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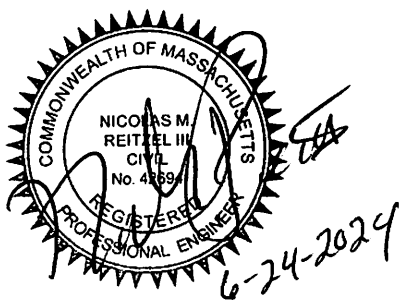
STORMWATER REPORT

149 PLEASANT STREET
ARLINGTON, MASSACHUSETTS

JUNE 24, 2024



PREPARED FOR:

FTO REALTY
109 BLANCHARD ROAD
LAWRENCE, MASSACHUSETTS

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SECTION 1: PROJECT NARRATIVE WITH SUMMARY TABLE AND MASSDEP STORMWATER STANDARDS

SECTION 1.1 - PROJECT NARRATIVE

The subject property, located at 149 Pleasant Street, is located in the R4 (Residence 4) zoning district in Arlington, Massachusetts. The subject property contains 9,805± square feet of area and is a corner lot with frontage along the western side of Pleasant Street and the northern side of Gray Street. Presently the property contains a 2-story, single-family dwelling with a paved driveway.

The on-site soils are medium to coarse sand with a Hydrologic Soil Group (HSG) rating of "A", as confirmed by soil test holes conducted across the site. The subject property gradually slopes from west to east, from the corner of the property on Gray Street down across the property towards Pleasant Street and a corner of the northeastern abutter's property (at 145 Pleasant Street). For the purposes of the HydroCAD stormwater analysis, Pleasant Street and the northeastern abutter serve as the pre-development and post-development analysis point.

The no portion of the subject property is located within any FEMA Flood Hazard Area.

The applicant is proposing to raze the existing dwelling and remove the existing paved driveway, and to construct a 2.5-story, 3-family dwelling with a paved driveway off of Pleasant Street and another paved driveway off of Gray Street.

In order to mitigate stormwater runoff for this proposed redevelopment, there will be roof drains leading to proposed drywells, as well as a gravel treatment and infiltration trench along the downgradient side of the proposed driveway off of Gray Street, and a deep-sump catch basin within the proposed driveway off of Pleasant Street.

SECTION 1.2 – SUMMARY TABLE & STORMWATER STANDARDS

STANDARD 1 - *No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

This Standard is met.

STANDARD 2 - *Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

The following table summarizes the Pre- vs. Post-development runoff calculations from the attached HydroCAD data, demonstrating compliance with Standard 2:

	Analysis Point	1R	2R
2-YEAR (3.1 inches)	**Pre Runoff (cfs)**	0.03	0.00
	Post Runoff (cfs)	0.00	0.00
	Change	-0.03 (-100%)	-0.00 (-0%)
10-YEAR (4.5 inches)	**Pre Runoff (cfs)**	0.16	0.01
	Post Runoff (cfs)	0.04	0.00
	Change	-0.12 (-75%)	-0.01 (-100%)
25-YEAR (5.4 inches)	**Pre Runoff (cfs)**	0.27	0.03
	Post Runoff (cfs)	0.09	0.02
	Change	-0.18 (-67%)	-0.01 (-33%)

This Standard is met.

STANDARD 3 - *Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.*

Required Recharge Volume (R_V)
R_V = Total Post-Dev. Impervious Area (sf) * 0.60 inches for A-type soils * 1/12 ft/inches
R_V = 4,300 ± sf * 0.60 inches * 1/12 ft/inches
R_V = 215±cf

The proposed drywells (11P & 12P) and the gravel treatment and infiltration trench (22P) have a total combined storage volume of 527±cf (3,942±gallons), exceeding the required volume.

Drawdown Time

The proposed drywell at Pond 11P has a total storage volume of 222±cf and a bottom area of 50±sf. T (11P)= Volume / (K * Bottom Area)

= 222±cf / (8.27 in/hr * (1 ft/12 in) * 50±sf) = 6.4± hours

6.4 hours < 72 hours

The proposed drywell at Pond 21P has a total storage volume of 297±cf and a bottom area of 50±sf. T (21P)= Volume / (K * Bottom Area)

= 297±cf / (8.27 in/hr * (1 ft/12 in) * 50±sf) = 8.6± hours

8.6 hours < 72 hours

The proposed gravel trench at Pond 22P has a total storage volume of 80±cf and a bottom area of 40±sf. T (13P)= Volume / (K * Bottom Area)

= 80±cf / (8.27 in/hr * (1 ft/12 in) * 40±sf) = 2.9± hours

2.9 hours < 72 hours

This Standard is met.

STANDARD 4 *- Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when: (a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained; (b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and (c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Water Quality Volume

V_{WQ} = (D_{WQ} / 12 in/ft) * A_{IMP}

= (1.0 in / 12 in/ft) * 4,300±sf

= 358±cf

The proposed drywells (11P & 12P) and the gravel treatment and infiltration trench (22P) have a total combined storage volume of 527±cf (3,942±gallons), exceeding the required volume.

There are two treatment trains for the proposed development:

Deep Sump Catch Basin/Filter Trench –> Drywell:

Initial Load	BMP	TSS Removal	Remaining TSS Load
1.00	Deep Sump CB/Filter Trench (25%)	-0.25	0.75
0.75	Drywell (80%)	-0.60	0.15

This treatment train removes 85% of the TSS Load

This Standard is met.

STANDARD 5 - *Land Uses with Higher Potential Pollutant Loads (LUHPPL).*

The proposed development is not a LUHPPL.

This Standard is met.

STANDARD 6 - *Stormwater discharges within critical areas.*

The proposed development is not located within a critical area.

This Standard is met.

STANDARD 7 - *Redevelopment Projects.*

Though the proposed project is a redevelopment, it complies with all stormwater standards.

This Standard is met.

STANDARD 8 - *A plan to control construction-related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.*

Please refer to the *Construction, Operation and Maintenance, and Long-term Pollution Prevention Plan.*

This Standard is met.

STANDARD 9 - *A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Please refer to the *Construction, Operation and Maintenance, and Long-term Pollution Prevention Plan.*

This Standard is met.

STANDARD 10 - *All illicit discharges to the stormwater management system are prohibited.*

Please refer to the *Construction, Operation and Maintenance, and Long-term Pollution Prevention Plan.*

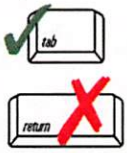
This Standard is met.

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

[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.

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

Checklist for Stormwater Report

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

6-24-2024

Signature and Date

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 (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

Massachusetts Department of Environmental Protection
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Checklist for Stormwater Report

the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ 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

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

Checklist (continued)

Standard 2: Peak Rate Attenuation

Checklist for Stormwater Report

☐ 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 (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 (continued)

Standard 4: Water Quality (continued)

Checklist for Stormwater Report

☒ 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)

☐ 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

☐ 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 (continued)

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

Checklist for Stormwater Report

☒ 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 (continued)

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

Checklist for Stormwater Report

☐ 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.

SECTION 2: MAPS

FIGURE 2.1, LOCUS MAP
(NOT TO SCALE)

FIGURE 2.2
USGS TOPOGRAPHIC MAP
(NO SCALE)

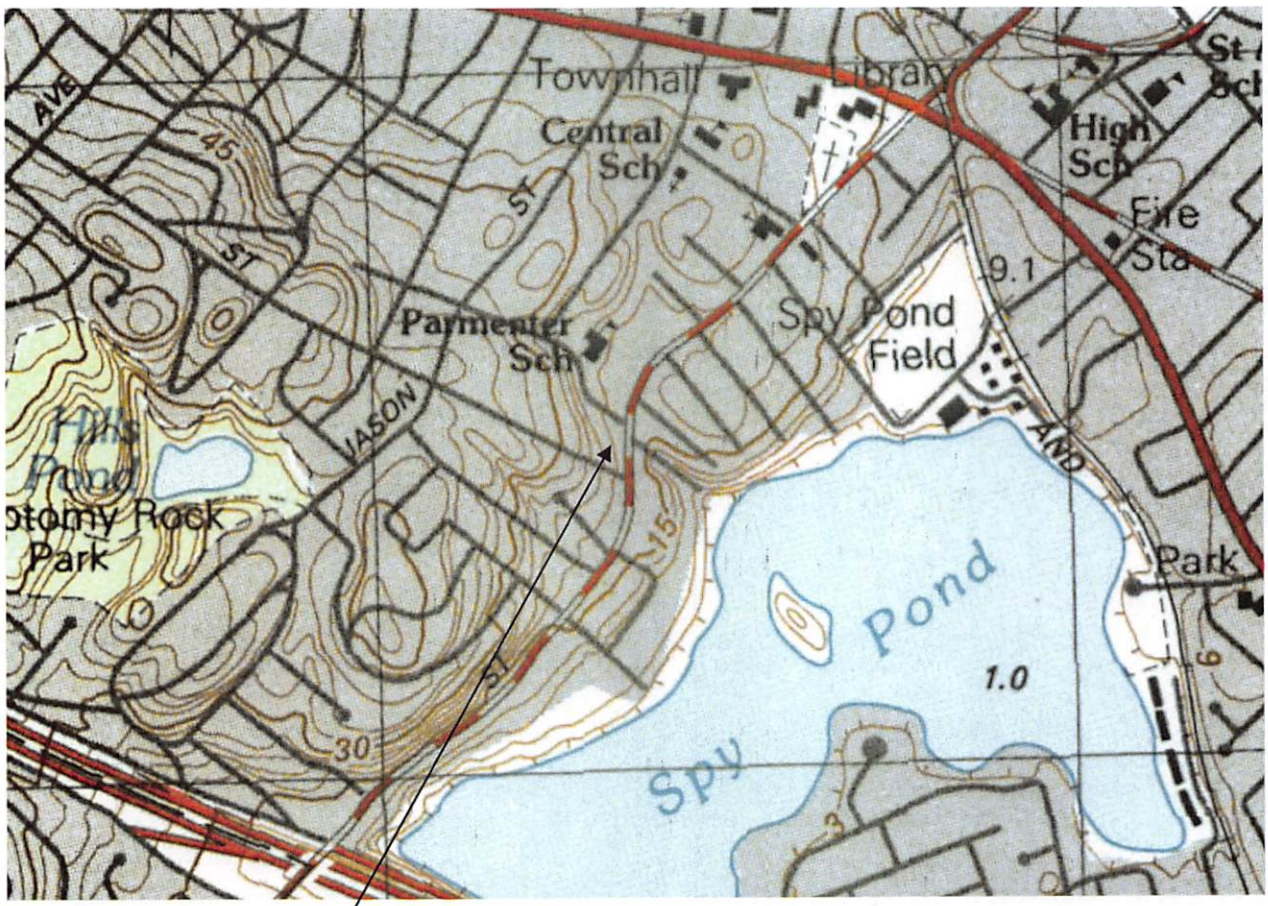
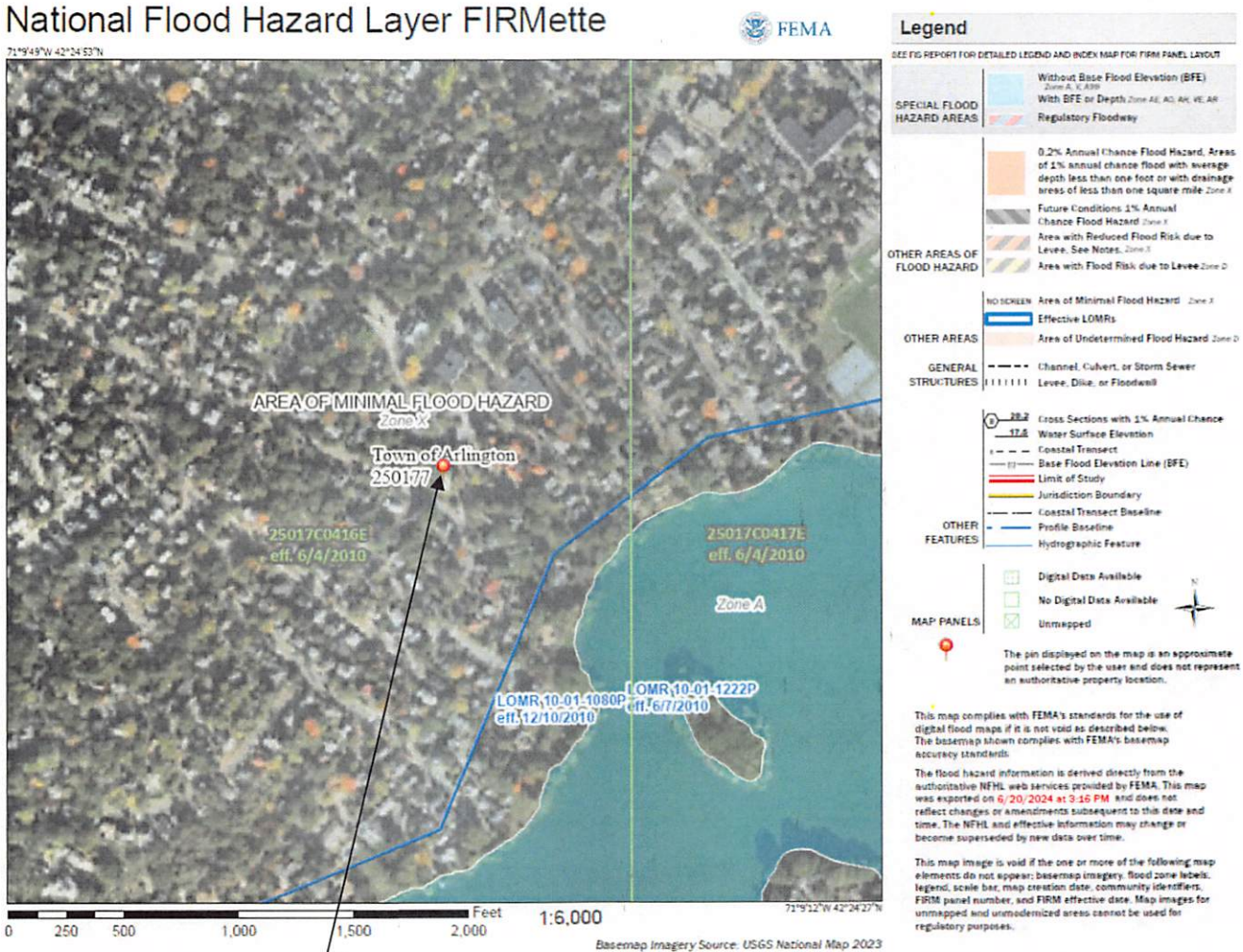


FIGURE 2.3
ARLINGTON GIS MAP
(NO SCALE)

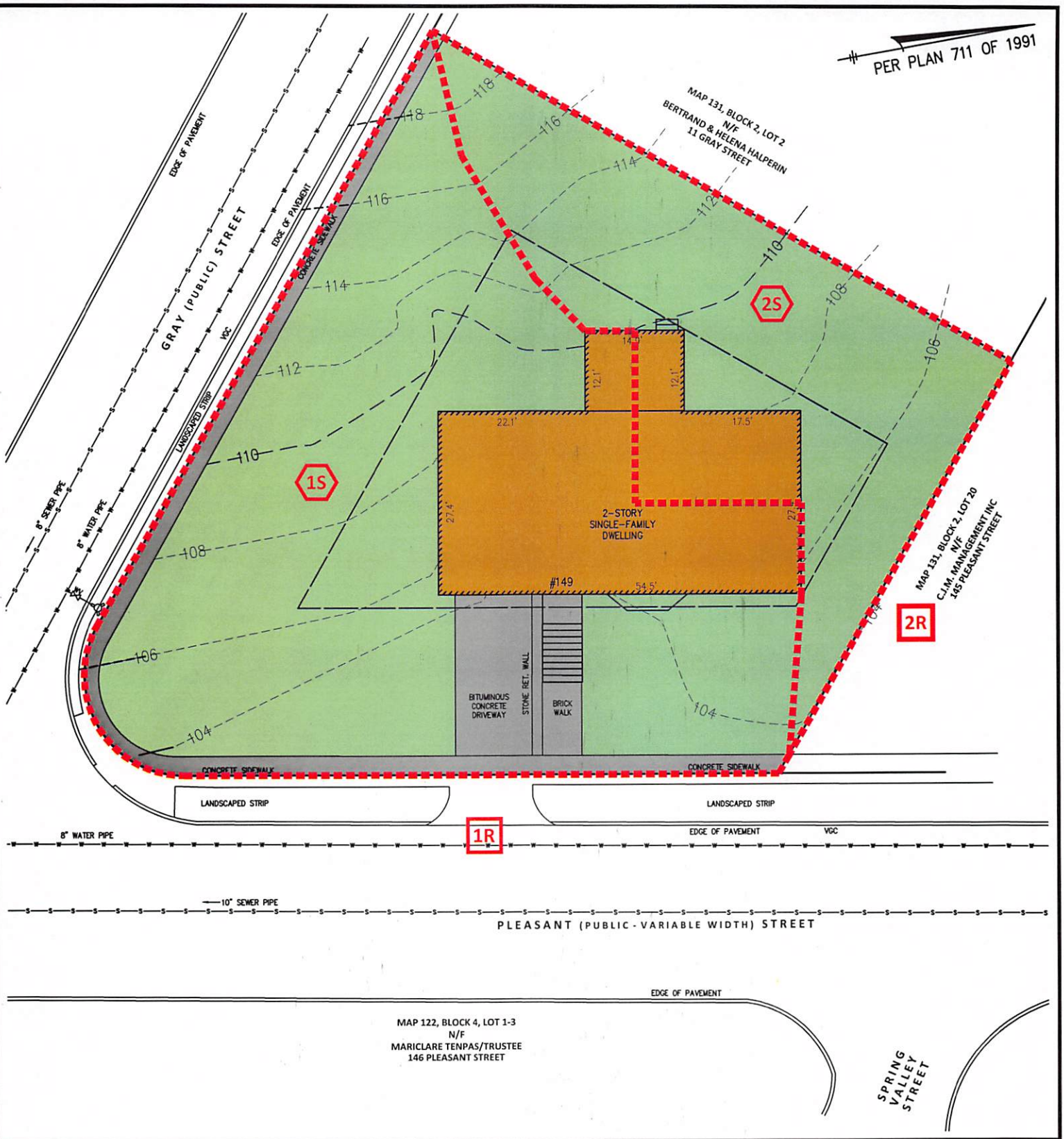
149 Pleasant Street

FIGURE 2.4
AERIAL IMAGE
(NO SCALE)

FIGURE 2.5
FEMA FIRMETTE FLOOD PLAIN MAP
(NO SCALE)



SECTION 3: STORMWATER CALCULATIONS AND DATA



SCALE: 1"=20'

0 10 20 40

PRE-DEVELOPMENT SUBCATCHMENT PLAN

149 PLEASANT STREET
ARLINGTON, MASSACHUSETTS

PLAN PREPARED FOR:
FTO REALTY
109 BLANCHARD ROAD
LAWRENCE, MASSACHUSETTS

JUNE 24, 2024

SCALE: 1"=20'

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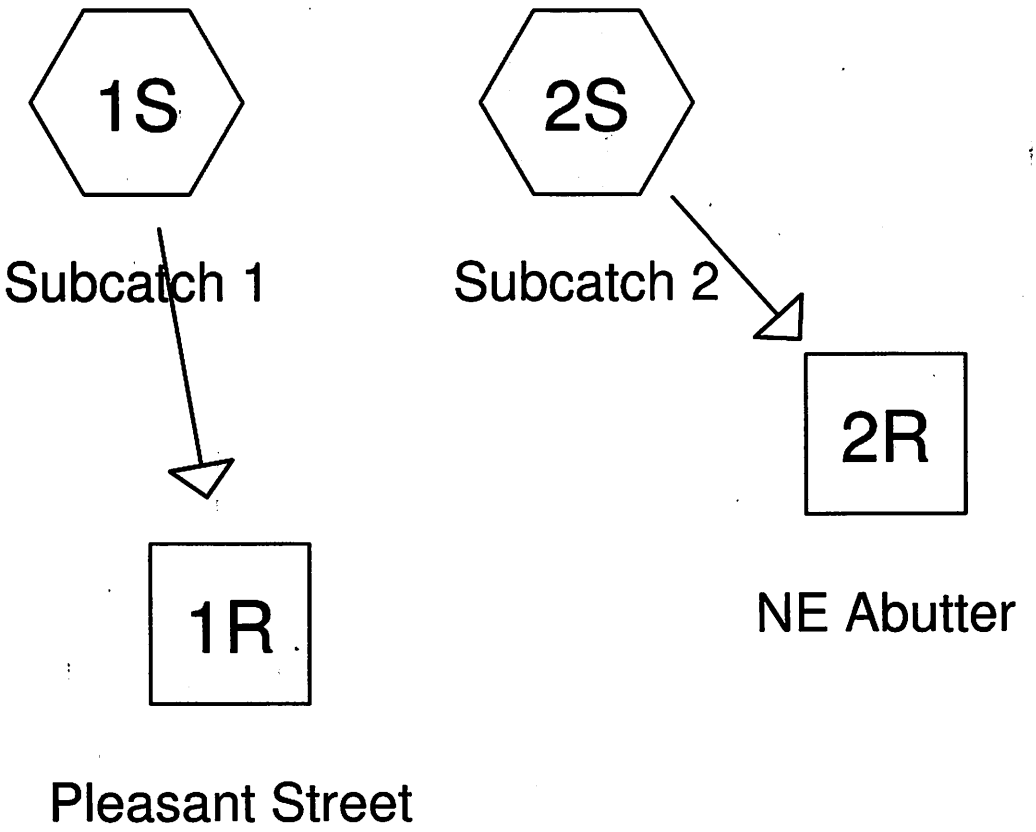


Subcat Reach Pond Link

Drainage Diagram for Pleasant149-Pre
Prepared by LandPlex
HydroCAD® 7.10 s/n 003867 © 2005 HydroCAD Software Solutions LLC

Subcatchment 1S: Subcatch 1

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.004 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,270	98	Roof, Driveway, Sidewalks
4,480	39	>75% Grass cover, Good, HSG A
6,750	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.4		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1200	2.4		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	110	Total			

Subcatchment 2S: Subcatch 2

Runoff = 0.00 cfs @ 14.95 hrs, Volume= 0.000 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
435	98	Paved Parking
2,620	39	>75% Grass cover, Good, HSG A
3,055	47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.3		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.1400	2.6		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	100	Total			

Reach 1R: Pleasant Street

Inflow Area = 0.155 ac, Inflow Depth > 0.29" for 2-Year event
Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.004 af
Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.070 ac, Inflow Depth > 0.04" for 2-Year event
Inflow = 0.00 cfs @ 14.95 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 14.95 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

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

Subcatchment 1S: Subcatch 1

Runoff = 0.16 cfs @ 12.06 hrs, Volume= 0.011 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,270	98	Roof, Driveway, Sidewalks
4,480	39	>75% Grass cover, Good, HSG A
6,750	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.4		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1200	2.4		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	110	Total			

Subcatchment 2S: Subcatch 2

Runoff = 0.01 cfs @ 12.27 hrs, Volume= 0.002 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
435	98	Paved Parking
2,620	39	>75% Grass cover, Good, HSG A
3,055	47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.3		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.1400	2.6		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	100	Total			

Reach 1R: Pleasant Street

Inflow Area = 0.155 ac, Inflow Depth > 0.86" for 10-Year event
Inflow = 0.16 cfs @ 12.06 hrs, Volume= 0.011 af
Outflow = 0.16 cfs @ 12.06 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.070 ac, Inflow Depth > 0.32" for 10-Year event
Inflow = 0.01 cfs @ 12.27 hrs, Volume= 0.002 af
Outflow = 0.01 cfs @ 12.27 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

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

Subcatchment 1S: Subcatch 1

Runoff = 0.27 cfs @ 12.06 hrs, Volume= 0.017 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
2,270	98	Roof, Driveway, Sidewalks
4,480	39	>75% Grass cover, Good, HSG A
6,750	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.1800	0.4		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1200	2.4		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	110	Total			

Subcatchment 2S: Subcatch 2

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.003 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
435	98	Paved Parking
2,620	39	>75% Grass cover, Good, HSG A
3,055	47	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.3		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"
0.3	50	0.1400	2.6		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.8	100	Total			

Reach 1R: Pleasant Street

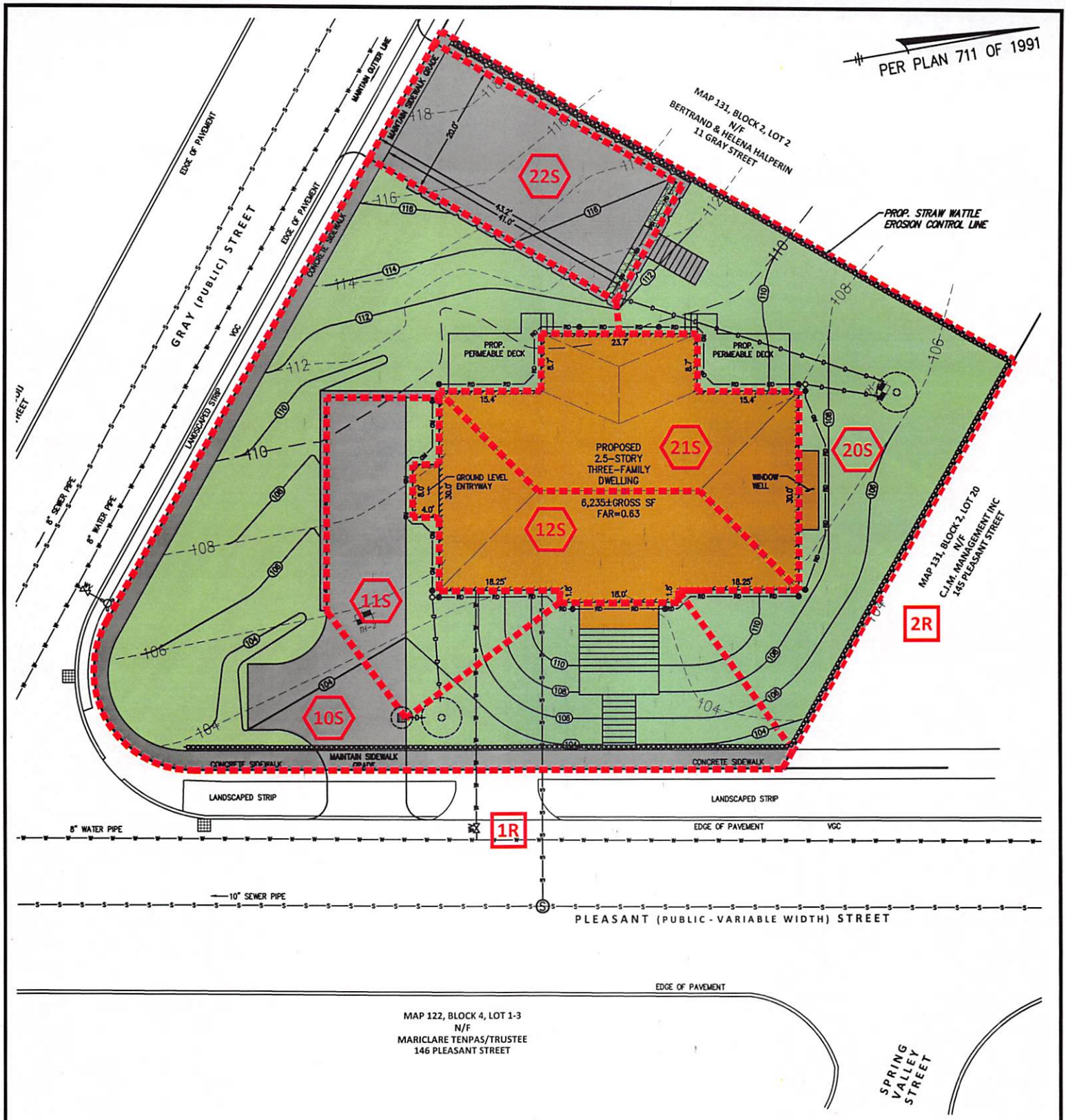
Inflow Area = 0.155 ac, Inflow Depth > 1.33" for 25-Year event
Inflow = 0.27 cfs @ 12.06 hrs, Volume= 0.017 af
Outflow = 0.27 cfs @ 12.06 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.070 ac, Inflow Depth > 0.60" for 25-Year event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 0.003 af
Outflow = 0.03 cfs @ 12.09 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

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



SCALE: 1"=20'

0 10 20 40

POST-DEVELOPMENT SUBCATCHMENT PLAN

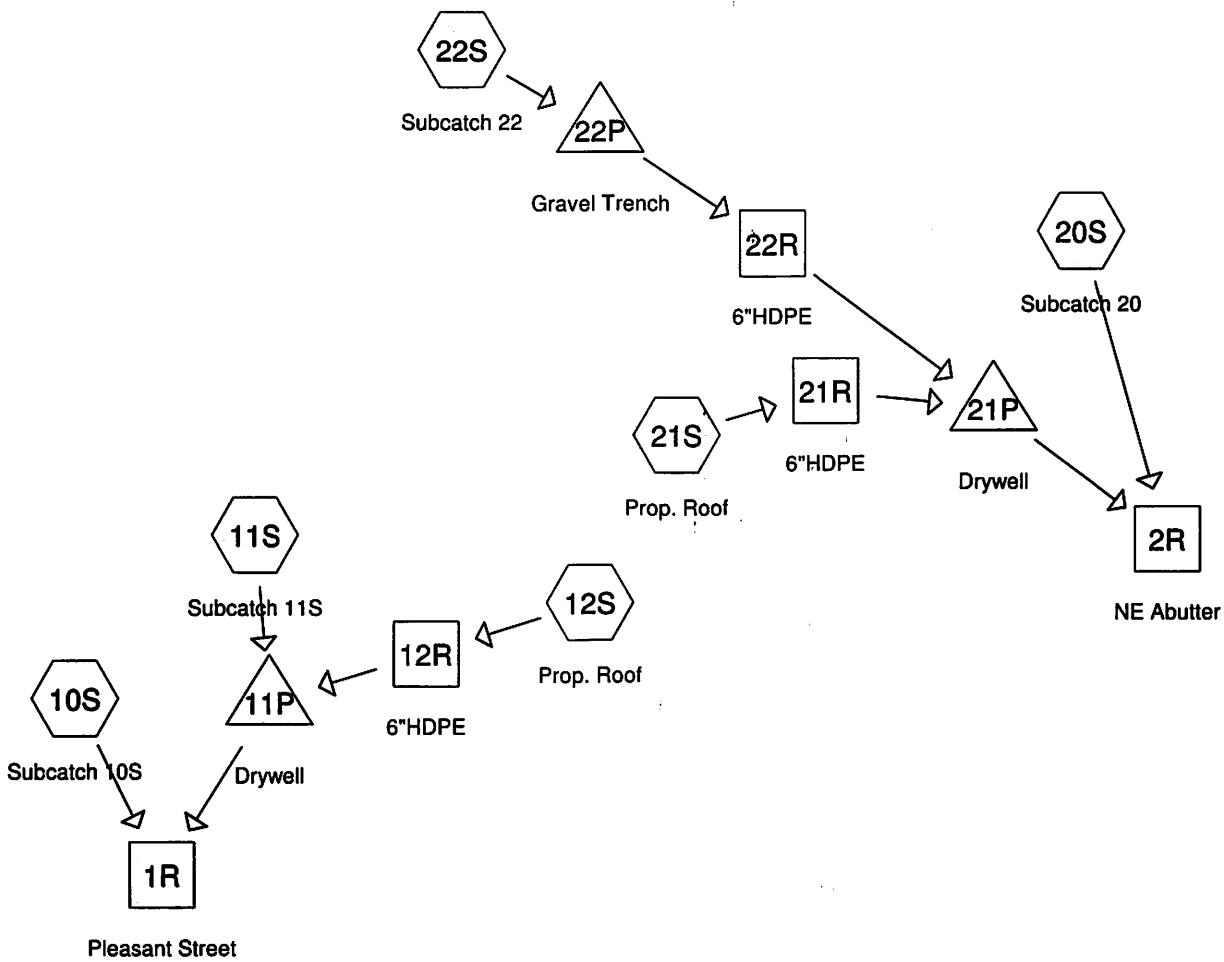
149 PLEASANT STREET
ARLINGTON, MASSACHUSETTS

PLAN PREPARED FOR:
FTO REALTY
109 BLANCHARD ROAD
LAWRENCE, MASSACHUSETTS

JUNE 24, 2024

SCALE: 1"=20'

LANDPLEX
CIVIL ENGINEERING - SURVEYING
10 George Street, Suite 208
Lowell, Massachusetts 01852
978-201-9390 - LandPlex.com



Subcat Reach Pond Link

Drainage Diagram for Pleasant149-Post
Prepared by LandPlex
HydroCAD® 7.10 s/n 003867 © 2005 HydroCAD Software Solutions LLC

Subcatchment 10S: Subcatch 10S

Runoff = 0.00 cfs @ 12.40 hrs, Volume= 0.001 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
960	98	Front stoop roof, Driveway, Sidewalks, Ret.Walls
3,060	39	>75% Grass cover, Good, HSG A
4,020	53	Weighted Average

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

Subcatchment 11S: Subcatch 11S

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
480	98	Driveway
360	39	>75% Grass cover, Good, HSG A
840	73	Weighted Average

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

Subcatchment 12S: Prop. Roof

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
885	98	Roof Area

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

Subcatchment 20S: Subcatch 20

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
135	98	Sidewalk, Ret.Walls, Driveway Stairs, Window well roof
2,035	39	>75% Grass cover, Good, HSG A
2,170	43	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0600	0.2		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 21S: Prop. Roof

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
1,020	98	Roof

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

Subcatchment 22S: Subcatch 22

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
830	98	Driveway, Conc. step
35	39	Gravel Infiltration Trench
865	96	Weighted Average

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

Reach 1R: Pleasant Street

Inflow Area = 0.132 ac, Inflow Depth > 0.10" for 2-Year event
Inflow = 0.00 cfs @ 12.40 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.40 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.093 ac, Inflow Depth > 0.00" for 2-Year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

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

Reach 12R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth > 2.68" for 2-Year event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af
Outflow = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.10' @ 12.09 hrs
Capacity at bank full= 0.65 cfs
Inlet Invert= 101.10', Outlet Invert= 100.90'
6.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0133 '/'

Reach 21R: 6"HDPE

Inflow Area = 0.023 ac, Inflow Depth > 2.68" for 2-Year event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af
Outflow = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.07' @ 12.09 hrs
Capacity at bank full= 1.69 cfs
Inlet Invert= 104.50', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 11.0' Slope= 0.0909 '/'

Reach 22R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth = 0.80" for 2-Year event
Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.001 af
Outflow = 0.05 cfs @ 12.10 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.7 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.05' @ 12.10 hrs
Capacity at bank full= 2.25 cfs
Inlet Invert= 110.40', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 43.0' Slope= 0.1605 '/'

Pond 11P: Drywell

Inflow Area = 0.040 ac, Inflow Depth > 1.78" for 2-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 11.80 hrs, Volume= 0.006 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.80 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 99.52' @ 12.76 hrs Surf.Area= 50 sf Storage= 84 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.4 min (820.5 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.25'	53 cf	**8.00'D x 6.00'H Gravel** 302 cf Overall - 170 cf Embedded = 132 cf x 40.0% Voids
#2	97.25'	170 cf	**6.00'D x 6.00'H Drywell** Inside #1
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	103.25'	**18.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.80 hrs HW=97.35' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.25' TW=0.00' (Dynamic Tailwater)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 21P: Drywell

Inflow Area = 0.043 ac, Inflow Depth > 1.82" for 2-Year event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 11.75 hrs, Volume= 0.007 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.75 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.93' @ 12.63 hrs Surf.Area= 50 sf Storage= 127 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 94.8 min (831.4 - 736.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	70 cf	**8.00'D x 8.00'H Gravel** 402 cf Overall - 226 cf Embedded = 176 cf x 40.0% Voids
#2	97.50'	226 cf	**6.00'D x 8.00'H Drywell** Inside #1
		297 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	105.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.75 hrs HW=97.59' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Gravel Trench

Inflow Area = 0.020 ac, Inflow Depth > 2.50" for 2-Year event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.01 cfs @ 11.80 hrs, Volume= 0.003 af
Primary = 0.05 cfs @ 12.09 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 110.53' @ 12.09 hrs Surf.Area= 40 sf Storage= 2 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (749.7 - 749.2)

Volume	Invert	Avail.Storage	Storage Description
#1	110.40'	80 cf	**2.00'W x 20.00'L x 5.00'H Prismatoid** 200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	110.40'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.80 hrs HW=110.45' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 12.09 hrs HW=110.53' TW=110.45' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.2 fps)

Subcatchment 10S: Subcatch 10S

Runoff = 0.04 cfs @ 12.12 hrs, Volume= 0.004 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
960	98	Front stoop roof, Driveway, Sidewalks, Ret.Walls
3,060	39	>75% Grass cover, Good, HSG A
4,020	53	Weighted Average

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

Subcatchment 11S: Subcatch 11S

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
480	98	Driveway
360	39	>75% Grass cover, Good, HSG A
840	73	Weighted Average

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

Subcatchment 12S: Prop. Roof

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
885	98	Roof Area

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

Subcatchment 20S: Subcatch 20

Runoff = 0.00 cfs @ 12.36 hrs, Volume= 0.001 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
135	98	Sidewalk, Ret.Walls, Driveway Stairs, Window well roof
2,035	39	>75% Grass cover, Good, HSG A
2,170	43	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0600	0.2		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 21S: Prop. Roof

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,020	98	Roof

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

Subcatchment 22S: Subcatch 22

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
830	98	Driveway, Conc. step
35	39	Gravel Infiltration Trench
865	96	Weighted Average

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

Reach 1R: Pleasant Street

Inflow Area = 0.132 ac, Inflow Depth > 0.39" for 10-Year event
Inflow = 0.04 cfs @ 12.12 hrs, Volume= 0.004 af
Outflow = 0.04 cfs @ 12.12 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.093 ac, Inflow Depth > 0.10" for 10-Year event
Inflow = 0.00 cfs @ 12.36 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.36 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

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

Reach 12R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth > 3.96" for 10-Year event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.12' @ 12.09 hrs
Capacity at bank full= 0.65 cfs
Inlet Invert= 101.10', Outlet Invert= 100.90'
6.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0133 '/'

Reach 21R: 6"HDPE

Inflow Area = 0.023 ac, Inflow Depth > 3.96" for 10-Year event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.7 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.08' @ 12.09 hrs
Capacity at bank full= 1.69 cfs
Inlet Invert= 104.50', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 11.0' Slope= 0.0909 '/'

Reach 22R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth = 1.42" for 10-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.002 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.06' @ 12.09 hrs
Capacity at bank full= 2.25 cfs
Inlet Invert= 110.40', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 43.0' Slope= 0.1605 '/'

Pond 11P: Drywell

Inflow Area = 0.040 ac, Inflow Depth > 2.88" for 10-Year event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 11.60 hrs, Volume= 0.009 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.60 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 101.86' @ 13.47 hrs Surf.Area= 50 sf Storage= 171 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 112.1 min (868.7 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.25'	53 cf	**8.00'D x 6.00'H Gravel**
			302 cf Overall - 170 cf Embedded = 132 cf x 40.0% Voids
#2	97.25'	170 cf	**6.00'D x 6.00'H Drywell** Inside #1
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	103.25'	**18.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.60 hrs HW=97.32' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.25' TW=0.00' (Dynamic Tailwater)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 21P: Drywell

Inflow Area = 0.043 ac, Inflow Depth > 2.80" for 10-Year event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 11.65 hrs, Volume= 0.009 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.65 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 103.55' @ 12.95 hrs Surf.Area= 50 sf Storage= 224 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 128.6 min (862.3 - 733.8)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	70 cf	**8.00'D x 8.00'H Gravel** 402 cf Overall - 226 cf Embedded = 176 cf x 40.0% Voids
#2	97.50'	226 cf	**6.00'D x 8.00'H Drywell** Inside #1
		297 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	105.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.65 hrs HW=97.63' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Gravel Trench

Inflow Area = 0.020 ac, Inflow Depth > 3.79" for 10-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.01 cfs @ 11.70 hrs, Volume= 0.004 af
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 110.56' @ 12.09 hrs Surf.Area= 40 sf Storage= 3 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (743.3 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	110.40'	80 cf	**2.00'W x 20.00'L x 5.00'H Prismatoid** 200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	110.40'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.70 hrs HW=110.46' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.07 cfs @ 12.09 hrs HW=110.56' TW=110.46' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.4 fps)

Subcatchment 10S: Subcatch 10S

Runoff = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
960	98	Front stoop roof, Driveway, Sidewalks, Ret.Walls
3,060	39	>75% Grass cover, Good, HSG A
4,020	53	Weighted Average

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

Subcatchment 11S: Subcatch 11S

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
480	98	Driveway
360	39	>75% Grass cover, Good, HSG A
840	73	Weighted Average

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

Subcatchment 12S: Prop. Roof

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
885	98	Roof Area

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

Subcatchment 20S: Subcatch 20

Runoff = 0.01 cfs @ 12.25 hrs, Volume= 0.002 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
135	98	Sidewalk, Ret.Walls, Driveway Stairs, Window well roof
2,035	39	>75% Grass cover, Good, HSG A
2,170	43	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	25	0.0600	0.2		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.10"

Subcatchment 21S: Prop. Roof

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
1,020	98	Roof

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

Subcatchment 22S: Subcatch 22

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
830	98	Driveway, Conc. step
35	39	Gravel Infiltration Trench
865	96	Weighted Average

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

Reach 1R: Pleasant Street

Inflow Area = 0.132 ac, Inflow Depth > 0.69" for 25-Year event
Inflow = 0.09 cfs @ 12.11 hrs, Volume= 0.008 af
Outflow = 0.09 cfs @ 12.11 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: NE Abutter

Inflow Area = 0.093 ac, Inflow Depth > 0.21" for 25-Year event
Inflow = 0.01 cfs @ 12.25 hrs, Volume= 0.002 af
Outflow = 0.01 cfs @ 12.25 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

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

Reach 12R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth > 4.78" for 25-Year event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.14' @ 12.09 hrs
Capacity at bank full= 0.65 cfs
Inlet Invert= 101.10', Outlet Invert= 100.90'
6.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0133 '/'

Reach 21R: 6"HDPE

Inflow Area = 0.023 ac, Inflow Depth > 4.78" for 25-Year event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af
Outflow = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.09' @ 12.09 hrs
Capacity at bank full= 1.69 cfs
Inlet Invert= 104.50', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 11.0' Slope= 0.0909 '/'

Reach 22R: 6"HDPE

Inflow Area = 0.020 ac, Inflow Depth = 1.87" for 25-Year event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.003 af
Outflow = 0.09 cfs @ 12.09 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.07' @ 12.09 hrs
Capacity at bank full= 2.25 cfs
Inlet Invert= 110.40', Outlet Invert= 103.50'
6.0" Diameter Pipe, n= 0.013
Length= 43.0' Slope= 0.1605 '/'

Pond 11P: Drywell

Inflow Area = 0.040 ac, Inflow Depth > 3.63" for 25-Year event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 12.76 hrs, Volume= 0.009 af, Atten= 87%, Lag= 40.2 min
Discarded = 0.01 cfs @ 11.40 hrs, Volume= 0.009 af
Primary = 0.01 cfs @ 12.76 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 103.26' @ 12.75 hrs Surf.Area= 50 sf Storage= 222 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.4 min (851.8 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.25'	53 cf	**8.00'D x 6.00'H Gravel** 302 cf Overall - 170 cf Embedded = 132 cf x 40.0% Voids
#2	97.25'	170 cf	**6.00'D x 6.00'H Drywell** Inside #1
		222 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	103.25'	**18.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.40 hrs HW=97.33' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 12.76 hrs HW=103.26' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.3 fps)

Pond 21P: Drywell

Inflow Area = 0.043 ac, Inflow Depth > 3.45" for 25-Year event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.01 cfs @ 11.45 hrs, Volume= 0.009 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.45 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 105.42' @ 13.14 hrs Surf.Area= 50 sf Storage= 293 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 116.2 min (849.0 - 732.8)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	70 cf	**8.00'D x 8.00'H Gravel** 402 cf Overall - 226 cf Embedded = 176 cf x 40.0% Voids
#2	97.50'	226 cf	**6.00'D x 8.00'H Drywell** Inside #1
		297 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	105.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.45 hrs HW=97.60' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Gravel Trench

Inflow Area = 0.020 ac, Inflow Depth > 4.62" for 25-Year event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.01 cfs @ 11.65 hrs, Volume= 0.005 af
Primary = 0.09 cfs @ 12.09 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 110.58' @ 12.09 hrs Surf.Area= 40 sf Storage= 3 cf
Plug-Flow detention time= 0.4 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (741.0 - 740.6)

Volume	Invert	Avail.Storage	Storage Description
#1	110.40'	80 cf	**2.00'W x 20.00'L x 5.00'H Prismatoid** 200 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	110.40'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.65 hrs HW=110.45' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 12.09 hrs HW=110.58' TW=110.47' (Dynamic Tailwater)
↑**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.4 fps)

SECTION 4: CONSTRUCTION-PERIOD, OPERATION & MAINTENANCE, AND LONG-TERM POLLUTION PREVENTION PLAN

SECTION 4.1 - INTRODUCTION

The following Operation and Maintenance plan provides the requirements for the proposed storm water management system throughout the construction phase and the post development period of the system. The maintenance standards presented are based on recommended design and maintenance standards in *Managing Stormwater in Massachusetts, Volume One: Stormwater Handbook, Prepared by: MA Department of Environmental Protection*

These operations and maintenance procedures are required for proper operation of the stormwater management system; additional procedures may also be developed as the system is operated over a period of time. As with all stormwater facilities, the conditions may change or the management may be simplified as the maintenance personnel become more familiar with them. For example, as detention facilities mature, the ability for the basins to remove pollutants, and the efficiency increases, and therefore, the frequency of inspection may need to be adjusted.

Proper maintenance is essential to ensure that the performance of the system meets the design expectation. A system that is not maintained will inevitably fail and could lead to financial loss, damage to surrounding infrastructure or environmentally sensitive areas, and an increase in the liability of the property owner. The three keys to maintaining a functional storm water management system are p*ersonnel, education, and record keeping.*

Personnel make the difference between a Stormwater Management System that performs as designed throughout its lifetime or one that fails due to lack of attention. *Education* provides the personnel with the skills needed to effectively maintain a Stormwater Management System. *Record Keeping* allows the personnel to track the maintenance and the performance of the system to determine when major maintenance tasks are required.

Maintenance is the responsibility of the property owner. This is true whether the property owner is an individual where the land is private property or where the land is public with the responsibility assigned to that municipality. Maintenance shall be performed as outlined in this Operational and Maintenance Plan. Those responsible for the work shall have a copy of this plan and a copy of the complete design plans to aid them in understanding the intent and requirements unique to this Stormwater Management Facility.

All maintenance personnel shall be aware of the purpose of each stormwater management BMP in removing contaminants and Total Suspended Solids (TSS) from the stormwater runoff. The result is the collection, removal and storage of the contaminants within the components. The contaminants could include trash, debris, oil, sediment and soluble or insoluble materials. In most situations, these can be handled, stored and disposed with minimal safety requirements, in that the health hazards are minimal with the concentrations involved. However, the personnel should be aware of the risk and/or the possibility of potential dangers.

The maintenance personnel shall be aware of the safety needs involved with entry into confined areas such as sediment and oil separators and shall abide by all applicable OSHA regulations. Personnel should be familiar with local emergency numbers and have access to first aid materials. Maintenance personnel shall be familiar with local, state and federal regulations and guidelines concerning the disposal of all materials generated from the facilities as a result of maintenance. All waste materials shall be handled, stored, transported and disposed in accordance with those regulations.

SECTION 4.2 – RESPONSIBLE PARTIES

The construction contractor as well as the owner will be the responsible parties during construction of the Stormwater Management System.

The owner of the property will be the responsible party during the post-development maintenance period of the Stormwater Management System.

SECTION 4.3 CONSTRUCTION PERIOD MAINTENANCE PROCEDURES

Maintenance requirements are the most demanding during the construction phase of a project when the ground is disturbed with partial runoff control in a condition that is most likely to produce silt-laden runoff. During this period, the contractor and owner shall meet the design and performance standards of a fully constructed, stabilized system. Proper treatment of stormwater is only possible with a proper construction sequence plan and rigorous maintenance procedures of the storm water components.
The general construction sequence, as it applies to the storm water management components shall be as follows:

1. Install erosion and sediment controls measures (straw wattle as shown on plan prior to disturbing soil and any temporary structures.
2. Conduct all soil-disturbing operations during the dry periods and not during times of precipitation.
3. Direct the storm water runoff into temporary pollution prevention structures.
4. Begin site work.
5. Stabilize grading and landscaped areas as soon as possible.

The following structures shall be in place during the construction phase and shall be maintained as outlined below.

Erosion Control Measures

Responsible Party: Site Contractor

- Straw wattle shall be placed and maintained as shown on the plan set.
- Straw wattle shall be inspected weekly during construction and after each rainstorm.
- Straw wattle shall be replaced if they become silt laden and no longer meet performance standards
- All sediments should be handled properly and disposed in accordance with local, state and federal guidelines and regulations.

Deep Sump Catch Basin

Responsible Party: Site Contractor

- Filter fabric, silt sacks, or the like shall be placed on top of the catch basin frame but beneath the grate (or erosion control lines such as silt socks shall entirely surround the catch basin frame and grate) for the duration of the construction process and shall be cleaned as needed, and removed at the conclusion of the construction period.
- Any construction period debris shall be removed from the Sump at the conclusion of construction

Gravel Treatment & Infiltration Trench

Responsible Party: Site Contractor

- Prevent heavy equipment from entering locations where the trench is proposed by roping or flagging
- Construct the trench only after the site has been stabilized. Diversion berms should be used during construction to prevent contaminants from entering the trench
- During and after excavation, all excavated materials should be placed downstream of the trench or immediately trucked offsite

Dry Wells

Responsible Party: Site Contractor

- Prevent heavy equipment from entering locations where the dry well is proposed by roping or flagging
- Construct the dry well only after the site has been stabilized. Diversion berms should be used during construction to prevent contaminants from entering the dry well
- During and after excavation, all excavated materials should be placed downstream of the dry well or immediately trucked offsite

SECTION 4.4 POST-DEVELOPMENT MAINTENANCE PROCEDURES

Erosion Control Measures

Responsible Party: Property Owner

- Straw wattle shall be removed following construction; contact the Conservation Commission to inspect stabilized area to conform to compliance requirements.

Deep Sump Catch Basin

Responsible Party: Property Owner

- Inspect the Deep Sump Catch Basin four times per year at minimum, or after significant storm events
- Clean the Deep Sump Catch Basin four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the Basin

Gravel Treatment & Infiltration Trench

Responsible Party: Property Owner

- Because trenches can be prone to failure due to clogging, they must be regularly maintained
- Inspect and clean areas upgradient of the trench regularly, including removing trash, debris, leaves, and grass clippings. Routinely remove any such items from the surface of the trench
- Inspect the trench after the first several rainfall events, after all major storms, and on regularly scheduled dates every six months
- Inspect the trench 24 hours or several days after after a rain event, to look for ponding or improperly draining water

Dry Wells

Responsible Party: Property Owner

- Inspect the dry well after every major storm in the first few months after construction to ensure proper stabilization and function. Thereafter, inspect annually
- Once a year, measure the water depth in the observation well at 24-hour and 48-hour intervals after a storm. Calculate clearance rates by dividing the drop in water level by the time elapsed

Inspections of hoods, elbows, baffles, etc. at the catch basins shall be conducted twice a year. Inspection and maintenance of lawns and landscaping (including trash/debris removal, etc.), and paved surfaces and sweeping shall be conducted twice a year.

37" Fill

0-~~22~~" Ap FSL 10yr 2/2

37-58 Bw SL 10yr 5/6

58-84" C M-C Sand 2.5y 5/3

No Obs / No redox few stones

Ap

0-57" FSL 10yr 2/2 FSL

57-85" Bw 10yr 5/6 SL

85-88" C M-C Sand 2.5y 5/3

No Obs / No Estiw

Few stones