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

April 2005
Revised March 2012

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 14,593 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 (10,462 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 (South of access Drive) is a low spot that provides snow storage and also captures runoff on-site to protect the downstream abutters.
2. The driveway and single family house mostly drain back into the site (Ponds 15 & 11 or Existing Catch Basin in Bancroft Street).
3. A ditch along the northerly boundary should protect the Bancroft Street abutters from significant project site runoff.
4. All runoff eventually is discharged to the municipal combined sewer (Reach 8).

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 combined sewer on Bancroft Street.

	Pre (SA-1)	Post (Reach 8)
2-Year Storm	3.13 c.f.s.	2.29 c.f.s.
10-Year Storm	7.57 c.f.s.	5.31 c.f.s.
25-Year Storm	9.86 c.f.s.	6.91 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.

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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BH2M

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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BH2M

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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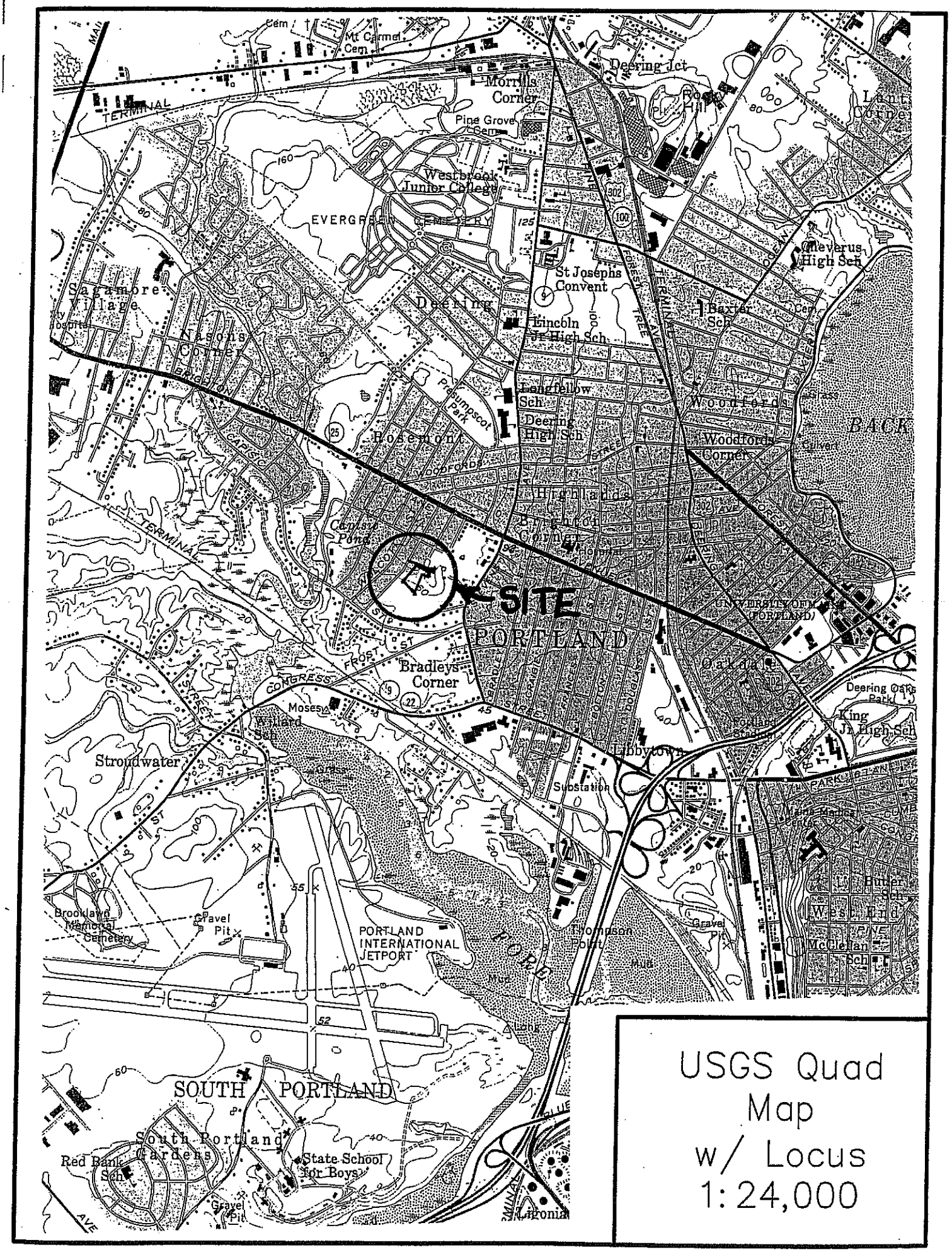
APPENDIX B

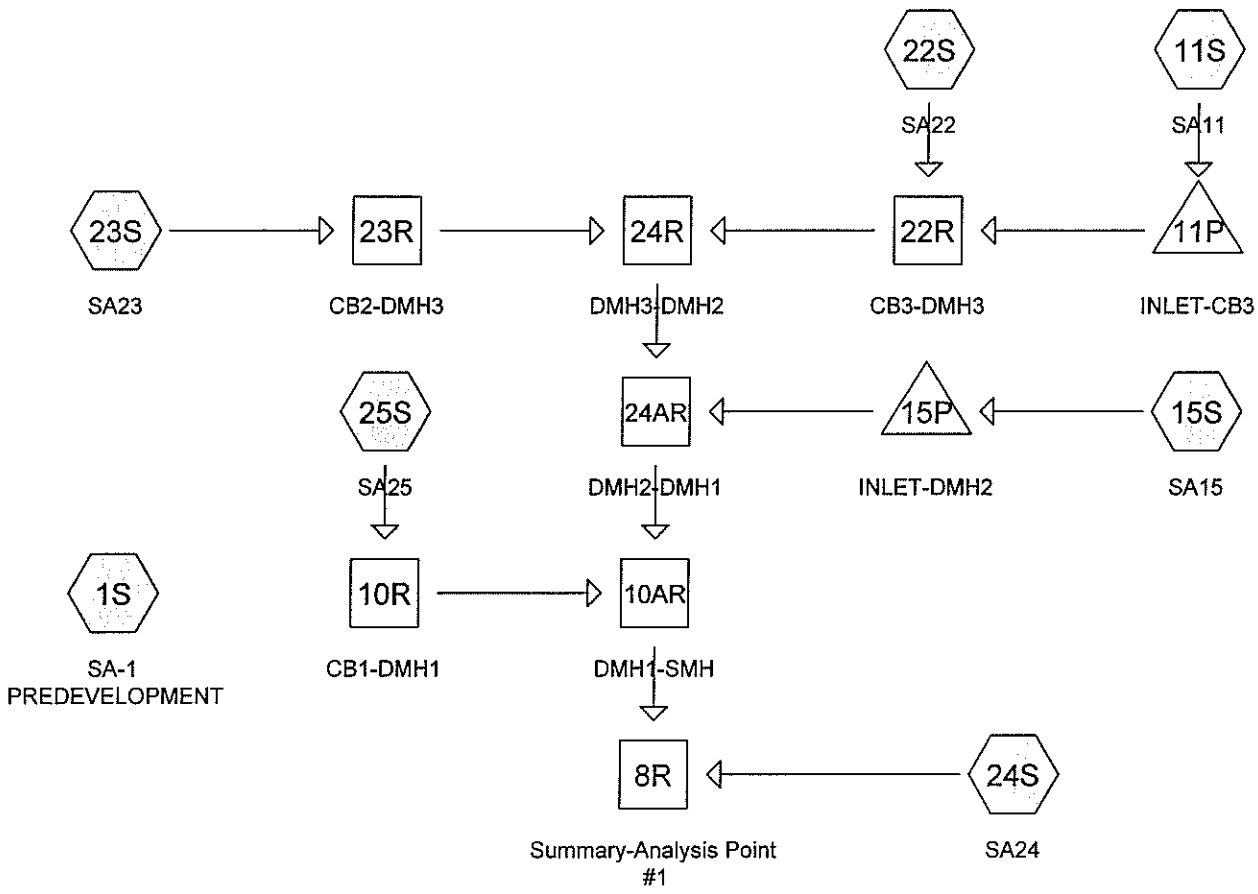
MAPS



USGS Quad Map w/ Locus 1:24,000

APPENDIX C

STORMWATER CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for CHABAD
Prepared by Berry Huff McDonald Milligan, Inc., Printed 3/14/2012

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.720	55	Woods, Good, HSG B (1S, 11S)
1.290	70	Woods, Good, HSG C (1S, 11S, 25S)
0.155	74	>75% Grass cover, Good, HSG C (11S, 15S, 23S, 24S, 25S)
0.940	75	1/4 acre lots, 38% imp, HSG B (1S, 11S)
1.700	77	Woods, Good, HSG D (1S, 11S, 25S)
0.350	80	>75% Grass cover, Good, HSG D (11S, 15S, 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)
0.335	98	Proposed Impervious Area (11S, 15S, 22S, 23S, 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=4.160 ac 16.64% Impervious Runoff Depth>0.71"
Flow Length=816' Tc=59.2 min CN=72 Runoff=1.40 cfs 0.247 af

Subcatchment 15S:SA15 Runoff Area=0.160 ac 6.25% Impervious Runoff Depth>1.09"
Flow Length=257' Tc=18.4 min CN=79 Runoff=0.15 cfs 0.015 af

Subcatchment 22S:SA22 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth>2.59"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment 23S:SA23 Runoff Area=0.020 ac 75.00% Impervious Runoff Depth>2.04"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=92 Runoff=0.06 cfs 0.003 af

Subcatchment 24S:SA24 Runoff Area=0.990 ac 40.57% Impervious Runoff Depth>1.47"
Flow Length=401' Tc=19.3 min CN=85 Runoff=1.26 cfs 0.121 af

Subcatchment 25S:SA25 Runoff Area=0.760 ac 15.79% Impervious Runoff Depth>1.08"
Flow Length=415' Tc=36.3 min CN=79 Runoff=0.53 cfs 0.068 af

Reach 8R: Summary-AnalysisPoint #1 Inflow=2.29 cfs 0.455 af
Outflow=2.29 cfs 0.455 af

Reach 10AR:DMH1-SMH Avg. Flow Depth=0.24' Max Vel=10.02 fps Inflow=1.81 cfs 0.334 af
18.0" Round Pipe n=0.012 L=18.0' S=0.0844 '/' Capacity=33.07 cfs Outflow=1.81 cfs 0.334 af

Reach 10R:CB1-DMH1 Avg. Flow Depth=0.23' Max Vel=3.37 fps Inflow=0.53 cfs 0.068 af
15.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=0.53 cfs 0.068 af

Reach 22R:CB3-DMH3 Avg. Flow Depth=0.38' Max Vel=4.46 fps Inflow=1.40 cfs 0.248 af
15.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=1.40 cfs 0.248 af

Reach 23R:CB2-DMH3 Avg. Flow Depth=0.08' Max Vel=1.77 fps Inflow=0.06 cfs 0.003 af
12.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=3.86 cfs Outflow=0.06 cfs 0.003 af

Reach 24AR:DMH2-DMH1 Avg. Flow Depth=0.28' Max Vel=7.03 fps Inflow=1.45 cfs 0.265 af
15.0" Round Pipe n=0.012 L=124.0' S=0.0350 '/' Capacity=13.09 cfs Outflow=1.45 cfs 0.265 af

Reach 24R:DMH3-DMH2 Avg. Flow Depth=0.27' Max Vel=7.31 fps Inflow=1.41 cfs 0.251 af
15.0" Round Pipe n=0.012 L=41.0' S=0.0400 '/' Capacity=14.00 cfs Outflow=1.41 cfs 0.251 af

Pond 11P:INLET-CB3 Peak Elev=61.82' Storage=139 cf Inflow=1.40 cfs 0.247 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=1.40 cfs 0.246 af

Pond 15P:INLET-DMH2 Peak Elev=59.86' Storage=26 cf Inflow=0.15 cfs 0.015 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0200 '/' Outflow=0.15 cfs 0.014 af

Total Runoff Area = 12.200 ac Runoff Volume = 0.894 af Average Runoff Depth = 0.88"
79.45% Pervious = 9.693 ac 20.55% Impervious = 2.507 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 = 1.40 cfs @ 12.88 hrs, Volume= 0.247 af, Depth> 0.71"

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
	0.670	70	Woods, Good, HSG C
	0.150	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.130	98	Proposed Impervious Area
	0.190	80	>75% Grass cover, Good, HSG D
	0.070	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
	4.160	72	Weighted Average
	3.468		83.36% Pervious Area
	0.692		16.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.5	150	0.0030	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
15.7	666	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.2	816	Total			

Summary for Subcatchment 15S: SA15

Runoff = 0.15 cfs @ 12.27 hrs, Volume= 0.015 af, Depth> 1.09"

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
*	0.010	98	Proposed Impervious Area
	0.100	80	>75% Grass cover, Good, HSG D
	0.050	74	>75% Grass cover, Good, HSG C
	0.160	79	Weighted Average
	0.150		93.75% Pervious Area
	0.010		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0350	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
2.1	107	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.4	257	Total			

Summary for Subcatchment 22S: SA22

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 2.59"

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
*	0.010	98	Proposed Impervious Area
	0.010		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 23S: SA23

Runoff = 0.06 cfs @ 12.01 hrs, Volume= 0.003 af, Depth> 2.04"

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
*	0.015	98	Proposed Impervious Area
	0.005	74	>75% Grass cover, Good, HSG C
	0.020	92	Weighted Average
	0.005		25.00% Pervious Area
	0.015		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 24S: SA24

Runoff = 1.26 cfs @ 12.27 hrs, Volume= 0.121 af, Depth> 1.47"

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
	0.060	80	>75% Grass cover, Good, HSG D
	0.020	74	>75% Grass cover, Good, HSG C
	0.990	85	Weighted Average
	0.588		59.43% Pervious Area
	0.402		40.57% 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 = 0.53 cfs @ 12.53 hrs, Volume= 0.068 af, Depth> 1.08"

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
*	0.080	98	Proposed Impervious Area
	0.010	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.500	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.760	79	Weighted Average
	0.640		84.21% Pervious Area
	0.120		15.79% 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"
5.6	265	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.3	415	Total			

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

Inflow Area = 6.100 ac, 20.48% Impervious, Inflow Depth > 0.90" for 2-Year Storm Event event
Inflow = 2.29 cfs @ 12.59 hrs, Volume= 0.455 af
Outflow = 2.29 cfs @ 12.59 hrs, Volume= 0.455 af, Atten= 0%, Lag= 0.0 min

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

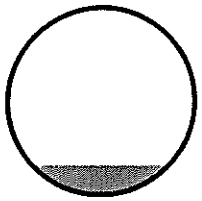
Summary for Reach 10AR: DMH1-SMH

Inflow Area = 5.110 ac, 16.58% Impervious, Inflow Depth > 0.78" for 2-Year Storm Event event
Inflow = 1.81 cfs @ 12.81 hrs, Volume= 0.334 af
Outflow = 1.81 cfs @ 12.81 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.02 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.30 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.81 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 33.07 cfs

18.0" Round Pipe
n= 0.012
Length= 18.0' Slope= 0.0844 '/'
Inlet Invert= 54.55', Outlet Invert= 53.03'



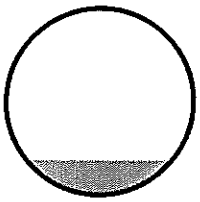
Summary for Reach 10R: CB1-DMH1

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 1.08" for 2-Year Storm Event event
Inflow = 0.53 cfs @ 12.53 hrs, Volume= 0.068 af
Outflow = 0.53 cfs @ 12.53 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.37 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 54.80', Outlet Invert= 54.65'



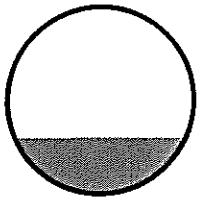
Summary for Reach 22R: CB3-DMH3

Inflow Area = 4.170 ac, 16.84% Impervious, Inflow Depth > 0.71" for 2-Year Storm Event event
Inflow = 1.40 cfs @ 12.90 hrs, Volume= 0.248 af
Outflow = 1.40 cfs @ 12.90 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.46 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.78 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



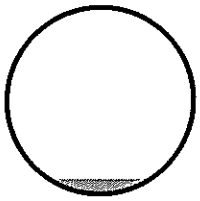
Summary for Reach 23R: CB2-DMH3

Inflow Area = 0.020 ac, 75.00% Impervious, Inflow Depth > 2.04" for 2-Year Storm Event event
Inflow = 0.06 cfs @ 12.01 hrs, Volume= 0.003 af
Outflow = 0.06 cfs @ 12.01 hrs, Volume= 0.003 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 0.3 min

Peak Storage= 0 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



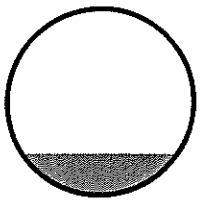
Summary for Reach 24AR: DMH2-DMH1

Inflow Area = 4.350 ac, 16.72% Impervious, Inflow Depth > 0.73" for 2-Year Storm Event event
Inflow = 1.45 cfs @ 12.89 hrs, Volume= 0.265 af
Outflow = 1.45 cfs @ 12.90 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.03 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.92 fps, Avg. Travel Time= 0.7 min

Peak Storage= 26 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 13.09 cfs

15.0" Round Pipe
n= 0.012
Length= 124.0' Slope= 0.0350 '/'
Inlet Invert= 58.99', Outlet Invert= 54.65'



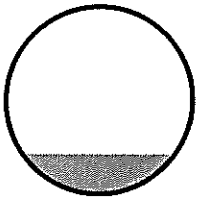
Summary for Reach 24R: DMH3-DMH2

Inflow Area = 4.190 ac, 17.12% Impervious, Inflow Depth > 0.72" for 2-Year Storm Event event
Inflow = 1.41 cfs @ 12.90 hrs, Volume= 0.251 af
Outflow = 1.41 cfs @ 12.90 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.31 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.01 fps, Avg. Travel Time= 0.2 min

Peak Storage= 8 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 14.00 cfs

15.0" Round Pipe
n= 0.012
Length= 41.0' Slope= 0.0400 '/'
Inlet Invert= 60.73', Outlet Invert= 59.09'



Summary for Pond 11P: INLET-CB3

Inflow Area = 4.160 ac, 16.64% Impervious, Inflow Depth > 0.71" for 2-Year Storm Event event
Inflow = 1.40 cfs @ 12.88 hrs, Volume= 0.247 af
Outflow = 1.40 cfs @ 12.90 hrs, Volume= 0.246 af, Atten= 0%, Lag= 1.2 min
Primary = 1.40 cfs @ 12.90 hrs, Volume= 0.246 af

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

Peak Elev= 61.82' @ 12.90 hrs Surf.Area= 295 sf Storage= 139 cf

Plug-Flow detention time= 2.8 min calculated for 0.246 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (867.8 - 866.1)

Volume	Invert	Avail.Storage	Storage Description
#1	61.08'	1,033 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.08	10	0	0
62.00	365	173	173
63.00	1,356	861	1,033

Device	Routing	Invert	Outlet Devices
#1	Primary	61.08'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.08' / 61.03' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.40 cfs @ 12.90 hrs HW=61.82' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.40 cfs @ 2.67 fps)

Summary for Pond 15P: INLET-DMH2

Inflow Area = 0.160 ac, 6.25% Impervious, Inflow Depth > 1.09" for 2-Year Storm Event event
Inflow = 0.15 cfs @ 12.27 hrs, Volume= 0.015 af
Outflow = 0.15 cfs @ 12.28 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.8 min
Primary = 0.15 cfs @ 12.28 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.86' @ 12.28 hrs Surf.Area= 80 sf Storage= 26 cf

Plug-Flow detention time= 14.4 min calculated for 0.014 af (97% of inflow)
Center-of-Mass det. time= 5.4 min (823.7 - 818.4)

Volume	Invert	Avail.Storage	Storage Description
#1	59.39'	1,925 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.39	10	0	0
60.00	100	34	34
61.00	187	144	177
62.00	784	486	663
63.00	1,740	1,262	1,925

Device	Routing	Invert	Outlet Devices
#1	Primary	59.65'	**12.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.65' / 59.09' S= 0.0200 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.15 cfs @ 12.28 hrs HW=59.86' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.15 cfs @ 1.23 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=4.160 ac 16.64% Impervious Runoff Depth>1.78"
Flow Length=816' Tc=59.2 min CN=72 Runoff=3.73 cfs 0.616 af

Subcatchment 15S:SA15 Runoff Area=0.160 ac 6.25% Impervious Runoff Depth>2.36"
Flow Length=257' Tc=18.4 min CN=79 Runoff=0.33 cfs 0.031 af

Subcatchment 22S:SA22 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth>4.15"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=98 Runoff=0.05 cfs 0.003 af

Subcatchment 23S:SA23 Runoff Area=0.020 ac 75.00% Impervious Runoff Depth>3.59"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=92 Runoff=0.10 cfs 0.006 af

Subcatchment 24S:SA24 Runoff Area=0.990 ac 40.57% Impervious Runoff Depth>2.89"
Flow Length=401' Tc=19.3 min CN=85 Runoff=2.44 cfs 0.239 af

Subcatchment 25S:SA25 Runoff Area=0.760 ac 15.79% Impervious Runoff Depth>2.35"
Flow Length=415' Tc=36.3 min CN=79 Runoff=1.17 cfs 0.149 af

Reach 8R: Summary-AnalysisPoint #1 Inflow=5.31 cfs 1.042 af
Outflow=5.31 cfs 1.042 af

Reach 10AR:DMH1-SMH Avg. Flow Depth=0.37' Max Vel=13.11 fps Inflow=4.52 cfs 0.803 af
18.0" Round Pipe n=0.012 L=18.0' S=0.0844 '/' Capacity=33.07 cfs Outflow=4.52 cfs 0.803 af

Reach 10R:CB1-DMH1 Avg. Flow Depth=0.35' Max Vel=4.23 fps Inflow=1.17 cfs 0.149 af
15.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=1.17 cfs 0.149 af

Reach 22R:CB3-DMH3 Avg. Flow Depth=0.65' Max Vel=5.78 fps Inflow=3.70 cfs 0.618 af
15.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=3.70 cfs 0.618 af

Reach 23R:CB2-DMH3 Avg. Flow Depth=0.11' Max Vel=2.08 fps Inflow=0.10 cfs 0.006 af
12.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=3.86 cfs Outflow=0.10 cfs 0.006 af

Reach 24AR:DMH2-DMH1 Avg. Flow Depth=0.46' Max Vel=9.23 fps Inflow=3.78 cfs 0.655 af
15.0" Round Pipe n=0.012 L=124.0' S=0.0350 '/' Capacity=13.09 cfs Outflow=3.78 cfs 0.655 af

Reach 24R:DMH3-DMH2 Avg. Flow Depth=0.44' Max Vel=9.63 fps Inflow=3.70 cfs 0.624 af
15.0" Round Pipe n=0.012 L=41.0' S=0.0400 '/' Capacity=14.00 cfs Outflow=3.70 cfs 0.624 af

Pond 11P:INLET-CB3 Peak Elev=62.42' Storage=538 cf Inflow=3.73 cfs 0.616 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=3.69 cfs 0.615 af

Pond 15P:INLET-DMH2 Peak Elev=59.97' Storage=32 cf Inflow=0.33 cfs 0.031 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0200 '/' Outflow=0.33 cfs 0.031 af

Total Runoff Area = 12.200 ac Runoff Volume = 2.070 af Average Runoff Depth = 2.04"
79.45% Pervious = 9.693 ac 20.55% Impervious = 2.507 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 = 3.73 cfs @ 12.83 hrs, Volume= 0.616 af, Depth> 1.78"

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
	0.670	70	Woods, Good, HSG C
	0.150	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.130	98	Proposed Impervious Area
	0.190	80	>75% Grass cover, Good, HSG D
	0.070	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
	4.160	72	Weighted Average
	3.468		83.36% Pervious Area
	0.692		16.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.5	150	0.0030	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
15.7	666	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.2	816	Total			

Summary for Subcatchment 15S: SA15

Runoff = 0.33 cfs @ 12.26 hrs, Volume= 0.031 af, Depth> 2.36"

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
*	0.010	98	Proposed Impervious Area
	0.100	80	>75% Grass cover, Good, HSG D
	0.050	74	>75% Grass cover, Good, HSG C
	0.160	79	Weighted Average
	0.150		93.75% Pervious Area
	0.010		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0350	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
2.1	107	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.4	257	Total			

Summary for Subcatchment 22S: SA22

Runoff = 0.05 cfs @ 12.00 hrs, Volume= 0.003 af, Depth> 4.15"

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
*	0.010	98	Proposed Impervious Area
	0.010		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 23S: SA23

Runoff = 0.10 cfs @ 12.01 hrs, Volume= 0.006 af, Depth> 3.59"

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
*	0.015	98	Proposed Impervious Area
	0.005	74	>75% Grass cover, Good, HSG C
	0.020	92	Weighted Average
	0.005		25.00% Pervious Area
	0.015		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 24S: SA24

Runoff = 2.44 cfs @ 12.26 hrs, Volume= 0.239 af, Depth> 2.89"

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
	0.060	80	>75% Grass cover, Good, HSG D
	0.020	74	>75% Grass cover, Good, HSG C
	0.990	85	Weighted Average
	0.588		59.43% Pervious Area
	0.402		40.57% 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 = 1.17 cfs @ 12.51 hrs, Volume= 0.149 af, Depth> 2.35"

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
*	0.080	98	Proposed Impervious Area
	0.010	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.500	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.760	79	Weighted Average
	0.640		84.21% Pervious Area
	0.120		15.79% 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"
5.6	265	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.3	415	Total			

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

Inflow Area = 6.100 ac, 20.48% Impervious, Inflow Depth > 2.05" for 10-Year Storm Event event
Inflow = 5.31 cfs @ 12.63 hrs, Volume= 1.042 af
Outflow = 5.31 cfs @ 12.63 hrs, Volume= 1.042 af, Atten= 0%, Lag= 0.0 min

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

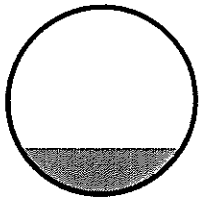
Summary for Reach 10AR: DMH1-SMH

Inflow Area = 5.110 ac, 16.58% Impervious, Inflow Depth > 1.89" for 10-Year Storm Event event
Inflow = 4.52 cfs @ 12.81 hrs, Volume= 0.803 af
Outflow = 4.52 cfs @ 12.82 hrs, Volume= 0.803 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.11 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.55 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.81 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 33.07 cfs

18.0" Round Pipe
n= 0.012
Length= 18.0' Slope= 0.0844 '/'
Inlet Invert= 54.55', Outlet Invert= 53.03'



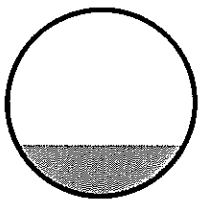
Summary for Reach 10R: CB1-DMH1

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 2.35" for 10-Year Storm Event event
Inflow = 1.17 cfs @ 12.51 hrs, Volume= 0.149 af
Outflow = 1.17 cfs @ 12.51 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.51 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 54.80', Outlet Invert= 54.65'



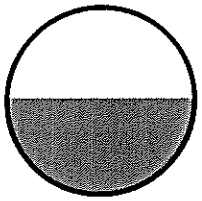
Summary for Reach 22R: CB3-DMH3

Inflow Area = 4.170 ac, 16.84% Impervious, Inflow Depth > 1.78" for 10-Year Storm Event event
Inflow = 3.70 cfs @ 12.90 hrs, Volume= 0.618 af
Outflow = 3.70 cfs @ 12.90 hrs, Volume= 0.618 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.78 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



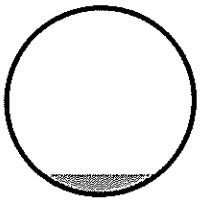
Summary for Reach 23R: CB2-DMH3

Inflow Area = 0.020 ac, 75.00% Impervious, Inflow Depth > 3.59" for 10-Year Storm Event event
Inflow = 0.10 cfs @ 12.01 hrs, Volume= 0.006 af
Outflow = 0.10 cfs @ 12.01 hrs, Volume= 0.006 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 0.2 min

Peak Storage= 0 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



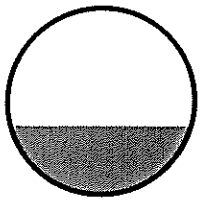
Summary for Reach 24AR: DMH2-DMH1

Inflow Area = 4.350 ac, 16.72% Impervious, Inflow Depth > 1.81" for 10-Year Storm Event event
Inflow = 3.78 cfs @ 12.89 hrs, Volume= 0.655 af
Outflow = 3.78 cfs @ 12.90 hrs, Volume= 0.655 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.23 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.81 fps, Avg. Travel Time= 0.5 min

Peak Storage= 51 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 13.09 cfs

15.0" Round Pipe
n= 0.012
Length= 124.0' Slope= 0.0350 '/'
Inlet Invert= 58.99', Outlet Invert= 54.65'



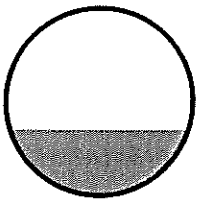
Summary for Reach 24R: DMH3-DMH2

Inflow Area = 4.190 ac, 17.12% Impervious, Inflow Depth > 1.79" for 10-Year Storm Event event
Inflow = 3.70 cfs @ 12.90 hrs, Volume= 0.624 af
Outflow = 3.70 cfs @ 12.90 hrs, Volume= 0.624 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.63 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.93 fps, Avg. Travel Time= 0.2 min

Peak Storage= 16 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 14.00 cfs

15.0" Round Pipe
n= 0.012
Length= 41.0' Slope= 0.0400 '/'
Inlet Invert= 60.73', Outlet Invert= 59.09'



Summary for Pond 11P: INLET-CB3

Inflow Area = 4.160 ac, 16.64% Impervious, Inflow Depth > 1.78" for 10-Year Storm Event event
Inflow = 3.73 cfs @ 12.83 hrs, Volume= 0.616 af
Outflow = 3.69 cfs @ 12.90 hrs, Volume= 0.615 af, Atten= 1%, Lag= 3.8 min
Primary = 3.69 cfs @ 12.90 hrs, Volume= 0.615 af

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

Peak Elev= 62.42' @ 12.90 hrs Surf.Area= 786 sf Storage= 538 cf

Plug-Flow detention time= 2.3 min calculated for 0.615 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (848.6 - 847.0)

Volume	Invert	Avail.Storage	Storage Description
#1	61.08'	1,033 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.08	10	0	0
62.00	365	173	173
63.00	1,356	861	1,033

Device	Routing	Invert	Outlet Devices
#1	Primary	61.08'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.08' / 61.03' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.69 cfs @ 12.90 hrs HW=62.42' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.69 cfs @ 3.48 fps)

Summary for Pond 15P: INLET-DMH2

Inflow Area = 0.160 ac, 6.25% Impervious, Inflow Depth > 2.36" for 10-Year Storm Event event
Inflow = 0.33 cfs @ 12.26 hrs, Volume= 0.031 af
Outflow = 0.33 cfs @ 12.27 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.5 min
Primary = 0.33 cfs @ 12.27 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 59.97' @ 12.27 hrs Surf.Area= 96 sf Storage= 32 cf

Plug-Flow detention time= 8.5 min calculated for 0.031 af (98% of inflow)
Center-of-Mass det. time= 3.9 min (805.1 - 801.2)

Volume	Invert	Avail.Storage	Storage Description
#1	59.39'	1,925 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.39	10	0	0
60.00	100	34	34
61.00	187	144	177
62.00	784	486	663
63.00	1,740	1,262	1,925

Device	Routing	Invert	Outlet Devices
#1	Primary	59.65'	**12.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.65' / 59.09' S= 0.0200 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.27 hrs HW=59.97' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.33 cfs @ 1.52 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=4.160 ac 16.64% Impervious Runoff Depth>2.35"
Flow Length=816' Tc=59.2 min CN=72 Runoff=4.96 cfs 0.815 af

Subcatchment 15S:SA15 Runoff Area=0.160 ac 6.25% Impervious Runoff Depth>3.01"
Flow Length=257' Tc=18.4 min CN=79 Runoff=0.42 cfs 0.040 af

Subcatchment 22S:SA22 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth>4.87"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=98 Runoff=0.06 cfs 0.004 af

Subcatchment 23S:SA23 Runoff Area=0.020 ac 75.00% Impervious Runoff Depth>4.33"
Flow Length=30' Slope=0.0300 '/' Tc=0.4 min CN=92 Runoff=0.12 cfs 0.007 af

Subcatchment 24S:SA24 Runoff Area=0.990 ac 40.57% Impervious Runoff Depth>3.59"
Flow Length=401' Tc=19.3 min CN=85 Runoff=3.01 cfs 0.296 af

Subcatchment 25S:SA25 Runoff Area=0.760 ac 15.79% Impervious Runoff Depth>3.00"
Flow Length=415' Tc=36.3 min CN=79 Runoff=1.49 cfs 0.190 af

Reach 8R:Summary-AnalysisPoint #1 Inflow=6.91 cfs 1.350 af
Outflow=6.91 cfs 1.350 af

Reach 10AR:DMH1-SMH Avg. Flow Depth=0.43' Max Vel=14.15 fps Inflow=5.91 cfs 1.054 af
18.0" Round Pipe n=0.012 L=18.0' S=0.0844 '/' Capacity=33.07 cfs Outflow=5.91 cfs 1.054 af

Reach 10R:CB1-DMH1 Avg. Flow Depth=0.39' Max Vel=4.53 fps Inflow=1.49 cfs 0.190 af
15.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=1.49 cfs 0.190 af

Reach 22R:CB3-DMH3 Avg. Flow Depth=0.77' Max Vel=6.17 fps Inflow=4.89 cfs 0.817 af
15.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=7.00 cfs Outflow=4.90 cfs 0.817 af

Reach 23R:CB2-DMH3 Avg. Flow Depth=0.12' Max Vel=2.19 fps Inflow=0.12 cfs 0.007 af
12.0" Round Pipe n=0.012 L=10.0' S=0.0100 '/' Capacity=3.86 cfs Outflow=0.11 cfs 0.007 af

Reach 24AR:DMH2-DMH1 Avg. Flow Depth=0.54' Max Vel=9.95 fps Inflow=5.00 cfs 0.864 af
15.0" Round Pipe n=0.012 L=124.0' S=0.0350 '/' Capacity=13.09 cfs Outflow=5.00 cfs 0.864 af

Reach 24R:DMH3-DMH2 Avg. Flow Depth=0.51' Max Vel=10.40 fps Inflow=4.90 cfs 0.825 af
15.0" Round Pipe n=0.012 L=41.0' S=0.0400 '/' Capacity=14.00 cfs Outflow=4.91 cfs 0.824 af

Pond 11P:INLET-CB3 Peak Elev=62.80' Storage=865 cf Inflow=4.96 cfs 0.815 af
15.0" Round Culvert n=0.012 L=10.0' S=0.0050 '/' Outflow=4.89 cfs 0.813 af

Pond 15P:INLET-DMH2 Peak Elev=60.01' Storage=36 cf Inflow=0.42 cfs 0.040 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0200 '/' Outflow=0.42 cfs 0.040 af

Total Runoff Area = 12.200 ac Runoff Volume = 2.688 af Average Runoff Depth = 2.64"
79.45% Pervious = 9.693 ac 20.55% Impervious = 2.507 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 = 4.96 cfs @ 12.82 hrs, Volume= 0.815 af, Depth> 2.35"

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
	0.670	70	Woods, Good, HSG C
	0.150	77	Woods, Good, HSG D
	1.300	87	1/4 acre lots, 38% imp, HSG D
*	0.130	98	Proposed Impervious Area
	0.190	80	>75% Grass cover, Good, HSG D
	0.070	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
	4.160	72	Weighted Average
	3.468		83.36% Pervious Area
	0.692		16.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.5	150	0.0030	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
15.7	666	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.2	816	Total			

Summary for Subcatchment 15S: SA15

Runoff = 0.42 cfs @ 12.25 hrs, Volume= 0.040 af, Depth> 3.01"

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
*	0.010	98	Proposed Impervious Area
	0.100	80	>75% Grass cover, Good, HSG D
	0.050	74	>75% Grass cover, Good, HSG C
	0.160	79	Weighted Average
	0.150		93.75% Pervious Area
	0.010		6.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0350	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
2.1	107	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.4	257	Total			

Summary for Subcatchment 22S: SA22

Runoff = 0.06 cfs @ 12.00 hrs, Volume= 0.004 af, Depth> 4.87"

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
*	0.010	98	Proposed Impervious Area
	0.010		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 23S: SA23

Runoff = 0.12 cfs @ 12.01 hrs, Volume= 0.007 af, Depth> 4.33"

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
*	0.015	98	Proposed Impervious Area
	0.005	74	>75% Grass cover, Good, HSG C
	0.020	92	Weighted Average
	0.005		25.00% Pervious Area
	0.015		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	30	0.0300	1.23		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment 24S: SA24

Runoff = 3.01 cfs @ 12.26 hrs, Volume= 0.296 af, Depth> 3.59"

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
	0.060	80	>75% Grass cover, Good, HSG D
	0.020	74	>75% Grass cover, Good, HSG C
	0.990	85	Weighted Average
	0.588		59.43% Pervious Area
	0.402		40.57% 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 = 1.49 cfs @ 12.50 hrs, Volume= 0.190 af, Depth> 3.00"

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
*	0.080	98	Proposed Impervious Area
	0.010	74	>75% Grass cover, Good, HSG C
	0.130	70	Woods, Good, HSG C
	0.500	77	Woods, Good, HSG D
*	0.040	98	Existing Impervious Area
	0.760	79	Weighted Average
	0.640		84.21% Pervious Area
	0.120		15.79% 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"
5.6	265	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.3	415	Total			

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

Inflow Area = 6.100 ac, 20.48% Impervious, Inflow Depth > 2.66" for 25-Year Storm Event event
Inflow = 6.91 cfs @ 12.62 hrs, Volume= 1.350 af
Outflow = 6.91 cfs @ 12.62 hrs, Volume= 1.350 af, Atten= 0%, Lag= 0.0 min

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

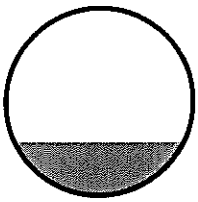
Summary for Reach 10AR: DMH1-SMH

Inflow Area = 5.110 ac, 16.58% Impervious, Inflow Depth > 2.47" for 25-Year Storm Event event
Inflow = 5.91 cfs @ 12.85 hrs, Volume= 1.054 af
Outflow = 5.91 cfs @ 12.85 hrs, Volume= 1.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.15 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 6.07 fps, Avg. Travel Time= 0.0 min

Peak Storage= 8 cf @ 12.85 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 33.07 cfs

18.0" Round Pipe
n= 0.012
Length= 18.0' Slope= 0.0844 '/'
Inlet Invert= 54.55', Outlet Invert= 53.03'



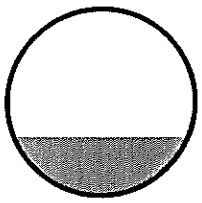
Summary for Reach 10R: CB1-DMH1

Inflow Area = 0.760 ac, 15.79% Impervious, Inflow Depth > 3.00" for 25-Year Storm Event event
Inflow = 1.49 cfs @ 12.50 hrs, Volume= 0.190 af
Outflow = 1.49 cfs @ 12.50 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 54.80', Outlet Invert= 54.65'



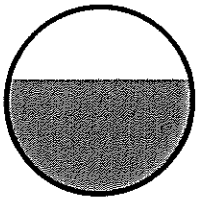
Summary for Reach 22R: CB3-DMH3

Inflow Area = 4.170 ac, 16.84% Impervious, Inflow Depth > 2.35" for 25-Year Storm Event event
Inflow = 4.89 cfs @ 12.90 hrs, Volume= 0.817 af
Outflow = 4.90 cfs @ 12.90 hrs, Volume= 0.817 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.17 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.58 fps, Avg. Travel Time= 0.1 min

Peak Storage= 8 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.00 cfs

15.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



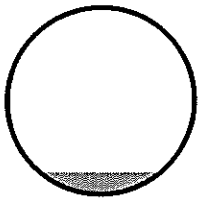
Summary for Reach 23R: CB2-DMH3

Inflow Area = 0.020 ac, 75.00% Impervious, Inflow Depth > 4.33" for 25-Year Storm Event event
Inflow = 0.12 cfs @ 12.01 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 12.01 hrs, Volume= 0.007 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 60.93', Outlet Invert= 60.83'



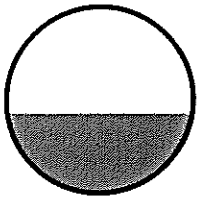
Summary for Reach 24AR: DMH2-DMH1

Inflow Area = 4.350 ac, 16.72% Impervious, Inflow Depth > 2.38" for 25-Year Storm Event event
Inflow = 5.00 cfs @ 12.89 hrs, Volume= 0.864 af
Outflow = 5.00 cfs @ 12.90 hrs, Volume= 0.864 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.95 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.18 fps, Avg. Travel Time= 0.5 min

Peak Storage= 62 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 13.09 cfs

15.0" Round Pipe
n= 0.012
Length= 124.0' Slope= 0.0350 '/'
Inlet Invert= 58.99', Outlet Invert= 54.65'



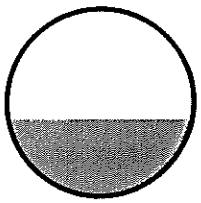
Summary for Reach 24R: DMH3-DMH2

Inflow Area = 4.190 ac, 17.12% Impervious, Inflow Depth > 2.36" for 25-Year Storm Event event
Inflow = 4.90 cfs @ 12.90 hrs, Volume= 0.825 af
Outflow = 4.91 cfs @ 12.90 hrs, Volume= 0.824 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.40 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.31 fps, Avg. Travel Time= 0.2 min

Peak Storage= 19 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 14.00 cfs

15.0" Round Pipe
n= 0.012
Length= 41.0' Slope= 0.0400 '/'
Inlet Invert= 60.73', Outlet Invert= 59.09'



Summary for Pond 11P: INLET-CB3

Inflow Area = 4.160 ac, 16.64% Impervious, Inflow Depth > 2.35" for 25-Year Storm Event event
Inflow = 4.96 cfs @ 12.82 hrs, Volume= 0.815 af
Outflow = 4.89 cfs @ 12.90 hrs, Volume= 0.813 af, Atten= 2%, Lag= 4.5 min
Primary = 4.89 cfs @ 12.90 hrs, Volume= 0.813 af

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

Peak Elev= 62.80' @ 12.90 hrs Surf.Area= 1,162 sf Storage= 865 cf

Plug-Flow detention time= 2.4 min calculated for 0.813 af (100% of inflow)
Center-of-Mass det. time= 1.9 min (843.0 - 841.1)

Volume	Invert	Avail.Storage	Storage Description
#1	61.08'	1,033 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.08	10	0	0
62.00	365	173	173
63.00	1,356	861	1,033

Device	Routing	Invert	Outlet Devices
#1	Primary	61.08'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.08' / 61.03' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.89 cfs @ 12.90 hrs HW=62.80' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.89 cfs @ 3.99 fps)

Summary for Pond 15P: INLET-DMH2

Inflow Area = 0.160 ac, 6.25% Impervious, Inflow Depth > 3.01" for 25-Year Storm Event event
Inflow = 0.42 cfs @ 12.25 hrs, Volume= 0.040 af
Outflow = 0.42 cfs @ 12.28 hrs, Volume= 0.040 af, Atten= 1%, Lag= 1.3 min
Primary = 0.42 cfs @ 12.28 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 60.01' @ 12.28 hrs Surf.Area= 101 sf Storage= 36 cf

Plug-Flow detention time= 7.2 min calculated for 0.040 af (99% of inflow)
Center-of-Mass det. time= 3.5 min (799.2 - 795.6)

Volume	Invert	Avail.Storage	Storage Description
#1	59.39'	1,925 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.39	10	0	0
60.00	100	34	34
61.00	187	144	177
62.00	784	486	663
63.00	1,740	1,262	1,925

Device	Routing	Invert	Outlet Devices
#1	Primary	59.65'	**12.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.65' / 59.09' S= 0.0200 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.28 hrs HW=60.01' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.41 cfs @ 1.62 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.