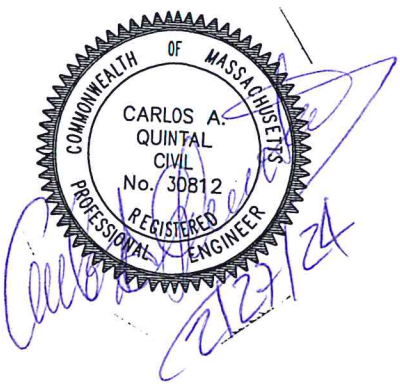
DRAINAGE ANALYSIS

FOR
Site Plan
100 and 110 East Central Street

LOCATED IN
FRANKLIN, MASSACHUSETTS

PREPARED FOR
110 East Central Street RE, LLC
37 East Central Street
Franklin, MA 02038



PREPARED BY
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DATE: January 5, 2024
Revised February 26, 2024

Table of Contents

APPENDIX A

I. DESCRIPTION

This report is offered in support of the stormwater management system designed for the "Site Plan – For 100 and 110 East Central Street" in Franklin, Massachusetts. The primary goals of this system are to collect the stormwater runoff generated from the existing parking area as well as the proposed parking area expansion located to the rear of the existing building. Additionally, the design provided for capturing the existing roof runoff (100 East Central Street) as well as the proposed building located on 110 East Central Street and direct it to the underground infiltration pond. An underground pond was added to the rear parking area and the infiltration rates for infiltration pond 1 were used in the model. This provided for additional storage and recharge as well as reductions in the post-development rate and volume of runoff. It should be noted that the rates and volumes of runoff to the existing wetland were shown to be matched or reduced in the original analysis without pond 2 being included. Both the pre-development and post-development conditions flowing offsite are summarized in Appendix B. This design will allow for the rate and volume of offsite stormwater to remain the same or be decreased.

II. Purpose

The purpose of this report is to examine the hydrological and hydraulic aspects of the proposed 100 and 110 East Central Street" Site Plan. This report was developed for review by the Town of Franklin Planning Board and Conservation Commission to obtain the necessary permits to allow the project to proceed.

This report considers the overall hydrological impact of proposed additional development upon the local watersheds with specific emphasis directed toward the adjacent and immediate downstream areas. The hydrology and criteria are consistent with the Town of Franklin Planning Board, Franklin Conservation Commission and MASS DEP Storm Water Management Policies.

III. Pre-Development Conditions

The site consists of two parcels of land containing 56,329 +/- square feet of land, when combined, and is located off of East Central Street in Franklin. The 100 East Central Street parcel is currently developed with an existing masonry apartment building and paved parking areas. landscaping, and ledge outcrops. The 110 East Central Street site is currently developed with a single family house, driveway, lawn and landscaping. The upland soils for the site were taken from the soil survey of Norfolk and Suffolk counties. The soils are classified as Hollis-Rock outcrop-Carlton complex and Urban Land. The Hollis Rock outcrop soil type is classified as a hydrologic soil group D. Soil testing was conducted on the site to determine soil types and permeability rates. See the soil logs and permeability test results located in Appendix F. A permeability test was completed on site and the infiltration rate was calculated using 50 percent of the slowest rate.
Utilizing a Hydrocad computer model the pre-development and post development conditions were calculated. This included an analysis of the watershed utilizing a Hydrologic soil group D. A comparison of the pre-development vs. post development rate and volume of runoff can be found in Appendix B.

IV. Post Development Conditions

The proposed development will consist of the construction of a mixed-use building on 110 East Central Street. The existing paved parking areas will be reconfigured, and new parking areas will be constructed. Curbing will be added and the storm-water runoff will be directed to the proposed drainage system.

The front portion of the sites storm-water will be captured in deep sump hooded catch basing and will be directed to the underground infiltration pond. The proposed infiltration system will promote groundwater

re-charge as required by the Town of Franklin Stormwater Regulations. The rear portion of the site's stormwater will be directed to catch basin 4 and catch basin 5. The runoff will then be directed to pond 2 and an outlet has been provided so the overflow of stormwater will be directed to a headwall and the isolated wetland. Municipal utility connections are also included in the project. The proposal is to service the buildings with town water and sewer. The project design includes the re-construction of one site driveway and the closing off of two existing curb cuts. The drainage system for the building and parking area consists of a closed drainage system.
TSS removal will be accomplished by a treatment train. The site will be treated by deep sump hooded catch basins and infiltration. Utilizing the same computer model as the existing conditions we have modeled the changes in surfaces and ground cover and have calculated the post development conditions. All calculations for the above have been included in this report. Pre-development calculations are in Appendix C. Post-development calculations are located in Appendix D.

V. Conclusion

Stormwater from the existing and proposed parking areas will be captured by the catch basins and a water quality unit for TSS removal which will then be directed to the underground infiltration pond and the isolated wetland The existing and proposed roofs will be captured and directed to a underground infiltration pond. The comparison in Appendix B summarizes the rate and volumes of runoff leaving the site in both the pre-development and post-development conditions. This comparison indicates that there is not an increase in the rate or volume of runoff during the 2-year 10-year or 100-year storm events.

VI. Stormwater Management Standards

Refer to Checklist for Stormwater Report in Appendix I

Town of Franklin Stormwater Management Bylaw – Chapter 153 – Bylaw Amendment 21-867

Impervious Coverage 100 and 110 East Central Street site =

1" x 35,328 sq. ft. impervious = 2,944 cubic feet (Required)

Storage in Pond 1 below the outlet invert = 4,306 cubic feet (Provided)

Pond 2 will provide storage of 1,373 cubic feet below the outlet invert.

This narrative is for the 100 and 110 East Central Street site

LID Measures

- No disturbance is proposed to any Wetland Resource Area.
- Existing Vegetation Removal is minimal with re-development of existing areas proposed.

Standard 1: No New Untreated Discharges
No new untreated discharges are proposed.
The site does not currently have any stormwater treatment. A stormwater system has been proposed to provide the required TSS removal which includes the installation of deep sump hooded catch basins, and infiltration basins.

Standard 2: Peak Rate Attenuation
The drainage system has been designed to match or reduce the rate and volume of storm-water runoff from the site when comparing the pre-development conditions to the post development conditions. See Appendix B of this report for a summary of the design storms.

Standard 3: Recharge

- Soil testing has been completed. See Appendix F or this report for permeability test results and sheet 4 for soil testing information.

- Drawdown within 72 hours
  Storage Volume below outlet = 4,306 cubic feet
  Time = (4,306) / (0.75"/hr x 1'/12" x 2,325 sf. = 29.6 hours < 72 hours

Standard 4: Water Quality

- The owner will be responsible for compliance with standard four requirements.
- Refer to the Operation and Maintenance Plan and the Storm-water Facilities Plan for the Inspection and Maintenance Schedule and the Operation and Maintenance Schedule.
- See Appendix E for the Manufactures TSS removal rate. The site is not located within a zone II. The Infiltration Pond has been designed with an infiltration rate of 0.75 inches per hour. This led to the Water Quality unit being modeled with a 1/2" WQV.
- The proposed project will include a Water Quality Unit which will provide TSS removal. The summary of the Manufacturers' Predicted Net Annual results as well as the TSS Removal Worksheet are included.

Standard 5: Land uses with higher potential pollutant loads

None proposed.

Standard 6: Critical Areas

N/A

Standard 7: Re-developments and Other Projects

A portion of the site is being re-developed. The storm-water standards have been met for the entire site with the exception of TSS removal. The pre-development watershed to East Central Street had 10, 967 sq. Ft. of impervious surface with out TSS removal. The post-development conditions have reduced the impervious area to 2,906 sq. ft.

Standard 8: Construction Period Pollution Prevention and Erosion Sedimentation Control

- Refer to sheet 6 for the Inspection and Maintenance Schedule and the Operation and Maintenance Schedule.
- The project will not be covered by a NPDES Construction General Permit.

Standard 9: Operation and Maintenance Plan

- Refer to sheet 6 for the Inspection and Maintenance Schedule and the Operation and Maintenance Schedule.
- The owner will be responsible for the storm-water management system, implementation of the operation and maintenance, the maintenance costs, and completion of the maintenance logs.

- Refer to sheet 6 for the Inspection and Maintenance Schedule and the Operation and Maintenance Schedule.

- Refer to the Operation and Maintenance Plan.

Standard 10: Prohibition of Illicit Discharges

- Owner to be responsible for compliance with avoiding illicit discharges.
- The site will be connected to the town sewer system.

APPENDIX B

Pre-Development vs. Post Development Rate and Volume of Runoff

This analysis was prepared to show the summary of the pre-development and post development rate and volume of runoff as required by the Town of Franklin Storm-water Requirements.

The pre-development watershed area A is located to the south portion of the site with a discharge to the existing wetland area. Post-development Link 2L was provided to combine the headwall outlet with the undeveloped area which discharge to the exiting isolated wetland area. A comparison of the rate and volume for pre-development area EW and post-development Link 1L is provided below:

2-year storm event (CFS)			2 year storm event (A.F.)		
Pre		Post	Pre		Post
A	vs	2L	A	vs	2L
1.66		1.40	0.120		0.067

10 year storm event (CFS)			10 year storm event (A.F.)		
Pre		Post	Pre		Post
A	vs	2L	A	vs	2L
3.15		2.87	0.230		0.159

100 year storm event (CFS)			100 year storm event (A.F.)		
Pre		Post	Pre		Post
A	vs	2L	A	vs	2L
5.55		4.72	0.415		0.315

Note: the above post development conditions are based on routing the runoff thought pond 2 and utilizing the infiltration rates for infiltration pond 1. The original comparison showed the post-development runoff was either the same or reduced without the pond being included in the analysis.

The pre-development watershed area B is located to the north portion of the site with a discharge to East Central Steet. Post-development Link 1L was provided to combine the pond outlet with sub-catchment 5 which drains to East Central Street. A comparison of the rate and volume for pre-development area EW and post-development Link 1L is provided below:

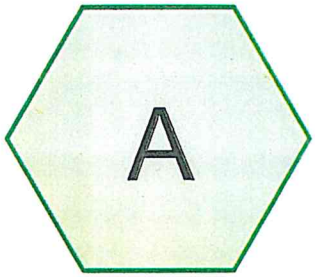
2-year storm event (CFS)			2 year storm event (A.F.)		
Pre		Post	Pre		Post
B	vs	1L	B	vs	1L
1.22		0.46	0.087		0.033

10 year storm event (CFS)			10 year storm event (A.F.)		
Pre		Post	Pre		Post
B	vs	1L	B	vs	1L
2.13		0.84	0.156		0.083

100 year storm event (CFS)			100 year storm event (A.F.)		
Pre		Post	Pre		Post
B	vs	1L	B	vs	1L
3.56		3.51	0.269		0.226

No changes or a reduction in both the rate of runoff and volume of runoff has been realized with the proposed storm-water systems.

APPENDIX C



East to wetland

North to E. Central

Subcat Reach Pond Link

Drainage Diagram for UC1587-PRE-11-23
Prepared by {enter your company name here} 12/17/2023
HydroCAD® 8.00 s/n 001535 © 2006 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.460	77	Woods, Good, HSG D (A,B)
0.319	80	>75% Grass cover, Good, HSG D (A,B)
0.047	98	Ledge (A)
0.439	98	Paved parking & roofs (A,B)
1.264		

2 YR PRE-DEVELOPMENT

Subcatchment A: East to wetland

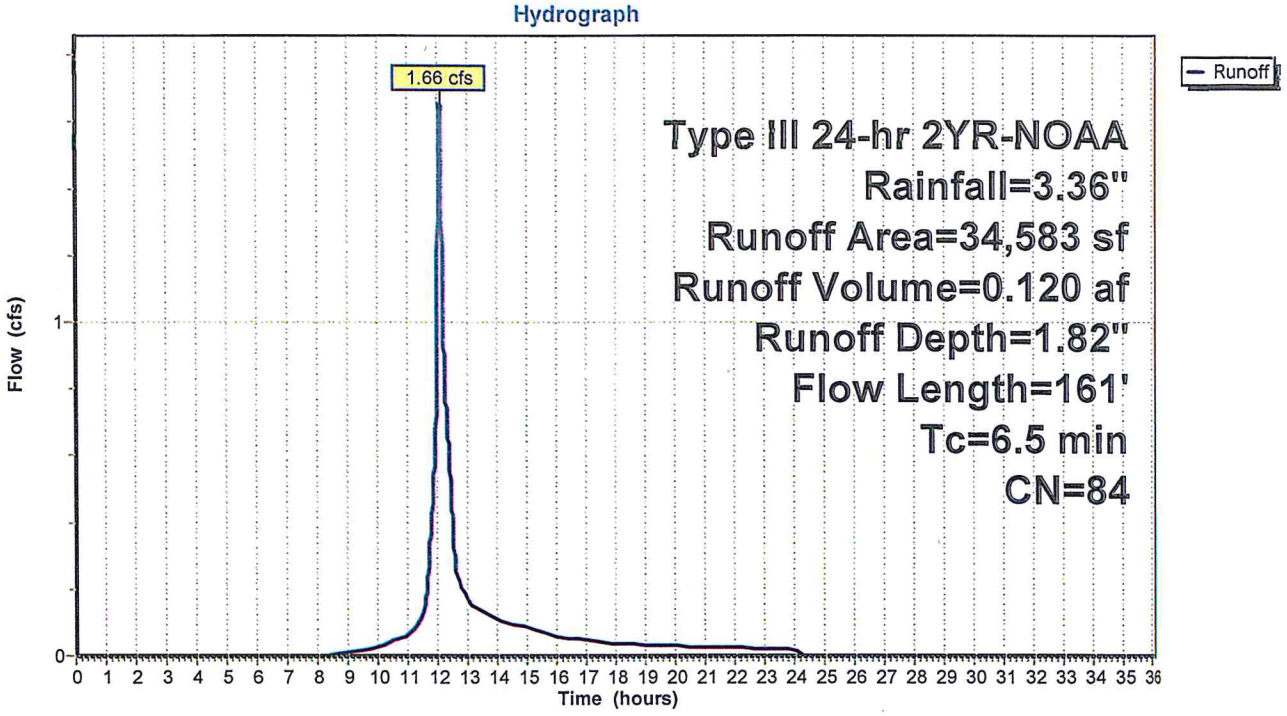
Runoff = 1.66 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-NOAA Rainfall=3.36"

Area (sf)	CN	Description
8,151	98	Paved parking & roofs
6,024	80	>75% Grass cover, Good, HSG D
18,371	77	Woods, Good, HSG D
2,037	98	Ledge
34,583	84	Weighted Average
24,395		Pervious Area
10,188		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	41	0.0976	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	37	0.1622	2.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	21	0.1905	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	4	0.5000	3.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.1053	1.62		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	39	0.1333	1.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	161	Total			

Subcatchment A: East to wetland



Subcatchment B: North to E. Central

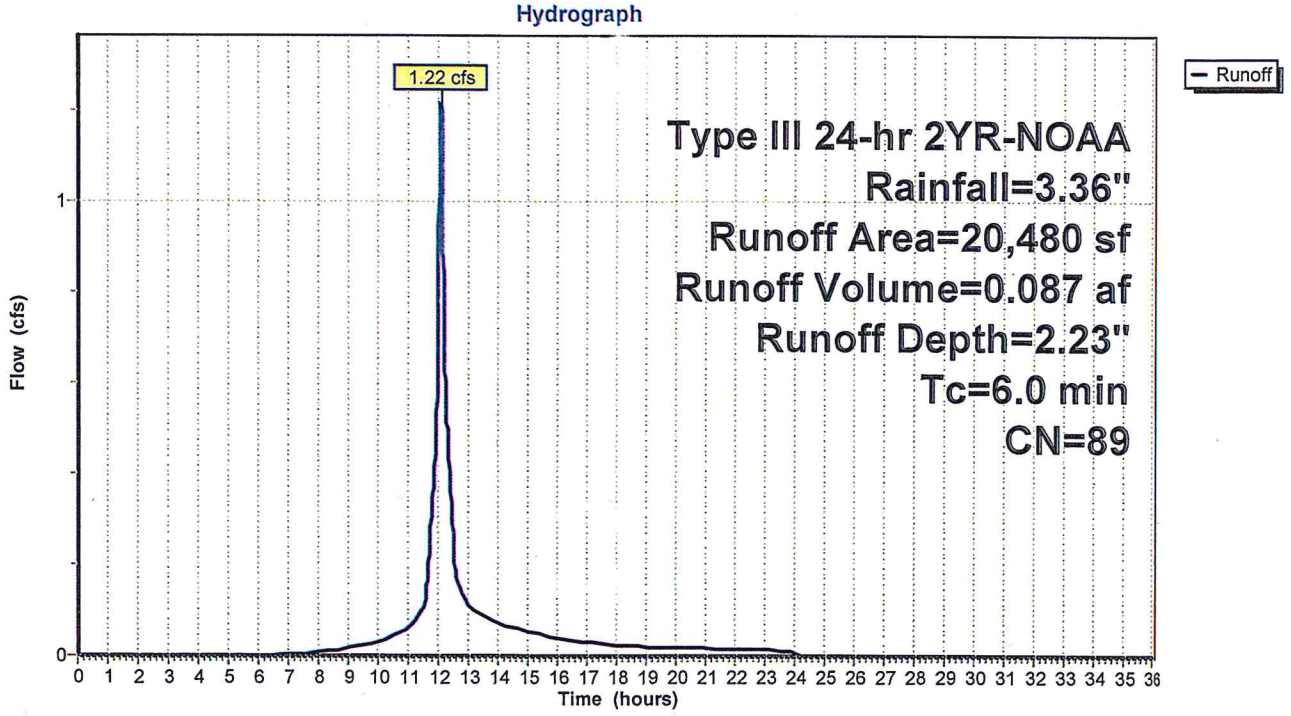
Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-NOAA Rainfall=3.36"

Area (sf)	CN	Description
10,967	98	Paved parking & roofs
7,859	80	>75% Grass cover, Good, HSG D
1,654	77	Woods, Good, HSG D
20,480	89	Weighted Average
9,513		Pervious Area
10,967		Impervious Area

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

Subcatchment B: North to E. Central



10 YR PRE-DEVELOPMENT

Subcatchment A: East to wetland

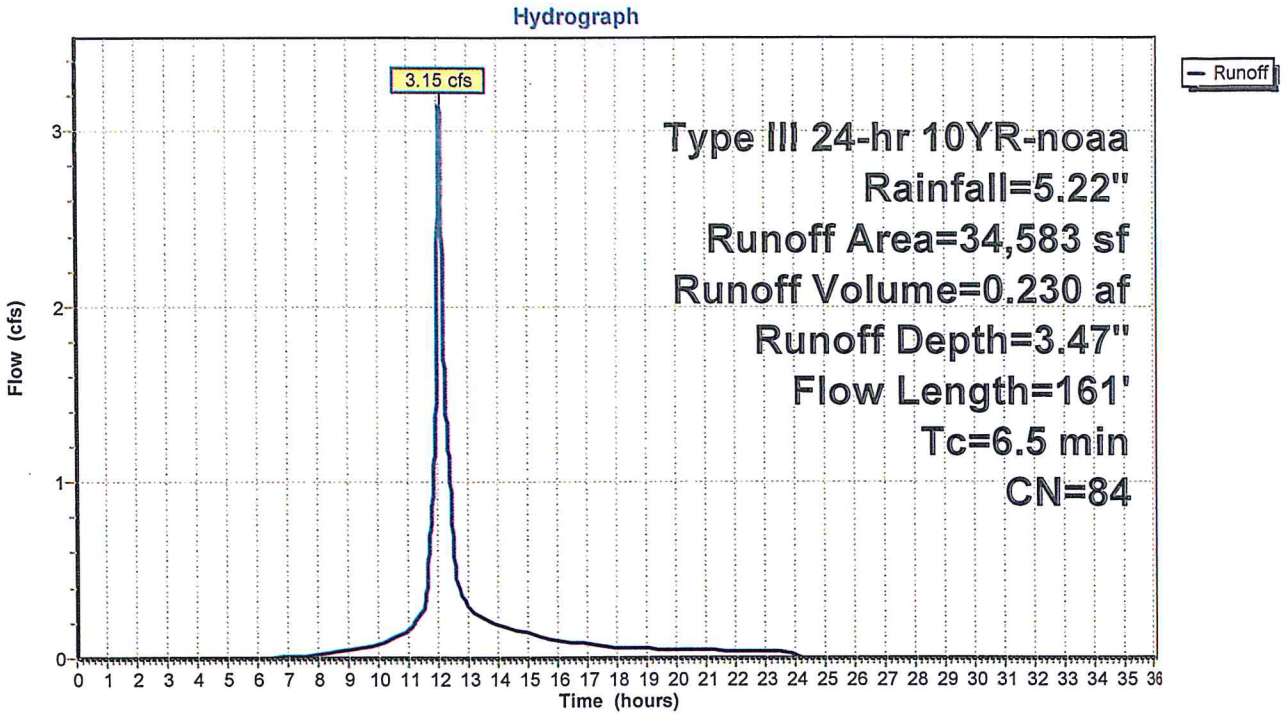
Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.230 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
8,151	98	Paved parking & roofs
6,024	80	>75% Grass cover, Good, HSG D
18,371	77	Woods, Good, HSG D
2,037	98	Ledge
34,583	84	Weighted Average
24,395		Pervious Area
10,188		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	41	0.0976	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	37	0.1622	2.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	21	0.1905	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	4	0.5000	3.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.1053	1.62		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	39	0.1333	1.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	161	Total			

Subcatchment A: East to wetland



Subcatchment B: North to E. Central

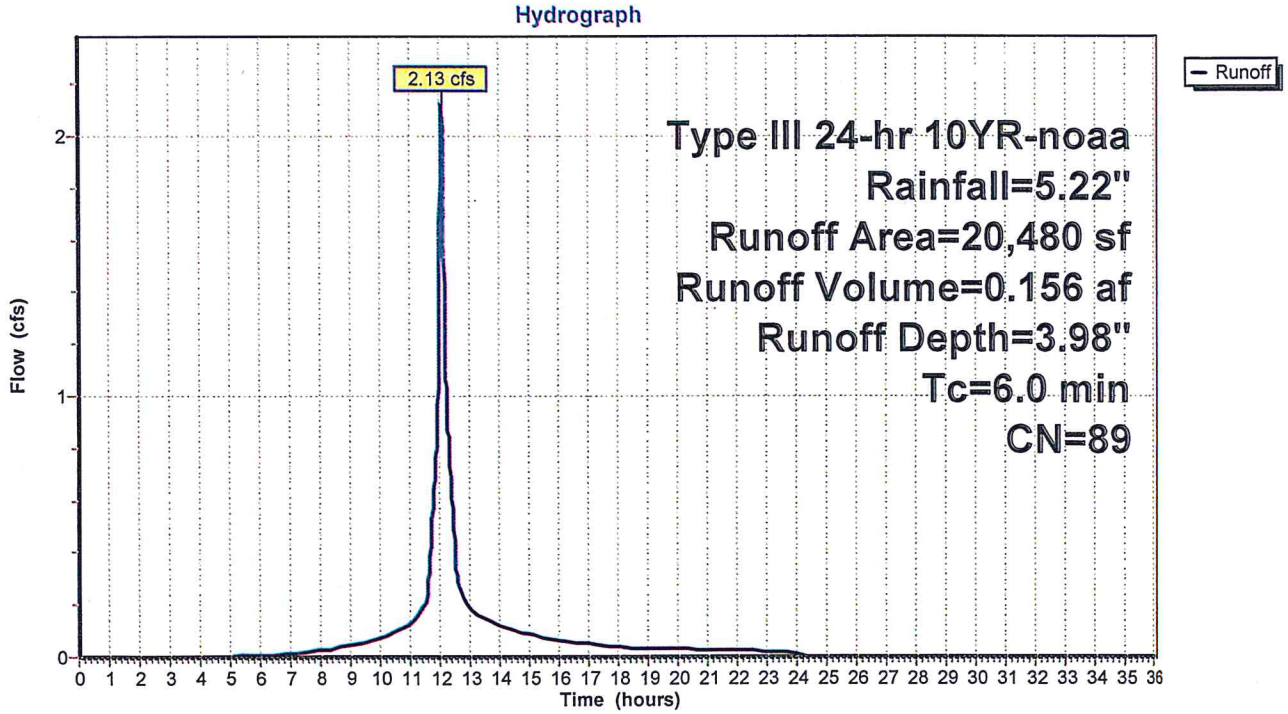
Runoff = 2.13 cfs @ 12.09 hrs, Volume= 0.156 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
10,967	98	Paved parking & roofs
7,859	80	>75% Grass cover, Good, HSG D
1,654	77	Woods, Good, HSG D
20,480	89	Weighted Average
9,513		Pervious Area
10,967		Impervious Area

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

Subcatchment B: North to E. Central



100 YR PRE-DEVELOPMENT

Subcatchment A: East to wetland

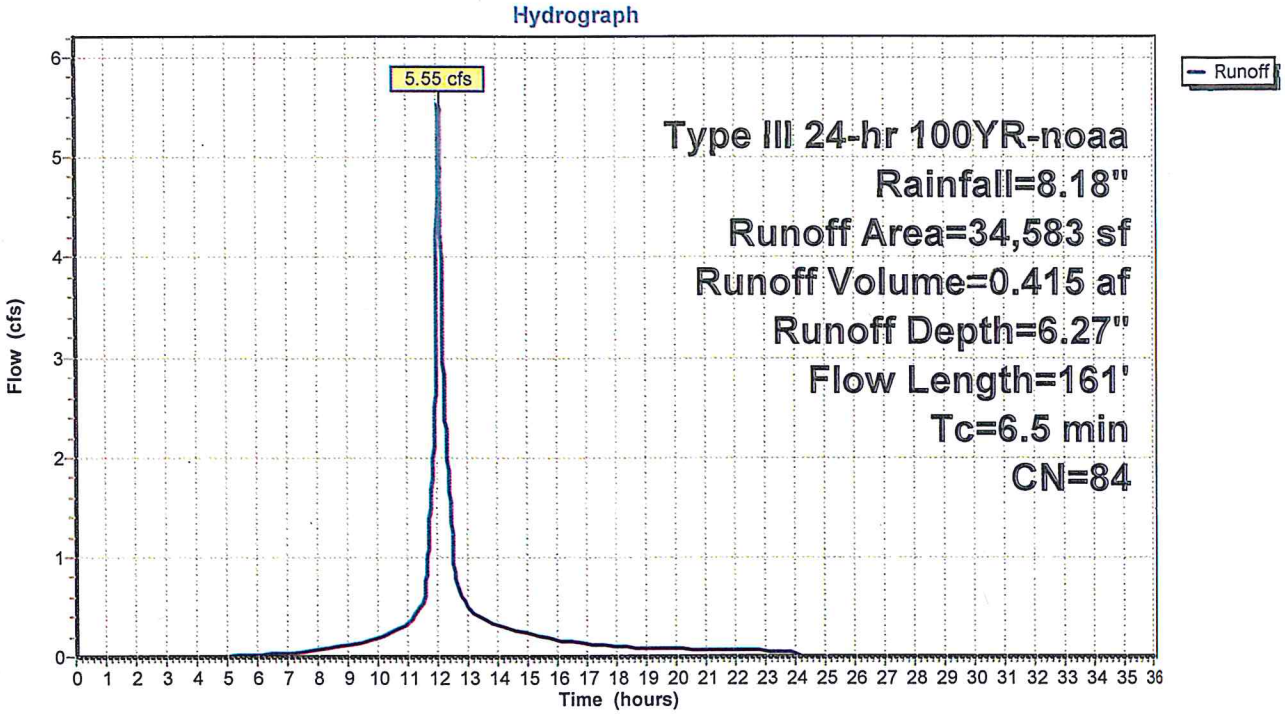
Runoff = 5.55 cfs @ 12.09 hrs, Volume= 0.415 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
8,151	98	Paved parking & roofs
6,024	80	>75% Grass cover, Good, HSG D
18,371	77	Woods, Good, HSG D
2,037	98	Ledge
34,583	84	Weighted Average
24,395		Pervious Area
10,188		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	41	0.0976	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.36"
0.3	37	0.1622	2.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	21	0.1905	2.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	4	0.5000	3.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	19	0.1053	1.62		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	39	0.1333	1.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	161	Total			

Subcatchment A: East to wetland



Subcatchment B: North to E. Central

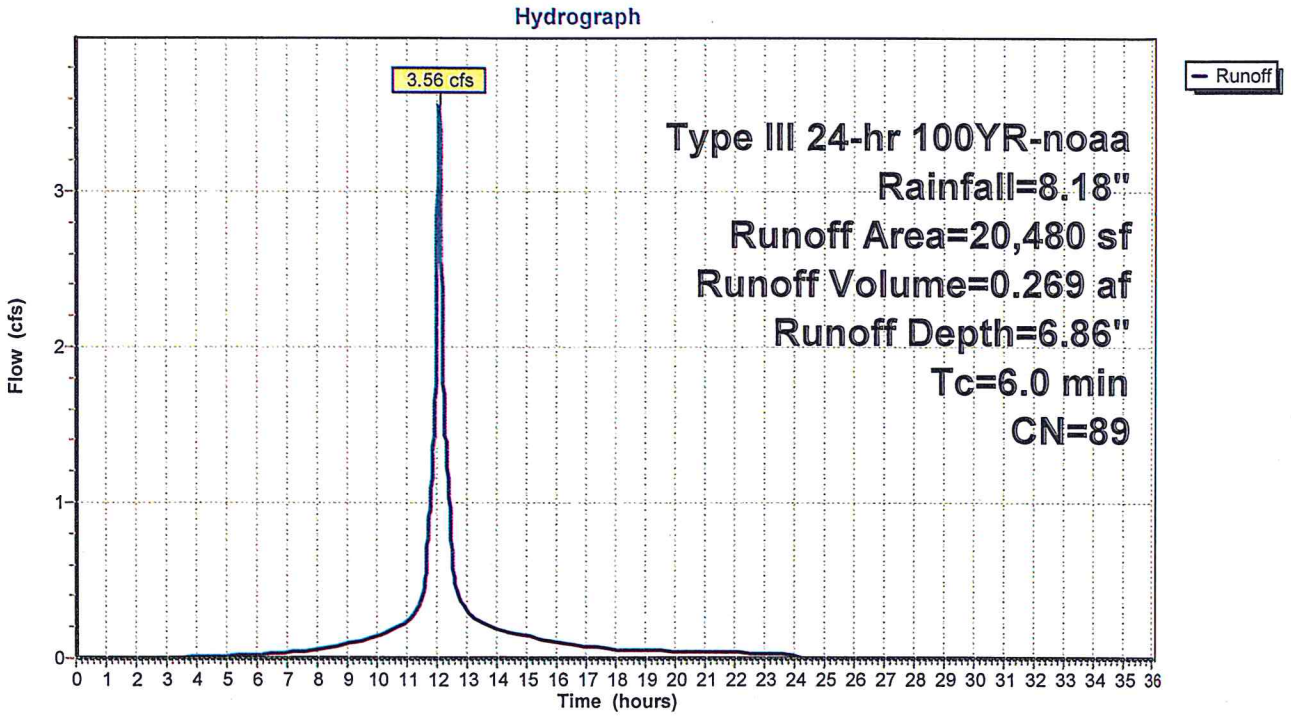
Runoff = 3.56 cfs @ 12.08 hrs, Volume= 0.269 af, Depth= 6.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

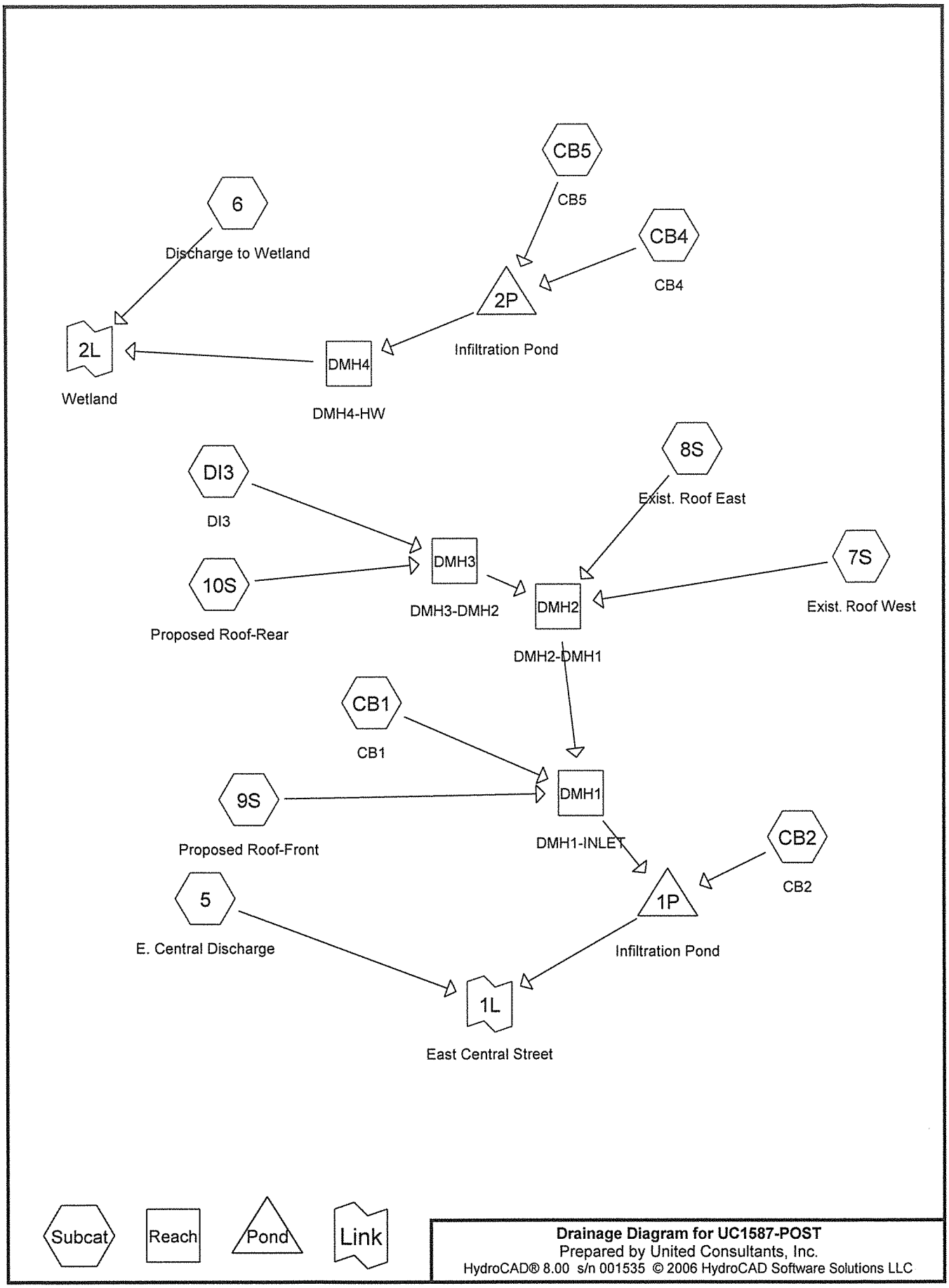
Area (sf)	CN	Description
10,967	98	Paved parking & roofs
7,859	80	>75% Grass cover, Good, HSG D
1,654	77	Woods, Good, HSG D
20,480	89	Weighted Average
9,513		Pervious Area
10,967		Impervious Area

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

Subcatchment B: North to E. Central



APPENDIX D



Drainage Diagram for UC1587-POST
Prepared by United Consultants, Inc.
HydroCAD® 8.00 s/n 001535 © 2006 HydroCAD Software Solutions LLC

2 YR POST-DEVELOPMENT

Subcatchment 5: E. Central Discharge

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
2,906	98	Paved parking & roofs
5,725	80	>75% Grass cover, Good, HSG D
8,631	86	Weighted Average
5,725		Pervious Area
2,906		Impervious Area

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

Subcatchment 6: Discharge to Wetland

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
417	98	Paved parking & roofs
5,457	80	>75% Grass cover, Good, HSG D
4,511	77	Woods, Good, HSG D
10,385	79	Weighted Average
9,968		Pervious Area
417		Impervious Area

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

Subcatchment 7S: Exist. Roof West

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	140	0.0200	6.36	2.22	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	140	Total			

Subcatchment 8S: Exist. Roof East

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.2	72	0.0300	7.79	2.72	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.2	72	Total			

Subcatchment 9S: Proposed Roof-Front

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.5	93	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.5	93	Total			

Subcatchment 10S: Proposed Roof-Rear

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	80	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	80	Total			

Subcatchment CB1: CB1

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
1,248	98	Paved parking & roofs
1,248		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	18	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	18	Total			

Subcatchment CB2: CB2

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
3,448	98	Paved parking & roofs
3,448		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	5	0.0200	8.34	6.55	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
6.0	5	Total			

Subcatchment CB4: CB4

Runoff = 0.81 cfs @ 12.09 hrs, Volume= 0.059 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
7,587	98	Paved parking & roofs
5,698	80	>75% Grass cover, Good, HSG D
13,285	90	Weighted Average
5,698		Pervious Area
7,587		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	40	0.0100	4.91	3.86	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	40	Total			

Subcatchment CB5: CB5

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.034 af, Depth= 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
5,531	98	Paved parking & roofs
151	80	>75% Grass cover, Good, HSG D
5,682	98	Weighted Average
151		Pervious Area
5,531		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	7	0.0500	10.99	8.63	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.0	7	Total			

Subcatchment DI3: DI3

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR-noaa Rainfall=3.36"

Area (sf)	CN	Description
4,396	98	Paved parking & roofs
731	80	>75% Grass cover, Good, HSG D
5,127	95	Weighted Average
731		Pervious Area
4,396		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	14	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	14	Total			

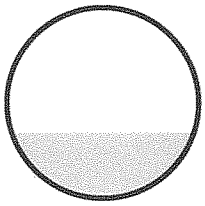
Reach DMH1: DMH1-INLET

Inflow Area = 0.374 ac, Inflow Depth = 3.02" for 2YR-noaa event
Inflow = 1.19 cfs @ 12.09 hrs, Volume= 0.094 af
Outflow = 1.19 cfs @ 12.09 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.93 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.63 cfs

12.0" Diameter Pipe, n= 0.010 PVC, smooth interior
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 311.20', Outlet Invert= 311.10'



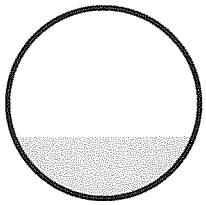
Reach DMH2: DMH2-DMH1

Inflow Area = 0.282 ac, Inflow Depth = 2.99" for 2YR-noaa event
Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.00 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 0.4 min

Peak Storage= 7 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.86 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 311.60', Outlet Invert= 311.30'



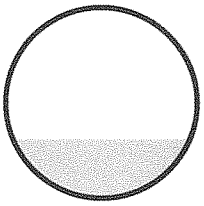
Reach DMH3: DMH3-DMH2

Inflow Area = 0.181 ac, Inflow Depth = 2.92" for 2YR-noaa event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.74 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 0.4 min

Peak Storage= 5 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.73 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 22.0' Slope= 0.0050 '/'
Inlet Invert= 311.81', Outlet Invert= 311.70'



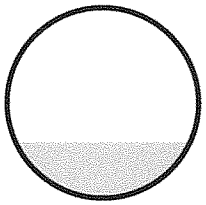
Reach DMH4: DMH4-HW

Inflow Area = 0.435 ac, Inflow Depth = 1.05" for 2YR-noaa event
Inflow = 1.05 cfs @ 12.13 hrs, Volume= 0.038 af
Outflow = 1.04 cfs @ 12.14 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.35 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.2 min

Peak Storage= 5 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.46 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 298.75', Outlet Invert= 298.25'



Pond 1P: Infiltration Pond

Inflow Area = 0.453 ac, Inflow Depth = 3.04" for 2YR-noaa event
Inflow = 1.44 cfs @ 12.09 hrs, Volume= 0.115 af
Outflow = 0.05 cfs @ 15.63 hrs, Volume= 0.115 af, Atten= 97%, Lag= 212.1 min
Discarded = 0.05 cfs @ 15.63 hrs, Volume= 0.115 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 310.78' @ 15.63 hrs Surf.Area= 2,325 sf Storage= 2,851 cf

Plug-Flow detention time= 548.2 min calculated for 0.115 af (100% of inflow)
Center-of-Mass det. time= 548.2 min (1,310.0 - 761.8)

Volume	Invert	Avail.Storage	Storage Description
#1	308.70'	2,567 cf	**32.75'W x 71.00'L x 4.00'H Prismatoid** 9,301 cf Overall - 2,884 cf Embedded = 6,417 cf x 40.0% Voids
#2	309.20'	2,884 cf	**36.0"D x 68.00'L Horizontal Cylinder** x 6 Inside #1
		5,451 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	311.65'	**6.0" Horiz. Orifice/Grate X 4.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.05 cfs @ 15.63 hrs HW=310.78' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=308.70' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Infiltration Pond

Inflow Area = 0.435 ac, Inflow Depth = 2.56" for 2YR-noaa event
Inflow = 1.24 cfs @ 12.09 hrs, Volume= 0.093 af
Outflow = 1.07 cfs @ 12.13 hrs, Volume= 0.093 af, Atten= 14%, Lag= 2.9 min
Discarded = 0.02 cfs @ 12.13 hrs, Volume= 0.055 af
Primary = 1.05 cfs @ 12.13 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 310.37' @ 12.13 hrs Surf.Area= 731 sf Storage= 1,368 cf

Plug-Flow detention time= 430.1 min calculated for 0.093 af (100% of inflow)
Center-of-Mass det. time= 430.1 min (1,217.0 - 786.9)

Volume	Invert	Avail.Storage	Storage Description
#1	307.10'	830 cf	**17.00'W x 43.00'L x 4.00'H Prismatoid** 2,924 cf Overall - 848 cf Embedded = 2,076 cf x 40.0% Voids
#2	308.10'	848 cf	**36.0"D x 40.00'L Horizontal Cylinder** x 3 Inside #1
		1,679 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	310.23'	**8.0" Horiz. Orifice/Grate X 3.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.02 cfs @ 12.13 hrs HW=310.37' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.03 cfs @ 12.13 hrs HW=310.37' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 1.03 cfs @ 1.21 fps)

Link 1L: East Central Street

Inflow Area = 0.651 ac, Inflow Depth = 0.60" for 2YR-noaa event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.033 af
Primary = 0.46 cfs @ 12.09 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 2L: Wetland

Inflow Area = 0.674 ac, Inflow Depth = 1.20" for 2YR-noaa event
Inflow = 1.40 cfs @ 12.13 hrs, Volume= 0.067 af
Primary = 1.40 cfs @ 12.13 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

10 YR POST-DEVELOPMENT

Subcatchment 5: E. Central Discharge

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
2,906	98	Paved parking & roofs
5,725	80	>75% Grass cover, Good, HSG D
8,631	86	Weighted Average
5,725		Pervious Area
2,906		Impervious Area

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

Subcatchment 6: Discharge to Wetland

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.059 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
417	98	Paved parking & roofs
5,457	80	>75% Grass cover, Good, HSG D
4,511	77	Woods, Good, HSG D
10,385	79	Weighted Average
9,968		Pervious Area
417		Impervious Area

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

Subcatchment 7S: Exist. Roof West

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	140	0.0200	6.36	2.22	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	140	Total			

Subcatchment 8S: Exist. Roof East

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.2	72	0.0300	7.79	2.72	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.2	72	Total			

Subcatchment 9S: Proposed Roof-Front

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.5	93	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.5	93	Total			

Subcatchment 10S: Proposed Roof-Rear

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	80	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	80	Total			

Subcatchment CB1: CB1

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
1,248	98	Paved parking & roofs
1,248		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	18	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	18	Total			

Subcatchment CB2: CB2

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
3,448	98	Paved parking & roofs
3,448		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	5	0.0200	8.34	6.55	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
6.0	5	Total			

Subcatchment CB4: CB4

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.104 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
7,587	98	Paved parking & roofs
5,698	80	>75% Grass cover, Good, HSG D
13,285	90	Weighted Average
5,698		Pervious Area
7,587		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	40	0.0100	4.91	3.86	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	40	Total			

Subcatchment CB5: CB5

Runoff = 0.67 cfs @ 12.08 hrs, Volume= 0.054 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
5,531	98	Paved parking & roofs
151	80	>75% Grass cover, Good, HSG D
5,682	98	Weighted Average
151		Pervious Area
5,531		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	7	0.0500	10.99	8.63	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.0	7	Total			

Subcatchment DI3: DI3

Runoff = 0.58 cfs @ 12.08 hrs, Volume= 0.045 af, Depth= 4.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR-noaa Rainfall=5.22"

Area (sf)	CN	Description
4,396	98	Paved parking & roofs
731	80	>75% Grass cover, Good, HSG D
5,127	95	Weighted Average
731		Pervious Area
4,396		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	14	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	14	Total			

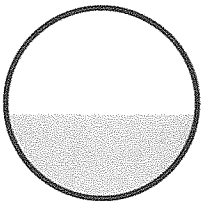
Reach DMH1: DMH1-INLET

Inflow Area = 0.374 ac, Inflow Depth = 4.87" for 10YR-noaa event
Inflow = 1.87 cfs @ 12.09 hrs, Volume= 0.152 af
Outflow = 1.87 cfs @ 12.09 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.58 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.63 cfs

12.0" Diameter Pipe, n= 0.010 PVC, smooth interior
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 311.20', Outlet Invert= 311.10'



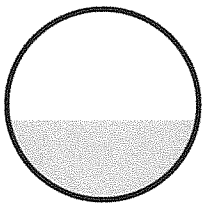
Reach DMH2: DMH2-DMH1

Inflow Area = 0.282 ac, Inflow Depth = 4.84" for 10YR-noaa event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.114 af
Outflow = 1.41 cfs @ 12.09 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 0.3 min

Peak Storage= 9 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.86 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 311.60', Outlet Invert= 311.30'



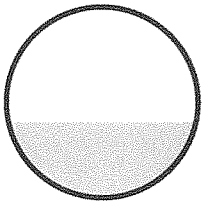
Reach DMH3: DMH3-DMH2

Inflow Area = 0.181 ac, Inflow Depth = 4.76" for 10YR-noaa event
Inflow = 0.90 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.90 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 0.4 min

Peak Storage= 6 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.73 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 22.0' Slope= 0.0050 '/'
Inlet Invert= 311.81', Outlet Invert= 311.70'



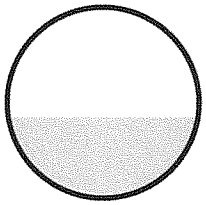
Reach DMH4: DMH4-HW

Inflow Area = 0.435 ac, Inflow Depth = 2.74" for 10YR-noaa event
Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.099 af
Outflow = 2.03 cfs @ 12.10 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.44 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.2 min

Peak Storage= 8 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.46 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 298.75', Outlet Invert= 298.25'



Pond 1P: Infiltration Pond

Inflow Area = 0.453 ac, Inflow Depth = 4.89" for 10YR-noaa event
Inflow = 2.27 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 0.24 cfs @ 12.80 hrs, Volume= 0.185 af, Atten= 90%, Lag= 42.9 min
Discarded = 0.05 cfs @ 12.80 hrs, Volume= 0.163 af
Primary = 0.19 cfs @ 12.80 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 311.69' @ 12.80 hrs Surf.Area= 2,325 sf Storage= 4,319 cf

Plug-Flow detention time= 697.5 min calculated for 0.185 af (100% of inflow)
Center-of-Mass det. time= 697.6 min (1,450.4 - 752.8)

Volume	Invert	Avail.Storage	Storage Description
#1	308.70'	2,567 cf	**32.75'W x 71.00'L x 4.00'H Prismatoid**
			9,301 cf Overall - 2,884 cf Embedded = 6,417 cf x 40.0% Voids
#2	309.20'	2,884 cf	**36.0"D x 68.00'L Horizontal Cylinder** x 6 Inside #1
		5,451 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	311.65'	**6.0" Horiz. Orifice/Grate X 4.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.05 cfs @ 12.80 hrs HW=311.69' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.18 cfs @ 12.80 hrs HW=311.69' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.67 fps)

Pond 2P: Infiltration Pond

Inflow Area = 0.435 ac, Inflow Depth = 4.36" for 10YR-noaa event
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.158 af
Outflow = 2.05 cfs @ 12.09 hrs, Volume= 0.158 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.059 af
Primary = 2.03 cfs @ 12.09 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 310.44' @ 12.09 hrs Surf.Area= 731 sf Storage= 1,404 cf

Plug-Flow detention time= 274.8 min calculated for 0.158 af (100% of inflow)
Center-of-Mass det. time= 275.0 min (1,049.9 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	307.10'	830 cf	**17.00'W x 43.00'L x 4.00'H Prismatoid** 2,924 cf Overall - 848 cf Embedded = 2,076 cf x 40.0% Voids
#2	308.10'	848 cf	**36.0"D x 40.00'L Horizontal Cylinder** x 3 Inside #1
		1,679 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	310.23'	**8.0" Horiz. Orifice/Grate X 3.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=310.44' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.02 cfs @ 12.09 hrs HW=310.44' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 2.02 cfs @ 1.51 fps)

Link 1L: East Central Street

Inflow Area = 0.651 ac, Inflow Depth = 1.52" for 10YR-noaa event
Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.083 af
Primary = 0.84 cfs @ 12.09 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 2L: Wetland

Inflow Area = 0.674 ac, Inflow Depth = 2.83" for 10YR-noaa event
Inflow = 2.87 cfs @ 12.09 hrs, Volume= 0.159 af
Primary = 2.87 cfs @ 12.09 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

100 YR POST-DEVELOPMENT

Subcatchment 5: E. Central Discharge

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 0.107 af, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
2,906	98	Paved parking & roofs
5,725	80	>75% Grass cover, Good, HSG D
8,631	86	Weighted Average
5,725		Pervious Area
2,906		Impervious Area

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

Subcatchment 6: Discharge to Wetland

Runoff = 1.56 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 5.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
417	98	Paved parking & roofs
5,457	80	>75% Grass cover, Good, HSG D
4,511	77	Woods, Good, HSG D
10,385	79	Weighted Average
9,968		Pervious Area
417		Impervious Area

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

Subcatchment 7S: Exist. Roof West

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	140	0.0200	6.36	2.22	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	140	Total			

Subcatchment 8S: Exist. Roof East

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
2,198	98	Paved parking & roofs
2,198		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.2	72	0.0300	7.79	2.72	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.2	72	Total			

Subcatchment 9S: Proposed Roof-Front

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.5	93	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.5	93	Total			

Subcatchment 10S: Proposed Roof-Rear

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
2,753	98	Paved parking & roofs
2,753		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.4	80	0.0050	3.18	1.11	**Circular Channel (pipe),** Diam= 8.0" Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
6.4	80	Total			

Subcatchment CB1: CB1

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
1,248	98	Paved parking & roofs
1,248		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	18	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	18	Total			

Subcatchment CB2: CB2

Runoff = 0.64 cfs @ 12.08 hrs, Volume= 0.052 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
3,448	98	Paved parking & roofs
3,448		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	5	0.0200	8.34	6.55	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
6.0	5	Total			

Subcatchment CB4: CB4

Runoff = 2.32 cfs @ 12.09 hrs, Volume= 0.177 af, Depth= 6.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
7,587	98	Paved parking & roofs
5,698	80	>75% Grass cover, Good, HSG D
13,285	90	Weighted Average
5,698		Pervious Area
7,587		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	40	0.0100	4.91	3.86	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	40	Total			

Subcatchment CB5: CB5

Runoff = 1.05 cfs @ 12.08 hrs, Volume= 0.086 af, Depth= 7.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
5,531	98	Paved parking & roofs
151	80	>75% Grass cover, Good, HSG D
5,682	98	Weighted Average
151		Pervious Area
5,531		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.0	7	0.0500	10.99	8.63	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.0	7	Total			

Subcatchment DI3: DI3

Runoff = 0.93 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 7.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR-noaa Rainfall=8.18"

Area (sf)	CN	Description
4,396	98	Paved parking & roofs
731	80	>75% Grass cover, Good, HSG D
5,127	95	Weighted Average
731		Pervious Area
4,396		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
0.1	14	0.0050	3.47	2.73	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	14	Total			

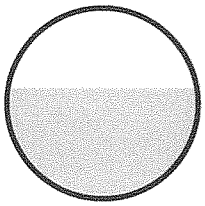
Reach DMH1: DMH1-INLET

Inflow Area = 0.374 ac, Inflow Depth = 7.83" for 100YR-noaa event
Inflow = 2.96 cfs @ 12.09 hrs, Volume= 0.244 af
Outflow = 2.96 cfs @ 12.09 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.25 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.63 cfs

12.0" Diameter Pipe, n= 0.010 PVC, smooth interior
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 311.20', Outlet Invert= 311.10'



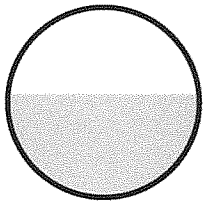
Reach DMH2: DMH2-DMH1

Inflow Area = 0.282 ac, Inflow Depth = 7.79" for 100YR-noaa event
Inflow = 2.23 cfs @ 12.09 hrs, Volume= 0.183 af
Outflow = 2.23 cfs @ 12.09 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.09 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 0.3 min

Peak Storage= 13 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.86 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 311.60', Outlet Invert= 311.30'



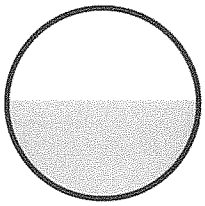
Reach DMH3: DMH3-DMH2

Inflow Area = 0.181 ac, Inflow Depth = 7.71" for 100YR-noaa event
Inflow = 1.43 cfs @ 12.09 hrs, Volume= 0.116 af
Outflow = 1.43 cfs @ 12.09 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.52 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 0.3 min

Peak Storage= 9 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.73 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 22.0' Slope= 0.0050 '/'
Inlet Invert= 311.81', Outlet Invert= 311.70'



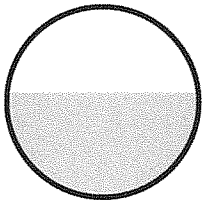
Reach DMH4: DMH4-HW

Inflow Area = 0.435 ac, Inflow Depth = 5.58" for 100YR-noaa event
Inflow = 3.20 cfs @ 12.11 hrs, Volume= 0.202 af
Outflow = 3.20 cfs @ 12.11 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.55 fps, Avg. Travel Time= 0.2 min

Peak Storage= 11 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.46 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 298.75', Outlet Invert= 298.25'



Pond 1P: Infiltration Pond

Inflow Area = 0.453 ac, Inflow Depth = 7.85" for 100YR-noaa event
Inflow = 3.59 cfs @ 12.09 hrs, Volume= 0.296 af
Outflow = 2.46 cfs @ 12.17 hrs, Volume= 0.296 af, Atten= 31%, Lag= 5.0 min
Discarded = 0.05 cfs @ 12.17 hrs, Volume= 0.178 af
Primary = 2.41 cfs @ 12.17 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 312.06' @ 12.17 hrs Surf.Area= 2,325 sf Storage= 4,821 cf

Plug-Flow detention time= 491.6 min calculated for 0.296 af (100% of inflow)
Center-of-Mass det. time= 491.8 min (1,237.2 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	308.70'	2,567 cf	**32.75'W x 71.00'L x 4.00'H Prismatoid** 9,301 cf Overall - 2,884 cf Embedded = 6,417 cf x 40.0% Voids
#2	309.20'	2,884 cf	**36.0"D x 68.00'L Horizontal Cylinder** x 6 Inside #1
		5,451 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	311.65'	**6.0" Horiz. Orifice/Grate X 4.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.05 cfs @ 12.17 hrs HW=312.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=2.41 cfs @ 12.17 hrs HW=312.06' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 2.41 cfs @ 3.07 fps)

Pond 2P: Infiltration Pond

Inflow Area = 0.435 ac, Inflow Depth = 7.27" for 100YR-noaa event
Inflow = 3.37 cfs @ 12.08 hrs, Volume= 0.264 af
Outflow = 3.22 cfs @ 12.11 hrs, Volume= 0.264 af, Atten= 4%, Lag= 1.5 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.061 af
Primary = 3.20 cfs @ 12.11 hrs, Volume= 0.202 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 310.63' @ 12.11 hrs Surf.Area= 731 sf Storage= 1,492 cf

Plug-Flow detention time= 176.9 min calculated for 0.264 af (100% of inflow)
Center-of-Mass det. time= 177.0 min (941.1 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	307.10'	830 cf	**17.00'W x 43.00'L x 4.00'H Prismatoid** 2,924 cf Overall - 848 cf Embedded = 2,076 cf x 40.0% Voids
#2	308.10'	848 cf	**36.0"D x 40.00'L Horizontal Cylinder** x 3 Inside #1
		1,679 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.750 in/hr Exfiltration over Wetted area**
#2	Primary	310.23'	**8.0" Horiz. Orifice/Grate X 3.00** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=310.63' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.20 cfs @ 12.11 hrs HW=310.63' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 3.20 cfs @ 3.06 fps)

Link 1L: East Central Street

Inflow Area = 0.651 ac, Inflow Depth = 4.16" for 100YR-noaa event
Inflow = 3.51 cfs @ 12.13 hrs, Volume= 0.226 af
Primary = 3.51 cfs @ 12.13 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 2L: Wetland

Inflow Area = 0.674 ac, Inflow Depth = 5.61" for 100YR-noaa event
Inflow = 4.72 cfs @ 12.10 hrs, Volume= 0.315 af
Primary = 4.72 cfs @ 12.10 hrs, Volume= 0.315 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

APPENDIX E

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: 100 and 110 East Central Street

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Infiltration Basin	**0.80**	**0.75**	**0.60**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: 10 & 110 East Central Street
Prepared By: RRG
Date: 1/5/2024

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

APPENDIX F

Guelph Permeameter Calculations

Input

Result

Support: ali@soilmoisture.com

Head #1

Reservoir Type (enter "1" for Combined and "2" for inner reservoir): 1
Enter water Head Height ("H" in cm): 5
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 1.0900

Reca Type: 35.2
H: 5
a: 3
H/a: 1.67
α*: 0.12
C1-0.01: 0.71
C2-0.01: 0.84
C1-0.12: 0.5
C2-0.12: 0.6
C: 0.8
R: 1.090
Q: 0.64
pi: 3.14

$\alpha^* =$ 0.12 (cm^{-1})

$C =$ 0.80315
$Q =$ 0.63983

$K_{fs} =$ 1.16E-03 cm/sec
6.98E-02 cm/min
1.16E-05 m/sec
2.75E-02 inch/min
4.58E-04 inch/sec

$\Phi_m =$ 9.70E-03 (cm^2/min)

Head #2

Reservoir Type (enter "1" for Combined and "2" for inner reservoir): 1
Enter water Head Height ("H" in cm): 10
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

Steady State Rate of Water Level Change ("R" in cm/min): 1.5800

Reca Type: 35.22
H: 10
a: 3
H/a: 3.3333
α*: 0.12
C1-0.01: 1.2184
C2-0.01: 1.2966
C1-0.12: 1.2875
C2-0.12: 1.2875
C: 1.2875
R: 1.581
Q: 0.9276
pi: 3.1416

$\alpha^* =$ 0.12 (cm^{-1})

$C =$ 1.28754
$Q =$ 0.92746

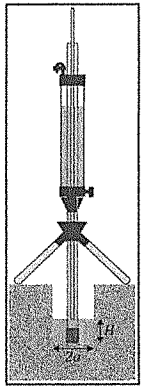
$K_{fs} =$ 1.00E-03 cm/sec
6.03E-02 cm/min
1.00E-05 m/ses
2.37E-02 inch/min
3.96E-04 inch/sec

$\Phi_m =$ 8.37E-03 (cm^2/min)

Average

$K_{fs} =$ 1.08E-03 cm/sec
6.51E-02 cm/min
1.08E-05 m/s
2.56E-02 inch/min
4.27E-04 inch/sec

$\Phi_m =$ 9.04E-03 (cm^2/min)



Two Head Method

Reservoir Type (enter "1" for Combined and "2" for inner reservoir): 1

Enter the first water Head Height ("H1" in cm): 5
Enter the second water Head Height ("H2" in cm): 10

Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropors, etc

$\alpha^* =$ 0.12 (cm^{-1})

Steady State Rate of Water Level Change ("R1" in cm/min): 1.0900

Steady State Rate of Water Level Change ("R2" in cm/min): 1.5800

1.95
$Q_1 =$ 0.03924

$Q_2 =$ 0.05688

$C_1 =$ 0.80315

Reca Type: 2.96
H1/a: 1.666667
H2/a: 3.333333
C1-0.01: 0.60949
C2-0.01: 1.21641
C1-0.04: 0.64206
C2-0.04: 1.29423
C1-0.12: 0.60315
C2-0.12: 1.28754
C1-0.36: 0.60315
C2-0.36: 1.28754

$C_2 =$ 1.28754

$G_1 =$ 0.00496

$G_2 =$ 0.00397

$G_3 =$ 0.05569

$G_4 =$ 0.02415

$K_{fs} =$ 3.15E-05 cm/sec
1.89E-03 cm/min
3.15E-07 m/sec
7.44E-04 inch/min
1.24E-05 inch/sec

$\Phi_m =$ 8.12E-04 (cm^2/min)

Calculation formulas related to shape factor (C). Where H_1 is the first water head height (cm), H_2 is the second water head height (cm), a is borehole radius (cm) and α^* is microscopic capillary length factor which is decided according to the soil texture-structure category. For one-head method, only C_1 needs to be calculated while for two-head method, C_1 and C_2 are calculated (Zhang et al., 1998).

Soil Texture-Structure Category	$\alpha^*(cm^{-1})$	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01	$C_1 = \left(\frac{H_1/a}{2.102 + 0.118(H_1/a)}\right)^{0.655}$ $C_2 = \left(\frac{H_2/a}{2.102 + 0.118(H_2/a)}\right)^{0.655}$
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04	$C_1 = \left(\frac{H_1/a}{1.992 + 0.091(H_1/a)}\right)^{0.683}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)}\right)^{0.683}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)}\right)^{0.734}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)}\right)^{0.734}$
Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macro pores, etc.	0.36	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)}\right)^{0.734}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)}\right)^{0.734}$

Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matric flux potential (cm^2/s), α^* is Macroscopic capillary length parameter (from Table 2), a is Borehole radius (cm), H_1 is the first head of water established in borehole (cm), H_2 is the second head of water established in borehole (cm) and C is Shape factor (from Table 2).

One Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$	$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi a^2 C_1 + 2\pi\left(\frac{H_1}{\alpha^*}\right)}$ $\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi a^2 C_1)\alpha^* + 2\pi H_1}$
One Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$	
Two Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$ $Q_2 = \bar{R}_2 \times 35.22$	$G_1 = \frac{H_2 C_1}{\pi(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1))}$ $G_2 = \frac{H_1 C_2}{\pi(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1))}$ $K_{fs} = G_2Q_2 - G_1Q_1$ $G_3 = \frac{(2H_2^2 + a^2C_2)C_1}{2\pi(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1))}$ $G_4 = \frac{(2H_1^2 + a^2C_1)C_2}{2\pi(2H_1H_2(H_2 - H_1) + a^2(H_1C_2 - H_2C_1))}$ $\Phi_m = G_3Q_1 - G_4Q_2$
Two Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$ $Q_2 = \bar{R}_2 \times 2.16$	

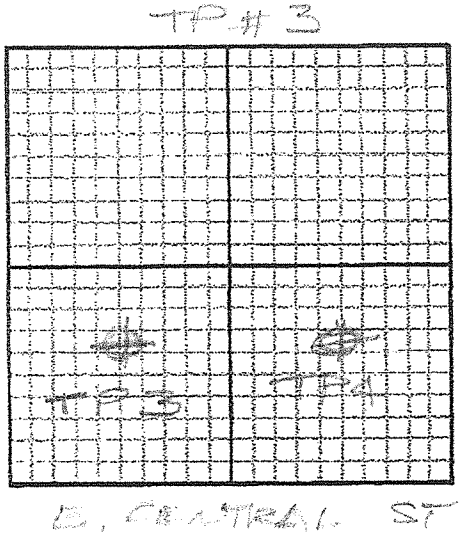
GP FIELD DATA SHEET — SECTION 1: SITE INFORMATION

Date 5/8/23 Investigator DONNA L. GOUDREAU

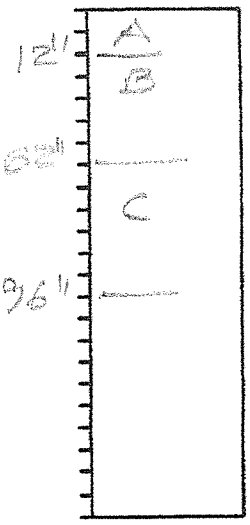
Site Location 100-110 E. CENTRAL ST. FRANKLIN

Dominant Soil Type(s) HOLLIS ROCK OUTCROP - CHARLTON COMPLEX

Site Map:



Soil Profile Description (horizon depth, texture, structure, color, etc.):



Description

SANDY LOAM 10YR 3/2

SANDY LOAM 10YR 4/4

SANDY LOAM 2.5Y 5/6

MOTTLES @ 90"

Presence of special soil conditions (mottling, water table depth, hardpan, induration, compacted layers, etc.):

Comments and Notes (topography, slope, vegetation, etc.):

SOILMOISTURE EQUIPMENT CORP.
P.O. Box 30025, Santa Barbara, CA 93130 USA
Phone: 805-964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com
Website: http://www.soilmoisture.com

SOILMOISTURE ®

Guelph Permeameter Data Sheet

Investigator: QUINTAL Date: 5/8/23

Location: 110 E. CENTRAL-FRANK Test Id: TP #3

Depth of hole: 62" Radius: 3 cm (standard calcs assume 3 cm radius)

Reservoirs used during test (check one): Combined: ✓ Inner only: _____

Reservoir constant used: 35.22

Water level in well = 5 cm

Time t (min)	Dt (min)	Water level in reservoir h (cm)	Dh (cm)	Rate of change Dh/Dt
0		15		
4:47	4.78	20	5	1.04
9:32	4.83	25	5	1.03
14:20	4.88	30	5	1.02
19:00	4.67	35	5	1.07
23:40	4.67	40	5	1.07
28:23	4.72	45	5	1.06
32:52	4.52	50	5	1.09
37:51	4.70	55	5	1.02
42:23	4.53	60	5	1.10
46:49	4.43	65	5	1.13
51:30	4.68	70	5	1.07
55:40	4.17	75	5	1.20

Steady rate for 3 consecutive readings (R_1): 1.07

Water level in well = 10 cm

Time t (min)	Dt (min)	Water level in reservoir h (cm)	Dh (cm)	Rate of change Dh/Dt
0		14		
3:50	3.83	20	6	1.57
8:42	3.87	25	5	1.29
13:48	3.10	30	5	1.61
18:35	3.45	35	5	1.45
16:30	2.92	40	5	1.71
19:48	3.30	45	5	1.51
22:58	3.17	50	5	1.58
26:21	3.38	55	5	1.48
29:20	30	60	5	1.67
32:30	3.17	65	5	1.58
35:47	3.28	70	5	1.52
38:54	3.13	75	5	1.59

Steady rate for 3 consecutive readings (R_2): 1.54

Comments:

$K_{fs} = 0.0251 \text{ in/min} = 1.506 \text{ in/hr}$

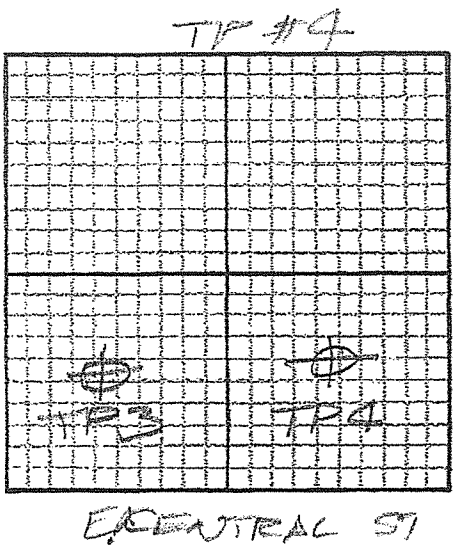
GP FIELD DATA SHEET SECTION 1: SITE INFORMATION

Date _____ Investigator _____

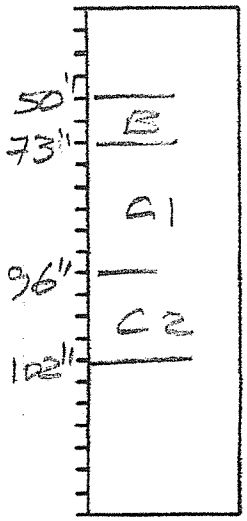
Site Location _____

Dominant Soil Type(s) _____

Site Map:



Soil Profile Description (horizon depth, texture, structure, color, etc.):



Description

FILL

SANDY LOAM 10YR4/4

SANDY LOAM 2.5Y5/6

SAND W/ GRAVEL 2.5Y4/6

Presence of special soil conditions (mottling, water table depth, hardpan, induration, compacted layers, etc.):

Comments and Notes (topography, slope, vegetation, etc.):

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P.O. Box 30025. Santa Barbara, CA 93130 USA
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Website: http://www.soilmoisture.com

SOILMOISTURE®

Guelph Permeameter Data Sheet

Investigator: DUNTZEL Date: 5/8/23

Location: 110 E. CENTRAL - FRANK Test Id: TP # 4

Depth of hole: 7.5" Radius: 3 cm (standard calcs assume 3 cm radius)

Reservoirs used during test (check one): Combined: ✓ Inner only: _____

Reservoir constant used: 35.22

Water level in well = 5 cm

Time t (min)	Dt (min)	Water level in reservoir h (cm)	Dh (cm)	Rate of change Dh/ Dt
0		15		
4:30	4.5	20	5	1.11
9:28	4.97	25	5	1.01
14:01	4.48	30	5	1.12
18:35	4.57	35	5	1.09
23:02	4.45	40	5	1.12
27:01	4.98	45	5	1.00
32:11	5.17	50	5	0.97
37:01	4.83	55	5	1.03
41:32	4.52	60	5	1.11
45:50	4.30	65	5	1.16
50:05	4.25	70	5	1.18
54:10	4.08	75	5	1.22

Steady rate for 3 consecutive readings (R_1): 1.09

Water level in well = 10 cm

Time t (min)	Dt (min)	Water level in reservoir h (cm)	Dh (cm)	Rate of change Dh/ Dt
0		15		
3:35	3.58	20	5	1.40
6:45	3.17	25	5	1.58
9:55	3.17	30	5	1.58
13:00	3.08	35	5	1.62
16:58	2.97	40	5	1.69
19:12	3.23	45	5	1.55
22:20	3.13	50	5	1.60
25:40	3.33	55	5	1.50
28:45	3.08	60	5	1.62
31:55	3.17	65	5	1.58
34:55	3.0	70	5	1.67
38:05	3.17	75	5	1.58

Steady rate for 3 consecutive readings (R_2): 1.58

Comments:

$K_{fs} = 0.0256$ in/min = 1.53 in/hr

Soil Map—Norfolk and Suffolk Counties, Massachusetts
(100 - 110 East Central Street)

Map Scale: 1:1,290 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	0.3	4.1%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	4.2	51.5%
602	Urban land, 0 to 15 percent slopes	3.6	44.4%
Totals for Area of Interest		**8.2**	**100.0%**

Norfolk and Suffolk Counties, Massachusetts

104C—Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w69p
Elevation: 0 to 1,270 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis, extremely stony, and similar soils: 35 percent
Charlton, extremely stony, and similar soils: 25 percent
Rock outcrop: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Canton, extremely stony

Percent of map unit: 7 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 1 percent
Landform: Hills, recessionial moraines, ground moraines, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Scituate, extremely stony

Percent of map unit: 1 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

Norfolk and Suffolk Counties, Massachusetts

602—Urban land, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: vkyj
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Rock outcrops

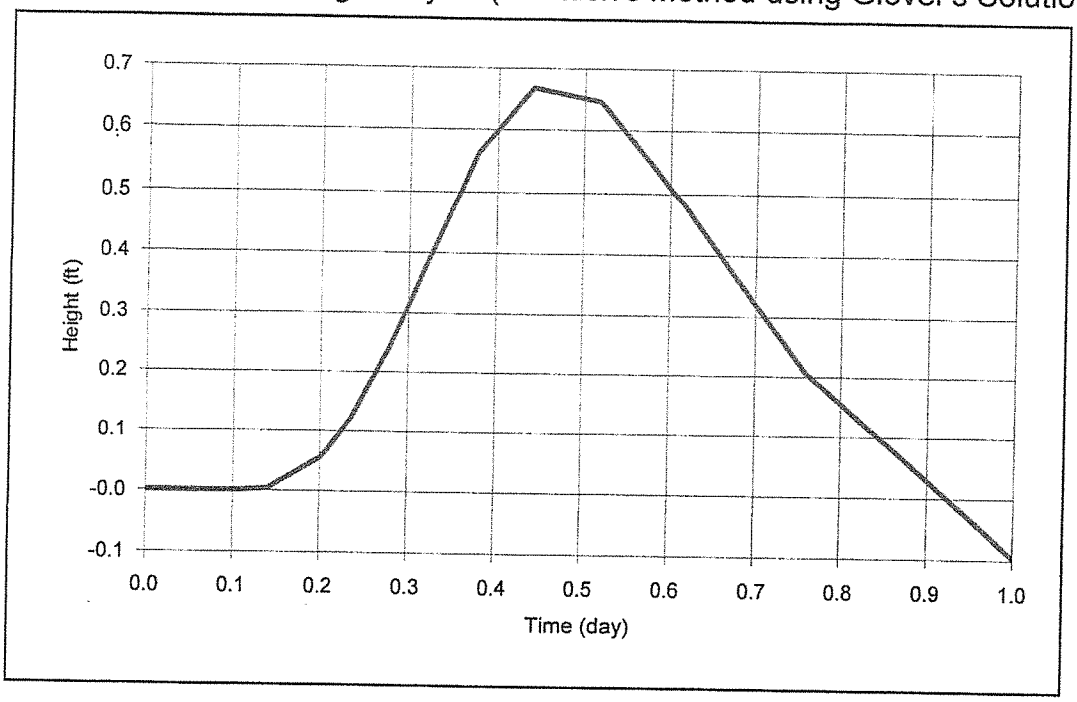
Percent of map unit: 1 percent
Hydric soil rating: Unranked

Data Source Information

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

APPENDIX G

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CAQ Engineering Associates

PROJECT: UC1578

ANALYST: CAQ

DATE: 1/4/2024 TIME: 4:38:35 PM

INPUT PARAMETERS

Application rate: 16.22 c.ft/day/sq. ft
Duration of application: 0.2 day
Total simulation time: 1 day
Fillable porosity: 0.2
Hydraulic conductivity: 1.506 ft/day
Initial saturated thickness: 0.5 ft
Length of application area: 73 ft
Width of application area: 32.75 ft
No constant head boundary used
Groundwater mounding @
X coordinate: 73 ft
Y coordinate: 32.75 ft
Total volume applied: 7755.593 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0
0	0
0	0
0	0
0	0
0.1	0
0.1	0
0.1	0
0.1	0
0.2	0.06
0.2	0.07
0.2	0.13
0.3	0.24
0.3	0.39
0.4	0.56
0.4	0.67
0.5	0.64
0.6	0.48
0.8	0.21
1	-0.1

APPENDIX H

CHECKLIST FOR DESIGNERS

GOALS and NEEDS addressed:

1. Create a visually appealing community
2. Stabilize and increase property values
3. Encourage low impact development
4. Preserve the Town's historic and cultural heritage
5. Protect Franklin's natural environment, including habitat, water resources, and ecosystem services

FRANKLIN POLICY:
Subdivision plans and site plans for all forms of development shall adhere to the principles of environmental and aesthetic compatibility and energy-efficient design.

BEST DEVELOPMENT PRACTICES The site plan should be designed to address the following to the maximum extent practicable	Incorporated into Project?
Unique natural features have been preserved *(the development program should either avoid altering or showcase significant natural features)*	☑
Native vegetation planted in disturbed areas as needed to enhance or restore habitat	☑
Historic and cultural resources have been preserved *(the development program should either avoid altering or showcase significant historic and cultural features)*	☑
Clearing, grading, and building placement consider viewsheds	☑
Cut and fill have been minimized	☑
Buildings blend into the natural topography	☑
Buildings are oriented to the sun and wind for maximum energy efficiency *Vegetated protection from northwest (winter) winds is provided* *Deciduous species planted or retained close to the East, South and West building edges*	☑
Conforms to §185-31 of the Town of Franklin Zoning Code and/ or Chapter 300 of the Town of Franklin Subdivision Regulations	☑

GOALS and NEEDS addressed:

1. Protect local and regional wetlands and water bodies
2. Maximize groundwater recharge to retain a viable local groundwater supply
3. Minimize pollutants in stormwater runoff

FRANKLIN POLICIES:

(A) All new development and redevelopment projects in Franklin shall meet the following stormwater management performance standards.

i. Post-development peak discharge rates and volumes from the site shall not exceed pre-development peak discharge rates and volumes from the site.

ii. The stormwater management system shall remove at least 80% of the average annual load of total suspended solids (TSS), at least 80% of the phosphorus loading, and at least 60% of nitrogen loading from the post-development stormwater created on site.

iii. All drainage facilities proposed shall utilize best management practices as outlined in the Massachusetts Stormwater Management Standards.

iv. All sites will have an Operation and Maintenance plan to insure future compliance.

(B) Non-structural stormwater management systems should be used wherever site conditions allow.

BEST DEVELOPMENT PRACTICES The site plan should be designed to address the following to the maximum extent practicable	Incorporated into Project?
Vegetated swales *(recommended to convey runoff from roadways & parking lots)*	☐
Vegetated filter strips *(recommended to filter and infiltrate runoff from roadways, parking lots, and driveways; use along roadsides and parking lots)*	☐
Constructed wetlands *(preferred method for stormwater retention & pollutant removal)*	☐
Bioretention cells *(rain gardens) (recommended on residential lots and parking lot islands)*	☐
Pervious paving surfaces *(recommended in overflow parking and low-traffic areas)*	☐
Sediment Forebays *(use in combination with other BDP)*	☐
Roof gardens *(encouraged on flat or gently sloped commercial and industrial rooftops)*	☐
Retention/Detention basins *(may be used in series with other practices to provide pre-treatment)*	☑
Recharge Systems *(suitable for all areas of development)*	☑
Drain pipe/catch basin systems *(as required to collect runoff when other systems are not practical)*	☑
If utilizing drain pipe and/or catch basin systems, have you documented that other systems are infeasible?	☐

Erosion and Sedimentation Control

Checklist for Designers

GOALS and NEEDS addressed:

1. Minimize clearing and regrading;
2. Prevent erosion and sedimentation.

FRANKLIN POLICIES:

(A) Any proposed project on a previously undeveloped site shall accommodate the development program in a way that minimizes clearing and re-grading, especially in areas of steep slopes, erosion-prone soils, or sensitive vegetation. For redevelopment projects, the site plan shall concentrate development in previously-disturbed areas to the extent possible.

(B) As a condition of approval, every proposed project shall submit and adhere to an erosion control plan that addresses soil stabilization, sediment retention, perimeter protection, construction scheduling, traffic area stabilization and dust control.

(C) If the proposed project is in an area under conservation jurisdiction, the project will require permitting deemed appropriate by the Conservation Commission.

BEST DEVELOPMENT PRACTICES The site plan should be designed to address the following to the maximum extent practicable.	Incorporated into Project?
Clearing and re-grading have been minimized	☑
Plan identifies sensitive areas to be protected and areas that are suitable for development	☑
Conservation Permits have been obtained *(when applicable)*	☑ Filed NOI
The erosion and sedimentation control plan addresses:	
• **Soil stabilization** *(cover or stabilize erodible surfaces not in immediate use)*	☑
• **Sediment retention** *(runoff interceptors and sediment traps/ponds)*	☑
• **Perimeter protection** *(vegetated buffers, compost socks or straw wattles at limit of work)*	☑
• **Construction scheduling** *(minimize disturbed area at any given time)*	☑
• **Traffic area stabilization** *(crushed rock or similar at construction vehicle entrance and parking areas)*	☑
• **Dust control** *(plan for stabilizing dry, dust-prone surfaces when necessary)*	☑
• **Vegetation** *(preserve existing vegetation and/or identify areas to be revegetated including proposed planting species, quantity and planting specifications)*	☑

GOALS and NEEDS addressed:

1. Stabilize water use at a sustainable level
2. Create landscapes that minimize habitat destruction and maximize habitat value
3. Encourage the development of landscapes that provide environmental quality and visual relief through the planting of native or naturalized species

FRANKLIN POLICIES:

(A) Site plans and landscape plans for all proposed projects shall take appropriate steps, as outlined in the Guidebook, to minimize water use for irrigation and to allow for natural recharge of groundwater. Landscape plans shall follow the guidelines in the Guidebook for selecting species that are most appropriate to the site conditions.

(B) Native and habitat-creating species shall be used in all landscape plans to the maximum extent possible while still meeting the site's landscaping needs. Invasive species may not be planted in Franklin under any condition. Refer to the Massachusetts Prohibited Plant list for more information.

(C) Actively promote the Town of Franklin's Water Conservation Measures.

BEST DEVELOPMENT PRACTICES The site plan must address all of the following principles.	Incorporated into Project?
Retain and Recharge water on site *(install bio-retention cells, vegetated filter strips and minimize lawn areas where feasible)*	☑
Preserve natural vegetation to the maximum extent practicable	☑
Irrigation system is water efficient *(if an in-ground irrigation system is proposed, it is a water efficient system with timers and automatic sensors to prevent overwatering)*	☐
Preserve soil permeability *(minimize disturbing existing landscapes. Prepare new planting beds in accordance to the Planting Bed Guidelines on p. 13, and install 1-2" of shredded pine bark mulch on new planting areas)*	☑
Minimize the use of turf grass *(when applicable, reduce the size of the lawn area; instead, plant a bio-retention cell, use alternative, drought tolerant groundcover)*	☑
Specify variety of native and naturalized species *(species from the plant list have been incorporated into the landscape design, and no invasive species are used. Refer to the Plant Species Section and the Massachusetts Prohibited Plant List)*	☑
Species are appropriate to the soil, site, and microclimate conditions *(select appropriate species from the plant list in this guidebook)*	☑

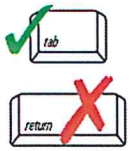
APPENDIX I

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

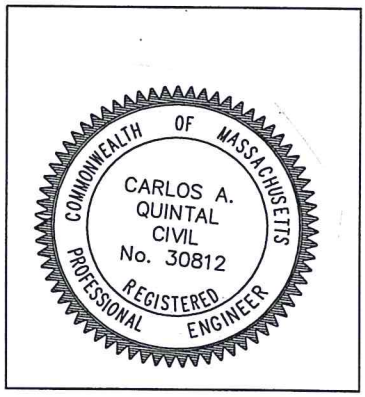
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date 1/11/24

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☑ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- [x] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [x] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [ ] Use of "country drainage" versus curb and gutter conveyance and pipe
- [ ] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [ ] Treebox Filter
- [ ] Water Quality Swale
- [ ] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): _____

Standard 1: No New Untreated Discharges

- [x] No new untreated discharges
- [x] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [x] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☑ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☑ Soil Analysis provided.

☑ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☑ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☑ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☑ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☑ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☑ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☑ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☑ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☑ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☑ The BMP is sized (and calculations provided) based on:

- ☑ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☑ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) N/A

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas N/A

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☑ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☑ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☑ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☑ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☑ Name of the stormwater management system owners;
- ☑ Party responsible for operation and maintenance;
- ☑ Schedule for implementation of routine and non-routine maintenance tasks;
- ☑ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☑ Description and delineation of public safety features;
- ☑ Estimated operation and maintenance budget; and
- ☑ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☑ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☑ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX J

Operation and Maintenance Plan

FOR
Site Plan
100 and 110 East Central Street

LOCATED IN
FRANKLIN, MASSACHUSETTS

PREPARED FOR
110 East Central Street RE, LLC
37 East Central Street
Franklin, MA 02038

PREPARED BY
UNITED CONSULTANTS, INC.
850 FRANKLIN STREET, SUITE 11D
WRENTHAM, MA. 02093

DATE: January 5, 2024

Operation and Maintenance Plan

Good House Keeping Measures

1. The parking area and driveway will receive the minimum amount of sand and salt. Snow will be stored at the locations shown on the site plan.
2. The site landscaping will consist of mulch with trees, shrubs, turf lawn and existing wooded areas. These areas will be assessed by the owner's landscape professional to determine the minimum amounts of fertilizers, herbicides and pesticides necessary and shall only apply the minimums necessary.
3. The site will be stabilized with landscaped areas with mulch and turf lawn. This will improve the existing site coverage.

Long Term Pollution Prevention Plan

The owner shall employ good housekeeping measures, which include removing trash and debris from the site, keeping trash in receptacles and complying with the long-term operation and maintenance plan.
The owner does not plan to store materials or waste products on the site.
The owner will not allow vehicles to be washed outside of the building.
The owner will have routine inspections and maintenance completed for the Storm-water BMP's. See the Operation and Maintenance Plan Stormwater Facilities Plan for details and schedule.
No hazardous materials for the businesses are anticipated. If hazardous materials are proposed in the future they will be stored within the building.
The owner will employ a landscape professional to determine and apply the minimum amounts of fertilizers, herbicides and pesticides. No storage of landscape materials on site is proposed.
The site is serviced by Town water and sewer.
A dumpster is proposed to provide refuse storage and will be emptied and disposed of offsite.
The owner will designate an emergency contact person prior to commencing construction.
Snow will be placed in the snow storage areas provided on the site plan. If necessary, excess parking spaces could be used to store snow.
The owner will apply the minimum amount of sand and salt necessary. The parking area will be swept four per year with one sweeping being immediately following the last winter sanding.
Sand piles will not be stored on site.

Operation and Maintenance Plan

An operation and maintenance schedule for the construction period and the post-development period has been provided on the Operation and Maintenance Plan Stormwater Facilities Plan.
During the construction period and after completion the Owner, 110 East Central Steet RE, LLC shall be responsible for the operation and maintenance of the site and the drainage system.
Upon completion of the construction work the property owner shall be responsible for the maintenance of the drainage facilities.
The yearly estimated operation and maintenance budget is $3,500.

The owner will provide documentation which will be submitted to the Franklin DPW confirming when maintenance has been satisfactorily completed.

The owner of the stormwater management system will notify the Director of changes in ownership or assignment of financial responsibility.

110 East Central Steet RE, LLC is the responsible party.

Name Manager
Title

Yearly Inspection and Maintenance Log

Page 1

100 and 110 East Central Street
Franklin, Massachusetts

Parking Lot Sweeping and Curb Inspection – Four Times Per Year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Notes:

Water Quality Unit - 4 Times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Cleaning Performed – 4 Times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Notes:

Catch Basins - 4 Times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Cleaning Performed – When Sediment Depth reaches 18"

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Notes:

Underground Infiltration Pond – 4 times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Cleaning Performed:

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Notes:

Landscape Area Inspection – 4 times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Work Performed Repairs completed:

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Headwall and Riprap – 4 times per year

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

Work Performed Repairs completed:

Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____
Date: _____ Performed By: _____

APPENDIX K

In Compliance with DEP Storm-water Management Standard 10

100 and 110 East Central Street Site

No Illicit discharges to the storm-water management system, including wastewater discharges and discharges of storm-water contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease are proposed and shall not be allowed.

The site map located in Appendix J shall be part of this Illicit Discharge Compliance Statement.

110 East Central Street RE, LLC is the responsible party.

Manager

Name Title

APPENDIX L