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2229 POST ROAD MIXED USE DEVELOPMENT 2229 POST ROAD (US ROUTE 1), WELLS, MAINE STORMWATER MANAGEMENT STUDY

Project No.: C171-22

January 18th, 2022

◆ Scope

This stormwater management plan has been prepared for 2229 Post Road, a proposed Mixed-Use development, located on U.S. Route 1, Wells, Maine. The entire parcel contains approximately 1.43 acres; the development will include 2 single-family residential units and 10 contractor spaces in 2 buildings. The project requires a Stormwater Permit by Rule from the Maine Department of Environmental Protection (MDEP) and must meet the Stormwater Management requirements for the Town of Wells. The project will create approximately 1.25 acres of developed area and approximately 0.98 acres of impervious area.

◆ Site and Watershed Description

The project site is in the Merriland River and Webhannet River watersheds. The Merriland River is tributary to Little River and ultimately, the Atlantic Ocean. The Webhannet River drains directly to the Atlantic Ocean. A 7½ minute series U.S.G.S. map of the project area is attached.

The existing site is developed with a small driveway and residence. The remainder of the lot contains woodlands and meadow.

Approximately 90% of the site drains toward the Merriland River, which is located on the southeast side of US Route 1 and north of Laudholm Farm Road. The Webhannet River is also located on the southeast side of U.S. Route 1 but south of Laudholm Farm Road. On-site runoff sheet flows across upland areas and several wooded wetlands prior to discharge toward the brooks. The topography of the site is slightly sloped; most areas contain slopes below 2%. The site is not within a FEMA flood zone.

◆ Soils/Hydrologic Soil Groups

Soil types and their respective Hydrologic Soil Groups (HSG) were determined from NRCS Soil Data. On site soil types are Adams (Ad). Hydrologic Soil Group (HSG) is A for this type of soil. Off-site soil types and their HSG's were determined from the Soil Survey of York County, Maine.

◆ Methodology

The stormwater quantity analysis will be conducted using the HydroCAD Stormwater Modeling System by Applied Microcomputer Systems. The analysis determines the "Existing Condition" and "Developed Condition" stormwater flows. Both cases are analyzed for the 2, 10 and 25-year, 24-hour frequency storm events. The Existing Condition analyzes the site as it currently exists, and the Developed Condition models the site with the proposed improvements described above.

◆ Water Quantity Analysis

Existing Condition

The site was divided into two subcatchments (SC) for the Existing Condition analysis. SC 1 flows off site to the north (Analysis Point 1). SC 2 is flows off site to the east (Analysis Point 2). This area is assumed to be undeveloped for the Existing Condition analysis. AP 1 is tributary to the Merriland River and AP 2 is tributary to the Webhannet River.

The APs were selected to provide convenient points to compare Existing Condition flows to Developed Condition flows.

Developed Condition

The Developed Condition analysis consists of 4 subcatchments. Other features such as ponds and reaches were added to account for on-site routing and detention of stormwater. 2 Detention Ponds are provided to control stormwater volume. All Developed Condition flows were routed to the Analysis Points described above.

Changes in Stormwater Flows

Tables showing Existing Condition peak flows, Developed Condition peak flows and the change in peak flow from Existing Condition to Developed Condition are presented on a separate page.

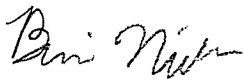
The analysis indicates a decrease in peak flow at all analysis points (AP's 1 and 2) for all storm events (2, 10 and 25-year).

Runoff from the detention ponds will be held until the stormwater can exfiltrate into the on-site soils. Soils have been analyzed for their permeability and separation from the seasonal high water table. The bottoms of both detention ponds are separated from the seasonal high water table by at least 3'.

◆ **Summary**

The use of detention ponds to attenuate peak flows will result in no increase in peak runoff quantity from the proposed development. No adverse effects are anticipated on any downstream properties or drainage structures for the analyzed storm events.

Sincerely;



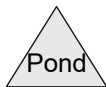
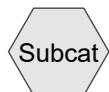
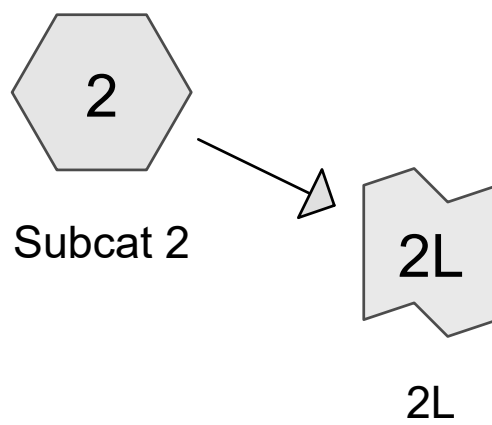
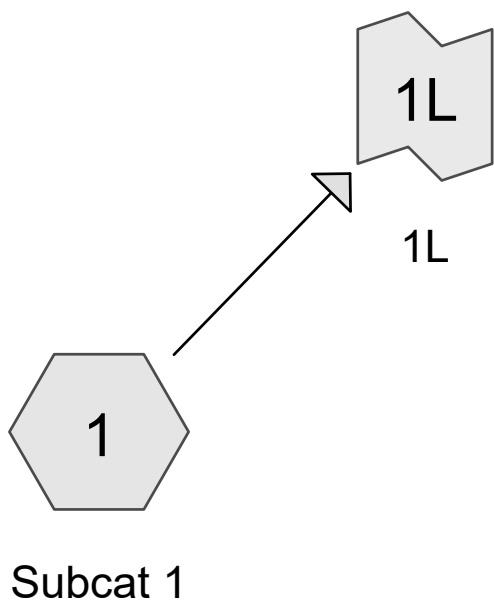
Brian Nielsen, E.I.T.
Staff Engineer

TABLE 1 - QUANTITY CALCULATIONS

STORM EVENT (inches per 24 hour storm)

		<u>2 (3.23")</u>	<u>10 (4.84")</u>	<u>25 (6.10")</u>
EXISTING	AP 1	0.00	0.06	0.36
	AP 2	0.00	0.00	0.00
DEVELOPED	AP 1	0.00	0.00	0.00
	AP 2	0.00	0.00	0.00
CHANGE	AP 1	0.00	-0.06	-0.36
	AP 2	0.00	0.00	0.00
	TOTAL	0.00	-0.06	-0.36

EXISTING CONDITION CALCULATIONS



LAUDHOLM FARM EXT

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Page 2

Project Notes

Rainfall events imported from "Burnt Mill Estates EXT - (Phase 1).hcp"

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Page 3

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,274	98	Demolished Paved parking, HSG A (1)
7,643	98	Existing Paved parking, HSG A (1)
67,377	30	Woods, Good, HSG A (1, 2)
77,294	39	TOTAL AREA

LAUDHOLM FARM EXT

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Page 4

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
77,294	HSG A	1, 2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
77,294		TOTAL AREA

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Page 5

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
2,274	0	0	0	0	2,274	Demolished
7,643	0	0	0	0	7,643	Paved parking Existing Paved parking
67,377	0	0	0	0	67,377	Woods, Good
77,294	0	0	0	0	77,294	TOTAL AREA

LAUDHOLM FARM EXT

Type III 24-hr 2-Year 2020 NRCS Rainfall=3.23"

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Page 6

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

Subcatchment 1: Subcat 1

Runoff Area=69,712 sf 14.23% Impervious Runoff Depth>0.00"
Flow Length=330' Tc=10.1 min CN=40 Runoff=0.00 cfs 3 cf

Subcatchment 2: Subcat 2

Runoff Area=7,581 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=45' Slope=0.0400 '/' Tc=3.9 min CN=30 Runoff=0.00 cfs 0 cf

Link 1L: 1L

Inflow=0.00 cfs 3 cf
Primary=0.00 cfs 3 cf

Link 2L: 2L

Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 77,294 sf Runoff Volume = 3 cf Average Runoff Depth = 0.00"
87.17% Pervious = 67,377 sf 12.83% Impervious = 9,917 sf

LAUDHOLM FARM EXT

Type III 24-hr 10-Year 2020 NRCS Rainfall=4.84"

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Page 7

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

Subcatchment 1: Subcat 1

Runoff Area=69,712 sf 14.23% Impervious Runoff Depth>0.16"
Flow Length=330' Tc=10.1 min CN=40 Runoff=0.06 cfs 921 cf

Subcatchment 2: Subcat 2

Runoff Area=7,581 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=45' Slope=0.0400 '/' Tc=3.9 min CN=30 Runoff=0.00 cfs 0 cf

Link 1L: 1L

Inflow=0.06 cfs 921 cf
Primary=0.06 cfs 921 cf

Link 2L: 2L

Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 77,294 sf Runoff Volume = 921 cf Average Runoff Depth = 0.14"
87.17% Pervious = 67,377 sf 12.83% Impervious = 9,917 sf

LAUDHOLM FARM EXT

Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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Page 8

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

Subcatchment 1: Subcat 1

Runoff Area=69,712 sf 14.23% Impervious Runoff Depth>0.45"
Flow Length=330' Tc=10.1 min CN=40 Runoff=0.36 cfs 2,605 cf

Subcatchment 2: Subcat 2

Runoff Area=7,581 sf 0.00% Impervious Runoff Depth>0.06"
Flow Length=45' Slope=0.0400 '/' Tc=3.9 min CN=30 Runoff=0.00 cfs 35 cf

Link 1L: 1L

Inflow=0.36 cfs 2,605 cf
Primary=0.36 cfs 2,605 cf

Link 2L: 2L

Inflow=0.00 cfs 35 cf
Primary=0.00 cfs 35 cf

Total Runoff Area = 77,294 sf Runoff Volume = 2,640 cf Average Runoff Depth = 0.41"
87.17% Pervious = 67,377 sf 12.83% Impervious = 9,917 sf

LAUDHOLM FARM EXT

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Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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Page 1

Summary for Subcatchment 1: Subcat 1

Runoff = 0.36 cfs @ 12.37 hrs, Volume= 2,605 cf, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Area (sf)	CN	Description
2,274	98	Demolished Paved parking, HSG A
7,643	98	Existing Paved parking, HSG A
59,796	30	Woods, Good, HSG A
69,712	40	Weighted Average
59,796		85.77% Pervious Area
9,917		14.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	45	0.0400	1.55		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.23"
9.6	285	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.1	330	Total			

Summary for Subcatchment 2: Subcat 2

Runoff = 0.00 cfs @ 15.33 hrs, Volume= 35 cf, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Area (sf)	CN	Description
7,581	30	Woods, Good, HSG A
7,581		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	45	0.0400	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.23"

Summary for Link 1L: 1LInflow Area = 69,712 sf, 14.23% Impervious, Inflow Depth > 0.45" for 25-Year 2020 NRCS event
Inflow = 0.36 cfs @ 12.37 hrs, Volume= 2,605 cf
Primary = 0.36 cfs @ 12.37 hrs, Volume= 2,605 cf, Atten= 0%, Lag= 0.0 min

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

LAUDHOLM FARM EXT

Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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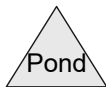
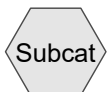
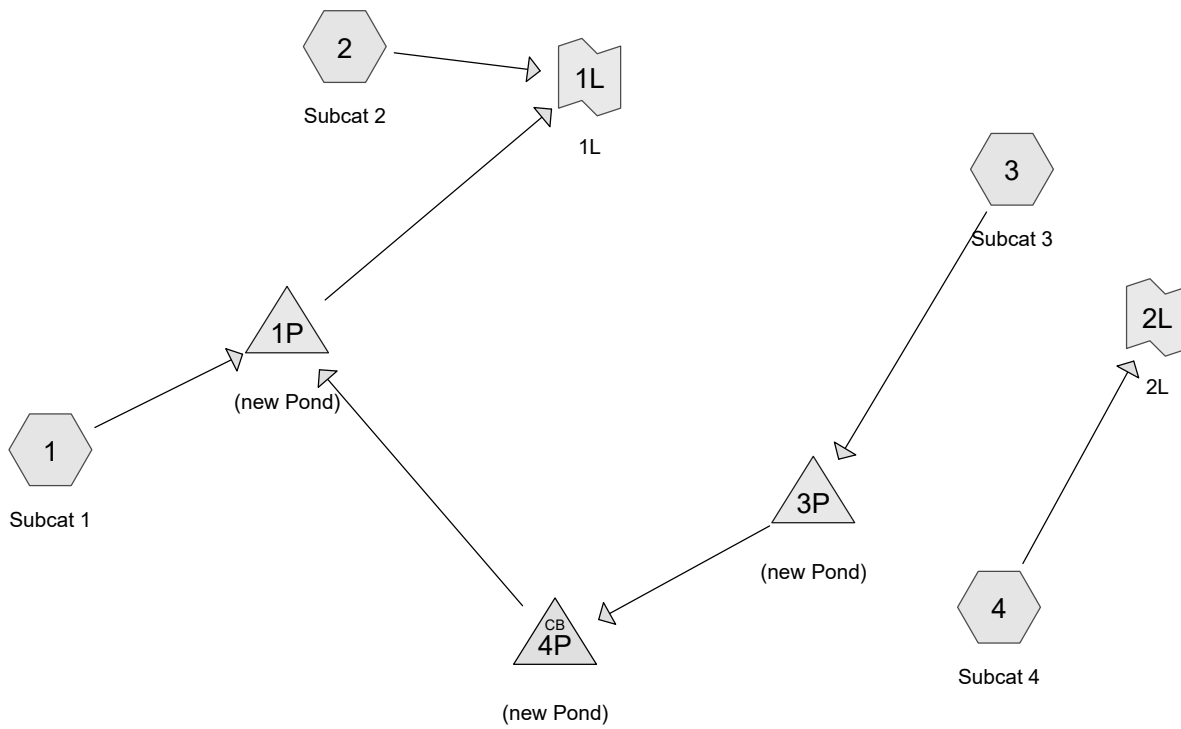
Page 2

Summary for Link 2L: 2L

Inflow Area = 7,581 sf, 0.00% Impervious, Inflow Depth > 0.06" for 25-Year 2020 NRCS event
Inflow = 0.00 cfs @ 15.33 hrs, Volume= 35 cf
Primary = 0.00 cfs @ 15.33 hrs, Volume= 35 cf, Atten= 0%, Lag= 0.0 min

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

DEVELOPED CONDITION CALCULATIONS



Routing Diagram for LAUDHOLM FARM PRP
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LAUDHOLM FARM PRP

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,643	98	Existing Paved parking, HSG A (1, 2)
23,727	98	Proposed Paved parking, HSG A (1, 3)
11,316	98	Roofs, HSG A (1, 3)
34,608	30	Woods, Good, HSG A (1, 2, 3, 4)
77,294	68	TOTAL AREA

LAUDHOLM FARM PRP

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Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
77,294	HSG A	1, 2, 3, 4
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
77,294		TOTAL AREA

LAUDHOLM FARM PRP

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Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subc Num
7,643	0	0	0	0	7,643	Existing Paved parking	
23,727	0	0	0	0	23,727	Proposed Paved parking	
11,316	0	0	0	0	11,316	Roofs	
34,608	0	0	0	0	34,608	Woods, Good	
77,294	0	0	0	0	77,294	TOTAL AREA	

LAUDHOLM FARM PRP

Type III 24-hr 2-Year 2020 NRCS Rainfall=3.23"

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Page 5

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

Subcatchment 1: Subcat 1 Runoff Area=64,977 sf 61.49% Impervious Runoff Depth>0.86"
Flow Length=246' Tc=2.8 min CN=72 Runoff=1.69 cfs 4,670 cf

Subcatchment 2: Subcat 2 Runoff Area=4,076 sf 0.85% Impervious Runoff Depth=0.00"
Flow Length=55' Slope=0.0200 '/' Tc=6.0 min CN=31 Runoff=0.00 cfs 0 cf

Subcatchment 3: Subcat 3 Runoff Area=7,396 sf 36.43% Impervious Runoff Depth>0.22"
Flow Length=78' Tc=1.1 min CN=55 Runoff=0.02 cfs 135 cf

Subcatchment 4: Subcat 4 Runoff Area=845 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=19' Slope=0.0500 '/' Tc=2.6 min CN=30 Runoff=0.00 cfs 0 cf

Pond 1P: (new Pond) Peak Elev=45.52' Storage=1,649 cf Inflow=1.69 cfs 4,670 cf
Outflow=0.20 cfs 4,671 cf

Pond 3P: (new Pond) Peak Elev=46.00' Storage=0 cf Inflow=0.02 cfs 135 cf
Discarded=0.02 cfs 135 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 135 cf

Pond 4P: (new Pond) Peak Elev=45.51' Inflow=0.00 cfs 0 cf
12.0" Round Culvert n=0.013 L=39.2' S=0.0051 '/' Outflow=0.00 cfs 0 cf

Link 1L: 1L Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 2L: 2L Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 77,294 sf Runoff Volume = 4,805 cf Average Runoff Depth = 0.75"
44.77% Pervious = 34,608 sf 55.23% Impervious = 42,686 sf

LAUDHOLM FARM PRP

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Type III 24-hr 10-Year 2020 NRCS Rainfall=4.84"

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Page 6

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

Subcatchment 1: Subcat 1

Runoff Area=64,977 sf 61.49% Impervious Runoff Depth>1.92"
Flow Length=246' Tc=2.8 min CN=72 Runoff=3.93 cfs 10,383 cf

Subcatchment 2: Subcat 2

Runoff Area=4,076 sf 0.85% Impervious Runoff Depth>0.00"
Flow Length=55' Slope=0.0200 '/' Tc=6.0 min CN=31 Runoff=0.00 cfs 0 cf

Subcatchment 3: Subcat 3

Runoff Area=7,396 sf 36.43% Impervious Runoff Depth>0.80"
Flow Length=78' Tc=1.1 min CN=55 Runoff=0.16 cfs 495 cf

Subcatchment 4: Subcat 4

Runoff Area=845 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=19' Slope=0.0500 '/' Tc=2.6 min CN=30 Runoff=0.00 cfs 0 cf

Pond 1P: (new Pond)

Peak Elev=46.30' Storage=4,983 cf Inflow=3.94 cfs 10,432 cf
Outflow=0.27 cfs 8,074 cf

Pond 3P: (new Pond)

Peak Elev=46.11' Storage=65 cf Inflow=0.16 cfs 495 cf
Discarded=0.04 cfs 447 cf Primary=0.04 cfs 49 cf Outflow=0.07 cfs 496 cf

Pond 4P: (new Pond)

Peak Elev=46.30' Inflow=0.04 cfs 49 cf
12.0" Round Culvert n=0.013 L=39.2' S=0.0051 '/' Outflow=0.04 cfs 49 cf

Link 1L: 1L

Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link 2L: 2L

Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 77,294 sf Runoff Volume = 10,878 cf Average Runoff Depth = 1.69"
44.77% Pervious = 34,608 sf 55.23% Impervious = 42,686 sf

LAUDHOLM FARM PRP

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Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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Page 7

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

Subcatchment 1: Subcat 1 Runoff Area=64,977 sf 61.49% Impervious Runoff Depth>2.86"
Flow Length=246' Tc=2.8 min CN=72 Runoff=5.87 cfs 15,485 cf

Subcatchment 2: Subcat 2 Runoff Area=4,076 sf 0.85% Impervious Runoff Depth>0.08"
Flow Length=55' Slope=0.0200 '/' Tc=6.0 min CN=31 Runoff=0.00 cfs 27 cf

Subcatchment 3: Subcat 3 Runoff Area=7,396 sf 36.43% Impervious Runoff Depth>1.43"
Flow Length=78' Tc=1.1 min CN=55 Runoff=0.31 cfs 879 cf

Subcatchment 4: Subcat 4 Runoff Area=845 sf 0.00% Impervious Runoff Depth>0.06"
Flow Length=19' Slope=0.0500 '/' Tc=2.6 min CN=30 Runoff=0.00 cfs 4 cf

Pond 1P: (new Pond) Peak Elev=46.89' Storage=8,212 cf Inflow=5.95 cfs 15,562 cf
Outflow=0.33 cfs 10,282 cf

Pond 3P: (new Pond) Peak Elev=46.31' Storage=206 cf Inflow=0.31 cfs 879 cf
Discarded=0.04 cfs 801 cf Primary=0.13 cfs 77 cf Outflow=0.17 cfs 878 cf

Pond 4P: (new Pond) Peak Elev=46.87' Inflow=0.13 cfs 77 cf
12.0" Round Culvert n=0.013 L=39.2' S=0.0051 '/' Outflow=0.13 cfs 77 cf

Link 1L: 1L Inflow=0.00 cfs 27 cf
Primary=0.00 cfs 27 cf

Link 2L: 2L Inflow=0.00 cfs 4 cf
Primary=0.00 cfs 4 cf

Total Runoff Area = 77,294 sf Runoff Volume = 16,396 cf Average Runoff Depth = 2.55"
44.77% Pervious = 34,608 sf 55.23% Impervious = 42,686 sf

LAUDHOLM FARM PRP

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Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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Page 1

Summary for Subcatchment 1: Subcat 1

Runoff = 5.87 cfs @ 12.05 hrs, Volume= 15,485 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Area (sf)	CN	Description
7,608	98	Existing Paved parking, HSG A
22,077	98	Proposed Paved parking, HSG A
10,271	98	Roofs, HSG A
25,021	30	Woods, Good, HSG A
64,977	72	Weighted Average
25,021		38.51% Pervious Area
39,957		61.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	39	0.0500	1.65		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.23"
2.4	207	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.8	246	Total			

Summary for Subcatchment 2: Subcat 2

Runoff = 0.00 cfs @ 15.02 hrs, Volume= 27 cf, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Area (sf)	CN	Description
35	98	Existing Paved parking, HSG A
4,041	30	Woods, Good, HSG A
4,076	31	Weighted Average
4,041		99.15% Pervious Area
35		0.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	55	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.23"

Summary for Subcatchment 3: Subcat 3

Runoff = 0.31 cfs @ 12.03 hrs, Volume= 879 cf, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

LAUDHOLM FARM PRP

Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Prepared by Attar Engineering

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Page 2

Area (sf)	CN	Description
1,650	98	Proposed Paved parking, HSG A
1,045	98	Roofs, HSG A
4,701	30	Woods, Good, HSG A
7,396	55	Weighted Average
4,701		63.57% Pervious Area
2,694		36.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	29	0.0100	0.82		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.23"
0.5	49	0.0550	1.64		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	78	Total			

Summary for Subcatchment 4: Subcat 4

Runoff = 0.00 cfs @ 15.31 hrs, Volume= 4 cf, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

Area (sf)	CN	Description
845	30	Woods, Good, HSG A
845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	19	0.0500	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 3.23"

Summary for Pond 1P: (new Pond)

Inflow Area = 72,373 sf, 58.93% Impervious, Inflow Depth > 2.58" for 25-Year 2020 NRCS event
 Inflow = 5.95 cfs @ 12.05 hrs, Volume= 15,562 cf
 Outflow = 0.33 cfs @ 14.21 hrs, Volume= 10,282 cf, Atten= 94%, Lag= 129.5 min
 Discarded = 0.33 cfs @ 14.21 hrs, Volume= 10,282 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 46.89' @ 14.21 hrs Surf.Area= 5,989 sf Storage= 8,212 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 127.8 min (920.8 - 793.0)

Volume	Invert	Avail.Storage	Storage Description
#1	45.00'	14,466 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

LAUDHOLM FARM PRP

Type III 24-hr 25-Year 2020 NRCS Rainfall=6.10"

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Page 3

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	2,794	0	0
46.00	4,376	3,585	3,585
47.00	6,183	5,280	8,865
47.80	7,820	5,601	14,466

Device	Routing	Invert	Outlet Devices
#1	Discarded	45.00'	2.400 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.33 cfs @ 14.21 hrs HW=46.89' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.33 cfs)

Summary for Pond 3P: (new Pond)

Inflow Area = 7,396 sf, 36.43% Impervious, Inflow Depth > 1.43" for 25-Year 2020 NRCS event
 Inflow = 0.31 cfs @ 12.03 hrs, Volume= 879 cf
 Outflow = 0.17 cfs @ 12.13 hrs, Volume= 878 cf, Atten= 44%, Lag= 5.8 min
 Discarded = 0.04 cfs @ 12.81 hrs, Volume= 801 cf
 Primary = 0.13 cfs @ 12.13 hrs, Volume= 77 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 46.31' @ 12.81 hrs Surf.Area= 777 sf Storage= 206 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 39.1 min (863.9 - 824.8)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	2,397 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	565	0	0
47.00	1,257	911	911
47.90	2,045	1,486	2,397

Device	Routing	Invert	Outlet Devices
#1	Primary	46.00'	12.0" Round Culvert L= 22.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.00' / 45.20' S= 0.0364 ' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	46.00'	2.400 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 12.81 hrs HW=46.31' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.08 cfs @ 12.13 hrs HW=46.19' TW=46.09' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 0.08 cfs @ 1.22 fps)

Summary for Pond 4P: (new Pond)

Inflow Area = 7,396 sf, 36.43% Impervious, Inflow Depth = 0.12" for 25-Year 2020 NRCS event
 Inflow = 0.13 cfs @ 12.13 hrs, Volume= 77 cf
 Outflow = 0.13 cfs @ 12.13 hrs, Volume= 77 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.13 cfs @ 12.13 hrs, Volume= 77 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 46.87' @ 15.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.10'	12.0" Round Culvert L= 39.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 45.10' / 44.90' S= 0.0051 ' S= 0.0051 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=46.09' TW=46.26' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Summary for Link 1L: 1L

Inflow Area = 76,448 sf, 55.84% Impervious, Inflow Depth > 0.00" for 25-Year 2020 NRCS event
 Inflow = 0.00 cfs @ 15.02 hrs, Volume= 27 cf
 Primary = 0.00 cfs @ 15.02 hrs, Volume= 27 cf, Atten= 0%, Lag= 0.0 min

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

Summary for Link 2L: 2L

Inflow Area = 845 sf, 0.00% Impervious, Inflow Depth > 0.06" for 25-Year 2020 NRCS event
 Inflow = 0.00 cfs @ 15.31 hrs, Volume= 4 cf
 Primary = 0.00 cfs @ 15.31 hrs, Volume= 4 cf, Atten= 0%, Lag= 0.0 min

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

OPERATION AND MAINTENANCE PROGRAM



ATTAR

ENGINEERING, INC

CIVIL • STRUCTURAL • MARINE

**COMMERICAL/RESIDENTIAL DEVELOPMENT
2229 POST ROAD
WELLS, MAINE**

**OPERATION AND MAINTENANCE PROGRAM
STORMWATER MANAGEMENT BMP's**

STORMWATER MANAGEMENT

This project contains specific Best Management Practices (BMP's) for the conveyance, storage, and treatment of stormwater and the prevention of erosion. These BMP's consist of a detention pond, swales, catch basins and culverts. All components should be inspected quarterly, and after every significant rain event of 1" in any 24-hour period. Additional inspection intervals are specified for certain BMP's.

The party responsible for implementing this Operation and Maintenance Program (O & M Program) shall be the property lessee ()

Swales

All swales should be inspected for accumulation of debris, which could adversely affect the function of this BMP. These areas should also be maintained to have gradual slopes, which prevent channeling of stormwater and erosion of the bottom and sides of the swales.

Culverts

Culvert inlets and outlets should be inspected for debris, which could clog the BMP.

Additionally, the placement of rip-rap should be inspected to ensure that all areas remain smooth and no areas exhibit erosion in the form of rills or gullies.

Catch Basins

All catch basin grates, sumps, and inlets/outlets should be inspected for accumulation of debris, which could adversely affect the function of this BMP. Additionally, the basin inverts shall be inspected for clogging and material soundness. Sumps shall always be clear to a depth of 1' below the outlet invert. Inlet structures shall be inspected and cleaned of debris at least twice annually, once in the spring following snow melt and once in the autumn after leaf fall.

Detention Ponds

Detention ponds shall be inspected to ensure that there is no channeling of stormwater and that no debris accumulates within the detention areas. The vegetative cover conditions shall be maintained. The inlets and outlets shall be inspected for erosion and any evidence of debris that could clog the outlet structures and culverts. Emergency spillways and level spreaders shall be inspected for any evidence of rilling and channeling and shall be maintained to promote a level, sheet-flow discharge. Pond embankments and side slopes shall be inspected for

erosion, destabilization of side slopes and evidence of embankment settling; corrective action shall be taken immediately to correct such issues. The height of grass shall be maintained at a maximum of 12"; mowing shall be limited to no more than two times during the growing season.

Snow Removal

Snow shall be stockpiled only in the approved snow storage areas. Plowing of snow into wetland areas or detention ponds shall be avoided. Additionally, a mostly sand mix (reduced salt) shall be applied during winter months to prevent excessive salt from leaching into wetland areas. Excess sand shall be removed from the storage areas, all paved surfaces and adjacent areas each spring.

Seeding, Fertilizing and Mulching

All exposed soil materials and stockpiles must be either temporarily or permanently seeded, fertilized and mulched in accordance with plan specifications. This is one of the most important features of the Erosion Control Plan, which will provide both temporary and permanent stabilization. Eroded or damaged lawn areas must be repaired until a 75% effective growth of vegetation is established and permanently maintained.

Record Keeping

Routine maintenance and inspections will be accomplished by the property lessee (Sweet Dirt, Inc.), or third party contracted by the property owner. All inspections accomplished in accordance with this program shall be documented on the attached Inspection & Maintenance Log. Copies of the Log shall be kept by the property owner or condominium association, and be made available to the Department (Maine Department of Environmental Protection), upon request.

INSPECTION & MAINTENANCE LOG

COMMERCIAL / INDUSTRIAL DEVELOPMENT

Date	Purpose ¹	Maintenance Done ²	By

1. Purpose is the reason for the inspection. For example; “quarterly’ or “after a significant rain event.”
2. Maintenance Done means any maintenance required as a result of the inspection, such as trash removal or re-seeding of areas.