Proposed
OAK BLUFF LANE
DEFINITIVE SUBDIVISION

Off Baldwin Street
Leicester, Massachusetts

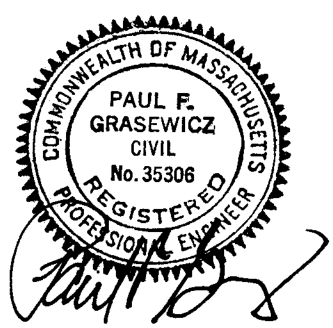
HYDROLOGY &
STORMWATER REPORT

For Leicester Planning Board Definitive Subdivision Approval
Leicester Conservation Commission Notice of Intent
Submittals

November 27, 2018

PREPARED FOR:

Central Land Development Corp.
31 Whitewood Road
Milford, MA 01757



GRAZ Engineering, L.L.C.
323 West Lake Road
Fitzwilliam, NH 03447

Proposed
OAK BLUFF LANE
DEFINITIVE SUBDIVISION

Off Baldwin Street, Leicester, MA

TABLE OF CONTENTS

November 27, 2018

<u>Appendix</u>

STORMWATER REPORT SUMMARY

Project Overview

In accordance with the preliminary subdivision plan approval by the Leicester Planning Board on March 27, 2018 of the "Preliminary Plan – Oak Bluff Lane" dated February 20, 2018 in compliance with the Board's conditions of approval, the current Town of Leicester "Rules & Regulations Governing the Subdivision of Land", and the "Zoning Bylaws" the Applicant and Owner, Central Land Development Corp., proposes a six (6) lot subdivision of their land located off Baldwin Street in Leicester, Massachusetts.

The land is comprised of land currently divided by a private way known as Oak Bluff Lane located on the northerly side of Baldwin Street. The project land is comprised of land located between the northerly sideline of Baldwin Street and the southwesterly edge of the graveled travelled way of Oak Bluff Lane. This parcel currently has an address of 216 Baldwin Street and is depicted as Parcel A1.1-0 on Assessors Map 48. The other portion of the land to be developed is located to the north of the edge of the travelled way of Oak Bluff Lane and is depicted as Parcel A1-0 on Assessors Map 48.

The 14.70 acre undeveloped woodland site is a portion of the land recorded in the Worcester District Registry of Deeds (WDRD) in Book 57984, Page 100. The major westerly boundary of the project parcels is the Leicester-Spencer town line. A portion of the most northwesterly proposed lot lies in the Town of Spencer. The site is zoned as Suburban/Agriculture (SA).

The proposed site will be provided with private septic systems & domestic water wells with overhead electrical and communication services from the existing public utilities located in Baldwin Street. In addition to those utilities a proposed stormwater management system has been designed to conform to the Massachusetts DEP Stormwater Management Standards that have been incorporated in the Wetlands Protection Act Regulations. A review of this system is provided below under the Proposed Site Conditions section of this report.

Existing Site Conditions

The existing site is undeveloped woodland with the frontage along the northerly sideline of Baldwin Street being a Bordering Vegetated Wetlands (BVW). The site generally slopes uphill from the northerly sideline of Baldwin Street to a location near the central part of the site located to the northerly side of the Oak Bluff Lane travelled way before the topography descends to a fairly large BVW at the back (northerly property line) of the site. Field investigation of the soils has indicated that the native soils of the site are comprised of a fine sandy loam that is consistent with hydrologic group "C" soil. A review of the NCRS Soil Survey mappings indicates the soils to be comprised of "C" soils for a portion of the upland areas while the wetlands and adjacent upland areas are classified as "D" soils.

Major portions of the proposed work for the roadway and site development are within the 100-foot buffer zone of the said wetlands. Therefore the project is under the under the jurisdiction of the MADEP Wetlands Protection Act and the Leicester Conservation Commission local wetlands regulations. A Notice of Intent for the project will be submitted separately.

Proposed Site Conditions

The majority of the back land (±6 acres) of the five (5) proposed lots located to the north of Oak Bluff Lane shall remain as wooded upland and wetland areas. The proposed ground cover for the majority of the proposed developed site will be residential lawns with the remainder being the proposed dwellings, driveways, roadways, and stormwater management facilities. Approximately 7.2 acres of the site will be developed under this scenario.

The proposed site has been designed to balance stormwater releases and utilize stormwater management practices to treat runoff, thereby minimizing environmental impact. Several techniques were utilized from the Massachusetts Department of Environmental Protections' (DEP) revised Stormwater Management handbooks to help maintain and provide better water quality, minimize runoff, and to provide groundwater recharge. These techniques include hooded deep sump catch basins, drainage channels, sediment fore bays, and detention/infiltration basins with rip-rapped outlet aprons.

Standard 1: No Untreated Discharges or Erosion to Wetlands

All discharges from the proposed site have been adequately treated. Calculations for water quality have been provided under Standard 4.

The runoff from roadway will be collected via deep sump catch basins and discharged to combined sediment forebay - infiltration or detention basins prior to discharge to the adjoining wetlands. Outlets have been lined with Riprap and sizes based on a reference from the Erosion and Sediment Control Handbook, Fig 7.45, Design of riprap outlet protection from a round pipe flowing full; minimum tailwater conditions. A table of the riprap sizes for the discharge outlets can be found on the detail sheet.

Standard 2: Peak Rate Attenuation

The analyses were made using SCS hydrological groups C & D soils sandy clay loam and silty clay loam using HydroCAD Software Solutions system for modeling the hydrology and hydraulics of stormwater runoff. The stormwater management system is designed to attenuate the 2 and 10-year frequency storms as required by the DEP Stormwater Management Guidelines, Standard 2. The 25-year storm has also been evaluated as required by the Town of Leicester for the design of the drainage pipe network. In addition, the 100-year frequency storm was analyzed and determined to have no adverse off-site impacts.

For the purpose of analyzing pre- and post-development stormwater peak rates of runoff, four (4) design points have been selected based on existing topographic conditions which were used for both the pre- and the post-peak rate calculations. The following table summarizes the pre versus post peak runoff rates for the above cited storm events for the various discharge points from the site with the respective HydroCAD node listings.

TABLE OF PRE AND POST TOTAL FLOWS FOR ANALYSIS POINTS OF 2, 10, 25, & 100 YR STORMS (CFS)				
	2	*10*	*25*	*100*
PRE (1P)	*6.53*	*15.36*	*20.59*	*30.54*
POST (50P)	*6.49*	*14.95*	*20.51*	*29.23*
PRE (3S)	*7.32*	*17.99*	*24.37*	*34.42*
POST (72P)	*6.86*	*16.62*	*22.77*	*32.83*
PRE (4S)	*0.64*	*1.62*	*2.21*	*3.14*
POST (41S)	*0.51*	*1.35*	*1.85*	*2.65*
PRE (5S)	*0.13*	*0.34*	*0.46*	*0.66*
POST (34S)	*0.12*	*0.32*	*0.44*	*0.63*

Standard 3: Recharge

Prior to visiting the site a review of the NRCS Soil Survey was made to identify the soils and hydrologic groups. The majority of the upland site is mapped as Montauk fine sandy loam (C soils) with the wetland area along the northerly side of Baldwin Street being Whitman fine sandy loam (D soils). As the proposed storm water management basin are proposed adjacent to wetlands, the soil conditions and estimated seasonal high groundwater table were further evaluated by onsite deep hole testing which were performed by GRAZ Engineering, LLC. Using the "Static Method" the required storage volume of the infiltration structure was determined for the additional impervious areas proposed by this project. The calculations for the proposed recharge volume including the drawdown time calculation have been included with this report.

Site Recharge to groundwater ***"Static Method"***

Soil type: C Rawls Rate: 0.27 In./Hr.
Total Site Impervious Area: 44,042 s.f.

Hydrologic Group	Target Depth Factor (F)	
A	0.60	inches
B	0.35	inches
C	0.25	inches
D	0.1	inches

Determine the required recharge volume:

Rv = F x impervious area

Rv = Required Recharge Volume
F = Target Depth Factor

$$Rv = \frac{0.25 \times 44{,}042}{12\text{ in. / ft.}} = 918 \text{ Cu.Ft.}$$

From Hydrocad determine the elevation that will hold back the required recharge volume:

Below is a excerpt from the stage storage table of Infiltration Pond 71P.
Based on an Rv = 918 Cu.Ft., the minimum low level outlet required = 864.15

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Inc. Storage (Cu. Ft.)	Cum. Storage (Cu. Ft.)
863.7	0	0	0
864	2,571	386	386
865	4,645	3,608	3,994
866	5,749	5,197	9,191
867	6,784	6,267	15,457
868	7,733	7,259	22,716
868.3	11,836	2,935	25,651

864.15	El. At Rv Min.
2550	Rv at LLO

The Low Level Outlet (LLO) has been designed at elevation: 864.60

Determine if the infiltration BMP will drain completely within 72 hours:

$$\text{Time drawdown} = \frac{Rv}{(K)\ (\text{Bottom Area})}$$

Rv = Storage Volume at Low Level Outlet (LLO) Elevation
K = Saturated Hydraulic Conductivity (Rawls Rate)
Bottom area = Bottom surface area not including sidewall

$$\text{Time drawdown} = \frac{2{,}550}{\frac{0.27}{12\text{ in. / ft.}} * 2{,}571} = 44 \text{ hours}$$

Result is satisfactory for design purposes 44 hrs. < 72 hrs.

Standard 4: Water Quality

The sediment forebays have been sized based on calculations using a ½-inch of runoff times the total impervious area of the post development project site. Calculations for the water quality volume and total suspended solids removal are provided.

The total site impervious area is 54,006 s.f., therefore the amount of volume to be treated for water quality is 2,252 c.f. The total supplied water quality volume from the two sediment forebays is 3,218 c.f. which is greater than the requirement for the project.

Stormwater runoff volumes to be treated for water quality

- Stormwater Policy Standard 4: 1/2-inch of runoff x total impervious area of post-development site

Sediment Forebay 55P

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.5 in runoff (Cu.Ft.)	
30S	9,959		
32S	0		
33S	8,893		
35S	2,354		
36S	2,308		
37S	5,854		
38S	5,795		
	35,163	**1,466**	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of Sediment Forebay.
Based on an W.Q.V. = 1,466 Cu.Ft., the min. W.Q.V. storage elevation required = 868.58

Elevation (Ft.)	Stage Storage Volumes Surface Area (Sq.Ft.)	Inc. Storage (Cu. Ft.)	Cum. Storage (Cu. Ft.)		
866.8	0	0	0		
867	558	56	56		
868	961	760	815	868.58	El. At Req. W.Q.V
868.8	1,297	903	1,718	2189	W.Q.V.at Weir El.
869	1,391	269	1,987		
870	1,959	1,675	3,662		
870.3	2,129	613	4,275		

The Weir Elevation has been designed at elevation: 868.80

Supplied Water Quality Volume: 2,189 Cu.Ft.

Stormwater runoff volumes to be treated for water quality

- Stormwater Policy Standard 4: 1/2-inch of runoff x total impervious area of post-development site

Sediment Forebay 70P

Required Water Quality Volume:

Subcatchment	Impervious Area (SF)	Imp. Area x 0.5 in runoff (Cu.Ft.)	
39S	6,088		
40S	2,870		
42S	9,885		
43S	0		
	18,843	**786**	**Required W.Q.V.**

From Hydrocad determine the elevation that will hold back the required Water Quality Volume (WQV):

Below is a excerpt from the stage storage table of Sediment Forebay.
From Hydrocad determine th 786 Cu.Ft., the min. W.Q.V. storage elevation required = 864.30

Stage Storage Volumes

Elevation (Ft.)	Surface Area (Sq.Ft.)	Inc. Storage (Cu. Ft.)	Cum. Storage (Cu. Ft.)		
863.5	678	0	0		
864	1033	428	428	864.30	El. At Req. W.Q.V
865	1371	1202	1630	1029	W.Q.V.at Weir El.
866	1,753	1562	3,192		
866.5	1,753	877	4,068		

The Weir Elevation has been designed at elevation: 864.50

Supplied Water Quality Volume: 1,029 Cu.Ft.

STORMWATER MANAGEMENT

Weighted 80% TSS REMOVAL

BMP'S	***% Removal***
- CB's = Catch Basin w/ 4' sump and outlet tee	25%
- SF/DB = Detention Basin with Sediment Forebay	80%
- SF/IB = Infiltration Basin with Sediment Forebay	80%
- GSW = Grassed Swale	70%
- N = No treatment	0%

AREAS	***BMP***	***IMP. AREA (SF)***	***TSS Removal***
33,35,36,37,38	CB's, SF/DB	25,204	85.0%
39,40,42	CB's, SF/IB	18,843	85.0%
30	GSW	9,959	70.0%
31	N	1,220	0.0%
TOTAL IMPERVIOUS AREA (SF)		***55,226***	
TOTAL WEIGHTED TSS REMOVAL			***80.4%***

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

System

The proposed Oak Bluff Lane Subdivision drainage system consists of a drainage network that collects and attenuates peak flows that will be generated from the proposed site development. The network includes deep sump hooded catch basins; drain manholes; culverts; drainage swales; sediment forebays; and infiltration and detention basins. Ultimately the flow discharges toward the wetland on the the northerly side of Baldwin Street and to the a low point on the property near the northerly property line and being southwesterly of the another wetland and southeasterly from the nearest point of Stiles Lake.

Responsible Parties

The stormwater management system shall be operated and maintained by the developer during construction. Once the development is complete and the town accepts the roadway, the Town of Leicester will take responsibility for the system.

Construction Operation and Maintenance

Sedimentation and erosion controls, such as haybales, siltfence, and the stabilized construction entrance shall be installed prior to the commencement of construction. The maintenance of the sedimentation and erosion controls during the construction and until the site is fully stabilized shall be the responsibility of the Owner through the site contractor.

Sedimentation and erosion controls shall be inspected on an ongoing basis and repaired and/or replaced as necessary throughout construction. Upon completion of construction, the sedimentation and erosion controls shall be maintained until the disturbed areas of the construction site are fully stabilized.

The stabilized construction entrance shall be maintained to prevent tracking and washing of sediment onto existing paved surfaces until the installation of the roadway bituminous concrete binder course. The entrance shall be top dressed with additional stone or length extended as necessary. Roads adjacent to the site shall be left clean at the end of each day by the removal of any sediment spilled, tracked, or washed onto the existing pavement.

All site runoff shall be routed through permanent drainage facilities where available. Temporary sediment basins shall be constructed to control disturbed area runoff where the permanent system is not in place. The controls shall be constructed and maintained to minimize erosion and sediment transport. Catch basins shall be equipped with a filter insert to trap sediment. Maintenance shall be weekly or as necessary.

Modified rock check dams shall be added to the drainage channels at 100' intervals during construction. They shall be inspected on an ongoing basis and repaired and/or replaced as necessary throughout construction. As part of the mosquito prevention they shall be inspected 72 hours after storms for standing water ponding behind them. Take corrective action if standing water is found.

The infiltration basins shall not be used as temporary sediment traps. The sediment forebay shall be excavated to one-foot above finish grade until the site has become fully stabilized. After the site is stabilized the basin shall be excavated to the finished grade.

The Contractor shall control airborne dust with the use of sprayed water as required minimize the impacts to neighboring properties. The use of calcium chloride or other chemicals are prohibited.

Mosquito Control**:** During construction the contractor is responsible for maintenance to see that larvicides are applied as necessary to the following stormwater treatment practices, which include but are not limited to: catch basins, drainage channels with check dams, sediment forebays, and infiltration basins. larvicides shall be applied by a licensed pesticide applicator in full compliance with all pesticide label requirements and any requirements that the Town of Leicester may have including types of larvicides and times of application.

Construction Period Pollution Prevention Measures

The Construction Period Pollution Prevention measures implemented under the Construction Erosion and Sedimentation Control will focus on developing, implementing, and enforcing a program that will reduce or eliminate the impacts of storm water runoff from the construction site. They focus predominately on temporary pollution prevention practices and address long-term or permanent pollution prevention measures that are implemented during the construction phase.

As described previously, sedimentation and erosion controls, such as haybales, siltfence, and stabilized construction entrances will be installed prior to the commencement of construction. Catch Basins will be equipped with sediment traps to prevent sedimentation from entering the stormwater system. Sediment Forebays and Temporary Detention Basins will be installed. Check Dams have been added to the drainage channels to help prevent erosion and help with the water quality. Inspections and maintenance of these controls have been well documented in the Operation and Maintenance Plan. With the addition of the Construction Inspection and Maintenance Log Form the contractor can incorporate a regimented schedule that will aid in the prevention of sedimentation pollution throughout the construction phase.

Construction Inspection and Maintenance Log Form | Sheet 1 of 1

Project: *OakBluff Lane*
Location: *Oak Bluff Lane, Leicester, MA* **Contractor:** ________
Inspection Date: ________ **Log Date:** ________ **By:** ________ **Title:** ________
Storm Date: ________ **Duration:** ________ **Amount of Rain:** ________
Remarks: ________
Note: The Inspector should be familiar with the Oak Bluff Lane Project & Stormwater Report

BMP	INSPECTION FREQUENCY	MAINTENANCE ACTION
Silt Fence / Haybales 1. Northerly side of Wetland at BaldwinSt 2. Northerly boundary at Pond 71P	1. Weekly 2. After a significant rain event	
Stabilized Construction Entrance Oak Bluff Lane at Baldwin Street	1. Weekly 2. After a significant rain event	
Temporary Detention Basins	Weekly	
Catch Basins / Sediment trap / Culverts	Weekly	
Drainage Channels / Check Dams	1. Bi-Weekly 2. After a significant rain event	
Sediment Forebays	Bi-Weekly	

Standard 9: Operation and Maintenance Plan

Long Term Operation and Long Term Maintenance

Catch Basins: Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow removal season. Sediments must also be removed 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. Clamshell buckets are typically used to remove sediment in Massachusetts. However, vacuum trucks are preferable, because they remove more trapped sediment and supernatant than clamshells. Vacuuming is also a speedier process and is less likely to snap the hood within the deep sump catch basin. All sediments and hydrocarbons accumulated in the sump must be removed and shall be disposed of in accordance with local and state regulations. The grates and the outlet culverts must also be cleared of leaves, sticks, etc.

Manholes: The storm manholes, storm sewers, and culverts shall be inspected twice annually for deposits or blockages. Any accumulated materials shall be flushed.

Riprap Outlets: Riprap outlets shall be inspected annually to determine if high flows have caused scour beneath the riprap and/or filter fabric or dislodged any of the riprap or filter fabric materials. Replace riprap and/or repair/replace filter fabric as required. Any tree growth or accumulated sediments shall be removed.

Check Dams: Inspect check dams after every significant rainfall event. Repair damage and remove sediment as needed. Coordinate inspections with the drainage channel cycle.

Drainage Channels and Culvert inlets and outlets: Initially, the drainage channel should be inspected after the first few months to make sure there is no rilling or gullying, and that vegetation in the channels is adequate. Thereafter, inspect the channel twice a year for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation. Regular maintenance includes mowing, fertilizing, liming, watering, pruning, weeding, and pest control. Mow channels at least once annually. Grass heights shall be no greater than 6 inches and mower blade depth shall be no lower than 3 to 4 inches. Excessive mowing may cause an increase in the design flow velocity. Remove all trash and debris at least once per year. Re-seed periodically to maintain the dense growth of grass vegetation.

Sediment Forebay: Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Sediment markers have been added as a quick reference. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. Inspect and clean sediment forebays at least twice per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.

Infiltration/Detention Basin: An important part of the maintenance of the infiltration basin is the maintenance of the sediment forebay. The infiltration basin shall be inspected and maintained at least twice a year, and after every time drainage discharges through the high outlet orifice. Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Dewatering trench valves are located in the outlet control on each infiltration basin. Sediment markers have also been added as a quick reference. Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include: Signs of differential settlement; Cracking; Erosion; Leakage in the embankments; Tree growth on the embankments; Condition of riprap; Sediment accumulation and the health of the turf. At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

Public Safety Features: Fencing will be provided around all basins to limit access to these areas. The basins have been designed to preclude standing water which will be a deterrent to mosquito breeding.

Operation and Maintenance Log Form |

Project: *Oak Bluff Lane*
Location: *Oak Bluff Lane, Leicester, MA* **Contractor:** ____________
Inspection Date: ________ **Log Date:** ________ **By:** ____________ **Title:** ____________
Storm Date: ____________ **Duration:** ____________ **Amount of Rain:** ____________
Remarks: ____________
Note: The Inspector should be familiar with the Brigham Hill Estates Project & Stormwater Report

BMP	INSPECTION FREQUENCY	MAINTENANCE ACTION
Catch Basins / Drop Inlets	4 times a year	1. Clean & clear grates of debris 2. Remove sediment* w/clam shell or vacuum * sediments to be disposed of in accordance with state and local regulations.
Drain Manholes	2 times a year	1. Inspect for blockages 2. Flush accumulated materials
Drainage Channels / Check Dams / Culverts	1. 2 times a year 2. After a significant rain event	1. Mow grass annually 3-4 inches min. 2. Remove grass clippings 3. Fill washed out areas and re-seed 4. Repair damage and remove sediment at check dams
Riprap outlets	Once a year	1. Inspect for scouring 2. Repair riprap as necessary 3. Remove plant & tree growth
Sediment Forebays	2 times a year	1. Mow grass 3-4 inches min. 2. Fill and repair washed out areas and re-seed** ** allow time for germination and make sure no scouring takes place 3. Remove sediments
Infiltration Basins	2 times a year	1. Mow grass 3-4 inches min. 2. Remove grass clippings, sediments, & debris 3. Break up (till) clogged surfaces

<u>Standard 10: Prohibition of Illicit Discharges</u>

Long-Term Period Pollution Prevention Plan

As part of an effort to reduce or eliminate the negative impacts of stormwater runoff, Long-Term Period Pollution Prevention measures must be implemented. A long term Operation and Maintenance Plan has been described under Standard 9 for ongoing inspection and maintenance. In addition, an Operation and Maintenance Log Form was created to assist the owner. in a specific maintenance schedule.

Long-Term Period Pollution Prevention Plan

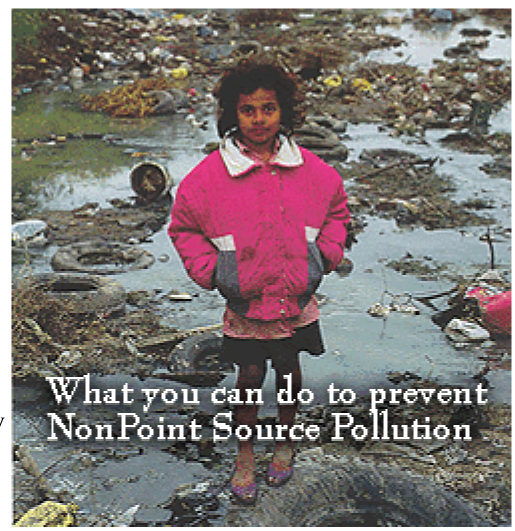
As part of an effort to reduce or eliminate the negative impacts of stormwater runoff, Long-Term Period Pollution Prevention measures must be implemented. A long term Operation and Maintenance Plan has been described under Standard 9 for ongoing inspection and maintenance. In addition, an Operation and Maintenance Log Form was created to assist the owner in a specific maintenance schedule.

Many people are not aware of Nonpoint-Source Pollution (NPS) and the effect it has on the environment. The owner will receive this report and be made aware of this information about NPS pollution prevention.

What you can do to prevent NPS pollution

Urban Stormwater Runoff

- Keep litter, pet wastes, leaves, and debris out of street gutters and storm drains--these outlets drain directly to lake, streams, rivers, and wetlands.



- Apply lawn and garden chemicals sparingly and according to directions.
- Dispose of used oil, antifreeze, paints, and other household chemicals properly, not in storm sewers or drains. If your community does not already have a program for collecting household hazardous wastes, ask your local government to establish one.
- Clean up spilled brake fluid, oil, grease, and antifreeze. Do not hose them into the street or parking lot where they can eventually reach local streams and lakes.
- Control soil erosion on your property by planting ground cover and stabilizing erosion-prone areas.
- Encourage local government officials to develop construction erosion/sediment control ordinances in your community.
- Purchase detergents and cleaners that are low in phosphorous to reduce the amount of nutrients discharged into our lakes, streams and coastal waters.

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

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

Checklist for Stormwater Report

A. Introduction

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.

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

COMMONWEALTH OF MASSACHUSETTS
PAUL F. GRASEWICZ
CIVIL
No. 35306
REGISTERED PROFESSIONAL ENGINEER

Paul F. Grasewicz

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 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:

☒ 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

☐ 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)

☒ 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

☐ 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)

☐ 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.

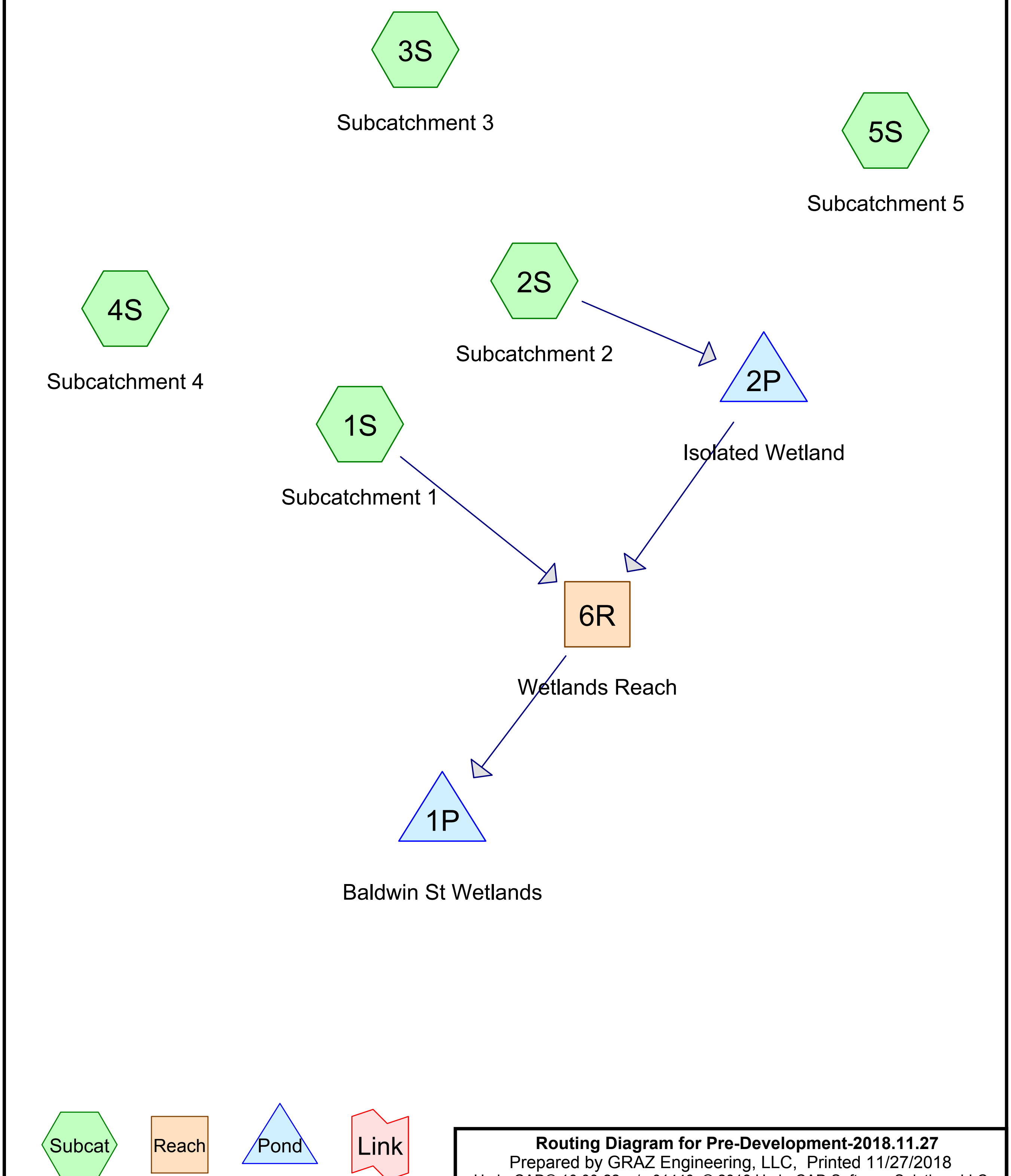
Standard 10: Prohibition of Illicit Discharges

☒ 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.

PRE-DEVELOPMENT CONDITIONS



Routing Diagram for Pre-Development-2018.11.27
Prepared by GRAZ Engineering, LLC, Printed 11/27/2018
HydroCAD® 10.00-22 s/n 01440 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,034	74	>75% Grass cover, Good, HSG C (1S, 3S)
30,167	80	>75% Grass cover, Good, HSG D (1S)
11,228	96	Gravel surface, HSG C (1S, 3S, 4S)
4,747	96	Gravel surface, HSG D (1S, 2S)
17,045	98	Paved parking, HSG C (3S)
75	98	Pavement & Roof, HSG C (1S)
23,565	98	Pavement & Roof, HSG D (1S)
22,823	77	Wooded Wetland, HSG C (3S)
707,839	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S)
144,947	77	Woods, Good, HSG D (1S, 2S, 3S)

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 7.67 cfs @ 12.18 hrs, Volume= 30,902 cf, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	75	98	Pavement & Roof, HSG C
*	23,565	98	Pavement & Roof, HSG D
	3,602	96	Gravel surface, HSG C
	4,374	96	Gravel surface, HSG D
	18,279	74	>75% Grass cover, Good, HSG C
	30,167	80	>75% Grass cover, Good, HSG D
	202,213	70	Woods, Good, HSG C
	104,936	77	Woods, Good, HSG D
	387,211	75	Weighted Average
	363,571		93.89% Pervious Area
	23,640		6.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Roadway Shoulder** Woods: Light underbrush n= 0.400 P2= 3.00"
1.1	103	0.1000	1.58		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
2.9	173	0.1620	1.01		**Shallow Concentrated Flow, Woodland** Forest w/Heavy Litter Kv= 2.5 fps
12.2	326	Total			

Summary for Subcatchment 2S: Subcatchment 2

Runoff = 1.57 cfs @ 12.16 hrs, Volume= 6,214 cf, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
353	96	Gravel surface, HSG D
20	96	Gravel surface, HSG D
56,868	70	Woods, Good, HSG C
29,990	77	Woods, Good, HSG D
87,231	73	Weighted Average
87,231		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Woodland** Woods: Light underbrush n= 0.400 P2= 3.00"
2.6	269	0.1150	1.70		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
10.8	319	Total			

Summary for Subcatchment 3S: Subcatchment 3

Runoff = 7.32 cfs @ 12.20 hrs, Volume= 31,923 cf, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
	17,045	98	Paved parking, HSG C
	5,695	96	Gravel surface, HSG C
	14,755	74	>75% Grass cover, Good, HSG C
	405,558	70	Woods, Good, HSG C
*	22,823	77	Wooded Wetland, HSG C
	10,021	77	Woods, Good, HSG D
	475,897	72	Weighted Average
	458,852		96.42% Pervious Area
	17,045		3.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	855	0.0700	1.06		**Lag/CN Method,**

Summary for Subcatchment 4S: Subcatchment 4

Runoff = 0.64 cfs @ 12.13 hrs, Volume= 2,385 cf, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
35,792	70	Woods, Good, HSG C
1,931	96	Gravel surface, HSG C
37,723	71	Weighted Average
37,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	348	0.0500	0.73		**Lag/CN Method,**

Summary for Subcatchment 5S: Subcatchment 5

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 440 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
7,408	70	Woods, Good, HSG C
7,408		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50		0.17		**Direct Entry, Woodland**

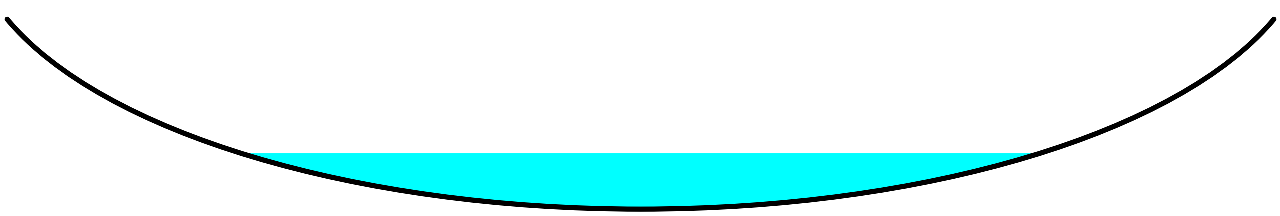
Summary for Reach 6R: Wetlands Reach

Inflow Area = 474,442 sf, 4.98% Impervious, Inflow Depth > 0.78" for 2 yr event
Inflow = 7.67 cfs @ 12.18 hrs, Volume= 30,902 cf
Outflow = 6.06 cfs @ 12.30 hrs, Volume= 30,615 cf, Atten= 21%, Lag= 6.9 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.85 fps, Min. Travel Time= 9.8 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 22.5 min

Peak Storage= 3,576 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 86.25 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 500.0' Slope= 0.0167 '/'
Inlet Invert= 866.00', Outlet Invert= 857.65'



‡

Summary for Pond 1P: Baldwin St Wetlands

Inflow Area = 474,442 sf, 4.98% Impervious, Inflow Depth > 0.77" for 2 yr event
Inflow = 6.06 cfs @ 12.30 hrs, Volume= 30,615 cf
Primary = 6.06 cfs @ 12.30 hrs, Volume= 30,615 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Isolated Wetland

Inflow Area = 87,231 sf, 0.00% Impervious, Inflow Depth > 0.85" for 2 yr event
Inflow = 1.57 cfs @ 12.16 hrs, Volume= 6,214 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 871.26' @ 24.00 hrs Surf.Area= 4,623 sf Storage= 6,213 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	868.50'	10,925 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
868.50	0	0	0
869.00	818	205	205
870.00	2,549	1,684	1,888
871.00	3,900	3,225	5,113
871.50	5,300	2,300	7,413
872.00	8,750	3,513	10,925

Device	Routing	Invert	Outlet Devices
#1	Primary	871.50'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=868.50' TW=866.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 1S: Subcatchment 1

Runoff = 0.04 cfs @ 13.87 hrs, Volume= 969 cf, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	75	98	Pavement & Roof, HSG C
*	23,565	98	Pavement & Roof, HSG D
	3,602	96	Gravel surface, HSG C
	4,374	96	Gravel surface, HSG D
	18,279	74	>75% Grass cover, Good, HSG C
	30,167	80	>75% Grass cover, Good, HSG D
	202,213	70	Woods, Good, HSG C
	104,936	77	Woods, Good, HSG D
	387,211	75	Weighted Average
	363,571		93.89% Pervious Area
	23,640		6.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Roadway Shoulder** Woods: Light underbrush n= 0.400 P2= 3.00"
1.1	103	0.1000	1.58		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
2.9	173	0.1620	1.01		**Shallow Concentrated Flow, Woodland** Forest w/Heavy Litter Kv= 2.5 fps
12.2	326	Total			

Summary for Subcatchment 2S: Subcatchment 2

Runoff = 0.00 cfs @ 15.18 hrs, Volume= 123 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
353	96	Gravel surface, HSG D
20	96	Gravel surface, HSG D
56,868	70	Woods, Good, HSG C
29,990	77	Woods, Good, HSG D
87,231	73	Weighted Average
87,231		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Woodland** Woods: Light underbrush n= 0.400 P2= 3.00"
2.6	269	0.1150	1.70		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
10.8	319	Total			

Summary for Subcatchment 3S: Subcatchment 3

Runoff = 0.02 cfs @ 15.62 hrs, Volume= 469 cf, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
	17,045	98	Paved parking, HSG C
	5,695	96	Gravel surface, HSG C
	14,755	74	>75% Grass cover, Good, HSG C
	405,558	70	Woods, Good, HSG C
*	22,823	77	Wooded Wetland, HSG C
	10,021	77	Woods, Good, HSG D
	475,897	72	Weighted Average
	458,852		96.42% Pervious Area
	17,045		3.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	855	0.0700	1.06		**Lag/CN Method,**

Summary for Subcatchment 4S: Subcatchment 4

Runoff = 0.00 cfs @ 17.02 hrs, Volume= 24 cf, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
35,792	70	Woods, Good, HSG C
1,931	96	Gravel surface, HSG C
37,723	71	Weighted Average
37,723		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	348	0.0500	0.73		**Lag/CN Method,**

Summary for Subcatchment 5S: Subcatchment 5

Runoff = 0.00 cfs @ 21.35 hrs, Volume= 3 cf, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
7,408	70	Woods, Good, HSG C
7,408		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50		0.17		**Direct Entry, Woodland**

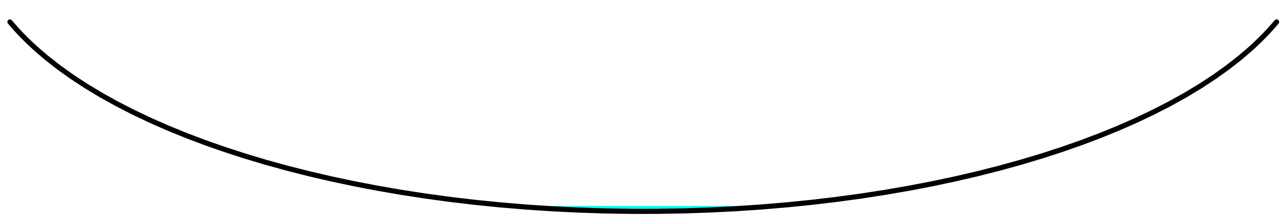
Summary for Reach 6R: Wetlands Reach

Inflow Area = 474,442 sf, 4.98% Impervious, Inflow Depth > 0.02" for First Flush event
Inflow = 0.04 cfs @ 13.87 hrs, Volume= 969 cf
Outflow = 0.03 cfs @ 15.15 hrs, Volume= 915 cf, Atten= 5%, Lag= 77.1 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.18 fps, Min. Travel Time= 47.3 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 55.5 min

Peak Storage= 99 cf @ 15.15 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 86.25 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 500.0' Slope= 0.0167 '/'
Inlet Invert= 866.00', Outlet Invert= 857.65'



‡

Summary for Pond 1P: Baldwin St Wetlands

Inflow Area = 474,442 sf, 4.98% Impervious, Inflow Depth > 0.02" for First Flush event
Inflow = 0.03 cfs @ 15.15 hrs, Volume= 915 cf
Primary = 0.03 cfs @ 15.15 hrs, Volume= 915 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 2P: Isolated Wetland

Inflow Area = 87,231 sf, 0.00% Impervious, Inflow Depth > 0.02" for First Flush event
Inflow = 0.00 cfs @ 15.18 hrs, Volume= 123 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 868.89' @ 24.00 hrs Surf.Area= 635 sf Storage= 123 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	868.50'	10,925 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
868.50	0	0	0
869.00	818	205	205
870.00	2,549	1,684	1,888
871.00	3,900	3,225	5,113
871.50	5,300	2,300	7,413
872.00	8,750	3,513	10,925

Device	Routing	Invert	Outlet Devices
#1	Primary	871.50'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=868.50' TW=866.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
33,034	74	>75% Grass cover, Good, HSG C (1S, 3S)
30,167	80	>75% Grass cover, Good, HSG D (1S)
11,228	96	Gravel surface, HSG C (1S, 3S, 4S)
4,747	96	Gravel surface, HSG D (1S, 2S)
17,045	98	Paved parking, HSG C (3S)
75	98	Pavement & Roof, HSG C (1S)
23,565	98	Pavement & Roof, HSG D (1S)
22,823	77	Wooded Wetland, HSG C (3S)
707,839	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S)
144,947	77	Woods, Good, HSG D (1S, 2S, 3S)

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=387,211 sf 6.11% Impervious Runoff Depth>2.04"
Flow Length=326' Tc=12.2 min CN=75 Runoff=17.27 cfs 65,981 cf

Subcatchment 2S: Subcatchment 2 Runoff Area=87,231 sf 0.00% Impervious Runoff Depth>1.89"
Flow Length=319' Tc=10.8 min CN=73 Runoff=3.73 cfs 13,746 cf

Subcatchment 3S: Subcatchment 3 Runoff Area=475,897 sf 3.58% Impervious Runoff Depth>1.81"
Flow Length=855' Slope=0.0700 '/' Tc=13.4 min CN=72 Runoff=17.99 cfs 71,962 cf

Subcatchment 4S: Subcatchment 4 Runoff Area=37,723 sf 0.00% Impervious Runoff Depth>1.74"
Flow Length=348' Slope=0.0500 '/' Tc=7.9 min CN=71 Runoff=1.62 cfs 5,480 cf

Subcatchment 5S: Subcatchment 5 Runoff Area=7,408 sf 0.00% Impervious Runoff Depth>1.67"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.34 cfs 1,032 cf

Reach 6R: Wetlands Reach Avg. Flow Depth=0.66' Max Vel=1.11 fps Inflow=17.27 cfs 72,239 cf
n=0.100 L=500.0' S=0.0167 '/' Capacity=86.25 cfs Outflow=14.69 cfs 71,745 cf

Pond 1P: Baldwin St Wetlands Inflow=14.69 cfs 71,745 cf
Primary=14.69 cfs 71,745 cf

Pond 2P: Isolated Wetland Peak Elev=871.55' Storage=7,695 cf Inflow=3.73 cfs 13,746 cf
Outflow=0.43 cfs 6,258 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=387,211 sf 6.11% Impervious Runoff Depth>2.69"
Flow Length=326' Tc=12.2 min CN=75 Runoff=22.87 cfs 86,728 cf

Subcatchment 2S: Subcatchment 2 Runoff Area=87,231 sf 0.00% Impervious Runoff Depth>2.51"
Flow Length=319' Tc=10.8 min CN=73 Runoff=5.01 cfs 18,261 cf

Subcatchment 3S: Subcatchment 3 Runoff Area=475,897 sf 3.58% Impervious Runoff Depth>2.42"
Flow Length=855' Slope=0.0700 '/' Tc=13.4 min CN=72 Runoff=24.37 cfs 96,135 cf

Subcatchment 4S: Subcatchment 4 Runoff Area=37,723 sf 0.00% Impervious Runoff Depth>2.34"
Flow Length=348' Slope=0.0500 '/' Tc=7.9 min CN=71 Runoff=2.21 cfs 7,361 cf

Subcatchment 5S: Subcatchment 5 Runoff Area=7,408 sf 0.00% Impervious Runoff Depth>2.26"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.46 cfs 1,395 cf

Reach 6R: Wetlands Reach Avg. Flow Depth=0.76' Max Vel=1.22 fps Inflow=22.87 cfs 97,489 cf
n=0.100 L=500.0' S=0.0167 '/' Capacity=86.25 cfs Outflow=19.84 cfs 96,917 cf

Pond 1P: Baldwin St Wetlands Inflow=19.84 cfs 96,917 cf
Primary=19.84 cfs 96,917 cf

Pond 2P: Isolated Wetland Peak Elev=871.63' Storage=8,178 cf Inflow=5.01 cfs 18,261 cf
Outflow=1.77 cfs 10,761 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=387,211 sf 6.11% Impervious Runoff Depth>3.70"
Flow Length=326' Tc=12.2 min CN=75 Runoff=31.60 cfs 119,493 cf

Subcatchment 2S: Subcatchment 2 Runoff Area=87,231 sf 0.00% Impervious Runoff Depth>3.50"
Flow Length=319' Tc=10.8 min CN=73 Runoff=7.01 cfs 25,444 cf

Subcatchment 3S: Subcatchment 3 Runoff Area=475,897 sf 3.58% Impervious Runoff Depth>3.40"
Flow Length=855' Slope=0.0700 '/' Tc=13.4 min CN=72 Runoff=34.42 cfs 134,734 cf

Subcatchment 4S: Subcatchment 4 Runoff Area=37,723 sf 0.00% Impervious Runoff Depth>3.30"
Flow Length=348' Slope=0.0500 '/' Tc=7.9 min CN=71 Runoff=3.14 cfs 10,378 cf

Subcatchment 5S: Subcatchment 5 Runoff Area=7,408 sf 0.00% Impervious Runoff Depth>3.20"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.66 cfs 1,978 cf

Reach 6R: Wetlands Reach Avg. Flow Depth=0.92' Max Vel=1.38 fps Inflow=32.61 cfs 137,420 cf
n=0.100 L=500.0' S=0.0167 '/' Capacity=86.25 cfs Outflow=29.75 cfs 136,737 cf

Pond 1P: Baldwin St Wetlands Inflow=29.75 cfs 136,737 cf
Primary=29.75 cfs 136,737 cf

Pond 2P: Isolated Wetland Peak Elev=871.74' Storage=8,908 cf Inflow=7.01 cfs 25,444 cf
Outflow=4.43 cfs 17,927 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=387,211 sf 6.11% Impervious Runoff Depth>0.03"
Flow Length=326' Tc=12.2 min CN=75 Runoff=0.04 cfs 969 cf

Subcatchment 2S: Subcatchment 2 Runoff Area=87,231 sf 0.00% Impervious Runoff Depth>0.02"
Flow Length=319' Tc=10.8 min CN=73 Runoff=0.00 cfs 123 cf

Subcatchment 3S: Subcatchment 3 Runoff Area=475,897 sf 3.58% Impervious Runoff Depth>0.01"
Flow Length=855' Slope=0.0700 '/' Tc=13.4 min CN=72 Runoff=0.02 cfs 469 cf

Subcatchment 4S: Subcatchment 4 Runoff Area=37,723 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=348' Slope=0.0500 '/' Tc=7.9 min CN=71 Runoff=0.00 cfs 24 cf

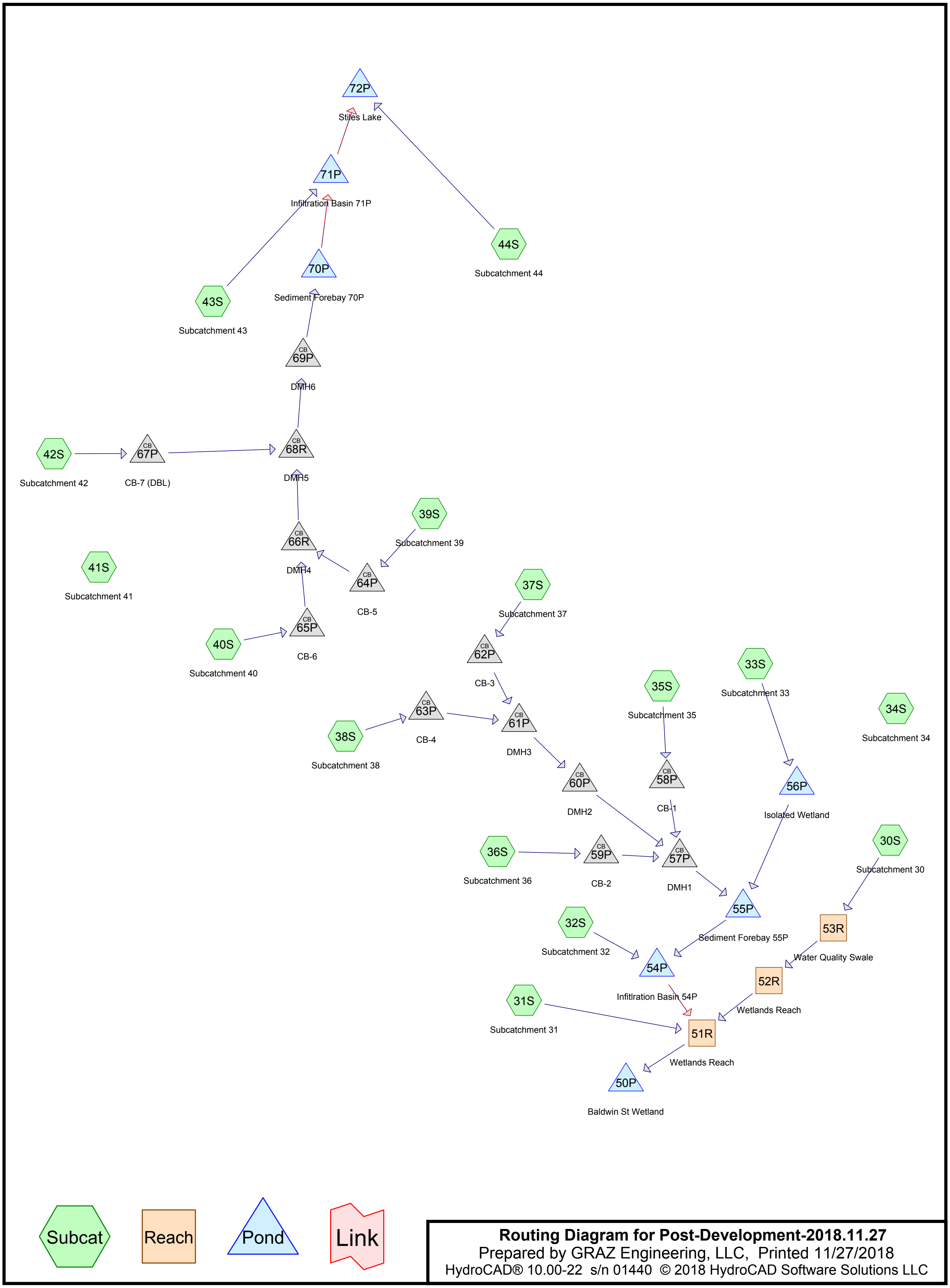
Subcatchment 5S: Subcatchment 5 Runoff Area=7,408 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.00 cfs 3 cf

Reach 6R: Wetlands Reach Avg. Flow Depth=0.04' Max Vel=0.18 fps Inflow=0.04 cfs 969 cf
n=0.100 L=500.0' S=0.0167 '/' Capacity=86.25 cfs Outflow=0.03 cfs 915 cf

Pond 1P: Baldwin St Wetlands Inflow=0.03 cfs 915 cf
Primary=0.03 cfs 915 cf

Pond 2P: Isolated Wetland Peak Elev=868.89' Storage=123 cf Inflow=0.00 cfs 123 cf
Outflow=0.00 cfs 0 cf

POST-DEVELOPMENT CONDITIONS



Routing Diagram for Post-Development-2018.11.27
Prepared by GRAZ Engineering, LLC, Printed 11/27/2018
HydroCAD® 10.00-22 s/n 01440 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
225,482	74	>75% Grass cover, Good, HSG C (30S, 31S, 32S, 33S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S, 44S)
74,770	80	>75% Grass cover, Good, HSG D (30S, 31S, 32S, 33S, 35S, 36S, 44S)
9,118	96	Gravel surface, HSG C (43S, 44S)
29,856	98	Pavement & Roof, HSG C (30S, 31S, 33S, 37S, 38S, 39S, 40S)
32,891	98	Pavement & Roof, HSG D (30S, 31S, 33S)
24,436	98	Pavement & Roofs, HSG C (44S)
12,552	98	Pavement, HSG C (35S, 36S, 42S)
1,995	98	Pavement, HSG D (35S, 36S)
492,258	70	Woods, Good, HSG C (30S, 31S, 33S, 34S, 39S, 41S, 44S)
92,112	77	Woods, Good, HSG D (31S, 33S)

Summary for Subcatchment 30S: Subcatchment 30

Runoff = 1.52 cfs @ 12.08 hrs, Volume= 4,569 cf, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	2,963	98	Pavement & Roof, HSG C
*	6,996	98	Pavement & Roof, HSG D
	16,395	74	>75% Grass cover, Good, HSG C
	10,724	80	>75% Grass cover, Good, HSG D
	4,711	70	Woods, Good, HSG C
	41,789	81	Weighted Average
	31,830		76.17% Pervious Area
	9,959		23.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	261		0.87		**Direct Entry,**

Summary for Subcatchment 31S: Subcatchment 31

Runoff = 6.22 cfs @ 12.18 hrs, Volume= 24,780 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	1,516	98	Pavement & Roof, HSG C
*	21,772	98	Pavement & Roof, HSG D
	25,885	74	>75% Grass cover, Good, HSG C
	31,521	80	>75% Grass cover, Good, HSG D
	134,936	70	Woods, Good, HSG C
	78,254	77	Woods, Good, HSG D
	293,884	76	Weighted Average
	270,596		92.08% Pervious Area
	23,288		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Roadway Shoulder** Woods: Light underbrush n= 0.400 P2= 3.00"
1.1	103	0.1000	1.58		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
2.9	173	0.1620	1.01		**Shallow Concentrated Flow, Woodland** Forest w/Heavy Litter Kv= 2.5 fps
12.2	326	Total			

Summary for Subcatchment 32S: Subcatchment 32

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 2,323 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
	17,205	74	>75% Grass cover, Good, HSG C
	10,298	80	>75% Grass cover, Good, HSG D
	27,503	76	Weighted Average
	27,503		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0700	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
2.1	266	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	316	Total			

Summary for Subcatchment 33S: Subcatchment 33

Runoff = 1.98 cfs @ 12.16 hrs, Volume= 7,471 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	4,770	98	Pavement & Roof, HSG C
*	4,123	98	Pavement & Roof, HSG D
	25,786	74	>75% Grass cover, Good, HSG C
	15,793	80	>75% Grass cover, Good, HSG D
	19,602	70	Woods, Good, HSG C
	13,858	77	Woods, Good, HSG D
	83,932	77	Weighted Average
	75,039		89.40% Pervious Area
	8,893		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Woodland** Woods: Light underbrush n= 0.400 P2= 3.00"
2.6	269	0.1150	1.70		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
10.8	319	Total			

Summary for Subcatchment 34S: Subcatchment 34

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 422 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
	7,097	70	Woods, Good, HSG C
	7,097		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50		0.17		**Direct Entry, Woodland**

Summary for Subcatchment 35S: Subcatchment 35

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 618 cf, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	1,471	98	Pavement, HSG C
*	883	98	Pavement, HSG D
	1,087	74	>75% Grass cover, Good, HSG C
	465	80	>75% Grass cover, Good, HSG D
	3,906	89	Weighted Average
	1,552		39.73% Pervious Area
	2,354		60.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	191		0.64		**Direct Entry,**

Summary for Subcatchment 36S: Subcatchment 36

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 614 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	1,196	98	Pavement, HSG C
*	1,112	98	Pavement, HSG D
	602	74	>75% Grass cover, Good, HSG C
	652	80	>75% Grass cover, Good, HSG D
	3,562	91	Weighted Average
	1,254		35.20% Pervious Area
	2,308		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	202		0.67		**Direct Entry,**

Summary for Subcatchment 37S: Subcatchment 37

Runoff = 0.63 cfs @ 12.08 hrs, Volume= 1,884 cf, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	5,854	98	Pavement & Roof, HSG C
	9,794	74	>75% Grass cover, Good, HSG C
	15,648	83	Weighted Average
	9,794		62.59% Pervious Area
	5,854		37.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	260		0.87		**Direct Entry,**

Summary for Subcatchment 38S: Subcatchment 38

Runoff = 0.59 cfs @ 12.08 hrs, Volume= 1,749 cf, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	5,795	98	Pavement & Roof, HSG C
	7,436	74	>75% Grass cover, Good, HSG C
	13,231	85	Weighted Average
	7,436		56.20% Pervious Area
	5,795		43.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	291		0.97		**Direct Entry,**

Summary for Subcatchment 39S: Subcatchment 39

Runoff = 0.83 cfs @ 12.08 hrs, Volume= 2,537 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	6,088	98	Pavement & Roof, HSG C
	17,311	74	>75% Grass cover, Good, HSG C
	2,246	70	Woods, Good, HSG C
	25,645	79	Weighted Average
	19,557		76.26% Pervious Area
	6,088		23.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	210		0.70		**Direct Entry,**

Summary for Subcatchment 40S: Subcatchment 40

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 729 cf, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	2,870	98	Pavement & Roof, HSG C
	1,943	74	>75% Grass cover, Good, HSG C
	4,813	88	Weighted Average
	1,943		40.37% Pervious Area
	2,870		59.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	230		0.77		**Direct Entry,**

Summary for Subcatchment 41S: Subcatchment 41

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,763 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
3,657	74	>75% Grass cover, Good, HSG C
26,012	70	Woods, Good, HSG C
29,669	70	Weighted Average
29,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	167		0.56		**Direct Entry,**

Summary for Subcatchment 42S: Subcatchment 42

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 2,367 cf, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	9,885	98	Pavement, HSG C
	2,727	74	>75% Grass cover, Good, HSG C
	12,612	93	Weighted Average
	2,727		21.62% Pervious Area
	9,885		78.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	164		0.55		**Direct Entry,**

Summary for Subcatchment 43S: Subcatchment 43

Runoff = 0.82 cfs @ 12.08 hrs, Volume= 2,499 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
5,424	96	Gravel surface, HSG C
19,837	74	>75% Grass cover, Good, HSG C
25,261	79	Weighted Average
25,261		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	244		0.81		**Direct Entry,**

Summary for Subcatchment 44S: Subcatchment 44

Runoff = 6.83 cfs @ 12.20 hrs, Volume= 28,967 cf, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.00"

	Area (sf)	CN	Description
*	24,436	98	Pavement & Roofs, HSG C
	3,694	96	Gravel surface, HSG C
	75,817	74	>75% Grass cover, Good, HSG C
	5,317	80	>75% Grass cover, Good, HSG D
	297,654	70	Woods, Good, HSG C
	406,918	73	Weighted Average
	382,482		93.99% Pervious Area
	24,436		6.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	811	0.0650	1.04		**Lag/CN Method,**

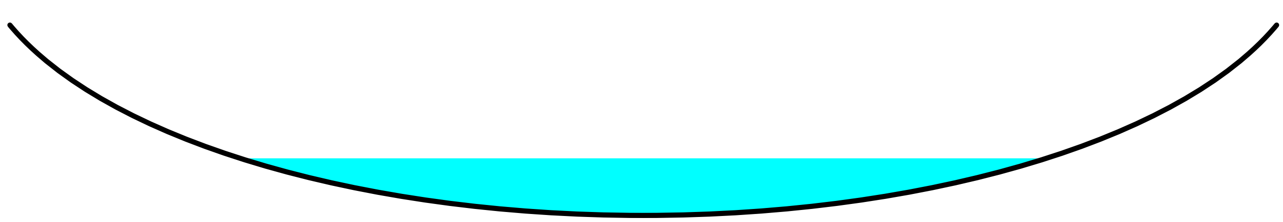
Summary for Reach 51R: Wetlands Reach

Inflow Area = 483,455 sf, 12.09% Impervious, Inflow Depth > 0.89" for 2 yr event
Inflow = 7.17 cfs @ 12.18 hrs, Volume= 35,689 cf
Outflow = 6.49 cfs @ 12.25 hrs, Volume= 35,487 cf, Atten= 9%, Lag= 3.9 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.88 fps, Min. Travel Time= 5.3 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 12.1 min

Peak Storage= 2,059 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 88.74 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 280.0' Slope= 0.0177 '/'
Inlet Invert= 862.60', Outlet Invert= 857.65'



‡

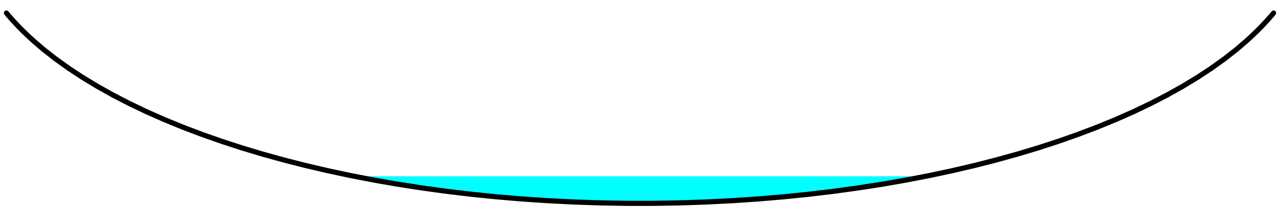
Summary for Reach 52R: Wetlands Reach

Inflow Area = 41,789 sf, 23.83% Impervious, Inflow Depth > 1.31" for 2 yr event
Inflow = 1.51 cfs @ 12.08 hrs, Volume= 4,566 cf
Outflow = 0.95 cfs @ 12.18 hrs, Volume= 4,515 cf, Atten= 37%, Lag= 5.8 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.39 fps, Min. Travel Time= 12.9 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 31.3 min

Peak Storage= 733 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 65.08 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 305.0' Slope= 0.0095 '/'
Inlet Invert= 865.50', Outlet Invert= 862.60'



‡

Summary for Reach 53R: Water Quality Swale

Inflow Area = 41,789 sf, 23.83% Impervious, Inflow Depth > 1.31" for 2 yr event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 4,569 cf
Outflow = 1.51 cfs @ 12.08 hrs, Volume= 4,566 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.71 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 1.9 min

Peak Storage= 51 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.13'
Defined Flood Depth= 867.00' Flow Area= 9,503.2 sf, Capacity= 114,446.10 cfs
Bank-Full Depth= 1.00' Flow Area= 7.5 sf, Capacity= 65.95 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 11.00'
Length= 92.0' Slope= 0.0543 '/'
Inlet Invert= 871.00', Outlet Invert= 866.00'

‡

Summary for Pond 50P: Baldwin St Wetland

Inflow Area = 483,455 sf, 12.09% Impervious, Inflow Depth > 0.88" for 2 yr event
Inflow = 6.49 cfs @ 12.25 hrs, Volume= 35,487 cf
Primary = 6.49 cfs @ 12.25 hrs, Volume= 35,487 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 54P: Infitlration Basin 54P

Inflow Area = 147,782 sf, 17.05% Impervious, Inflow Depth > 0.75" for 2 yr event
Inflow = 1.13 cfs @ 12.23 hrs, Volume= 9,239 cf
Outflow = 0.28 cfs @ 15.25 hrs, Volume= 6,393 cf, Atten= 76%, Lag= 180.7 min
Primary = 0.28 cfs @ 15.25 hrs, Volume= 6,393 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 867.31' @ 15.25 hrs Surf.Area= 3,650 sf Storage= 3,657 cf
Flood Elev= 870.30' Surf.Area= 10,118 sf Storage= 24,066 cf

Plug-Flow detention time= 233.6 min calculated for 6,390 cf (69% of inflow)
Center-of-Mass det. time= 121.9 min (1,058.8 - 936.9)

Volume	Invert	Avail.Storage	Storage Description
#1	865.60'	24,066 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
865.60	0	0	0
866.00	1,408	282	282
867.00	3,210	2,309	2,591
868.00	4,627	3,919	6,509
869.00	7,547	6,087	12,596
870.00	9,506	8,527	21,123
870.30	10,118	2,944	24,066

Device	Routing	Invert	Outlet Devices
#1	Primary	863.55'	**12.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 863.55' / 863.05' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	866.70'	**20.0 deg x 1.20' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.69 (C= 3.36)
#3	Device 1	868.80'	**1.3" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.8" x 25.8" Grate (47% open area) Limited to weir flow at low heads
#4	Secondary	868.80'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)

Primary OutFlow Max=0.28 cfs @ 15.25 hrs HW=867.31' TW=862.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.28 cfs of 6.83 cfs potential flow)
  ├─**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.28 cfs @ 2.10 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=865.60' TW=862.60' (Dynamic Tailwater)
└─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 55P: Sediment Forebay 55P

Inflow Area =	120,279 sf,	20.95% Impervious,	Inflow Depth > 0.87"	for 2 yr event	
Inflow =	1.62 cfs @	12.08 hrs,	Volume=	8,671 cf	
Outflow =	0.74 cfs @	12.25 hrs,	Volume=	6,916 cf,	Atten= 55%, Lag= 10.8 min
Primary =	0.74 cfs @	12.25 hrs,	Volume=	6,916 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 868.94' @ 12.25 hrs Surf.Area= 1,365 sf Storage= 1,911 cf
Flood Elev= 870.30' Surf.Area= 2,129 sf Storage= 4,275 cf

Plug-Flow detention time= 140.4 min calculated for 6,913 cf (80% of inflow)
Center-of-Mass det. time= 56.1 min (963.3 - 907.2)

Volume	Invert	Avail.Storage	Storage Description
#1	866.80'	4,275 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
866.80	0	0	0
867.00	558	56	56
868.00	961	760	815
868.80	1,297	903	1,718
869.00	1,391	269	1,987
870.00	1,959	1,675	3,662
870.30	2,129	613	4,275

Device	Routing	Invert	Outlet Devices
#1	Primary	868.80'	**143.1 deg x 4.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=0.74 cfs @ 12.25 hrs HW=868.94' TW=866.40' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.74 cfs @ 1.15 fps)

Summary for Pond 56P: Isolated Wetland

Inflow Area =	83,932 sf,	10.60% Impervious,	Inflow Depth > 1.07"	for 2 yr event	
Inflow =	1.98 cfs @	12.16 hrs,	Volume=	7,471 cf	
Outflow =	0.19 cfs @	13.95 hrs,	Volume=	3,805 cf,	Atten= 90%, Lag= 107.2 min
Primary =	0.19 cfs @	13.95 hrs,	Volume=	3,805 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 870.73' @ 13.95 hrs Surf.Area= 3,533 sf Storage= 4,102 cf
Flood Elev= 872.10' Surf.Area= 11,108 sf Storage= 12,507 cf

Plug-Flow detention time= 278.8 min calculated for 3,803 cf (51% of inflow)
Center-of-Mass det. time= 153.1 min (1,012.1 - 859.0)

Volume	Invert	Avail.Storage	Storage Description
#1	868.50'	13,638 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
868.50	0	0	0
869.00	818	205	205
870.00	2,549	1,684	1,888
871.00	3,900	3,225	5,113
871.50	5,300	2,300	7,413
872.00	10,715	4,004	11,416
872.20	11,500	2,222	13,638

Device	Routing	Invert	Outlet Devices
#1	Primary	870.50'	**12.0" Round Culvert** L= 27.2' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 870.50' / 868.20' S= 0.0846 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	872.10'	**10.0' long x 7.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Primary OutFlow Max=0.19 cfs @ 13.95 hrs HW=870.73' TW=868.88' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.19 cfs @ 1.43 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 57P: DMH1

Inflow Area = 36,347 sf, 44.88% Impervious, Inflow Depth > 1.61" for 2 yr event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 4,866 cf
Outflow = 1.62 cfs @ 12.08 hrs, Volume= 4,866 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.08 hrs, Volume= 4,866 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 869.01' @ 12.22 hrs
Flood Elev= 871.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	867.95'	**12.0" Round Culvert** L= 22.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 867.95' / 867.65' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.08 hrs HW=868.84' TW=868.56' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 1.50 cfs @ 2.02 fps)

Summary for Pond 58P: CB-1

Inflow Area = 3,906 sf, 60.27% Impervious, Inflow Depth > 1.90" for 2 yr event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 618 cf
Outflow = 0.21 cfs @ 12.07 hrs, Volume= 618 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.07 hrs, Volume= 618 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 869.02' @ 12.22 hrs
Flood Elev= 871.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.60'	**12.0" Round Culvert** L= 18.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 868.60' / 868.20' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.17 cfs @ 12.07 hrs HW=868.91' TW=868.84' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 0.17 cfs @ 1.23 fps)

Summary for Pond 59P: CB-2

Inflow Area = 3,562 sf, 64.80% Impervious, Inflow Depth > 2.07" for 2 yr event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 614 cf
Outflow = 0.20 cfs @ 12.07 hrs, Volume= 614 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.20 cfs @ 12.07 hrs, Volume= 614 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 869.02' @ 12.22 hrs
Flood Elev= 871.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.60'	**12.0" Round Culvert** L= 3.9' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 868.60' / 868.20' S= 0.1026 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.07 hrs HW=868.89' TW=868.83' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 0.16 cfs @ 1.28 fps)

Summary for Pond 60P: DMH2

Inflow Area = 28,879 sf, 40.34% Impervious, Inflow Depth > 1.51" for 2 yr event
Inflow = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf
Outflow = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 871.08' @ 12.08 hrs
Flood Elev= 874.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	870.50'	**12.0" Round Culvert** L= 72.5' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 870.50' / 868.20' S= 0.0317 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.08 hrs HW=871.08' TW=868.85' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.21 cfs @ 2.59 fps)

Summary for Pond 61P: DMH3

Inflow Area = 28,879 sf, 40.34% Impervious, Inflow Depth > 1.51" for 2 yr event
Inflow = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf
Outflow = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 12.08 hrs, Volume= 3,634 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 879.68' @ 12.08 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.10'	**12.0" Round Culvert** L= 85.9' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 879.10' / 870.60' S= 0.0990 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.08 hrs HW=879.68' TW=871.08' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.21 cfs @ 2.59 fps)

Summary for Pond 62P: CB-3

Inflow Area = 15,648 sf, 37.41% Impervious, Inflow Depth > 1.45" for 2 yr event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 1,884 cf
Outflow = 0.63 cfs @ 12.08 hrs, Volume= 1,884 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.08 hrs, Volume= 1,884 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 880.25' @ 12.08 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.80'	**12.0" Round Culvert** L= 13.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 879.80' / 879.20' S= 0.0444 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.63 cfs @ 12.08 hrs HW=880.25' TW=879.68' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.63 cfs @ 1.81 fps)

Summary for Pond 63P: CB-4

Inflow Area = 13,231 sf, 43.80% Impervious, Inflow Depth > 1.59" for 2 yr event
Inflow = 0.59 cfs @ 12.08 hrs, Volume= 1,749 cf
Outflow = 0.59 cfs @ 12.08 hrs, Volume= 1,749 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.59 cfs @ 12.08 hrs, Volume= 1,749 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 880.24' @ 12.08 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.80'	**12.0" Round Culvert** L= 6.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 879.80' / 879.20' S= 0.0937 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.59 cfs @ 12.08 hrs HW=880.24' TW=879.68' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.59 cfs @ 1.78 fps)

Summary for Pond 64P: CB-5

Inflow Area = 25,645 sf, 23.74% Impervious, Inflow Depth > 1.19" for 2 yr event
Inflow = 0.83 cfs @ 12.08 hrs, Volume= 2,537 cf
Outflow = 0.83 cfs @ 12.08 hrs, Volume= 2,537 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.83 cfs @ 12.08 hrs, Volume= 2,537 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 891.93' @ 12.08 hrs
Flood Elev= 895.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	891.40'	**12.0" Round Culvert** L= 20.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 891.40' / 890.40' S= 0.0495 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.08 hrs HW=891.93' TW=890.84' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.83 cfs @ 1.96 fps)

Summary for Pond 65P: CB-6

Inflow Area =	4,813 sf, 59.63% Impervious,	Inflow Depth > 1.82"	for 2 yr event
Inflow =	0.24 cfs @ 12.07 hrs, Volume=	729 cf	
Outflow =	0.24 cfs @ 12.07 hrs, Volume=	729 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.24 cfs @ 12.07 hrs, Volume=	729 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 891.67' @ 12.07 hrs
Flood Elev= 895.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	891.40'	**12.0" Round Culvert** L= 22.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 891.40' / 890.40' S= 0.0439 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.24 cfs @ 12.07 hrs HW=891.67' TW=890.84' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.24 cfs @ 1.40 fps)

Summary for Pond 66R: DMH4

Inflow Area =	30,458 sf, 29.41% Impervious,	Inflow Depth > 1.29"	for 2 yr event
Inflow =	1.08 cfs @ 12.08 hrs, Volume=	3,266 cf	
Outflow =	1.08 cfs @ 12.08 hrs, Volume=	3,266 cf, Atten= 0%, Lag= 0.0 min	
Primary =	1.08 cfs @ 12.08 hrs, Volume=	3,266 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 890.84' @ 12.08 hrs
Flood Elev= 894.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	890.30'	**12.0" Round Culvert** L= 103.5' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 890.30' / 885.70' S= 0.0444 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.07 cfs @ 12.08 hrs HW=890.84' TW=886.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.07 cfs @ 2.50 fps)

Summary for Pond 67P: CB-7 (DBL)

Inflow Area =	12,612 sf, 78.38% Impervious,	Inflow Depth > 2.25"	for 2 yr event
Inflow =	0.77 cfs @ 12.07 hrs, Volume=	2,367 cf	
Outflow =	0.77 cfs @ 12.07 hrs, Volume=	2,367 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.77 cfs @ 12.07 hrs, Volume=	2,367 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 886.92' @ 12.08 hrs
Flood Elev= 889.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.40'	**12.0" Round Culvert** L= 84.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 886.40' / 885.70' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.07 hrs HW=886.92' TW=886.33' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.76 cfs @ 2.69 fps)

Summary for Pond 68R: DMH5

Inflow Area = 43,070 sf, 43.75% Impervious, Inflow Depth > 1.57" for 2 yr event
Inflow = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf
Outflow = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 886.33' @ 12.08 hrs
Flood Elev= 892.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	885.45'	**12.0" Round Culvert** L= 123.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 885.45' / 867.80' S= 0.1426 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.84 cfs @ 12.08 hrs HW=886.33' TW=866.88' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.84 cfs @ 2.52 fps)

Summary for Pond 69P: DMH6

Inflow Area = 43,070 sf, 43.75% Impervious, Inflow Depth > 1.57" for 2 yr event
Inflow = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf
Outflow = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 866.88' @ 12.08 hrs
Flood Elev= 868.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	866.00'	**12.0" Round Culvert** L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 866.00' / 865.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.84 cfs @ 12.08 hrs HW=866.88' TW=864.73' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.84 cfs @ 2.52 fps)

Summary for Pond 70P: Sediment Forebay 70P

Inflow Area = 43,070 sf, 43.75% Impervious, Inflow Depth > 1.57" for 2 yr event
Inflow = 1.85 cfs @ 12.08 hrs, Volume= 5,633 cf
Outflow = 1.71 cfs @ 12.11 hrs, Volume= 4,194 cf, Atten= 7%, Lag= 1.9 min
Primary = 1.71 cfs @ 12.11 hrs, Volume= 4,194 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 864.97' @ 15.38 hrs Surf.Area= 1,362 sf Storage= 1,595 cf
Flood Elev= 866.00' Surf.Area= 1,753 sf Storage= 3,192 cf

Plug-Flow detention time= 150.5 min calculated for 4,192 cf (74% of inflow)
Center-of-Mass det. time= 60.9 min (881.8 - 820.9)

Volume	Invert	Avail.Storage	Storage Description
#1	863.50'	4,068 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.50	678	0	0
864.00	1,033	428	428
865.00	1,371	1,202	1,630
866.00	1,753	1,562	3,192
866.50	1,753	877	4,068

Device	Routing	Invert	Outlet Devices
#1	Primary	864.50'	**143.1 deg x 4.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	866.00'	**78.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.71 cfs @ 12.11 hrs HW=864.74' TW=864.30' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.71 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.50' TW=863.70' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 71P: Infiltration Basin 71P

Inflow Area = 68,331 sf, 27.58% Impervious, Inflow Depth > 1.18" for 2 yr event
Inflow = 2.49 cfs @ 12.10 hrs, Volume= 6,693 cf
Outflow = 0.12 cfs @ 15.37 hrs, Volume= 3,337 cf, Atten= 95%, Lag= 196.5 min
Primary = 0.12 cfs @ 15.37 hrs, Volume= 3,337 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 864.97' @ 15.37 hrs Surf.Area= 4,593 sf Storage= 3,877 cf
Flood Elev= 868.30' Surf.Area= 11,836 sf Storage= 25,651 cf

Plug-Flow detention time= 330.4 min calculated for 3,337 cf (50% of inflow)
Center-of-Mass det. time= 192.2 min (1,061.4 - 869.1)

Volume	Invert	Avail.Storage	Storage Description
#1	863.70'	25,651 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.70	0	0	0
864.00	2,571	386	386
865.00	4,645	3,608	3,994
866.00	5,749	5,197	9,191
867.00	6,784	6,267	15,457
868.00	7,733	7,259	22,716
868.30	11,836	2,935	25,651

Device	Routing	Invert	Outlet Devices
#1	Primary	860.00'	**12.0" Round Culvert** L= 54.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 860.00' / 858.00' S= 0.0366 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	864.60'	**30.0 deg x 1.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.61 (C= 3.26)
#3	Device 1	866.80'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	866.80'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)

Primary OutFlow Max=0.12 cfs @ 15.37 hrs HW=864.97' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.12 cfs of 8.00 cfs potential flow)
  ├─**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.12 cfs @ 1.60 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.70' TW=0.00' (Dynamic Tailwater)
└─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 72P: Stiles Lake

Inflow Area =	475,249 sf,	9.11% Impervious,	Inflow Depth > 0.82"	for 2 yr event
Inflow =	6.83 cfs @	12.20 hrs, Volume=	32,304 cf	
Primary =	6.83 cfs @	12.20 hrs, Volume=	32,304 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 30S: Subcatchment 30

Runoff = 0.05 cfs @ 12.14 hrs, Volume= 340 cf, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	2,963	98	Pavement & Roof, HSG C
*	6,996	98	Pavement & Roof, HSG D
	16,395	74	>75% Grass cover, Good, HSG C
	10,724	80	>75% Grass cover, Good, HSG D
	4,711	70	Woods, Good, HSG C
	41,789	81	Weighted Average
	31,830		76.17% Pervious Area
	9,959		23.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	261		0.87		**Direct Entry,**

Summary for Subcatchment 31S: Subcatchment 31

Runoff = 0.04 cfs @ 12.59 hrs, Volume= 935 cf, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	1,516	98	Pavement & Roof, HSG C
*	21,772	98	Pavement & Roof, HSG D
	25,885	74	>75% Grass cover, Good, HSG C
	31,521	80	>75% Grass cover, Good, HSG D
	134,936	70	Woods, Good, HSG C
	78,254	77	Woods, Good, HSG D
	293,884	76	Weighted Average
	270,596		92.08% Pervious Area
	23,288		7.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Roadway Shoulder** Woods: Light underbrush n= 0.400 P2= 3.00"
1.1	103	0.1000	1.58		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
2.9	173	0.1620	1.01		**Shallow Concentrated Flow, Woodland** Forest w/Heavy Litter Kv= 2.5 fps
12.2	326	Total			

Summary for Subcatchment 32S: Subcatchment 32

Runoff = 0.00 cfs @ 12.48 hrs, Volume= 88 cf, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
17,205	74	>75% Grass cover, Good, HSG C
10,298	80	>75% Grass cover, Good, HSG D
27,503	76	Weighted Average
27,503		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0700	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
2.1	266	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.6	316	Total			

Summary for Subcatchment 33S: Subcatchment 33

Runoff = 0.02 cfs @ 12.51 hrs, Volume= 332 cf, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	4,770	98	Pavement & Roof, HSG C
*	4,123	98	Pavement & Roof, HSG D
	25,786	74	>75% Grass cover, Good, HSG C
	15,793	80	>75% Grass cover, Good, HSG D
	19,602	70	Woods, Good, HSG C
	13,858	77	Woods, Good, HSG D
	83,932	77	Weighted Average
	75,039		89.40% Pervious Area
	8,893		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow, Woodland** Woods: Light underbrush n= 0.400 P2= 3.00"
2.6	269	0.1150	1.70		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
10.8	319	Total			

Summary for Subcatchment 34S: Subcatchment 34

Runoff = 0.00 cfs @ 21.35 hrs, Volume= 3 cf, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
7,097	70	Woods, Good, HSG C
7,097		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50		0.17		**Direct Entry, Woodland**

Summary for Subcatchment 35S: Subcatchment 35

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 93 cf, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	1,471	98	Pavement, HSG C
*	883	98	Pavement, HSG D
	1,087	74	>75% Grass cover, Good, HSG C
	465	80	>75% Grass cover, Good, HSG D
	3,906	89	Weighted Average
	1,552		39.73% Pervious Area
	2,354		60.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	191		0.64		**Direct Entry,**

Summary for Subcatchment 36S: Subcatchment 36

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 107 cf, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	1,196	98	Pavement, HSG C
*	1,112	98	Pavement, HSG D
	602	74	>75% Grass cover, Good, HSG C
	652	80	>75% Grass cover, Good, HSG D
	3,562	91	Weighted Average
	1,254		35.20% Pervious Area
	2,308		64.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	202		0.67		**Direct Entry,**

Summary for Subcatchment 37S: Subcatchment 37

Runoff = 0.03 cfs @ 12.11 hrs, Volume= 172 cf, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	5,854	98	Pavement & Roof, HSG C
	9,794	74	>75% Grass cover, Good, HSG C
	15,648	83	Weighted Average
	9,794		62.59% Pervious Area
	5,854		37.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	260		0.87		**Direct Entry,**

Summary for Subcatchment 38S: Subcatchment 38

Runoff = 0.05 cfs @ 12.10 hrs, Volume= 191 cf, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	5,795	98	Pavement & Roof, HSG C
	7,436	74	>75% Grass cover, Good, HSG C
	13,231	85	Weighted Average
	7,436		56.20% Pervious Area
	5,795		43.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	291		0.97		**Direct Entry,**

Summary for Subcatchment 39S: Subcatchment 39

Runoff = 0.02 cfs @ 12.34 hrs, Volume= 150 cf, Depth> 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	6,088	98	Pavement & Roof, HSG C
	17,311	74	>75% Grass cover, Good, HSG C
	2,246	70	Woods, Good, HSG C
	25,645	79	Weighted Average
	19,557		76.26% Pervious Area
	6,088		23.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	210		0.70		**Direct Entry,**

Summary for Subcatchment 40S: Subcatchment 40

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 101 cf, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	2,870	98	Pavement & Roof, HSG C
	1,943	74	>75% Grass cover, Good, HSG C
	4,813	88	Weighted Average
	1,943		40.37% Pervious Area
	2,870		59.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	230		0.77		**Direct Entry,**

Summary for Subcatchment 41S: Subcatchment 41

Runoff = 0.00 cfs @ 21.35 hrs, Volume= 11 cf, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
3,657	74	>75% Grass cover, Good, HSG C
26,012	70	Woods, Good, HSG C
29,669	70	Weighted Average
29,669		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	167		0.56		**Direct Entry,**

Summary for Subcatchment 42S: Subcatchment 42

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 473 cf, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	9,885	98	Pavement, HSG C
	2,727	74	>75% Grass cover, Good, HSG C
	12,612	93	Weighted Average
	2,727		21.62% Pervious Area
	9,885		78.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	164		0.55		**Direct Entry,**

Summary for Subcatchment 43S: Subcatchment 43

Runoff = 0.02 cfs @ 12.34 hrs, Volume= 147 cf, Depth> 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

Area (sf)	CN	Description
5,424	96	Gravel surface, HSG C
19,837	74	>75% Grass cover, Good, HSG C
25,261	79	Weighted Average
25,261		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	244		0.81		**Direct Entry,**

Summary for Subcatchment 44S: Subcatchment 44

Runoff = 0.02 cfs @ 15.21 hrs, Volume= 573 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr First Flush Rainfall=1.00"

	Area (sf)	CN	Description
*	24,436	98	Pavement & Roofs, HSG C
	3,694	96	Gravel surface, HSG C
	75,817	74	>75% Grass cover, Good, HSG C
	5,317	80	>75% Grass cover, Good, HSG D
	297,654	70	Woods, Good, HSG C
	406,918	73	Weighted Average
	382,482		93.99% Pervious Area
	24,436		6.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	811	0.0650	1.04		**Lag/CN Method,**

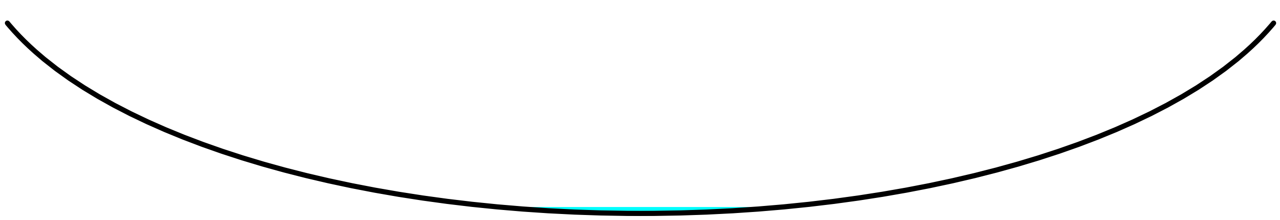
Summary for Reach 51R: Wetlands Reach

Inflow Area = 483,455 sf, 12.09% Impervious, Inflow Depth > 0.03" for First Flush event
Inflow = 0.06 cfs @ 12.59 hrs, Volume= 1,261 cf
Outflow = 0.05 cfs @ 13.55 hrs, Volume= 1,231 cf, Atten= 12%, Lag= 57.6 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.20 fps, Min. Travel Time= 23.1 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 28.4 min

Peak Storage= 73 cf @ 13.55 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 88.74 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 280.0' Slope= 0.0177 '/'
Inlet Invert= 862.60', Outlet Invert= 857.65'



‡

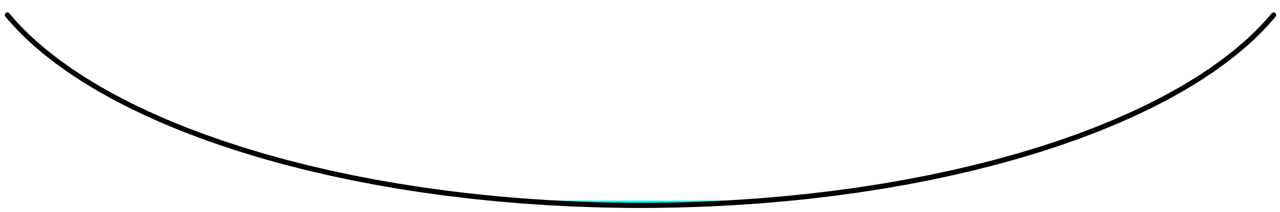
Summary for Reach 52R: Wetlands Reach

Inflow Area = 41,789 sf, 23.83% Impervious, Inflow Depth > 0.10" for First Flush event
Inflow = 0.04 cfs @ 12.28 hrs, Volume= 340 cf
Outflow = 0.02 cfs @ 12.66 hrs, Volume= 326 cf, Atten= 55%, Lag= 22.7 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 41.2 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 57.3 min

Peak Storage= 50 cf @ 12.66 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.50' Flow Area= 45.0 sf, Capacity= 65.08 cfs

45.00' x 1.50' deep Parabolic Channel, n= 0.100 Earth, dense brush, high stage
Length= 305.0' Slope= 0.0095 '/'
Inlet Invert= 865.50', Outlet Invert= 862.60'



‡

Summary for Reach 53R: Water Quality Swale

Inflow Area = 41,789 sf, 23.83% Impervious, Inflow Depth > 0.10" for First Flush event
Inflow = 0.05 cfs @ 12.14 hrs, Volume= 340 cf
Outflow = 0.04 cfs @ 12.28 hrs, Volume= 340 cf, Atten= 3%, Lag= 8.5 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.74 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 2.8 min

Peak Storage= 6 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.01'
Defined Flood Depth= 867.00' Flow Area= 9,503.2 sf, Capacity= 114,446.10 cfs
Bank-Full Depth= 1.00' Flow Area= 7.5 sf, Capacity= 65.95 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 11.00'
Length= 92.0' Slope= 0.0543 '/'
Inlet Invert= 871.00', Outlet Invert= 866.00'

‡

Summary for Pond 50P: Baldwin St Wetland

Inflow Area = 483,455 sf, 12.09% Impervious, Inflow Depth > 0.03" for First Flush event
Inflow = 0.05 cfs @ 13.55 hrs, Volume= 1,231 cf
Primary = 0.05 cfs @ 13.55 hrs, Volume= 1,231 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 54P: Infitlration Basin 54P

Inflow Area = 147,782 sf, 17.05% Impervious, Inflow Depth > 0.01" for First Flush event
Inflow = 0.00 cfs @ 12.48 hrs, Volume= 88 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 865.82' @ 24.00 hrs Surf.Area= 787 sf Storage= 88 cf
Flood Elev= 870.30' Surf.Area= 10,118 sf Storage= 24,066 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	865.60'	24,066 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
865.60	0	0	0
866.00	1,408	282	282
867.00	3,210	2,309	2,591
868.00	4,627	3,919	6,509
869.00	7,547	6,087	12,596
870.00	9,506	8,527	21,123
870.30	10,118	2,944	24,066

Device	Routing	Invert	Outlet Devices
#1	Primary	863.55'	**12.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 863.55' / 863.05' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	866.70'	**20.0 deg x 1.20' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.69 (C= 3.36)
#3	Device 1	868.80'	**1.3" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.8" x 25.8" Grate (47% open area) Limited to weir flow at low heads
#4	Secondary	868.80'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=865.60' TW=862.60' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 4.71 cfs potential flow)
  ├─**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=865.60' TW=862.60' (Dynamic Tailwater)
└─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 55P: Sediment Forebay 55P

Inflow Area = 120,279 sf, 20.95% Impervious, Inflow Depth > 0.06" for First Flush event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 562 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 867.72' @ 24.00 hrs Surf.Area= 848 sf Storage= 562 cf
Flood Elev= 870.30' Surf.Area= 2,129 sf Storage= 4,275 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	866.80'	4,275 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
866.80	0	0	0
867.00	558	56	56
868.00	961	760	815
868.80	1,297	903	1,718
869.00	1,391	269	1,987
870.00	1,959	1,675	3,662
870.30	2,129	613	4,275

Device	Routing	Invert	Outlet Devices
#1	Primary	868.80'	**143.1 deg x 4.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=866.80' TW=865.60' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 56P: Isolated Wetland

Inflow Area = 83,932 sf, 10.60% Impervious, Inflow Depth > 0.05" for First Flush event
Inflow = 0.02 cfs @ 12.51 hrs, Volume= 332 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 869.14' @ 24.00 hrs Surf.Area= 1,054 sf Storage= 332 cf
Flood Elev= 872.10' Surf.Area= 11,108 sf Storage= 12,507 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	868.50'	13,638 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
868.50	0	0	0
869.00	818	205	205
870.00	2,549	1,684	1,888
871.00	3,900	3,225	5,113
871.50	5,300	2,300	7,413
872.00	10,715	4,004	11,416
872.20	11,500	2,222	13,638

Device	Routing	Invert	Outlet Devices
#1	Primary	870.50'	**12.0" Round Culvert** L= 27.2' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 870.50' / 868.20' S= 0.0846 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	872.10'	**10.0' long x 7.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=868.50' TW=866.80' (Dynamic Tailwater)
—**1=Culvert** (Controls 0.00 cfs)
—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 57P: DMH1

Inflow Area = 36,347 sf, 44.88% Impervious, Inflow Depth > 0.19" for First Flush event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 562 cf
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 562 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 562 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 868.16' @ 12.09 hrs
Flood Elev= 871.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	867.95'	**12.0" Round Culvert** L= 22.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 867.95' / 867.65' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=868.16' TW=867.01' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.14 cfs @ 1.22 fps)

Summary for Pond 58P: CB-1

Inflow Area =	3,906 sf, 60.27% Impervious,	Inflow Depth > 0.28"	for First Flush event
Inflow =	0.03 cfs @ 12.08 hrs, Volume=	93 cf	
Outflow =	0.03 cfs @ 12.08 hrs, Volume=	93 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.03 cfs @ 12.08 hrs, Volume=	93 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 868.69' @ 12.08 hrs
Flood Elev= 871.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.60'	**12.0" Round Culvert** L= 18.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 868.60' / 868.20' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.08 hrs HW=868.69' TW=868.16' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.03 cfs @ 0.81 fps)

Summary for Pond 59P: CB-2

Inflow Area =	3,562 sf, 64.80% Impervious,	Inflow Depth > 0.36"	for First Flush event
Inflow =	0.03 cfs @ 12.08 hrs, Volume=	107 cf	
Outflow =	0.03 cfs @ 12.08 hrs, Volume=	107 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.03 cfs @ 12.08 hrs, Volume=	107 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 868.70' @ 12.08 hrs
Flood Elev= 871.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	868.60'	**12.0" Round Culvert** L= 3.9' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 868.60' / 868.20' S= 0.1026 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.08 hrs HW=868.70' TW=868.16' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.03 cfs @ 0.85 fps)

Summary for Pond 60P: DMH2

Inflow Area =	28,879 sf, 40.34% Impervious,	Inflow Depth > 0.15"	for First Flush event
Inflow =	0.08 cfs @ 12.10 hrs, Volume=	363 cf	
Outflow =	0.08 cfs @ 12.10 hrs, Volume=	363 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.08 cfs @ 12.10 hrs, Volume=	363 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 870.64' @ 12.10 hrs
Flood Elev= 874.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	870.50'	**12.0" Round Culvert** L= 72.5' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 870.50' / 868.20' S= 0.0317 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.08 cfs @ 12.10 hrs HW=870.64' TW=868.16' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.08 cfs @ 1.26 fps)

Summary for Pond 61P: DMH3

Inflow Area =	28,879 sf, 40.34% Impervious,	Inflow Depth > 0.15"	for First Flush event
Inflow =	0.08 cfs @ 12.10 hrs, Volume=	363 cf	
Outflow =	0.08 cfs @ 12.10 hrs, Volume=	363 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.08 cfs @ 12.10 hrs, Volume=	363 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 879.24' @ 12.10 hrs
Flood Elev= 883.42'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.10'	**12.0" Round Culvert** L= 85.9' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 879.10' / 870.60' S= 0.0990 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.08 cfs @ 12.10 hrs HW=879.24' TW=870.64' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.08 cfs @ 1.26 fps)

Summary for Pond 62P: CB-3

Inflow Area =	15,648 sf, 37.41% Impervious,	Inflow Depth > 0.13"	for First Flush event
Inflow =	0.03 cfs @ 12.11 hrs, Volume=	172 cf	
Outflow =	0.03 cfs @ 12.11 hrs, Volume=	172 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.03 cfs @ 12.11 hrs, Volume=	172 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 879.90' @ 12.11 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.80'	**12.0" Round Culvert** L= 13.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 879.80' / 879.20' S= 0.0444 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.11 hrs HW=879.90' TW=879.24' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.03 cfs @ 0.85 fps)

Summary for Pond 63P: CB-4

Inflow Area = 13,231 sf, 43.80% Impervious, Inflow Depth > 0.17" for First Flush event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 191 cf
Outflow = 0.05 cfs @ 12.10 hrs, Volume= 191 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.10 hrs, Volume= 191 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 879.92' @ 12.10 hrs
Flood Elev= 884.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	879.80'	**12.0" Round Culvert** L= 6.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 879.80' / 879.20' S= 0.0937 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 12.10 hrs HW=879.92' TW=879.24' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.05 cfs @ 0.92 fps)

Summary for Pond 64P: CB-5

Inflow Area = 25,645 sf, 23.74% Impervious, Inflow Depth > 0.07" for First Flush event
Inflow = 0.02 cfs @ 12.34 hrs, Volume= 150 cf
Outflow = 0.02 cfs @ 12.34 hrs, Volume= 150 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 12.34 hrs, Volume= 150 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 891.47' @ 12.34 hrs
Flood Elev= 895.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	891.40'	**12.0" Round Culvert** L= 20.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 891.40' / 890.40' S= 0.0495 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.02 cfs @ 12.34 hrs HW=891.47' TW=890.38' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.02 cfs @ 0.70 fps)

Summary for Pond 65P: CB-6

Inflow Area = 4,813 sf, 59.63% Impervious, Inflow Depth > 0.25" for First Flush event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 101 cf
Outflow = 0.03 cfs @ 12.09 hrs, Volume= 101 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.09 hrs, Volume= 101 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 891.49' @ 12.09 hrs
Flood Elev= 895.91'

Device	Routing	Invert	Outlet Devices
#1	Primary	891.40'	**12.0" Round Culvert** L= 22.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 891.40' / 890.40' S= 0.0439 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.09 hrs HW=891.49' TW=890.38' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.03 cfs @ 0.82 fps)

Summary for Pond 66R: DMH4

Inflow Area = 30,458 sf, 29.41% Impervious, Inflow Depth > 0.10" for First Flush event
Inflow = 0.03 cfs @ 12.12 hrs, Volume= 251 cf
Outflow = 0.03 cfs @ 12.12 hrs, Volume= 251 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 12.12 hrs, Volume= 251 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 890.39' @ 12.12 hrs
Flood Elev= 894.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	890.30'	**12.0" Round Culvert** L= 103.5' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 890.30' / 885.70' S= 0.0444 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.12 hrs HW=890.39' TW=885.68' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.03 cfs @ 1.01 fps)

Summary for Pond 67P: CB-7 (DBL)

Inflow Area = 12,612 sf, 78.38% Impervious, Inflow Depth > 0.45" for First Flush event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 473 cf
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 473 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.08 hrs, Volume= 473 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 886.62' @ 12.08 hrs
Flood Elev= 889.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	886.40'	**12.0" Round Culvert** L= 84.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 886.40' / 885.70' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.08 hrs HW=886.62' TW=885.69' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.16 cfs @ 1.25 fps)

Summary for Pond 68R: DMH5

Inflow Area =	43,070 sf, 43.75% Impervious,	Inflow Depth > 0.20"	for First Flush event	
Inflow =	0.19 cfs @	12.08 hrs, Volume=	724 cf	
Outflow =	0.19 cfs @	12.08 hrs, Volume=	724 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.19 cfs @	12.08 hrs, Volume=	724 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 885.69' @ 12.08 hrs
Flood Elev= 892.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	885.45'	**12.0" Round Culvert** L= 123.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 885.45' / 867.80' S= 0.1426 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.19 cfs @ 12.08 hrs HW=885.69' TW=866.24' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.19 cfs @ 1.31 fps)

Summary for Pond 69P: DMH6

Inflow Area =	43,070 sf, 43.75% Impervious,	Inflow Depth > 0.20"	for First Flush event	
Inflow =	0.19 cfs @	12.08 hrs, Volume=	724 cf	
Outflow =	0.19 cfs @	12.08 hrs, Volume=	724 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.19 cfs @	12.08 hrs, Volume=	724 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 866.24' @ 12.08 hrs
Flood Elev= 868.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	866.00'	**12.0" Round Culvert** L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 866.00' / 865.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.19 cfs @ 12.08 hrs HW=866.24' TW=863.68' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.19 cfs @ 1.31 fps)

Summary for Pond 70P: Sediment Forebay 70P

Inflow Area =	43,070 sf, 43.75% Impervious,	Inflow Depth > 0.20"	for First Flush event
Inflow =	0.19 cfs @ 12.08 hrs, Volume=	724 cf	
Outflow =	0.00 cfs @ 1.00 hrs, Volume=	0 cf,	Atten= 100%, Lag= 0.0 min
Primary =	0.00 cfs @ 1.00 hrs, Volume=	0 cf	
Secondary =	0.00 cfs @ 1.00 hrs, Volume=	0 cf	

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 864.27' @ 24.00 hrs Surf.Area= 1,126 sf Storage= 724 cf
Flood Elev= 866.00' Surf.Area= 1,753 sf Storage= 3,192 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	863.50'	4,068 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.50	678	0	0
864.00	1,033	428	428
865.00	1,371	1,202	1,630
866.00	1,753	1,562	3,192
866.50	1,753	877	4,068

Device	Routing	Invert	Outlet Devices
#1	Primary	864.50'	**143.1 deg x 4.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#2	Secondary	866.00'	**78.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.50' TW=863.70' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.50' TW=863.70' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 71P: Infiltration Basin 71P

Inflow Area = 68,331 sf, 27.58% Impervious, Inflow Depth > 0.03" for First Flush event
Inflow = 0.02 cfs @ 12.34 hrs, Volume= 147 cf
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 863.89' @ 24.00 hrs Surf.Area= 1,589 sf Storage= 147 cf
Flood Elev= 868.30' Surf.Area= 11,836 sf Storage= 25,651 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	863.70'	25,651 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
863.70	0	0	0
864.00	2,571	386	386
865.00	4,645	3,608	3,994
866.00	5,749	5,197	9,191
867.00	6,784	6,267	15,457
868.00	7,733	7,259	22,716
868.30	11,836	2,935	25,651

Device	Routing	Invert	Outlet Devices
#1	Primary	860.00'	**12.0" Round Culvert** L= 54.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 860.00' / 858.00' S= 0.0366 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	864.60'	**30.0 deg x 1.30' rise Sharp-Crested Vee/Trap Weir X 2.00** Cv= 2.61 (C= 3.26)
#3	Device 1	866.80'	**1.2" x 7.3" Horiz. Orifice/Grate X 3.00 columns** X 11 rows C= 0.600 in 25.7" x 25.7" Grate (44% open area) Limited to weir flow at low heads
#4	Secondary	866.80'	**170.5 deg x 5.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.70' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.00 cfs of 6.76 cfs potential flow)
  ├─**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=863.70' TW=0.00' (Dynamic Tailwater)
└─**4=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond 72P: Stiles Lake

Inflow Area =	475,249 sf, 9.11% Impervious, Inflow Depth > 0.01"	for First Flush event
Inflow =	0.02 cfs @ 15.21 hrs, Volume=	573 cf
Primary =	0.02 cfs @ 15.21 hrs, Volume=	573 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
225,482	74	>75% Grass cover, Good, HSG C (30S, 31S, 32S, 33S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 42S, 43S, 44S)
74,770	80	>75% Grass cover, Good, HSG D (30S, 31S, 32S, 33S, 35S, 36S, 44S)
9,118	96	Gravel surface, HSG C (43S, 44S)
29,856	98	Pavement & Roof, HSG C (30S, 31S, 33S, 37S, 38S, 39S, 40S)
32,891	98	Pavement & Roof, HSG D (30S, 31S, 33S)
24,436	98	Pavement & Roofs, HSG C (44S)
12,552	98	Pavement, HSG C (35S, 36S, 42S)
1,995	98	Pavement, HSG D (35S, 36S)
492,258	70	Woods, Good, HSG C (30S, 31S, 33S, 34S, 39S, 41S, 44S)
92,112	77	Woods, Good, HSG D (31S, 33S)

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 30S: Subcatchment 30 Runoff Area=41,789 sf 23.83% Impervious Runoff Depth>2.55"
Flow Length=261' Tc=5.0 min CN=81 Runoff=2.97 cfs 8,865 cf

Subcatchment 31S: Subcatchment 31 Runoff Area=293,884 sf 7.92% Impervious Runoff Depth>2.12"
Flow Length=326' Tc=12.2 min CN=76 Runoff=13.66 cfs 52,020 cf

Subcatchment 32S: Subcatchment 32 Runoff Area=27,503 sf 0.00% Impervious Runoff Depth>2.13"
Flow Length=316' Tc=5.6 min CN=76 Runoff=1.59 cfs 4,876 cf

Subcatchment 33S: Subcatchment 33 Runoff Area=83,932 sf 10.60% Impervious Runoff Depth>2.21"
Flow Length=319' Tc=10.8 min CN=77 Runoff=4.24 cfs 15,426 cf

Subcatchment 34S: Subcatchment 34 Runoff Area=7,097 sf 0.00% Impervious Runoff Depth>1.67"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.32 cfs 989 cf

Subcatchment 35S: Subcatchment 35 Runoff Area=3,906 sf 60.27% Impervious Runoff Depth>3.29"
Flow Length=191' Tc=5.0 min CN=89 Runoff=0.35 cfs 1,072 cf

Subcatchment 36S: Subcatchment 36 Runoff Area=3,562 sf 64.80% Impervious Runoff Depth>3.50"
Flow Length=202' Tc=5.0 min CN=91 Runoff=0.33 cfs 1,038 cf

Subcatchment 37S: Subcatchment 37 Runoff Area=15,648 sf 37.41% Impervious Runoff Depth>2.72"
Flow Length=260' Tc=5.0 min CN=83 Runoff=1.19 cfs 3,551 cf

Subcatchment 38S: Subcatchment 38 Runoff Area=13,231 sf 43.80% Impervious Runoff Depth>2.91"
Flow Length=291' Tc=5.0 min CN=85 Runoff=1.07 cfs 3,205 cf

Subcatchment 39S: Subcatchment 39 Runoff Area=25,645 sf 23.74% Impervious Runoff Depth>2.37"
Flow Length=210' Tc=5.0 min CN=79 Runoff=1.70 cfs 5,074 cf

Subcatchment 40S: Subcatchment 40 Runoff Area=4,813 sf 59.63% Impervious Runoff Depth>3.19"
Flow Length=230' Tc=5.0 min CN=88 Runoff=0.42 cfs 1,281 cf

Subcatchment 41S: Subcatchment 41 Runoff Area=29,669 sf 0.00% Impervious Runoff Depth>1.67"
Flow Length=167' Tc=5.0 min CN=70 Runoff=1.35 cfs 4,133 cf

Subcatchment 42S: Subcatchment 42 Runoff Area=12,612 sf 78.38% Impervious Runoff Depth>3.71"
Flow Length=164' Tc=5.0 min CN=93 Runoff=1.23 cfs 3,894 cf

Subcatchment 43S: Subcatchment 43 Runoff Area=25,261 sf 0.00% Impervious Runoff Depth>2.37"
Flow Length=244' Tc=5.0 min CN=79 Runoff=1.68 cfs 4,998 cf

Subcatchment 44S: Subcatchment 44 Runoff Area=406,918 sf 6.01% Impervious Runoff Depth>1.89"
Flow Length=811' Slope=0.0650 '/' Tc=13.0 min CN=73 Runoff=16.28 cfs 64,087 cf

Reach 51R: Wetlands Reach Avg. Flow Depth=0.66' Max Vel=1.14 fps Inflow=15.93 cfs 81,306 cf
n=0.100 L=280.0' S=0.0177 '/' Capacity=88.74 cfs Outflow=14.95 cfs 81,013 cf

Reach 52R: Wetlands Reach Avg. Flow Depth=0.31' Max Vel=0.50 fps Inflow=2.97 cfs 8,860 cf
n=0.100 L=305.0' S=0.0095 '/' Capacity=65.08 cfs Outflow=2.07 cfs 8,787 cf

Reach 53R: Water Quality Swale Avg. Flow Depth=0.19' Max Vel=3.43 fps Inflow=2.97 cfs 8,865 cf
n=0.030 L=92.0' S=0.0543 '/' Capacity=65.95 cfs Outflow=2.97 cfs 8,860 cf

Pond 50P: Baldwin St Wetland Inflow=14.95 cfs 81,013 cf
Primary=14.95 cfs 81,013 cf

Pond 54P: Infitlration Basin 54P Peak Elev=868.00' Storage=6,497 cf Inflow=4.33 cfs 23,622 cf
Primary=1.73 cfs 20,498 cf Secondary=0.00 cfs 0 cf Outflow=1.73 cfs 20,498 cf

Pond 55P: Sediment Forebay 55P Peak Elev=869.13' Storage=2,168 cf Inflow=2.94 cfs 20,516 cf
Outflow=2.76 cfs 18,746 cf

Pond 56P: Isolated Wetland Peak Elev=871.23' Storage=6,080 cf Inflow=4.24 cfs 15,426 cf
Outflow=1.57 cfs 11,652 cf

Pond 57P: DMH1 Peak Elev=870.08' Inflow=2.94 cfs 8,865 cf
12.0" Round Culvert n=0.013 L=22.6' S=0.0133 '/' Outflow=2.94 cfs 8,865 cf

Pond 58P: CB-1 Peak Elev=870.09' Inflow=0.35 cfs 1,072 cf
12.0" Round Culvert n=0.013 L=18.2' S=0.0220 '/' Outflow=0.35 cfs 1,072 cf

Pond 59P: CB-2 Peak Elev=870.09' Inflow=0.33 cfs 1,038 cf
12.0" Round Culvert n=0.013 L=3.9' S=0.1026 '/' Outflow=0.33 cfs 1,038 cf

Pond 60P: DMH2 Peak Elev=871.36' Inflow=2.26 cfs 6,756 cf
12.0" Round Culvert n=0.013 L=72.5' S=0.0317 '/' Outflow=2.26 cfs 6,756 cf

Pond 61P: DMH3 Peak Elev=879.96' Inflow=2.26 cfs 6,756 cf
12.0" Round Culvert n=0.013 L=85.9' S=0.0990 '/' Outflow=2.26 cfs 6,756 cf

Pond 62P: CB-3 Peak Elev=880.46' Inflow=1.19 cfs 3,551 cf
12.0" Round Culvert n=0.013 L=13.5' S=0.0444 '/' Outflow=1.19 cfs 3,551 cf

Pond 63P: CB-4 Peak Elev=880.41' Inflow=1.07 cfs 3,205 cf
12.0" Round Culvert n=0.013 L=6.4' S=0.0937 '/' Outflow=1.07 cfs 3,205 cf

Pond 64P: CB-5 Peak Elev=892.23' Inflow=1.70 cfs 5,074 cf
12.0" Round Culvert n=0.013 L=20.2' S=0.0495 '/' Outflow=1.70 cfs 5,074 cf

Pond 65P: CB-6 Peak Elev=891.77' Inflow=0.42 cfs 1,281 cf
12.0" Round Culvert n=0.013 L=22.8' S=0.0439 '/' Outflow=0.42 cfs 1,281 cf

Pond 66R: DMH4 Peak Elev=891.12' Inflow=2.12 cfs 6,355 cf
12.0" Round Culvert n=0.013 L=103.5' S=0.0444 '/' Outflow=2.12 cfs 6,355 cf

Pond 67P: CB-7 (DBL) Peak Elev=887.43' Inflow=1.23 cfs 3,894 cf
12.0" Round Culvert n=0.013 L=84.6' S=0.0083 '/' Outflow=1.23 cfs 3,894 cf

Pond 68R: DMH5 Peak Elev=887.21' Inflow=3.36 cfs 10,249 cf
12.0" Round Culvert n=0.013 L=123.8' S=0.1426 '/' Outflow=3.36 cfs 10,249 cf

Pond 69P: DMH6 Peak Elev=867.76' Inflow=3.36 cfs 10,249 cf
12.0" Round Culvert n=0.013 L=36.5' S=0.0137 '/' Outflow=3.36 cfs 10,249 cf

Pond 70P: Sediment Forebay 70P Peak Elev=865.37' Storage=2,164 cf Inflow=3.36 cfs 10,249 cf
Primary=2.51 cfs 8,744 cf Secondary=0.00 cfs 0 cf Outflow=2.51 cfs 8,744 cf

Pond 71P: Infiltration Basin 71P Peak Elev=865.37' Storage=5,788 cf Inflow=4.18 cfs 13,742 cf
Primary=0.73 cfs 10,169 cf Secondary=0.00 cfs 0 cf Outflow=0.73 cfs 10,169 cf

Pond 72P: Stiles Lake Inflow=16.58 cfs 74,256 cf
Primary=16.58 cfs 74,256 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 30S: Subcatchment 30 Runoff Area=41,789 sf 23.83% Impervious Runoff Depth>3.25"
Flow Length=261' Tc=5.0 min CN=81 Runoff=3.78 cfs 11,314 cf

Subcatchment 31S: Subcatchment 31 Runoff Area=293,884 sf 7.92% Impervious Runoff Depth>2.78"
Flow Length=326' Tc=12.2 min CN=76 Runoff=17.97 cfs 68,027 cf

Subcatchment 32S: Subcatchment 32 Runoff Area=27,503 sf 0.00% Impervious Runoff Depth>2.78"
Flow Length=316' Tc=5.6 min CN=76 Runoff=2.09 cfs 6,375 cf

Subcatchment 33S: Subcatchment 33 Runoff Area=83,932 sf 10.60% Impervious Runoff Depth>2.87"
Flow Length=319' Tc=10.8 min CN=77 Runoff=5.53 cfs 20,071 cf

Subcatchment 34S: Subcatchment 34 Runoff Area=7,097 sf 0.00% Impervious Runoff Depth>2.26"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.44 cfs 1,336 cf

Subcatchment 35S: Subcatchment 35 Runoff Area=3,906 sf 60.27% Impervious Runoff Depth>4.06"
Flow Length=191' Tc=5.0 min CN=89 Runoff=0.43 cfs 1,320 cf

Subcatchment 36S: Subcatchment 36 Runoff Area=3,562 sf 64.80% Impervious Runoff Depth>4.27"
Flow Length=202' Tc=5.0 min CN=91 Runoff=0.40 cfs 1,268 cf

Subcatchment 37S: Subcatchment 37 Runoff Area=15,648 sf 37.41% Impervious Runoff Depth>3.44"
Flow Length=260' Tc=5.0 min CN=83 Runoff=1.50 cfs 4,491 cf

Subcatchment 38S: Subcatchment 38 Runoff Area=13,231 sf 43.80% Impervious Runoff Depth>3.64"
Flow Length=291' Tc=5.0 min CN=85 Runoff=1.33 cfs 4,017 cf

Subcatchment 39S: Subcatchment 39 Runoff Area=25,645 sf 23.74% Impervious Runoff Depth>3.06"
Flow Length=210' Tc=5.0 min CN=79 Runoff=2.19 cfs 6,537 cf

Subcatchment 40S: Subcatchment 40 Runoff Area=4,813 sf 59.63% Impervious Runoff Depth>3.95"
Flow Length=230' Tc=5.0 min CN=88 Runoff=0.52 cfs 1,585 cf

Subcatchment 41S: Subcatchment 41 Runoff Area=29,669 sf 0.00% Impervious Runoff Depth>2.26"
Flow Length=167' Tc=5.0 min CN=70 Runoff=1.85 cfs 5,585 cf

Subcatchment 42S: Subcatchment 42 Runoff Area=12,612 sf 78.38% Impervious Runoff Depth>4.49"
Flow Length=164' Tc=5.0 min CN=93 Runoff=1.48 cfs 4,719 cf

Subcatchment 43S: Subcatchment 43 Runoff Area=25,261 sf 0.00% Impervious Runoff Depth>3.06"
Flow Length=244' Tc=5.0 min CN=79 Runoff=2.16 cfs 6,439 cf

Subcatchment 44S: Subcatchment 44 Runoff Area=406,918 sf 6.01% Impervious Runoff Depth>2.51"
Flow Length=811' Slope=0.0650 '/' Tc=13.0 min CN=73 Runoff=21.88 cfs 85,143 cf

Reach 51R: Wetlands Reach Avg. Flow Depth=0.76' Max Vel=1.26 fps Inflow=21.62 cfs 107,947 cf
n=0.100 L=280.0' S=0.0177 '/' Capacity=88.74 cfs Outflow=20.51 cfs 107,610 cf

Reach 52R: Wetlands Reach Avg. Flow Depth=0.35' Max Vel=0.55 fps Inflow=3.78 cfs 11,309 cf
n=0.100 L=305.0' S=0.0095 '/' Capacity=65.08 cfs Outflow=2.72 cfs 11,226 cf

Reach 53R: Water Quality Swale Avg. Flow Depth=0.21' Max Vel=3.72 fps Inflow=3.78 cfs 11,314 cf
n=0.030 L=92.0' S=0.0543 '/' Capacity=65.95 cfs Outflow=3.78 cfs 11,309 cf

Pond 50P: Baldwin St Wetland Inflow=20.51 cfs 107,610 cf
Primary=20.51 cfs 107,610 cf

Pond 54P: Infitlration Basin 54P Peak Elev=868.44' Storage=8,838 cf Inflow=5.82 cfs 31,941 cf
Primary=2.46 cfs 28,694 cf Secondary=0.00 cfs 0 cf Outflow=2.46 cfs 28,694 cf

Pond 55P: Sediment Forebay 55P Peak Elev=869.20' Storage=2,273 cf Inflow=3.97 cfs 27,343 cf
Outflow=3.83 cfs 25,566 cf

Pond 56P: Isolated Wetland Peak Elev=871.49' Storage=7,380 cf Inflow=5.53 cfs 20,071 cf
Outflow=2.35 cfs 16,247 cf

Pond 57P: DMH1 Peak Elev=870.66' Inflow=3.66 cfs 11,096 cf
12.0" Round Culvert n=0.013 L=22.6' S=0.0133 '/' Outflow=3.66 cfs 11,096 cf

Pond 58P: CB-1 Peak Elev=870.68' Inflow=0.43 cfs 1,320 cf
12.0" Round Culvert n=0.013 L=18.2' S=0.0220 '/' Outflow=0.43 cfs 1,320 cf

Pond 59P: CB-2 Peak Elev=870.68' Inflow=0.40 cfs 1,268 cf
12.0" Round Culvert n=0.013 L=3.9' S=0.1026 '/' Outflow=0.40 cfs 1,268 cf

Pond 60P: DMH2 Peak Elev=871.56' Inflow=2.82 cfs 8,508 cf
12.0" Round Culvert n=0.013 L=72.5' S=0.0317 '/' Outflow=2.82 cfs 8,508 cf

Pond 61P: DMH3 Peak Elev=880.16' Inflow=2.82 cfs 8,508 cf
12.0" Round Culvert n=0.013 L=85.9' S=0.0990 '/' Outflow=2.82 cfs 8,508 cf

Pond 62P: CB-3 Peak Elev=880.56' Inflow=1.50 cfs 4,491 cf
12.0" Round Culvert n=0.013 L=13.5' S=0.0444 '/' Outflow=1.50 cfs 4,491 cf

Pond 63P: CB-4 Peak Elev=880.50' Inflow=1.33 cfs 4,017 cf
12.0" Round Culvert n=0.013 L=6.4' S=0.0937 '/' Outflow=1.33 cfs 4,017 cf

Pond 64P: CB-5 Peak Elev=892.44' Inflow=2.19 cfs 6,537 cf
12.0" Round Culvert n=0.013 L=20.2' S=0.0495 '/' Outflow=2.19 cfs 6,537 cf

Pond 65P: CB-6 Peak Elev=891.81' Inflow=0.52 cfs 1,585 cf
12.0" Round Culvert n=0.013 L=22.8' S=0.0439 '/' Outflow=0.52 cfs 1,585 cf

Pond 66R: DMH4 Peak Elev=891.31' Inflow=2.71 cfs 8,122 cf
12.0" Round Culvert n=0.013 L=103.5' S=0.0444 '/' Outflow=2.71 cfs 8,122 cf

Pond 67P: CB-7 (DBL) Peak Elev=888.16' Inflow=1.48 cfs 4,719 cf
12.0" Round Culvert n=0.013 L=84.6' S=0.0083 '/' Outflow=1.48 cfs 4,719 cf

Pond 68R: DMH5 Peak Elev=887.92' Inflow=4.19 cfs 12,840 cf
12.0" Round Culvert n=0.013 L=123.8' S=0.1426 '/' Outflow=4.19 cfs 12,840 cf

Pond 69P: DMH6 Peak Elev=868.47' Inflow=4.19 cfs 12,840 cf
12.0" Round Culvert n=0.013 L=36.5' S=0.0137 '/' Outflow=4.19 cfs 12,840 cf

Pond 70P: Sediment Forebay 70P Peak Elev=865.60' Storage=2,516 cf Inflow=4.19 cfs 12,840 cf
Primary=2.93 cfs 11,308 cf Secondary=0.00 cfs 0 cf Outflow=2.93 cfs 11,308 cf

Pond 71P: Infiltration Basin 71P Peak Elev=865.60' Storage=6,958 cf Inflow=5.08 cfs 17,747 cf
Primary=1.38 cfs 14,081 cf Secondary=0.00 cfs 0 cf Outflow=1.38 cfs 14,081 cf

Pond 72P: Stiles Lake Inflow=22.74 cfs 99,224 cf
Primary=22.74 cfs 99,224 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 30S: Subcatchment 30 Runoff Area=41,789 sf 23.83% Impervious Runoff Depth>4.34"
Flow Length=261' Tc=5.0 min CN=81 Runoff=5.02 cfs 15,108 cf

Subcatchment 31S: Subcatchment 31 Runoff Area=293,884 sf 7.92% Impervious Runoff Depth>3.81"
Flow Length=326' Tc=12.2 min CN=76 Runoff=24.65 cfs 93,217 cf

Subcatchment 32S: Subcatchment 32 Runoff Area=27,503 sf 0.00% Impervious Runoff Depth>3.81"
Flow Length=316' Tc=5.6 min CN=76 Runoff=2.86 cfs 8,735 cf

Subcatchment 33S: Subcatchment 33 Runoff Area=83,932 sf 10.60% Impervious Runoff Depth>3.91"
Flow Length=319' Tc=10.8 min CN=77 Runoff=7.54 cfs 27,356 cf

Subcatchment 34S: Subcatchment 34 Runoff Area=7,097 sf 0.00% Impervious Runoff Depth>3.20"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.63 cfs 1,895 cf

Subcatchment 35S: Subcatchment 35 Runoff Area=3,906 sf 60.27% Impervious Runoff Depth>5.22"
Flow Length=191' Tc=5.0 min CN=89 Runoff=0.54 cfs 1,698 cf

Subcatchment 36S: Subcatchment 36 Runoff Area=3,562 sf 64.80% Impervious Runoff Depth>5.44"
Flow Length=202' Tc=5.0 min CN=91 Runoff=0.51 cfs 1,616 cf

Subcatchment 37S: Subcatchment 37 Runoff Area=15,648 sf 37.41% Impervious Runoff Depth>4.55"
Flow Length=260' Tc=5.0 min CN=83 Runoff=1.96 cfs 5,938 cf

Subcatchment 38S: Subcatchment 38 Runoff Area=13,231 sf 43.80% Impervious Runoff Depth>4.77"
Flow Length=291' Tc=5.0 min CN=85 Runoff=1.72 cfs 5,262 cf

Subcatchment 39S: Subcatchment 39 Runoff Area=25,645 sf 23.74% Impervious Runoff Depth>4.13"
Flow Length=210' Tc=5.0 min CN=79 Runoff=2.94 cfs 8,817 cf

Subcatchment 40S: Subcatchment 40 Runoff Area=4,813 sf 59.63% Impervious Runoff Depth>5.10"
Flow Length=230' Tc=5.0 min CN=88 Runoff=0.66 cfs 2,047 cf

Subcatchment 41S: Subcatchment 41 Runoff Area=29,669 sf 0.00% Impervious Runoff Depth>3.20"
Flow Length=167' Tc=5.0 min CN=70 Runoff=2.65 cfs 7,921 cf

Subcatchment 42S: Subcatchment 42 Runoff Area=12,612 sf 78.38% Impervious Runoff Depth>5.67"
Flow Length=164' Tc=5.0 min CN=93 Runoff=1.84 cfs 5,962 cf

Subcatchment 43S: Subcatchment 43 Runoff Area=25,261 sf 0.00% Impervious Runoff Depth>4.13"
Flow Length=244' Tc=5.0 min CN=79 Runoff=2.90 cfs 8,685 cf

Subcatchment 44S: Subcatchment 44 Runoff Area=406,918 sf 6.01% Impervious Runoff Depth>3.50"
Flow Length=811' Slope=0.0650 '/' Tc=13.0 min CN=73 Runoff=30.69 cfs 118,636 cf

Reach 51R: Wetlands Reach Avg. Flow Depth=0.90' Max Vel=1.40 fps Inflow=30.58 cfs 149,738 cf
n=0.100 L=280.0' S=0.0177 '/' Capacity=88.74 cfs Outflow=29.23 cfs 149,340 cf

Reach 52R: Wetlands Reach Avg. Flow Depth=0.40' Max Vel=0.60 fps Inflow=5.01 cfs 15,102 cf
n=0.100 L=305.0' S=0.0095 '/' Capacity=65.08 cfs Outflow=3.74 cfs 15,004 cf

Reach 53R: Water Quality Swale Avg. Flow Depth=0.25' Max Vel=4.08 fps Inflow=5.02 cfs 15,108 cf
n=0.030 L=92.0' S=0.0543 '/' Capacity=65.95 cfs Outflow=5.01 cfs 15,102 cf

Pond 50P: Baldwin St Wetland Inflow=29.23 cfs 149,340 cf
Primary=29.23 cfs 149,340 cf

Pond 54P: Infitlration Basin 54P Peak Elev=868.89' Storage=11,765 cf Inflow=8.93 cfs 44,928 cf
Primary=3.73 cfs 40,786 cf Secondary=0.46 cfs 731 cf Outflow=4.19 cfs 41,517 cf

Pond 55P: Sediment Forebay 55P Peak Elev=869.32' Storage=2,469 cf Inflow=6.33 cfs 37,980 cf
Outflow=6.17 cfs 36,193 cf

Pond 56P: Isolated Wetland Peak Elev=871.84' Storage=9,819 cf Inflow=7.54 cfs 27,356 cf
Outflow=3.05 cfs 23,466 cf

Pond 57P: DMH1 Peak Elev=871.80' Inflow=4.73 cfs 14,514 cf
12.0" Round Culvert n=0.013 L=22.6' S=0.0133 '/' Outflow=4.73 cfs 14,514 cf

Pond 58P: CB-1 Peak Elev=871.83' Inflow=0.54 cfs 1,698 cf
12.0" Round Culvert n=0.013 L=18.2' S=0.0220 '/' Outflow=0.54 cfs 1,698 cf

Pond 59P: CB-2 Peak Elev=871.83' Inflow=0.51 cfs 1,616 cf
12.0" Round Culvert n=0.013 L=3.9' S=0.1026 '/' Outflow=0.51 cfs 1,616 cf

Pond 60P: DMH2 Peak Elev=873.06' Inflow=3.68 cfs 11,200 cf
12.0" Round Culvert n=0.013 L=72.5' S=0.0317 '/' Outflow=3.68 cfs 11,200 cf

Pond 61P: DMH3 Peak Elev=880.55' Inflow=3.68 cfs 11,200 cf
12.0" Round Culvert n=0.013 L=85.9' S=0.0990 '/' Outflow=3.68 cfs 11,200 cf

Pond 62P: CB-3 Peak Elev=880.97' Inflow=1.96 cfs 5,938 cf
12.0" Round Culvert n=0.013 L=13.5' S=0.0444 '/' Outflow=1.96 cfs 5,938 cf

Pond 63P: CB-4 Peak Elev=880.87' Inflow=1.72 cfs 5,262 cf
12.0" Round Culvert n=0.013 L=6.4' S=0.0937 '/' Outflow=1.72 cfs 5,262 cf

Pond 64P: CB-5 Peak Elev=892.87' Inflow=2.94 cfs 8,817 cf
12.0" Round Culvert n=0.013 L=20.2' S=0.0495 '/' Outflow=2.94 cfs 8,817 cf

Pond 65P: CB-6 Peak Elev=891.93' Inflow=0.66 cfs 2,047 cf
12.0" Round Culvert n=0.013 L=22.8' S=0.0439 '/' Outflow=0.66 cfs 2,047 cf

Pond 66R: DMH4 Peak Elev=891.71' Inflow=3.60 cfs 10,864 cf
12.0" Round Culvert n=0.013 L=103.5' S=0.0444 '/' Outflow=3.60 cfs 10,864 cf

Pond 67P: CB-7 (DBL) Peak Elev=889.66' Inflow=1.84 cfs 5,962 cf
12.0" Round Culvert n=0.013 L=84.6' S=0.0083 '/' Outflow=1.84 cfs 5,962 cf

Pond 68R: DMH5 Peak Elev=889.27' Inflow=5.44 cfs 16,826 cf
12.0" Round Culvert n=0.013 L=123.8' S=0.1426 '/' Outflow=5.44 cfs 16,826 cf

Pond 69P: DMH6 Peak Elev=869.82' Inflow=5.44 cfs 16,826 cf
12.0" Round Culvert n=0.013 L=36.5' S=0.0137 '/' Outflow=5.44 cfs 16,826 cf

Pond 70P: Sediment Forebay 70P Peak Elev=865.88' Storage=2,983 cf Inflow=5.44 cfs 16,826 cf
Primary=3.81 cfs 15,257 cf Secondary=0.00 cfs 0 cf Outflow=3.81 cfs 15,257 cf

Pond 71P: Infiltration Basin 71P Peak Elev=865.88' Storage=8,500 cf Inflow=6.71 cfs 23,941 cf
Primary=2.58 cfs 20,152 cf Secondary=0.00 cfs 0 cf Outflow=2.58 cfs 20,152 cf

Pond 72P: Stiles Lake Inflow=32.82 cfs 138,788 cf
Primary=32.82 cfs 138,788 cf

Time span=1.00-24.00 hrs, dt=0.01 hrs, 2301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 30S: Subcatchment 30 Runoff Area=41,789 sf 23.83% Impervious Runoff Depth>0.10"
Flow Length=261' Tc=5.0 min CN=81 Runoff=0.05 cfs 340 cf

Subcatchment 31S: Subcatchment 31 Runoff Area=293,884 sf 7.92% Impervious Runoff Depth>0.04"
Flow Length=326' Tc=12.2 min CN=76 Runoff=0.04 cfs 935 cf

Subcatchment 32S: Subcatchment 32 Runoff Area=27,503 sf 0.00% Impervious Runoff Depth>0.04"
Flow Length=316' Tc=5.6 min CN=76 Runoff=0.00 cfs 88 cf

Subcatchment 33S: Subcatchment 33 Runoff Area=83,932 sf 10.60% Impervious Runoff Depth>0.05"
Flow Length=319' Tc=10.8 min CN=77 Runoff=0.02 cfs 332 cf

Subcatchment 34S: Subcatchment 34 Runoff Area=7,097 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=50' Tc=5.0 min CN=70 Runoff=0.00 cfs 3 cf

Subcatchment 35S: Subcatchment 35 Runoff Area=3,906 sf 60.27% Impervious Runoff Depth>0.28"
Flow Length=191' Tc=5.0 min CN=89 Runoff=0.03 cfs 93 cf

Subcatchment 36S: Subcatchment 36 Runoff Area=3,562 sf 64.80% Impervious Runoff Depth>0.36"
Flow Length=202' Tc=5.0 min CN=91 Runoff=0.03 cfs 107 cf

Subcatchment 37S: Subcatchment 37 Runoff Area=15,648 sf 37.41% Impervious Runoff Depth>0.13"
Flow Length=260' Tc=5.0 min CN=83 Runoff=0.03 cfs 172 cf

Subcatchment 38S: Subcatchment 38 Runoff Area=13,231 sf 43.80% Impervious Runoff Depth>0.17"
Flow Length=291' Tc=5.0 min CN=85 Runoff=0.05 cfs 191 cf

Subcatchment 39S: Subcatchment 39 Runoff Area=25,645 sf 23.74% Impervious Runoff Depth>0.07"
Flow Length=210' Tc=5.0 min CN=79 Runoff=0.02 cfs 150 cf

Subcatchment 40S: Subcatchment 40 Runoff Area=4,813 sf 59.63% Impervious Runoff Depth>0.25"
Flow Length=230' Tc=5.0 min CN=88 Runoff=0.03 cfs 101 cf

Subcatchment 41S: Subcatchment 41 Runoff Area=29,669 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=167' Tc=5.0 min CN=70 Runoff=0.00 cfs 11 cf

Subcatchment 42S: Subcatchment 42 Runoff Area=12,612 sf 78.38% Impervious Runoff Depth>0.45"
Flow Length=164' Tc=5.0 min CN=93 Runoff=0.16 cfs 473 cf

Subcatchment 43S: Subcatchment 43 Runoff Area=25,261 sf 0.00% Impervious Runoff Depth>0.07"
Flow Length=244' Tc=5.0 min CN=79 Runoff=0.02 cfs 147 cf

Subcatchment 44S: Subcatchment 44 Runoff Area=406,918 sf 6.01% Impervious Runoff Depth>0.02"
Flow Length=811' Slope=0.0650 '/' Tc=13.0 min CN=73 Runoff=0.02 cfs 573 cf

Reach 51R: Wetlands Reach Avg. Flow Depth=0.05' Max Vel=0.20 fps Inflow=0.06 cfs 1,261 cf
n=0.100 L=280.0' S=0.0177 '/' Capacity=88.74 cfs Outflow=0.05 cfs 1,231 cf

Reach 52R: Wetlands Reach Avg. Flow Depth=0.04' Max Vel=0.12 fps Inflow=0.04 cfs 340 cf
n=0.100 L=305.0' S=0.0095 '/' Capacity=65.08 cfs Outflow=0.02 cfs 326 cf

Reach 53R: Water Quality Swale Avg. Flow Depth=0.01' Max Vel=0.74 fps Inflow=0.05 cfs 340 cf
n=0.030 L=92.0' S=0.0543 '/' Capacity=65.95 cfs Outflow=0.04 cfs 340 cf

Pond 50P: Baldwin St Wetland Inflow=0.05 cfs 1,231 cf
Primary=0.05 cfs 1,231 cf

Pond 54P: Infitlration Basin 54P Peak Elev=865.82' Storage=88 cf Inflow=0.00 cfs 88 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond 55P: Sediment Forebay 55P Peak Elev=867.72' Storage=562 cf Inflow=0.14 cfs 562 cf
Outflow=0.00 cfs 0 cf

Pond 56P: Isolated Wetland Peak Elev=869.14' Storage=332 cf Inflow=0.02 cfs 332 cf
Outflow=0.00 cfs 0 cf

Pond 57P: DMH1 Peak Elev=868.16' Inflow=0.14 cfs 562 cf
12.0" Round Culvert n=0.013 L=22.6' S=0.0133 '/' Outflow=0.14 cfs 562 cf

Pond 58P: CB-1 Peak Elev=868.69' Inflow=0.03 cfs 93 cf
12.0" Round Culvert n=0.013 L=18.2' S=0.0220 '/' Outflow=0.03 cfs 93 cf

Pond 59P: CB-2 Peak Elev=868.70' Inflow=0.03 cfs 107 cf
12.0" Round Culvert n=0.013 L=3.9' S=0.1026 '/' Outflow=0.03 cfs 107 cf

Pond 60P: DMH2 Peak Elev=870.64' Inflow=0.08 cfs 363 cf
12.0" Round Culvert n=0.013 L=72.5' S=0.0317 '/' Outflow=0.08 cfs 363 cf

Pond 61P: DMH3 Peak Elev=879.24' Inflow=0.08 cfs 363 cf
12.0" Round Culvert n=0.013 L=85.9' S=0.0990 '/' Outflow=0.08 cfs 363 cf

Pond 62P: CB-3 Peak Elev=879.90' Inflow=0.03 cfs 172 cf
12.0" Round Culvert n=0.013 L=13.5' S=0.0444 '/' Outflow=0.03 cfs 172 cf

Pond 63P: CB-4 Peak Elev=879.92' Inflow=0.05 cfs 191 cf
12.0" Round Culvert n=0.013 L=6.4' S=0.0937 '/' Outflow=0.05 cfs 191 cf

Pond 64P: CB-5 Peak Elev=891.47' Inflow=0.02 cfs 150 cf
12.0" Round Culvert n=0.013 L=20.2' S=0.0495 '/' Outflow=0.02 cfs 150 cf

Pond 65P: CB-6 Peak Elev=891.49' Inflow=0.03 cfs 101 cf
12.0" Round Culvert n=0.013 L=22.8' S=0.0439 '/' Outflow=0.03 cfs 101 cf

Pond 66R: DMH4 Peak Elev=890.39' Inflow=0.03 cfs 251 cf
12.0" Round Culvert n=0.013 L=103.5' S=0.0444 '/' Outflow=0.03 cfs 251 cf

Pond 67P: CB-7 (DBL) Peak Elev=886.62' Inflow=0.16 cfs 473 cf
12.0" Round Culvert n=0.013 L=84.6' S=0.0083 '/' Outflow=0.16 cfs 473 cf

Pond 68R: DMH5 Peak Elev=885.69' Inflow=0.19 cfs 724 cf
12.0" Round Culvert n=0.013 L=123.8' S=0.1426 '/' Outflow=0.19 cfs 724 cf

Pond 69P: DMH6 Peak Elev=866.24' Inflow=0.19 cfs 724 cf
12.0" Round Culvert n=0.013 L=36.5' S=0.0137 '/' Outflow=0.19 cfs 724 cf

Pond 70P: Sediment Forebay 70P Peak Elev=864.27' Storage=724 cf Inflow=0.19 cfs 724 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond 71P: Infiltration Basin 71P Peak Elev=863.89' Storage=147 cf Inflow=0.02 cfs 147 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond 72P: Stiles Lake Inflow=0.02 cfs 573 cf
Primary=0.02 cfs 573 cf

APPENDIX A
EcoTec, Inc. Wetland Resource Evaluation

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

November 20, 2017

Matthew Schold
Schold Development
77 Chickering Road
Spencer, MA 01562

RE: Wetland Resource Evaluation, Baldwin Street, Leicester and Lake Ave, Spencer, Massachusetts

Dear Mr. Schold:

On October 3-5, 2017, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the "Act") and its implementing regulations (310 CMR 10.00 *et seq.*; the "Regulations"); (2) the Towns of Spencer and Leicester Wetland Bylaws; and (3) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Scott Jordan, CPESC conducted the inspection.

The subject site consists of approximately 33-acres parcel located off Lake Ave in Spencer and Baldwin Street in Leicester. Please note that the frontage along the Stiles Reservoir was not evaluated. The upland portions of the site consist of upland forest. The wetland resources observed on the site are described below.

Methodology

The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands or, in the absence of Bordering Vegetated Wetlands, Bank was delineated in the field in accordance with the definitions set forth in the regulations at 310 CMR 10.55(2)(c) and 310 CMR 10.54(2). Section 10.55(2)(c) states that "The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." Section 10.54(2)(c) states that "The upper boundary of Bank is the first observable break in the slope or the mean annual flood level, whichever is lower." The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy "*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*," issued March 1, 1995; and (2) "*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook*," produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this report is based on the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). Federal wetlands were presumed to have boundaries conterminous with the delineated Bordering Vegetated Wetlands and Bank. One set of DEP Bordering Vegetated

Wetland Delineation Field Data Forms completed for observation plots located in the wetlands and uplands near flag A-94 is attached. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
Start A1 to A95 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the eastern portion of the site, along Baldwin St., that is associated with an intermittent stream.
Start B1 to B4 (B4 connect to B1)	Blue Flags	Boundary of Isolated Vegetated Wetland under the Bylaw located in the western portion of the site. Not Isolated Land Subject to Flooding.
Start C1 to C4 (C4 connect to C1)	Blue Flags	Boundary of Isolated Vegetated Wetland under the Bylaw located in the western portion of the site. Not Isolated Land Subject to Flooding.
Start D1 to D11 (D11 connect to D1)	Blue Flags	Boundary of Isolated Vegetated Wetland under the Bylaw located in the northeastern portion of the site, along Oak Bluff Ln. Does not appear large enough to qualify as Isolated Land Subject to Flooding.
Start E1 to E31 (E31 connect to E1)	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the northern portion of the site that is associated with an intermittent stream.
Start F1 to F8 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located offsite to the northeast, along Baldwin Street, that is associated with an intermittent stream.
Start G1 to G28 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located offsite to the southeast, along Baldwin Street, that is associated with an intermittent stream.

Findings

Wetland A / F/ G (i.e., flags A1 to A95, F1 to F8, and G1 to G28) consists of a wooded swamp located in or near the eastern portion of the site, along Baldwin Street, that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*), American elm (*Ulmus americana*), yellow birch (*Betula alleghaniensis*), and ironwood (*Carpinus caroliniana*) trees and/or saplings; highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), northern spicebush (*Lindera benzoin*), and sweet pepper-bush (*Clethra alnifolia*) shrubs; and bristly blackberry (*Rubus hispidus*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), spotted touch-me-not (*Impatiens capensis*), and sphagnum moss (*Sphagnum sp.*) ground cover. Evidence of wetland hydrology, including hydric soils, saturated soils, evidence of flooding, and drainage patterns, was observed within the delineated wetland. This vegetated wetland borders an intermittent stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent stream would be regulated as Bank under the Act and Leicester and Spencer Bylaws. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands under the Act and Bylaws.

Wetland B (i.e., flags B1 to B4) consists of an isolated vegetated wetland located in the western portion of the site. Plant species observed in this isolated depression include red maple (*Acer rubrum*) trees and/or saplings; and highbush blueberry (*Vaccinium corymbosum*) shrubs. Hydric soils and other evidence of wetland hydrology, including saturated soils, and evidence of flooding, were observed within the delineated wetland. This wetland does not border a creek, stream, river, pond, or lake; accordingly, it would not be regulated as Bordering Vegetated Wetlands under the Act. Section 10.57(2)(b)1. states that "Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area that at least once per year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches." Based upon field observations, the potential ponding area appears to be too small to hold the requisite volume and depth of water to be regulated as Isolated Land Subject to Flooding under the Act. Accordingly, this area would not be subject to jurisdiction under the Act. However, depending upon the proximity of this area to a Bordering Vegetated Wetlands, this area may be subject to jurisdiction as a federal wetland. Federal wetlands do not have a Buffer Zone, however, this area would contain a 100-foot Buffer Zone under the Spencer Bylaw.

Wetland C (i.e., flags C1 to C4) consists of an isolated vegetated wetland located in the western portion of the site. Plant species observed in this isolated depression include red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*) trees and/or saplings; and highbush blueberry (*Vaccinium corymbosum*) shrubs. Hydric soils and other evidence of wetland hydrology, including saturated soils, and evidence of flooding, were observed within the delineated wetland. This wetland does not border a creek, stream, river, pond, or lake; accordingly, it would not be regulated as Bordering Vegetated Wetlands under the Act. Section 10.57(2)(b)1. states that "Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area that at least once per year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches." Based upon field observations, the potential ponding area appears to be too small to hold the requisite volume and depth of water to be regulated as Isolated Land Subject to Flooding under the Act. Accordingly, this area would not be subject to jurisdiction under the Act. However, depending upon the proximity of this area to a Bordering Vegetated Wetlands, this area may be subject to jurisdiction as a federal wetland. Federal wetlands do not have a Buffer Zone, however, this area would contain a 100-foot Buffer Zone under the Spencer Bylaw.

Wetland D (i.e., flags D1 to D11) consists of an isolated vegetated wetland located in the northeastern portion of the site, along Oak Bluff Lane. Plant species observed in this isolated wetland include red maple (*Acer rubrum*) trees and/or saplings; and highbush blueberry (*Vaccinium corymbosum*) shrubs. Hydric soils and other evidence of wetland hydrology, including saturated soils, and evidence of flooding, were observed within the delineated wetland. This wetland does not border a creek, stream, river, pond, or lake; accordingly, it would not be regulated as Bordering Vegetated Wetlands under the Act. Section 10.57(2)(b)1. states that "Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area that at least once per year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches." Based upon field observations, the potential ponding area appears to be too small to hold the requisite volume and depth of water to be regulated as Isolated Land Subject to Flooding under the Act. Accordingly, this area would not be subject to jurisdiction under the Act. However, depending upon the proximity of this area to a Bordering Vegetated Wetlands, this area may be subject to jurisdiction as a federal wetland.

Federal wetlands do not have a Buffer Zone, however this area would contain a 100-foot Buffer Zone under the Leicester Bylaw.

Wetland E (i.e., flags E1 to E31) consists of a wooded swamp located in the northern portion of the site that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), gray birch (*Betula populifolia*), and eastern hemlock (*Tsuga canadensis*) trees and/or saplings; highbush blueberry (*Vaccinium corymbosum*) and common winterberry (*Ilex verticillata*) shrubs; and cinnamon fern (*Osmunda cinnamomea*) and sphagnum moss (*Sphagnum sp.*) ground cover. Evidence of wetland hydrology, including hydric soils, saturated soils, evidence of flooding, and drainage patterns, was observed within the delineated wetland. This vegetated wetland borders an intermittent stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent stream would be regulated as Bank under the Act and Leicester Bylaw. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands under the Act and Leicester Bylaw.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that "The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm." The project engineer should evaluate the most recent National Flood Insurance Program flood profile data to determine if Bordering Land Subject to Flooding occurs on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bordering Vegetated Wetlands or Bank boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act. A copy of the most recent Flood Insurance Rate Map for the site is attached.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (i.e., Worcester South Quadrangle, dated 1983, attached) and observations made during the site inspection, two streams that are not shown on the USGS Map are located in the northern portion of the site, and in the eastern portion of the site. The watershed areas for these streams at the site were determined to be less than 0.5 square miles (see attached watershed calculations). As such, the streams would be designated intermittent under the Massachusetts Wetlands Protection Act regulations. Furthermore, based upon a review of the current USGS Map and observations made during the site inspection, there are no other mapped or unmapped streams located within 200 feet of the site. Accordingly, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas On-line Data Viewer Output 10/6/17*, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq*.)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; "MESA") and MESA Regulations (321 CMR 10.00 *et seq*.)], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC.

Scott Jordan

Scott Jordan, CPESC
Senior Environmental Scientist

Attachments (9 pages)

11/W/LeicesterSpencerBaldwinStReport

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Prepared by: **EcoTec, Inc.** Project location: **Baldwin Street & Lake Ave** DEP File # :

Check all that apply:
- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☑ Vegetation and other indications of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

Section I. Vegetation

Observation Plot Number: **UPLAND** Transect Number: **TPU @ A94** Date of Delineation: **10/3/17**

A. Sample Layer and Plant Species # (by common/scientific name)			B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category * #
Tree	**Red maple**	***Acer rubrum***	**70**	**100**	**yes**	**FAC***
Sapling	**None**					
Shrub	**Red oak**	***Quercus rubra***	**5**	**25**	**yes**	**FACU-**
	Highbush blueberry	***Vaccinium corymbosum***	**10**	**50**	**yes**	**FACW-***
	Elderberry	***Sambucus canadensis***	**5**	**25**	**yes**	**FACW-***
Ground cover	**Poison ivy**	***Toxicodendron radicans***	**30**	**50**	**yes**	**FAC***
	Virginia creeper	***Parthenocissus quinquefolia***	**30**	**50**	**yes**	**FACU**

 # Plant Taxonomy and Wetland Indicator Category from "National List of Plant Species that Occur in Wetlands: Massachusetts" (Fish & Wildlife Service, U.S. Department of the Interior, 1988) as required by 310 CMR 10.55(2)(c).

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c. 131, s. 40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusions:

Number of dominant wetland indicator plants: **4** Number of dominant non-wetland indicator plants: **2**

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? **yes**

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

TPU @ A94

Section II. Indicators of Hydrology

1. Soil Survey

Is there a published soil survey for this site? -

title/date: -
map number: -
soil type mapped: -
hydric soil inclusions: -

Are field observations consistent with soil survey? -

Remarks: -

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
A	0-6	10YR 3/2	
Bw	6-12+	10YR 4/4	

Remarks: stony fine sandy loam

3. Other: -

Conclusion: Is soil Hydric? No

Other Indications of Hydrology: (check all that apply and describe)

- ☐ Site inundated: ______
- ☐ Depth to free water in observation hole: ______
- ☐ Depth to soil saturation in observation hole: ______
- ☐ Water marks: ______
- ☐ Drift lines: ______
- ☐ Sediment deposits: ______
- ☐ Drainage patterns in BVW: ______
- ☐ Oxidized rhizospheres: ______
- ☐ Water-stained leaves: ______
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other): ______
- ☐ Other: ______

Vegetation and Hydrology Conclusion

	yes	no
Number of wetland indicator plants ≥ number of non-wetland indicator plants	☑	☐
Wetland hydrology present:		
hydric soil present	☐	☑
other indicators of hydrology present	☐	☑
Sample location is in a BVW	☐	☑

Submit this form with the Request for Determination of Applicability or Notice of Intent.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Prepared by: EcoTec, Inc. Project location: Baldwin Street & Lake Ave DEP File # :

Check all that apply:

- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☑ Vegetation and other indications of hydrology used to delineate BVW boundary: fill out Sections I and II
- ☐ Method other than dominance test used (attach additional information)

Section I. Vegetation

Observation Plot Number: WETLAND Transect Number: TPW @ A94 Date of Delineation: 10/3/17

A. Sample Layer and Plant Species # (by common/scientific name)			B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category * #
Tree	Red maple	*Acer rubrum*	80	100	yes	FAC*
Sapling	Black birch	*Betula lenta*	10	100	yes	FACU-
Shrub	Red oak	*Quercus rubra*	5	16	no	FACU-
	Winterberry	*Ilex verticillata*	20	67	yes	FACW+*
	Red maple	*Acer rubrum*	5	16	no	FAC*
Ground cover	Poison ivy	*Toxicodendron radicans*	15	50	yes	FAC*
	Dewberry	*Rubus hispidus*	15	50	yes	FACW*

 # Plant Taxonomy and Wetland Indicator Category from "National List of Plant Species that Occur in Wetlands: Massachusetts" (Fish & Wildlife Service, U.S. Department of the Interior, 1988) as required by 310 CMR 10.55(2)(c).

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c. 131, s. 40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusions:

Number of dominant wetland indicator plants: 4 Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

TPW @ A94

Section II. Indicators of Hydrology

1. Soil Survey

Is there a published soil survey for this site? -

title/date: -
map number: -
soil type mapped: -
hydric soil inclusions: -

Are field observations consistent with soil survey? -

Remarks: -

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
A	0-16+	10YR 2/2	

Remarks: stony fine sandy loam

3. Other: -

Conclusion: Is soil Hydric? No

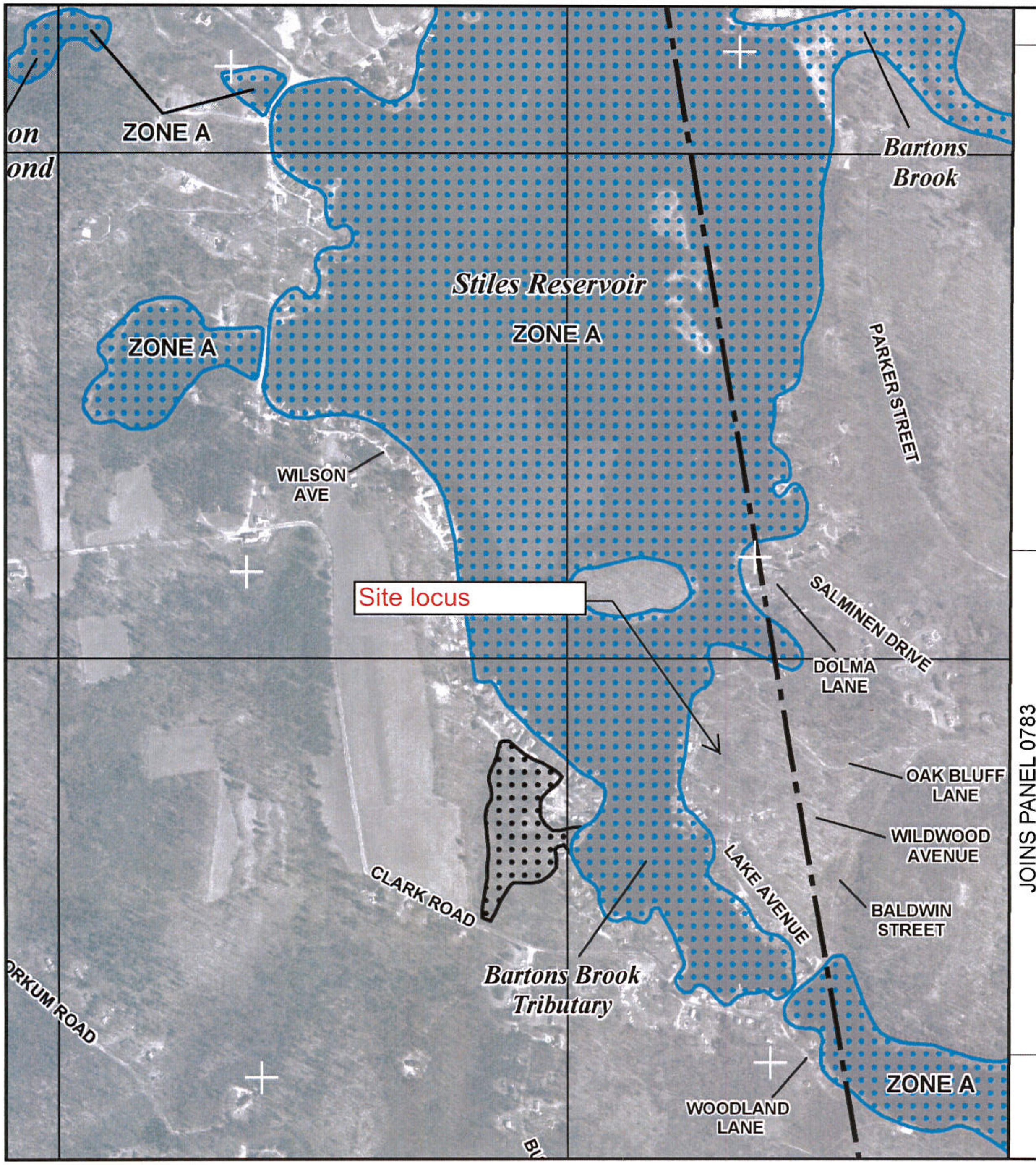
Other Indications of Hydrology: (check all that apply and describe)

- ☐ Site inundated: ______
- ☐ Depth to free water in observation hole: ______
- ☐ Depth to soil saturation in observation hole: ______
- ☐ Water marks: ______
- ☐ Drift lines: ______
- ☐ Sediment deposits: ______
- ☐ Drainage patterns in BVW: ______
- ☐ Oxidized rhizospheres: ______
- ☑ Water-stained leaves: ______
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other): ______
- ☐ Other: ______

Vegetation and Hydrology Conclusion

	yes	no
Number of wetland indicator plants ≥ number of non-wetland indicator plants	☑	☐
Wetland hydrology present:		
hydric soil present	☐	☑
other indicators of hydrology present	☑	☐
Sample location is in a BVW	☑	☐

Submit this form with the Request for Determination of Applicability or Notice of Intent.



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0780E

FIRM

FLOOD INSURANCE RATE MAP

WORCESTER COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 780 OF 1075

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHARLTON, TOWN OF	250299	0780	E
LEICESTER, TOWN OF	250313	0780	E
SPENCER, TOWN OF	250335	0780	E

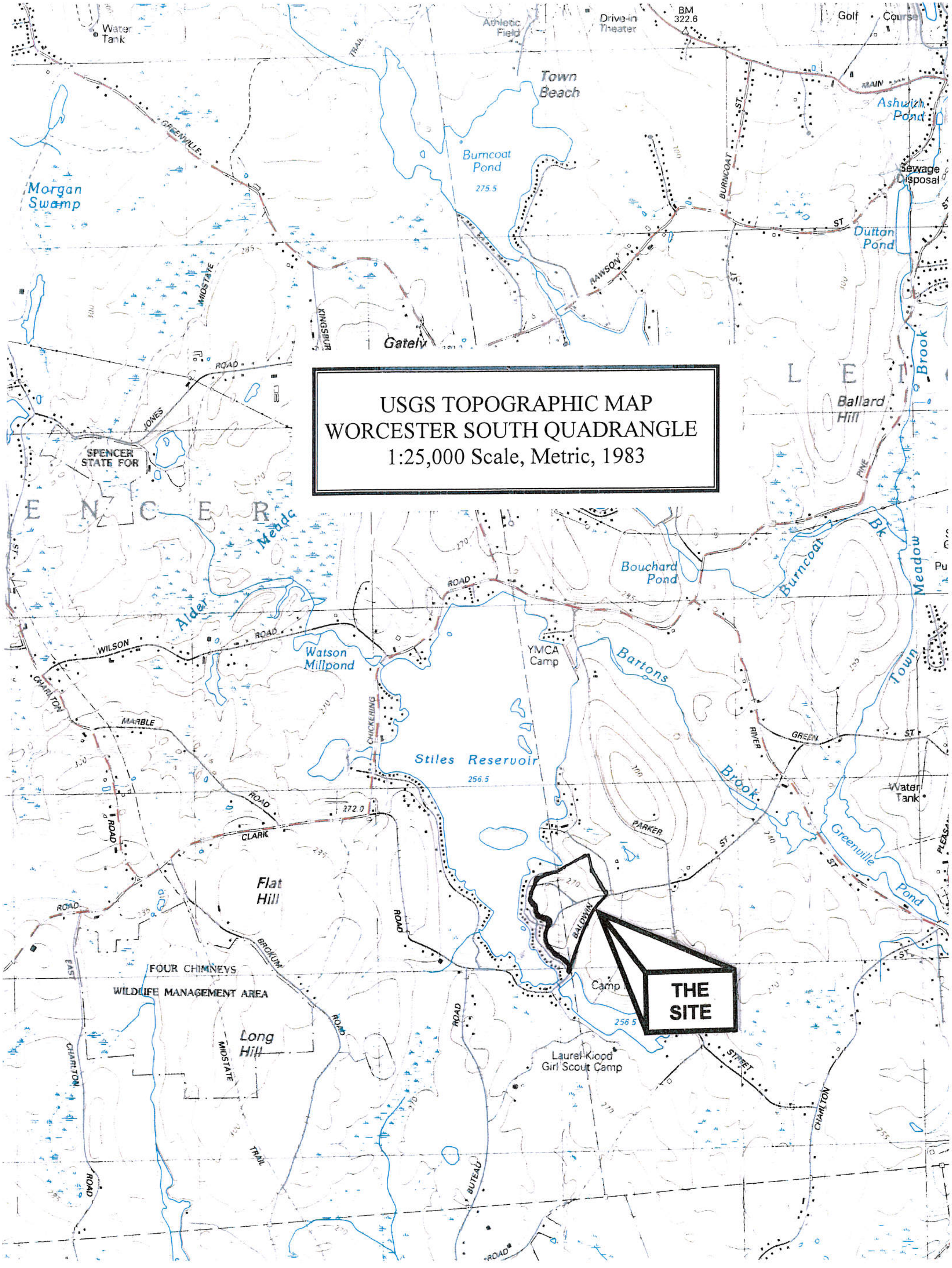
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 25027C0780E

EFFECTIVE DATE JULY 4, 2011

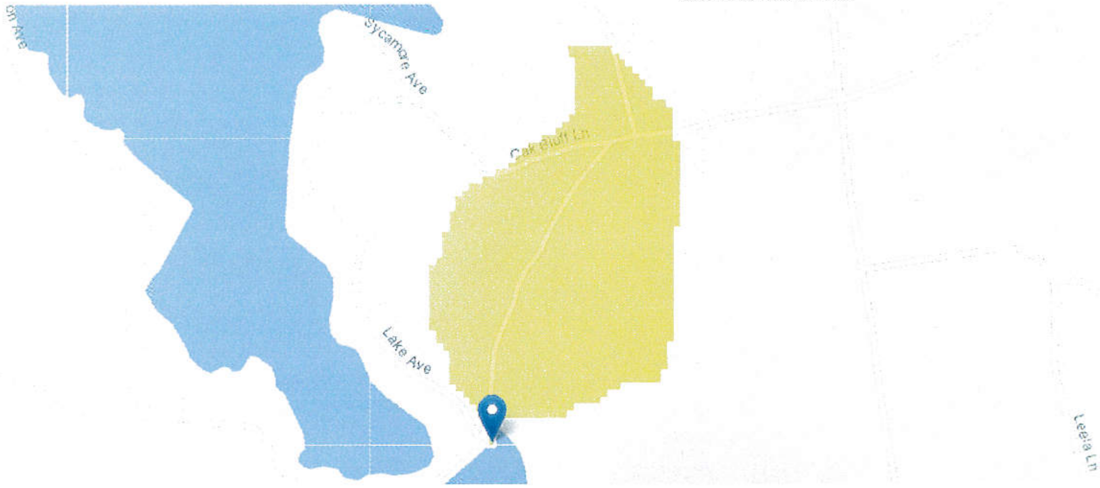
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


USGS TOPOGRAPHIC MAP
WORCESTER SOUTH QUADRANGLE
1:25,000 Scale, Metric, 1983
THE SITE
Water Tank
Athletic Field
Drive-in Theater
BM 322.6
Golf Course
Town Beach
MAIN
Ashworth Pond
Burncoat Pond
275.5
Morgan Swamp
GREENVILLE
BURNCOAT ST
Sewage Disposal
Dutton Pond
RAWSON
MIDSTATE
KINGSBUR
Gately
ROAD
JONES
SPENCER STATE FOR
Ballard Hill
PINE
Brook
Burncoat Bk
Meadow
Bouchard Pond
Alder
WILSON
ROAD
Watson Millpond
YMCA Camp
Bartons
CHARLTON
MARBLE
CHICKERING
Stiles Reservoir
256.5
RIVER
GREEN ST
Brook
Water Tank
ROAD
CLARK
272.0
PARKER
ST
Greenville
Pond
Flat Hill
BALDWIN
ROAD
EAST
BROKUM
FOUR CHIMNEYS
WILDLIFE MANAGEMENT AREA
Camp
256.5
Long Hill
MIDSTATE
Laurel Kiood Girl Scout Camp
STREET
CHARLTON
TRAIL
BUTEAU
ROAD

StreamStats Report

Region ID:	MA
Workspace ID:	MA20171002200841722000
Clicked Point (Latitude, Longitude):	42.20002, -71.94180
Time:	2017-10-02 16:09:01 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0574	square miles
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	3.534	percent

Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0574	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	3.534	percent	0.32	24.6

Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit

Flow-Duration Statistics Citations

Natural Heritage Atlas On-line Data Viewer Output 10/6/17

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

Scott Jordan, CPESC
Senior Environmental Scientist

Scott Jordan is an Environmental Scientist with EcoTec, Inc. Since joining EcoTec in 2000, Mr. Jordan's duties have included wetland resource evaluation and delineation; erosion and sediment control planning and monitoring, environmental monitoring, including water quality analysis, sediment analysis and wildlife habitat impact analysis; environmental permitting at local, state, and federal level; pond and stream evaluation; wildlife habitat evaluation, vernal pool evaluation; and wetland restoration and replication design and oversight. He has served as an environmental consultant to the development community, engineering firms, municipalities, and conservation commissions. Prior to joining EcoTec, Mr. Jordan was the Senior Laboratory Technician for GeoComp Corporation where he performed numerous physical properties analysis of soils and geosynthetic materials in accordance with ASTM, and AASHTO specifications. His approximately seven years experience evaluating New England soils includes soil analysis and classification of site-remediated soils with oil and hazardous material contamination. His educational background includes courses in organic and inorganic chemistry, biology, botany and comparative vertebrate physiology, with extensive coursework in ecology and wildlife biology; and he has completed several professional training seminars including erosion and sediment control, soil evaluation, wildlife habitat evaluation, wetland mitigation, vernal pool evaluation, water quality assessment using macro-invertebrates, and river morphology and functions. He has participated in several rare species and wildlife monitoring and inventory projects, including marsh bird surveys, marbled salamander (*Ambystoma opacum*) survey, great laurel (*Rhododendron maximum*) survey, wood turtle (*Glyptemys insculpta*) habitat assessments and sweeps, eastern box turtle (*Terrapene carolina*) habitat assessments, and greater black-backed gull (*Larus marinus*) inventory. His prior research experience includes behavioral and acoustic studies of the common loon (*Gavia immer*) in northwestern Maine.

Education: Bachelor of Science: Biology - Wildlife and Environmental, *Cum Laude*
Framingham State College, 2000
Biotechnology Certificate
Middlesex Community College, 1994

Professional Affiliations: Certified Professional in Erosion and Sediment Control (Cert. #3644)
Massachusetts Association of Conservation Commissioners
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists
Society of Soil Scientists of Southern New England

APPENDIX B
Soil Test Pit Data

OAK BLUFF LANE - LEICESTER, MA						
TABLE OF SOIL TEST PIT DATA FOR DRAINAGE BASINS						
Testing Date: 11/16/18						
Performed by: Brian MacEwen, PLS, GRAZ Engineering, LLC						
TP# *	LOCATION	DEPTH	HORIZON	TEXTURE	ESHWT	NOTES
		(inches)			(inches)	
70P	Sediment Forebay 70P	0-4	Ap	F.S.L.		
		4-33	Bw	F.S.L.	39	Dry
		33-82	Cd	L.S.		No Refusal
71P	Infiltration Pond 71P	0-3	Ap	F.S.L.		
		3-36	Bw	F.S.L.	37	Dry
		36-82	Cd	L.S.		No Refusal
55P	Sediment Forebay 55P	0-42	Fill			
		42-47	Ap	F.S.L.		Dry
		47-70	Bw	F.S.L.		Weeps at 70"
		70-96	Cd	L.S.	78	Standing at 90", No Refusal
54P	Infiltration Pond 54P	0-5	Ap	F.S.L.		
		5-37	Bw	F.S.L.		
		37-77	C1	L.S.	44	Dry
		77-102	C2	L.S.		No Refusal

***Test Pit numbers depicted hereon correspond to the Hydrology Report node listings.**