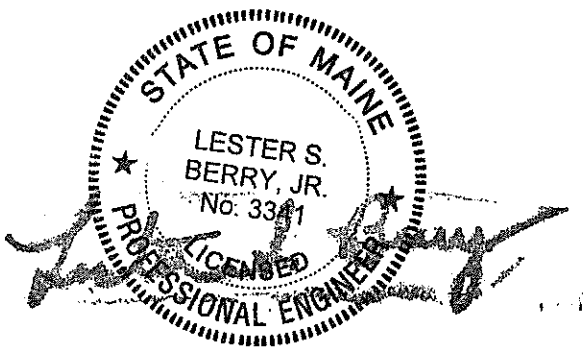
STORMWATER MANAGEMENT REPORT
FOR
CHABAD LUBAVITCH OF MAINE INC.
POMEROY STREET
PORTLAND, MAINE

April 2005
Revised March 2012
Revised November 2012
Revised April 2013



Prepared By:

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STORMWATER MANAGEMENT REPORT

For: **Chabad Lubavitch of Maine, Inc.**
Portland, Maine

Introduction

Chabad Lubavitch of Maine, Inc. is proposing to construct a single-family residence on his parcel. This project also includes the construction of approximately 200 feet of Pomeroy Street. This site is a 1.69-acre parcel of land located off of Pomeroy Street in Portland. See attached USGS Location Map.

Pomeroy Street is an un-constructed public way. Part of the proposed development includes constructing Pomeroy Street to the City of Portland standards.

The project site will be served by public water and public sewer. Both utilities shall be extended to the site from Bancroft Street.

The total impervious area of the residence, driveway and Pomeroy Street equals 13,296 s.f. (developed area = 28,554 s.f.) This is below the threshold for a DEP Stormwater Permit. Therefore, this report is for City of Portland Site Plan approval only.

A. Narrative

This site will house the residence of Rabbi Wilansky of Chabad Lubavitch of Maine, Inc. The building will be served by public water and sewer.

Construction of this building and related site improvements will not require a DEP Stormwater Permit. A similar project on this site was previously approved by the City of Portland for a single family home with attached assembly space (Site Plan and Conditional Use permits) back in August of 2005. These permits have since expired so the applicant is seeking to get new permits for the project with the removal of the assembly space. The original project received a DEP Tier I Wetland Alteration Permit (L22414-TB-A-N) for the filling of 13,028 s.f. of wetlands. An amendment to the Wetland Alteration Permit is required for this revised project since the wetland impacts have been reduced for the current proposed project (10,522 s.f.). This permit application will be filed by our office later in the approval process when the plans are further along.

B. Maps

See Appendix B.

C. Pre-development Site Plan

It is our understanding that abutters have drainage concerns about this project and continued concerns regarding a previous project called Redlon Park. We were able to obtain a digital file of the broader area that included the post-development drainage area for Redlon Park. As shown on the plan, the Redlon Park post-development basin generally passes to the south of the project site.

The project drainage basin consists of 6.10 acres of land that is tributary to an existing catchbasin on Bancroft Street. The project site (1.69 acres) makes up less than 1/3 of the drainage area. The basin is predominantly wooded except for the 5-6 existing homes. Although the site is moderately graded, the site appeared to be rather wet with sluggish drainage. The project will have no impact on the homes and land uphill (to the south).

D. Post-development Site Plan

The post-development plan is shown at a 1"=100 scale to provide an overall view. A second post-development plan is also included to provide a more detailed view. Key features include:

1. Pond 11 (Culvert under Driveway to residence) is an at grade (to avoid the collection of groundwater) culvert directing runoff from the wetlands under the proposed driveway to the downstream wetlands.
2. The driveway and single family house mostly drain back into the site (SA-11 & SA-24).
3. A ditch along the northerly portion of the proposed improvements should protect the Bancroft Street abutters from significant project site runoff (all runoff directed to wetlands).
4. All runoff eventually is discharged to the municipal combined sewer/drainage line (Reach 8) similar to current pre development conditions
5. Reach 11-Flow remains directed to this wetland to encourage infiltration, thus ultimately reducing the volume of runoff discharged to the combined City sewer/drainage line in Bancroft Street.
6. A curtain drain has been added along the eastern side of the Pomeroy Street improvements. All runoff from Pomeroy Street will be directed to this curtain drain where it will infiltrate into the ground. An outlet pipe has been proposed for periods of significant rainfall that will discharge flow to the existing catchbasin (Reach 8) in Bancroft Street.

E. Runoff Analysis

The runoff from the site was calculated using HydroCAD computer software by Applied Microcomputer System, Chocura, New Hampshire. Both pre-

development and post-development calculations are in the same model (see calculations in Appendix C).

The analysis point is the existing Catch basin in Bancroft Street.

	Pre (SA-1)	Post (Reach 8)
2-Year Storm	3.13 c.f.s.	1.73 c.f.s.
10-Year Storm	7.57 c.f.s.	4.86 c.f.s.
25-Year Storm	9.86 c.f.s.	6.57 c.f.s.

The peak flow rates have been decreased for all storm events for this project. The project will also reduce drainage impacts to surrounding homes as the project is currently designed. No adverse impacts are anticipated to abutting homes or neighboring natural resources as a result of this project. The volume and peak rate of runoff directed to the existing catch basin within Bancroft Street (Analysis Point #1) has been significantly reduced by this design (67% for 25-year storm).

APPENDIX A

ANALYST'S QUALIFICATIONS

BH2M

Providing Quality Civil-Site Engineering & Surveying for Over 33 Years.

SERVICES:

- Site Development Design
- Subdivision Design
- Stormwater Management Analysis & Design
- Utility Design
- Roadway Design
- Development Permitting
- Construction Administration & Oversight
- Full Service Survey Department

COMPANY OVERVIEW

Berry Huff McDonald Milligan Inc. (BH2M) was founded in 1978 in Gorham, Maine to provide quality civil-site engineering and surveying services. Over the past 33 years BH2M has worked on over 6,000 projects for our diverse client base, which consists of Municipal and Private Sector clients. BH2M has developed a reputation for a strong committment to excellence in all portions of a project. The staff structure at BH2M is unique in that all the engineers and project managers are partners within the company. This has been a successful formula that has resulted in many long standing relationships with our clients. Each project at BH2M is overseen by a senior principal within the company to assure the highest level of quality of work and performance.

EXPERIENCE

BH2M has provided Quality Civil-Site Engineering and Surveying on many projects within the City of Portland, Including:

Office & Commercial Developments
- Oakhurst Dairy
- WB Mason Headquarters
- Unum
- Walgreens - Bayside Area

Hospitals
- Childrens Hospital
- Congress St. Medical Building

Roadway Improvements
- Oak Street

Major Industrial
- Brunswick Naval Air Station Hanger Project - Brunswick
- Brunswick Naval Air Station Tower Project - Brunswick
- Savage Intermodel Facility - Auburn
- Pratt-Whitney - North Berwick

CURRENT PROJECTS

- Route 25 & Oak Hill Road Intersection Relocation and Sidewalk Project- Standish
- Summer Winds Condominiums - Old Orchard Beach
- Black Point Park at Scarborough Beach - Scarborough
- Village Square Sidewalk Restoration - Gorham
- Fogg Brook Subdivision - Buxton
- Sawyer Estates Subdivision - Gorham

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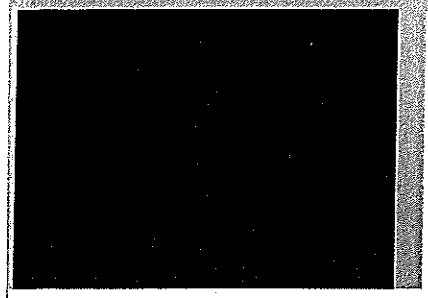
Selected Stormwater Management Project Experience



- Route 25 & Oak Hill Road Reconstruction & Drainage Improvement, Standish 2012
- Summer Winds Condominium, Old Orchard Beach 2011
- Village Square Sidewalk Reconstruction, Gorham 2011
- Black Point Park at Scarborough Beach, Scarborough 2011
- Fogg Brook Subdivision, Gorham 2011
- Sawyer Estates Subdivision, Gorham 2011
- Golden Ridge Subidvision, Cape Elizabeth 2011
- Juniper Knoll Subdivision, Saco 2010
- Meadowbrook Subdivision, Waterboro 2010
- Bradbury Ridge Subdivision, Hollis 2010
- Lands End Subdivision, Old Orchard Beach 2010
- Limington Salt Shed, Limington 2010
- Peterson Fields Subdivision, 2010
- The Trails Subdivision, Saco 2010
- Mitchell Hill Subdivision, Windham 2010
- Stonehill Subdivision, Biddeford 2010
- Kate's Homemade Butter Plant, Arundel 2010
- Carsons Point Subdivision, Saco 2010
- Pratts Brook Farm Subdivision, Yarmouth 2010
- Highland Glen Subdivision, Yarmouth 2010
- Tucker Road Culvert Improvements, Limington 2010
- Dunegrass Sections B & C, Old Orchard Beach 2010
- Skylark Commons Subdivision, Portland 2009
- Pleasant Ridge Subdivision, Buxton 2009
- Wholesale Distribution and Warehouse Facility, Brockton Ma 2009
- Willowdale Commons Condominium, Old Orchard Beach 2009
- Atlantic Park Condominium, Old Orchard Beach 2009
- Whispering Pines Subdivision, Buxton 2009
- Aceto Construction Facility, Buxton 2009
- D & E Enterprises Facility, Hollis 2009
- K & S Subdivision, Sanford 2009
- Wild Acres Campground Expansion, Old Orchard Beack 2009
- Hardware Store, Biddeford 2009
- Hid n Pines Campground, Old Orchard Beach 2009
- Green Court Acres Subdivision, Waterboro 2009

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BH2M

Lester S. Berry, P.E.

EDUCATION:

B.S. Civil Engineering
University of Maine

M.S. Civil Engineering
University of Maine

PROFESSIONAL SOCIETIES:

American Society of Civil Engineers

Maine Association of Planners

Construction Specifications Institute

PROFESSIONAL BACKGROUND:

Vice President BH2M
1978 - Present
Gorham, Maine

Project Engineer
Dale E. Caruthers Company
1975 - 1978
Gorham, Maine

Engineer
State of New Hampshire
1971 - 1972
Concord, New Hampshire

Lester S. Berry, P.E.
Vice President & Senior Engineer

Les co-founded Berry Huff McDonald Milligan Inc. in 1978. He has 40 years of experience in both the public and private sector and has worked on projects in Maine and New Hampshire. His expertise includes a diversified range of all aspects of civil-site engineering, with a focus on site development and the design and implementation of state of the art Stormwater Management Systems.

The following is a list of recent projects worked on by Les:

- Route 25 & Oak Hill Road Intersection Relocation and Sidewalk Project, Standish 2012
- Summer Winds Condominium, Old Orchard Beach 2011
- Village Square Sidewalk Restoration, Gorham 2011
- Black Point Park at Scarborough Beach, Scarborough 2011
- Sawyer Estates Subdivision, Gorham 2011
- Limington Salt Shed, Limington 2011
- Kate's Homemade Butter Plant, Arundel 2011
- Peterson Fields Subdivision, Gorham 2010
- The Trails Subdivision, Gorham 2010
- Savage Intermodal Facility, Auburn 2010
- Childrens Hospital, Portland 2010
- Tucker Road Culvert Improvements, Limington 2010
- Mitchell Hill Subdivision, Windham 2010
- Stonehill Subdivision, Biddeford 2010
- Skylark Commons Subdivision, Portland 2010
- WB Mason Headquarters, Portland 2009
- Walgreens, Portland 2009
- Unum Site Improvements, Portland 2008
- Congress Street Medical Building, Portland 2008

STORMWATER EDUCATION: Hydraulic & related College course Erosion & Sediment Control Stormwater Management Water Conservation Districts, Phosphorus Management, Erosion Control Seminars by Maine DEP, HydroCAD & Advanced HydroCAD, BMP's for Stormwater and Erosion Control.

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Andrew S. Morrell, E.I.T.

EDUCATION:

B.S. Civil Engineering
State University of New York
Buffalo, NY

PROFESSIONAL BACKGROUND:

Project Engineer
BH2M - Gorham, Me
August 2001 - August 2007
April 2010 - Present

Project Engineer
DeLuca-Hoffman Associates
South Portland, Me
August 2007 - March 2010

Project Engineer
Diversified Civil Engineering
Westford, Ma
May 1999 - August 2001

STORMWATER EDUCATION:

Hydraulics Review Class
for Professional Engineering
License Exam - ASCE 2009

Hydrocad Seminar
Joint Environment Training
Coordinating Committee 2002

STORMWATER EXPERIENCE:

12 years experience
performing stormwater
management design and
calculations.

Andrew S. Morrell, E.I.T.
Project Engineer

Andy has worked for BH2M for over 9 years and has over 12 years of experience in both the public and private sector and has worked on projects in Maine and Massachusetts. His expertise includes site development, subdivisions and the design of supporting Stormwater Management Systems.

The following is a list of recent projects worked on by Andy:

- Route 25 & Oak Hill Road Intersection Relocation and Sidewalk Project, Standish 2012
- Childrens Hospital, Portland 2011
- Village Square Sidewalk Restoration, Gorham 2011
- Black Point Park at Scarborough Beach, Scarborough 2011
- Sawyer Estates Subdivision, Gorham 2011
- Juniper Knoll Subdivision, Saco 2010
- Limington Salt Shed, Limington 2010
- Kate's Homemade Butter Plant, Arundel 2010
- Tucker Road Culvert Improvements, Limington 2010
- Bradbury Ridge Subdivision, Buxton 2010
- Lands End Subdivision, Old Orchard Beach 2010
- Peterson Fields Subdivision, Gorham 2010
- The Trails Subdivision, Saco 2010
- Mitchell Hill Subdivision, Windham 2010
- Stonehill Subdivision, Biddeford 2010
- Carsons Point Subdivision, Saco 2010
- Pratts Brook Farm Subdivision, Yarmouth 2010
- Highland Glen Subdivision, Yarmouth 2010
- Skylark Commons Subdivision, Portland 2010
- Sunrise Ridge Subdivision, Buxton 2009
- Atlantic Park Condominium, Old Orchard Beach 2009
- Pleasant Ridge Subdivision, Buxton 2009
- Dunegrass Sections B & C, Old Orchard Beach 2009
- Meadowbrook Subdivision, Waterboro 2009
- Aceto Construction Facility, Buxton 2009
- Unum Site Improvements, Portland 2009

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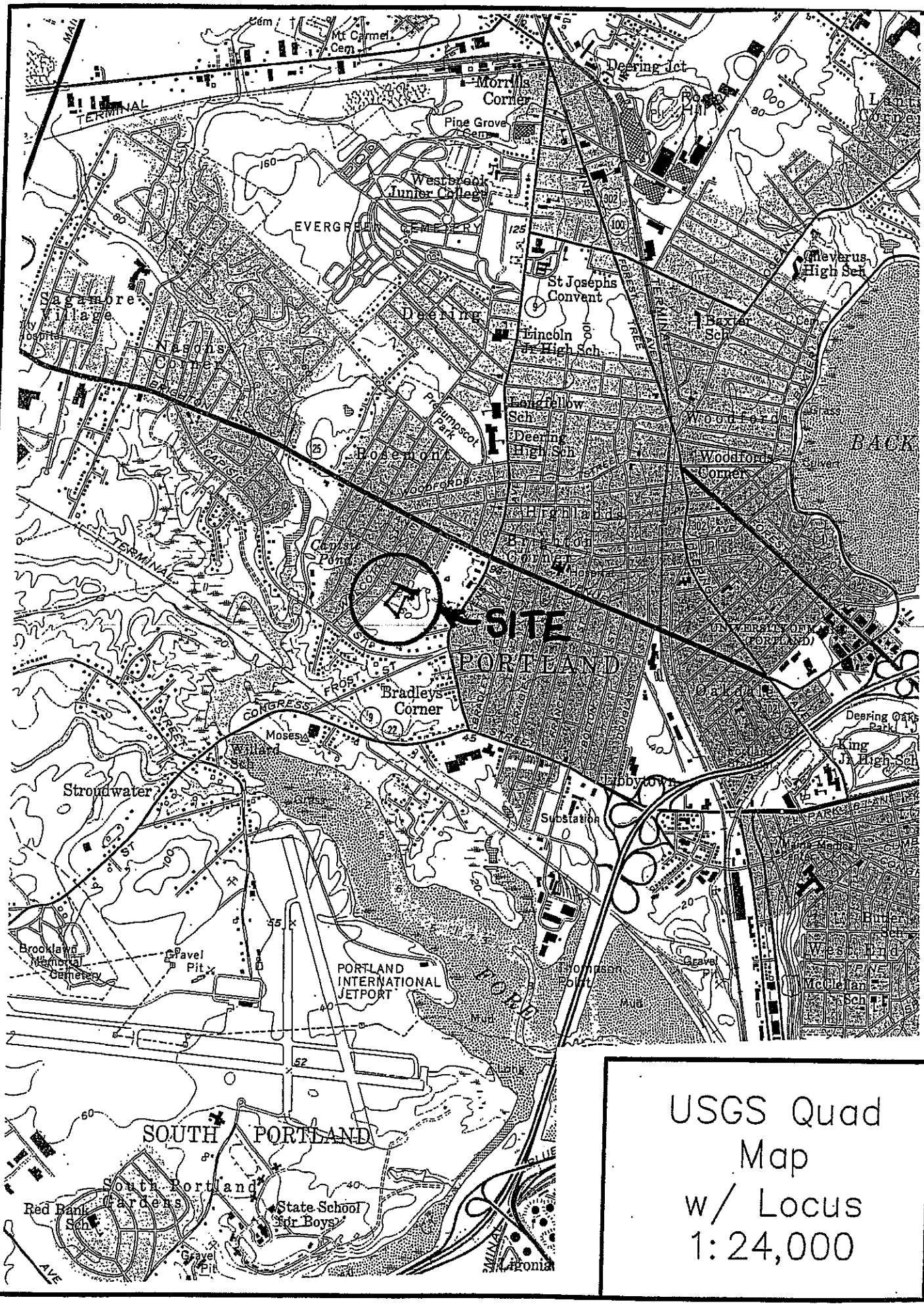
APPENDIX B

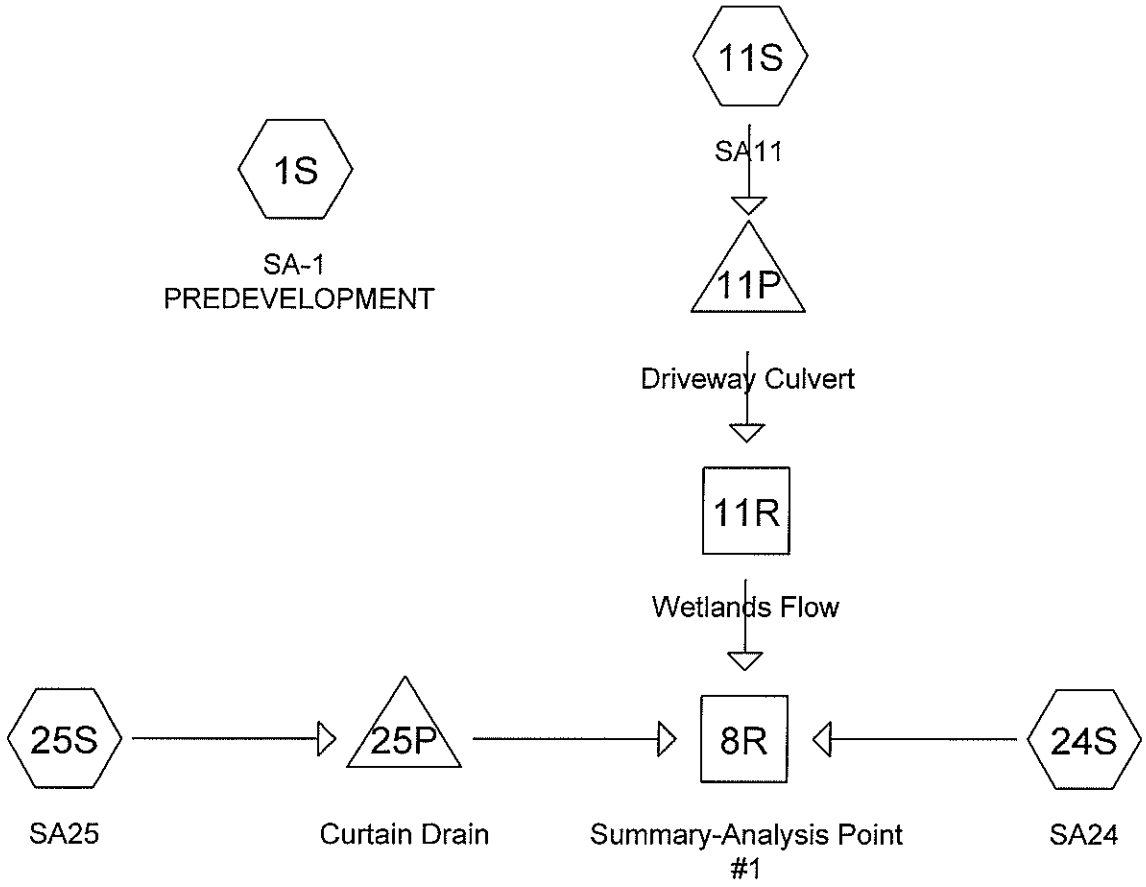
MAPS



USGS Quad Map w/ Locus 1:24,000

APPENDIX C

STORMWATER CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for CHABAD -Revised 4-15-2013
Prepared by Berry Huff McDonald Milligan, Inc., Printed 4/10/2013

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.720	55	Woods, Good, HSG B (1S, 11S)
1.510	70	Woods, Good, HSG C (1S, 11S, 25S)
0.170	74	>75% Grass cover, Good, HSG C (11S, 24S, 25S)
0.940	75	1/4 acre lots, 38% imp, HSG B (1S, 11S)
1.660	77	Woods, Good, HSG D (1S, 11S, 25S)
0.180	80	>75% Grass cover, Good, HSG D (11S, 24S)
2.120	83	1/4 acre lots, 38% imp, HSG C (1S, 24S)
2.550	87	1/4 acre lots, 38% imp, HSG D (1S, 11S, 24S)
0.040	98	Existing Impervious Area (25S)
0.310	98	Proposed Impervious Area (11S, 24S, 25S)
12.200	**75**	**TOTAL AREA**

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

Subcatchment 1S:SA-1 Runoff Area=6.100 ac 20.62% Impervious Runoff Depth>0.86"
Flow Length=1,000' Tc=41.4 min CN=75 Runoff=3.13 cfs 0.438 af

Subcatchment 11S:SA11 Runoff Area=4.310 ac 15.14% Impervious Runoff Depth>0.68"
Flow Length=772' Tc=36.7 min CN=71 Runoff=1.76 cfs 0.242 af

Subcatchment 24S:SA24 Runoff Area=1.110 ac 36.18% Impervious Runoff Depth>1.40"
Flow Length=401' Tc=19.3 min CN=84 Runoff=1.34 cfs 0.130 af

Subcatchment 25S:SA25 Runoff Area=0.680 ac 25.00% Impervious Runoff Depth>1.20"
Flow Length=455' Slope=0.0200 '/' Tc=37.9 min CN=81 Runoff=0.52 cfs 0.068 af

Reach 8R: Summary-Analysis Point #1 Inflow=1.73 cfs 0.410 af
Outflow=1.73 cfs 0.410 af

Reach 11R: Wetlands Flow Avg. Flow Depth=0.26' Max Vel=0.51 fps Inflow=1.21 cfs 0.242 af
n=0.150 L=229.0' S=0.0207 '/' Capacity=36.93 cfs Outflow=1.19 cfs 0.238 af

Pond 11P: Driveway Culvert Peak Elev=63.24' Storage=1,509 cf Inflow=1.76 cfs 0.242 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=1.21 cfs 0.242 af

Pond 25P: Curtain Drain Peak Elev=61.95' Storage=1,236 cf Inflow=0.52 cfs 0.068 af
6.0" Round Culvert n=0.012 L=234.0' S=0.0296 '/' Outflow=0.33 cfs 0.042 af

Total Runoff Area = 12.200 ac Runoff Volume = 0.878 af Average Runoff Depth = 0.86"
79.66% Pervious = 9.718 ac 20.34% Impervious = 2.482 ac

Summary for Subcatchment 1S: SA-1 PREDEVELOPMENT

Runoff = 3.13 cfs @ 12.62 hrs, Volume= 0.438 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.00"

Area (ac)	CN	Description
1.050	87	1/4 acre lots, 38% imp, HSG D
1.050	77	Woods, Good, HSG D
1.250	55	Woods, Good, HSG B
0.760	75	1/4 acre lots, 38% imp, HSG B
1.500	83	1/4 acre lots, 38% imp, HSG C
0.490	70	Woods, Good, HSG C
6.100	75	Weighted Average
4.842		79.38% Pervious Area
1.258		20.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
14.5	850	0.0380	0.97		**Shallow Concentrated Flow, LIGHT WOODS** Woodland Kv= 5.0 fps
41.4	1,000	Total			

Summary for Subcatchment 11S: SA11

Runoff = 1.76 cfs @ 12.58 hrs, Volume= 0.242 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.00"

	Area (ac)	CN	Description
	0.890	70	Woods, Good, HSG C
	0.260	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.090	98	Proposed Impervious Area
	0.040	80	>75% Grass cover, Good, HSG D
	0.080	74	>75% Grass cover, Good, HSG C
	0.180	75	1/4 acre lots, 38% imp, HSG B
	1.470	55	Woods, Good, HSG B
	4.310	71	Weighted Average
	3.658		84.86% Pervious Area
	0.652		15.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
9.8	622	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.7	772	Total			

Summary for Subcatchment 24S: SA24

Runoff = 1.34 cfs @ 12.27 hrs, Volume= 0.130 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.00"

	Area (ac)	CN	Description
	0.200	87	1/4 acre lots, 38% imp, HSG D
	0.620	83	1/4 acre lots, 38% imp, HSG C
*	0.090	98	Proposed Impervious Area
	0.140	80	>75% Grass cover, Good, HSG D
	0.060	74	>75% Grass cover, Good, HSG C
	1.110	84	Weighted Average
	0.708		63.82% Pervious Area
	0.402		36.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0330	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	94	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
19.3	401	Total			

Summary for Subcatchment 25S: SA25

Runoff = 0.52 cfs @ 12.54 hrs, Volume= 0.068 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Event Rainfall=3.00"

	Area (ac)	CN	Description
*	0.130	98	Proposed Impervious Area
	0.030	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.350	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.680	81	Weighted Average
	0.510		75.00% Pervious Area
	0.170		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.2	305	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	455	Total			

Summary for Reach 8R: Summary-Analysis Point #1

Inflow Area = 6.100 ac, 20.07% Impervious, Inflow Depth > 0.81" for 2-Year Storm Event event
Inflow = 1.73 cfs @ 12.98 hrs, Volume= 0.410 af
Outflow = 1.73 cfs @ 12.98 hrs, Volume= 0.410 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 11R: Wetlands Flow

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 0.67" for 2-Year Storm Event event
Inflow = 1.21 cfs @ 12.91 hrs, Volume= 0.242 af
Outflow = 1.19 cfs @ 13.13 hrs, Volume= 0.238 af, Atten= 2%, Lag= 13.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.51 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 12.7 min

Peak Storage= 535 cf @ 13.01 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.50' Flow Area= 27.4 sf, Capacity= 36.93 cfs

7.00' x 1.50' deep channel, n= 0.150
Side Slope Z-value= 10.0 5.0 '/' Top Width= 29.50'
Length= 229.0' Slope= 0.0207 '/'
Inlet Invert= 62.43', Outlet Invert= 57.69'

‡

Summary for Pond 11P: Driveway Culvert

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 0.68" for 2-Year Storm Event event
Inflow = 1.76 cfs @ 12.58 hrs, Volume= 0.242 af
Outflow = 1.21 cfs @ 12.91 hrs, Volume= 0.242 af, Atten= 31%, Lag= 19.9 min
Primary = 1.21 cfs @ 12.91 hrs, Volume= 0.242 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 63.24' @ 12.91 hrs Surf.Area= 3,015 sf Storage= 1,509 cf

Plug-Flow detention time= 11.4 min calculated for 0.242 af (100% of inflow)
Center-of-Mass det. time= 10.6 min (862.6 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	62.65'	24,075 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.65	100	0	0
63.00	193	51	51
64.00	11,964	6,079	6,130
65.00	23,926	17,945	24,075

Device	Routing	Invert	Outlet Devices
#1	Primary	62.65'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.65' / 62.43' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.20 cfs @ 12.91 hrs HW=63.24' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.20 cfs @ 2.77 fps)

Summary for Pond 25P: Curtain Drain

Inflow Area = 0.680 ac, 25.00% Impervious, Inflow Depth > 1.20" for 2-Year Storm Event event
Inflow = 0.52 cfs @ 12.54 hrs, Volume= 0.068 af
Outflow = 0.33 cfs @ 12.92 hrs, Volume= 0.042 af, Atten= 36%, Lag= 22.4 min
Primary = 0.33 cfs @ 12.92 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 61.95' @ 12.92 hrs Surf.Area= 702 sf Storage= 1,236 cf

Plug-Flow detention time= 134.1 min calculated for 0.042 af (61% of inflow)
Center-of-Mass det. time= 61.2 min (889.6 - 828.4)

Volume	Invert	Avail.Storage	Storage Description
#1	54.58'	2,092 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,231 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.58	10	0	0
55.00	100	23	23
56.00	200	150	173
57.00	300	250	423
58.00	400	350	773
59.00	500	450	1,223
60.00	600	550	1,773
61.00	700	650	2,423
61.50	702	351	2,774
62.00	702	351	3,125
63.00	702	702	3,827
64.00	702	702	4,529
65.00	702	702	5,231

Device	Routing	Invert	Outlet Devices
#1	Primary	61.50'	**6.0" Round Culvert** L= 234.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.50' / 54.58' S= 0.0296 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.33 cfs @ 12.92 hrs HW=61.95' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.33 cfs @ 1.80 fps)

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

Subcatchment 1S:SA-1 Runoff Area=6.100 ac 20.62% Impervious Runoff Depth>2.02"
Flow Length=1,000' Tc=41.4 min CN=75 Runoff=7.57 cfs 1.026 af

Subcatchment 11S:SA11 Runoff Area=4.310 ac 15.14% Impervious Runoff Depth>1.72"
Flow Length=772' Tc=36.7 min CN=71 Runoff=4.80 cfs 0.618 af

Subcatchment 24S:SA24 Runoff Area=1.110 ac 36.18% Impervious Runoff Depth>2.80"
Flow Length=401' Tc=19.3 min CN=84 Runoff=2.66 cfs 0.259 af

Subcatchment 25S:SA25 Runoff Area=0.680 ac 25.00% Impervious Runoff Depth>2.52"
Flow Length=455' Slope=0.0200 '/' Tc=37.9 min CN=81 Runoff=1.10 cfs 0.143 af

Reach 8R: Summary-Analysis Point #1 Inflow=4.86 cfs 0.987 af
Outflow=4.86 cfs 0.987 af

Reach 11R: Wetlands Flow Avg. Flow Depth=0.47' Max Vel=0.71 fps Inflow=3.53 cfs 0.617 af
n=0.150 L=229.0' S=0.0207 '/' Capacity=36.93 cfs Outflow=3.48 cfs 0.612 af

Pond 11P: Driveway Culvert Peak Elev=63.75' Storage=4,619 cf Inflow=4.80 cfs 0.618 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=3.53 cfs 0.617 af

Pond 25P: Curtain Drain Peak Elev=63.31' Storage=1,618 cf Inflow=1.10 cfs 0.143 af
6.0" Round Culvert n=0.012 L=234.0' S=0.0296 '/' Outflow=0.93 cfs 0.116 af

Total Runoff Area = 12.200 ac Runoff Volume = 2.045 af Average Runoff Depth = 2.01"
79.66% Pervious = 9.718 ac 20.34% Impervious = 2.482 ac

Summary for Subcatchment 1S: SA-1 PREDEVELOPMENT

Runoff = 7.57 cfs @ 12.58 hrs, Volume= 1.026 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.70"

Area (ac)	CN	Description
1.050	87	1/4 acre lots, 38% imp, HSG D
1.050	77	Woods, Good, HSG D
1.250	55	Woods, Good, HSG B
0.760	75	1/4 acre lots, 38% imp, HSG B
1.500	83	1/4 acre lots, 38% imp, HSG C
0.490	70	Woods, Good, HSG C
6.100	75	Weighted Average
4.842		79.38% Pervious Area
1.258		20.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
14.5	850	0.0380	0.97		**Shallow Concentrated Flow, LIGHT WOODS** Woodland Kv= 5.0 fps
41.4	1,000	Total			

Summary for Subcatchment 11S: SA11

Runoff = 4.80 cfs @ 12.53 hrs, Volume= 0.618 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.70"

	Area (ac)	CN	Description
	0.890	70	Woods, Good, HSG C
	0.260	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.090	98	Proposed Impervious Area
	0.040	80	>75% Grass cover, Good, HSG D
	0.080	74	>75% Grass cover, Good, HSG C
	0.180	75	1/4 acre lots, 38% imp, HSG B
	1.470	55	Woods, Good, HSG B
	4.310	71	Weighted Average
	3.658		84.86% Pervious Area
	0.652		15.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
9.8	622	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.7	772	Total			

Summary for Subcatchment 24S: SA24

Runoff = 2.66 cfs @ 12.26 hrs, Volume= 0.259 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.70"

	Area (ac)	CN	Description
	0.200	87	1/4 acre lots, 38% imp, HSG D
	0.620	83	1/4 acre lots, 38% imp, HSG C
*	0.090	98	Proposed Impervious Area
	0.140	80	>75% Grass cover, Good, HSG D
	0.060	74	>75% Grass cover, Good, HSG C
	1.110	84	Weighted Average
	0.708		63.82% Pervious Area
	0.402		36.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0330	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	94	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
19.3	401	Total			

Summary for Subcatchment 25S: SA25

Runoff = 1.10 cfs @ 12.52 hrs, Volume= 0.143 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Event Rainfall=4.70"

	Area (ac)	CN	Description
*	0.130	98	Proposed Impervious Area
	0.030	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.350	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.680	81	Weighted Average
	0.510		75.00% Pervious Area
	0.170		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.2	305	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	455	Total			

Summary for Reach 8R: Summary-Analysis Point #1

Inflow Area = 6.100 ac, 20.07% Impervious, Inflow Depth > 1.94" for 10-Year Storm Event event
Inflow = 4.86 cfs @ 12.89 hrs, Volume= 0.987 af
Outflow = 4.86 cfs @ 12.89 hrs, Volume= 0.987 af, Atten= 0%, Lag= 0.0 min

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

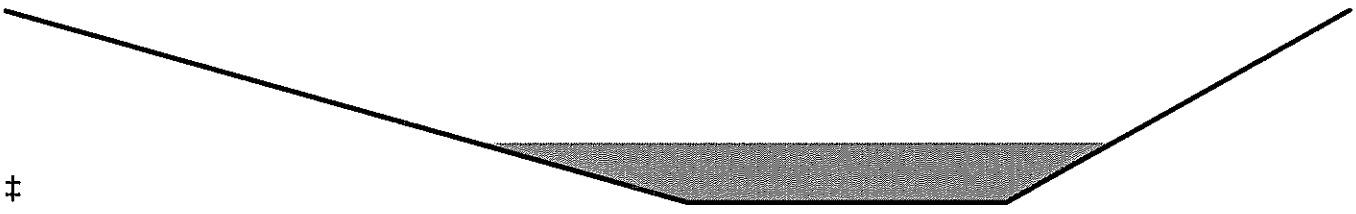
Summary for Reach 11R: Wetlands Flow

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 1.72" for 10-Year Storm Event event
Inflow = 3.53 cfs @ 12.82 hrs, Volume= 0.617 af
Outflow = 3.48 cfs @ 12.98 hrs, Volume= 0.612 af, Atten= 1%, Lag= 9.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.71 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 10.2 min

Peak Storage= 1,129 cf @ 12.89 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.50' Flow Area= 27.4 sf, Capacity= 36.93 cfs

7.00' x 1.50' deep channel, n= 0.150
Side Slope Z-value= 10.0 5.0 '/' Top Width= 29.50'
Length= 229.0' Slope= 0.0207 '/'
Inlet Invert= 62.43', Outlet Invert= 57.69'



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Summary for Pond 11P: Driveway Culvert

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 1.72" for 10-Year Storm Event event
Inflow = 4.80 cfs @ 12.53 hrs, Volume= 0.618 af
Outflow = 3.53 cfs @ 12.82 hrs, Volume= 0.617 af, Atten= 27%, Lag= 16.9 min
Primary = 3.53 cfs @ 12.82 hrs, Volume= 0.617 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 63.75' @ 12.82 hrs Surf.Area= 9,038 sf Storage= 4,619 cf

Plug-Flow detention time= 16.7 min calculated for 0.617 af (100% of inflow)
Center-of-Mass det. time= 16.3 min (847.9 - 831.6)

Volume	Invert	Avail.Storage	Storage Description
#1	62.65'	24,075 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.65	100	0	0
63.00	193	51	51
64.00	11,964	6,079	6,130
65.00	23,926	17,945	24,075

Device	Routing	Invert	Outlet Devices
#1	Primary	62.65'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.65' / 62.43' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.52 cfs @ 12.82 hrs HW=63.75' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.52 cfs @ 3.54 fps)

Summary for Pond 25P: Curtain Drain

Inflow Area = 0.680 ac, 25.00% Impervious, Inflow Depth > 2.52" for 10-Year Storm Event event
Inflow = 1.10 cfs @ 12.52 hrs, Volume= 0.143 af
Outflow = 0.93 cfs @ 12.72 hrs, Volume= 0.116 af, Atten= 15%, Lag= 11.9 min
Primary = 0.93 cfs @ 12.72 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 63.31' @ 12.72 hrs Surf.Area= 702 sf Storage= 1,618 cf

Plug-Flow detention time= 80.2 min calculated for 0.116 af (82% of inflow)
Center-of-Mass det. time= 32.7 min (844.9 - 812.2)

Volume	Invert	Avail.Storage	Storage Description
#1	54.58'	2,092 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,231 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.58	10	0	0
55.00	100	23	23
56.00	200	150	173
57.00	300	250	423
58.00	400	350	773
59.00	500	450	1,223
60.00	600	550	1,773
61.00	700	650	2,423
61.50	702	351	2,774
62.00	702	351	3,125
63.00	702	702	3,827
64.00	702	702	4,529
65.00	702	702	5,231

Device	Routing	Invert	Outlet Devices
#1	Primary	61.50'	**6.0" Round Culvert** L= 234.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.50' / 54.58' S= 0.0296 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=0.93 cfs @ 12.72 hrs HW=63.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.93 cfs @ 4.74 fps)

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

Subcatchment 1S:SA-1 Runoff Area=6.100 ac 20.62% Impervious Runoff Depth>2.63"
Flow Length=1,000' Tc=41.4 min CN=75 Runoff=9.86 cfs 1.335 af

Subcatchment 11S:SA11 Runoff Area=4.310 ac 15.14% Impervious Runoff Depth>2.29"
Flow Length=772' Tc=36.7 min CN=71 Runoff=6.43 cfs 0.821 af

Subcatchment 24S:SA24 Runoff Area=1.110 ac 36.18% Impervious Runoff Depth>3.49"
Flow Length=401' Tc=19.3 min CN=84 Runoff=3.29 cfs 0.323 af

Subcatchment 25S:SA25 Runoff Area=0.680 ac 25.00% Impervious Runoff Depth>3.18"
Flow Length=455' Slope=0.0200 '/' Tc=37.9 min CN=81 Runoff=1.38 cfs 0.180 af

Reach 8R: Summary-AnalysisPoint #1 Inflow=6.57 cfs 1.291 af
Outflow=6.57 cfs 1.291 af

Reach 11R: Wetlands Flow Avg. Flow Depth=0.55' Max Vel=0.78 fps Inflow=4.84 cfs 0.820 af
n=0.150 L=229.0' S=0.0207 '/' Capacity=36.93 cfs Outflow=4.78 cfs 0.814 af

Pond 11P: Driveway Culvert Peak Elev=64.00' Storage=6,133 cf Inflow=6.43 cfs 0.821 af
18.0" Round Culvert n=0.012 L=45.0' S=0.0049 '/' Outflow=4.84 cfs 0.820 af

Pond 25P: Curtain Drain Peak Elev=64.17' Storage=1,860 cf Inflow=1.38 cfs 0.180 af
6.0" Round Culvert n=0.012 L=234.0' S=0.0296 '/' Outflow=1.13 cfs 0.154 af

Total Runoff Area = 12.200 ac Runoff Volume = 2.660 af Average Runoff Depth = 2.62"
79.66% Pervious = 9.718 ac 20.34% Impervious = 2.482 ac

Summary for Subcatchment 1S: SA-1 PREDEVELOPMENT

Runoff = 9.86 cfs @ 12.58 hrs, Volume= 1.335 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.50"

Area (ac)	CN	Description
1.050	87	1/4 acre lots, 38% imp, HSG D
1.050	77	Woods, Good, HSG D
1.250	55	Woods, Good, HSG B
0.760	75	1/4 acre lots, 38% imp, HSG B
1.500	83	1/4 acre lots, 38% imp, HSG C
0.490	70	Woods, Good, HSG C
6.100	75	Weighted Average
4.842		79.38% Pervious Area
1.258		20.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
14.5	850	0.0380	0.97		**Shallow Concentrated Flow, LIGHT WOODS** Woodland Kv= 5.0 fps
41.4	1,000	Total			

Summary for Subcatchment 11S: SA11

Runoff = 6.43 cfs @ 12.52 hrs, Volume= 0.821 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.50"

	Area (ac)	CN	Description
	0.890	70	Woods, Good, HSG C
	0.260	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.090	98	Proposed Impervious Area
	0.040	80	>75% Grass cover, Good, HSG D
	0.080	74	>75% Grass cover, Good, HSG C
	0.180	75	1/4 acre lots, 38% imp, HSG B
	1.470	55	Woods, Good, HSG B
	4.310	71	Weighted Average
	3.658		84.86% Pervious Area
	0.652		15.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
9.8	622	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.7	772	Total			

Summary for Subcatchment 24S: SA24

Runoff = 3.29 cfs @ 12.26 hrs, Volume= 0.323 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.50"

	Area (ac)	CN	Description
	0.200	87	1/4 acre lots, 38% imp, HSG D
	0.620	83	1/4 acre lots, 38% imp, HSG C
*	0.090	98	Proposed Impervious Area
	0.140	80	>75% Grass cover, Good, HSG D
	0.060	74	>75% Grass cover, Good, HSG C
	1.110	84	Weighted Average
	0.708		63.82% Pervious Area
	0.402		36.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0330	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.3	94	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	157	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
19.3	401	Total			

Summary for Subcatchment 25S: SA25

Runoff = 1.38 cfs @ 12.52 hrs, Volume= 0.180 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Event Rainfall=5.50"

	Area (ac)	CN	Description
*	0.130	98	Proposed Impervious Area
	0.030	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.350	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.680	81	Weighted Average
	0.510		75.00% Pervious Area
	0.170		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.2	305	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.9	455	Total			

Summary for Reach 8R: Summary-Analysis Point #1

Inflow Area = 6.100 ac, 20.07% Impervious, Inflow Depth > 2.54" for 25-Year Storm Event event
Inflow = 6.57 cfs @ 12.87 hrs, Volume= 1.291 af
Outflow = 6.57 cfs @ 12.87 hrs, Volume= 1.291 af, Atten= 0%, Lag= 0.0 min

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

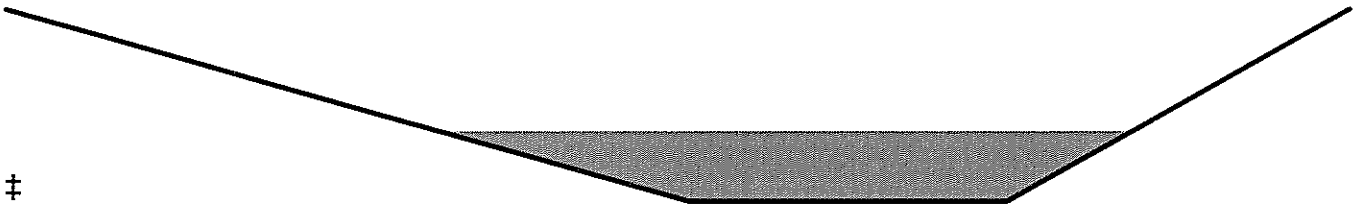
Summary for Reach 11R: Wetlands Flow

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 2.28" for 25-Year Storm Event event
Inflow = 4.84 cfs @ 12.79 hrs, Volume= 0.820 af
Outflow = 4.78 cfs @ 12.94 hrs, Volume= 0.814 af, Atten= 1%, Lag= 8.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.78 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.40 fps, Avg. Travel Time= 9.6 min

Peak Storage= 1,415 cf @ 12.86 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.50' Flow Area= 27.4 sf, Capacity= 36.93 cfs

7.00' x 1.50' deep channel, n= 0.150
Side Slope Z-value= 10.0 5.0 '/' Top Width= 29.50'
Length= 229.0' Slope= 0.0207 '/'
Inlet Invert= 62.43', Outlet Invert= 57.69'



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Summary for Pond 11P: Driveway Culvert

Inflow Area = 4.310 ac, 15.14% Impervious, Inflow Depth > 2.29" for 25-Year Storm Event event
Inflow = 6.43 cfs @ 12.52 hrs, Volume= 0.821 af
Outflow = 4.84 cfs @ 12.79 hrs, Volume= 0.820 af, Atten= 25%, Lag= 16.0 min
Primary = 4.84 cfs @ 12.79 hrs, Volume= 0.820 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 64.00' @ 12.79 hrs Surf.Area= 11,966 sf Storage= 6,133 cf

Plug-Flow detention time= 17.6 min calculated for 0.818 af (100% of inflow)
Center-of-Mass det. time= 17.2 min (842.7 - 825.5)

Volume	Invert	Avail.Storage	Storage Description
#1	62.65'	24,075 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.65	100	0	0
63.00	193	51	51
64.00	11,964	6,079	6,130
65.00	23,926	17,945	24,075

Device	Routing	Invert	Outlet Devices
#1	Primary	62.65'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.65' / 62.43' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.84 cfs @ 12.79 hrs HW=64.00' (Free Discharge)
↑**1=Culvert** (Barrel Controls 4.84 cfs @ 3.81 fps)

Summary for Pond 25P: Curtain Drain

Inflow Area = 0.680 ac, 25.00% Impervious, Inflow Depth > 3.18" for 25-Year Storm Event event
Inflow = 1.38 cfs @ 12.52 hrs, Volume= 0.180 af
Outflow = 1.13 cfs @ 12.74 hrs, Volume= 0.154 af, Atten= 18%, Lag= 13.2 min
Primary = 1.13 cfs @ 12.74 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 64.17' @ 12.74 hrs Surf.Area= 702 sf Storage= 1,860 cf

Plug-Flow detention time= 70.1 min calculated for 0.153 af (85% of inflow)
Center-of-Mass det. time= 30.3 min (837.1 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	54.58'	2,092 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 5,231 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.58	10	0	0
55.00	100	23	23
56.00	200	150	173
57.00	300	250	423
58.00	400	350	773
59.00	500	450	1,223
60.00	600	550	1,773
61.00	700	650	2,423
61.50	702	351	2,774
62.00	702	351	3,125
63.00	702	702	3,827
64.00	702	702	4,529
65.00	702	702	5,231

Device	Routing	Invert	Outlet Devices
#1	Primary	61.50'	**6.0" Round Culvert** L= 234.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.50' / 54.58' S= 0.0296 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Primary OutFlow Max=1.13 cfs @ 12.74 hrs HW=64.17' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.13 cfs @ 5.75 fps)

APPENDIX D

OPERATION & MAINTENANCE PLAN

OPERATIONS & MAINTENANCE PLAN

For: Chabad Lubavitch
Portland, Me

The applicant, Chabad Lubavitch of Maine LLC, will be responsible for all required maintenance until the roadway (Pomeroy Street) are offered to the City of Portland for consideration as a public street at which time the City will be responsible for all maintenance within the public Right of Way and Chabad Lubavitch of Maine LLC will remain responsible for the maintenance outside of the Public Right of way. The following is a summary of the required maintenance:

Roadways

1. On-site inspection of the roads on an annual schedule or after a significant period of rainfall.
   a.) All low spots of pooling water shall be regraded to direct the water off the pavement.
   b.) Areas of erosions shall be repaired immediately.
   c.) Sweeping the roadway free of sand after the winter season should be completed annually.

Stormdrain Inlet & Outlet

1. On-site inspection of the rip-rap surrounding the stormdrain inlets and outlets on a monthly schedule or after a significant period of rainfall.
   a.) Carefully inspect to determine if high flows have caused scour beneath the rip-rap or dislodged any of the stones. If repairs are needed, they should be accomplished immediately.

Vegetated Swale with Check Dams

1. On-site inspection of the vegetated ditches on a monthly schedule or after a significant period of rainfall.
   a.) Ditches should be inspected to repair erosion problems, remove any accumulated debris and to check the condition and integrity of the check dams.

Storm Drain System Includes Catchbasins

1. Inspect catchbasin inlets, culvert entrances and field inlets on a monthly basis for debris or conditions which could inhibit flow entry. Remove debris.
2. Inspect all catchbasin structures on an annual basis.
   a.) Check that rim elevations are properly set to optimize flow entry.
   b.) Measure and record silt accumulation, if any.
3. Check pipelines on an annual basis to determine silt accumulation, if any.

4. Inspect swales, channels, and ditches on a semi-annual basis.
   a.) Check for debris that may inhibit flow – remove as warranted.
   b.) Note and remove excessive vegetation – mow monthly.
   c.) Note any erosion or non-vegetated areas which could lead to erosion.
   d.)

Housekeeping

1. Use attached "Inspection & Maintenance Log" and keep records in three-ring binder.
2. See attached Appendix B "Inspection and Maintenance" from MDEP Stormwater Regulations.
3. See attached "Appendix C" from MDEP Stormwater Regulations for performance standards.

CHABAD LUBAVITCH OF MAINE LLC
STORMWATER MANAGEMENT
INSPECTION & MAINTENANCE LOG

FACILITY:		**YEAR:**	
LOCATION:		**CONTRACTOR:**	
FUNCTION:		**DEP PROJ. MANAGER:**	
DATE OF INSPECTION:		**INSPECTOR:**	
ITEM ID	**DESCRIPTION OF CONDITIONS**	**MAINTENANCE ACCOMPLISHED**	**DATE OF MAINTENANCE**
ROADWAYS			
STORMDRAIN INLET & OUTLET			
VEGETATED SWALES			
STORMDRAIN SYSTEM			
CHECK DAMS			
CATCH BASINS & FIELD INLETS			

APPENDIX B. Inspection and maintenance

This appendix applies to all projects. A project that is only required to meet basic standards (stormwater PBR) must meet the standards in Section 1. All other projects must meet standards in Sections 1 through 5.

See Appendix D(5) for additional maintenance requirements related to infiltration of stormwater.

1. **During construction.** The following standards must be met during construction.

   (a) Inspection and corrective action. Inspect disturbed and impervious areas, erosion control measures, materials 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 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.

   (b) Maintenance. Maintain all measures in effective operating condition until areas are permanently stabilized. If best management practices (BMPs) need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within 7 calendar days and prior to any storm event (rainfall).

   (c) Documentation. Keep a log (report) summarizing the inspections and any corrective action taken. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicles access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

   The log must be made accessible to department staff and a copy must be provided upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

2. **Post-construction.** The following standards must be met after construction.

   (a) Plan. Carry out an approved inspection and maintenance plan that is consistent with the minimum requirements of this section. The plan must address inspection and maintenance of the project's permanent erosion control measures and stormwater management system. This plan may be combined with the plan listed in Section 2(a) of this appendix. See Section 8(C)(2) for submission requirements.

   (b) Inspection and corrective action. 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. Inspection

or maintenance tasks other than those discussed below must be included in the maintenance plan developed for a specific site.

NOTE: Expanded and more-detailed descriptions for specific maintenance tasks may be found in the Maine DEP's "Stormwater Management for Maine: Best Management Practices."

(i) Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. See permanent stabilization standards in Appendix A(5).

(ii) Inspect ditches, swales and other open stormwater channels in the spring, in late fall, and after heavy rains 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 sideslopes.

(iii) 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.

(iv) Inspect and, if required, clean-out catch basins at least once a year, preferably in early spring. Clean-out must include the removal and legal disposal of any accumulated sediments and debris at the bottom of the basin, at inlet any 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).

(v) Inspect resource and treatment buffers at least once a year for evidence of erosion, concentrating flow, and encroachment by development. If flows are concentrating within a buffer, site grading, level spreaders, or ditch turn-outs must be used to ensure a more even distribution of flow into a buffer. Check down slope of all spreaders and turn-outs for erosion. If erosion is present, adjust or modify the spreader's or turnout's lip to ensure a better distribution of flow into a buffer. Clean-out any accumulation of sediment within the spreader bays or turn-out pools.

(c) Regular maintenance

(i) 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.

(ii) Manage each buffer's vegetation consistently with the requirements in any deed restrictions for the buffer. Wooded buffers must remain fully wooded and have no disturbance to the duff layer. Vegetation in non-wooded buffers may not be cut more than three times per year, and may not be cut shorter than six inches.

NOTE: Contact the department's Division of Watershed Management (Maine DEP) for assistance developing inspection and maintenance requirements for other drainage control and runoff treatment measures installed on the site. The maintenance needs for most measures may be found in the Maine DEP's "Stormwater Management for Maine: Best Management Practices."

(d) Documentation. Keep a log (report) summarizing inspections, maintenance, and any corrective actions taken. The log 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. If a maintenance task requires the clean-out of any sediments or debris, indicate where the sediment and debris was disposed after removal.

The log must be made accessible to department staff and a copy provided to the department upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

3. **Maintenance contract.** Contract with a third-party or other qualified professional, as approved by the department, for the removal of accumulated sediments, oils, and debris within any proprietary devices and the replacement of any absorptive filters. The frequency of sediment clean-out and filter replacements must be consistent with the unit's storage capacity and the estimated pollutant load from the contributing drainage area. This clean-out frequency is usually established by the manufacturer of the proprietary system when sizing the device for the project.

4. **Re-certification.** Submit a certification of the following to the department within three months of the expiration of each five-year interval from the date of issuance of the permit.

(a) Identification and repair of erosion problems. All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.
(b) Inspection and repair of stormwater control system. All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.
(c) Maintenance. The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the department, and the maintenance log is being maintained.

Municipalities with separate storm sewer systems regulated under the Maine Pollutant Discharge Elimination System (MPDES) Program may report on all regulated systems under their control as part of their required annual reporting in lieu of separate certification of each system. Municipalities not regulated by MPDES, but that are responsible for maintenance of permitted stormwater systems, may report on multiple stormwater systems in one report.

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

6. **Additional requirements.** Additional requirements may be applied on a site-specific basis.

APPENDIX C. Housekeeping

These performance standards apply to all projects.

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

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.

   See Appendix D for license by rule standards for infiltration.

   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.

   NOTE: An example of the use of BMPs to control fugitive sediment and dust is as follows. Operations during wet months that experience tracking of mud off the site onto public roads should provide for sweeping of road areas at least once a week and prior to significant storm events. Where chronic mud tracking occurs, a stabilized construction entrance should be provided. Operations during dry months, that experience fugitive dust problems, should wet down the access roads once a week or more frequently as needed.

   NOTE: Dewatering a stream without a permit from the department violates state water quality standards and the Natural Resources Protection Act.

4. **Debris and other materials.** Litter, construction debris, and chemicals exposed to stormwater 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. **Trench or foundation de-watering.** Trench 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 must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the department.

NOTE: For guidance on de-watering controls, consult the Maine Erosion and Sediment Control BMPs", Maine Department of Environmental Protection."

6. **Non-stormwater discharges.** Identify and prevent contamination by non-stormwater discharges.

7. **Additional requirements.** Additional requirements may be applied on a site-specific basis.

CHAPTER 32 STORM WATER

ARTICLE I. IN GENERAL

Sec. 32-1. Definitions.

For the purposes of this article, the terms listed below are defined as follows:

Applicant. "Applicant" means a person with requisite right, title or interest or an agent for such person who has filed an application for a development project that requires a post-construction stormwater management plan under this article.

Best management practices ("BMP"). "Best management practices" or "BMPs" means schedules or activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Clean Water Act. "Clean Water Act" means the federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq.*, also known as the "Clean Water Act"), and any subsequent amendments thereto.

Discharge. "Discharge" means any spilling, leaking, pumping, pouring, emptying, dumping, disposing or other addition of pollutants to "waters of the state." "Direct discharge" or "point source" means any discernable, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating craft, from which pollutants are or may be discharged.

Enforcement authority. "Enforcement authority" means the person(s) or department authorized under section 32-3 of this article to administer and enforce this article.

Exempt person or discharge. "Exempt person or discharge" means any person who is subject to a multi-sector general permit for industrial activities, a general permit for construction activity, a general permit for the discharge of storm water from the Maine department of transportation and the Maine turnpike authority

municipal separate storm sewer systems, or a general permit for the discharge of storm water from state or federally owned authority municipal separate storm sewer system facilities; and any non-storm water discharge permitted under a NPDES permit, waiver, or waste discharge license or order issued to the discharger and administered under the authority of the U.S. environmental protection agency ("EPA") or the Maine department of environmental protection ("DEP").City of Portland

Municipality. "Municipality" means the city of Portland.

Municipal separate storm sewer system, or MS4. "Municipal separate storm sewer system" or "MS4," means conveyances for storm water, including, but not limited to, roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels or storm drains (other than publicly owned treatment works and combined sewers) owned or operated by any municipality, sewer or sewage district, fire district, state agency or federal agency or other public entity that discharges directly to surface waters of the state.

National pollutant discharge elimination system (NPDES) storm water discharge permit. "National pollutant discharge elimination system (NPDES) storm water discharge permit" means a permit issued by the EPA or by the DEP that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-storm water discharge. "Non-storm water discharge" means any discharge to an MS4 that is not composed entirely of storm water.

Person. "Person" means any individual, firm, corporation, municipality, quasi-municipal corporation, state agency or federal agency or other legal entity which creates, initiates, originates or maintains a discharge of storm water or a non-storm water discharge.

Pollutant. "Pollutant" means dredged spoil, solid waste, junk, incinerator residue, sewage, refuse, effluent, garbage, sewage sludge, munitions, chemicals, biological or radiological materials, oil, petroleum products or by-products, heat, wrecked or discarded equipment, rock, sand, dirt and industrial, municipal, domestic, commercial or agricultural wastes of any kind.

Post-construction stormwater management plan. "Post-construction stormwater management plan" means BMPs employed by a development project to meet the stormwater standards of Section V of the department of planning and urban development's Technical and Design Standards and Guidelines.

Premises. "Premises" means any building, lot, parcel of land, or portion of land, whether improved or unimproved, including adjacent sidewalks and parking strips, located within the municipality from which discharges into the storm drainage system are or may be created, initiated, originated or maintained.

Qualified post-construction stormwater inspector. "Qualified post-construction stormwater inspector" means a person who conducts post-construction stormwater best management practice inspections for compensation and who has received the appropriate training for the same from DEP or otherwise meets DEP requirements to perform said inspections.

Regulated small MS4. "Regulated small MS4" means any small MS4 regulated by the State of Maine "general permit for the discharge of storm water from small municipal separate storm sewer systems" dated July 1, 2008 ("general permit") or the general permits for the discharge of storm water from the Maine department of transportation and Maine turnpike authority small MS4s or state or federally owned or operated small MS4s, including all those located partially or entirely within an urbanized area (UA).

Small municipal separate storm sewer system, or small MS4. "Small municipal separate storm sewer system", or "small MS4," means any MS4 that is not already covered by the phase I MS4 storm water program including municipally owned or operated storm sewer systems, state or federally-owned systems, such as colleges, universities, prisons, Maine department of transportation and Maine turnpike authority road systems and facilities, and military bases and facilities.

Storm drainage system. "Storm drainage system" means the City of Portland's regulated small MS4 and other conveyances for storm water located in areas outside the UA that drain into the regulated small MS4.

Storm water. "Storm water" means any storm water runoff, snowmelt runoff, and surface runoff and drainage; "Stormwater" has the same meaning as "storm water".

Urbanized area ("UA"). "Urbanized area" or "UA" means the areas of the State of Maine so defined by the latest decennial (2000) census by the U.S. Bureau of Census.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-2. Reserved.
Sec. 32-3. Reserved.

Sec. 32-4. Reserved.

Sec. 32-5. Reserved.
Sec. 32-6. Reserved.
Sec. 32-7. Reserved.
Sec. 32-8. Reserved.
Sec. 32-9. Reserved.
Sec. 32-10. Reserved.
Sec. 32-11. Reserved.
Sec. 32-12. Reserved.
Sec. 32-13. Reserved.
Sec. 32-14. Reserved.
Sec. 32-15. Reserved.

ARICLE II. PROHIBITED DISCHARGES

Sec. 32-16. Applicability.

This Article shall apply to all persons discharging storm water and/or non-storm water discharges from any premises into the storm drainage system.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-17. Responsibility for administration.

The department of public services is the enforcement authority who shall administer, implement, and enforce the provisions of this article.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10; 8-17-09)

Sec. 32-18. Prohibition of non-storm water discharges.

(a) *General prohibition.* Except as allowed or exempted herein, no person shall create, initiate, originate or maintain a non-storm water discharge to the storm drainage system. Such non-storm water discharges are prohibited notwithstanding the fact that the city may have approved the connections, drains or conveyances by which a person discharges un-allowed non-storm water discharges to the storm drainage system.

(b) *Allowed non-storm water discharges.* The creation, initiation, origination and maintenance of the following non-storm water discharges to the storm drainage system is allowed:

(1) Landscape irrigation; diverted stream flows; rising ground waters; uncontaminated flows from foundation drains; air conditioning and compressor condensate; irrigation water; flows from uncontaminated springs; uncontaminated water from crawl space pumps; uncontaminated flows from footing drains; lawn watering runoff; flows from riparian habitats and wetlands; residual street wash water (where spills/leaks of toxic or hazardous materials have not

occurred, unless all spilled material has been removed and detergents are not used); hydrant flushing and fire fighting activity runoff; water line flushing and discharges from potable water sources; individual residential car washing; and de-chlorinated swimming pool discharges.

(2) Discharges specified in writing by the enforcement authority as being necessary to protect public health and safety.

(3) Dye testing, with verbal notification to the enforcement authority prior to the time of the test.

(c) *Exempt person or discharge.* This article shall not apply to an exempt person or discharge, except that the enforcement authority may request from exempt persons and persons with exempt discharges copies of permits, notices of intent, licenses and orders from the EPA or DEP that authorize the discharge(s).
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-19. Suspension of access to the city's small MS4.

The enforcement authority may, without prior notice, physically suspend discharge access to the storm drainage system to a person when such suspension is necessary to stop an actual or threatened non-storm water discharge to the storm drainage system which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the storm drainage system, or which may cause the city to violate the terms of its environmental permits. Such suspension may include, but is not limited to, blocking pipes, constructing dams or taking other measures, on public ways or public property, to physically block the discharge to prevent or minimize a non-storm water discharge to the storm drainage system. If a person fails to comply with a suspension order issued in an emergency, the enforcement authority may take such steps as deemed necessary to prevent or minimize damage to the storm drainage system, or to minimize danger to persons.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-20. Monitoring of discharges.

In order to determine compliance with this article, the enforcement authority may enter upon and inspect premises subject to this article at reasonable hours to inspect the premises and connections thereon to the storm drainage system; and to conduct monitoring, sampling and testing of the discharge to the storm drainage system.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-21. Enforcement.

It shall be unlawful for any person to violate any provision of or to fail to comply with any of the requirements of this article. Whenever the enforcement authority believes that a person has violated this article, the enforcement authority may enforce this article in accordance with 30-A M.R.S.A. § 4452.

(a) *Notice of violation.* Whenever the enforcement authority believes that a person has violated this article, the enforcement authority may order compliance with this article by written notice of violation to that person indicating the nature of the violation and ordering the action necessary to correct it, including, without limitation:

(1) The elimination of non-storm water discharges to the storm drainage system, including, but not limited to, disconnection of the premises from the MS4.

(2) The cessation of discharges, practices, or operations in violation of this article.

(3) At the Person's expense, the abatement or remediation (in accordance with best management practices in DEP rules and regulations) of non-storm water discharges to the storm drainage system and the restoration of any affected property; and/or

(4) The payment of fines, of the city's remediation costs and of the city's reasonable administrative costs and attorneys' fees and costs. If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such abatement or restoration must be completed.

(b) *Penalties/fines/injunctive relief.* In addition to the imposition of any other costs or penalties provided for herein, any person who violates this section shall be subject to fines, penalties and orders for injunctive relief and shall be responsible for the city's attorney's fees and costs, all in accordance with 30-A M.R.S.A. § 4452. Each day such violation continues shall constitute a separate violation. Moreover, any person who violates this section also shall be responsible for any and all fines, penalties, damages and costs, including, but not limited to attorneys' fees and costs, incurred by the city for violation of federal and State environmental laws and

regulations caused by or related to that person's violation of this article; this responsibility shall be in addition to any penalties, fines or injunctive relief imposed under this section.

(c) *Consent agreement.* The enforcement authority may, with the approval of the city manager, enter into a written consent agreement with the violator to address timely abatement of the violation(s) of this article for the purposes of eliminating violations of this article and of recovering fines, costs and fees without court action.

(d) *Appeal of notice of violation.* Any person receiving a notice of violation or suspension notice may appeal the determination of the enforcement authority to the city manager or his or her designee. The notice of appeal must be received within 30 days from the date of receipt of the notice of violation. The city manager shall hold a hearing on the appeal within 30 days from the date of receipt of the notice of appeal, except that such hearing may be delayed by agreement of the city manager and the appellant. The city manager may affirm, reverse or modify the decision of the enforcement authority. A suspension under Section 32-5 of this article remains in place unless or until lifted by the city manager or by a reviewing court. A party aggrieved by the decision of the city manager may appeal that decision to the Maine superior court within 45 days of the date of the city manager's decision pursuant to Rule 80B of the Maine Rules of Civil Procedure.

(e) *Enforcement measures.* If the violation has not been corrected pursuant to the requirements set forth in the notice of violation, or, in the event of an appeal to the city manager, within 45 days of a decision of the city manager affirming the enforcement authority's decision, then the enforcement authority may recommend that the corporation counsel's office file an enforcement action in a Maine court of competent jurisdiction under Rule 80K of the Maine Rules of Civil Procedure.

(f) *Ultimate responsibility of discharger.* The standards set forth herein are minimum standards; therefore this article does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants into waters of the U.S. caused by said person. This article shall not create liability on the part of the city, or any officer agent or employee thereof for any damages that

result from any person's reliance on this article or any administrative decision lawfully made hereunder.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-22. Severability.

The provisions of this article are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this article or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions, clauses, sentences, or paragraphs or application of this article.
(Ord. No. 85-08/09, 10-20-08; Ord. No. 35-09/10, 8-17-09)

Sec. 32-23. Reserved.
Sec. 32-24. Reserved.
Sec. 32-25. Reserved.
Sec. 32-26. Reserved.
Sec. 32-27. Reserved.
Sec. 32-28. Reserved.
Sec. 32-29. Reserved.
Sec. 32-30. Reserved.
Sec. 32-31. Reserved.
Sec. 32-32. Reserved.
Sec. 32-33. Reserved.
Sec. 32-34. Reserved.
Sec. 32-35. Reserved.

ARTICLE III. POST-CONSTRUCTION STORMWATER MANAGEMENT.

Sec. 32-36. Applicability.

This article applies to all development projects that require a stormwater management plan pursuant to section V of the department of planning and urban development's Technical and Design Standards and Guidelines.
(Ord. No. 35-09/10, 8-17-09)

Sec. 32-37. Post-construction stormwater management plan approval.

Notwithstanding any ordinance provision to the contrary, no applicant for a development project to which this article is applicable shall receive approval for that development project unless the applicant also receives approval for its post-construction stormwater management plan and for the best management practices ("BMPs") for that development project.
(Ord. No. 35-09/10, 9-17-09)

Sec. 32-38. Post-construction stormwater management plan compliance.

Any person owning, operating, or otherwise having control over a BMP required by a post construction stormwater management plan shall maintain the BMPs in accordance with the approved plan and shall demonstrate compliance with that plan as follows:

(a) *Inspections.* The owner or operator of a BMP shall hire a qualified post-construction stormwater inspector to at least annually, inspect the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.

(b) *Maintenance and repair.* If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the department of public services ("DPS") in the annual report.

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

(d) *Filing fee.* Any persons required to file and annual certification under this section shall include with the annual certification a filing fee established by DPS to pay the administrative and technical costs of review of the annual certification.

(e) *Right of entry.* In order to determine compliance with this article and with the post-construction stormwater management plan, DPS may enter upon property at reasonable hours with the consent of the owner, occupant or agent to inspect the BMPs.

Sec. 32-39. Enforcement.

It shall be unlawful for any person to violate any provision of or to fail to comply with any of the requirements of this article or of the post-construction stormwater management plan. Whenever the enforcement authority believes that a person has violated this article, DPS may enforce this article in accordance with 30-A M.R.S.A. § 4452. Each day on which a violation exists shall constitute a separate violation for purposes of this section.

(a) *Notice of violation.* Whenever DPS believes that a person has violated this article or the post-construction stormwater management plan, DPS may order compliance by written notice of violation to that person indicating the nature of the violation and ordering eh action necessary to correct it, including, without limitation:

(1) The abatement of violations, and the cessation of practices or operations in violation of this article or of the post-construction stormwater management plan;

(2) At the person's expense, compliance with BMPs required as a condition of approval of the development project, the repair of BMPs and/or the restoration of any affected property; and/or

(3) The payment of fines, of the City's remediation costs and of the City's reasonable administrative costs and attorneys' fees and costs.

(4) If abatement of a violation, compliance with BMPs, repair of BMPs and/or restoration of affected property is required, the notice shall set forth a deadline within which such abatement, compliance, repair and/or restoration must be completed.

(b) *Penalties/fines/injunctive relief.* In addition to the imposition of any other costs or penalties provided for herein, any person who violates this section shall be subject to fines, penalties and orders for injunctive relief and shall be responsible for the city's attorney's fees and costs, all in accordance with 30-A M.R.S.A. § 4452. Each day such violation continues shall constitute a separate violation. Moreover, any person who violates this section also shall be responsible for any and all fines, penalties, damages and costs, including, but not limited to

attorneys' fees and costs, incurred b y the city for violation of federal and state environmental laws and regulations caused by or related to that person's violation of this article; this responsibility shall be in addition to any penalties, fines or injunctive relief imposed under this section.

(c) *Consent agreement.* The enforcement authority may, without approval of the city manager, enter into a written consent agreement with the violator to address timely abatement of the violation(s) of this article for the purposes of eliminating violations of this article and of recovering fines, costs and fees without court action.

(d) *Appeal of notice of violation.* Any person receiving a notice of violation or suspension notice may appeal the determination of the enforcement authority to the city manager or his or her designee. The notice of appeal must be received within 30 days from the date of receipt of the notice of violation. The city manager shall hold a hearing on the appeal within 30 days from the date of receipt of the notice of appeal, except that such hearing may be delayed by agreement of the city manager and the appellant. The city manager may affirm, reverse or modify the decision of the DPS. A party aggrieved by the decision of the city manager may appeal that decision to the Maine superior court within forty-five (45) days of the date of the city manager's decision pursuant to Rule 80B of the Maine Rules of Civil Procedure.

(e) *Enforcement measures.* If the violation has not been corrected pursuant to the requirements set forth in the notice of violation, or , in the event of an appeal to the city manger, within forty-five (45) days of a decision of the city manager affirming the enforcement authority's decision, then the enforcement authority may recommend that the corporation counsel's office file an enforcement action in a Maine court of competent jurisdiction under Rule 80K of the Maine Rules of Civil Procedure.

(Ord. No. 35-09/10, 8-17-09)

Sec. 32-40. Severability.

The provisions of this article are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this article or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions, clauses, sentences, or paragraphs or application of this article.

(Ord. No. 35-09/10, 8-17-09)