STORMWATER MANAGEMENT REPORT

A Plus Auto Service & Showroom

1027 Roosevelt Trail
Windham, Maine

Submitted by:

Double A Properties, LLC
968 Roosevelt Trail
Windham, Maine 04062

Prepared by:
Andy Morrell

BH2M
Berry, Huff, McDonald, Milligan Inc.
Engineers, Surveyors

Date:
June 2025

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LIST OF APPENDICES

1.0 INTRODUCTION

The applicant, Double A Properties LLC, is proposing to construct a 32,500 square foot Automotive Service/Sales/Showroom building located at 1027 Roosevelt Trail in Windham, ME. The parcel (Tax Map 21, Lot 12) is approximately 12.2 acres in size. The project is required to obtain an Individual Stormwater Management Permit from the Maine DEP.

The scope of work includes but is not limited to:

- Tree clearing and grubbing
- Stump and boulder removal
- Construction of a bituminous parking lot
- Construction of the 32,500-sf commercial building
- Installation of storm drain system including catch basins, stormdrains, and grassed underdrained soil filters.
- Installation of utilities
- Final site stabilization

The proposed infrastructure improvements will create approximately 126,792 sf (2.91 acres) of new impervious area and 62,789 sf (1.44 acres) of newly vegetated area totaling 189,581 sf (4.35 acres) of newly developed area.

The Stormwater Management Plan has been prepared to satisfy the requirements of the Maine Department of Environmental Protections "Stormwater Management Rules" Chapters 500, 501 and 502, the most recent version of the "Maine Stormwater Best Management Practices Manual", and the Town of Windham's Stormwater Ordinance.

1.1 OVERVIEW OF MODELING METHODOGY AND SOURCE INFORMATION

Hydrologic Analysis: The pre and post development conditions have been modeled using modeling software (Hydrocad Version 10) which is based upon the methodology contained within the USDA Soil Conservation Service Technical Release 55. Type III 24-hour storm distributions for SE Cumberland County were used for the analysis. The following return periods and 24-hour rainfall depths were used for the analysis:

Return Period	24-Hour Rainfall Depth
2-Year Storm	3.10 inches
10-Year Storm	4.60 inches
25-Year Storm	5.80 inches

Soils: The soils used for the stormwater analysis were digitized from the Natural Resource Conservation Service (NRCS), web soil survey website. The source of the data is the Cumberland County Soil Survey (Class D). Refer to the following for additional documentation regarding the soils used for modelling:

- Appendix B of this Report
- Pre and Post Development Watershed Plans (Sheets A and B)

The onsite soils include:

Soil Map Unit	Unit Description	Hydrologic Soil Group
HhB	Hermon sandy loam, 0-8% slopes, very stony	A
HhC	Hermon sandy loam, 8-15% slopes, very stony	A
Sp	Sebago mucky peat	A/D

Topography: On ground survey by BH2M

Natural Resources: Mark Hampton Associates, LLC.

1.2 DESCRIPTION OF POINTS OF ANALYSIS

The watershed model analyzes the discharge of runoff at two Analysis Points as described below:

Analysis Point #1
Description: Culmination of flow to Hyde Brook at the northern property line.
Pre Development Tributary Drainage Area: 517,583 sf
Post Development Tributary Drainage Area: 545,011 sf

Analysis Point #2
Description: Culmination of flow to ditch along Roosevelt Trail, located at the southwestern property corner.
Pre Development Tributary Drainage Area: 64,241 sf
Post Development Tributary Drainage Area: 36,813 sf

1.3 PRE DEVELOPMENT CONDITIONS

The Existing Conditions are shown on Sheet A of the accompanying plans. The parcel to be developed encompasses an area of approximately 12.2 acres and is located on Roosevelt Trail in Windham. The parcel is currently undeveloped and flows to Hyde Brook which is a tributary to Sebago Lake.

The watershed that was analyzed for this project is approximately 13.36 acres. The analysis points are described in Section 1.2 of this report. The watershed generally flows from south to north and is bounded by Roosevelt Trail to the south, commercial lots to the east and west, and Hyde Brook to the north.

The Pre-Development Watershed Map is included as Sheet A of the accompanying plans and the Calculations are attached as Appendix C.

The Pre-Development Watershed Model predicts the following peak flow rates:

Pre-Development Peak Flows (cu. ft./sec)			
Analysis Point	**2-Year**	**10-Year**	**25-Year**
AP-1	0.00	0.20	1.19
AP-2	0.03	0.44	1.07

1.4 POST DEVELOPMENT CONDITIONS

The proposed project will include construction of a 32,500 square foot commercial building with a paved access drive, parking lot, and associated stormwater infrastructure. Below is a summary of the proposed developed areas associated with construction of the public infrastructure.

Proposed Impervious Area	=	126,792 sf
Proposed Landscaped Area	=	62,789 sf
Proposed Developed Area	=	189,581 sf

The Post Development Watershed Map is included as Sheet B of the accompanying plan set and the Calculations are attached as Appendix D.

The Post-Development Watershed Model predicts the following peak flow rates:

Post Development Peak Flows (cu. ft./sec)			
Analysis Point	**2-Year**	**10-Year**	**25-Year**
AP-1	0.30	0.82	3.27
AP-2	1.01	2.14	3.12

1.5 BASIC STANDARDS

The proposed project is required to meet the Basic Standards for the Maine DEP. To meet the Basic Standards the project design must demonstrate that the erosion and sedimentation control, inspection and maintenance, and housekeeping standards specified in Appendices A, B, and C of 06-096 Chapter 500 (Maine DEP) are met, and that the grading or other construction activity will not impede or otherwise alter drainageways so as to have an unreasonable adverse impact on a wetland or waterbody, or an adjacent downslope parcel.

The proposed project will provide temporary (during construction) BMP's and post-construction BMP's. Refer to Sheet 5 of the project plans for erosion and sedimentation control narratives and details. The project requirements for inspection and maintenance during construction and post-construction are described in the Erosion and Sedimentation Control - Inspection and Maintenance Plan found in Appendix F of this Report. The housekeeping standards can also be found in the Inspection and Maintenance Plan.

1.6 GENERAL STANDARDS

The proposed project is required to meet the General Standards. To meet the general standards, the project design must demonstrate that the stormwater management system includes treatment measures that will provide pollutant removal or treatment and mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms and potential temperature impacts. This must be achieved by providing treatment of no less than 95% of the impervious area and no less than 80% of the developed area.

The stormwater management system includes a grassed underdrained soil filter. The proposed BMP has been designed in accordance with the design requirements outlined in the Maine Stormwater Best Management Practices Manual, Volume III. Below is a summary of the treatment areas associated with the proposed infrastructure. Refer to Appendix E for detailed calculations.

Stormwater Treatment Summary	
Total Proposed Impervious Area	126,792 sf
Total Proposed Developed Area	189,581 sf
Total Treated Impervious Area	121,585 sf
Total Treated Developed Area and Credits	168,629 sf
Impervious Area Treatment %	**95.89% (95% required)**
Developed Area Treatment %	**88.95% (80% required)**

1.7 PHOSPHORUS STANDARD

The proposed project flows to Hyde Brook which is a tributary to Sebago Lake, which is considered a lake most-at-risk listed in 06-096 Chapter 502. Since the project will create over 20,000 sf of impervious area in a lake most-at-risk watershed but will not exceed 3 acres of impervious area or 5 acres of developed area, the general standard can be used instead of the phosphorus standard.

1.8 URBAN IMPAIRED STREAM STANDARD

The proposed project flows to Hyde Brook which is a tributary to Sebago Lake. Sebago Lake is not listed in 06-096 Chapter 502 as an Urban Impaired Stream. The Urban Impaired Stream Standard does not apply to this project.

1.9 FLOODING STANDARD

The proposed project is not required to meet the Flooding Standards of the Maine DEP. However, the Town of Windham requires that pre and post development runoff modelling be evaluated. To meet the Flooding Standard, the project design must demonstrate that the stormwater management systems will accomplish the following:

a) The system must detain, retain, or result in the infiltration of stormwater from 24-hour storms of the 2-year, 10-year, and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project.

b) The design of piped or open channel systems must be based on a 10-year, 24-hour storm without overloading or flooding beyond channel limits.

c) The areas expected to be flooded by runoff from a 10-year or 25-year, 24-hour storm must be defined, and no buildings or other similar facilities may be planned within such areas.

d) Runoff from the project may not flood the primary access road to the project and any public roads bordering the project as a result of a 25-year, 24-hour storm.

The following Table compares the Pre and Post Development peak flow rates for the 2-year, 10-year, and 25-year storm events. Refer to Appendix C for the Pre-Development model and Appendix D for Post Development model.

Peak Flow Comparison (cu. ft./sec)						
Analysis Point	2-Year		10-Year		25-Year	
	Pre	Post	Pre	Post	Pre	Post
AP-1	0.00	0.30	0.20	0.82	1.19	3.27
AP-2	0.03	1.01	0.44	2.14	1.07	3.12

As illustrated in the table above, development of the proposed project will create a condition where peak flows of stormwater are increased from the pre-development conditions at both analysis points.

Analysis Point #1 – This increase is the result of an increased curve number in the subcatchment and flooding control for the proposed stormwater BMP's. Runoff from this project is directed to a stream directly adjacent to the development that flows to a large marsh before discharging Sebago Lake. 95.89% of the impervious area and 88.95% of the developed area from the proposed development will be treated prior to discharging to the onsite stream. No adverse impacts will be created to the downstream conditions.

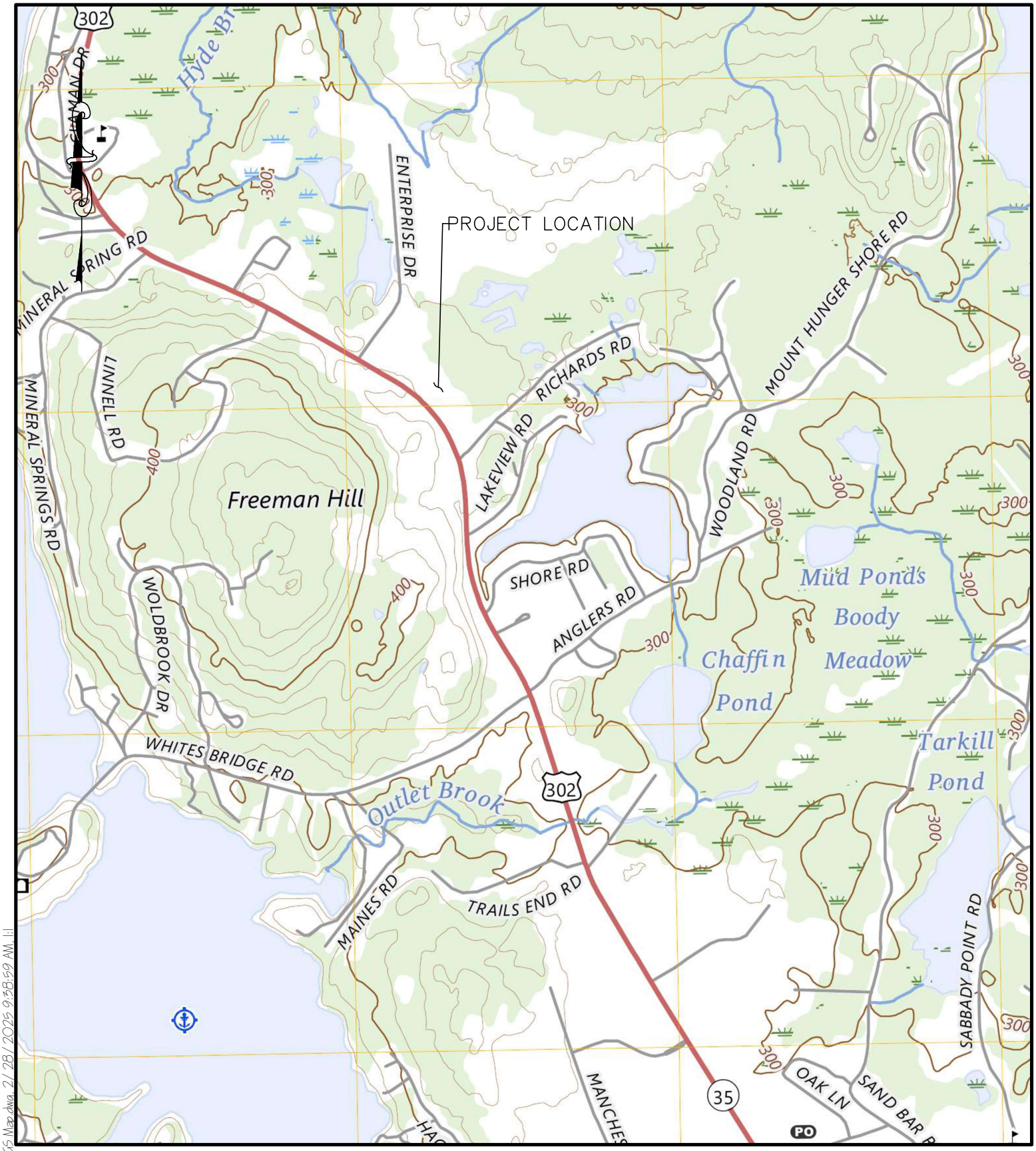
Analysis Point #2 – This increase is the result of a decreased time of concentration and an increase in the weighted curve number for the subcatchment in the post development condition. The proposed project will reduce the area flowing to this analysis point by 47%. No adverse impacts will be created to the downstream conditions.

Please see the post development stormwater model for additional information.

1.10 CLOSURE

The proposed stormwater management facilities have been designed to mitigate stormwater impacts associated with the development of the proposed project. The proposed stormwater management facilities have been designed to meet the Basic, General and Flooding Standards required by Chapter 500.

Appendix A
Figures



REFERENCES:
1. USGS QUADRANGLE NORTH WINDHAM, ME 2024

Scale: 1" = 2000'

2000' 0 2000' 4000'

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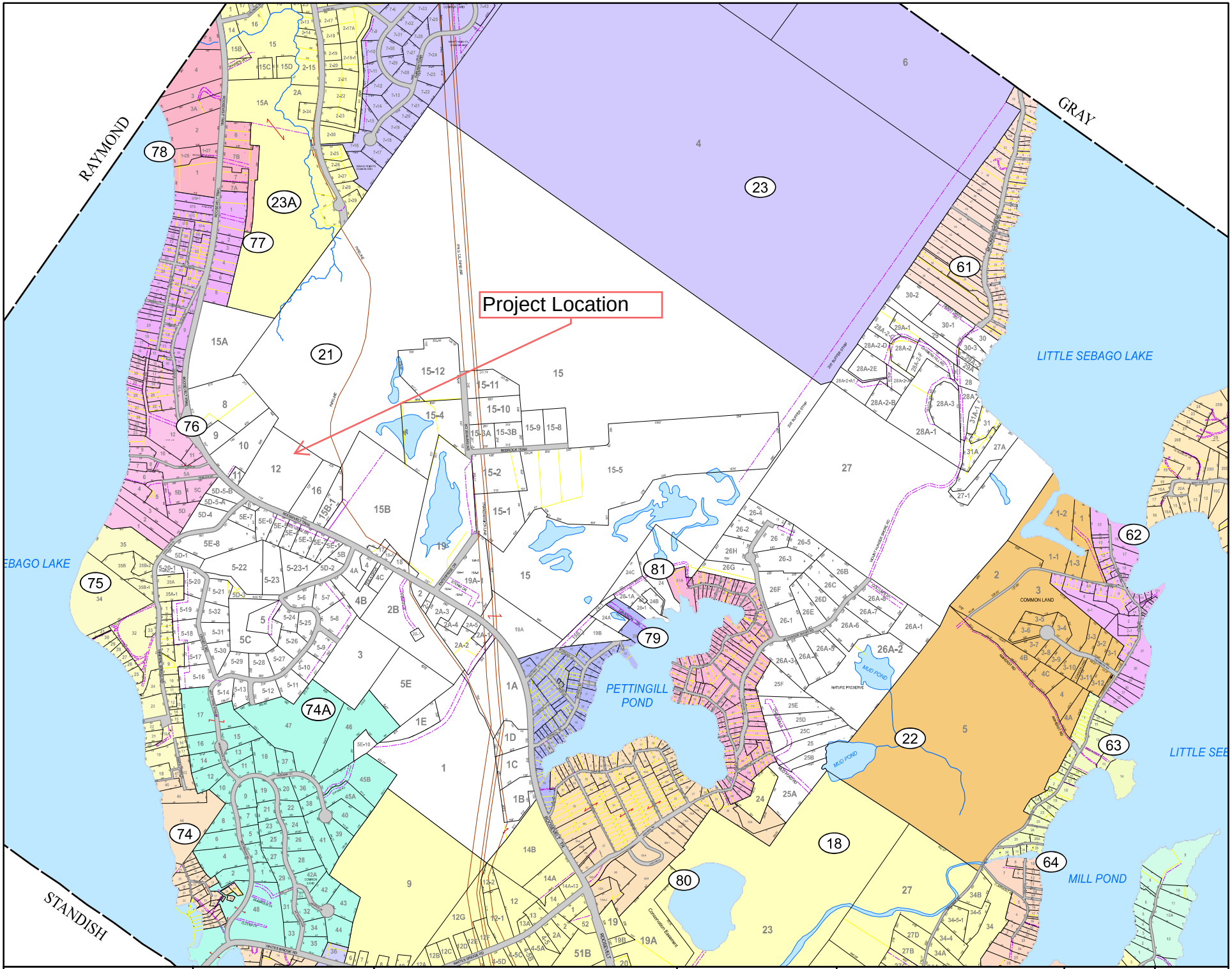
C:\Users\qfeeney\Desktop\CAD\USGS Map.dwg, 2/28/2025 9:38:59 AM, HP



THIS MAP IS FOR ASSESSMENT PURPOSES. IT IS NOT VALID FOR LEGAL DESCRIPTION OR CONVEYANCE.

THE HORIZONTAL DATUM IS THE MAINE STATE PLANE COORDINATE SYSTEM, NAD 83.

ORIGINAL MAPPING BY JAMES W. SEWALL COMPANY, OLD TOWN, MAINE

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LEGEND

PARCEL NUMBER
RECORD DIMENSION
SUBDIVISION LOT NO.
COMMON OWNERSHIP
STREAMS
CEMETERY
CONDOMINIUM
FARMSTEAD
OLD PROPERTY LINES
UTILITY LINES
ROW EASEMENT
ROW EASEMENT PAID

SCALE: 1" = 400'

REVISED TO: APRIL 1, 2024

PROPERTY MAPS

WINDHAM

MAINE

INDEX DIAGRAM

MAP NO. 21

National Flood Hazard Layer FIRMette

FEMA

70°28'6"W 43°51'55"N

70°27'28"W 43°51'29"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/28/2025 at 3:02 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Beginning With Habitat

February 28, 2025

- Parcels- Unorganized Townships
- Parcels- Organized Towns\Cities
- Aquifers
- National Wetlands Inventory Wetlands
- Shellfish Beds
- Stream Buffer (75 feet)
- Great Ponds, Rivers and Coastal Buffer (250 feet)
- Atlantic Salmon Habitat
- Shorebird Habitat
- Seabird Nesting Island
- Tidal Waterfowl / Wading Bird Habitat
- Inland Waterfowl / Wading Bird Habitat
- Significant Vernal Pools
- Deer Wintering Areas
- Essential Wildlife Habitats
- Endangered, Threatened, and Special Concern Species
- Natural Communities
- Rare Plants and Natural Communities
- Focus Areas- Overlapping Organized Towns
- Conserved Lands
- Highway Bridge Connectors

Riparian Connectors
- Less than 2000 Vehicles/Day
- More than 2000 Vehicles/Day

Undeveloped Block Connectors
- Less than 2000 Vehicles/Day
- More than 2000 Vehicles/Day
- Undeveloped Habitat Blocks

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

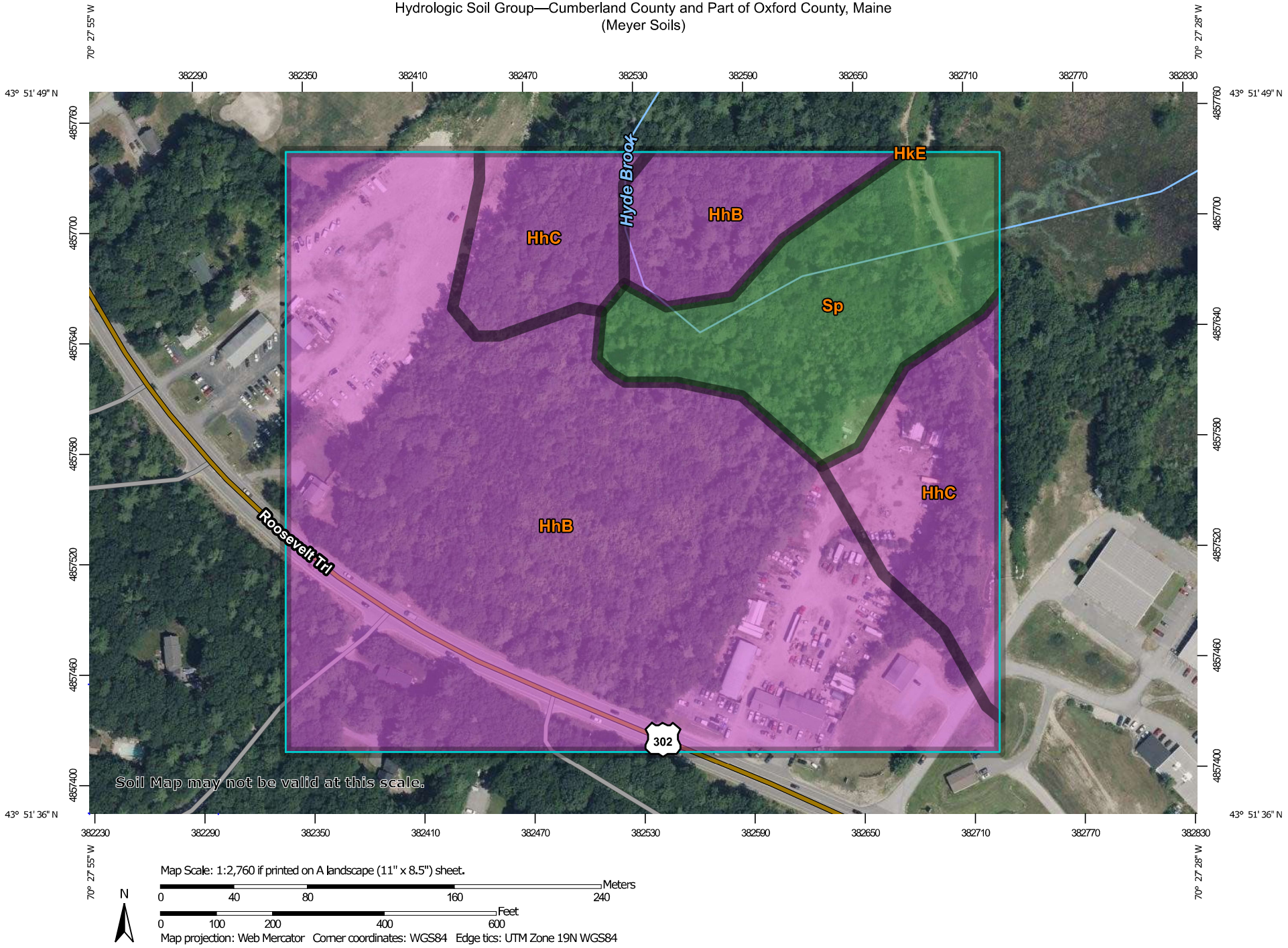
Maxar

Beginning with Habitat Program for Planning Purpo

Map Created With BWH Ma

Appendix B
Soils Report

Hydrologic Soil Group—Cumberland County and Part of Oxford County, Maine
(Meyer Soils)



Map Scale: 1:2,760 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 21, Aug 26, 2024

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

Date(s) aerial images were photographed: Jul 22, 2021—Oct 7, 2021

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HhB	Hermon sandy loam, 0 to 8 percent slopes, very stony	A	21.9	69.6%
HhC	Hermon sandy loam, 8 to 15 percent slopes, very stony	A	4.8	15.3%
HkE	Hermon sandy loam, 20 to 60 percent slopes, extremely stony	A	0.0	0.0%
Sp	Sebago mucky peat	A/D	4.7	15.1%
Totals for Area of Interest			**31.5**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C
Pre Development Calculations

Subcat Reach Pond Link

Routing Diagram for Pre Development
Prepared by BH2M, Printed 6/18/2025

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

Subcatchment SA-1: Runoff Area=517,583 sf 2.15% Impervious Runoff Depth>0.32"
Flow Length=800' Tc=30.7 min CN=39 Runoff=1.19 cfs 0.313 af

Subcatchment SA-2: Runoff Area=64,241 sf 28.02% Impervious Runoff Depth>0.99"
Flow Length=369' Tc=17.5 min CN=51 Runoff=1.07 cfs 0.121 af

Total Runoff Area = 13.357 ac Runoff Volume = 0.434 af Average Runoff Depth = 0.39"
94.99% Pervious = 12.688 ac 5.01% Impervious = 0.669 ac

Summary for Subcatchment SA-1:

Runoff = 1.19 cfs @ 12.74 hrs, Volume= 0.313 af, Depth> 0.32"

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-YR Rainfall=5.80"

Area (sf)	CN	Description
419,760	30	Woods, Good, HSG A
78,086	77	Woods, Good, HSG D
11,136	98	Paved parking, HSG A
8,601	39	>75% Grass cover, Good, HSG A
517,583	39	Weighted Average
506,447		97.85% Pervious Area
11,136		2.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.6	150	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
9.5	500	0.0305	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	150	0.0067	3.95	126.44	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=2.00' Z= 5.0 '/' Top.W=26.00' n= 0.035 Earth, dense weeds
30.7	800	Total			

Summary for Subcatchment SA-2:

Runoff = 1.07 cfs @ 12.30 hrs, Volume= 0.121 af, Depth> 0.99"

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-YR Rainfall=5.80"

Area (sf)	CN	Description
35,001	30	Woods, Good, HSG A
17,998	98	Paved parking, HSG A
11,242	39	>75% Grass cover, Good, HSG A
64,241	51	Weighted Average
46,243		71.98% Pervious Area
17,998		28.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	109	0.0435	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	260	0.0190	7.37	368.39	**Trap/Vee/Rect Channel Flow,** Bot.W=15.00' D=2.00' Z= 5.0 '/' Top.W=35.00' n= 0.035 Earth, dense weeds
17.5	369	Total			

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

Subcatchment SA-1: Runoff Area=517,583 sf 2.15% Impervious Runoff Depth=0.00"
Flow Length=800' Tc=30.7 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment SA-2: Runoff Area=64,241 sf 28.02% Impervious Runoff Depth>0.10"
Flow Length=369' Tc=17.5 min CN=51 Runoff=0.03 cfs 0.012 af

Total Runoff Area = 13.357 ac Runoff Volume = 0.012 af Average Runoff Depth = 0.01"
94.99% Pervious = 12.688 ac 5.01% Impervious = 0.669 ac

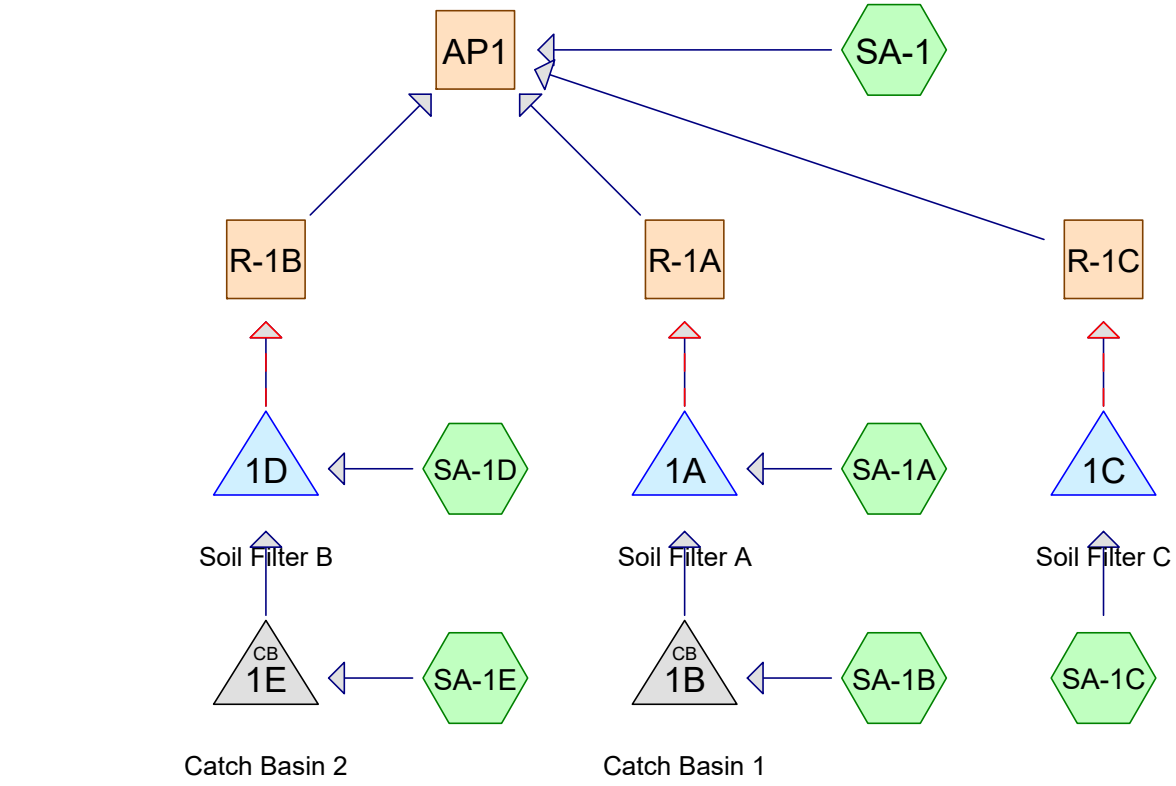
Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment SA-1: Runoff Area=517,583 sf 2.15% Impervious Runoff Depth>0.09"
Flow Length=800' Tc=30.7 min CN=39 Runoff=0.20 cfs 0.091 af

Subcatchment SA-2: Runoff Area=64,241 sf 28.02% Impervious Runoff Depth>0.50"
Flow Length=369' Tc=17.5 min CN=51 Runoff=0.44 cfs 0.062 af

Total Runoff Area = 13.357 ac Runoff Volume = 0.153 af Average Runoff Depth = 0.14"
94.99% Pervious = 12.688 ac 5.01% Impervious = 0.669 ac

Appendix D
Post Development Calculations



Subcat Reach Pond Link

Routing Diagram for Post Development
Prepared by BH2M, Printed 6/18/2025

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

Subcatchment SA-1: Runoff Area=376,382 sf 2.96% Impervious Runoff Depth>0.45"
Flow Length=1,139' Tc=42.4 min CN=42 Runoff=1.41 cfs 0.326 af

Subcatchment SA-1A: Runoff Area=11,699 sf 0.00% Impervious Runoff Depth>0.32"
Tc=6.0 min CN=39 Runoff=0.04 cfs 0.007 af

Subcatchment SA-1B: Runoff Area=53,147 sf 93.30% Impervious Runoff Depth>4.80"
Flow Length=345' Tc=7.4 min CN=94 Runoff=6.33 cfs 0.488 af

Subcatchment SA-1C: Runoff Area=74,200 sf 74.44% Impervious Runoff Depth>3.67"
Flow Length=303' Tc=10.1 min CN=83 Runoff=6.65 cfs 0.521 af

Subcatchment SA-1D: Runoff Area=21,334 sf 40.05% Impervious Runoff Depth>1.86"
Tc=6.0 min CN=63 Runoff=1.11 cfs 0.076 af

Subcatchment SA-1E: Runoff Area=8,249 sf 99.67% Impervious Runoff Depth>5.15"
Tc=6.0 min CN=98 Runoff=1.05 cfs 0.081 af

Subcatchment SA-2: Runoff Area=36,813 sf 63.03% Impervious Runoff Depth>2.99"
Tc=6.0 min CN=76 Runoff=3.12 cfs 0.211 af

Reach AP1: Inflow=3.27 cfs 0.888 af
Outflow=3.27 cfs 0.888 af

Reach R-1A: Avg. Flow Depth=0.11' Max Vel=1.20 fps Inflow=2.25 cfs 0.278 af
n=0.035 L=483.0' S=0.0166 '/' Capacity=343.96 cfs Outflow=1.95 cfs 0.273 af

Reach R-1B: Avg. Flow Depth=0.01' Max Vel=0.54 fps Inflow=0.06 cfs 0.056 af
n=0.035 L=500.0' S=0.0297 '/' Capacity=460.74 cfs Outflow=0.06 cfs 0.053 af

Reach R-1C: Avg. Flow Depth=0.07' Max Vel=0.77 fps Inflow=1.02 cfs 0.249 af
n=0.035 L=1,112.0' S=0.0126 '/' Capacity=299.88 cfs Outflow=0.78 cfs 0.235 af

Pond 1A: Soil Filter A Peak Elev=309.66' Storage=10,452 cf Inflow=6.33 cfs 0.495 af
Primary=0.14 cfs 0.140 af Secondary=2.12 cfs 0.138 af Outflow=2.25 cfs 0.278 af

Pond 1B: Catch Basin 1 Peak Elev=312.70' Inflow=6.33 cfs 0.488 af
15.0" Round Culvert n=0.013 L=144.0' S=0.0050 '/' Outflow=6.33 cfs 0.488 af

Pond 1C: Soil Filter C Peak Elev=313.10' Storage=12,523 cf Inflow=6.65 cfs 0.521 af
Primary=0.14 cfs 0.124 af Secondary=0.88 cfs 0.124 af Outflow=1.02 cfs 0.249 af

Pond 1D: Soil Filter B Peak Elev=313.80' Storage=4,543 cf Inflow=2.15 cfs 0.157 af
Primary=0.06 cfs 0.056 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.056 af

Pond 1E: Catch Basin 2 Peak Elev=315.14' Inflow=1.05 cfs 0.081 af
12.0" Round Culvert n=0.013 L=102.0' S=0.0050 '/' Outflow=1.05 cfs 0.081 af

Total Runoff Area = 13.357 ac Runoff Volume = 1.710 af Average Runoff Depth = 1.54"
73.20% Pervious = 9.777 ac 26.80% Impervious = 3.580 ac

Summary for Subcatchment SA-1:

Runoff = 1.41 cfs @ 12.83 hrs, Volume= 0.326 af, 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 STORM Rainfall=5.80"

Area (sf)	CN	Description
11,136	98	Paved parking, HSG A
23,749	39	>75% Grass cover, Good, HSG A
263,411	30	Woods, Good, HSG A
78,086	77	Woods, Good, HSG D
376,382	42	Weighted Average
365,246		97.04% Pervious Area
11,136		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.5	150	0.0133	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
2.7	201	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	163	0.0123	1.66		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.6	625	0.0067	3.95	126.44	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=2.00' Z= 5.0 '/' Top.W=26.00' n= 0.035
42.4	1,139	Total			

Summary for Subcatchment SA-1A:

Runoff = 0.04 cfs @ 12.37 hrs, Volume= 0.007 af, Depth> 0.32"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
11,699	39	>75% Grass cover, Good, HSG A
11,699		100.00% Pervious Area

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

Summary for Subcatchment SA-1B:

Runoff = 6.33 cfs @ 12.10 hrs, Volume= 0.488 af, Depth> 4.80"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
3,559	39	>75% Grass cover, Good, HSG A
49,588	98	Paved parking, HSG A
53,147	94	Weighted Average
3,559		6.70% Pervious Area
49,588		93.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	72	0.0417	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.2	78	0.0130	1.08		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.5	195	0.1040	6.55		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.4	345	Total			

Summary for Subcatchment SA-1C:

Runoff = 6.65 cfs @ 12.14 hrs, Volume= 0.521 af, Depth> 3.67"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
55,231	98	Paved parking, HSG A
18,969	39	>75% Grass cover, Good, HSG A
74,200	83	Weighted Average
18,969		25.56% Pervious Area
55,231		74.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.10"
1.6	100	0.0100	1.03		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10"
0.3	35	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	118	0.0085	2.92	17.50	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.035 Earth, dense weeds
10.1	303	Total			

Summary for Subcatchment SA-1D:

Runoff = 1.11 cfs @ 12.10 hrs, Volume= 0.076 af, Depth> 1.86"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
8,544	98	Paved parking, HSG A
12,790	39	>75% Grass cover, Good, HSG A
21,334	63	Weighted Average
12,790		59.95% Pervious Area
8,544		40.05% Impervious Area

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

Summary for Subcatchment SA-1E:

Runoff = 1.05 cfs @ 12.09 hrs, Volume= 0.081 af, Depth> 5.15"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
8,222	98	Paved parking, HSG A
27	39	>75% Grass cover, Good, HSG A
8,249	98	Weighted Average
27		0.33% Pervious Area
8,222		99.67% Impervious Area

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

Summary for Subcatchment SA-2:

Runoff = 3.12 cfs @ 12.09 hrs, Volume= 0.211 af, Depth> 2.99"

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 STORM Rainfall=5.80"

Area (sf)	CN	Description
23,205	98	Paved parking, HSG A
11,839	39	>75% Grass cover, Good, HSG A
1,769	30	Woods, Good, HSG A
36,813	76	Weighted Average
13,608		36.97% Pervious Area
23,205		63.03% Impervious Area

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

Summary for Reach AP1:

Inflow Area = 12.512 ac, 24.35% Impervious, Inflow Depth > 0.85" for 25-YEAR STORM event
Inflow = 3.27 cfs @ 12.66 hrs, Volume= 0.888 af
Outflow = 3.27 cfs @ 12.66 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach R-1A:

Inflow Area = 1.489 ac, 76.47% Impervious, Inflow Depth > 2.24" for 25-YEAR STORM event
Inflow = 2.25 cfs @ 12.40 hrs, Volume= 0.278 af
Outflow = 1.95 cfs @ 12.61 hrs, Volume= 0.273 af, Atten= 14%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.20 fps, Min. Travel Time= 6.7 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 16.4 min

Peak Storage= 792 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 50.0 sf, Capacity= 343.96 cfs

15.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 35.00'
Length= 483.0' Slope= 0.0166 '/'
Inlet Invert= 301.00', Outlet Invert= 293.00'

‡

Summary for Reach R-1B:

Inflow Area = 0.679 ac, 56.67% Impervious, Inflow Depth > 0.99" for 25-YEAR STORM event
Inflow = 0.06 cfs @ 17.32 hrs, Volume= 0.056 af
Outflow = 0.06 cfs @ 17.84 hrs, Volume= 0.053 af, Atten= 0%, Lag= 31.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.54 fps, Min. Travel Time= 15.5 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 15.5 min

Peak Storage= 55 cf @ 17.58 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 2.00' Flow Area= 50.0 sf, Capacity= 460.74 cfs

15.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 35.00'
Length= 500.0' Slope= 0.0297 '/'
Inlet Invert= 307.86', Outlet Invert= 293.00'

‡

Summary for Reach R-1C:

Inflow Area = 1.703 ac, 74.44% Impervious, Inflow Depth > 1.75" for 25-YEAR STORM event
Inflow = 1.02 cfs @ 12.75 hrs, Volume= 0.249 af
Outflow = 0.78 cfs @ 13.54 hrs, Volume= 0.235 af, Atten= 23%, Lag= 46.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.77 fps, Min. Travel Time= 24.0 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 40.6 min

Peak Storage= 1,122 cf @ 13.14 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 2.00' Flow Area= 50.0 sf, Capacity= 299.88 cfs

15.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 5.0 '/' Top Width= 35.00'
Length= 1,112.0' Slope= 0.0126 '/'
Inlet Invert= 307.00', Outlet Invert= 293.00'

‡

Summary for Pond 1A: Soil Filter A

Inflow Area = 1.489 ac, 76.47% Impervious, Inflow Depth > 3.99" for 25-YEAR STORM event
Inflow = 6.33 cfs @ 12.10 hrs, Volume= 0.495 af
Outflow = 2.25 cfs @ 12.40 hrs, Volume= 0.278 af, Atten= 64%, Lag= 17.8 min
Primary = 0.14 cfs @ 12.40 hrs, Volume= 0.140 af
Secondary = 2.12 cfs @ 12.40 hrs, Volume= 0.138 af

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

Peak Elev= 309.66' @ 12.40 hrs Surf.Area= 5,118 sf Storage= 10,452 cf
Flood Elev= 310.50' Surf.Area= 6,045 sf Storage= 15,130 cf

Plug-Flow detention time= 140.9 min calculated for 0.277 af (56% of inflow)
Center-of-Mass det. time= 57.8 min (806.7 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	15,130 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
307.00	2,812	0	0
308.00	3,630	3,221	3,221
308.50	4,068	1,925	5,146
309.00	4,505	2,143	7,289
310.00	5,437	4,971	12,260
310.50	6,045	2,871	15,130

Device	Routing	Invert	Outlet Devices
#1	Primary	304.50'	**6.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 304.50' / 301.00' S= 0.0778 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	309.50'	**13.0' long x 13.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.60 2.64 2.70 2.66 2.65 2.66 2.65 2.63
#3	Device 1	304.50'	**1.5" Vert. Orifice/Grate** C= 0.620

Primary OutFlow Max=0.14 cfs @ 12.40 hrs HW=309.66' (Free Discharge)
↑—**1=Culvert** (Passes 0.14 cfs of 1.65 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 11.23 fps)

Secondary OutFlow Max=2.11 cfs @ 12.40 hrs HW=309.66' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.11 cfs @ 1.03 fps)

Summary for Pond 1B: Catch Basin 1

Inflow Area = 1.220 ac, 93.30% Impervious, Inflow Depth > 4.80" for 25-YEAR STORM event
Inflow = 6.33 cfs @ 12.10 hrs, Volume= 0.488 af
Outflow = 6.33 cfs @ 12.10 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min
Primary = 6.33 cfs @ 12.10 hrs, Volume= 0.488 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.70' @ 12.10 hrs
Flood Elev= 313.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	**15.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 310.00' / 309.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.28 cfs @ 12.10 hrs HW=312.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.28 cfs @ 5.11 fps)

Summary for Pond 1C: Soil Filter C

Inflow Area = 1.703 ac, 74.44% Impervious, Inflow Depth > 3.67" for 25-YEAR STORM event
Inflow = 6.65 cfs @ 12.14 hrs, Volume= 0.521 af
Outflow = 1.02 cfs @ 12.75 hrs, Volume= 0.249 af, Atten= 85%, Lag= 36.7 min
Primary = 0.14 cfs @ 12.75 hrs, Volume= 0.124 af
Secondary = 0.88 cfs @ 12.75 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 313.10' @ 12.75 hrs Surf.Area= 6,373 sf Storage= 12,523 cf
Flood Elev= 314.00' Surf.Area= 7,516 sf Storage= 18,763 cf

Plug-Flow detention time= 162.8 min calculated for 0.248 af (48% of inflow)
Center-of-Mass det. time= 79.1 min (857.5 - 778.4)

Volume	Invert	Avail.Storage	Storage Description
#1	310.50'	18,763 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
310.50	3,313	0	0
311.00	3,871	1,796	1,796
312.00	5,029	4,450	6,246
313.00	6,244	5,637	11,883
314.00	7,516	6,880	18,763

Device	Routing	Invert	Outlet Devices
#1	Primary	307.80'	**6.0" Round Culvert** L= 79.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 307.80' / 307.00' S= 0.0101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	313.00'	**10.0' long x 25.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Device 1	307.80'	**1.5" Vert. Orifice/Grate** C= 0.620

Primary OutFlow Max=0.14 cfs @ 12.75 hrs HW=313.10' (Free Discharge)
└**1=Culvert** (Passes 0.14 cfs of 1.31 cfs potential flow)
└**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 11.39 fps)

Secondary OutFlow Max=0.87 cfs @ 12.75 hrs HW=313.10' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.87 cfs @ 0.85 fps)

Summary for Pond 1D: Soil Filter B

Inflow Area = 0.679 ac, 56.67% Impervious, Inflow Depth > 2.78" for 25-YEAR STORM event
Inflow = 2.15 cfs @ 12.09 hrs, Volume= 0.157 af
Outflow = 0.06 cfs @ 17.32 hrs, Volume= 0.056 af, Atten= 97%, Lag= 313.9 min
Primary = 0.06 cfs @ 17.32 hrs, Volume= 0.056 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 313.80' @ 17.32 hrs Surf.Area= 3,433 sf Storage= 4,543 cf
Flood Elev= 315.00' Surf.Area= 4,609 sf Storage= 9,494 cf

Plug-Flow detention time= 182.7 min calculated for 0.056 af (35% of inflow)
Center-of-Mass det. time= 67.1 min (840.3 - 773.2)

Volume	Invert	Avail.Storage	Storage Description
#1	311.50'	9,494 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
311.50	1,260	0	0
312.00	1,477	684	684
313.00	1,954	1,716	2,400
314.00	3,813	2,884	5,283
315.00	4,609	4,211	9,494

Device	Routing	Invert	Outlet Devices
#1	Primary	309.00'	**6.0" Round Culvert** L= 228.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 309.00' / 307.86' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	314.00'	**20.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Device 1	309.00'	**1.0" Vert. Orifice/Grate** C= 0.620

Primary OutFlow Max=0.06 cfs @ 17.32 hrs HW=313.80' (Free Discharge)
↑—**1=Culvert** (Passes 0.06 cfs of 0.82 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 10.85 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=311.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 1E: Catch Basin 2

Inflow Area = 0.189 ac, 99.67% Impervious, Inflow Depth > 5.15" for 25-YEAR STORM event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.081 af
Outflow = 1.05 cfs @ 12.09 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 12.09 hrs, Volume= 0.081 af

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

Peak Elev= 315.14' @ 12.09 hrs
Flood Elev= 317.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	314.51'	**12.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 314.51' / 314.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.09 hrs HW=315.13' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.02 cfs @ 2.84 fps)

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

Subcatchment SA-1: Runoff Area=376,382 sf 2.96% Impervious Runoff Depth>0.00"
Flow Length=1,139' Tc=42.4 min CN=42 Runoff=0.01 cfs 0.002 af

Subcatchment SA-1A: Runoff Area=11,699 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment SA-1B: Runoff Area=53,147 sf 93.30% Impervious Runoff Depth>2.31"
Flow Length=345' Tc=7.4 min CN=94 Runoff=3.16 cfs 0.235 af

Subcatchment SA-1C: Runoff Area=74,200 sf 74.44% Impervious Runoff Depth>1.42"
Flow Length=303' Tc=10.1 min CN=83 Runoff=2.62 cfs 0.201 af

Subcatchment SA-1D: Runoff Area=21,334 sf 40.05% Impervious Runoff Depth>0.42"
Tc=6.0 min CN=63 Runoff=0.18 cfs 0.017 af

Subcatchment SA-1E: Runoff Area=8,249 sf 99.67% Impervious Runoff Depth>2.68"
Tc=6.0 min CN=98 Runoff=0.56 cfs 0.042 af

Subcatchment SA-2: Runoff Area=36,813 sf 63.03% Impervious Runoff Depth>0.99"
Tc=6.0 min CN=76 Runoff=1.01 cfs 0.070 af

Reach AP1: Inflow=0.30 cfs 0.225 af
Outflow=0.30 cfs 0.225 af

Reach R-1A: Avg. Flow Depth=0.02' Max Vel=0.41 fps Inflow=0.12 cfs 0.113 af
n=0.035 L=483.0' S=0.0166 '/' Capacity=343.96 cfs Outflow=0.12 cfs 0.107 af

Reach R-1B: Avg. Flow Depth=0.01' Max Vel=0.54 fps Inflow=0.05 cfs 0.043 af
n=0.035 L=500.0' S=0.0297 '/' Capacity=460.74 cfs Outflow=0.05 cfs 0.041 af

Reach R-1C: Avg. Flow Depth=0.02' Max Vel=0.38 fps Inflow=0.12 cfs 0.092 af
n=0.035 L=1,112.0' S=0.0126 '/' Capacity=299.88 cfs Outflow=0.12 cfs 0.076 af

Pond 1A: Soil Filter A Peak Elev=308.74' Storage=6,147 cf Inflow=3.16 cfs 0.235 af
Primary=0.12 cfs 0.113 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.113 af

Pond 1B: Catch Basin 1 Peak Elev=311.09' Inflow=3.16 cfs 0.235 af
15.0" Round Culvert n=0.013 L=144.0' S=0.0050 '/' Outflow=3.16 cfs 0.235 af

Pond 1C: Soil Filter C Peak Elev=311.82' Storage=5,376 cf Inflow=2.62 cfs 0.201 af
Primary=0.12 cfs 0.092 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.092 af

Pond 1D: Soil Filter B Peak Elev=312.31' Storage=1,159 cf Inflow=0.73 cfs 0.059 af
Primary=0.05 cfs 0.043 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.043 af

Pond 1E: Catch Basin 2 Peak Elev=314.95' Inflow=0.56 cfs 0.042 af
12.0" Round Culvert n=0.013 L=102.0' S=0.0050 '/' Outflow=0.56 cfs 0.042 af

Total Runoff Area = 13.357 ac Runoff Volume = 0.567 af Average Runoff Depth = 0.51"
73.20% Pervious = 9.777 ac 26.80% Impervious = 3.580 ac

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

Subcatchment SA-1: Runoff Area=376,382 sf 2.96% Impervious Runoff Depth>0.17"
Flow Length=1,139' Tc=42.4 min CN=42 Runoff=0.30 cfs 0.120 af

Subcatchment SA-1A: Runoff Area=11,699 sf 0.00% Impervious Runoff Depth>0.10"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.002 af

Subcatchment SA-1B: Runoff Area=53,147 sf 93.30% Impervious Runoff Depth>3.69"
Flow Length=345' Tc=7.4 min CN=94 Runoff=4.93 cfs 0.376 af

Subcatchment SA-1C: Runoff Area=74,200 sf 74.44% Impervious Runoff Depth>2.63"
Flow Length=303' Tc=10.1 min CN=83 Runoff=4.83 cfs 0.374 af

Subcatchment SA-1D: Runoff Area=21,334 sf 40.05% Impervious Runoff Depth>1.14"
Tc=6.0 min CN=63 Runoff=0.65 cfs 0.047 af

Subcatchment SA-1E: Runoff Area=8,249 sf 99.67% Impervious Runoff Depth>4.05"
Tc=6.0 min CN=98 Runoff=0.83 cfs 0.064 af

Subcatchment SA-2: Runoff Area=36,813 sf 63.03% Impervious Runoff Depth>2.05"
Tc=6.0 min CN=76 Runoff=2.14 cfs 0.144 af

Reach AP1: Inflow=0.82 cfs 0.426 af
Outflow=0.82 cfs 0.426 af

Reach R-1A: Avg. Flow Depth=0.04' Max Vel=0.62 fps Inflow=0.37 cfs 0.167 af
n=0.035 L=483.0' S=0.0166 '/' Capacity=343.96 cfs Outflow=0.36 cfs 0.161 af

Reach R-1B: Avg. Flow Depth=0.01' Max Vel=0.54 fps Inflow=0.06 cfs 0.051 af
n=0.035 L=500.0' S=0.0297 '/' Capacity=460.74 cfs Outflow=0.06 cfs 0.049 af

Reach R-1C: Avg. Flow Depth=0.02' Max Vel=0.40 fps Inflow=0.14 cfs 0.115 af
n=0.035 L=1,112.0' S=0.0126 '/' Capacity=299.88 cfs Outflow=0.14 cfs 0.097 af

Pond 1A: Soil Filter A Peak Elev=309.53' Storage=9,829 cf Inflow=4.93 cfs 0.378 af
Primary=0.14 cfs 0.133 af Secondary=0.24 cfs 0.034 af Outflow=0.37 cfs 0.167 af

Pond 1B: Catch Basin 1 Peak Elev=311.85' Inflow=4.93 cfs 0.376 af
15.0" Round Culvert n=0.013 L=144.0' S=0.0050 '/' Outflow=4.93 cfs 0.376 af

Pond 1C: Soil Filter C Peak Elev=312.95' Storage=11,559 cf Inflow=4.83 cfs 0.374 af
Primary=0.14 cfs 0.115 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.115 af

Pond 1D: Soil Filter B Peak Elev=313.20' Storage=2,833 cf Inflow=1.48 cfs 0.111 af
Primary=0.06 cfs 0.051 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.051 af

Pond 1E: Catch Basin 2 Peak Elev=315.06' Inflow=0.83 cfs 0.064 af
12.0" Round Culvert n=0.013 L=102.0' S=0.0050 '/' Outflow=0.83 cfs 0.064 af

Total Runoff Area = 13.357 ac Runoff Volume = 1.126 af Average Runoff Depth = 1.01"
73.20% Pervious = 9.777 ac 26.80% Impervious = 3.580 ac

Appendix E

Water Quality Calculations and Vegetated Soil Filter Sizing Calculations

BH2M
380B Main Street
Gorham, Maine 04038

WATER QUALITY CALCULATIONS
A PLUS AUTO

Subcatchment ID	Proposed Impervious Area (sq. ft.)	Proposed Lawn Area (sq. ft.)	Proposed Developed Area (sq. ft.)	Existing Impervious Area (sq.ft.)	Existing Vegetated Area (sq.ft.)	Treated Impervious Area (sq. ft.)	Treated Developed Area (sq. ft.)	BMP ID
1	0	15,148	15,148	11,136	350,098	0	0	None
1A	0	11,699	11,699	0	0	0	11,699	Filter A
1B	49,588	3,559	53,147	0	0	49,588	53,147	Filter A
1C	55,231	18,969	74,200	0	0	55,231	74,200	Filter C
1D	8,544	12,790	21,334	0	0	8,544	21,334	Filter B
1E	8,222	27	8,249	0	0	8,222	8,249	Filter B
2	5,207	597	5,804	17,998	13,011	0	0	None
Total	**126,792**	**62,789**	**189,581**	**29,134**	**363,109**	**121,585**	**168,629**	

Treatment Summary	
Proposed Impervious Area (sq. ft.)=	126,792
Proposed Developed Area (sq. ft.)=	189,581
Treated Impervious Area (sq. ft.)=	121,585
Treated Developed Area (sq. ft.)=	168,629
Impervious Area Treatment % =	**95.89%**
Developed Area Treatment % =	**88.95%**

Grassed Underdrained Soil Filter A Calculations

Subcatchment ID	Impervious Area (sf)	WQ Impervious Area Runoff Depth (inches)	WQ Impervious Volume Required (ft3)	Landscaped Area (sf)	WQ Landscape Area Runoff Depth (inches)	WQ Landscape Volume Required (ft^3)	Total WQ Volume Required (ft^3)
1A	0	1.00	0	11,699	0.40	390	390
1B	49,588	1.00	4,132	3,559	0.40	119	4,251
Total	**49,588**		**4,132**	**15,258**		**509**	**4,641**

Summary of Underdrain Filter Sizing	
Total WQ Volume Required (ft^3)	4,641
WQ Volume Provided (ft^3)	**5,145**
Filter Surface Elevation	307.00
WQ Surface Elevation	308.50
Invert of Underdrain	304.67
5% of Tributary Impervious Area (ft^2)	2,479
2% of Tributary Landscaped (ft^2)	305
Filter Surface Area Required (ft^2)	2,785
Filter Surface Area Provided (ft^2)	**2,812**

Underdrain Filter Volume				
Elevation	Surface Area (ft^2)	Average Stage Area (ft^2)	Stage Volume (ft^3)	Cumulative Volume (ft^3)
307	2,812	0	0	0
308	3,630	3,221	3,221	3,221
308.5	4,068	3,849	1,924	5,145
309	4,505	4,286	2,143	7,289
309.5	4,971	4,738	2,369	9,658
310	5,437	5,204	2,602	12,260
Water Quality Volume Provided (at Elevation 308.50) =				**5,145**

Orifice Sizing	
Discharge Coefficient	0.62
Orifice Size (inches)	1.5
Orifice Size (feet)	0.13
Orifice Area (ft^2)	0.012
Orifice Centerline Elevation	304.92

Orifice Eqn: $C*A*(2gH)^{\wedge 1/2}$

Q (cfs)	Stage Elevation	Total Drawdown at Stage	Pond Area	Drawdown Time (hrs)
0.0880	**307**	**0.00**	**2,812**	**0.00**
0.1071	**308**	**1.00**	**3,630**	**9.42**
0.1232	**309**	**1.00**	**4,505**	**10.15**
0.1306	**309.5**	**0.50**	**4,971**	**5.29**
		Total Drawdown Time =		**24.86**

Required Sediment Storage		
Area to be Sanded	1.1	acres
Sand Used per Storm	500	lbs/acre-storm
Weight of Sand	90	lbs/cf
# of Storms per Year	10	storms/year
Sediment Storage Required	**63.24**	**cf/year**

Provided Storage Volume		
Total # of CB's	1	
Sump Depth	2	ft
CB Diameter	4	ft
CB Sediment Storage Volume	25.12	cf
Forebay Volume	65	cf
Total Volume	**90.12**	**cf**

Grassed Underdrained Soil Filter B Calculations

Subcatchment ID	Impervious Area (sf)	WQ Impervious Area Runoff Depth (inches)	WQ Impervious Volume Required (ft3)	Landscaped Area (sf)	WQ Landscape Area Runoff Depth (inches)	WQ Landscape Volume Required (ft^3)	Total WQ Volume Required (ft^3)
1D	8,544	1.00	712	12,790	0.40	426	1,138
1E	8,222	1.00	685	27	0.40	1	686
Total	**16,766**		**1,397**	**12,817**		**427**	**1,824**

Summary of Underdrain Filter Sizing	
Total WQ Volume Required (ft^3)	1,824
WQ Volume Provided (ft^3)	**2,400**
Filter Surface Elevation	311.50
WQ Surface Elevation	313.00
Invert of Underdrain	309.17
5% of Tributary Impervious Area (ft^2)	838
2% of Tributary Landscaped (ft^2)	256
Filter Surface Area Required (ft^2)	1,095
Filter Surface Area Provided (ft^2)	**1,260**

Underdrain Filter Volume				
Elevation	Surface Area (ft^2)	Average Stage Area (ft^2)	Stage Volume (ft^3)	Cumulative Volume (ft^3)
311.5	1,260			0
312	1,477	1,369	684	684
313	1,954	1,716	1,716	2,400
314	3,813	2,884	2,884	5,283
315	4,609	3,282	3,282	8,565
Water Quality Volume Provided (at Elevation 313.0) =				**2,400**

Orifice Sizing	
Discharge Coefficient	0.62
Orifice Size (inches)	1
Orifice Size (feet)	0.08
Orifice Area (ft^2)	0.005
Orifice Centerline Elevation	309.42

Orifice Eqn: $C*A*(2gH)^{\wedge 1/2}$

Q (cfs)	Stage Elevation	Total Drawdown at Stage	Pond Area	Drawdown Time (hrs)
0.0391	**311.5**	**0.00**	**1,260**	**0.00**
0.0436	**312**	**0.50**	**1,477**	**4.71**
0.0513	**313**	**1.00**	**1,954**	**10.58**
0.0580	**314**	**1.00**	**3,813**	**18.25**
		Total Drawdown Time =		**33.54**

Required Sediment Storage		
Area to be Sanded	0.4	acres
Sand Used per Storm	500	lbs/acre-storm
Weight of Sand	90	lbs/cf
# of Storms per Year	10	storms/year
Sediment Storage Required	**21.38**	**cf/year**

Provided Storage Volume		
Total # of CB's	1	
Sump Depth	2	ft
CB Diameter	4	ft
CB Sediment Storage Volume	25.12	cf
Forebay Volume	52	cf
Total Volume	**77.12**	**cf**

Grassed Underdrained Soil Filter C Calculations

Subcatchment ID	Impervious Area (sf)	WQ Impervious Area Runoff Depth (inches)	WQ Impervious Volume Required (ft3)	Landscaped Area (sf)	WQ Landscape Area Runoff Depth (inches)	WQ Landscape Volume Required (ft^3)	Total WQ Volume Required (ft^3)
1C	55,231	1.00	4,603	18,969	0.40	632	5,235
Total	**55,231**		**4,603**	**18,969**		**632**	**5,235**

Summary of Underdrain Filter Sizing	
Total WQ Volume Required (ft^3)	5,235
WQ Volume Provided (ft^3)	**6,246**
Filter Surface Elevation	310.50
WQ Surface Elevation	312.00
Invert of Underdrain	308.17
5% of Tributary Impervious Area (ft^2)	2,762
2% of Tributary Landscaped (ft^2)	379
Filter Surface Area Required (ft^2)	3,141
Filter Surface Area Provided (ft^2)	**3,313**

Underdrain Filter Volume				
Elevation	Surface Area (ft^2)	Average Stage Area (ft^2)	Stage Volume (ft^3)	Cumulative Volume (ft^3)
310.5	3,313			0
311	3,871	3,592	1,796	1,796
312	5,029	4,450	4,450	6,246
313	6,244	5,637	5,637	11,883
314	7,516	6,880	6,880	18,763
Water Quality Volume Provided (at Elevation 312.0) =				**6,246**

Orifice Sizing	
Discharge Coefficient	0.62
Orifice Size (inches)	1.5
Orifice Size (feet)	0.13
Orifice Area (ft^2)	0.012
Orifice Centerline Elevation	308.42

Orifice Eqn: $C*A*(2gH)^{\wedge 1/2}$

Q (cfs)	Stage Elevation	Total Drawdown at Stage	Pond Area	Drawdown Time (hrs)
0.0880	**310.5**	**0.00**	**3,313**	**0.00**
0.0980	**311**	**0.50**	**3,871**	**5.49**
0.1154	**312**	**1.00**	**5,029**	**12.10**
0.1306	**313**	**1.00**	**6,244**	**13.28**
			Total Drawdown Time =	**30.87**

Required Sediment Storage		
Area to be Sanded	1.3	acres
Sand Used per Storm	500	lbs/acre-storm
Weight of Sand	90	lbs/cf
# of Storms per Year	10	storms/year
Sediment Storage Required	**70.44**	**cf/year**

Provided Storage Volume		
Total # of CB's	0	
Sump Depth	2	ft
CB Diameter	4	ft
CB Sediment Storage Volume	0.00	cf
Forebay Volume	86	cf
Total Volume	**86.00**	**cf**

Appendix F
Inspection and Maintenance Manual

EROSION AND SEDIMENTATION CONTROL
INSPECTION AND MAINTENANCE PLAN

A Plus Auto Service & Showroom

1027 Roosevelt Trail
Windham, Maine

Submitted by:

Double A Properties, LLC
968 Roosevelt
Windham, Maine 04062

Prepared by:

BH2M
Berry, Huff, McDonald, Milligan Inc.
Engineers, Surveyors

Date:
June 2025

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LIST OF APPENDICES

1.0 INTRODUCTION

The intent of this plan is to establish inspection and maintenance procedures to be implemented for erosion and sediment control best management practices (BMP's) during construction, as well as for post-construction stormwater BMP's, for the A-Plus Auto Service & Showroom Project. This plan has been prepared in conformance with the requirements set forth in 06-096 Chapter 500 – Stormwater Management, the Town of Windham Post-Construction Stormwater Management Ordinance, and the Maine Construction General Permit.

1.1 PROJECT DESCRIPTION

Double A Properties LLC, is proposing to construct a 32,500 sf commercial building with associated parking and access infrastructure (the project). The Project is proposed to occupy approximately 4.62 acres on a parcel located off Roosevelt Trail in Windham known as Tax Map 21, Lot 12.

The scope of work includes but is not limited to:

- Tree clearing and grubbing
- Stump and boulder removal
- Construction of a bituminous parking lot
- Construction of a 32,500sf commercial building
- Installation of storm drain system including catch basins, stormdrains, and grassed underdrained soil filters.
- Installation of utilities
- Final site stabilization

1.2 REQUIRED PERMITS

The following is a list of Municipal, State, and Federal permits that are required for the Project:

Municipal
Town Windham Site Plan Approval

State of Maine
Maine DEP Individual Stormwater Permit

Federal
None

1.3 REFERENCES

This plan has been developed in accordance with the following:

- Stormwater Management Law 38 M.R.S. §420-C and §420-D
  http://legislature.maine.gov/statutes/38/title38sec420-C.html
  http://legislature.maine.gov/statutes/38/title38sec420-D.html

- 06-096 Chapter 500 – Stormwater Management
  http://www.maine.gov/sos/cec/rules/06/096/096c500.docx

- General Permit – Construction Activity
  Maine Pollutant Discharge Elimination System (MPDES)
  https://www.maine.gov/dep/land/stormwater/construction.html

- Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers
  https://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_engineers.pdf

- Maine Erosion and Sediment Control Practices Field Guide for Contractors
  https://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_field.pdf

- MaineDOT Best Management Practices for Erosion and Sedimentation Control
  https://www.maine.gov/mdot/env/documents/bmp/BMP2008full.pdf

1.4 RESPONSIBLE PARTIES

Preparer/Design Engineer:	Andrew S. Morrell, PE BH2M 380B Main Street Gorham, Maine 04038 (207) 839-2771
Developer/Applicant:	Double A Properties, LLC 968 Roosevelt Trail Windham, ME 04062
Site Contractor:	_____ _____ _____
Owner:	Double A Properties, LLC 968 Roosevelt Trail Windham, ME 04062
Post Construction Stormwater Inspector*:	Andrew S. Morrell, PE BH2M 380B Main Street Gorham, Maine 04038 (207) 839-2771
Stormwater Maintenance**:	
During Construction:	Double A Properties, LLC 968 Roosevelt Trail Windham, ME 04062
Post Construction:	_____ _____ _____

** During construction, the Developer/Applicant or their representatives will be responsible for implementing the erosion and sediment control BMP's as well routine inspections and maintenance of the BMP's. Post-construction stormwater BMP inspection, maintenance, reporting, and required recertifications will be the responsibility of the Owner or their representatives.

1.5 INSPECTION AND MAINTENANCE – DURING CONSTRUCTION

Anyone who conducts or directs an activity that involves exposing, filling or displacing soil or other earthen materials should take appropriate measures to prevent erosion and the loss of sediment beyond the project site or into a sensitive resource. Erosion and sediment control measures should be in place before the activity begins and should remain functional until the site is permanently stabilized. All measures should remain effective until all areas are permanently stabilized. Any disturbed area should be regularly inspected until the site is fully stabilized with either 90% grass cover or a permanent impervious surface such as pavement. A person who has knowledge of erosion and sediment control measures and of stormwater management practices should inspect the site at a minimum once a week, and before and after a storm event. Any failing measure should be repaired or modified to adequately stabilize the site prior to the next storm event or no later than 7 calendar days. The inspection frequency table found in Appendix D shall be used as a guide for inspecting each specific BMP. The inspection form found in Appendix B shall be used to record the inspection, its outcome, and the required maintenance.

Refer to the Plans found in Appendix A for additional erosion and sediment control details and narratives.

General Inspection, Maintenance, and Documentation Requirements

1. Inspection and corrective action: Inspect disturbed and impervious areas, erosion control measures, and material storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. Inspect these areas at least once a week as well as before and within 24 hours 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 the permit, shall conduct the inspections.

2. Maintenance: If BMP's need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. If additional BMPs or significant repair of BMPs are necessary, implementation must be completed within 7 calendar days and prior to any storm event. All measures must be maintained in effective operating condition until areas are permanently stabilized.

3. Documentation: Maintain a binder with construction inspection forms summarizing the inspections and any corrective action taken. The forms must include the name and qualifications of the person making the inspections, the date of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicle access points to the parcel. Refer to Appendix B for the construction inspection form. Major observations must include BMP's that need maintenance, BMP's 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 inspection form what corrective action should be taken and when it was taken. The Owner shall retain a copy of the inspection forms for a period of at least five years from the completion of permanent stabilization.

Site-Specific BMP's

Refer to Appendix D for inspection and maintenance requirements and frequencies of site-specific BMP's. Refer to the Plans found in Appendix A for narratives and details of the site-specific BMP's. The following is a list of the site-specific BMP's that will require routine inspection and maintenance:

- Sedimentation Barriers (Silt Fence or Erosions Control Mix Berm)
- Stabilized Construction Entrance
- Construction Limit Barrier Fence
- Temporary Sediment Trap
- Pipe Inlet/Outlet Protection
- Temporary Grass/Stone Lined Swale
- Parking Lot and Sidewalks
- Snow Storage Areas
- Catch Basins and Storm Drain Manholes
- Storm Drains and Culverts
- Grassed Underdrained Soil Filters

Winter Construction

Winter construction is any construction activity performed during the period from November 1 through April 15. If disturbed areas are not stabilized with permanent measures by November 1 or new soil disturbance occurs after November 1, but before April 15, then these areas must be protected and runoff from them must be controlled by additional measures and restrictions.

Site Stabilization: For winter stabilization, hay mulch is applied at twice the standard temporary stabilization rate. At the end of each construction day, areas that have been brought to final grade must be stabilized. Mulch may not be spread on top of snow.

1. Sediment Barriers: All areas within 75 feet of a protected natural resource must be protected with a double row of sediment barriers.

2. Ditches: All vegetated ditch lines that have not been stabilized by November 1, or will be worked during the winter construction period, must be stabilized with an appropriate stone lining backed by an appropriate gravel bed or geotextile unless specifically released from this standard by Maine DEP.

3. Slopes: Mulch netting must be used to anchor mulch on all slopes greater than 8% unless erosion control blankets or erosion control mix is being used on these slopes.

Refer to the Plans contained in Appendix A for additional winter construction erosion and sediment control requirements.

1.6 INSPECTION AND MAINTENANCE – POST-CONSTRUCTION

The long-term operation and maintenance of a stormwater management system is as critical to its performance as its design and construction. Proper operation and maintenance practices ensure that stormwater BMP's continue to improve water quality by removing pollutants effectively over the long-term and decreasing the risk of re-suspending sediment. Without proper maintenance, BMPs are likely to fail and will no longer provide treatment of stormwater. The following includes a summary of the inspection, maintenance, and documentation requirements for post-construction stormwater BMP's.

Refer to the Plans contained in Appendix A for details and locations of site-specific post-construction BMP's.

General Inspection, Maintenance, and Documentation Requirements

1. Inspection and maintenance: All measures must be maintained in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct the inspections. The following areas, facilities, and measures must be inspected and identified deficiencies must be corrected. Areas, facilities, and measures other than those listed below may also require inspection on a specific site.

a) Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after significant rainfall events (1 inch in 24-hour period) 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) Inspect catch basins and drain manholes annually and clean out either when the sump is half full or when sediment is within one foot of the invert of the outlet pipe. Clean-out must include the removal and legal disposal of any accumulated sediments and debris at the bottom of the basin, at any inlet grates, at any inflow channels to the basin, and at any pipes between basins. If the basin outlet is designed to trap floatable materials, then remove the floating debris and any floating oils (using oil absorptive pads).

c) Inspect ditches, swales and other open stormwater channels in the spring, in late fall, and after significant rainfall events (1 inch in 24-hour period) to remove any obstructions to flow, remove accumulated sediments and debris, to control vegetated growth that could obstruct flow, and to repair any erosion of the ditch lining. Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. The channel must receive adequate routine maintenance to maintain capacity and prevent or correct any erosion of the channel's bottom or side slopes.

d) Inspect culverts in the spring, in 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; and to repair any erosion damage at the culvert’s inlet and outlet.

e) Inspect at least once per year, each underdrained soil filter, including the filter embankments, vegetation, underdrain piping, and overflow spillway. Remove and dispose of accumulated sediments in the filter. If needed, rehabilitate any clogged surface linings, and flush underdrain piping.

f) Inspect level spreaders in the spring, in late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, and outlet, and repair any erosion damage at the inlet and outlet.

2. Regular maintenance

    a) Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. 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. Grading of gravel roads, or grading of the gravel shoulders of gravel or paved roads, must be routinely performed to ensure that stormwater drains immediately off the road surface to adjacent buffer areas or stable ditches, and is not impeded by accumulations of graded material on the road shoulder or by excavation of false ditches in the shoulder. If water bars or open-top culverts are used to divert runoff from road surfaces, clean-out any sediments within or at the outlet of these structures to restore their function.

3. Documentation: Maintain a binder of inspection forms summarizing inspection, maintenance, and any corrective actions taken. The inspection forms must include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. Refer to Appendix C for inspection forms. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed of after removal. The log must be made accessible to Department staff and a copy provided to the Department upon request. The Owner shall retain a copy of the logs for a period of at least five years from the completion of permanent stabilization.

4. The site-specific post-construction BMP's for Natural Wonders Daycare include the following:

    - Underdrained Soil Filters
    - Parking Lot and Sidewalks
    - Storm Drain System (including culverts, storm drains, catch basins, drain manholes, and vegetated and reinforced ditches/swales).
    - Snow storage areas
    - Rip rap inlet and outlet aprons
    - Sediment forebay

1.7 RECERTIFICATION OF STORMWATER MANAGEMENT SYSTEMS

This parcel is not subject to recertification with the Maine DEP and is not in the Town of Windham's designated MS4 area. No recertification is required.

1.8 SITE-SPECIFIC BMP MAINTENANCE AND ANNUAL REPORTING REQUIREMENTS

Below is a site-specific of list BMP's implemented for the Project as well as their ID, discharge location, and inspection and certification requirements.

Table 1 - Post-Construction BMP Designation Table

Post-Const. BMP ID	Type of Post-Const. BMP	Discharge Location	MS4 (YES/NO)	Inspection Frequency	Post-Const. Certification Requirement	Post-Const. Responsibility
BMP-A	Vegetated Areas	N/A	N/A	N/A	N/A	Owner
BMP-B	Catch Basins	Soil Filter	No	Annual	N/A	Owner
BMP-C	Stormdrain Pipes	Soil Filter	No	Annual	N/A	Owner
BMP-D	Parking & Sidewalks	Stormdrain System	No	Biannual	N/A	Owner
BMP-E	Soil Filter	Wooded Area	No	Biannual	N/A	Owner

1.9 HOUSEKEEPING

The following performance standards shall apply:

1. Spill prevention: Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop and implement as necessary appropriate spill prevention, containment, and response planning measures.

NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a

day. For more information, visit the Department's website at : http://www.maine.gov/dep/spills/emergspillresp/

2. 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. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area or provide for treatment within the infiltration area in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

   See 06-096 Chapter 500 - Appendix D for license by rule standards for infiltration of stormwater.

NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

3. 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, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately, no less than once a week, and prior to significant storm events. Operations during dry months that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

NOTE: Take care in sourcing water. Dewatering a stream without a permit from the Department may violate state water quality standards and the *Natural Resources Protection Act*.

4. Debris and other materials: Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

NOTE: To prevent these materials from becoming a source of pollutants, construction and post- construction activities related to a project may be required to comply with applicable provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. Excavation de-watering: Excavation de-watering is the removal of water from trenches, foundations, coffer dams, 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 removed from the ponded area, either through gravity or pumping, 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 by the Department.

NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

6. Authorized non-stormwater discharges: Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non- stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

   a) Discharges from firefighting activity;
   b) Fire hydrant flushings;
   c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);
   d) Dust control runoff in accordance with permit conditions;
   e) Routine external building washdown, not including surface paint removal, that does not involve detergents;
   f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;
   g) Uncontaminated air conditioning or compressor condensate;
   h) Uncontaminated groundwater or spring water;
   i) Foundation or footer drain-water where flows are not contaminated;
   j) Uncontaminated excavation dewatering;
   k) Potable water sources including waterline flushings; and
   l) Landscape irrigation.

7. Unauthorized non-stormwater discharges: The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with 06-096 Chapter 500 - Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

    a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;
    b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;
    c) Soaps, solvents, or detergents used in vehicle and equipment washing; and
    d) Toxic or hazardous substances from a spill or other release.

8. Additional requirements: Additional requirements may be applied on a site-specific basis.

Appendix A
Plans

Appendix B
Construction Inspection Forms

CONSTRUCTION INSPECTION FORM FOR EROSION AND SEDIMENT CONTROL					
General Information:					
Site Name:	Date:		Inspected by:		
Owner:					
Retained 3PI:	Last Rain Date:			Amount:	
Reason for Inspection:	Weekly	Winter	Final	Rain Event	Complaint
Description of disturbed area:					
Photos:					

	YES/NO/NA	COMMENTS
1. Is an Erosion and Sediment Control Plan available?		
ESC plan on-site and followed		
Other:		
2. Are all erosion control practices installed properly, maintained and functioning?		
Disturbed areas stable		
Concentrated flow inlet/outlet protection		
All areas at final grade		
Disturbed dormant areas stabilized		
Access roads and parking		
Hillsides and stockpiles		
Other:		
3. Are all sedimentation control practices installed properly, maintained and functioning?		
Construction entrance		
Sedimentation basins/traps/diversions		
Perimeter controls		
Check dams		
Other:		
4. Is maintenance of ESC measures, construction activities and housekeeping kept-up?		
Sedimentation/erosion in ditches		
Tracked Sediment or dust at exits		
Hazardous material storage and spill control practices		
Waste management (concrete, hazardous material, etc.)		
Other:		
5. Violation, Corrective Actions, Recommendations		
Sediment discharged from site?		
Corrective action required?		
Site compliant with all permits?		
Notice of violation or stop work order issued?		
Comments/Corrective Actions (complete corrective actions before the next rain event and within 7 day)		

Appendix C
Post-Construction Inspection Forms

A-Plus Auto
Post-Construction Inspection Form (Buffers/Level Spreaders)

Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Erosion or concentrated flows evident?		
Downgradient of level spreaders stable?		
Level spreaders built along contour?		
Evidence of accumulated sediment in level spreader trough?		
Number of level spreaders adequate for flow distribution?		
Buffer monumentation visible?		
Evidence of buffer vegetation removal or frequent mowing?		
Temporary or permanent structures within the buffer?		
Evidence of motorized vehicles operating in buffer?		
Trash, debris, or waste within buffer area?		

Additional Comments:

A-Plus Auto **Post-Construction Inspection Form (Detention Ponds)**					
Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Embankment showing signs of settlement, slope erosion, piping, or slumping?		
Woody vegetation growing in embankment?		
Debris accumulated at trash racks?		
Outlet control structure operating as intended? Orifice clear of debris?		
Accumulated sediment in forebay?		
Emergency spillway stable? Dislodged rip rap?		
Internal outlet control structure free of debris?		
Sediment accumulating in basin bottom? Dredging needed?		
Additional Comments:		

A-Plus Auto
Post-Construction Inspection Form (Ditches, Swales and Open Stormwater Channels)

Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Obstructions, sediment or debris noticeable in ditch line?		
Mowing required?		
Woody vegetation apparent in ditches?		
Side slopes stable? Signs of slumping?		
Rip rap stable? Underlying filter fabric visible?		

Additional Comments:

A-Plus Auto **Post-Construction Inspection Form (Roadway and Parking Areas)**					
Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Winter sand accumulation apparent?		
Pavement Sweeping required?		
Gravel shoulders graded appropriately?		
Gravel road grading required?		
Low spots causing puddling?		

Additional Comments:

A-Plus Auto **Post-Construction Inspection Form (Storm Drain System including catch basins and culverts)**					
Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Accumulated debris or sediment at inlet, outlet, or within culvert/storm drain?		
Flow obstructions present?		
Erosion apparent at culvert inlet/outlet?		
Accumulated debris around catch basin grate?		
Accumulated debris in catch basin sump?		
Floating debris or oils found in catch basins?		

Additional Comments:

A-Plus Auto **Post-Construction Inspection Form (Underdrain Filter)**					
Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
Debris apparent in basin bottom?		
Vegetation established in basin bottom?		
Basin draining within 72 hours?		
Inlet forebay rip rap stable and free of debris?		
Embankment and side slopes stable? Sloughs or unvegetated areas apparent?		
Outlet free of debris? Rip rap stable?		
Valve in operating condition?		
Outlet control structure operational free of debris?		
Orifice free of debris and operational?		

Additional Comments:

A-Plus Auto **Post-Construction Inspection Form (Vegetated Area)**					
Project name:	Date:		Inspected by:		
Owner name:					
Last rain date:	Amount:				
Reason for inspection:	Rain Event	Monthly	Annually	Maint. Performed	Other (Specify)
General description of BMP condition/recent maintenance performed:					
Photos: (Attach)					

Inspection Details	**Comments**	**Maintenance Required**
All slopes and embankments well vegetated? Signs of sparse growth?		
Rill erosion apparent in vegetated areas?		
Downs slope of level spreaders/ditch turnouts stable?		
Mowing of vegetated areas appropriate?		

Additional Comments:

Appendix D

Inspection Frequency Checklist and Long-Term Inspection & Maintenance Plan

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before and After a Storm	After Construction
SEDIMENT BARRIERS			
Sediment barriers are installed prior to soil disturbances	X	X	
Silt fences are keyed in and tight	X	X	
Barriers are repaired and replaced as necessary	X	X	
Barriers are removed when the site is stabilized - Silt fence should be cut at the ground surface			X
TEMPORARY STABILIZATION			
Areas are stabilized if idle for 14 days or more	X	X	
Daily stabilization within 100 ft of a natural resource	X	X	
MULCH			
Seed and mulch within 7 days of final grading. Ground is not visible	X	X	
Erosion control mix is 4-6 inch thick	X	X	
Erosion control blankets or hay mulch are anchored	X	X	
VEGETATION			
Vegetation provides 90% soil cover	X		X
Loam or soil amendment were provided	X		X
New seeded areas are mulched and protected from vehicle, foot traffic and runoff	X	X	X
Areas that will remain unworked for more than 1 year are vegetated with grass	X		
SLOPES AND EMBANKMENTS			
Final graded slopes and embankments are stabilized	X	X	X
Diversions are provided for areas with rill erosion	X	X	X
Areas steeper than 2:1 are riprapped	X		
Stones are angular, durable and various in size	X		
Riprap is underlain with a gravel layer or filter fabric	X		
STORMWATER CHANNELS AND CULVERTS			
Ditches and swales are permanently stabilized–channels that will be riprapped have been over-excavated	X	X	X
Ditches are clear of obstructions, accumulated sediments or debris	X	X	X
Ditch lining/bottoms are free of erosion	X	X	X
Check dams are spaced correctly to slow flow velocity	X		
Underlying filter fabric or gravel is not visible	X	X	X
Culvert aprons and plunge pools are sized for expected flows volume and velocity	X		
Stones are angular, durable and various in size	X		
Culverts are sized to avoid upgradient flooding	X	X	
Culvert protection extends to the maximum flow elevation within the ditch	X	X	X
Culvert is embedded, not hanging	X	X	X

CATCH BASIN SYSTEMS			
Catch basins are built properly	X		
Accumulated sediments and debris are removed from sump, grate and collection area		X	X
Floating debris and floating oils are removed from trap			X
ROADWAYS AND PARKING SURFACES			
The gravel pad at the construction entrance is clear from sediments	X	X	
Roads are crowned		X	X
Cross drainage (culvert) is provided	X		
False ditches (from winter sand) are graded		X	X
BUFFERS			
Buffers are free of erosion or concentrated flows		X	X
The downgradient of spreaders and turnouts is stable		X	X
Level spreaders are on the contour			X
The number of spreaders and ditch turnouts is adequate for flow distribution		X	X
Any sediment accumulation is removed from within spreader or turnouts		X	X
STORMWATER BASINS AND TRAPS			
Embankments are free of settlement, slope erosion, internal piping, and downstream swamping		X	X
All flow control structure or orifices are operational and clear of debris or sediments		X	X
Any pre-treatment structure that collects sediment or hydrocarbons is clean or maintained		X	X
Vegetated filters and infiltration basins have adequate grass growth			X
Any impoundment or forebay is free of sediment		X	X
WINTER CONSTRUCTION (November 1st-April15th)			
Final graded areas are mulched daily at twice the normal rate with hay, and anchor (not on snow)	Daily		
A double row of sediment barrier is provided for all areas within 100 ft of a sensitive resource (use erosion control mix on frozen ground)	Daily		
Newly constructed ditches are riprapped	Daily		
Slopes greater than 8% are covered with an erosion control blanket or a 4-inch layer of erosion control mix	Daily		
HOUSEKEEPING PUNCH LIST			
All disturbed areas are permanently stabilized, and plantings are established (grass seeds have germinated with 90% vegetative cover)			X
All trash, sediments, debris or any solid waste have been removed from stormwater channels, catch basins, detention structures, discharge points, etc.			X
All ESC devices have been removed: (silt fence and posts, diversions and sediment structures, etc.)			X
All deliverables (certifications, survey information, as-built plans, reports, notice of termination (NOT), etc.) in accordance with all permit requirements have been submitted to town, Maine DEP, association, owner, etc.			X

INSPECTION AND MAINTENANCE PLAN FOR STORMWATER MANAGEMENT STRUCTURES (BMPS)

	INSPECTION SCHEDULE	CORRECTIVE ACTIONS
VEGETATED AREAS	Annually early spring and after heavy rains	Inspect all slopes and embankments and replant areas of bare soil or with sparse growth
		Armor rill erosion areas with riprap or divert the runoff to a stable area
		Inspect and repair down-slope of all spreaders and turn-outs for erosion
		Mow vegetation as specified for the area
DITCHES, SWALES AND OPEN STORMWATER CHANNELS	Annually spring and late fall and after heavy rains	Remove obstructions, sediments or debris from ditches, swales and other open channels
		Repair any erosion of the ditch lining
		Mow vegetated ditches
		Remove woody vegetation growing through riprap
		Repair any slumping side slopes
		Repair riprap where underlying filter fabric or gravel is showing or if stones have dislodge
CULVERTS	Spring and late fall and after heavy rains	Remove accumulated sediments and debris at the inlet, outlet, or within the conduit
		Remove any obstruction to flow
		Repair any erosion damage at the culvert's inlet and outlet
CATCH BASINS	Annually in the spring	Remove sediments and debris from the bottom of the basin and inlet grates
		Remove floating debris and oils (using oil absorptive pads) from any trap
ROADWAYS AND PARKING AREAS	Annually in the spring or as needed	Clear and remove accumulated winter sand in parking lots and along roadways
		Sweep pavement to remove sediment
		Grade road shoulders and remove accumulated winter sand
		Grade gravel roads and gravel shoulders
		Clean out the sediment within water bars or open-top culverts
		Ensure that stormwater runoff is not impeded by false ditches of sediment in the shoulder
RESOURCE AND TREATMENT BUFFERS	Annually in the spring	Inspect buffers for evidence of erosion, concentrated flow, or encroachment by development
		Manage the buffer's vegetation with the requirements in any deed restrictions
		Repair any sign of erosion within a buffer
		Inspect and repair down-slope of all spreaders and turn-outs for erosion
		Install more level spreaders, or ditch turn-outs if needed for a better distribution of flow
		Clean out any accumulation of sediment within the spreader bays or turnout pools
		Mow non-wooded buffers no shorter than six inches and less than three times per year
WETPONDS AND DETENTION BASINS	Annually in fall and after heavy rains	Inspect the embankments for settlement, slope erosion, piping, and slumping
		Mow the embankment to control woody vegetation
		Inspect the outlet structure for broken seals, obstructed orifices, and plugged trash racks
		Remove and dispose of sediments and debris within the control structure
		Repair any damage to trash racks or debris guards
		Replace any dislodged stone in riprap spillways
		Remove and dispose of accumulated sediments within the impoundment and forebay
FILTRATION AND INFILTRATION BASINS	Annually in the spring and late fall	Clean the basin of debris, sediment and hydrocarbons
		Provide for the removal and disposal of accumulated sediments within the basin
		Renew the basin media if it fails to drain within 72 hours after a one inch rainfall event
		Till, seed and mulch the basin if vegetation is sparse
		Repair riprap where underlying filter fabric or gravel is showing or where stones have dislodged
PROPRIETARY DEVICES	As specified by manufacturer	Contract with a third-party for inspection and maintenance
		Follow the manufacturer's plan for cleaning of devices
OTHER PRACTICES	As specified for devices	Contact the department for appropriate inspection and maintenance requirements for other drainage control and runoff treatment measures.

Appendix E

Five-Year Recertification for Long-Term Maintenance of Stormwater Management Systems

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Resources
17 State House Station
Augusta, Maine 04333

FIVE-YEAR RECERTIFICATION FOR LONG-TERM MAINTENANCE OF STORMWATER MANAGEMENT SYSTEMS

For Site Location & Stormwater Projects

This form complies with the condition that requires reporting every 5 years on the long-term maintenance of stormwater management structures of projects permitted under the Stormwater Management Law since 2005. Complete the following sections, include inspection photos, and use additional paper if needed. A copy of the report if the inspection was performed by a professional experienced in BMP maintenance should be included. Electronic copy of this form and information about the five-year recertication are available on the Maine DEP website at: http://www.maine.gov/dep/land/stormwater/stormwaterbmps/

Please type or print in black ink only

Owner/Licensee		**3rd Party Inspection Company** (if applicable)	
Name of Representative:		**Name of Inspector or preparer of report:**	
Company:		**Company:**	
Mailing Address:		**Mailing Address:**	
Daytime Phone #:		**Daytime Phone #:**	
E-mail Address:		**E-mail Address:**	

LOCATION OF DEVELOPMENT			
Name of Project:			
Address and Town:			
DEP Permit Number:		**Year of Permit:**	

PROJECT SPECIFICS	
If the project is unfinished, please describe its current status and your plans for the future. The filing of this report of on-site long-term maintenance activities is still required.	
If the project is within a MPDES Regulated Town, the maintenance report prepared for the town should be submitted with this form.	
If the project is a subdivision with a Homeowner's association, identify the responsible party.	
Confirm that the required recording of deed restrictions for the protection of buffers or conservation land has been done, and that the buffers are maintained according to the restrictions.	
Identify the contractor for the required renewal of a 5-year maintenance contract for the inspection, cleaning and maintenance of manufactured proprietary structures.	
Is a maintenance log available for review?	

LONG-TERM MAINTENANCE (please comment on the following):
All areas of the development have been inspected for erosion, and appropriate steps have been taken to permanently stabilize these areas.
All stormwater control structures have been inspected for damage, wear, malfunction, and appropriate steps have been taken to repair or replace the failing systems.
The erosion control and stormwater maintenance plan for the site is being implemented as written, and a maintenance log has been created and is being maintained.

CERTIFICATIONS/SIGNATURES
By signing below. the owner (or authorized agent) certifies that all stormwater management structures at the project described above are stable and operational as designed.
Signed:_____ **Title**_____**Date:**_____
This completed form and all supporting documents summarized above shall be sent to the following address. An emailed report is appropriate and should be sent to Recert-DEP@maine.gov Five-year Recertification Bureau of Land Resources 17 State House Station Augusta, ME 04333 Tel: (207) 287-2624 or (207) 287-2602

Appendix F
Permit Orders