.46	32.74	35.93	31.36

Table 1. Existing Drainage Conditions peak runoff or flows.

Table 2. Proposed Drainage Conditions peak runoff or flows.

STORM EVENT	RAINFALL (in.)	Catchment 1 w Level Spreader 1A	Catchment 2 (cfs)	Catchment 3 (cfs)	Catchment 4 (cfs)	Catchment 5 (cfs)	Catchment 6 (cfs)
		(cfs)					
2-year	3.0	0.31	4.92	10.52	12.44	13.33	11.59
10-year	4.7	3.88	10.32	22.52	26.05	28.46	24.82
25-year	5.5	4.91	12.98	28.46	32.74	35.93	31.36

As can be seen from the tables above, the Proposed Drainage Conditions runoff or flows will be essentially equal to or less than the Existing Drainage Conditions runoff due to the incorporation of the proposed mitigation measures. As can also be seen from comparison of the runoff or peak flows for each of the drainage areas or catchments other than catchment 1, is that no increase of runoff occurs from the construction of the gravel access drive or communications compound. The negligible or imperceptible increase in runoff is due to the relatively small area of gravel access road within each relatively large catchment or drainage area.

From close review of the HydroCAD data, only Catchment 1 (Area 1) at the front of property or south end of parcel and driveway entrance has a nominal increase in runoff due to the placement of the gravel access driveway. As such, stormwater mitigation measures for this location include a multiple stormwater turnouts with stone level spreaders. The level spreaders shall have a combined storage volume of at least 3,500 cubic feet and be at least 2 feet deep. In addition, driveway water



bars will be installed and will route driveway runoff into the woods or forested areas. The stormwater mitigation measures will be installed according to *Gravel Road Maintenance Manual, A Guide for Landowners on Camp and Other Gravel Roads,* Maine DEP (2016).

CONCLUSIONS

With the construction or site development according to the approved Site Plan or Zoning Drawings (ZD) plan and implementation of the proposed mitigation measures, the proposed communications facility and gravel driveway will have minimal or no negative impact on the environment with regards to stormwater runoff.



LIMITATIONS

It shall be understood that the proposed communications facility and driveway be constructed according to the zoning drawings or Site Plan as submitted by Hudson Design Group and approved by the Town. HDG shall not be liable or responsible for any proposed changes, deletions or additions, made by the general contractor during the construction of the facility without HDG's review and written approval and / or Maine DEP or local zoning and conservation commission approval as may be required.

NRCS SOIL DATA

SECTION 2

HUDSON DESIGN GROUP, LLC



Natural Resources Conservation Service

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Web Soil Survey National Cooperative Soil Survey

Area of Interest (AOI)	Spoil Area	The soil surveys that comprise your AOI were mapped a
Area of Interes	st (AOI) 👌 Stony Spot	Warning: Soil Man may not be valid at this scale
Soils Soil Map Unit Soil Map Unit Soil Map Unit Special Point Features	Polygons Very Stony Spot Lines Wet Spot Points Cher Special Line Features	Enlargement of maps beyond the scale of mapping can misunderstanding of the detail of mapping and accuracy placement. The maps do not show the small areas of co soils that could have been shown at a more detailed sc Please rely on the bar scale on each map sheet for map
Image: Blowout Image: Borrow Pit Image: Borrow Pit Image: Clay Spot	Water Features Streams and Canals Transportation HHH Rails	measurements. Source of Map: Natural Resources Conservation Ser Web Soil Survey URL: http://websoilsurvey.nrcs.usda Coordinate System: Web Mercator (EPSG:3857)
 Closed Depress Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swart Mine or Quart Miscellaneous Perennial Wat Rock Outcrop Saline Spot Sandy Spot Severely Erod Sinkhole Slide or Slip Sodic Spot 	ssion Interstate Highways US Routes Major Roads Local Roads Background Maper Marial Photography Water er	 Maps from the Web Soil Survey are based on the Web projection, which preserves direction and shape but dis distance and area. A projection that preserves area, su Albers equal-area conic projection, should be used if mo calculations of distance or area are required. This product is generated from the USDA-NRCS certifie the version date(s) listed below. Soil Survey Area: Cumberland County and Part of Oxf Maine Survey Area Data: Version 11, Sep 17, 2015 Soil map units are labeled (as space allows) for map scalor larger. Date(s) aerial images were photographed: Jun 20, 20 2010 The orthophoto or other base map on which the soil line compiled and digitized probably differs from the backgr imagery displayed on these maps. As a result, some m of map unit boundaries may be evident.

Map Unit Legend

Cumberland County and Part of Oxford County, Maine (ME005)					
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI		
EmB	Elmwood fine sandy loam, 0 to 8 percent slopes	0.8	0.5%		
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	17.4	10.7%		
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	21.0	12.9%		
HsB	Hollis very rocky fine sandy loam, 3 to 8 percent slopes	15.2	9.4%		
HsC	Hollis very rocky fine sandy loam, 8 to 20 percent slopes	84.4	51.9%		
Sn	Scantic silt loam, 0 to 3 percent slopes	19.4	12.0%		
Sz	Swanton fine sandy loam	1.4	0.9%		
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	3.0	1.8%		
Totals for Area of Interest		162.6	100.0%		



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Conservation Service



Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Cumberland County and Part of Oxford County, Maine (ME005)					
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI	
EmB	Elmwood fine sandy loam, 0 to 8 percent slopes	В	0.8	0.5%	
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	D	17.4	10.7%	
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	D	21.0	12.9%	
HsB	Hollis very rocky fine sandy loam, 3 to 8 percent slopes	D	15.2	9.4%	
HsC	Hollis very rocky fine sandy loam, 8 to 20 percent slopes	D	84.4	51.9%	
Sn	Scantic silt loam, 0 to 3 percent slopes	D	19.4	12.0%	
Sz	Swanton fine sandy loam	C/D	1.4	0.9%	
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	С	3.0	1.8%	
Totals for Area of Intere	st		162.6	100.0%	

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition Component Percent Cutoff: None Specified Tie-break Rule: Higher



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Web Soil Survey National Cooperative Soil Survey



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Depth to Water Table

Depth to Water Ta	Depth to Water Table— Summary by Map Unit — Cumberland County and Part of Oxford County, Maine (ME005)					
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI		
EmB	Elmwood fine sandy loam, 0 to 8 percent slopes	69	0.8	0.5%		
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	>200	17.4	10.7%		
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	>200	21.0	12.9%		
HsB	Hollis very rocky fine sandy loam, 3 to 8 percent slopes	>200	15.2	9.4%		
HsC	Hollis very rocky fine sandy loam, 8 to 20 percent slopes	>200	84.4	51.9%		
Sn	Scantic silt loam, 0 to 3 percent slopes	15	19.4	12.0%		
Sz	Swanton fine sandy loam	23	1.4	0.9%		
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	61	3.0	1.8%		
Totals for Area of Intere	est		162.6	100.0%		

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters Aggregation Method: Dominant Component Component Percent Cutoff: None Specified Tie-break Rule: Lower Interpret Nulls as Zero: No Beginning Month: January Ending Month: December



Web Soil Survey National Cooperative Soil Survey



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Depth to Any Soil R	Restrictive Layer
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Depth to Any Soil Re	strictive Layer— Summar	y by Map Unit — Cumberla (ME005)	and County and Part of 0	Oxford County, Maine
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
EmB	Elmwood fine sandy loam, 0 to 8 percent slopes	>200	0.8	0.5%
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	46	17.4	10.7%
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	46	21.0	12.9%
HsB	Hollis very rocky fine sandy loam, 3 to 8 percent slopes	46	15.2	9.4%
HsC	Hollis very rocky fine sandy loam, 8 to 20 percent slopes	46	84.4	51.9%
Sn	Scantic silt loam, 0 to 3 percent slopes	>200	19.4	12.0%
Sz	Swanton fine sandy loam	>200	1.4	0.9%
WrB	Woodbridge fine sandy loam, 0 to 8 percent slopes	51	3.0	1.8%
Totals for Area of Intere	est		162.6	100.0%

Description

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component Component Percent Cutoff: None Specified Tie-break Rule: Lower Interpret Nulls as Zero: No

SECTION 3A

HYDROCAD DATA (EXISTING CONDITION)



Type III 24-hr 2-year Rainfall=3.00" Printed 6/8/2016 Page 2

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

Subcatchment 1: Area 1	Flow Length=380'	Runoff Area=1.286 ac 0.00% Impervious Runoff Depth>1.09" Slope=0.0950 '/' Tc=4.9 min CN=79 Runoff=1.76 cfs 0.117 af
Subcatchment 2: Area 2	Flow Length=575'	Runoff Area=4.152 ac 0.00% Impervious Runoff Depth>1.21" Slope=0.0210 '/' Tc=13.6 min CN=81 Runoff=4.92 cfs 0.419 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7.699 ac 0.00% Impervious Runoff Depth>1.15" Slope=0.0690 '/' Tc=7.2 min CN=80 Runoff=10.52 cfs 0.739 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9.296 ac 0.00% Impervious Runoff Depth>1.21" Slope=0.0410 '/' Tc=9.3 min CN=81 Runoff=12.44 cfs 0.939 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>1.15" Slope=0.1500 '/' Tc=3.1 min CN=80 Runoff=13.33 cfs 0.817 af
Subcatchment 6: Area 6	Flow Length=260'	Runoff Area=7.690 ac 0.00% Impervious Runoff Depth>1.15" Slope=0.0690 '/' Tc=4.1 min CN=80 Runoff=11.59 cfs 0.739 af
Pond 2P: Wetlands		Peak Elev=148.79' Storage=0.418 af Inflow=4.92 cfs 0.419 af Outflow=0.00 cfs 0.000 af
Pond 3A: Wetlands		Peak Elev=129.29' Storage=0.158 af Inflow=10.52 cfs 0.739 af Outflow=5.99 cfs 0.721 af
Pond 4A: Wetlands		Peak Elev=140.23' Storage=0.274 af Inflow=12.44 cfs 0.939 af Outflow=5.65 cfs 0.899 af
Pond 5A: Wetlands		Peak Elev=152.29' Storage=0.152 af Inflow=13.33 cfs 0.817 af Outflow=7.81 cfs 0.802 af
Pond 6A: Wetlands		Peak Elev=174.30' Storage=0.104 af Inflow=11.59 cfs 0.739 af Outflow=8.27 cfs 0.730 af
Total Runo	ff Area = 38.623 a	c Runoff Volume = 3.769 af Average Runoff Depth = 1.17"

100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.117 af, Depth> 1.09"



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Summary for Subcatchment 2: Area 2

Runoff = 4.92 cfs @ 12.20 hrs, Volume= 0.419 af, Depth> 1.21"



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Summary for Subcatchment 3: Area 3

Runoff = 10.52 cfs @ 12.11 hrs, Volume= 0.739 af, Depth> 1.15"



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Summary for Subcatchment 4: Area 4

Runoff = 12.44 cfs @ 12.14 hrs, Volume= 0.939 af, Depth> 1.21"



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Summary for Subcatchment 5: Area 5

Runoff = 13.33 cfs @ 12.05 hrs, Volume= 0.817 af, Depth> 1.15"



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Summary for Subcatchment 6: Area 6

Runoff = 11.59 cfs @ 12.07 hrs, Volume= 0.739 af, Depth> 1.15"



Summary for Pond 2P: Wetlands

Inflow Are	ea =	4.152 ac,	0.00% Impervious, Inflo	ow Depth > 1.21" for 2-year event
Inflow	=	4.92 cfs @	12.20 hrs, Volume=	0.419 af
Outflow	=	0.00 cfs @	5.00 hrs, Volume=	0.000 af, Atten= 100%, Lag= 0.0 min
Primary	=	0.00 cfs @	5.00 hrs, Volume=	0.000 af
Routing b	y Stor-Ind	d method, Tir	me Span= 5.00-20.00 hrs	s, dt= 0.05 hrs
Peak Ele	v= 148.79)' @ 20.00 hr	s Surf.Area= 0.593 ac	Storage= 0.418 af

Plug-Flow detention time= (not calculated: initial storage excedes outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Des	scription		
#1	148.00'	0.547 af	Custom Sta	age Data (Prisma	atic)Listed below (Recalc)	
Elevation (feet)	Surf.Area (acres	a Inc.S s) (acre-	Store Cum feet) (acr	n.Store <u>e-feet)</u>		
148.00 149.00	0.46 0.62	9 0 6 0	.000 .547	0.000 0.547		
Device R	outing	Invert O	utlet Devices			
#1 Pi	rimary	149.00' 1 H C	5.0' long x 10 ead (feet) 0.20 oef. (English)	.0' breadth Broad D 0.40 0.60 0.80 2.49 2.56 2.70 2	d-Crested Rectangular Weir 0 1.00 1.20 1.40 1.60 2.69 2.68 2.69 2.67 2.64	

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=148.00' (Free Discharge)

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Pond 2P: Wetlands
Summary for Pond 3A: Wetlands

Inflow Area =	7.699 ac,	0.00% Impervious, Inflov	v Depth > 1.15" for 2-year event			
Inflow =	10.52 cfs @	12.11 hrs, Volume=	0.739 af			
Outflow =	5.99 cfs @	12.27 hrs, Volume=	0.721 af, Atten= 43%, Lag= 9.7 min			
Primary =	5.99 cfs @	12.27 hrs, Volume=	0.721 af			
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 129.29' @ 12.27 hrs Surf.Area= 0.554 ac Storage= 0.158 af						
Plug-Flow detention time= 30.5 min calculated for 0.721 af (98% of inflow)						

Volume	Inve	ert Av	ail.Stora	ge Sto	Storage Description	
#1	129.0	00'	1.233	af Cu	Custom Stage Data (Prismatic)Listed below (Recalc)	
Elevation (feet 129.00 131.00	n Su t) (0 0	rf.Area (<u>acres)</u> 0.528 0.705	Inc (acr	c.Store <u>e-feet)</u> 0.000 1.233	e Cum.Store (acre-feet) 0 0.000 3 1.233	
Device	Routing		Invert	Outlet	t Devices	
#1	Primary		129.00'	15.0' lo Head (Coef. (long x 10.0' breadth Broad-Crested Rectangular Weir l (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 l (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64	

Primary OutFlow Max=5.96 cfs @ 12.27 hrs HW=129.29' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 5.96 cfs @ 1.36 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 3A: Wetlands

Summary for Pond 4A: Wetlands

Inflow Are	ea = 9.29	6 ac, 0.0	00% Impervious, Inflow Depth > 1.21" for 2-year event				
Inflow	= 12.44	cfs @ 12	2.14 hrs, Volume= 0.939 af				
Outflow	= 5.65	cfs @ 12	2.42 hrs, Volume= 0.899 af, Atten= 55%, Lag= 16.8 min				
Primary	= 5.65	cfs @ 12	2.42 hrs, Volume= 0.899 af				
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 140.23' @ 12.42 hrs Surf.Area= 1.194 ac Storage= 0.274 af							
Plug-Flov	v detention time	= 50.9 mi	n calculated for 0.899 af (96% of inflow)				
Center-or	-iviass det. time	= 55.6 mi	11 (842.1 - 808.3)				
Volume	Invert A	vail.Stora	age Storage Description				
#1	140.00'	2.682	2 af Custom Stage Data (Prismatic) Listed below (Recalc)				
Elevatior	n Surf.Area	In	c.Store Cum.Store				
(feet) (acres)	(ac	re-feet) (acre-feet)				
140.00) 1.149		0.000 0.000				
142.00) 1.533		2.682 2.682				
Davias	Douting	Invert	Outlet Devices				
Device	Routing		Oulier Devices				

Primary OutFlow Max=5.64 cfs @ 12.42 hrs HW=140.23' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 5.64 cfs @ 1.21 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 4A: Wetlands

Summary for Pond 5A: Wetlands

Innow Are	a = 8.50)0 ac, 0.0	00% Impe	ervious, Inflow D	epth > 1.15"	for 2-year event		
Inflow	= 13.33	cfs @ 12	2.05 hrs,	Volume=	0.817 af			
Outflow	= 7.81	cfs @ 12	2.16 hrs,	Volume=	0.802 af, Atte	en= 41%, Lag= 6.3 min		
Primary	= 7.81	cfs @ 12	2.16 hrs,	Volume=	0.802 af			
Routing by	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs							
Peak Elev	Peak Elev= 152.29' @ 12.16 hrs Surf.Area= 0.539 ac Storage= 0.152 af							
Plug-Flow	detention time	e= 23.7 mi	n calculat	ted for 0.802 af (98% of inflow)			
Center-of-	Mass det. time	e= 16.6 mi	n (820.7	- 804.1)				
Volume	Invert /	Avail.Stora	ige Sto	rage Description				
#1	152.00'	1.200	af Cus	stom Stage Data	(Prismatic)Lis	sted below (Recalc)		
				Ū	· /	, , , , , , , , , , , , , , , , , , ,		
Elevation	Surf.Area	a In	c.Store	Cum.Store	. ,			
Elevation (feet)	Surf.Area (acres	a In) (ac	c.Store re-feet)	Cum.Store (acre-feet)	. ,			
Elevation (feet) 152.00	Surf.Area	a In) (ac 1	c.Store re-feet) 0.000	Cum.Store (acre-feet) 0.000				
Elevation (feet) 152.00 154.00	Surf.Area (acres 0.514 0.686	a In) (ac 1	c.Store <u>re-feet)</u> 0.000 1.200	Cum.Store (acre-feet) 0.000 1.200	. ,			
Elevation (feet) 152.00 154.00 Device I	Surf.Area (acres 0.514 0.686 Routing	a In) (ac 4 5 Invert	c.Store re-feet) 0.000 1.200 Outlet D	Cum.Store (acre-feet) 0.000 1.200 Devices	. ,			
Elevation (feet) 152.00 154.00 Device I #1 I	Surf.Area (acres 0.514 0.686 Routing Primary	a In) (ac 4 5 <u>Invert</u> 152.00'	c.Store re-feet) 0.000 1.200 Outlet D 20.0' Ion Head (fr	Cum.Store (acre-feet) 0.000 1.200 Devices ng x 10.0' breac	Ith Broad-Cres	sted Rectangular Weir		

Primary OutFlow Max=7.74 cfs @ 12.16 hrs HW=152.29' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 7.74 cfs @ 1.35 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 5A: Wetlands

Summary for Pond 6A: Wetlands

1111000 / 1100	a = 7.690)ac, 0.00)% Imper	vious, Inflow D	epth > 1.15"	for 2-year event		
Inflow	= 11.59 c	cfs @ 12.0)7 hrs, ∖	/olume=	0.739 af			
Outflow	= 8.27 0	ofs @ 12.1	15 hrs, ∖	/olume=	0.730 af, Atte	en= 29%, Lag= 5.0 min		
Primary	= 8.27 c	cfs @ 12.1	15 hrs, ∖	/olume=	0.730 af			
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs								
Peak Elev= 174.30' @ 12.15 hrs Surf.Area= 0.356 ac Storage= 0.104 af								
Plug-Flow	detention time:	= 16.1 min	calculate	ed for 0.727 af (98% of inflow)			
Center-of-	Center-of-Mass det. time= 11.3 min (816.2 - 804.8)							
Volume	Invert A	vail.Storage	e Stora	age Description				
#1	174.00'	0.791 a	af Cust	om Stage Data	(Prismatic) Lis	sted below (Recalc)		
#1 Elevation	174.00' Surf.Area	0.791 a Inc.	af Cust Store	om Stage Data Cum.Store	n (Prismatic)Lis	sted below (Recalc)		
#1 Elevation (feet)	174.00' Surf.Area (acres)	0.791 a Inc. (acre	af Cust Store <u>-feet)</u>	om Stage Data Cum.Store (acre-feet)	າ (Prismatic)Lis	sted below (Recalc)		
#1 Elevation (feet) 174.00	174.00' Surf.Area (acres) 0.339	0.791 a Inc. (acre	af Cust Store <u>-feet)</u> 0.000	om Stage Data Cum.Store (acre-feet) 0.000	ı (Prismatic) Lis	sted below (Recalc)		
#1 Elevation (feet) 174.00 176.00	174.00' Surf.Area (acres) 0.339 0.452	0.791 a Inc. (acre	af Cust Store <u>-feet)</u> 0.000 0.791	om Stage Data Cum.Store (acre-feet) 0.000 0.791	। (Prismatic)Lis	sted below (Recalc)		
#1 Elevation (feet) 174.00 176.00 Device R	174.00' Surf.Area (acres) 0.339 0.452	0.791 a Inc. (acre	af Cust Store <u>feet)</u> 0.000 0.791 Dutlet De	om Stage Data Cum.Store (acre-feet) 0.000 0.791	n (Prismatic)Lis	sted below (Recalc)		

Primary OutFlow Max=8.27 cfs @ 12.15 hrs HW=174.30' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 8.27 cfs @ 1.38 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 6A: Wetlands

Type III 24-hr 10-year Rainfall=4.70" Printed 6/8/2016 C Page 19

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

Subcatchment 1: Area 1	Flow Length=380	Runoff Area=1.286 ac 0.00% Impervious Runoff Depth>2.37" Slope=0.0950 '/' Tc=4.9 min CN=79 Runoff=3.85 cfs 0.254 af
Subcatchment 2: Area 2	Flow Length=575'	Runoff Area=4.152 ac 0.00% Impervious Runoff Depth>2.54" Slope=0.0210 '/' Tc=13.6 min CN=81 Runoff=10.32 cfs 0.878 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7.699 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.0690 '/' Tc=7.2 min CN=80 Runoff=22.52 cfs 1.575 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9.296 ac 0.00% Impervious Runoff Depth>2.54" Slope=0.0410 '/' Tc=9.3 min CN=81 Runoff=26.05 cfs 1.968 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.1500 '/' Tc=3.1 min CN=80 Runoff=28.46 cfs 1.741 af
Subcatchment6: Area 6	Flow Length=260'	Runoff Area=7.690 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.0690 '/' Tc=4.1 min CN=80 Runoff=24.82 cfs 1.575 af
Pond 2P: Wetlands		Peak Elev=149.20' Storage=0.547 af Inflow=10.32 cfs 0.878 af Outflow=3.44 cfs 0.333 af
Pond 3A: Wetlands		Peak Elev=129.52' Storage=0.289 af Inflow=22.52 cfs 1.575 af Outflow=15.04 cfs 1.548 af
Pond 4A: Wetlands		Peak Elev=140.42' Storage=0.504 af Inflow=26.05 cfs 1.968 af Outflow=14.20 cfs 1.910 af
Pond 5A: Wetlands		Peak Elev=152.51' Storage=0.274 af Inflow=28.46 cfs 1.741 af Outflow=19.23 cfs 1.719 af
Pond 6A: Wetlands		Peak Elev=174.52' Storage=0.183 af Inflow=24.82 cfs 1.575 af Outflow=19.70 cfs 1.561 af
Total Runo	ff Area = 38.623 a	ac Runoff Volume = 7.991 af Average Runoff Depth = 2.48"

100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 3.85 cfs @ 12.08 hrs, Volume= 0.254 af, Depth> 2.37"



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Summary for Subcatchment 2: Area 2

Runoff = 10.32 cfs @ 12.19 hrs, Volume= 0.878 af, Depth> 2.54"



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Summary for Subcatchment 3: Area 3

Runoff = 22.52 cfs @ 12.11 hrs, Volume= 1.575 af, Depth> 2.46"



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Summary for Subcatchment 4: Area 4

Runoff = 26.05 cfs @ 12.13 hrs, Volume= 1.968 af, Depth> 2.54"



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Summary for Subcatchment 5: Area 5

Runoff = 28.46 cfs @ 12.05 hrs, Volume= 1.741 af, Depth> 2.46"



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Summary for Subcatchment 6: Area 6

Runoff = 24.82 cfs @ 12.06 hrs, Volume= 1.575 af, Depth> 2.46"



Summary for Pond 2P: Wetlands

Inflow Area	a =	4.152 ac,	0.00% Impervious, Inflow D	epth > 2.54" for 10-year event		
Inflow	=	10.32 cfs @	12.19 hrs, Volume=	0.878 af		
Outflow	=	3.44 cfs @	12.85 hrs, Volume=	0.333 af, Atten= 67%, Lag= 39.6 min		
Primary	=	3.44 cfs @	12.85 hrs, Volume=	0.333 af		
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs						
Peak Elev:	= 149.2	0' @ 12.85 hr	s Surf.Area= 0.626 ac Stor	age= 0.547 af		

Plug-Flow detention time= 211.1 min calculated for 0.333 af (38% of inflow) Center-of-Mass det. time= 120.6 min (913.6 - 793.0)

Volume	Invert	Avail.Stora	age Stora	ge Description	
#1	148.00'	0.54	7 af Cust	om Stage Data	(Prismatic)Listed below (Recalc)
Elevation (feet) 148.00	Surf.A (acr 0.4	rea Ir r <u>es) (ac</u> 469	nc.Store cre-feet) 0.000	Cum.Store (acre-feet) 0.000	
149.00	0.0	626	0.547	0.547	
Device I	Routing	Invert	Outlet De	vices	
#1 I	Primary	149.00'	15.0' long Head (fee Coef. (En	g x 10.0' breadt et) 0.20 0.40 0. glish) 2.49 2.56	Image: Image and the sector of the

Primary OutFlow Max=3.44 cfs @ 12.85 hrs HW=149.20' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 3.44 cfs @ 1.13 fps)



Pond 2P: Wetlands

Summary for Pond 3A: Wetlands

Inflow Are	a =	7.699 ac,	0.00% Im	npervious, Inflow Depth > 2.46" for 10-year event			
Inflow	= 22	2.52 cfs @	12.11 hrs	s, Volume= 1.575 af			
Outflow	= 15	5.04 cfs @	12.22 hrs	s, Volume= 1.548 af, Atten= 33%, Lag= 6.6 min			
Primary	= 15	5.04 cfs @	12.22 hrs	rs, Volume= 1.548 af			
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 129.52' @ 12.22 hrs Surf.Area= 0.574 ac Storage= 0.289 af							
Plug-Flow Center-of-	detention Mass det.	time= 24.4 time= 17.7	min calcul min (807.	ulated for 1.543 af (98% of inflow) 7.9 - 790.2)			
Volume	Invert	Avail.St	orage St	Storage Description			
#1	129.00'	1.2	233 af C i	Custom Stage Data (Prismatic)Listed below (Recalc)			
Elevation	Surf.	Area	Inc.Store	e Cum.Store			
(feet)	(ad	cres)	(acre-feet)	t) (acre-feet)			
129.00	0).528	0.000	0 0.000			
131.00	0).705	1.233	3 1.233			
Device I	Routing	Inve	rt Outlet	et Devices			
#1 I	Primary	129.0	0' 15.0' I Head	long x 10.0' breadth Broad-Crested Rectangular Weir l (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60			

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.88 cfs @ 12.22 hrs HW=129.52' (Free Discharge)



Pond 3A: Wetlands

Summary for Pond 4A: Wetlands

Inflow Area	a =	9.296 ac,	0.00% Impervious, I	nflow Depth > 2.	54" for 10-year event
Inflow	=	26.05 cfs @	12.13 hrs, Volume=	1.968 af	
Outflow	=	14.20 cfs @	12.33 hrs, Volume=	1.910 af,	Atten= 45%, Lag= 11.6 min
Primary	=	14.20 cfs @	12.33 hrs, Volume=	1.910 af	
Routing by	Stor-In	d method, Tir	ne Span= 5.00-20.00	hrs, dt= 0.05 hrs	

Peak Elev= 140.42' @ 12.33 hrs Surf.Area= 1.230 ac Storage= 0.504 af

Plug-Flow detention time= 40.9 min calculated for 1.910 af (97% of inflow) Center-of-Mass det. time= 29.8 min (819.4 - 789.6)

Volume	Invert	Avail.Stora	ge Stora	age Description	
#1	140.00'	2.682	af Cust	tom Stage Data	(Prismatic)Listed below (Recalc)
Elevation (feet) 140.00 142.00	Surf.Are (acre 1.14 1.53	ea Inc <u>s) (acr</u> 19 33	c.Store <u>e-feet)</u> 0.000 2.682	Cum.Store (acre-feet) 0.000 2.682	
Device F	Routing	Invert	Outlet De	evices	
#1 F	Primary	140.00'	20.0' lon Head (fee Coef. (Er	g x 10.0' breadt et) 0.20 0.40 0. nglish) 2.49 2.56	h Broad-Crested Rectangular Weir 60 0.80 1.00 1.20 1.40 1.60 5 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.16 cfs @ 12.33 hrs HW=140.42' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 14.16 cfs @ 1.67 fps)

Hydrograph 26.05 cfs Inflow Primary Inflow Area=9.296 ac 25 Peak Elev=140.42' Storage=0.504 af 20 Flow (cfs) 14.20 cfs 15 10 5 0-6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 5 Time (hours)

Pond 4A: Wetlands

Summary for Pond 5A: Wetlands

IIIIIOw Alea	= 8.500)ac, 0.00)% Impe	rvious, Inflow D	epth > 2.46	5" for 10-year event	
Inflow	= 28.46 c	rfs @ 12.	05 hrs,	Volume=	1.741 af	-	
Outflow	= 19.23 c	fs @ 12.	13 hrs,	Volume=	1.719 af, A	Atten= 32%, Lag= 4.5 min	
Primary	= 19.23 c	sfs @ 12.	13 hrs,	Volume=	1.719 af	, C	
Routing by	Stor-Ind metho	od, Time S	span= 5.	00-20.00 hrs, dt=	= 0.05 hrs	_	
Peak Elev= 152.51' @ 12.13 hrs Surf.Area= 0.558 ac Storage= 0.274 af							
Plug-Flow of Center-of-N	detention time= lass det. time=	= 19.0 min = 13.8 min	calculat (800.7	ed for 1.719 af (- 786.9)	99% of inflov	v)	
Volume	Invert A	vail.Storag	je Stor	age Description			
<i>#1</i>	450.00	4 000	< ^		(
# I	152.00	1.200 8	at Cus	tom Stage Data	a (Prismatic)	Listed below (Recalc)	
# I Elevation	Surf.Area	1.200 a	af Cus .Store	tom Stage Data Cum.Store	a (Prismatic)	Listed below (Recalc)	
# I Elevation (feet)	Surf.Area (acres)	1.200 a Inc (acre	af Cus .Store e-feet)	tom Stage Data Cum.Store (acre-feet)	a (Prismatic)	Listed below (Recalc)	
Elevation (feet) 152.00	Surf.Area (acres) 0.514	1.200 a Inc (acre	af Cus .Store <u>e-feet)</u> 0.000	tom Stage Data Cum.Store (acre-feet) 0.000	a (Prismatic	Listed below (Recalc)	
#1 Elevation (feet) 152.00 154.00	Surf.Area (acres) 0.514 0.686	1.200 a Inc (acre	af Cus .Store <u>e-feet)</u> 0.000 1.200	tom Stage Data Cum.Store (acre-feet) 0.000 1.200	a (Prismatic	Listed below (Recalc)	
Elevation (feet) 152.00 154.00 Device R	Surf.Area (acres) 0.514 0.686 outing	1.200 a Inc (acre	af Cus .Store <u>e-feet)</u> 0.000 1.200 <u>Outlet D</u>	tom Stage Data Cum.Store (acre-feet) 0.000 1.200 evices	a (Prismatic	Listed below (Recalc)	

Primary OutFlow Max=19.00 cfs @ 12.13 hrs HW=152.51' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 19.00 cfs @ 1.88 fps)



Pond 5A: Wetlands

Summary for Pond 6A: Wetlands

Innow Area	= 7.690	ac, 0.00%	Impervious, Inflow Depth > 2.46" for 10-year event	
Inflow :	= 24.82 c	fs @ 12.06	hrs, Volume= 1.575 af	
Outflow :	= 19.70 c	fs @ 12.12	hrs, Volume= 1.561 af, Atten= 21%, Lag= 3.6 min	
Primary :	= 19.70 c	fs @ 12.12	hrs, Volume= 1.561 af	
Routing by	Stor-Ind metho	od, Time Spa	an= 5.00-20.00 hrs, dt= 0.05 hrs	
Peak Elev=	174.52' @ 12	.12 hrs Sur	f.Area= 0.368 ac Storage= 0.183 af	
Plug-Flow d Center-of-M	letention time= lass det. time=	= 12.9 min ca = 9.4 min (79	alculated for 1.556 af (99% of inflow) 97.1 - 787.7)	
Volume	Invert Av	vail.Storage	Storage Description	
				_
#1	174.00'	0.791 af	Custom Stage Data (Prismatic)Listed below (Recalc)	
#1 Elevation	174.00' Surf.Area	0.791 af Inc.St	Custom Stage Data (Prismatic)Listed below (Recalc) tore Cum.Store	
#1 Elevation (feet)	174.00' Surf.Area (acres)	0.791 af Inc.St (acre-fe	Custom Stage Data (Prismatic)Listed below (Recalc) tore Cum.Store eet) (acre-feet)	
#1 Elevation (feet) 174.00	174.00' Surf.Area (acres) 0.339	0.791 af Inc.St (acre-fe 0.	Custom Stage Data (Prismatic)Listed below (Recalc) tore Cum.Store eet) (acre-feet) 000 0.000	
#1 Elevation (feet) 174.00 176.00	174.00' Surf.Area (acres) 0.339 0.452	0.791 af Inc.Si (acre-fo 0. 0.	Custom Stage Data (Prismatic)Listed below (Recalc)toreCum.Storeeet)(acre-feet)0000.0007910.791	
#1 Elevation (feet) 174.00 176.00 Device Ro	174.00' Surf.Area (acres) 0.339 0.452	0.791 af Inc.Si (acre-fe 0. 0. Invert Ou	Custom Stage Data (Prismatic)Listed below (Recalc) tore Cum.Store eet) (acre-feet) 000 0.000 791 0.791 utlet Devices	

Primary OutFlow Max=19.17 cfs @ 12.12 hrs HW=174.51' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 19.17 cfs @ 1.88 fps)



Pond 6A: Wetlands

Type III 24-hr 25year Rainfall=5.50" Printed 6/8/2016 Page 36

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

Subcatchment 1: Area 1	Flow Length=380	Runoff Area=1.286 ac 0.00% Impervious Runoff Depth>3.03" Slope=0.0950 '/' Tc=4.9 min CN=79 Runoff=4.92 cfs 0.324 af
Subcatchment 2: Area 2	Flow Length=575'	Runoff Area=4.152 ac 0.00% Impervious Runoff Depth>3.21" Slope=0.0210 '/' Tc=13.6 min CN=81 Runoff=12.98 cfs 1.110 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7.699 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.0690 '/' Tc=7.2 min CN=80 Runoff=28.46 cfs 2.001 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9.296 ac 0.00% Impervious Runoff Depth>3.21" Slope=0.0410 '/' Tc=9.3 min CN=81 Runoff=32.74 cfs 2.488 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.1500 '/' Tc=3.1 min CN=80 Runoff=35.93 cfs 2.212 af
Subcatchment6: Area 6	Flow Length=260'	Runoff Area=7.690 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.0690 '/' Tc=4.1 min CN=80 Runoff=31.36 cfs 2.000 af
Pond 2P: Wetlands		Peak Elev=149.38' Storage=0.547 af Inflow=12.98 cfs 1.110 af Outflow=8.84 cfs 0.565 af
Pond 3A: Wetlands		Peak Elev=129.62' Storage=0.344 af Inflow=28.46 cfs 2.001 af Outflow=19.73 cfs 1.970 af
Pond 4A: Wetlands		Peak Elev=140.50' Storage=0.604 af Inflow=32.74 cfs 2.488 af Outflow=18.87 cfs 2.423 af
Pond 5A: Wetlands		Peak Elev=152.61' Storage=0.328 af Inflow=35.93 cfs 2.212 af Outflow=25.59 cfs 2.186 af
Pond 6A: Wetlands		Peak Elev=174.61' Storage=0.216 af Inflow=31.36 cfs 2.000 af Outflow=25.58 cfs 1.985 af
Total Runof	Area = 38.623 a	c Runoff Volume = 10.135 af Average Runoff Depth = 3.15"

100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 4.92 cfs @ 12.07 hrs, Volume= 0.324 af, Depth> 3.03"



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Summary for Subcatchment 2: Area 2

Runoff = 12.98 cfs @ 12.19 hrs, Volume= 1.110 af, Depth> 3.21"



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Summary for Subcatchment 3: Area 3

Runoff = 28.46 cfs @ 12.11 hrs, Volume= 2.001 af, Depth> 3.12"



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Summary for Subcatchment 4: Area 4

Runoff = 32.74 cfs @ 12.13 hrs, Volume= 2.488 af, Depth> 3.21"



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Summary for Subcatchment 5: Area 5

Runoff = 35.93 cfs @ 12.05 hrs, Volume= 2.212 af, Depth> 3.12"



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Summary for Subcatchment 6: Area 6

Runoff = 31.36 cfs @ 12.06 hrs, Volume= 2.000 af, Depth> 3.12"



Summary for Pond 2P: Wetlands

Inflow Area	= 4.152	2 ac, 0.0	0% Impervious, Inflow Depth > 3.21" for 25year event				
Inflow =	= 12.98 (cfs @ 12.	.19 hrs, Volume= 1.110 af				
Outflow =	= 8.84 (cfs @ 12.	.44 hrs, Volume= 0.565 af, Atten= 32%, Lag= 15.3 min				
Primary =	= 8.84 (cfs @ 12.	.44 hrs, Volume= 0.565 af				
Routing by S	Stor-Ind meth	od, Time S	Span= 5.00-20.00 hrs, dt= 0.05 hrs				
Peak Elev= 149.38' @ 12.44 hrs Surf.Area= 0.626 ac Storage= 0.547 af							
Plug-Flow d	etention time	= 160.6 mi	in calculated for 0.565 af (51% of inflow)				
Center-of-M	ass det. time:	= 79.9 min	n (867.5 - 787.5)				
Volume	Invert A	vail.Stora	ge Storage Description				
#1	148.00'	0.547	af Custom Stage Data (Prismatic)Listed below (Recalc)				
Elevation	Surf.Area	Inc	c.Store Cum.Store				
(feet)	(acres)	(acr	e-feet) (acre-feet)				
148.00	0.469		0.000 0.000				
149.00	0.626		0.547 0.547				
		lovort	Outlet Davies				
Device Ro	outing	Inven	Outlet Devices				

Primary OutFlow Max=8.40 cfs @ 12.44 hrs HW=149.36' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 8.40 cfs @ 1.54 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC

Hydrograph 12.98 cfs Inflow Primary 14 Inflow Area=4.152 ac Peak Elev=149.38' 12 Storage=0.547 af 8.84 cfs 10-Flow (cfs) 8 6 4 2 0-6 9 10 11 12 13 14 15 16 17 18 19 20 8 5 7 Time (hours)

Pond 2P: Wetlands

Summary for Pond 3A: Wetlands

Inflow Are	ea =	7.699 ac,	0.00% Impervious, I	nflow Depth > 3.12	2" for 25year event
Inflow	=	28.46 cfs @	12.11 hrs, Volume=	2.001 af	-
Outflow	=	19.73 cfs @	12.21 hrs, Volume=	1.970 af, 1	Atten= 31%, Lag= 6.2 min
Primary	=	19.73 cfs @	12.21 hrs, Volume=	1.970 af	-

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 129.62' @ 12.21 hrs Surf.Area= 0.583 ac Storage= 0.344 af

Plug-Flow detention time= 22.8 min calculated for 1.970 af (98% of inflow) Center-of-Mass det. time= 16.7 min (801.3 - 784.6)

Volume	Inv	/ert A	vail.Stora	ge Ste	Storage Description
#1	129.	00'	1.233	af Cu	Custom Stage Data (Prismatic)Listed below (Recalc)
Elevatio (fee	on Si et)	urf.Area (acres)	Ind (acr	c.Store e-feet)	e Cum.Store t) (acre-feet)
129.0	00	0.528		0.000	0 0.000
131.0	00	0.705		1.233	3 1.233
Device	Routing		Invert	Outlet	et Devices
#1	Primary		129.00'	15.0' lo Head (Coef. (long x 10.0' breadth Broad-Crested Rectangular Weir d (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 . (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=19.62 cfs @ 12.21 hrs HW=129.62' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 19.62 cfs @ 2.12 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 3A: Wetlands
Falmouth 3 ME - EXIST COND 06.02.16

Summary for Pond 4A: Wetlands

Inflow	Area =	9.296 ac,	0.00% Impervious,	Inflow Depth > 3.21"	for 25year event
Inflow	=	32.74 cfs @	12.13 hrs, Volume=	= 2.488 af	
Outflov	v =	18.87 cfs @	12.31 hrs, Volume=	= 2.423 af, Att	en= 42%, Lag= 10.4 min
Primar	y =	18.87 cfs @	12.31 hrs, Volume=	= 2.423 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 140.50' @ 12.31 hrs Surf.Area= 1.246 ac Storage= 0.604 af

Plug-Flow detention time= 38.2 min calculated for 2.423 af (97% of inflow) Center-of-Mass det. time= 28.1 min (812.2 - 784.1)

Volume	Inve	ert Av	/ail.Storag	ge Stor	rage Description	
#1	140.0	0'	2.682	af Cus	stom Stage Data	(Prismatic)Listed below (Recalc)
Elevation (feet 140.00 142.00	n Sur t <u>) (</u> 0 0	rf.Area <u>acres)</u> 1.149 1.533	Inc (acr	:.Store <u>e-feet)</u> 0.000 2.682	Cum.Store (acre-feet) 0.000 2.682	
Device #1	Routing Primary		Invert 140.00'	Outlet D 20.0' lor	evices ng x 10.0' breadt	h Broad-Crested Rectangular Weir
				Head (fe Coef. (E	eet) 0.20 0.40 0. nglish) 2.49 2.56	60 0.80 1.00 1.20 1.40 1.60 5 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=18.83 cfs @ 12.31 hrs HW=140.50' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 18.83 cfs @ 1.87 fps)



Pond 4A: Wetlands

Falmouth 3 ME - EXIST COND 06.02.16

Summary for Pond 5A: Wetlands

Inflow Ar	ea =	8.500	ac, 0.0	0% Imp	ervious, Inflow De	epth > 3.12"	for 25year event
Inflow	=	35.93 cf	s@ 12	.05 hrs,	Volume=	2.212 af	
Outflow	=	25.59 cf	s@ 12	.12 hrs,	Volume=	2.186 af, Atte	en= 29%, Lag= 4.2 min
Primary	=	25.59 cf	s@ 12	.12 hrs,	Volume=	2.186 af	
Routing I	by Stor-Ir	nd metho	d, Time S	Span= 5	.00-20.00 hrs, dt=	0.05 hrs	
Peak Ele	ev= 152.6	51' @ 12. ⁻	12 hrs	Surf.Area	a= 0.566 ac Stor	age= 0.328 af	
Plug-Flov	w detenti	on time=	17.7 mir	n calcula	ted for 2.186 af (9	9% of inflow)	
Center-o	f-Mass d	et. time=	13.0 mir	n (794.4	- 781.4)		
Volume	Inv	ert Av	ail.Stora	ge Sto	rage Description		
#1	152.	00'	1.200	af Cu	stom Stage Data	(Prismatic)Lis	ted below (Recalc)
Elevatio	n Su	urf.Area	Ind	c.Store	Cum.Store		
(fee	t)	(acres)	(acr	e-feet)	(acre-feet)		
152.0	0	0.514		0.000	0.000		
154.0	0	0.686		1.200	1.200		
Device	Routing		Invert	Outlet [Devices		
#1	Primary	1	52.00'	20.0' Io Head (f	ng x 10.0' bread eet) 0.20 0.40 0	th Broad-Cres	ted Rectangular Weir 1.20 1.40 1.60

Primary OutFlow Max=24.98 cfs @ 12.12 hrs HW=152.60' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 24.98 cfs @ 2.09 fps)

Hydrograph Inflow 35.93 cfs 40 Primary Inflow Area=8.500 ac 35 Peak Elev=152.61' 30-25.59 cfs Storage=0.328 af 25 Flow (cfs) 20 15 10 5 0 6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 5 Time (hours)

Pond 5A: Wetlands

Falmouth 3 ME - EXIST COND 06.02.16

Summary for Pond 6A: Wetlands

INNOW Area	a – 7.690)ac, 0.0	10% Impei	rvious, Inflow D)epth > 3.1	2" for 25year event
Inflow	= 31.36 c	fs @ 12	.06 hrs, \	/olume=	2.000 af	-
Outflow	= 25.58 c	fs @ 12	.12 hrs, \	/olume=	1.985 af,	Atten= 18%, Lag= 3.4 min
Primary	= 25.58 c	rfs @ 12	.12 hrs, \	/olume=	1.985 af	
Routing by	Stor-Ind metho	od, Time S	Span= 5.0	0-20.00 hrs, dt	= 0.05 hrs	
Peak Elev=	= 174.61' @ 12	.12 hrs 8	Surf.Area=	= 0.373 ac Sto	rage= 0.216	b af
Plug-Flow Center-of-N	detention time= /lass det. time=	= 12.1 mir = 8.9 min	n calculate (791.1 - 7	ed for 1.985 af (782.2)	99% of inflo	w)
Volume	Invert A	vail.Stora	ge Stora	age Description		
#1	174.00'	0.791	af Cust	tom Stage Data	a (Prismatio	c) Listed below (Recalc)
#1 Elevation	174.00' Surf.Area	0.791 Inc	af Cus t c.Store	tom Stage Data	a (Prismatio	c) Listed below (Recalc)
#1 Elevation (feet)	174.00' Surf.Area (acres)	0.791 Inc (acr	af Cus t c.Store re-feet)	tom Stage Data Cum.Store (acre-feet)	a (Prismatio	c) Listed below (Recalc)
#1 Elevation (feet) 174.00	174.00' Surf.Area (acres) 0.339	0.791 Inc (acr	af Cus t c.Store r <u>e-feet)</u> 0.000	tom Stage Data Cum.Store (acre-feet) 0.000	a (Prismatio	:) Listed below (Recalc)
#1 Elevation (feet) 174.00 176.00	174.00' Surf.Area (acres) 0.339 0.452	0.791 Inc (acr	af Cus t c.Store <u>e-feet)</u> 0.000 0.791	tom Stage Data Cum.Store (acre-feet) 0.000 0.791	a (Prismatio	:) Listed below (Recalc)
#1 Elevation (feet) 174.00 176.00 Device R	174.00' Surf.Area (acres) 0.339 0.452 outing	0.791 Inc (acr	af Cus t c.Store <u>e-feet)</u> 0.000 0.791 Outlet De	tom Stage Data Cum.Store (acre-feet) 0.000 0.791	a (Prismatio	c) Listed below (Recalc)

Primary OutFlow Max=24.90 cfs @ 12.12 hrs HW=174.60' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 24.90 cfs @ 2.08 fps)



Pond 6A: Wetlands

SECTION 3B

HYDROCAD DATA (PROPOSED CONDITION)



Type III 24-hr 2-year Rainfall=3.00" Printed 6/8/2016 Page 2

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

Subcatchment 1: Area 1	Flow Length=380'	Runoff Area=1 Slope=0.0950 '/'	.286 ac 0.00 Tc=4.8 min	0% Imperviou CN=80 Ru	s Runoff Dep noff=1.87 cfs	oth>1.15" 0.124 af
Subcatchment 2: Area 2	Flow Length=575'	Runoff Area=4 Slope=0.0210 '/'	1.152 ac 0.00 Tc=13.6 min	0% Imperviou CN=81 Ru	s Runoff Dep noff=4.92 cfs	oth>1.21" 0.419 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7 Slope=0.0690 '/'	7.699 ac 0.00 Tc=7.2 min	0% Imperviou CN=80 Run	s Runoff Dep off=10.52 cfs	oth>1.15" 0.739 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9 Slope=0.0410 '/'	0.296 ac 0.00 Tc=9.3 min	0% Imperviou CN=81 Run	s Runoff Dep off=12.44 cfs	oth>1.21" 0.939 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8 Slope=0.1500 '/'	3.500 ac 0.00 Tc=3.1 min	0% Imperviou CN=80 Run	s Runoff Dep off=13.33 cfs	oth>1.15" 0.817 af
Subcatchment 6: Area 6	Flow Length=260'	Runoff Area=7 Slope=0.0690 '/'	7.690 ac 0.00 Tc=4.1 min	0% Imperviou CN=80 Run	s Runoff Dep off=11.59 cfs	oth>1.15" 0.739 af
Pond 1A: SW Runout w L	evel Spreaders	Peak Elev=12	7.53' Storage	e=2,879 cf In Out	flow=1.87 cfs flow=0.31 cfs	0.124 af 0.058 af
Pond 2P: Wetlands		Peak Elev=14	8.79' Storage	e=0.418 af In Out	flow=4.92 cfs flow=0.00 cfs	0.419 af 0.000 af
Pond 3A: Wetlands		Peak Elev=129.	.29' Storage=	⊧0.158 af Infl Out	ow=10.52 cfs flow=5.99 cfs	0.739 af 0.721 af
Pond 4A: Wetlands		Peak Elev=140.	.23' Storage=	=0.274 af Infl Out	ow=12.44 cfs flow=5.65 cfs	0.939 af 0.899 af
Pond 5A: Wetlands		Peak Elev=152.	.29' Storage=	=0.152 af Infl Out	ow=13.33 cfs flow=7.81 cfs	0.817 af 0.802 af
Pond 6A: Wetlands		Peak Elev=174.	.30' Storage=	=0.104 af Infl Out	ow=11.59 cfs flow=8.27 cfs	0.739 af 0.730 af
Total Dum of	K Amar 00 000 a		0.775	- 6		4 4 4 7

Total Runoff Area = 38.623 ac Runoff Volume = 3.775 af Average Runoff Depth = 1.17" 100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 1.87 cfs @ 12.08 hrs, Volume= 0.124 af, Depth> 1.15"



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Summary for Subcatchment 2: Area 2

Runoff = 4.92 cfs @ 12.20 hrs, Volume= 0.419 af, Depth> 1.21"



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Summary for Subcatchment 3: Area 3

Runoff = 10.52 cfs @ 12.11 hrs, Volume= 0.739 af, Depth> 1.15"



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Summary for Subcatchment 4: Area 4

Runoff = 12.44 cfs @ 12.14 hrs, Volume= 0.939 af, Depth> 1.21"



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Summary for Subcatchment 5: Area 5

Runoff = 13.33 cfs @ 12.05 hrs, Volume= 0.817 af, Depth> 1.15"



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Summary for Subcatchment 6: Area 6

Runoff = 11.59 cfs @ 12.07 hrs, Volume= 0.739 af, Depth> 1.15"



Summary for Pond 1A: SW Runout w Level Spreaders

Inflow Area	I =	1.286 ac,	0.00% Impervious,	Inflow Depth > 1.1	5" for 2-year event
Inflow	=	1.87 cfs @	12.08 hrs, Volume	= 0.124 af	-
Outflow	=	0.31 cfs @	12.61 hrs, Volume	= 0.058 af,	Atten= 83%, Lag= 31.7 min
Primary	=	0.31 cfs @	12.61 hrs, Volume	= 0.058 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 127.53' @ 12.61 hrs Surf.Area= 1,296 sf Storage= 2,879 cf

Plug-Flow detention time= 182.7 min calculated for 0.058 af (47% of inflow) Center-of-Mass det. time= 96.4 min (901.8 - 805.4)

Volume	Inv	ert Avail.S	torage	Storage	Description	
#1	125.0	00' 3	483 cf	Custom	Stage Data (Pr	r ismatic) Listed below (Recalc)
Elevation	n N	Surf.Area	Inc.s	Store	Cum.Store	
(leet)	(sq-it)	-DIGUD)	leet)	(cubic-leet)	
125.00)	900		0	0	
126.00)	1,089		995	995	
127.00	0	1,296	1	,193	2,187	
128.00	C	1,296	1	,296	3,483	
Device	Routing	Inve	t Outlet	Device	S	
#1	Primary	127.50	b' 20.0' Head 2.50 Coef. 2.65	long x ((feet) 0 3.00 3.5 (English 2.67 2.6	5.0' breadth Bro .20 0.40 0.60 50 4.00 4.50 5 1) 2.34 2.50 2. 66 2.68 2.70 2	Dad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00 .00 5.50 70 2.68 2.66 2.65 2.65 2.65 .74 2.79 2.88

Primary OutFlow Max=0.29 cfs @ 12.61 hrs HW=127.53' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 0.29 cfs @ 0.43 fps)



Pond 1A: SW Runout w Level Spreaders

Summary for Pond 2P: Wetlands

Inflow Are	a =	4.152 ac,	0.00% Impervious	, Inflow Depth	> 1.21"	for 2-year	event
Inflow	=	4.92 cfs @	12.20 hrs, Volum	e= 0.4	19 af	-	
Outflow	=	0.00 cfs @	5.00 hrs, Volum	e= 0.0	00 af, Atte	en= 100%,	Lag= 0.0 min
Primary	=	0.00 cfs @	5.00 hrs, Volum	e= 0.0	00 af		-
Routing by	/ Stor-Inc	l method. Tin	ne Span= 5.00-20	00 hrs. dt= 0.0	5 hrs		

Peak Elev= 148.79' @ 20.00 hrs Surf.Area= 0.593 ac Storage= 0.418 af

Plug-Flow detention time= (not calculated: initial storage excedes outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	Inve	ert Av	vail.Storag	ge Stor	rage Description	
#1	148.0	0'	0.547	af Cus	stom Stage Data (Prismatic)Listed below (Recalc)
Elevatio (feet 148.0 149.0	n Su t <u>) (</u> 0 0	rf.Area (acres) 0.469 0.626	Inc (acre	e.Store e-feet) 0.000 0.547	Cum.Store (acre-feet) 0.000 0.547	
Device	Routing		Invert	Outlet D	evices	
#1	Primary		149.00'	15.0' lor Head (fe Coef. (E	ng x 10.0' breadtl eet) 0.20 0.40 0.6 nglish) 2.49 2.56	h Broad-Crested Rectangular Weir 50 0.80 1.00 1.20 1.40 1.60 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=148.00' (Free Discharge)



Pond 2P: Wetlands

Summary for Pond 3A: Wetlands

Inflow Are	a =	7.699 ac,	0.00% Ir	npervious,	Inflow	Depth >	1.15"	for 2-ye	ear event	
Inflow	=	10.52 cfs @	12.11 h	s, Volume	=	0.739	af			
Outflow	=	5.99 cfs @	12.27 h	s, Volume	=	0.721	af, Atte	en= 43%,	, Lag= 9.	7 min
Primary	=	5.99 cfs @	12.27 h	s, Volume	=	0.721	af		C C	
Routing b Peak Elev	y Stor-Ir ⁄= 129.2	nd method, Tir 29' @ 12.27 hr	me Span . s Surf.A	= 5.00-20.0 rea= 0.554	0 hrs, d ac Ste	t= 0.05 hi orage= 0.	rs 158 af			
Plug-Flow Center-of-	detenti Mass d	on time= 30.5 et. time= 21.4	min calc min (82	ulated for 0 3.6 - 807.2	.721 af)	(98% of i	nflow)			
Volume	Inv	rert Avail.St	torage \$	Storage De	scriptior	า				
#1	120	00' 1	222 of (Suctor Ct		o (Driem		tod bolo	w (Pacalo	

#1	129.0	00'	1.233	af Cus	tom Stage Data	(Prismatic)Listed below (Recalc)
Elevatio (fee	on Su et)	urf.Area (acres)	In (ac	c.Store re-feet)	Cum.Store (acre-feet)	
129.0 131.0)0)0	0.528 0.705		0.000 1.233	0.000 1.233	
Device	Routing		Invert	Outlet D	evices	
#1	Primary		129.00'	15.0' lor Head (fe Coef. (E	ng x 10.0' breac eet) 0.20 0.40 (nglish) 2.49 2.5	Ith Broad-Crested Rectangular Weir 0.60 0.80 1.00 1.20 1.40 1.60 66 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.96 cfs @ 12.27 hrs HW=129.29' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 5.96 cfs @ 1.36 fps)



Pond 3A: Wetlands

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Summary for Pond 4A: Wetlands

Inflow Area	a = 9.296	ac, 0.00 ⁶	% Impervious, Inflow Depth > 1.21" for 2-year eve	nt
Inflow	= 12.44 c	rfs @ 12.1	4 hrs, Volume= 0.939 af	
Outflow	= 5.65 c	rfs @ 12.4	2 hrs, Volume= 0.899 af, Atten= 55%, Lag=	16.8 min
Primary	= 5.65 c	rfs @ 12.4	2 hrs, Volume= 0.899 af	
Routing by Peak Elev=	stor-Ind mether 140.23' @ 12	od, Time Sp .42 hrs Su	oan= 5.00-20.00 hrs, dt= 0.05 hrs ırf.Area= 1.194 ac Storage= 0.274 af	
Plug-Flow	detention time=	= 50.9 min c	calculated for 0.899 af (96% of inflow)	
Center-of-I	Mass det. time=	= 35.8 min ((842.1 - 806.3)	
		,		
Volume	Invert A	vail.Storage	e Storage Description	
		<u> </u>		
#1	140.00'	2.682 at	f Custom Stage Data (Prismatic)Listed below (Rec	alc)
#1 Elevation (feet)	140.00' Surf.Area (acres)	2.682 at Inc.s (acre-	f Custom Stage Data (Prismatic) Listed below (Rec Store Cum.Store feet) (acre-feet)	alc)
#1 Elevation (feet) 140.00	140.00' Surf.Area (acres) 1.149	2.682 at Inc.s (acre-	f Custom Stage Data (Prismatic) Listed below (Rec Store Cum.Store -feet) (acre-feet) 0.000 0.000	alc)
#1 Elevation (feet) 140.00 142.00	140.00' Surf.Area (acres) 1.149 1.533	2.682 at Inc.s (acre- 0 2	f Custom Stage Data (Prismatic) Listed below (Rec Store Cum.Store <u>feet) (acre-feet)</u> 0.000 0.000 2.682 2.682	alc)
#1 Elevation (feet) 140.00 142.00	140.00' Surf.Area (acres) 1.149 1.533	2.682 at Inc.9 (acre- 0 2	f Custom Stage Data (Prismatic) Listed below (Rec Store Cum.Store <u>feet) (acre-feet)</u> 0.000 0.000 2.682 2.682	alc)
#1 Elevation (feet) 140.00 142.00 Device R	140.00' Surf.Area (acres) 1.149 1.533	2.682 at Inc.s (acre- 2 Invert C	f Custom Stage Data (Prismatic) Listed below (Rec Store Cum.Store <u>-feet) (acre-feet)</u> 0.000 0.000 2.682 2.682 Dutlet Devices	alc)
#1 Elevation (feet) 140.00 142.00 Device R #1 P	140.00' Surf.Area (acres) 1.149 1.533 Routing Primary	2.682 at Inc.s (acre- 0 2 Invert C 140.00' 2	f Custom Stage Data (Prismatic)Listed below (Rec Store Cum.Store -feet) (acre-feet) 0.000 0.000 2.682 2.682 Outlet Devices 0.0' long x 10.0' breadth Broad-Crested Rectangul	alc) ar Weir
#1 Elevation (feet) 140.00 142.00 Device R #1 P	140.00' Surf.Area (acres) 1.149 1.533 Couting Primary	2.682 at Inc.s (acre- 0 2 <u>Invert C</u> 140.00' 2 H	f Custom Stage Data (Prismatic)Listed below (Rec Store Cum.Store -feet) (acre-feet) 0.000 0.000 2.682 2.682 Dutlet Devices 0.00' long x 10.0' breadth Broad-Crested Rectangul lead (feet) 0.20 0.40 0.60 0.80 1.00 1.40 1.60	alc) ar Weir 0

Primary OutFlow Max=5.64 cfs @ 12.42 hrs HW=140.23' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 5.64 cfs @ 1.21 fps)



Pond 4A: Wetlands

Summary for Pond 5A: Wetlands

Inflow Area	ı = 8.500) ac, 0.0	00% Impervious, Inflow Depth > 1.15" for 2-year event				
Inflow	= 13.33 c	rfs @ 12	2.05 hrs, Volume= 0.817 af				
Outflow	= 7.81 c	rfs @ 12	2.16 hrs, Volume= 0.802 af, Atten= 41%, Lag= 6.3 min				
Primary	= 7.81 c	rfs @ 12	2.16 hrs, Volume= 0.802 af				
Routing by	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs						
Peak Elev= 152.29' @ 12.16 hrs Surf.Area= 0.539 ac Storage= 0.152 af							
Plug-Flow	Plug-Flow detention time= 23.7 min calculated for 0.802 af (98% of inflow)						
Center-of-N	Center-of-Mass det. time= 16.6 min (820.7 - 804.1)						
Volume	Invert A	vail.Stora	age Storage Description				
#1	152.00'	1.200	af Custom Stage Data (Prismatic)Listed below (Recalc)				
Elevation	Surf.Area	In	ic.Store Cum.Store				
(feet)	(acres)	(acı	re-feet) (acre-feet)				
152.00	0.514		0.000 0.000				
154.00	0.686		1.200 1.200				
Device R	outing	Invert	Outlet Devices				
#1 P	rimary	152.00'	20.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60				

Primary OutFlow Max=7.74 cfs @ 12.16 hrs HW=152.29' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 7.74 cfs @ 1.35 fps)



Pond 5A: Wetlands

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Summary for Pond 6A: Wetlands

Inflow Are	a = 7.69	0 ac, 0.	00% Impe	rvious, Inflow Depth	> 1.15"	for 2-year event	
Inflow	= 11.59	cfs @ 12	2.07 hrs,	Volume= 0.7	39 af		
Outflow	= 8.27	cfs @ 12	2.15 hrs,	Volume= 0.7	30 af, Atter	n= 29%, Lag= 5.0 min	
Primary	= 8.27	cfs @ 12	2.15 hrs,	Volume= 0.7	30 af		
Routing b	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs						
Peak Elev= 174.30' @ 12.15 hrs Surf.Area= 0.356 ac Storage= 0.104 af							
Plug-Flow	Plug-Flow detention time= 16.1 min calculated for 0.727 af (98% of inflow)						
Center-of-Mass det. time= 11.3 min (816.2 - 804.8)							
Volume	Invert	Avail.Stora	age Stor	age Description			
#1	174.00'	0.791	l af Cus	tom Stage Data (Pr	i smatic) Liste	ed below (Recalc)	
Elevation	Surf.Area	a In	nc.Store	Cum.Store			
(feet)	(acres) (ac	re-feet)	(acre-feet)			
17/ 00	0.33	-					
174.00	0.55	9	0.000	0.000			
176.00	0.35	2	0.000 0.791	0.000 0.791			
176.00 Device	0.35 0.45 Routing	2 Invert	0.000 0.791 Outlet D	0.000 0.791 evices			
176.00 176.00 <u>Device</u> #1	0.33 0.45 Routing Primary	9 2 <u>Invert</u> 174.00'	0.000 0.791 Outlet D 20.0' Ioi	0.000 0.791 evices ng x 10.0' breadth E	Broad-Crest	ed Rectangular Weir	
176.00 176.00 <u>Device</u> #1	0.33 0.45 Routing Primary	2 Invert 174.00'	0.000 0.791 Outlet D 20.0' Ior Head (fe	0.000 0.791 evices ng x 10.0' breadth E et) 0.20 0.40 0.60	Broad-Crest 0.80 1.00	ed Rectangular Weir 1.20 1.40 1.60	

Primary OutFlow Max=8.27 cfs @ 12.15 hrs HW=174.30' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 8.27 cfs @ 1.38 fps)



Pond 6A: Wetlands

Type III 24-hr 10-year Rainfall=4.70" Falmouth 3 ME - PROP COND 06.08.16 Prepared by Hudson Design Group LLC Printed 6/8/2016 HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method Pupoff Aroa 1 296 as 0.000/ Imponyious Pupoff Dopths 2.46"

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Subcatchment1: Area 1	Flow Length=380	Close Construction of the
Subcatchment 2: Area 2	Flow Length=575'	Runoff Area=4.152 ac 0.00% Impervious Runoff Depth>2.54" Slope=0.0210 '/' Tc=13.6 min CN=81 Runoff=10.32 cfs 0.878 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7.699 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.0690 '/' Tc=7.2 min CN=80 Runoff=22.52 cfs 1.575 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9.296 ac 0.00% Impervious Runoff Depth>2.54" Slope=0.0410 '/' Tc=9.3 min CN=81 Runoff=26.05 cfs 1.968 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.1500 '/' Tc=3.1 min CN=80 Runoff=28.46 cfs 1.741 af
Subcatchment 6: Area 6	Flow Length=260'	Runoff Area=7.690 ac 0.00% Impervious Runoff Depth>2.46" Slope=0.0690 '/' Tc=4.1 min CN=80 Runoff=24.82 cfs 1.575 af
Pond 1A: SW Runout w	Level Spreaders	Peak Elev=127.69' Storage=3,081 cf Inflow=4.02 cfs 0.263 af Outflow=3.88 cfs 0.198 af
Pond 2P: Wetlands		Peak Elev=149.20' Storage=0.547 af Inflow=10.32 cfs 0.878 af Outflow=3.44 cfs 0.333 af
Pond 3A: Wetlands		Peak Elev=129.52' Storage=0.289 af Inflow=22.52 cfs 1.575 af Outflow=15.04 cfs 1.548 af
Pond 4A: Wetlands		Peak Elev=140.42' Storage=0.504 af Inflow=26.05 cfs 1.968 af Outflow=14.20 cfs 1.910 af
Pond 5A: Wetlands		Peak Elev=152.51' Storage=0.274 af Inflow=28.46 cfs 1.741 af Outflow=19.23 cfs 1.719 af
Pond 6A: Wetlands		Peak Elev=174.52' Storage=0.183 af Inflow=24.82 cfs 1.575 af Outflow=19.70 cfs 1.561 af
— —		

Total Runoff Area = 38.623 ac Runoff Volume = 8.000 af Average Runoff Depth = 2.49" 100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 4.02 cfs @ 12.07 hrs, Volume= 0.263 af, Depth> 2.46"



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Summary for Subcatchment 2: Area 2

Runoff = 10.32 cfs @ 12.19 hrs, Volume= 0.878 af, Depth> 2.54"



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Summary for Subcatchment 3: Area 3

Runoff = 22.52 cfs @ 12.11 hrs, Volume= 1.575 af, Depth> 2.46"



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Summary for Subcatchment 4: Area 4

Runoff = 26.05 cfs @ 12.13 hrs, Volume= 1.968 af, Depth> 2.54"



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Summary for Subcatchment 5: Area 5

Runoff = 28.46 cfs @ 12.05 hrs, Volume= 1.741 af, Depth> 2.46"



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Summary for Subcatchment 6: Area 6

Runoff = 24.82 cfs @ 12.06 hrs, Volume= 1.575 af, Depth> 2.46"



Summary for Pond 1A: SW Runout w Level Spreaders

Inflow Area	I =	1.286 ac,	0.00% Impervious,	Inflow Depth >	2.46" for	10-year event
Inflow	=	4.02 cfs @	12.07 hrs, Volume	= 0.263	af	
Outflow	=	3.88 cfs @	12.09 hrs, Volume	= 0.198	af, Atten= 4	1%, Lag= 1.1 min
Primary	=	3.88 cfs @	12.09 hrs, Volume	= 0.198	af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 127.69' @ 12.09 hrs Surf.Area= 1,296 sf Storage= 3,081 cf

Plug-Flow detention time= 95.8 min calculated for 0.197 af (75% of inflow) Center-of-Mass det. time= 36.1 min (824.4 - 788.3)

Volume	Inv	ert Avail.S	torage Stora	age Description			
#1	125.	00' 3,	483 cf Cust	tom Stage Data (P	rismatic)Listed below (Recalc)		
Elevation (feet	n ·)	Surf.Area	Inc.Store (cubic-feet)	cum.Store			
125.00 126.00 127.00))))	900 1,089 1 296	0 0 995 1 193	0 0 995 2 187			
128.0	0	1,296	1,296	3,483			
Device	Routing	Inver	t Outlet Dev	vices			
#1	Primary	127.50	20.0' long Head (feet 2.50 3.00 Coef. (Eng 2.65 2.67	20.0' 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			

Primary OutFlow Max=3.78 cfs @ 12.09 hrs HW=127.69' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 3.78 cfs @ 1.01 fps) Hydrograph 4 02 cfs 3.88 cfs Inflow Area=1.286 ac Peak Elev=127.69' Storage=3,081 cf

Pond 1A: SW Runout w Level Spreaders

0 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Time (hours)
Summary for Pond 2P: Wetlands

Inflow Are	ea =	4.152 ac,	0.00% Impervious, Inflow I	Depth > 2.54" for 10-year event
Inflow	=	10.32 cfs @	12.19 hrs, Volume=	0.878 af
Outflow	=	3.44 cfs @	12.85 hrs, Volume=	0.333 af, Atten= 67%, Lag= 39.6 min
Primary	=	3.44 cfs @	12.85 hrs, Volume=	0.333 af
Routing b Peak Elev	y Stor-Ir /= 149.2	nd method, Tir 0' @ 12.85 hr	ne Span= 5.00-20.00 hrs, d s Surf.Area= 0.626 ac St	t= 0.05 hrs orage= 0.547 af
Plug-Flow	detenti	on time= 211.	1 min calculated for 0.333 a	f (38% of inflow)

Center-of-Mass det. time= 120.6 min (913.6 - 793.0)

Volume	Inve	ert Av	vail.Stora	ge Stora	age Description	
#1	148.0)0'	0.547	af Cust	om Stage Data	(Prismatic)Listed below (Recalc)
Elevatio (fee	n Su t) (rf.Area (acres) 0.469	Ind (acr	c.Store e-feet)	Cum.Store (acre-feet) 0.000	
149.0	0	0.626		0.547	0.547	
Device	Routing		Invert	Outlet De	vices	
#1	Primary		149.00'	15.0' lon Head (fee Coef. (En	g x 10.0' bread et) 0.20 0.40 0 iglish) 2.49 2.5	th Broad-Crested Rectangular Weir .60 0.80 1.00 1.20 1.40 1.60 6 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.44 cfs @ 12.85 hrs HW=149.20' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 3.44 cfs @ 1.13 fps)



Pond 2P: Wetlands

Summary for Pond 3A: Wetlands

Inflow Are	ea =	7.699 ac,	0.00% Impe	ervious, Inflow Depth > 2.46" for 10-year event
Inflow	=	22.52 cfs @	12.11 hrs,	Volume= 1.575 af
Outflow	=	15.04 cfs @	12.22 hrs,	Volume= 1.548 af, Atten= 33%, Lag= 6.6 min
Primary	=	15.04 cfs @	12.22 hrs,	Volume= 1.548 af
Routing b	y Stor-In	d method, Ti	me Span= 5.	.00-20.00 hrs, dt= 0.05 hrs
Peak Elev	/= 129.52	2' @ 12.22 h	rs Surf.Area	a= 0.574 ac Storage= 0.289 af
Plug-Flow	/ detentic	on time= 24.4	min calculat	ted for 1.543 af (98% of inflow)
Center-of-	-Mass de	et. time= 17.7	' min (807.9	- 790.2)
Volume	Inve	ert Avail.S	torage Stor	rage Description
#1	129.0	0' 1.	233 af Cus	stom Stage Data (Prismatic)Listed below (Recalc)
#1 Elevation	129.0 מ Su	0' 1. rf.Area	233 af Cus Inc.Store	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store
#1 Elevation (feet)	129.0 n Su) (0' 1. rf.Area /acres)	233 af Cus Inc.Store (acre-feet)	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet)
#1 Elevation (feet) 129.00	129.0 n Sur) (0' 1. rf.Area <u>′acres)</u> 0.528	233 af Cus Inc.Store (acre-feet) 0.000	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet) 0.000
#1 Elevation (feet) 129.00 131.00	129.0 n Sul) ()	0' 1. rf.Area <u>(acres)</u> 0.528 0.705	233 af Cus Inc.Store (acre-feet) 0.000 1.233	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet) 0.000 1.233
#1 Elevation (feet) 129.00 131.00 Device	129.0 n Sur) () Routing	0' 1. rf.Area <u>(acres)</u> 0.528 0.705 Inve	233 af Cus Inc.Store (acre-feet) 0.000 1.233 ert Outlet D	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet) 0.000 1.233
#1 Elevation (feet) 129.00 131.00 Device #1	129.0 n Sur) () Routing Primary	0' 1. rf.Area (acres) 0.528 0.705 Inve 129.0	233 af Cus Inc.Store (acre-feet) 0.000 1.233 ert Outlet D 0' 15.0' loi	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet) 0.000 1.233 Devices ng x 10.0' breadth Broad-Crested Rectangular Weir
#1 Elevation (feet) 129.00 131.00 Device #1	129.0 n Sur) () Routing Primary	0' 1. rf.Area (acres) 0.528 0.705 Inve 129.0	233 af Cus Inc.Store (acre-feet) 0.000 1.233 ert Outlet D 00' 15.0' Ior Head (fe	stom Stage Data (Prismatic)Listed below (Recalc) Cum.Store (acre-feet) 0.000 1.233 Devices ng x 10.0' breadth Broad-Crested Rectangular Weir eet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Primary OutFlow Max=14.88 cfs @ 12.22 hrs HW=129.52' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 14.88 cfs @ 1.91 fps)

Hydrograph 22.52 cfs Inflow 25 Primary Inflow Area=7.699 ac Peak Elev=129.52' 20 Storage=0.289 af 15.04 cfs Flow (cfs) 15 10-5 0-6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 5 Time (hours)

Pond 3A: Wetlands

Summary for Pond 4A: Wetlands

Inflow Ar	ea =	9.296 ac,	0.00% Impervious, Inflow	Depth > 2.54" for 10-year event	
Inflow	=	26.05 cfs @	12.13 hrs, Volume=	1.968 af	
Outflow	=	14.20 cfs @	12.33 hrs, Volume=	1.910 af, Atten= 45%, Lag= 11.6 mi	in
Primary	=	14.20 cfs @	12.33 hrs, Volume=	1.910 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 140.42' @ 12.33 hrs Surf.Area= 1.230 ac Storage= 0.504 af

Plug-Flow detention time= 40.9 min calculated for 1.910 af (97% of inflow) Center-of-Mass det. time= 29.8 min (819.4 - 789.6)

Volume	Inve	ert A∖	/ail.Stora	ge St	Storage Description	
#1	140.0	0'	2.682	af Cu	Custom Stage Data (Prismatic)Listed below (Recalc)	
Elevation (feet 140.00 142.00	n Sur) ())	f.Area <u>acres)</u> 1.149 1.533	In (acı	c.Store <u>e-feet)</u> 0.000 2.682	re Cum.Store <u>at) (acre-feet)</u> 00 0.000 32 2.682	
Device	Routing		Invert	Outlet	et Devices	
#1	Primary		140.00'	20.0' l Head Coef.	' long x 10.0' breadth Broad-Crested Rectangular Weir d (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 f. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64	

Primary OutFlow Max=14.16 cfs @ 12.33 hrs HW=140.42' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 14.16 cfs @ 1.67 fps)



Pond 4A: Wetlands

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Summary for Pond 5A: Wetlands

Inflow Area	= 8.500) ac, 0.0	0% Impe	rvious, Inflow D	Depth > 2	.46"	for 10-	year ev	ent
Inflow	= 28.46 c	ofs @ 12.	.05 hrs, \	/olume=	1.741 af	:		-	
Outflow	= 19.23 c	fs @ 12.	.13 hrs. \	√olume=	1.719 af	. Atter	n= 32%	. Lag=	4.5 min
Primary	= 19.23 c	cfs @ 12.	.13 hrs, \	/olume=	1.719 af			, - <u></u>	-
Routing by	Stor-Ind metho	od, Time S	Span= 5.0	0-20.00 hrs, dt	= 0.05 hrs				
Peak Elev=	: 152.51' @ 12	.13 hrs S	Surf.Area=	= 0.558 ac Sto	orage= 0.2	74 af			
Plug-Flow of Center-of-N	detention time= /ass det. time=	= 19.0 min = 13.8 min	calculate (800.7 -	ed for 1.719 af (· 786.9)	(99% of inf	low)			
Volume	Invert A	vail.Storad	ne Stora	age Description	1				
			90 0.01	age Beeenpaen					
#1	152.00'	1.200	af Cust	tom Stage Data	a (Prismat	t ic) List	ed belo	w (Reca	alc)
#1 Elevation	152.00' Surf.Area	1.200	af Cus t	tom Stage Data	a (Prismat	t ic) List	ed belo	w (Reca	alc)
#1 Elevation (feet)	152.00' Surf.Area (acres)	1.200 Inc (acre	af Cus t c.Store e-feet)	tom Stage Data Cum.Store (acre-feet)	a (Prismat	tic)List	ed belc	w (Reca	alc)
#1 Elevation (feet) 152.00	152.00' Surf.Area (acres) 0.514	1.200 Inc (acre	af Cus t c.Store <u>e-feet)</u> 0.000	tom Stage Data Cum.Store (acre-feet) 0.000	a (Prismat	t ic) List	ed belo	ow (Reca	alc)
#1 Elevation (feet) 152.00 154.00	152.00' Surf.Area (acres) 0.514 0.686	1.200 Inc (acre	af Cus t c.Store <u>e-feet)</u> 0.000 1.200	tom Stage Data Cum.Store (acre-feet) 0.000 1.200	a (Prismat	t ic) List	ed belo	ow (Reca	alc)
#1 Elevation (feet) 152.00 154.00 Device R	152.00' Surf.Area (acres) 0.514 0.686 outing	1.200 Inc (acro	af Cus t c.Store <u>e-feet)</u> 0.000 1.200 Outlet De	tom Stage Data Cum.Store (acre-feet) 0.000 1.200	a (Prismat	t ic) List	ed belc	ow (Reca	alc)

Primary OutFlow Max=19.00 cfs @ 12.13 hrs HW=152.51' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 19.00 cfs @ 1.88 fps)

Hydrograph Inflow 28.46 cfs Primary 30-Inflow Area=8.500 ac Peak Elev=152.51' 25 Storage=0.274 af 19.23 cfs 20 Flow (cfs) 15 10 5 0-5 6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 Time (hours)

Pond 5A: Wetlands

Summary for Pond 6A: Wetlands

Inflow Area	i = 7.690)ac, 0.00)% Impe	rvious, Inflow	Depth >	2.46"	for 10-ye	ar event
Inflow	= 24.82 c	rfs @ 12.0	06 hrs, `	Volume=	1.575	af	-	
Outflow	= 19.70 c	rfs @ 12.*	12 hrs, `	Volume=	1.561	af, Atte	en= 21%, I	Lag= 3.6 min
Primary	= 19.70 c	sfs @ 12.1	12 hrs, `	Volume=	1.561	af		0
Routing by	Stor-Ind metho	od, Time S	pan= 5.0	00-20.00 hrs, d	t= 0.05 h	S		
Peak Elev=	= 174.52' @ 12	.12 hrs S	urf.Area	= 0.368 ac St	orage= 0.	183 af		
Plug-Flow of Center-of-N	detention time= /lass det. time=	= 12.9 min = 9.4 min (calculate	ed for 1.556 af 787.7)	(99% of i	nflow)		
			_	,				
Volume	Invert A	vail.Storad	e Stora	age Description	ו			
					•			
#1	174.00'	0.791 a	af Cus	tom Stage Dat	a (Prism	atic)Lis	ted below	(Recalc)
#1 Elevation	174.00' Surf.Area	0.791 a	af Cus Store	tom Stage Dat	a (Prism	atic)Lis	ted below	(Recalc)
#1 Elevation (feet)	174.00' Surf.Area (acres)	0.791 a Inc. (acre	af Cus Store e-feet)	tom Stage Dat Cum.Store (acre-feet)	a (Prism	atic)Lis	ted below	(Recalc)
#1 Elevation (feet) 174.00	174.00' Surf.Area (acres) 0.339	0.791 a Inc. (acre	af Cus Store e-feet) 0.000	tom Stage Dat Cum.Store (acre-feet) 0.000	a (Prism	atic)Lis	ted below	(Recalc)
#1 Elevation (feet) 174.00 176.00	174.00' Surf.Area (acres) 0.339 0.452	0.791 a Inc. (acre	af Cus Store <u>e-feet)</u> 0.000 0.791	tom Stage Dat Cum.Store (acre-feet) 0.000 0.791	a (Prism	atic)Lis	ted below	(Recalc)
#1 Elevation (feet) 174.00 176.00 Device R	174.00' Surf.Area (acres) 0.339 0.452 outing	0.791 a Inc. (acre	Af Cus Store 2-feet) 0.000 0.791 Outlet De	tom Stage Dat Cum.Store (acre-feet) 0.000 0.791 evices	a (Prism	atic) Lis	ted below	(Recalc)

Primary OutFlow Max=19.17 cfs @ 12.12 hrs HW=174.51' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 19.17 cfs @ 1.88 fps)

Hydrograph Inflow 24.82 cfs Primary Inflow Area=7.690 ac 25 Peak Elev=174.52' 19.70 cfs Storage=0.183 af 20 Flow (cfs) 15 10 5 0-6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 5 Time (hours)

Pond 6A: Wetlands

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i annoutr	J			COND 0	0.00.10

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

Subcatchment 1: Area 1	Flow Length=380	Runoff Area=1.286 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.0950 '/' Tc=4.8 min CN=80 Runoff=5.09 cfs 0.334 af
Subcatchment 2: Area 2	Flow Length=575	Runoff Area=4.152 ac 0.00% Impervious Runoff Depth>3.21" Slope=0.0210 '/' Tc=13.6 min CN=81 Runoff=12.98 cfs 1.110 af
Subcatchment 3: Area 3	Flow Length=520'	Runoff Area=7.699 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.0690 '/' Tc=7.2 min CN=80 Runoff=28.46 cfs 2.001 af
Subcatchment 4: Area 4	Flow Length=540'	Runoff Area=9.296 ac 0.00% Impervious Runoff Depth>3.21" Slope=0.0410 '/' Tc=9.3 min CN=81 Runoff=32.74 cfs 2.488 af
Subcatchment 5: Area 5	Flow Length=300'	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.1500 '/' Tc=3.1 min CN=80 Runoff=35.93 cfs 2.212 af
Subcatchment 6: Area 6	Flow Length=260'	Runoff Area=7.690 ac 0.00% Impervious Runoff Depth>3.12" Slope=0.0690 '/' Tc=4.1 min CN=80 Runoff=31.36 cfs 2.000 af
Pond 1A: SW Runout w L	evel Spreaders	Peak Elev=127.72' Storage=3,122 cf Inflow=5.09 cfs 0.334 af Outflow=4.91 cfs 0.269 af
Pond 2P: Wetlands		Peak Elev=149.38' Storage=0.547 af Inflow=12.98 cfs 1.110 af Outflow=8.84 cfs 0.565 af
Pond 3A: Wetlands		Peak Elev=129.62' Storage=0.344 af Inflow=28.46 cfs 2.001 af Outflow=19.73 cfs 1.970 af
Pond 4A: Wetlands		Peak Elev=140.50' Storage=0.604 af Inflow=32.74 cfs 2.488 af Outflow=18.87 cfs 2.423 af
Pond 5A: Wetlands		Peak Elev=152.61' Storage=0.328 af Inflow=35.93 cfs 2.212 af Outflow=25.59 cfs 2.186 af
Pond 6A: Wetlands		Peak Elev=174.61' Storage=0.216 af Inflow=31.36 cfs 2.000 af Outflow=25.58 cfs 1.985 af
Total Runoff	Area = 38.623 ac	Runoff Volume = 10.145 af Average Runoff Depth = 3.15

100.00% Pervious = 38.623 ac 0.00% Impervious = 0.000 ac

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Summary for Subcatchment 1: Area 1

Runoff = 5.09 cfs @ 12.07 hrs, Volume= 0.334 af, Depth> 3.12"



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Summary for Subcatchment 2: Area 2

Runoff = 12.98 cfs @ 12.19 hrs, Volume= 1.110 af, Depth> 3.21"



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Summary for Subcatchment 3: Area 3

Runoff = 28.46 cfs @ 12.11 hrs, Volume= 2.001 af, Depth> 3.12"



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Summary for Subcatchment 4: Area 4

Runoff = 32.74 cfs @ 12.13 hrs, Volume= 2.488 af, Depth> 3.21"



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Summary for Subcatchment 5: Area 5

Runoff = 35.93 cfs @ 12.05 hrs, Volume= 2.212 af, Depth> 3.12"



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Summary for Subcatchment 6: Area 6

Runoff = 31.36 cfs @ 12.06 hrs, Volume= 2.000 af, Depth> 3.12"



Summary for Pond 1A: SW Runout w Level Spreaders

Inflow Area	=	1.286 ac,	0.00% Impervious,	Inflow Depth > 3	.12" for 25y	ear event
Inflow	=	5.09 cfs @	12.07 hrs, Volume	= 0.334 af	-	
Outflow	=	4.91 cfs @	12.09 hrs, Volume	= 0.269 af	, Atten= 3%,	Lag= 0.8 min
Primary	=	4.91 cfs @	12.09 hrs, Volume	= 0.269 af		

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2 Peak Elev= 127.72' @ 12.09 hrs Surf.Area= 1,296 sf Storage= 3,122 cf

Plug-Flow detention time= 81.6 min calculated for 0.268 af (80% of inflow) Center-of-Mass det. time= 30.4 min (813.2 - 782.7)

Volume	Inv	ert Avail.S	Storage	Storage	Description	
#1	125.	00' 3	,483 cf	Custom	Stage Data (Pi	rismatic)Listed below (Recalc)
Elevatio	n +)	Surf.Area	Inc.S	Store	Cum.Store	
	()	(54-11)	(cuuc	-ieel)	(cubic-leet)	
125.0	0	900		0	0	
126.0	0	1,089		995	995	
127.0	0	1,296	1	,193	2,187	
128.0	0	1,296	1	,296	3,483	
Device	Routing	Inve	rt Outlet	t Devices	S	
#1	Primary	127.50	0' 20.0' Head 2.50 Coef. 2.65	long x (feet) 0 3.00 3.5 (English 2.67 2.6	5.0' breadth Br .20 0.40 0.60 50 4.00 4.50 5 1) 2.34 2.50 2. 56 2.68 2.70 2	Dad-Crested Rectangular Weir 0.80 1.00 1.20 1.40 1.60 1.80 2.00 0.00 5.50 70 2.68 2.66 2.65 2.65 2.65 .74 2.79 2.88

Primary OutFlow Max=4.77 cfs @ 12.09 hrs HW=127.72' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 4.77 cfs @ 1.10 fps)



Pond 1A: SW Runout w Level Spreaders

Summary for Pond 2P: Wetlands

Inflow Are	a = 4.1	152 ac, 0.	00% Imper	rvious, Inflow Depth > 3.21" for 25year event
Inflow	= 12.9	98 cfs @ 12	2.19 hrs, ∖	Volume= 1.110 af
Outflow	= 8.8	34 cfs @ 1	2.44 hrs, ∖	Volume= 0.565 af, Atten= 32%, Lag= 15.3 min
Primary	= 8.8	84 cfs @ 12	2.44 hrs, V	Volume= 0.565 af
Routing b	y Stor-Ind me	ethod, Time	Span= 5.0	00-20.00 hrs, dt= 0.05 hrs
Peak Elev	′= 149.38' @	12.44 hrs	Surf.Area=	= 0.626 ac Storage= 0.547 af
Plug-Flow	detention tir	ne= 160.6 r	nin calculat	ated for 0.565 af (51% of inflow)
Center-of	Mass det. tir	ne= 79.9 m	in (867.5 -	- 787.5)
Volume	Invert	Avail.Stora	age Stora	age Description
#1	148.00'	0.547	7 af Cust	tom Stage Data (Prismatic)Listed below (Recalc)
Elevation	Surf.Ar	ea Ir	nc.Store	Cum.Store
(feet)	(acre	es) (ad	cre-feet)	(acre-feet)
148.00	0.4	69	0.000	0.000
149.00	0.6	26	0.547	0.547
Device	Routing	Invert	Outlet De	evices
#1	Primary	149.00'	15.0' lon g Head (fee Coef. (En	ng x 10.0' breadth Broad-Crested Rectangular Weir eet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 nglish) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
			· ·	o ,

Primary OutFlow Max=8.40 cfs @ 12.44 hrs HW=149.36' (Free Discharge) ☐ 1=Broad-Crested Rectangular Weir (Weir Controls 8.40 cfs @ 1.54 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC

Hydrograph 12.98 cfs Inflow Primary 14 Inflow Area=4.152 ac Peak Elev=149.38' 12 Storage=0.547 af 8.84 cfs 10-Flow (cfs) 8 6 4 2 0-6 9 10 11 12 13 14 15 16 17 18 19 20 8 5 7 Time (hours)

Pond 2P: Wetlands

Summary for Pond 3A: Wetlands

Inflow Are	ea =	7.699 ac,	0.00% Impervious,	Inflow Depth > 3.1	2" for 25year event
Inflow	=	28.46 cfs @	12.11 hrs, Volume=	= 2.001 af	-
Outflow	=	19.73 cfs @	12.21 hrs, Volume=	= 1.970 af,	Atten= 31%, Lag= 6.2 min
Primary	=	19.73 cfs @	12.21 hrs, Volume=	= 1.970 af	-

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 129.62' @ 12.21 hrs Surf.Area= 0.583 ac Storage= 0.344 af

Plug-Flow detention time= 22.8 min calculated for 1.970 af (98% of inflow) Center-of-Mass det. time= 16.7 min (801.3 - 784.6)

Volume	Invert	Avail.Stora	ge Stora	age Description	
#1	129.00'	1.233	af Cust	om Stage Data	(Prismatic)Listed below (Recalc)
Elevation (feet)	Surf.Are	ea Ind s) (acr	c.Store re-feet)	Cum.Store (acre-feet)	
131.00	0.70)5	1.233	1.233	
Device I	Routing	Invert	Outlet De	evices	
#1 I	Primary	129.00'	15.0' lon Head (fee Coef. (Er	g x 10.0' breadt et) 0.20 0.40 0. nglish) 2.49 2.56	h Broad-Crested Rectangular Weir 60 0.80 1.00 1.20 1.40 1.60 6 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=19.62 cfs @ 12.21 hrs HW=129.62' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 19.62 cfs @ 2.12 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC

Hydrograph 28.46 cfs Inflow Primary 30-Inflow Area=7.699 ac Peak Elev=129.62' 25 Storage=0.344 af 19.73 cfs 20 Flow (cfs) 15 10 5 0-5 6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 Time (hours)

Pond 3A: Wetlands

Prepared by Hudson Design Group LLC HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC

Summary for Pond 4A: Wetlands

Inflow A	Area =	9.296 ac,	0.00% Impervious, Inflo	ow Depth > 3.21"	for 25year event
Inflow	=	32.74 cfs @	12.13 hrs, Volume=	2.488 af	
Outflov	v =	18.87 cfs @	12.31 hrs, Volume=	2.423 af, Atte	en= 42%, Lag= 10.4 min
Primar	у =	18.87 cfs @	12.31 hrs, Volume=	2.423 af	-

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 140.50' @ 12.31 hrs Surf.Area= 1.246 ac Storage= 0.604 af

Plug-Flow detention time= 38.2 min calculated for 2.423 af (97% of inflow) Center-of-Mass det. time= 28.1 min (812.2 - 784.1)

Volume	Invert	Avail.Stor	age Stora	age Description	
#1	140.00'	2.68	2 af Cust	tom Stage Data	(Prismatic)Listed below (Recalc)
Elevation (feet) 140.00 142.00) Surf./) (ac) 1) 1	Area li <u>cres) (a</u> .149 .533	nc.Store <u>cre-feet)</u> 0.000 2.682	Cum.Store (acre-feet) 0.000 2.682	
Device #1	Routing Primary	Invert 140.00'	Outlet De	evices g x 10.0' breadt	h Broad-Crested Rectangular Weir
			Head (fee Coef. (Er	et) 0.20 0.40 0. nglish) 2.49 2.56	60 0.80 1.00 1.20 1.40 1.60 5 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=18.83 cfs @ 12.31 hrs HW=140.50' (Free Discharge) **1=Broad-Crested Rectangular Weir** (Weir Controls 18.83 cfs @ 1.87 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 4A: Wetlands

Summary for Pond 5A: Wetlands

Inflow Ar	ea =	8.500 ac,	0.00% Imp	ervious, Inflow Depth	า> 3.12"	for 25year event
Inflow	=	35.93 cfs @	12.05 hrs.	Volume= 2.2	212 af	
Outflow	=	25.59 cfs @	12.12 hrs.	Volume= 2.1	186 af, Atte	en= 29%, Lag= 4.2 min
Primary	=	25.59 cfs @	12.12 hrs,	Volume= 2.	186 af	
Routing b	by Stor-Ir	nd method, T	ime Span= క	.00-20.00 hrs, dt= 0.0)5 hrs	
Peak Ele	v= 152.6	1' @ 12.12 ł	rs Surf.Are	a= 0.566 ac Storage	e= 0.328 af	
Plug-Flow	w detenti	on time= 17.	7 min calcula	ated for 2.186 af (99%	of inflow)	
Center-or	f-Mass d	et. time= 13.	0 min (794.4	- 781.4)		
Volume	Inv	ert Avail.	Storage Sto	orage Description		
#1	152.0)0' 1	.200 af C ι	stom Stage Data (Pi	r ismatic) Lis	ted below (Recalc)
Elevatio	n Su	ırf.Area	Inc.Store	Cum.Store		
Elevatio	n Su t)	ırf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)		
Elevation (feet 152.0	n Su t) 0	rf.Area (acres) 0.514	Inc.Store (acre-feet) 0.000	Cum.Store (acre-feet) 0.000		
Elevatio (feet 152.0 154.0	n Su t <u>)</u> 0 0	nf.Area (acres) 0.514 0.686	Inc.Store (acre-feet) 0.000 1.200	Cum.Store (acre-feet) 0.000 1.200		
Elevatio (feet 152.00 154.00 Device	n Su t <u>)</u> 0 Routing	urf.Area (<u>acres)</u> 0.514 0.686 Inv	Inc.Store (acre-feet) 0.000 1.200 ert Outlet	Cum.Store (acre-feet) 0.000 1.200 Devices		

Primary OutFlow Max=24.98 cfs @ 12.12 hrs HW=152.60' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 24.98 cfs @ 2.09 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC

Hydrograph Inflow 35.93 cfs 40 Primary Inflow Area=8.500 ac 35 Peak Elev=152.61' 30-25.59 cfs Storage=0.328 af 25 Flow (cfs) 20 15 10 5 0 6 8 9 10 11 12 13 14 15 16 17 18 19 20 7 5 Time (hours)

Pond 5A: Wetlands

Summary for Pond 6A: Wetlands

Innow Area	a = 7.690)ac, 0.0)0% Impe	rvious, Inflow D	epth > 3.1	2" for 25year event
Inflow	= 31.36 c	cfs @ 12	.06 hrs. \	√olume=	2.000 af	-
Outflow	= 25.58 c	cfs @ 12	.12 hrs, \	√olume=	1.985 af,	Atten= 18%, Lag= 3.4 min
Primary	= 25.58 c	cfs @ 12	2.12 hrs, \	/olume=	1.985 af	ý G
Routing by	Stor-Ind meth	od, Time	Span= 5.0	0-20.00 hrs, dt=	= 0.05 hrs	
Peak Elev=	= 174.61' @ 12	.12 hrs	Surf.Area	= 0.373 ac Sto	rage= 0.216	at
Plug-Flow Center-of-N	detention time= Mass det. time=	= 12.1 mir = 8.9 min	n calculate (791.1 - ⁻	ed for 1.985 af (782.2)	99% of inflo	w)
Volume	Invert A	vail.Stora	ge Stora	age Description		
#1	174.00'	0.791	af Cus	tom Stage Data	(Prismatio	JListed below (Recalc)
#1 Elevation	174.00' Surf.Area	0.791 In	af Cus c.Store	tom Stage Data Cum.Store	ı (Prismatic	JListed below (Recalc)
#1 Elevation (feet)	174.00' Surf.Area (acres)	0.791 In (aci	af Cus c.Store re-feet)	tom Stage Data Cum.Store (acre-feet)	ı (Prismatic	:) Listed below (Recalc)
#1 Elevation (feet) 174.00	174.00' Surf.Area (acres) 0.339	0.791 In (acı	af Cus c.Store r <u>e-feet)</u> 0.000	tom Stage Data Cum.Store (acre-feet) 0.000	ı (Prismatic	:) Listed below (Recalc)
#1 Elevation (feet) 174.00 176.00	174.00' Surf.Area (acres) 0.339 0.452	0.791 In (acı	af Cus c.Store <u>re-feet)</u> 0.000 0.791	tom Stage Data Cum.Store (acre-feet) 0.000 0.791	ı (Prismatic	:) Listed below (Recalc)
#1 Elevation (feet) 174.00 176.00 Device R	174.00' Surf.Area (acres) 0.339 0.452	0.791 In (acı Invert	af Cus c.Store <u>re-feet)</u> 0.000 0.791 Outlet De	tom Stage Data Cum.Store (acre-feet) 0.000 0.791	ı (Prismatic	:) Listed below (Recalc)

Primary OutFlow Max=24.90 cfs @ 12.12 hrs HW=174.60' (Free Discharge) 1=Broad-Crested Rectangular Weir (Weir Controls 24.90 cfs @ 2.08 fps) HydroCAD® 9.10 s/n 06371 © 2009 HydroCAD Software Solutions LLC



Pond 6A: Wetlands

SECTION 4

DRAINAGE CATCHMENTS



ΤΟ	VN OF FALM Planning B	iouth, me Ioard		$\left\lceil \right\rangle$	erizon wireless	400 FRIBERG PARKWAY WESTBORCUICH, MA 01581 (508) 330-3330 TEL
			SONING	PREPARED FOR:		557-5553 33&-5586
AREA ACRES) 1.286	WEIGHTED CN 79	TIME OF CONCENTRATION T_{C} (MINS) 4.9	FOR	€	Hudson Perign Groupus	1400 OSGOOD STREET BULDING 20 NORTH SUITE 3090 TEL: (978) N. ANDOVER, MA 01845 FAX: (978)
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2. REFER TO STRUCTURAL ANALYSIS BY OTHERS