24: WATER QUALITY, STORMWATER MANAGEMENT AND EROSION CONTROL (14-526(b) 3 a)

The proposed site development has been designed in accordance with the City and Maine DEP Chapter 500 Stormwater standards. Please refer to the **Stormwater Management Report**, this section. Erosion control features, details and the written ESC plan are included on the site plans.

SEBAGO TECHNICS

CIVIL ENGINEERING ▪ SURVEYING ▪ LANDSCAPE ARCHITECTURE

Stormwater Management Report

To:

City of Portland

Proposed Warehouse Building

2 Evergreen Drive
Portland, Maine

Prepared for:
Rob Derrey
2 Evergreen Drive,
Portland, ME 04101

Prepared by:
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November 2018

Table of Contents

A. Introduction 1
Scope 1
Tributary Watershed 1
Regulatory Requirements 1
B. Existing Conditions 2
Soils 2
Existing Drainage Patterns 2
Flood Zone 2
C. Proposed Conditions 3
Project Overview 3
BMP summary 3
D. Methodology 3
E. Pre-Development Watershed Model 3
F. Post-Development Watershed Model 4
G. Stormwater Quality Management 4
H. Stormwater Quantity Management 4
I. Conclusion 5

Attachments

Attachment A – Water Quality Calculations
Attachment B – Soils Map & FEMA Map
Attachment C – Pre-Development Stormwater Modeling Data
Attachment D – Post-Development Stormwater Modeling Data
Attachment E – Inspection, Maintenance & Housekeeping Plan
Attachment F – Stormwater Watershed Plans

Stormwater Management Narrative
Proposed Warehouse Building
Portland, ME

A. Introduction

This Stormwater Management Plan has been prepared to address the potential impacts associated with the proposed development at 2 Evergreen Drive in Portland. The stormwater management controls that are outlined in this plan have been designed to best suit the proposed development and to comply with applicable regulatory requirements to evaluate the pre- and post-development conditions.

Scope

Proposed improvements include the construction of a 9,200 square foot building and reconfiguration of parking spaces to improve site circulation and safety. Remaining developed areas will comprise of vegetated side slopes, plantings, and an existing depressional area. The total developed area is 0.29 acres.

Tributary Watershed

This site drains to the Presumpscot River which ultimately outfalls at Casco Bay.

Regulatory Requirements

Regulatory requirements by Maine Department of Environmental Protection (MDEP) and the City of Portland are described below for this project.

Basic Standard - Chapter 500, Section 4(B)

Since the project will not disturb more than one (1) acre of land area, MDEP Basic Standards do not apply. They require that grading or other construction activities on the site do not impede or otherwise alter drainage ways to have an unreasonable adverse impact. We have avoided adverse impacts by providing an Erosion & Sedimentation Control Plan, and an Inspection, Maintenance and Housekeeping Plan (Attachment E) to be implemented during construction and post-construction stabilization of the site. These construction requirements have been developed following Best Management Practice guidelines.

General Standard - Chapter 500, Section 4(C)

Since the project will not create more than one (1) acre of impervious surface, MDEP General Standards do not apply, which require a project's stormwater management system to include treatment measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential temperature impacts. The General Standards require treatment of no less than 95% of the site's created impervious area and no less than 80% of the site's created developed area (landscaped area and impervious area combined).

Flooding Standard - Chapter 500, Section 4(F)

Since the planned project will not create more than three (3) acres of impervious surface, MDEP Flooding Standards are required to be met. The Flooding Standard requires a project's stormwater management system to detain, retain, or result in the infiltration of stormwater from 24-hour storms

of the 2, 10, and 25-year frequencies such that the peak flow rates of stormwater from the project site do not exceed the peak flow rates of stormwater prior to undertaking the project.

Municipal Requirements

Per the City of Portland Code of Ordinances 14-526 subsection 3, all development shall comply with the standards of Section 5 of the Technical Manual. Section 5 states that all development shall meet the Maine Department of Environmental Protection Chapter 500 Stormwater Management Rules including General and Flooding Standards.

B. Existing Conditions

Soils

Soil information for the site was obtained via the USDA United States Department of Agriculture and Natural Resources Conservation Service's Web Soil Survey. The Hydrologic Soil Group (HSG) of the site soils are classified by Technical Release TR-55 of the Soil Conservation Service as follows:

Soil Type	Symbol	HSG	Drainage Class
Scantic Silt Loam (0-3% slopes)	Sn	D	Poorly Drained
Windsor Loamy Sand (0-8% slopes)	WmB	A	Excessively Drained

Existing Drainage Patterns

The site includes an existing building totaling 2,800 square feet accessed by a paved driveway from Evergreen Drive, through to site to the adjacent property to the north, and associated parking. The remaining land consists of vegetated sideslopes and a wooded area to the north of the site which drains to the existing depression area to the north.

Runoff from the site generally flows from the elevated areas to the south of the site at Evergreen Drive to a gentle, wooded slope to the northeast of the site before entering the existing depression. This depression drains to the Riverside Drive drainage system which ultimately outfalls at the Presumpscot River approximately 0.5 miles downstream. For stormwater analysis purposes, runoff was analyzed at two study points where the runoff exits the subject parcel to the northeast. Study Point 1 (SP-1) is located at the adjacent parcel to the east where some site runoff goes offsite to an existing catch basin. Study Point 2 (SP-2) is located at the outfall pipe of the existing depression to the City drainage system.

Flood Zone

The proposed development area of the site is located in Zone C, areas of minimal flooding, per the FEMA Flood Insurance Rate Map for the City of Portland, Community Panel 230051 0001 B, effective July 17, 1986 (Attachment B).

C. Proposed Conditions

Project Overview

Proposed improvements involve the construction of an 9,200 square foot building on the north side of the site and rearranged parking for improved site circulation and safety. The proposed development will increase the total impervious area by approximately 0.21-acres over the existing impervious areas that exist today. The stormwater management plan was designed so that existing drainage patterns are not significantly altered at the Study Point.

BMP summary

The proposed development has included roof drip edge filter to treat the total proposed impervious area (the proposed building). This has been designed to provide treatment and detention of stormwater.

D. Methodology

The stormwater runoff analysis was developed using the "HydroCAD" computer modeling software, which incorporates the TR-55 and TR-20 methodologies as provided by the Soil Conservation Service of the U.S. Department of Agriculture.

The peak runoff rates were calculated using a 24-hour duration storm event with a Type III rainfall distribution. The rainfall amounts for southeast Cumberland County for the 2-year, 10-year and 25-year storm events are as follows:

Storm Frequency	24-hr Duration Rainfall (in.)
2-yr	3.10
10-yr	4.60
25-yr	5.80

Runoff curve numbers were determined for each of the watersheds by measuring the area of each hydrologic soil group within each type of land cover. The type of land cover was determined based on survey data, field reconnaissance and aerial photography. Times of concentration were determined from site topographic maps in accordance with SCS procedures.

The hydrologic model incorporates the following design assumptions:

- The minimum time of concentration (Tc) is six minutes, based upon limitations of the TR-55 model.

E. Pre-Development Watershed Model

The pre-development watershed model consists of three (3) subcatchments and two (2) study points.

Subcatchment 1S includes a portion of the access road on the site. The area is graded to discharge runoff easterly to an existing catch basin offsite. This node was modelled at SP-1 to analyze separately.

Subcatchment 2.0S includes the majority of the developed area including the existing building, parking area, access road and wooded areas. The paved areas are graded so that stormwater runoff flows north to the wooded area and discharges to the existing stormwater detention area to the north. An outlet pipe from the detention pond discharges into City drainage infrastructure with the Riverside Drive Right-of-Way modelled as SP-2.

Subcatchment 2.1S includes the Riverside Drive Right-of-Way which drains to a catch basin downstream of the stormwater detention area. This subcatchment outfalls to node SP-2.

F. Post-Development Watershed Model

The post-development watershed model consists of four (4) subcatchments and two (2) study points. Modeling reflects on-site ground cover changes to include proposed landscaping and impervious areas associated with the proposed building construction.

Subcatchment 10S includes a portion of the access road on the site. The area is graded to discharge runoff easterly to an existing catch basin offsite. This subcatchment remains untouched in the post-development condition. This node was modelled at SP-1.

Subcatchments 20S and 21S include the majority of the developed area including the buildings, parking area, access road and vegetated areas. The paved areas are graded so that stormwater runoff flows north to catch basins and drainage pipes and discharges to the existing stormwater detention area to the north. An outlet pipe from the detention pond discharges into City drainage infrastructure with the Riverside Drive Right-of-Way modelled as SP-2.

Subcatchment 22S includes the Riverside Drive Right-of-Way which drains to a catch basin downstream of the stormwater detention area. This subcatchment outfalls to node SP-2.

G. Stormwater Quality Management

Drip Edge Filter

A roof drip edge filter will treat the runoff from the proposed building. The drip edge filter was designed in conformance with Section 7.6 of the BMPs Technical Design Manual. Drip edge filters provide a high level of contaminate removal and detention prior to discharge into downstream drainage ways.

Through the use of the aforementioned BMP 100% of new impervious area and 80.02% of new developed area will be receiving treatment. This meets the requirements for the MDEP General Standards.

H. Stormwater Quantity Management

The HydroCAD model predicts slight decreases in estimated peak flow rates during the 2-, 10- and 25-year storm events at the study points. The analysis of SP-1 and SP-2 as separate nodes was important to ensure that there was no increase in runoff rates or adverse effects due to the design.

The following table summarizes the results of stormwater calculations for the design storm events for the project area.

STORMWATER PEAK DISCHARGE SUMMARY TABLE						
Study Point	2YR-24HR		10YR-24HR		25YR-24HR	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
SP-1	0.26	0.26	0.41	0.41	0.53	0.53
SP-2	2.81	2.79	4.67	4.42	5.89	5.59

I. Conclusion

Based on the modeling data and stated assumptions, post-development peak flow rates examined at the study points for the whole site decrease from their corresponding pre-development rates during the 2-year, 10-year, and 25-year storm events.

An Erosion and Sedimentation Control Plan has been developed using the Maine Department of Environmental Protection's Erosion and Sediment Control Field Guide for Contractors for the project site placing emphasis on the installation of sedimentation barriers and revegetation to minimize erosion potential from development activities during and after construction. The Erosion Control Plan is incorporated into the design plans and includes the locations of the erosion control provisions (i.e., silt fence, silt sacks, erosion control blanket) along with a narrative and construction details for reference by the contractor during construction. Provisions for periodic inspection and maintenance of erosion control measures are included in the Inspection, Maintenance, and Housekeeping Plan in Attachment E of this application.

Prepared by

SEBAGO TECHNICS, INC.

Amber R. Ferland, P.E.
Project Engineer

Paul D. Ostrowski, P.E.
Senior Project Engineer

PDO/ARF

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED
PROFESSIONAL ENGINEER

Attachment A

Water Quality Calculations

Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job #18002

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	EXISTING ONSITE LANDSCAPED AREA TO REMAIN (S.F.)	NEW ONSITE LANDSCAPED AREA (S.F.)	NET NEW DEVELOPED AREA (S.F.)	NET EXISTING DEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	IMPERVIOUS AREA TREATED (S.F.)	LANDSCAPED AREA TREATED* (S.F.)	DEVELOPED AREA TREATED (S.F.)	TREATMENT BMP
10S	4,717	3,128	0	1,589	0	0	4,717	NO	0	0	0	
20S	10,158	0	9,200	0	958	10,158	0	YES	9,200	958	10,158	DripEdge
21S	43,527	25,569	0	15,421	2,537	2,537	40,990	NO	0	0	0	
22S	9,044	8,975	0	69	0	0	9,044	NO	0	0	0	
TOTAL (S.F.)	**67,446**	**37,672**	**9,200**	**17,079**	**3,495**	**12,695**	**54,751**		**9,200**	**958**	**10,158**	

TOTAL NEW IMPERVIOUS AREA (S.F.)	**9,200**	**TOTAL DEVELOPED AREA (S.F.)**	**12,695**
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	**9,200**	**TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)**	**10,158**
% OF IMPERVIOUS AREA RECEIVING TREATMENT	**100.00%**	**% OF DEV. AREA RECEIVING TREATMENT**	**80.02%**

SEBAGO TECHNICS, INC.
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JOB	18002		
SHEET NO.	1	OF	1
CALCULATED BY	ARF	DATE	11/15/2018
CHECKED BY	PDO		
FILE NAME	18002WQCalcs	PRINT DATE	11/30/2018

Treatment Calculations for Proposed Roof Drip Edge							
WQV Calculation							
(WQV = Water Quality Volume)							
Total Impervious Area =		9,200	sf				
WQV (MDEP)= 1" x Impervious Area =			766.7	cf =	0.018	acre-ft	
Length of Trench=			85.0	ft.			
Width of Trench=			10.0	ft.			
Depth of Stone			12.0	in.	40% porosity		
Depth of Sand Media=			30.0	in.	20% porosity		
WQV Provided = Area of Trench * (Depth of stone*stone porosity + Depth of sand*sand porosity)							
WQV for first 1" =		765.0					
Additional WQV Provided =		425.0	cf				
Total WQV Provided =		**1,190.0**	**cf**				

The stone reservoir volume for the drip edge filter was designed to provide the storage required to convey the water quality storm (storm that generates 1" of runoff over the roof) through the filter media under the stone. Additonal water quality is provided in the porosity of the underdrain sand.

Attachment B

Soil Map & FEMA Map

Map Scale: 1:1,010 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 15, Sep 6, 2018

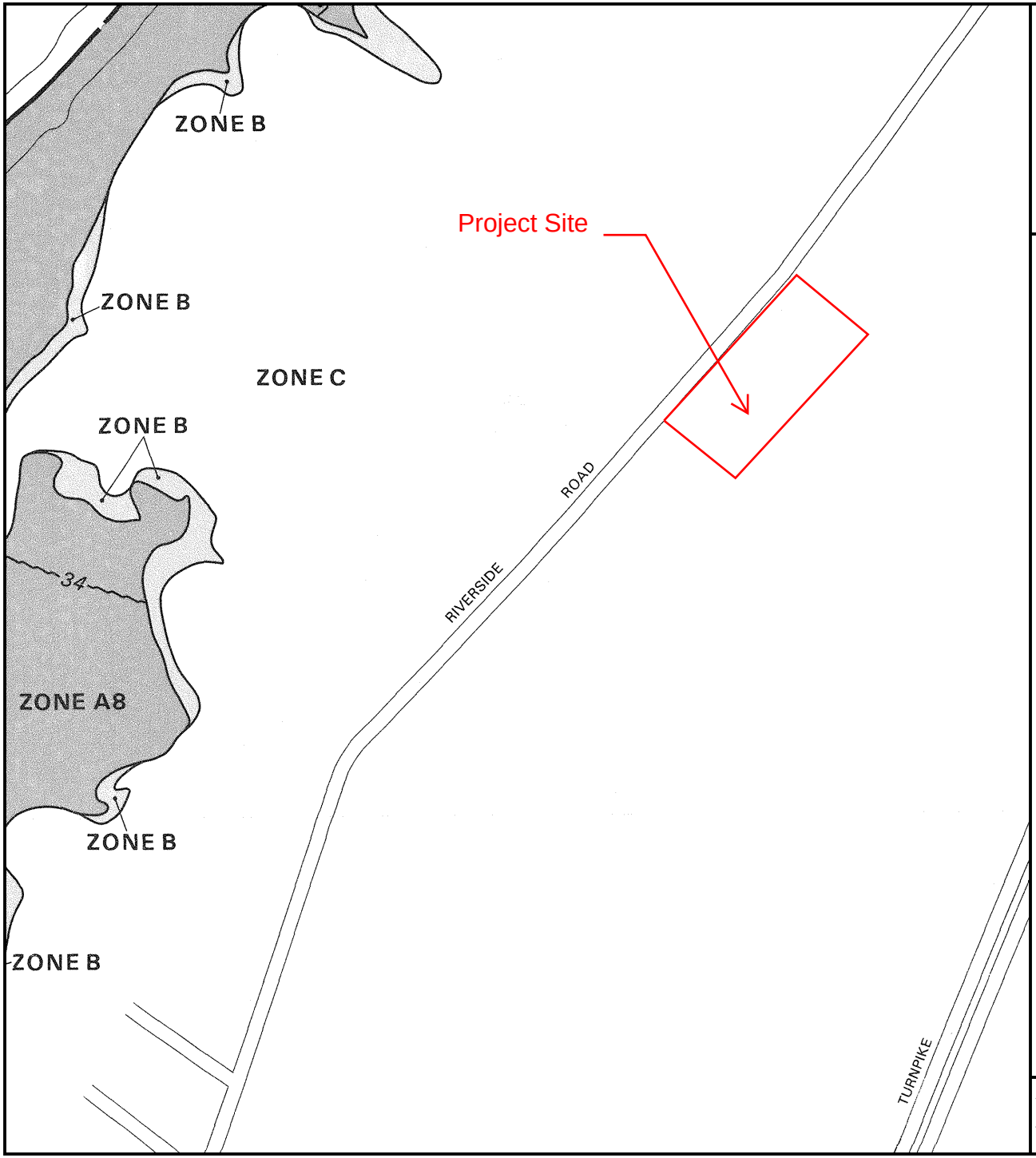
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Sn	Scantic silt loam, 0 to 3 percent slopes	1.4	91.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	0.1	8.8%
Totals for Area of Interest		**1.6**	**100.0%**



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
PORTLAND, MAINE
CUMBERLAND COUNTY

PANEL 1 OF 17
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230051 0001 B

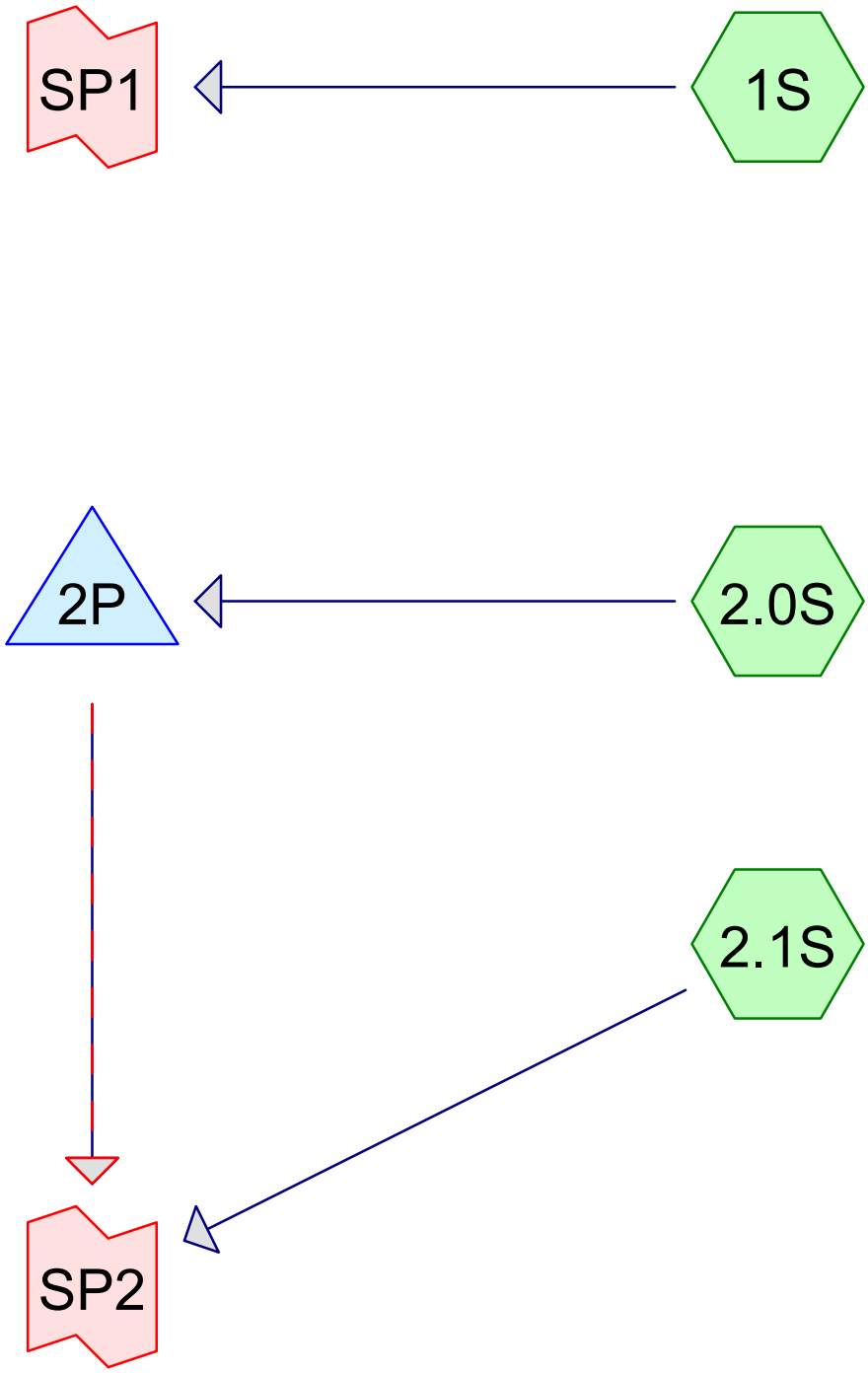
EFFECTIVE DATE:
JULY 17, 1986

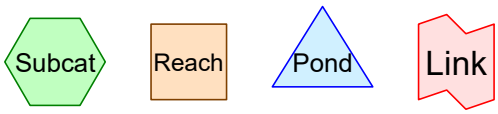
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Attachment C

Pre-Development Stormwater Modeling





Routing Diagram for 18002 PRE
Prepared by Sebago Technics, Inc., Printed 11/27/2018
HydroCAD® 10.00-18 s/n 01856 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,297	39	>75% Grass cover, Good, HSG A (2.0S)
13,101	80	>75% Grass cover, Good, HSG D (1S, 2.0S, 2.1S)
7,377	98	Paved parking, HSG A (2.0S, 2.1S)
30,887	98	Paved parking, HSG D (1S, 2.0S, 2.1S)
1,070	32	Woods/grass comb., Good, HSG A (2.0S)
12,713	79	Woods/grass comb., Good, HSG D (2.0S)
67,445	**88**	**TOTAL AREA**

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment1S: Runoff Area=4,716 sf 66.31% Impervious Runoff Depth=2.26"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.26 cfs 887 cf

Subcatchment2.0S: Runoff Area=53,685 sf 48.70% Impervious Runoff Depth=1.75"
Flow Length=391' Tc=6.6 min CN=86 Runoff=2.47 cfs 7,822 cf

Subcatchment2.1S: Runoff Area=9,044 sf 99.43% Impervious Runoff Depth=2.87"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=0.62 cfs 2,161 cf

Pond 2P: Peak Elev=63.18' Storage=461 cf Inflow=2.47 cfs 7,822 cf
Primary=2.27 cfs 7,761 cf Secondary=0.00 cfs 0 cf Outflow=2.27 cfs 7,761 cf

Link SP1: Inflow=0.26 cfs 887 cf
Primary=0.26 cfs 887 cf

Link SP2: Inflow=2.81 cfs 9,923 cf
Primary=2.81 cfs 9,923 cf

Total Runoff Area = 67,445 sf Runoff Volume = 10,870 cf Average Runoff Depth = 1.93"
43.27% Pervious = 29,181 sf 56.73% Impervious = 38,264 sf

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment1S: Runoff Area=4,716 sf 66.31% Impervious Runoff Depth=3.70"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.41 cfs 1,454 cf

Subcatchment2.0S: Runoff Area=53,685 sf 48.70% Impervious Runoff Depth=3.10"
Flow Length=391' Tc=6.6 min CN=86 Runoff=4.34 cfs 13,848 cf

Subcatchment2.1S: Runoff Area=9,044 sf 99.43% Impervious Runoff Depth>4.36"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=0.93 cfs 3,289 cf

Pond 2P: Peak Elev=63.49' Storage=758 cf Inflow=4.34 cfs 13,848 cf
Primary=3.87 cfs 13,788 cf Secondary=0.00 cfs 0 cf Outflow=3.87 cfs 13,788 cf

Link SP1: Inflow=0.41 cfs 1,454 cf
Primary=0.41 cfs 1,454 cf

Link SP2: Inflow=4.67 cfs 17,077 cf
Primary=4.67 cfs 17,077 cf

Total Runoff Area = 67,445 sf Runoff Volume = 18,591 cf Average Runoff Depth = 3.31"
43.27% Pervious = 29,181 sf 56.73% Impervious = 38,264 sf

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment1S: Runoff Area=4,716 sf 66.31% Impervious Runoff Depth=4.87"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.53 cfs 1,915 cf

Subcatchment2.0S: Runoff Area=53,685 sf 48.70% Impervious Runoff Depth=4.22"
Flow Length=391' Tc=6.6 min CN=86 Runoff=5.84 cfs 18,878 cf

Subcatchment2.1S: Runoff Area=9,044 sf 99.43% Impervious Runoff Depth>5.56"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=1.18 cfs 4,191 cf

Pond 2P: Peak Elev=63.75' Storage=1,082 cf Inflow=5.84 cfs 18,878 cf
Primary=4.91 cfs 18,817 cf Secondary=0.00 cfs 0 cf Outflow=4.91 cfs 18,817 cf

Link SP1: Inflow=0.53 cfs 1,915 cf
Primary=0.53 cfs 1,915 cf

Link SP2: Inflow=5.89 cfs 23,008 cf
Primary=5.89 cfs 23,008 cf

Total Runoff Area = 67,445 sf Runoff Volume = 24,984 cf Average Runoff Depth = 4.45"
43.27% Pervious = 29,181 sf 56.73% Impervious = 38,264 sf

Summary for Subcatchment 1S:

Runoff = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
3,127	98	Paved parking, HSG D
1,589	80	>75% Grass cover, Good, HSG D
4,716	92	Weighted Average
1,589		33.69% Pervious Area
3,127		66.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0030	0.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.4	45	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	175	0.0057	0.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	320	Total			

Summary for Subcatchment 2.0S:

Runoff = 5.84 cfs @ 12.09 hrs, Volume= 18,878 cf, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
20,394	98	Paved parking, HSG D
5,751	98	Paved parking, HSG A
1,070	32	Woods/grass comb., Good, HSG A
12,713	79	Woods/grass comb., Good, HSG D
2,297	39	>75% Grass cover, Good, HSG A
11,460	80	>75% Grass cover, Good, HSG D
53,685	86	Weighted Average
27,540		51.30% Pervious Area
26,145		48.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	23	0.0150	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
1.8	69	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	175	0.0086	1.88		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.9	124	0.0202	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.6	391	Total			

Summary for Subcatchment 2.1S:

Runoff = 1.18 cfs @ 12.08 hrs, Volume= 4,191 cf, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
7,366	98	Paved parking, HSG D
1,626	98	Paved parking, HSG A
52	80	>75% Grass cover, Good, HSG D
9,044	98	Weighted Average
52		0.57% Pervious Area
8,992		99.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0170	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.8	126	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9					**Direct Entry,**
6.0	226	Total			

Summary for Pond 2P:

Inflow Area = 53,685 sf, 48.70% Impervious, Inflow Depth = 4.22" for 25YR event
Inflow = 5.84 cfs @ 12.09 hrs, Volume= 18,878 cf
Outflow = 4.91 cfs @ 12.15 hrs, Volume= 18,817 cf, Atten= 16%, Lag= 3.2 min
Primary = 4.91 cfs @ 12.15 hrs, Volume= 18,817 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 63.75' @ 12.15 hrs Surf.Area= 1,365 sf Storage= 1,082 cf
Flood Elev= 67.00' Surf.Area= 3,500 sf Storage= 9,180 cf

Plug-Flow detention time= 8.1 min calculated for 18,813 cf (100% of inflow)
Center-of-Mass det. time= 6.1 min (805.6 - 799.5)

Volume	Invert	Avail.Storage	Storage Description
#1	62.00'	9,180 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.00	0	0	0
63.00	656	328	328
64.00	1,606	1,131	1,459
65.00	2,237	1,922	3,381
66.00	2,931	2,584	5,965
67.00	3,500	3,216	9,180

Device	Routing	Invert	Outlet Devices
#1	Primary	62.43'	**15.0" Round Culvert** L= 21.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 62.43' / 60.44' S= 0.0948 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Secondary	66.00'	**10.0' 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=4.91 cfs @ 12.15 hrs HW=63.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.91 cfs @ 4.00 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=62.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link SP1:

Inflow Area = 4,716 sf, 66.31% Impervious, Inflow Depth = 4.87" for 25YR event
Inflow = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf
Primary = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

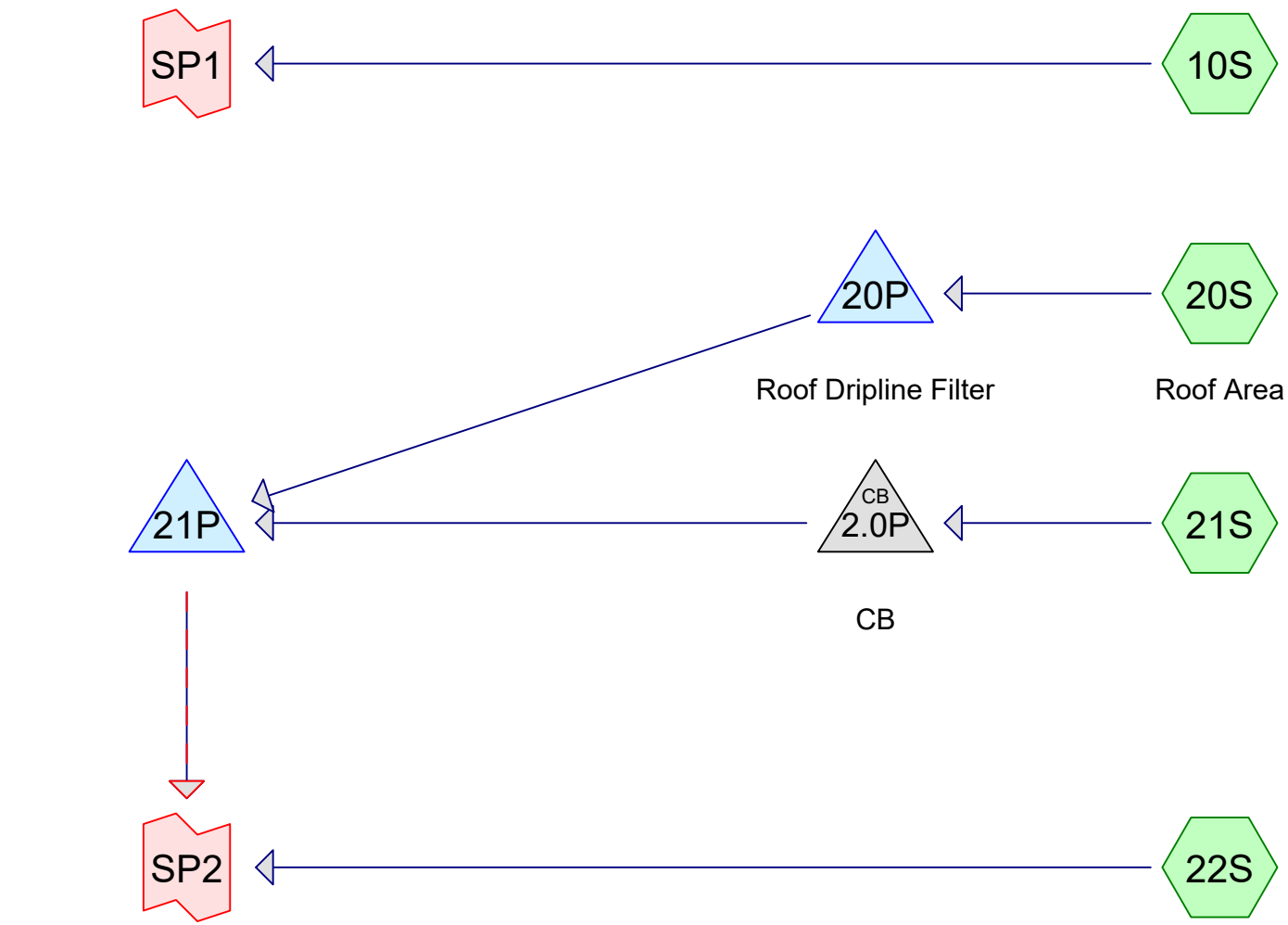
Summary for Link SP2:

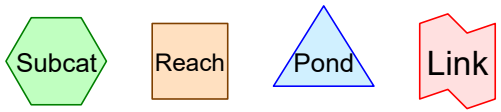
Inflow Area = 62,729 sf, 56.01% Impervious, Inflow Depth > 4.40" for 25YR event
Inflow = 5.89 cfs @ 12.13 hrs, Volume= 23,008 cf
Primary = 5.89 cfs @ 12.13 hrs, Volume= 23,008 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Attachment D

Post-Development Stormwater Modeling





Routing Diagram for 18002 POST
Prepared by Sebago Technics, Inc., Printed 11/27/2018
HydroCAD® 10.00-18 s/n 01856 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
3,102	39	>75% Grass cover, Good, HSG A (21S)
15,423	80	>75% Grass cover, Good, HSG D (10S, 21S, 22S)
958	96	Gravel surface, HSG D (20S)
8,975	98	Paved parking (22S)
5,751	98	Paved parking, HSG A (21S)
22,946	98	Paved parking, HSG D (10S, 21S)
9,200	98	Roofs, HSG A (20S)
266	32	Woods/grass comb., Good, HSG A (21S)
825	79	Woods/grass comb., Good, HSG D (21S)
67,446	**91**	**TOTAL AREA**

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment10S: Runoff Area=4,717 sf 66.31% Impervious Runoff Depth=2.26"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.26 cfs 887 cf

Subcatchment20S: Roof Area Runoff Area=10,158 sf 90.57% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.70 cfs 2,428 cf

Subcatchment21S: Runoff Area=43,527 sf 58.74% Impervious Runoff Depth=1.83"
Flow Length=256' Tc=6.0 min CN=87 Runoff=2.14 cfs 6,626 cf

Subcatchment22S: Runoff Area=9,044 sf 99.24% Impervious Runoff Depth=2.87"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=0.62 cfs 2,161 cf

Pond 2.0P: CB Peak Elev=64.48' Inflow=2.14 cfs 6,626 cf
15.0" Round Culvert n=0.013 L=194.0' S=0.0075 '/' Outflow=2.14 cfs 6,626 cf

Pond 20P: Roof Dripline Filter Peak Elev=67.52' Storage=516 cf Inflow=0.70 cfs 2,428 cf
Outflow=0.20 cfs 2,371 cf

Pond 21P: Peak Elev=63.17' Storage=337 cf Inflow=2.34 cfs 8,997 cf
Primary=2.20 cfs 8,952 cf Secondary=0.00 cfs 0 cf Outflow=2.20 cfs 8,952 cf

Link SP1: Inflow=0.26 cfs 887 cf
Primary=0.26 cfs 887 cf

Link SP2: Inflow=2.79 cfs 11,114 cf
Primary=2.79 cfs 11,114 cf

Total Runoff Area = 67,446 sf Runoff Volume = 12,102 cf Average Runoff Depth = 2.15"
30.50% Pervious = 20,574 sf 69.50% Impervious = 46,872 sf

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment10S: Runoff Area=4,717 sf 66.31% Impervious Runoff Depth=3.70"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.41 cfs 1,454 cf

Subcatchment20S: Roof Area Runoff Area=10,158 sf 90.57% Impervious Runoff Depth>4.36"
Tc=6.0 min CN=98 Runoff=1.05 cfs 3,694 cf

Subcatchment21S: Runoff Area=43,527 sf 58.74% Impervious Runoff Depth=3.19"
Flow Length=256' Tc=6.0 min CN=87 Runoff=3.69 cfs 11,579 cf

Subcatchment22S: Runoff Area=9,044 sf 99.24% Impervious Runoff Depth>4.36"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=0.93 cfs 3,289 cf

Pond 2.0P: CB Peak Elev=64.90' Inflow=3.69 cfs 11,579 cf
15.0" Round Culvert n=0.013 L=194.0' S=0.0075 '/' Outflow=3.69 cfs 11,579 cf

Pond 20P: Roof Dripline Filter Peak Elev=68.64' Storage=976 cf Inflow=1.05 cfs 3,694 cf
Outflow=0.20 cfs 3,638 cf

Pond 21P: Peak Elev=63.43' Storage=543 cf Inflow=3.88 cfs 15,216 cf
Primary=3.56 cfs 15,171 cf Secondary=0.00 cfs 0 cf Outflow=3.56 cfs 15,171 cf

Link SP1: Inflow=0.41 cfs 1,454 cf
Primary=0.41 cfs 1,454 cf

Link SP2: Inflow=4.42 cfs 18,460 cf
Primary=4.42 cfs 18,460 cf

Total Runoff Area = 67,446 sf Runoff Volume = 20,016 cf Average Runoff Depth = 3.56"
30.50% Pervious = 20,574 sf 69.50% Impervious = 46,872 sf

Time span=1.00-48.00 hrs, dt=0.01 hrs, 4701 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

Subcatchment10S: Runoff Area=4,717 sf 66.31% Impervious Runoff Depth=4.87"
Flow Length=320' Tc=8.5 min CN=92 Runoff=0.53 cfs 1,915 cf

Subcatchment20S: Roof Area Runoff Area=10,158 sf 90.57% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=98 Runoff=1.33 cfs 4,708 cf

Subcatchment21S: Runoff Area=43,527 sf 58.74% Impervious Runoff Depth=4.33"
Flow Length=256' Tc=6.0 min CN=87 Runoff=4.93 cfs 15,692 cf

Subcatchment22S: Runoff Area=9,044 sf 99.24% Impervious Runoff Depth>5.56"
Flow Length=226' Slope=0.0170 '/' Tc=6.0 min CN=98 Runoff=1.18 cfs 4,191 cf

Pond 2.0P: CB Peak Elev=65.39' Inflow=4.93 cfs 15,692 cf
15.0" Round Culvert n=0.013 L=194.0' S=0.0075 '/' Outflow=4.93 cfs 15,692 cf

Pond 20P: Roof Dripline Filter Peak Elev=69.08' Storage=1,361 cf Inflow=1.33 cfs 4,708 cf
Outflow=0.21 cfs 4,651 cf

Pond 21P: Peak Elev=63.63' Storage=756 cf Inflow=5.13 cfs 20,343 cf
Primary=4.52 cfs 20,298 cf Secondary=0.00 cfs 0 cf Outflow=4.52 cfs 20,298 cf

Link SP1: Inflow=0.53 cfs 1,915 cf
Primary=0.53 cfs 1,915 cf

Link SP2: Inflow=5.59 cfs 24,490 cf
Primary=5.59 cfs 24,490 cf

Total Runoff Area = 67,446 sf Runoff Volume = 26,506 cf Average Runoff Depth = 4.72"
30.50% Pervious = 20,574 sf 69.50% Impervious = 46,872 sf

Summary for Subcatchment 10S:

Runoff = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
3,128	98	Paved parking, HSG D
1,589	80	>75% Grass cover, Good, HSG D
4,717	92	Weighted Average
1,589		33.69% Pervious Area
3,128		66.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0030	0.63		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.4	45	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.5	175	0.0057	0.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	320	Total			

Summary for Subcatchment 20S: Roof Area

Runoff = 1.33 cfs @ 12.08 hrs, Volume= 4,708 cf, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
9,200	98	Roofs, HSG A
958	96	Gravel surface, HSG D
10,158	98	Weighted Average
958		9.43% Pervious Area
9,200		90.57% Impervious Area

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

Summary for Subcatchment 21S:

Runoff = 4.93 cfs @ 12.09 hrs, Volume= 15,692 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

Area (sf)	CN	Description
5,751	98	Paved parking, HSG A
19,818	98	Paved parking, HSG D
266	32	Woods/grass comb., Good, HSG A
825	79	Woods/grass comb., Good, HSG D
3,102	39	>75% Grass cover, Good, HSG A
13,765	80	>75% Grass cover, Good, HSG D
43,527	87	Weighted Average
17,958		41.26% Pervious Area
25,569		58.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	23	0.0150	0.90		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
1.8	69	0.0080	0.63		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
1.4	164	0.0090	1.93		**Shallow Concentrated Flow, C-D**
					Paved Kv= 20.3 fps
2.4					**Direct Entry, TR 55 REQ**
6.0	256	Total			

Summary for Subcatchment 22S:

Runoff = 1.18 cfs @ 12.08 hrs, Volume= 4,191 cf, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=5.80"

	Area (sf)	CN	Description
*	8,975	98	Paved parking
	69	80	>75% Grass cover, Good, HSG D
	9,044	98	Weighted Average
	69		0.76% Pervious Area
	8,975		99.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0170	1.27		**Sheet Flow,**
					Smooth surfaces n= 0.011 P2= 3.10"
0.8	126	0.0170	2.65		**Shallow Concentrated Flow,**
					Paved Kv= 20.3 fps
3.9					**Direct Entry,**
6.0	226	Total			

Summary for Pond 2.0P: CB

Inflow Area = 43,527 sf, 58.74% Impervious, Inflow Depth = 4.33" for 25YR event
Inflow = 4.93 cfs @ 12.09 hrs, Volume= 15,692 cf
Outflow = 4.93 cfs @ 12.09 hrs, Volume= 15,692 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.93 cfs @ 12.09 hrs, Volume= 15,692 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 65.39' @ 12.09 hrs
Flood Elev= 68.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.65'	**15.0" Round STORMDRAIN** L= 194.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.65' / 62.20' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.93 cfs @ 12.09 hrs HW=65.39' TW=63.56' (Dynamic Tailwater)
└─**1=STORMDRAIN** (Inlet Controls 4.93 cfs @ 4.01 fps)

Summary for Pond 20P: Roof Dripline Filter

Inflow Area = 10,158 sf, 90.57% Impervious, Inflow Depth > 5.56" for 25YR event
Inflow = 1.33 cfs @ 12.08 hrs, Volume= 4,708 cf
Outflow = 0.21 cfs @ 12.55 hrs, Volume= 4,651 cf, Atten= 84%, Lag= 28.3 min
Primary = 0.21 cfs @ 12.55 hrs, Volume= 4,651 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 69.08' @ 12.55 hrs Surf.Area= 908 sf Storage= 1,361 cf
Flood Elev= 69.00' Surf.Area= 900 sf Storage= 1,293 cf

Plug-Flow detention time= 56.3 min calculated for 4,650 cf (99% of inflow)
Center-of-Mass det. time= 48.4 min (794.1 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	2,243 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	850	0.0	0	0
65.01	850	20.0	2	2
67.00	850	20.0	338	340
67.01	850	40.0	3	343
68.49	850	40.0	503	847
68.50	850	100.0	9	855
70.00	1,000	100.0	1,388	2,243

Device	Routing	Invert	Outlet Devices
#1	Primary	62.30'	**12.0" Round Outlet** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.30' / 62.20' S= 0.0100 '/' Cc= 0.900

			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	65.33'	**6.0" Round Underdrain**
			L= 85.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 65.33' / 65.00' S= 0.0039 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	65.00'	**10.000 in/hr Infiltration over Surface area**

Primary OutFlow Max=0.21 cfs @ 12.55 hrs HW=69.08' TW=62.95' (Dynamic Tailwater)
└─**1=Outlet** (Passes 0.21 cfs of 7.39 cfs potential flow)
└─**2=Underdrain** (Passes 0.21 cfs of 1.01 cfs potential flow)
└─**3=Infiltration** (Exfiltration Controls 0.21 cfs)

Summary for Pond 21P:

Inflow Area =	53,685 sf, 64.76% Impervious, Inflow Depth = 4.55" for 25YR event				
Inflow =	5.13 cfs @	12.09 hrs, Volume=	20,343 cf		
Outflow =	4.52 cfs @	12.13 hrs, Volume=	20,298 cf, Atten= 12%, Lag= 2.6 min		
Primary =	4.52 cfs @	12.13 hrs, Volume=	20,298 cf		
Secondary =	0.00 cfs @	1.00 hrs, Volume=	0 cf		

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 63.63' @ 12.13 hrs Surf.Area= 1,145 sf Storage= 756 cf
Flood Elev= 67.00' Surf.Area= 3,500 sf Storage= 8,670 cf

Plug-Flow detention time= 6.3 min calculated for 20,298 cf (100% of inflow)
Center-of-Mass det. time= 4.7 min (800.2 - 795.5)

Volume	Invert	Avail.Storage	Storage Description
#1	62.00'	8,670 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.00	0	0	0
63.00	484	242	242
64.00	1,531	1,008	1,250
65.00	2,115	1,823	3,073
66.00	2,790	2,453	5,525
67.00	3,500	3,145	8,670

Device	Routing	Invert	Outlet Devices
#1	Primary	62.43'	**15.0" Round Culvert**
			L= 21.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 62.43' / 60.44' S= 0.0948 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Secondary	66.00'	**10.0' 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=4.52 cfs @ 12.13 hrs HW=63.63' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.52 cfs @ 3.73 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=62.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Summary for Link SP1:

Inflow Area = 4,717 sf, 66.31% Impervious, Inflow Depth = 4.87" for 25YR event
Inflow = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf
Primary = 0.53 cfs @ 12.12 hrs, Volume= 1,915 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Summary for Link SP2:

Inflow Area = 62,729 sf, 69.73% Impervious, Inflow Depth > 4.68" for 25YR event
Inflow = 5.59 cfs @ 12.11 hrs, Volume= 24,490 cf
Primary = 5.59 cfs @ 12.11 hrs, Volume= 24,490 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.01 hrs

Attachment E

Inspection, Maintenance, and Housekeeping Plan

INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN
PROPOSED WAREHOUSE BUILDING
PORTLAND, MAINE

Introduction

The following plan outlines the anticipated inspection and maintenance procedures for the erosion and sedimentation control measures as well as stormwater management facilities for the project. This plan also outlines several housekeeping requirements that shall be followed during and after construction. These procedures shall be followed in order to ensure the intended function of the designed measures and to prevent unreasonably adverse impacts to the surrounding environment.

The procedures outlined in this Inspection, Maintenance and Housekeeping Plan are provided as an overview of the anticipated practices to be used on this site. In some instances, additional measures may be required due to unexpected conditions. For additional detail on any of the erosion and sedimentation control measures or stormwater management devices to be utilized on this project, refer to the most recently revised edition of the "Maine Erosion and Sedimentation Control BMP" manual and/or the "Stormwater Management for Maine: Best Management Practices" manual as published by the Maine Department of Environmental Protection (MDEP).

During Construction

1. **Inspection:** During the construction process, it is the Contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. These responsibilities include inspecting disturbed and impervious areas, erosion control measures, materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as before and after a storm event, and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in any applicable permits, shall conduct the inspections.

2. **Maintenance:** All measures shall be maintained in an effective operating condition until areas are permanently stabilized. If Best Management Practices (BMPs) need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within 7 calendar days and prior to any storm event (rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, material storage areas, and vehicle access points to the site. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to the appropriate regulatory agency upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

4. **Specific Inspection and Maintenance Tasks:** The following is a list of erosion control and

stormwater management measures and the specific inspection and maintenance tasks to be performed during construction.

A. Sediment Barriers:

- Hay bale barriers, silt fences, and filter berms shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
- If the fabric on a silt fence or filter barrier should decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, it shall be replaced.
- Sediment deposits should be removed after each storm event. They must be removed before deposits reach approximately one-half the height of the barrier.
- Filter berms shall be reshaped as needed.
- Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared, and seeded.

B. Stone Check Dams:

- Inspect the center of the dam to make sure it is lower than the edges. Erosion caused by high flows around the edges of the dam must be corrected.
- Sediment accumulation shall be removed prior to reaching half of the original design height.
- Areas beneath stone check dams must be seeded and mulched upon removal.

C. Riprap Materials:

- Once a riprap installation has been completed, it should require very little maintenance. It shall, however, be inspected periodically to determine if high flows have caused scour beneath the riprap or dislodged any of the stone.

D. Erosion Control Blankets:

- Inspect these reinforced areas semi-annually and after significant rainfall events for slumping, sliding, seepage, and scour. Pay close attention to unreinforced areas adjacent to the erosion control blankets, which may experience accelerated erosion.
- Review all applicable inspection and maintenance procedures recommended by the specific blanket manufacturer. These tasks shall be included in addition to the requirements of this plan.

E. Stabilized Construction Entrances/Exits:

- The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way.
- When the control pad becomes ineffective, the stone shall be removed along with the collected soil material. The entrance should then be reconstructed.
- Areas that have received mud-tracking or sediment deposits shall be swept or

washed. Washing shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device (not into storm drains, ditches, or waterways).

F. Temporary Seed and Mulch:

- Mulched areas should be inspected after rain events to check for rill erosion.
- If less than 90% of the soil surface is covered by mulch, additional mulch shall be applied in bare areas.
- In applications where seeding and mulch have been applied in conjunction with erosion control blankets, the blankets must be inspected after rain events for dislocation or undercutting.
- Mulch shall continue to be reapplied until 95% of the soil surface has established temporary vegetative cover.

G. Stabilized Temporary Drainage Swales:

- Sediment accumulation in the swale shall be removed once the cross section of the swale is reduced by 25%.
- The swales shall be inspected after rainfall events. Any evidence of sloughing of the side slopes or channel erosion shall be repaired and corrective action should be taken to prevent reoccurrence of the problem.
- In addition to the stabilized lining of the channel (i.e. erosion control blankets), stone check dams may be needed to further reduce channel velocity.

5. **Housekeeping:** The following general performance standards apply to the proposed project.

A. Spill prevention: Controls must be used to prevent pollutants from being discharged from materials on-site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.

B. Groundwater protection: During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors, accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

C. Fugitive sediment and dust: Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

D. Debris and other materials: Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

E. Trench or foundation dewatering: Trench dewatering is the removal of water from trenches, foundations, cofferdams, ponds, and other areas within the construction area that retain water after excavation. In most cases, the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved.

Post-Construction

1. **Inspection:** After construction, it is the responsibility of the owner or assigned heirs to comply with the inspection and maintenance procedures outlined in this section. All measures must be maintained in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions in all applicable permits, shall conduct the inspections.

2. **Specific Inspection and Maintenance Tasks:** The following is a list of permanent erosion control and stormwater management measures and the inspection and maintenance tasks to be performed after construction.

A. Vegetated Areas:

- Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems.
- Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

B. Winter Sanding:

- Clear accumulations of winter sand along access road at least once a year, preferably in the spring.
- Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader or other acceptable method.

C. Culverts:

- Inspect culverts in the spring, in the late fall, and after heavy rains to remove any obstructions to flow.
- Remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit.
- Inspect and repair any erosion damage at the culvert's inlet and outlet.

D. Roof Dripline

- These structures may not be paved over or altered in anyway. No gutter may be installed on the roof line.
- During the first year, the dripline shall be inspected semi-annually and following major storm events.
- Debris and sediment buildup shall be removed as needed. Any bare area or erosion rills shall be repaired with new stone.
- The dripline should be inspected after every major storm in the first year to be sure it is functioning properly. Thereafter, the dripline should be inspected at least once every six months to ensure that it is draining within 48 hours following a one inch storm or greater.
- Sediment and plant debris should be removed at least annually.

3. **City of Portland Certification:** Any person owning, leasing or having control over a BMP required by a Post-Construction Stormwater Management Plan shall maintain the BMPs in accordance with the approved plan and shall demonstrate compliance with that Plan as follows:

A. Inspections: The owner or operator of a BMP shall hire a qualified post-construction stormwater inspector to least annually, inspect the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and State inspections, cleaning and maintenance requirements of the approved Post-Construction Stormwater Management Plan.

B. Maintenance & Repair: If the BMP requires maintenance, repair, or replacement to function as intended by the approved stormwater management plan, the owner or operator of the BMP shall take corrective actions(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the department of public works ("DPW") in the annual report.

C. Annual Report: The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification to DPW in a form provided by DPW, certifying that the person has inspected the BMP(s) and that they are adequately maintained and functioning as intended by the approved stormwater management plan, or that they require maintenance or repair, including the record of the deficiency and corrective action(s) taken.

D. Filing Fee: Any persons required to file an annual certification under this section shall include with the annual certification a filing fee established by the DPW to pay the administrative and technical costs of review of the annual certification.

E. Right of Entry: In order to determine compliance with this article and with the post-construction stormwater management plan, DPW may enter upon property at reasonable hours with the consent of the owner, occupant or agent to inspect the BMPs.

4. **Duration of Maintenance:** Perform maintenance as described and required for any associated permits unless and until the system is formally accepted by a municipality or quasi-municipal district, or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system. If a municipality or quasi-municipal district chooses to accept a stormwater management system, or a component of a stormwater system, it must provide a letter to the MDEP stating that it assumes responsibility for the system. The letter must specify the components of the system for which the municipality or district will assume responsibility, and that the municipality or district agrees to maintain those components of the system in compliance with MDEP standards. Upon such assumption of responsibility, and approval by the MDEP, the municipality, quasi-municipal district, or association becomes a co-permittee for this purpose only and must comply with all terms and conditions of the permit.

Attachments

Attachment 1 – Sample Stormwater Inspection and Maintenance Log Form

Attachment 2 - City of Portland Post-Construction Stormwater BMP Inspection

ATTACHMENT 1

STORMWATER INSPECTION AND MAINTENANCE LOG
PROPOSED WAREHOUSE BUILDING
PORTLAND, MAINE

This log is intended to accompany the Inspection, Maintenance and Housekeeping Plan for 2 Evergreen Drive. The following items shall be checked, cleaned and maintained on a regular basis as specified in the Maintenance Plan and as described in the table below. This log shall be kept on file for a minimum of five (5) years and shall be available for review by the municipality. Qualified personnel familiar with drainage systems and soils shall perform all inspections. Attached is a copy of the construction and post-construction maintenance logs.

		INSPECTOR NAME	DATE PERFORMED	SUGGESTED INTERVAL
Vegetated Areas				
	Inspect all slopes and embankments			Annually
	Replant bare areas or areas with sparse growth			Annually
Ditches & Swales				
	Remove any obstructions and accumulated sediments and debris			Monthly
	Repair any erosion of ditch lining			Annually
	Mow vegetated ditches			Annually
	Remove woody vegetation growing through riprap			Annually
	Repair any slumping side slopes			Annually
	Replace riprap where stones have dislodged			Annually
Culverts				
	Remove accumulated sediments and debris at the inlet, outlet, within conduit			Annually
	Repair any erosion at inlet and outlet			Annually
	Sump Depth			Annually
Roof Dripline				
	Remove sediment & debris			Monthy
	Inspection after major storm to verify proper function			Bi-Annually

ATTACHMENT 2

SAMPLE STORMWATER INSPECTION AND MAINTENANCE FORM
PROPOSED WAREHOUSE BUILDING, PORTLAND, ME

FORM 4

Non-Residential Stormwater Credits: Annual Inspection of BMPs and structural stormwater controls

Site Information

Address: _____

Street Address Zip Code

Parcel ID (Chart, Block, Lot # + 3-digit ID): _____

Contact Information

Owner (must be owner, lessee or buyer)

Name: _____

Last First M.I.

Business Name (if Applicable): _____

Mailing Address: _____

Street Address Apartment/Unit #

_____

City State Zip Code

Phone #: (___)____-_____ E-mail Address: _____

Agent/Representative

Name: _____

Last First M.I.

Mailing Address: _____

Street Address Apartment/Unit #

_____

City State Zip Code

Phone #: (___)____-_____ E-mail Address: _____

Inspector

Name: _____

Last First M.I.

Business Name (if Applicable): _____

Mailing Address: _____

Street Address Apartment/Unit #

_____

City State Zip Code

Phone #: (___)____-_____ E-mail Address: _____

Certifying Statements (to be completed by credit holder or representative)

By checking the boxes below, the owner (or the applicant on behalf of the owner) certifies that the following statements regarding the maintenance of the property's stormwater management system, as well as the adherence to the approved maintenance and inspection plan, are true.

☐ Stormwater facilities and the features of the site that contribute to their efficacy (such as drainage swales, culverts, site grade, etc.) have not been altered since approval of the most recent credit application.

☐ Stormwater facilities have been maintained in accordance with the approved maintenance and inspection plan (if applicable)

Applicant Signature

I hereby certify that I am the owner of record of the named property, or that the owner of record has authorized me to submit this application on his or her behalf. I agree to conform to all applicable laws of the City of Portland. In addition, I understand that the City of Portland Department of Public Services has the authority to enter and inspect all areas that pertain to this application at any reasonable hour to verify that the information contained in this form is accurate.

Signature: _____ Date: _____

Inspection Results (to be completed by the Inspector)

☐ **FAIL** (Select if any one item on the attached Inspection Report is coded "No")

Note: if a failing inspection is submitted by June 30, the owner will have until the following July 31 to submit a passing inspection report in order to continue credits. If a subsequent failing inspection report or no inspection report is submitted by July 31, credits will be discontinued.

☐ **PASS**

Professional Certification and Signature (to be completed by Inspector)

As a duly qualified third party inspector, I attest that a thorough inspection has been completed for all applicable BMPs and structural stormwater controls associated with this site. I further certify that all of the information contained in this inspection report has been completed truthfully.

Signature: _____Date: _____

Professional Identification (License #, if applicable): _____

INSPECTION REPORT

General Information

Inspection Date: _____ Days since last precipitation: _____

Inspection duration: _____ Quantity of last precipitation (in): _____

Weather: _____ Storm event: _____

Nearby natural resources	☐ Yes	☐ No	☐ NA
Copy of ESC plan	☐ Yes	☐ No	☐ NA

MEDEP Permit # (*if applicable*)

Notes:

BMP's/Structural Controls

Type	# On Site	Type	# On Site
Vegetated Area	_____	Detention & Retention Facility	_____
Stormwater Channel	_____	Runoff Infiltration Facility	_____
Culvert	_____	Other: _____	_____
Catch Basin System	_____	Other: _____	_____
Roadway/Surface Parking	_____	Other: _____	_____
Buffer	_____	Other: _____	_____

Notes:

Vegetated Areas

Condition of slopes and embankment is good	☐ Yes	☐ No	☐ NA
No bare areas (< 90% covered) with sparse growth	☐ Yes	☐ No	☐ NA
Armored areas have no rill erosion or the flow diverted to onsite areas can withstand concentrated flows	☐ Yes	☐ No	☐ NA

Notes:

Stormwater Channels			
Condition of ditches, swales, & other stormwater channels good	☐ Yes	☐ No	☐ NA
No obstructions, accumulated sediments or debris	☐ Yes	☐ No	☐ NA
Vegetated growth and woody vegetation controlled	☐ Yes	☐ No	☐ NA
Erosion of any ditch lining repaired	☐ Yes	☐ No	☐ NA
Vegetated ditches have been mowed	☐ Yes	☐ No	☐ NA
Woody vegetation growing through riprap has been removed	☐ Yes	☐ No	☐ NA
Riprap has been replaced where underlying filter fabric or underdrain gravel is showing or where stones have dislodged	☐ Yes	☐ No	☐ NA
Notes:			

Culverts			
Accumulated sediments and debris at the inlet, outlet, and within the conduit have been removed	☐ Yes	☐ No	☐ NA
Erosion damage at the inlet and outlet have been repaired	☐ Yes	☐ No	☐ NA
Notes:			

Catch Basin Systems			
Accumulated sediments from inflow channels and pipes between basins have been removed and legally disposed of	☐ Yes	☐ No	☐ NA
Debris and/or oils have been removed from any baffle or grease trap	☐ Yes	☐ No	☐ NA
Notes:			

Roadway and Parking Surfaces			
Accumulated sand in parking lots and along roadways has been cleared	☐ Yes	☐ No	☐ NA
Pavement is swept to help remove sediment	☐ Yes	☐ No	☐ NA
Road shoulders and excess sand have been graded	☐ Yes	☐ No	☐ NA
Gravel roads and road shoulders have been graded	☐ Yes	☐ No	☐ NA
Stormwater is not impeded by accumulations of material or false ditches	☐ Yes	☐ No	☐ NA
Notes:			

Buffers	
Treatment buffers have been inspected for evidence of erosion, concentrated flow, or encroachment by development	☐ Yes ☐ No ☐ NA
Buffer vegetation has been managed per requirements of all deed restrictions and/or maintenance agreements	☐ Yes ☐ No ☐ NA
Vegetation in all non-wooded buffers has been mowed no shorter than 6 inches and less than three times per year	☐ Yes ☐ No ☐ NA
The sown-slope of all spreaders and turn-outs for erosion have been inspected and repaired	☐ Yes ☐ No ☐ NA
Sediment has been cleaned from all spreader bays or turnout pools	☐ Yes ☐ No ☐ NA
Notes:	

Stormwater Detention and Retention Facilities	
Embankments have been inspected for settlement, slope erosion, internal piping, and downstream swamping	☐ Yes ☐ No ☐ NA
Embankments have been mowed to control woody vegetation	☐ Yes ☐ No ☐ NA
The outlet control structure has been inspected for broken seals, obstructed orifices, and plugged trash racks	☐ Yes ☐ No ☐ NA
Sediment and debris within the control structure have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Any damage to the trash racks or debris guards has been repaired	☐ Yes ☐ No ☐ NA
Vegetated spillways have been mowed to control woody vegetation and replace any dislodged stone in riprap spillways	☐ Yes ☐ No ☐ NA
Accumulated sediments within the impoundment and forebay have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Notes:	

Proprietary Treatment Devices	
A third party has been contracted with for the removal of accumulated sediments, oils, and debris within the device and replacement of any absorptive filters, or work is scheduled to be performed in-house	☐ Yes ☐ No ☐ NA
Maintenance has been performed in accordance with manufacturer's specifications and guidelines	☐ Yes ☐ No ☐ NA
Notes:	

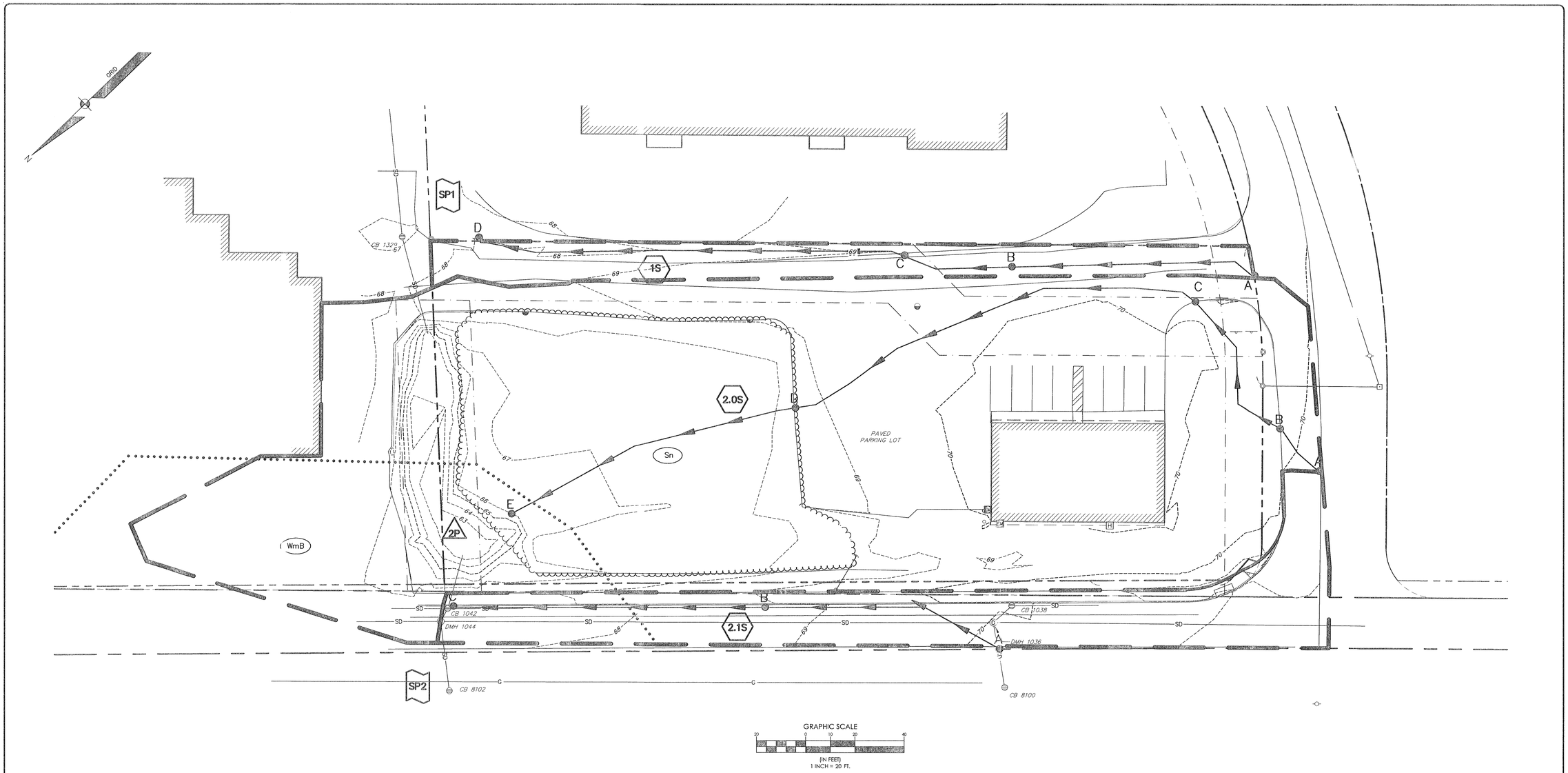
Runoff Infiltration Facilities	
Any pretreatment measures that collected sediment and hydrocarbons entering an infiltration system have been inspected and cleaned out	☐ Yes ☐ No ☐ NA
Accumulated sediments within the infiltration area have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
The infiltration system has been renewed if it fails to drain within 72 hours after a rainfall of one-half inch or more	☐ Yes ☐ No ☐ NA
The soil of vegetated infiltration basins has been tilled and replanted	☐ Yes ☐ No ☐ NA
Rock-lined basins or stone-filled trenches have been reconstructed by removing stones, replacing underlying filter fabric, and tiling or removing the underlying wall	☐ Yes ☐ No ☐ NA
Notes:	

Photos
Comprehensive photos with captions, as applicable, must be submitted in conjunction with this form.

Other Inspection Notes	
Corrective action needed not specified above	☐ Yes ☐ No ☐ NA
Follow up required	☐ Yes ☐ No ☐ NA
Verbal notification provided to responsible party	☐ Yes ☐ No ☐ NA
Verbal notification contact: _____	
Notes:	

Attachment F

Pre-Development and Post-Development Stormwater Watershed Plans



LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (B, C)
- REACH
- WATERSHED LABEL (1)
- REACH (1)
- DETENTION POND (1)
- STUDY POINT (1)
- SOILS BOUNDARY
- SOIL MAP UNIT
- FLOW ARROW

SOIL TYPES

SYMBOL	SOIL SERIES	SLOPE	HSG	DRAINAGE CLASS
WmB	WINDSOR LOAMY SAND	0–8%	A	VERY WELL DRAINED
Sn	SCANTIC SILT LOAM	0–3%	C	VERY POORLY DRAINED

NOTES:
1. OFFSITE SOIL INFORMATION FOR THE PROJECT WAS OBTAINED VIA THE USDA UNITED STATES DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY. THE HYDROLOGIC SOIL GROUP (HSG) OF THE SITE SOILS ARE CLASSIFIED BY TECHNICAL RELEASE TR-55 OF THE SOIL CONSERVATION SERVICE.
2. Tc PATHS NOT SHOWN ARE ASSUMED TO HAVE A MINIMUM VALUE OF 6 MINUTES BASED ON TR-55 STANDARDS.

NOT FOR CONSTRUCTION

AMBER R. FERLAND, PE 15451

STATE OF MAINE — AMBER R. FERLAND — No. 15451 — LICENSED PROFESSIONAL ENGINEER — 11/30/18

DESIGNED	CHECKED
ARF	PDO

REV:	BY:	DATE:	STATUS:
A	ARF	11/30/18	SITE PLAN TO CITY

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

PRE-DEVELOPMENT STORMWATER PLAN

OF:
PROPOSED WAREHOUSE BUILDING
2 EVERGREEN DRIVE
PORTLAND, MAINE

FOR:
ROB DERREY
2 EVERGREEN DRIVE
PORTLAND, ME 04101

PROJECT NO.	SCALE
18002	1" = 20'

SHEET 1 OF 2

18002SWP-PRE.dwg, TAB:SWP-PRE

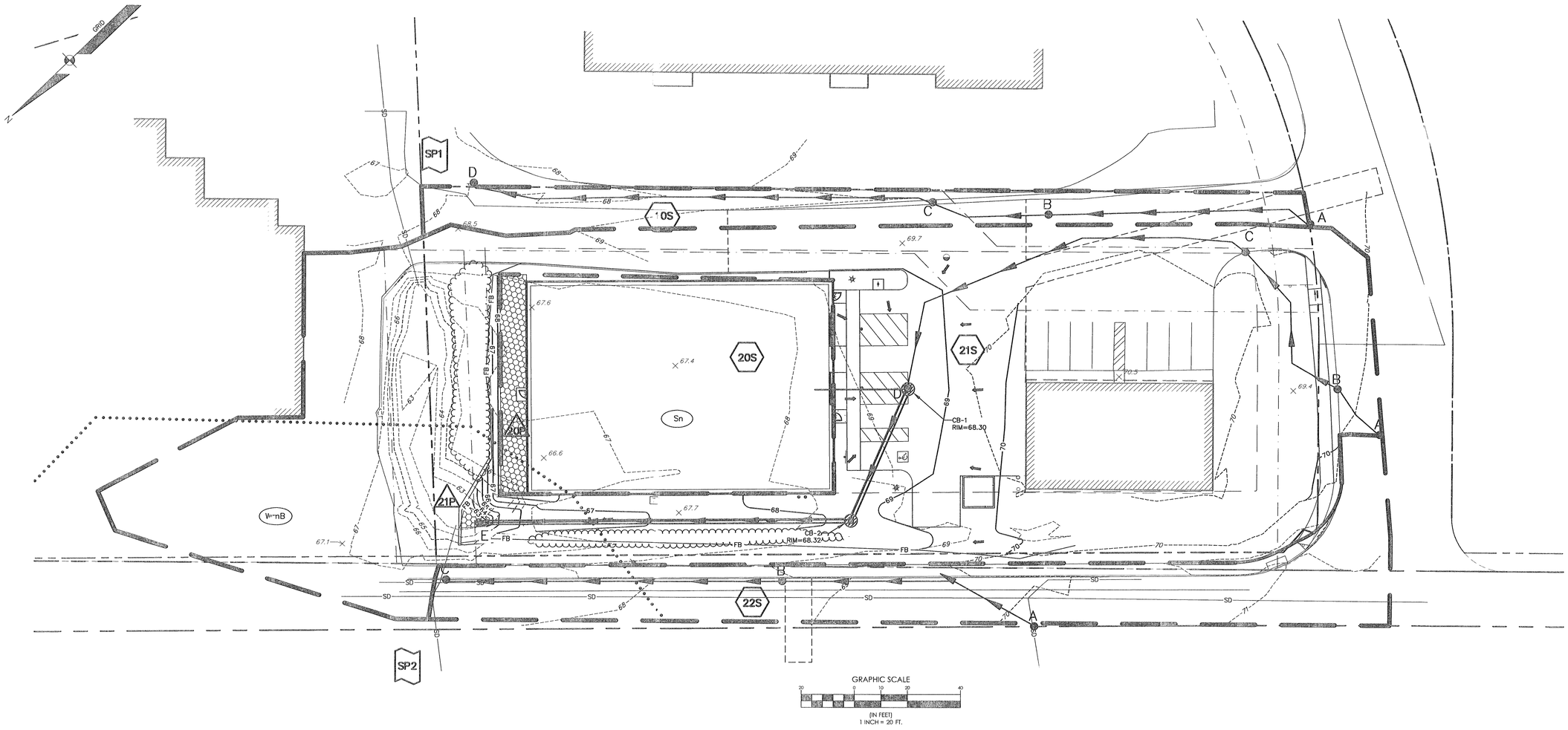


Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job #18002

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	EXISTING ONSITE LANDSCAPED AREA TO REMAIN (S.F.)	NEW ONSITE LANDSCAPED AREA (S.F.)	NET NEW DEVELOPED AREA (S.F.)	NET EXISTING DEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	IMPERVIOUS AREA TREATED (S.F.)	LANDSCAPED AREA TREATED* (S.F.)	DEVELOPED AREA TREATED (S.F.)	TREATMENT BMP
10S	4,717	3,128	0	1,589	0	0	4,717	NO	0	0	0	
20S	10,158	0	9,200	0	958	10,158	0	YES	9,200	958	10,158	DripEdge
21S	43,527	25,569	0	15,421	2,537	2,537	40,990	NO	0	0	0	
22S	9,044	8,975	0	69	0	0	9,044	NO	0	0	0	
TOTAL (S.F.)	67,446	37,672	9,200	17,079	3,495	12,695	54,751		9,200	958	10,158	

TOTAL NEW IMPERVIOUS AREA (S.F.)	9,200	TOTAL DEVELOPED AREA (S.F.	12,695
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	9,200	TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)	10,158
% OF IMPERVIOUS AREA RECEIVING TREATMENT	100.00%	% OF DEV. AREA RECEIVING TREATMENT	80.02%

STORMWATER PEAK DISCHARGE SUMMARY TABLE

STUDY POINT	2-YEAR STORM		10-YEAR STORM		25-YEAR STORM	
	PRE (CFS)	POST (CFS)	PRE (CFS)	POST (CFS)	PRE (CFS)	POST (CFS)
SP-1	0.26	0.26	0.41	0.41	0.53	0.53
SP-2	2.81	2.79	4.67	4.42	5.89	5.59

SOIL TYPES

SYMBOL	SOIL SERIES	SLOPE	HSG	DRAINAGE CLASS
Wm8	WINDSOR LOAMY SAND	0–8%	A	VERY WELL DRAINED
Sn	SCANTIC SILT LOAM	0–3%	C	VERY POORLY DRAINED

NOTES:
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2. Tc PATHS NOT SHOWN ARE ASSUMED TO HAVE A MINIMUM VALUE OF 6 MINUTES BASED ON TR-55 STANDARDS.

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- FLOW ARROW

NOT FOR CONSTRUCTION

AMBER R. FERLAND, PE 15451

STATE OF MAINE — AMBER R. FERLAND — No. 15451 — LICENSED PROFESSIONAL ENGINEER — 11/30/18

DESIGNED	CHECKED
ARF	PDO

REV:	BY:	DATE:	STATUS:
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POST-DEVELOPMENT STORMWATER PLAN
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PROJECT NO.	SCALE
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SHEET 2 OF 2

18002SWP-POST.dwg, TAB: 24x36