Stormwater Report

Building 3 ExpansionProject

12-16 Rio Way
Fairhaven, MA

Prepared for:
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Project Summary

Nye Lubricants, Inc (Nye) is filing this Notice of Intent (NOI) for work within resource area buffer zones that will complement the expansion of Building 3 (to be located outside of the resource area buffer zones). The work included in this application includes a reduction of the impervious area within the buffer zone and stormwater management improvements within the Building 3 parking area as well, and construction of a public access path along the river's edge to comply with the Commonwealth of Massachusetts' Chapter 91 regulations.

The proposed stormwater control system is designed with multiple stormwater treatment and conveyance Best Management Practices (BMPs) that will capture and treat runoff from the developed site as well as protect the existing on-site wetland resource areas including the Acushnet River Riverfront area. The stormwater management system has been designed in compliance with the Massachusetts Stormwater Management Policy.

The hydrologic conditions were compared for the existing conditions and the proposed conditions using HydroCAD v. 10.0. The existing conditions were divided into nine subcatchments. The proposed conditions were divided into 10 subcatchments, however with the same discharge points as in the existing conditions for comparison purposes. Both the Existing Watershed and Proposed Watershed plans are included with this report. The majority of this existing land-cover is pavement, in fair condition (CN= 98) with a small a small area vegetative cover, in good condition (CN= 61). Subcatchment 9 is the wooded area in the western part of the property, (CN=60). The proposed land cover will remain consistent with the existing land cover types, with the biggest change of adding the expanded building (CN=98), but also with a program of targeted removal of some of the parking areas to place planting beds and bioretention areas.

One unique item to note for this is that there are several proposed development subcatchments where there is no change or activity proposed, namely Subcatchment 1, 3, 8, and 10. These areas were analyzed as part of the site, however as this is a redevelopment project and there are no changes to the impervious coverage in those areas, there is no stormwater controls proposed as part of this project. Also for proposed development subcatchment areas 6 and 7, there is no grading changes or new impervious, the only proposed changes are removal of some impervious parking area to create new permeable landscaped areas. These subcatchments were analyzed for peak runoff rates, but not for the water quality measures. The areas were the biggest changes are proposed and where the stormwater management program is most intense is proposed development Subcatchments 2, 4, and 5.

Stormwater Control and Peak Flow Attenuation

No new untreated discharges will be created as a result of the proposed work. The table below shows the reduction in peak flow rates (cfs) and volumes (acre-ft) for each of the discharge points from the proposed conditions compared to the existing conditions. As is allowable under the Massachusetts Stormwater Policy, peak flow rates and volumes were controlled to the maximum extent practicable as this is a redevelopment project. The most important thing to note about this project is the vast improvement in water quality management and controls being implemented. The existing infrastructure has little

stormwater quality controls and the proposed project will provide a wide variety of stormwater treatment strategies and promote a significant amount of groundwater recharge.

Reduction from Predevelopment Runoff								
			2 yr storm		10 yr storm		100 yr storm	
Discharge Point	Pre-Development Subcatchment	Post Development Subcatchment	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)
Acushnet River - Northwest	1	1	0.31	0.026	0.28	0.029	0.86	-0.015
Onsite - Northeast	2	2a	0.63	0.039	0.36	0.054	-1.93	0.074
Sycamore Street- East	3	3	0.31	-0.059	0.37	0.023	0.36	0.027
Onsite- Parking Area	4	4,5	3.16	0.315	0.08	0.477	2	0.748
Onsite -Rio Way	5	10	0	0	0	0	0	0
On-site - western parking	6	6	0.3	0.064	0.25	0.068	0.17	0.072
Howland Road	7	7	0.13	-0.014	0.32	-0.007	0.5	0.002
Acushnet River Southwest	8	8	0	0	0	0	0	0
Acushnet River - west	9	9	0	0	0	0	0	0

Soil Information

Soils at the project site area are classified as Urban Soils. The soils are classified by the Natural Resources Conservation Service, and the information was gathered through their WebSoil Survey. For more specific detail on the soils, we reviewed boring logs and a geotechnical report conducted from an original planning effort for the building expansion project. As part of that effort, nine (9) borings were advanced throughout the site area. For the depths concerned with the stormwater management BMPs, soils were identified as granular fills consisting of loose to very dense , gray to brown fine to coarse sand with trace to little silt.

the soils were consistent as mapped, urban fill materials, relatively granular and somewhat dense. In order to proceed with the design, we have characterized the soils as a sandy loam, which is a hydrologic soil group B, which a hydraulic conductivity rating of 1.02 in/hr. Sandy Loam soils per the USDA are medium to coarse textured soils, with generally greater than 0% silt but less than 50% silt and predominantly sandy with less than 80% sand. This is consistent with the native soils from the glacial outwash that has occurred along the Acushnet River that we have experienced throughout our work in the harbor.

In addition to the soil information reviewed from the borings, the geotechnical program also had a series of monitoring wells installed, which groundwater depths provided, and Apex re-gauged the wells to

confirm depths in 2021. As expected, groundwater levels are tidally impacted by the adjacent Acushnet River and in general are 5.5 to 6.5 feet below the surface levels, so approximately elevation 0.5 to 1.5 ft.

Long Term Pollution Prevention Plan

The proposed BMP improvements will be effective in source control and pollution prevention. TSS removal rates will be met and even exceeded areas through the use of LID techniques, vegetated landscaped areas (in the form of a swale), bioretention areas and stormwater recharge through cultec chambers. As shown on the attached TSS Removal Rate Sheet, we will reduce TSS by between 80 to 93%. The pretreatment for the infiltration practices is vegetated landscaped areas, in the form of a swale, complete with underdrain, which will slow the velocity of the water and help settle out large sediment. Attached with this report is a Long-Term Pollution Prevention Plan which references and builds off the Operation and Maintenance Plan prepared for the stormwater BMPs designed for this project as well Spill Prevention Control and Countermeasure Plan, prepared by Apex Companies, LLC, dated October 2020.

Construction Period Pollution Prevention Plan

Nye Lubricants will be responsible for managing its third-party contractors to comply with the program set forth below. Martin Weinstein, as Director of Quality Engineering and EHS, will be responsible for ensuring compliance. Mr. Weinstein or the contractor's designated foreman shall be responsible for verifying daily that erosion and sedimentation controls are properly in place prior to the start of work for the day. The O&M activity log, which is provided in the Operation and Maintenance Plan, shall be used and completed daily with those erosion inspections.

Only the work shown on the accompanying contract plan shall be performed and erosion controls placed in the locations shown on those plans and in the manner presented shall remain functional and effective throughout the duration of the work.

As this project will disturb more than one acre of land, there project will acquire coverage under the EPA NDPES Construction General Permit, with more specific construction pollution prevention measures covered in the Stormwater Pollution Prevention Plan, (SWPPP) prepared for this project. That SWPPP will also ensure compliance with the Town of Fairhaven's Storwmater Bylaw.

In order to maintain the integrity of the water quality in the area and to prevent illicit discharges from entering wetland resource areas surrounding the project site, the following construction sequencing shall be followed:

1. Mobilize to site and develop a staging area within uplands, away from any resource areas, as indicated on the plans.
2. Place environmental protection devices inclusive of siltation fencing and straw bales, as indicated on the project drawings.
3. Clear within work limits only the necessary vegetation.
4. Verify condition and locations of existing subsurface utilities.
5. Excavate top and subsoil within work area to grade.
6. Excavate and prepare subgrade for building foundations as required.

7. Pour/place foundations for building
8. Prepare subgrade of new driveway and permeable parking area to southeast and east of new building.
9. Place binder course on proposed paved area.
10. Place reinforcing grid for permeable parking area and back fill with stone as required per manufacturer's specifications.
11. Sawcut existing asphalt in areas where improvements will be performed.
12. Carefully remove asphalt and place for proper disposal.
13. Excavate areas for subsurface recharge chambers.
14. Place filter fabric, stone, pipes, inspection ports and chambers as specified.
15. Backfill chamber areas as specified.
16. Excavate vegetated area and bioretention area footprints.
17. Core into existing Catch basin and manhole structures to add pipes as specified
18. Place filter fabric, stone, underdrains and bioretention soil mix as specified.
19. Loam and seed as specified.
20. Place plantings in vegetated areas and bioretention areas as specified.
21. Install vertical curbing around landscaped areas
22. Monitor settlement during construction process.
23. Place wearing (top) course on proposed paved area
24. Patch pavement areas as needed around sawcut areas.
25. Clear vegetation and cut grades for public access pathway.
26. Prepare subgrade for reinforced pathway material.
27. Place reinforcing grid for pathway and back fill with stone as required per manufacturer's specifications.
28. Remove silt and collected debris from environmental protection devices.
29. Verify site has been stabilized, remove erosion controls.
30. Demobilize from site.

Stormwater Management Policy Compliance

The proposed stormwater management systems for the Building 3 Expansion project have been designed in compliance with the Stormwater Management Standards of the Massachusetts DEP. The proposed stormwater BMPs have been designed to protect surface and ground water resources and wetlands. The following describes compliance with each of the Standards of the Massachusetts Stormwater Management Policy handbooks, Volumes 1, 2, and 3 (2008).

As listed and required under the Massachusetts DEP Stormwater Policy Manual, there are ten (10) Stormwater Management Standards required for projects falling under its jurisdiction. The ten standards and how compliance with each will be achieved are discussed below:

1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. The project is a redevelopment and will not create any new stormwater conveyances. All runoff from impervious areas created or impacted as part of this

project shall have been effectively treated through a treatment train of structural BMPs prior to any discharge to the resource areas.

2. Stormwater Management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04. As this is a redevelopment project project, the post development peak discharge rates were controlled to the maximum extent practicable. For all the design storms modeled, the peak flows for each discharge design point are less than or equal to the pre-development peak rates for the 2 yr and 10 yr storm events as required by Standard 2. The 2, 10, 25 and 100 year storm events summary flows are shown in the table below.

Reduction from Predevelopment Runoff			2 yr storm	10 yr storm	25 yr storm	100 yr storm
Discharge Point	Pre-Development Subcatchment	Post Development Subcatchment	Rate (cfs)	Rate (cfs)	Rate (cfs)	Rate (cfs)
Acushnet River - Northwest	1	1	0.31	0.28	0.25	0.86
Onsite -Northeast	2	2a	0.63	0.36	-1.68	-1.93
Sycamore Street- East	3	3	0.31	0.37	0.37	0.36
Onsite- Parking Area	4	4,5	3.16	0.08	0.92	2
Onsite -Rio Way	5	10	0	0	0	0
On-site -western parking	6	6	0.3	0.25	0.22	0.17
Howland Road	7	7	0.13	0.32	0.39	0.5
Acushnet River Southwest	8	8	0	0	0	0
Acushnet River - west	9	9	0	0	0	0

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

The Building 3 Expansion project utilizes vegetated landscaped areas (swales), bioretention areas and subsurface recharge chambers for recharge of the runoff generated by the proposed project activities. The amount of stormwater recharged through the proposed designs will exceed the required recharge volume as determined by the Massachusetts Stormwater Handbook, employed the "Simple Dynamic" method (as described in Volume 3 of the 2008 Massachusetts Stormwater Management Handbook) to size the infiltration BMPs. The HydroCAD computer model created for this project based on TR-20 was used for the analysis. The simple dynamic analysis accounts for the fact that stormwater is exfiltrating from the BMP at the same time that the voids (storage area) are filling. The required recharge volume and drawdown time

for all BMPs are shown in the attached Tables 1, 2, and 3. All calculations were performed as shown in Volume 3 of the Massachusetts Stormwater Management Policy.

4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

- *a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
- *b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
- *c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Pretreatment is provided for all proposed stormwater BMPs handling runoff from paved areas (no pretreatment is necessary for roof runoff). The pretreatment BMP used for the is a vegetated landscaped area, which acts as a vegetated swale and is a minimum of 8 feet wide, as required in Volume 2 of the 2008 Massachusetts Stormwater Management Handbook. The water quality treatment volume for all BMPs is shown in the attached Tables 4 and 5. All calculations were performed as shown in Volume 3 of the Massachusetts Stormwater Management Policy. The 80% required removal rate for total suspended solids (TSS) will be achieved with the implementation of vegetated areas and bioretention areas. The cumulative total of the structural BMPs exceed the target 80% removal. Detailed TSS removal calculations are attached.

An Operation and Maintenance Plan has been prepared as a separate document and is intended to serve as a long-term pollution prevention plan for the Stormwater BMP Improvement Project development. This long-term O&M Plan has been developed to ensure that the proposed stormwater management systems are properly maintained and function as designed.

5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater Discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M. GL c. 21, §§26-53 and the regulations promulgated thereunder at 314 CMR 3. 00, 314 CMR4.00, and 314 CMR 5.00.

The land area involved in this project is not designated as Land Uses with Higher Potential Pollutant Loads. Nye does conduct activities under a NDPES MSGP, however those activities occur within the buildings and will not discharge to the stormwater controls being implemented as part of this work. Furthermore, those activities are governed by their Spill Control and Countermeasure Plan that they have in place.

6. Stormwater discharges with the Zone I or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical areas, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices

determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to Said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2) (a) 1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

The discharges for this project are not located within a Zone II or an Internet Wellhead Protection Area, or discharge to a critical area. The project does propose a treatment train of structural practices to reduce runoff impacts to the wetland resource areas.

7. A redevelopment project is required to meet the following Storm water Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing Storm water discharges shall comply with Standards 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Storm water Management Standards and improve existing conditions.

This Project is a re-development project. It has been designed to meet all the applicable Stormwater Management Standards to the maximum extent practicable and is an improvement upon existing conditions by providing stormwater water quality treatment and promoting recharge by providing structural BMPs.

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

In order to maintain the integrity of the water quality in the area and to prevent illicit discharges from entering into wetland resource areas surrounding the project site, a construction sequencing plan and construction methodology plans have been developed and are included with this filing.

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

A site-specific Operation and Maintenance Manual (O&M Manual) is included as part of this report. The draft manual details procedures for maintain the Stormwater BMPs as well as schedules and troubleshooting issues. The O&M manual defines the parties responsible the execution of the procedures detailed within it.

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

There are no known or suspected illicit discharge within the immediate project site area. No illicit discharges shall be made, and a compliance statement is provided with the Stormwater Report as required by the MA DEP Stormwater Management Policy Manual.

Stormwater Report

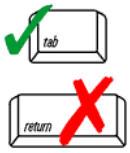
Stormwater Checklist

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

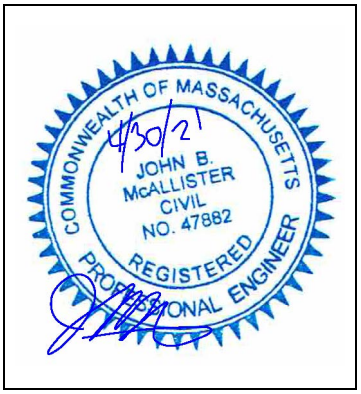
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



April 30, 2021

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): Subsurface Recharge Chambers

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 for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

☒ 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 for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☒ An Illicit Discharge Compliance Statement is attached;

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

Stormwater Report

Stormwater Management Calculation Tables

Nye Lubricants

Building 3 Expansion Project

Pre Development Volumes									
		2 yr storm		10 yr storm		25 yr storm		100 yr storm	
Discharge Point	Tributary Subcatchments	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)
Acushnet River - Northwest	1	5.48	0.347	8.21	0.532	9.75	0.639	12.43	0.826
Onsite -Northeast	2	0.63	0.039	1.23	0.074	1.59	0.096	2.25	0.136
Sycamore Street- East	3	0.92	0.056	1.59	0.097	1.98	0.122	2.67	0.167
Onsite- Parking Area	4	4.74	0.404	8.35	0.706	10.49	0.888	14.29	1.219
Onsite -Rio Way	5	1.89	0.125	2.72	0.183	3.2	0.216	4.02	0.274
On-site -western parking	6	5.54	0.359	8.11	0.537	9.57	0.64	12.11	0.819
Howland Road	7	3.11	0.218	4.72	0.337	5.63	0.406	7.22	0.528
Acushnet River Southwest	8	6	0.436	8.71	0.649	10.25	0.77	12.92	0.984
Acushnet River - west	9	0.36	0.047	1.16	0.118	1.72	0.167	2.82	0.263

Post Development									
		2 yr storm		10 yr storm		25 yr storm		100 yr storm	
Discharge Point	Tributary Subcatchments	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)
Acushnet River - Northwest	1	5.17	0.321	7.93	0.503	9.5	0.609	11.57	0.841
Recharge Chambers	2	0	0	0.87	0.02	3.27	0.036	4.18	0.062
Sycamore Street- East	3	0.61	0.115	1.22	0.074	1.61	0.097	2.31	0.14
Onsite- Parking Area	4	0	0	0	0	0	0	1.38	0.046
Onsite- Parking Area	5	1.58	0.089	8.27	0.229	9.57	0.291	10.91	0.425
On-site -western parking	6	5.24	0.295	7.86	0.469	9.35	0.569	11.94	0.747
Howland Road	7	2.98	0.232	4.4	0.344	5.24	0.409	6.72	0.526
Acushnet River Southwest	8	6	0.436	8.71	0.649	10.25	0.77	12.92	0.984
Acushnet River - west	9	0.36	0.047	1.16	0.118	1.72	0.167	2.82	0.263
Onsite -Rio Way	10	1.89	0.125	2.72	0.183	3.2	0.216	4.02	0.274

Nye Lubricants

Building 3 Expansion Project

Reduction from Predevelopment Runoff										
			2 yr storm		10 yr storm		25 yr storm		100 yr storm	
Discharge Point	Pre-Development Subcatchment	Post Development Subcatchment	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)	Rate (cfs)	Volume (acre-ft)
Acushnet River - Northwest	1	1	0.31	0.026	0.28	0.029	0.25	0.03	0.86	-0.015
Onsite -Northeast	2	2a	0.63	0.039	0.36	0.054	-1.68	0.06	-1.93	0.074
Sycamore Street- East	3	3	0.31	-0.059	0.37	0.023	0.37	0.025	0.36	0.027
Onsite- Parking Area	4	4,5	3.16	0.315	0.08	0.477	0.92	0.597	2	0.748
Onsite -Rio Way	5	10	0	0	0	0	0	0	0	0
On-site -western parking	6	6	0.3	0.064	0.25	0.068	0.22	0.071	0.17	0.072
Howland Road	7	7	0.13	-0.014	0.32	-0.007	0.39	-0.003	0.5	0.002
Acushnet River Southwest	8	8	0	0	0	0	0	0	0	0
Acushnet River - west	9	9	0	0	0	0	0	0	0	0

Table 1 Required Recharge Volume
Nye Lubricants, Inc. , 12 Howland Road, Fairhaven, MA
As shown in Vol 3. Chapter 1 Page 15 of the Massachusetts Stormwater Handbook
Required Recharge Volume determined by the following equation:

$R_v = F \times A_{imp}$ where:

R_v	Required Recharge Volume
F	Target Depth Factor
A_{imp}	Impervious Area

Given:
NRCS Hydrologic Soil Type - B
Target Depth Factor = 0.35 inch

Post Development Subcatchment	A_{imp} $ft.^2$	A_{imp} acre	F inch	R_v acre-ft	R_v $ft.^3$	
1	56,560	1.30	0.35	0.0379	1649.667	Existing Impervious , No change proposed
2A	30,000	0.69	0.35	0.0201	875	
2B	30,000	0.69	0.35	0.0201	875	
3	5,870	0.13	0.35	0.0039	171.2083	Existing Impervious , No change proposed
4	9,310	0.21	0.35	0.0062	271.5417	
5	52,370	1.20	0.35	0.0351	1527.458	
6	58,490	1.34	0.35	0.0392	1705.958	Existing Impervious, no new impervious, only a reduction of impervious
7	36,860	0.85	0.35	0.0247	1075.083	Existing Impervious, no new impervious, only a reduction of impervious
8	72,920	1.67	0.35	0.0488	2126.833	Existing Impervious , No change proposed
9	0	0.00	0.35	0.0000	0	
10	22,140	0.51	0.35	0.0148	645.75	Existing Impervious , No change proposed
Totals for the developed site	374520.00	8.60	0.60	0.25	10923.50	

Table 2 Simple Dynamic Method for Recharge
Nye Lubricants, Inc. , 12 Howland Road, Fairhaven, MA
As shown in Vol 3. Chapter 1 Page 19 of the Massachusetts Stormwater Handbook
Using the following equations
$A = R_v / (D+KT)$
$V = A \times D$
where

R_v	Required Recharge Volume
A	Minimum Req'd surface area of the bottom of the infiltration structure
V	Storage Volume
D	depth of the infiltration facility
K	Rawls rate for saturated hydraulic conductivity
T	allowable drawdown

Use

k=	1.02	in/hr
T	2	hours

Subcatchment	R_v $ft.^3$	D ft	A $ft.^2$	V_{req} $ft.^3$	Receiving Recharge Facility	$V_{provided}$ $ft.^3$	$V_{provided} > V_{req}$ Yes/No
1	1,649.67				N/A - No change		
2A	875.00	1.90	422.71	803.14	Recharge System 1	2,396	Yes
2B	875.00	1.90	422.71	803.14	Recharge System 2	2,396	Yes
3	171.21				N/A - No change		
4	271.54	1.00	232.09	232.09	Permeable Parking	2,737	Yes
5	1,527.46	2.00	703.90	1,407.80	Bioretention Areas 1 and 2	2,015	Yes
6	1,705.96	2.00	786.16	1,572.31	Bioretention Areas 3	786	N/A Reduction in Impervious Only
7	1,075.08				N/A Reduction in Impervious Only		
8	2,126.83				N/A - No change		
9	0.00				N/A - No change	609	Yes
10	645.75				N/A - No change		
Totals for the developed site	10,277.75	N/A	2,567.55	4,818.47	N/A	10,938.20	Yes

Table 3 Drawdown
Nye Lubricants, Inc. , 12 Howland Road, Fairhaven, MA

Using the following equations
$Time_{drawdown} = R_v/(K^* Bottom\ Area)$
As shown in Vol 3. Chapter 1 Page 25 of the Massachusetts Stormwater Handbook

$Time_{drawdown}$	Drawdown time for Infiltration BMP, must be < 72 hours
R_v	Required Recharge Volume
Bottom area	Bottom Area of Recharge Structure
K	Rawls rate for saturated hydraulic conductivity
K=	1.02 in/hr

Subcatchment	R_v $ft.^3$	Bottom Area $ft.^2$	$Time_{drawdown}$ hours	$Time_{drawdown}$ < 72 hours Yes/No
1	1,649.67	N/A	N/A	N/A
2A	875.00	2400	4.29	Yes
2B	875.00	2400	4.29	Yes
3	171.21	N/A	N/A	N/A
4	271.54	3910	0.82	Yes
5	1,527.46	2556	7.03	Yes
6	1,705.96	470	42.70	Yes
7	1,075.08	N/A	N/A	N/A
8	2,126.83	N/A	N/A	N/A
9	0.00	N/A	N/A	N/A
10	645.75	N/A	N/A	N/A
Totals	10,277.75	11,736.00	59.13	Yes

Table 4 Water Quality Volume

Nye Lubricants, Inc. , 12 Howland Road, Fairhaven, MA

As shown in Vol 3. Chapter 1 Page 32 of the Massachusetts Stormwater Handbook

$V_{WQ} = (D_{WQ}/12 \text{ in/ft})*(A_{imp}*43{,}560 \text{ ft.}^2/\text{acre})$

where

V_{WQ}	Water Quality Volume
D_{WQ}	Water Quality Depth
A_{imp}	Impervious Area

D_{WQ} 0.5 in

Subcatchment	A_{imp}	A_{imp}	V_{WQ}	$V_{provided}$	$V_{provided} > V_{req}$
	ft.^{2}	acre	ft.^{3}	ft.^{3}	Yes/No
1	56,560	1.30	2,356.67	N/A	Yes
2A	30,000	0.69	1,250.00	2,396	Yes
2B	30,000	0.13	244.58	2,396	Yes
3	5,870	0.21	387.92	N/A	Yes
4	9,310	1.20	2,182.08	2,737	Yes
5	52,370	1.34	2,437.08	2,015	No
6	58,490			786	Yes
7	36,860			N/A	Yes
8	72,920			N/A	Yes
9	0			N/A	Yes
10	22,140			N/A	Yes
Totals	374,520	4.88	8,858	10,329	Yes

Table 5 TSS Removal Worksheet
Nye Lubricants, Inc. , 12 Howland Road, Fairhaven, MA
As shown in Vol 3. Chapter 1 Page 34 of the Massachusetts Stormwater Handbook

Treatment Train No. 1 Applicable to Subcatchment 5

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Vegetated Swale	25%	1.00	0.25	0.75
Bioretention Area	90%	0.75	0.68	0.08
	Total TSS Removal =		**0.93**	

Treatment Train No. 2 Applicable to Subcatchment 2

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Subsurface Recharge	80%	1.00	0.80	0.20
	Total TSS Removal =		**0.80**	

No pretreatment needed for Roof Runoff

Stormwater Report

Illicit Discharge Compliance Statement

From: Martin J. Weinstein
Date: August 8, 2019
Subject: Statement on Illicit Discharges

To whom it may concern,

There are no known or suspected illicit discharge within the project site area. All undocumented pipes have been closed off and no longer functional. No illicit discharges shall be made during the construction process and this compliance statement is provided as required by the MA DEP Stormwater Management Policy Manual.

Very Respectfully,

Martin J. Weinstein
Director of Quality, Engineering, and EHS
Phone: (508) 996-6721 (ext.627)
Email: mweinstein@nyelubricants.com

Stormwater Report

Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan

In support of its efforts for the Expansion of Building 3, Nye Lubricants, Inc (Nye) is also installing a series of stormwater Best Management Practices (BMPs) to provide water quality treatment from the runoff from parking area as well as promote recharge and protect the neighboring wetland resource areas. While Nye will be implementing provisions of their Operations and Maintenance plan for those stormwater BMPs, the are also providing this Long-Term Pollution Prevention Plan to enhance and protect water quality from their operations on site. Note: the Nye property is much larger than the project area in front of Building 3, so this plan will be focused on the project area mostly but may reference activities and locations outside of the project area but still part of the Nye campus.

Contacts

The Nye personnel responsible for implementing this Long-Term Pollution Prevention Plan are:

Martin J. Weinstein
Director of Quality, Engineering, EHS
mweinstein@nyelubricants.com
508-996-6721

Victor Montero
vmontero@nyelubricants.com
978-390-9934

Routine Inspections

Routine inspections for the stormwater BMPs will occur as dictated in the Operations and Maintenance plan for the Building 1 Parking Area Stormwater BMPs and the Building 3 Stormwater BMP Manual. Routine inspections for material storage and environmental controls are covered by the Spill Prevention Control and Countermeasure Plan, prepared by Apex Companies, LLC, dated October 2020.

Vehicle Washing Controls

There is no -onsite washing of vehicles, and any maintenance done to vehicles is performed within Building 3.

Spill Prevention

Nye's spill prevention procedures and activities are described and covered in its Spill Prevention Control and Countermeasure Plan, prepared by Woodard and Curran, dated December 4, 2017.

Material Storage

Nye's management and control of storage of hazardous materials on site are described and covered in its Spill Prevention Control and Countermeasure Plan, prepared by Apex Companies, LLC, dated October 2020.

Maintenance of Landscaped Areas

Nye employs a maintenance staff that handles day to day maintenance of the grounds. In addition, Nye has a Landscaper under contract, who visits the site once or twice per week as needed to maintain the grounds. Nye is committed to having a cleaning landscaped grounds.

Fertilizers, Herbicides and Pesticides

The use of fertilizers, herbicides and pesticides is on a limited basis and performed by its landscaping subcontractor. Application of these materials is not done within 48 of a forecasted storm event.

Pet waste management

There are typically no pets on the grounds at Nye, however if a passerby walking a pet leaves waste unattended, one of Nye's maintenance staff will remove and properly dispose of the waste.

Septic System Management

The Nye facility on Howland Road is serviced the municipal Publicly Owned Treatment Works in the Town of Fairhaven and therefor there is no Septic System management required.

Solid Waste Management

The primary solid waste management is performed behind Building 3, where their trash dumpsters as well as recycling facilities. There is a trash compactor on southern side of Building 1 in the project, on a concrete pad. Nye takes care to maintain and keep clean the areas surrounding these items.

Snow Disposal and Plowing Plans

During winter storm events, snow is typically removed by plowing from the parking areas and stockpiled on site. No stockpile of snow will be allowed on top of the stormwater BMPs being implemented as part of this project.

Salt

Pet friendly salt is used for the paved areas where walking and parking activities occur to ensure safe conditions for workers and visitors at Nye.

Street Sweeping

Nye has an on-site street sweeper which is used for the seashells continually dropped on the parking areas by birds in the area. The street sweeping proceeds are collected and properly disposed.

Illicit Discharges

Nye has already implemented a program to inspect and remove illicit discharges and provided an Illicit Discharge statement with the Notice of Intent filing. Nye will continue to monitor for and prohibit illicit discharges for its facility.

Training for Staff or Personnel

Nye will continue to oversee and implement this plan, which will include training and educate of maintenance staff and subcontractors, such as landscapers working on the grounds. Training is also included in its Spill Prevention Control and Countermeasure Plan, prepared by Apex Companies, LLC, dated October 2020.

Stormwater Report

Operations and Maintenance Plan

Operation & Maintenance Plan for Stormwater BMPs Nye Lubricants, Inc. 12 Howland Road Fairhaven, MA 02719

Prepared for:
Nye Lubricants, Inc.
12 Howland Road
Fairhaven, MA 02719

Prepared by:

Apex Companies, LLC
1213 Purchase Street, Room 231
New Bedford, MA 02740

Table of Contents

Appendices

1.0 Introduction

Nye Lubricants, Inc (Nye) originally created this Stormwater O&M plan in 2019 as part of its efforts to repave the area in front of Building 1. This O&M plan is being updated to incorporate the proposed changes as part of the Building 3 expansion project. This work involves Nye's operations along Howland Road, which encompasses two (2) parcels of land, Map 19 Lot 100 and Map 19 Lot 242. As part of the balance between development and environmental protection, the project proposes various Stormwater Best Management Practices (BMPs) to capture and treat runoff from the developed area and maintain the ecological integrity of the wetland resource areas.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) provides a mechanism for the consistent inspection and maintenance of the of stormwater drainage structures installed during the Project. Included in this O&M Plan is a description of the stormwater structure, the location of each structure, an inspection schedule for each stormwater structure, and a standard form to be utilized to document the inspection and maintenance of each stormwater structure. Nye will be responsible for the Operation and Maintenance of the proposed Stormwater BMPs and the vegetative plantings. We estimated that the annual expense will be $2,500 for all the tasks described herein.

3.0 Descriptions and Locations

3.1 Description

The stormwater BMPs to be operated and maintained include a vegetated filter strip, vegetated/landscaped plantings areas/swale, subsurface recharge chambers and raingarden/bioretention area. For more specific location information and design specifications, please refer to the project plans accompanying this O&M Plan.

3.1.1 RainGardens/ Bioretention areas

RainGardens function as soil and plant-based filtration devices that remove pollutants through a variety of physical, biological, and chemical treatment processes. The RainGardens used in this Project utilize a bioretention system consisting of a soil bed planted with native vegetation all located above an underdrain layer. Stormwater runoff entering the RainGarden system is filtered through the hardwood bark mulch layer and then the bioretention soil mixture before being collected and then conveyed downstream by the underdrain system. Runoff storage depths above the planting bed surface are less than 6 inches. Bioretention systems are used to remove a wide range of pollutants, such as suspended solids, nutrients, metals, hydrocarbons, and bacteria from stormwater runoff. They can also reduce the peak runoff rates and increase stormwater infiltration when designed as a multi-stage, multi-function facility.[1]

[1] New Jersey Stormwater Best Management Practices Manual, February 2004, Chapter 9.1, "Standard for Bioretention Systems."

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3.1.2 Vegetated Filter Strip

Vegetated Filter strips, often referred to as grass buffer strips, are uniformly graded vegetated surfaces that receive sheet flow runoff from an adjacent impervious area. These filters are intended slow runoff, filter some of the sediment and promote natural infiltration. They are typically designed as a pre-treatment stormwater BMP and implemented as a first line of defense in a stormwater treatment train.

3.1.3 Landscaped Planting Beds/ Swales

Several of the parking area planting beds will be inverted, rather than raised to provide increase hydraulic retention time and promote recharge and filtering prior to release to the main treatment BMPs. Because of the shape, planting and mulch associated with these landscaped beds, they will retain runoff for longer periods of time. These are intended as a pre-treatment stormwater BMP and will allow for settlement of suspended solids prior to discharge.

3.1.4 Subsurface Chambers

Roof runoff is generally considered "clean" and does not require pre-treatment prior to recharge. A series of cultec stormwater chambers set on a bed of crushed stone and backfill with stone as well, are being implemented to handle the roof runoff from the Building 3 expansion. These recharge chambers will received the roof runoff directly and provide subsurface detention and recharge into the native subsurface.

3.1.5 Street Sweeping

Street sweeping activities are performed to address debris that collects in parking and paved areas. At this site that could include sand, debris, and seashells. This is a non-structural best management practice that is used to removed items that collect on the impervious area that could contain nutrients or contaminants that would be deleterious to the surrounding area if they runoff from the impervious area.

3.2 Location

The site is located at 12 Howland Road in Fairhaven, with the stormwater BMPs located in the southwestern corner of the parking area for Building 1, in the parking area in front of Building 3, and to the east where some recharge chambers are located. Locations are also shown in the plans provided in Appendix B of this Manual.

4.0 Inspection Frequency, Safety, and Schedule

4.1 Inspection Frequency

A complete and thorough inspection of the system using the inspection and maintenance forms provided in Appendix A of this Manual shall be performed on a semi-annual basis (once in the spring and once during the fall) and after major rain events or nor'easter storm events (approximately 2.0 inches of rain). See Section 5.0 Implementation and Maintenance Procedures for a description of the inspection activities.

4.2 Inspection Safety

The inspector performing the inspections on the structures and vegetation must have the proper safety equipment (heavy duty gloves, steel-toed boots, hard hat, and first aid kits, etc.) and training before conducting any inspections. If the drainage structures reveal any safety problems the site activities may need to be modified to reduce or eliminate the safety risk. The following is a list of safety precautions the inspector should be aware of when conducting the drainage structure inspections.

- Wear gloves for any inspections. Wearing gloves not only reduces the risk of getting cuts and abrasions, but also reduces the exposure of pollutants to the skin.
- Lift boulders or cobbles carefully. These items can be very heavy and if wet, can be slippery. Also, learn the correct way to lift heavy items to avoid back injury.
- Check the water depth of the system before you take a step in the water. The water may be deeper than you think or there may be steep slopes below the water line.
- Be aware that nails, broken glass, or other sharp debris may be present and can cause injury. Wearing the proper safety clothing will reduce the safety risk associated with these objects.
- Because the site contains vegetation, ticks, mosquitos and other pests can represents a risk. Products containing permethrin kill ticks. Permethrin can be used to treat boots, clothing and camping gear and remain protective through several washings. Use a repellent with DEET on skin. Repellents containing 20% or more DEET (N, N-diethyl-m-toluamide) can protect up to several hours. Always follow product instructions. Long sleeves and long pants are recommended to be worn to minimize exposed skin areas. After the site visit, check clothing and body for ticks, and remove any found as soon as possible, using tweezers and pulling the tick straight out.

4.3 Maintenance

All maintenance work must be done in accordance with OSHA regulations. Maintenance personnel will have the proper safety equipment (heavy duty gloves, steel-toed boots, first aid kits, etc.) and training before performing any maintenance on the Site. The following is a list of safety precautions maintenance personnel should be aware of when they perform maintenance on the drainage structures.

- Operate equipment safely and in accordance with the manufacturer's specifications. Equipment operators must always remain aware of site personnel to avoid causing injury to others.
- Contact Dig Safe System Inc. at 1-888-DIG-SAFE seventy-two (72) hours before excavating a site. Underground utility wires and pipes may be present. Cover excavated areas that cannot be filled in at the end of the day. Also, be aware of overhead electrical wires that could come in contact with maintenance equipment.
- Identify where you will dispose removed sediment or wastes prior to cleaning the drainage structures. Use shovels, trowels or a high-suction vacuum to remove wastes. Do not clean sediment or waste with bare hands. The sediment or waste may be hazardous. Place the sediment or waste in an area where it cannot be washed into a storm drain or water body.
- Wear gloves when performing maintenance work. Wearing gloves not only reduces the risk of getting cuts and abrasions, but also reduces the exposure of pollutants to the skin.

5.0 Implementation and Maintenance Procedures

Nye is responsible for inspecting and maintaining the parking area and the stormwater BMPs being implemented as part of this project. The following list of inspections and maintenance will be performed on the required schedule. All sediment, debris, and hydrocarbons contaminated material that are removed during the maintenance of the stormwater system components should be properly handled and disposed.

5.1 RainGardens

The primary maintenance requirement for RainGardens (Bioretention Systems) is that of inspection, and repair or replacement of the RainGarden's individual components. Typically, these activities consist of nothing more than that which is required of any landscaped area. The primary maintenance function is the removal of accumulated sediment and debris. Other potential tasks include the replacement of dead vegetation, soil pH regulation, erosion repair at inflow points, mulch replenishment and repair of inflow structures.

5.1.1 Checklist

Table 5-1 RainGarden Maintenance Schedule
Soil
• Visually inspect and repair in the Spring and Fall. In the event of erosion, stabilize erosion path with ¾ inch crushed stone • Remove accumulated sediment, debris, and litter • Check the soil pH every other Spring. Apply appropriate product to adjust pH, as required. The recommended soil pH levels should range from between 5.0 and 6.0 for the raingardens.
Mulch
• Re-mulch any void areas by hand, as needed. • Every Spring add a fresh mulch layer. • Every 3rd year, remove and replace mulch.
Plants
• Once a month during the growing season, visually inspect vegetation for disease and pest problems. • Every Spring and Fall, remove and replace all dead and diseased vegetation. • Weed, as needed. • Prune excess growth and dead branches every Spring. • During periods of drought, inspect for signs of stress (wilting, yellow, spotted or brown leaves, loss of leaves, etc.). Water in the early morning as needed.
General

• Annually, after a heavy rainstorm, inspect RainGardens for signs of ponding and to make sure water dissipates after a period of 4 to 6 hours. • Monthly, inspect and remove accumulated trash and debris from Raingardens.

5.2 Vegetated Filter Strips

Inspections will be performed once during the late spring and once during the fall, however there shall be additional inspections per year for the first growing season following construction. During the initial post-construction period, special attention will be paid to the grass plantings to ensure they are establishing as intended. Filter strips should be inspected for health of vegetation, soil stability, erosion and sedimentation. Regular maintenance tasks include mowing, watering, weeding, pest control and sediment removal.

Checklist

Table 5-2 Vegetated Filter Strip Maintenance Schedule
Soil
• Visually inspect and repair in the Spring and Fall. In the event of erosion, stabilize erosion path by reestablishing soil, grass, and mulch. • Every Spring and Fall remove accumulated sediments and debris. • Check the soil pH every other Spring. Apply appropriate product to adjust pH, as required. The recommended soil pH levels should range between 5.0 and 6.0 for the water quality swales.
Grass
• Once a month during the growing season, visually inspect vegetation for disease and pest problems. • Every Spring and Fall, remove and replace all dead and diseased vegetation. • Weed, as needed. • Reseed if needed, to maintain effectiveness of vegetation for pollutant and sediment removal. • Mow as necessary. Never cut shorter than 4 inches. • During periods of drought, inspect for signs of stress (wilting, yellow, spotted or brown leaves, loss of leaves, etc.). Water in the early morning as needed.
General
• In the event of heavy sediment accumulation, the vegetated water quality swale may need to be reconstructed.

5.3 Planting Bed Areas (swales)

Inspections will be performed once during the late spring and once during the fall, however there shall be additional inspections per year for the first growing season following construction. During the initial post-construction period, special attention will be paid to the plantings to ensure they are establishing as

intended and not affected by the first winter season. These vegetated planting areas should be inspected for health of vegetation, soil stability, erosion and sedimentation. Regular maintenance tasks include mowing, watering, weeding, replacement of dead vegetation pest control and sediment removal.

Checklist

Table 5-2 Planting Bed Maintenance Schedule
Soil
• Visually inspect and repair in the Spring and Fall. In the event of erosion, stabilize erosion path by reestablishing soil, grass, and mulch. • Every Spring and Fall remove accumulated sediments and debris. • Check the soil pH every other Spring. Apply appropriate product to adjust pH, as required. The recommended soil pH levels should range between 5.0 and 6.0 for the water quality swales.
Mulch
• Re-mulch any void areas by hand, as needed. • Every Spring add a fresh mulch layer. • Every 3rd year, remove and replace mulch.
Plants
• Once a month during the growing season, visually inspect vegetation for disease and pest problems. • Every Spring and Fall, remove and replace all dead and diseased vegetation. • Weed, as needed. • Prune excess growth and dead branches every Spring. • During periods of drought, inspect for signs of stress (wilting, yellow, spotted or brown leaves, loss of leaves, etc.). Water in the early morning as needed.
General
• In the event of heavy sediment accumulation, the landscaped area may need to be reconstructed.

5.4 Subsurface Recharge Chambers

Inspections will be performed once during the late spring and once during the fall, however there shall be additional inspections for the first year following construction as the site is stabilized. During the initial post-construction period, special attention will be paid to ensure there is not an accumulation of sediment within the chambers. Regular maintenance tasks include visual inspection and documentation.

As recommended by the manufacturer, there are several maintenance activities to follow:

The CULTEC system will be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC

Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pretreatment device). CCTV inspection of this row can be deployed through this access port to deter mine if any sediment has accumulated in the inlet row.

Minor Maintenance The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris, as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris, as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris, as required.

Major Maintenance The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers.

	Frequency	Action
Inlets and Outlets	Every 3 years	• Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	• Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	• Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	• Clean stormwater management chambers and feed connectors of any debris. • Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	• Clean stormwater management chambers and feed connectors of any debris. • Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. • Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. • Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. • Attain the appropriate approvals as required. • Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1st year	• Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	• Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	• Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

5.5 Street Sweeping

Nye has an on-site street sweeper which is used for the seashells continually dropped on the parking areas by birds in the area. The street sweeping will also be used to remove sediment and debris that accumulates in the parking structure. The street sweeping proceeds are collected and properly disposed.

5.5.1 Checklist

Table 5-2 **Street Sweeping Maintenance Schedule**
Soil
• Visually inspect in the Spring and Fall, particularly in advance of snow storms, and following a heavy snow event and the associated melting.

• Every Spring and Fall remove accumulated sediments and debris. • Seashells shall be removed on an as-needed basis.
General
• In the event of heavy sediment accumulation, street sweeping may need to occur more frequently.

6.0 Inspections and Record Keeping

An "Inspection and Maintenance Form" shall be filled out each time inspectional or maintenance work is performed.

A binder will be kept at the property owner's offices that contains all the completed forms and/or photos and related material. The inspection reports in the binder will be maintained for a minimum of three years and will include photo documentation of the inspections.

A review of all Operation & Maintenance actions will take place annually to ensure that the Site is being taken care of in the manner illustrated in this Operation & Maintenance Plan.

The Nye personnel responsible for implementing this Operations and Maintenance Plan are:

_____

Martin J. Weinstein
Director of Quality, Engineering, EHS
mweinstein@nyelubricants.com
508-996-6721

Victor Montero
vmontero@nyelubricants.com
978-390-9934

_____

O&M Activity Log –Stormwater BMPs, 12 Howland Rd, Fairhaven, MA

Activity No.	Description of the Activity	Dates of the Activity	Signature of Person Performing Activity	Activity Performed by [Name(s) and Title]
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

BIORETENTION MAINTENANCE INSPECTION FORM

Bioretention Cell: _____ Date: _____ Time: _____
Weather: _____ Inspector(s): _____
Date of last rainfall: _____ Amount: _____ Inches
Street Location: _____

Maintenance Issues:
Comments:

Scoring Breakdown:		
N/A = Not Applicable	**1 = Monitor (potential for future problem exists**	***Use open space in each section to further explain scoring as needed**
N/I = Not Investigated	**2 = Routine maintenance required**	
0 = Not a problem	**3 = Immediate repair necessary**	

1. Outlet, Underdrain, & Cleanout Condition (Inspect underdrain outlet inside catch basin)						
Broken (replacement required?)	N/A	N/I	0	1	2	3
Clogging (flushing required)	N/A	N/I	0	1	2	3
Submerged Outlet Pipe (CB cleaning required)	N/A	N/I	0	1	2	3
2. Bioretention Soil Mix Condition						
Sediment/debris accumulation > 1”	No	Yes				
Ponding more than 24 hours after rain	No	Yes				
Soil pH						
Sediment Accumulation in soil bed	N/A	N/I	0	1	2	3
Oil/chemical accumulation in soil bed	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
3. Plant Condition						
Disease/Pest Problems	N/A	N/I	0	1	2	3
Weeds	N/A	N/I	0	1	2	3
Excess growth and/or dead branches	N/A	N/I	0	1	2	3
Signs of drought	N/A	N/I	0	1	2	3
4. Mulch Condition						
Overall Condition	N/A	N/I	0	1	2	3
5. Erosion						
Soil and/or debris erosion	N/A	N/I	0	1	2	3

<u>Overall Condition of Bioretention Cell</u>
Inspector’s Summary:

Planting Bed MAINTENANCE INSPECTION FORM

Facility Number: _____ Date: _____ Time: _____
Weather: _____ Inspector(s): _____
Date of last rainfall: _____ Amount: _____ Inches
Street Location: _____ GPS Coordinates: _____

Maintenance Issues:
Comments:

Scoring Breakdown:		
N/A = Not Applicable	**1 = Monitor (potential for future problem exists**	***Use open space in each section to further explain scoring as needed**
N/I = Not Investigated	**2 = Routine maintenance required**	
0 = Not a problem	**3 = Immediate repair necessary**	

1. Plant Condition						
Disease/Pest Problems	N/A	N/I	0	1	2	3
Weeds	N/A	N/I	0	1	2	3
Excess growth and/or dead branches	N/A	N/I	0	1	2	3
Debris/trash accumulation	N/A	N/I	0	1	2	3
General plant cover	N/A	N/I	0	1	2	3
Plant diversity	N/A	N/I	0	1	2	3
Signs of drought	N/A	N/I	0	1	2	3
2. Outlet / Underdrain Condition						
Overall Condition	N/A	N/I	0	1	2	3
Broken/Clogged Pipe	N/A	N/I	0	1	2	3
3. Erosion						
Soil and/or debris erosion	N/A	N/I	0	1	2	3
4. Mulch						
Overall Condition	N/A	N/I	0	1	2	3

Overall Condition of Site`
Inspector's Summary:

Photo Caption: XXX	Photo Caption: XXX
Photo Caption: XXX	Photo Caption: XXX
Photo Caption: XXX	Photo Caption: XXX

CONSTITUTION BEACH MAINTENANCE INSPECTION FORM

Facility Number: _____ Date: _____ Time: _____
Weather: _____ Inspector(s): _____
Date of last rainfall: _____ Amount: _____ Inches
Street Location: _____ GPS Coordinates: _____

Maintenance Issues:
Comments:

Scoring Breakdown:		
N/A = Not Applicable	**1 = Monitor (potential for future problem exists**	***Use open space in each section to further explain scoring as needed**
N/I = Not Investigated	**2 = Routine maintenance required**	
0 = Not a problem	**3 = Immediate repair necessary**	

1. Plant Condition						
Disease/Pest Problems	N/A	N/I	0	1	2	3
Weeds	N/A	N/I	0	1	2	3
Excess growth and/or dead branches	N/A	N/I	0	1	2	3
Debris/trash accumulation	N/A	N/I	0	1	2	3
General plant cover	N/A	N/I	0	1	2	3
Plant diversity	N/A	N/I	0	1	2	3
Signs of drought	N/A	N/I	0	1	2	3
2. Boulder Wall Condition						
Overall Condition	N/A	N/I	0	1	2	3
3. Erosion						
Soil and/or debris erosion	N/A	N/I	0	1	2	3

Overall Condition of Site`
Inspector's Summary:

Photo Caption: XXX	Photo Caption: XXX
Photo Caption: XXX	Photo Caption: XXX
Photo Caption: XXX	Photo Caption: XXX

BMP OPERATION & MAINTENANCE LOG

Project Name: _____

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

Minor Maintenance

Frequency		Action
Monthly in first year		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Month 1	Date:	
□ Month 2	Date:	
□ Month 3	Date:	
□ Month 4	Date	
□ Month 5	Date:	
□ Month 6	Date:	
□ Month 7	Date:	
□ Month 8	Date:	
□ Month 9	Date:	
□ Month 10	Date:	
□ Month 11	Date:	
□ Month 12	Date:	
Spring and Fall		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
One year after commissioning and every third year following		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Year 1	Date:	
□ Year 4	Date:	
□ Year 7	Date:	
□ Year 10	Date:	
□ Year 13	Date:	
□ Year 16	Date:	
□ Year 19	Date:	
□ Year 22	Date:	

Major Maintenance

	Frequency		Action
Inlets and Outlets	**Every 3 years**		Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
			Notes
	□ Year 1	Date:	
	□ Year 4	Date:	
	□ Year 7	Date:	
	□ Year 10	Date:	
	□ Year 13	Date:	
	□ Year 16	Date:	
	□ Year 19	Date:	
	□ Year 22	Date:	
	Spring and Fall		Check inlet and outlets for clogging and remove any debris, as required.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
CULTEC Stormwater Chambers	**2 years after commissioning**		□ Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
			Notes
	□ Year 2	Date:	

Major Maintenance

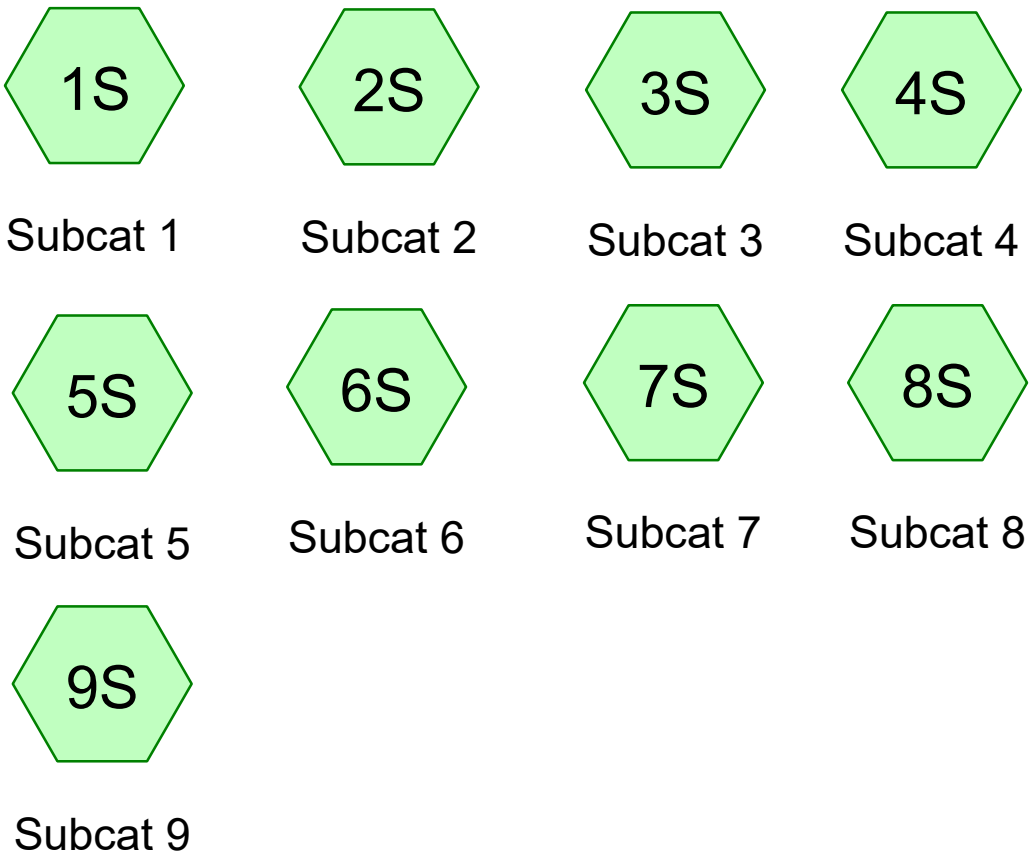
	Frequency		Action
CULTEC Stormwater Chambers	**9 years after commissioning every 9 years following**		□ Clean stormwater management chambers and feed connectors of any debris. □ Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
			Notes
	□ Year 9	Date:	
	□ Year 18	Date:	
	□ Year 27	Date:	
	□ Year 36	Date:	
	45 years after commissioning		□ Clean stormwater management chambers and feed connectors of any debris. □ Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. □ Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. □ Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. □ Attain the appropriate approvals as required. □ Establish a new operation and maintenance schedule.
			Notes
	□ Year 45	Date:	

Major Maintenance

	Frequency		Action
Surrounding Site	**Monthly in 1st year**		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Month 1	Date:	
	□ Month 2	Date:	
	□ Month 3	Date:	
	□ Month 4	Date:	
	□ Month 5	Date:	
	□ Month 6	Date:	
	□ Month 7	Date:	
	□ Month 8	Date:	
	□ Month 9	Date:	
	□ Month 10	Date:	
	□ Month 11	Date:	
	□ Month 12	Date:	
	Spring and Fall		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	Yearly		□ Confirm that no unauthorized modifications have been performed to the site.
			Notes
	□ Year 1	Date:	
	□ Year 2	Date:	
	□ Year 3	Date:	
	□ Year 4	Date:	
	□ Year 5	Date:	
	□ Year 6	Date:	
	□ Year 7	Date:	

Stormwater Report

Existing Conditions HydroCAD model



Subcat Reach Pond Link

Routing Diagram for Nye Bldg 3 Existing Conditions
Prepared by {enter your company name here}, Printed 5/2/2021

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>2.54"
Flow Length=280' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=5.21 cfs 0.367 af

Subcatchment 2S: Subcat 2 Runoff Area=18,870 sf 34.50% Impervious Runoff Depth>1.17"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=74 Runoff=0.59 cfs 0.042 af

Subcatchment 3S: Subcat 3 Runoff Area=19,250 sf 30.49% Impervious Runoff Depth>1.63"
Flow Length=150' Slope=0.0200 '/' Tc=5.0 min CN=81 Runoff=0.87 cfs 0.060 af

Subcatchment 4S: Subcat 4 Runoff Area=135,960 sf 50.27% Impervious Runoff Depth>1.55"
Flow Length=360' Slope=0.0200 '/' Tc=11.3 min CN=80 Runoff=4.74 cfs 0.404 af

Subcatchment 5S: Subcat 5 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>2.94"
Flow Length=135' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=1.79 cfs 0.132 af

Subcatchment 6S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>2.74"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=94 Runoff=5.27 cfs 0.379 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 81.72% Impervious Runoff Depth>2.44"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=91 Runoff=3.11 cfs 0.218 af

Subcatchment 8S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>2.84"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=6.00 cfs 0.436 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>0.49"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=0.36 cfs 0.054 af

Total Runoff Area = 12.173 ac Runoff Volume = 2.092 af Average Runoff Depth = 2.06"
37.69% Pervious = 4.587 ac 62.31% Impervious = 7.586 ac

Summary for Subcatchment 1S: Subcat 1

Runoff = 5.21 cfs @ 12.07 hrs, Volume= 0.367 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
18,970	73	Woods/grass comb., Poor, HSG B
56,560	98	Paved parking, HSG B
75,530	92	Weighted Average
18,970		25.12% Pervious Area
56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.0	180	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	280	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 2S: Subcat 2

Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.042 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
12,360	61	>75% Grass cover, Good, HSG B
6,510	98	Paved parking, HSG B
18,870	74	Weighted Average
12,360		65.50% Pervious Area
6,510		34.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	130	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 3

Runoff = 0.87 cfs @ 12.08 hrs, Volume= 0.060 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
13,380	73	Woods/grass comb., Poor, HSG B
5,870	98	Paved parking, HSG B
19,250	81	Weighted Average
13,380		69.51% Pervious Area
5,870		30.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.3	50	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Subcat 4

Runoff = 4.74 cfs @ 12.16 hrs, Volume= 0.404 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
67,610	61	>75% Grass cover, Good, HSG B
68,350	98	Paved parking, HSG B
135,960	80	Weighted Average
67,610		49.73% Pervious Area
68,350		50.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.5	260	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.3	360	Total			

Summary for Subcatchment 5S: Subcat 5

Runoff = 1.79 cfs @ 12.07 hrs, Volume= 0.132 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
1,360	61	>75% Grass cover, Good, HSG B
22,140	98	Paved parking, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.2	35	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 6S: Subcat 6

Runoff = 5.27 cfs @ 12.07 hrs, Volume= 0.379 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
12,350	73	Woods/grass comb., Poor, HSG B
60,040	98	Paved parking, HSG B
72,390	94	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.5	250	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	350	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 3.11 cfs @ 12.07 hrs, Volume= 0.218 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
8,510	61	>75% Grass cover, Good, HSG B
38,040	98	Paved parking, HSG B
46,550	91	Weighted Average
8,510		18.28% Pervious Area
38,040		81.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 8S: Subcat 8

Runoff = 6.00 cfs @ 12.07 hrs, Volume= 0.436 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
7,440	61	>75% Grass cover, Good, HSG B
72,920	98	Paved parking, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.6	75	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 0.36 cfs @ 12.33 hrs, Volume= 0.054 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>3.89"
Flow Length=280' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=7.81 cfs 0.562 af

Subcatchment 2S: Subcat 2 Runoff Area=18,870 sf 34.50% Impervious Runoff Depth>2.20"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=74 Runoff=1.15 cfs 0.080 af

Subcatchment 3S: Subcat 3 Runoff Area=19,250 sf 30.49% Impervious Runoff Depth>2.81"
Flow Length=150' Slope=0.0200 '/' Tc=5.0 min CN=81 Runoff=1.51 cfs 0.103 af

Subcatchment 4S: Subcat 4 Runoff Area=135,960 sf 50.27% Impervious Runoff Depth>2.71"
Flow Length=360' Slope=0.0200 '/' Tc=11.3 min CN=80 Runoff=8.35 cfs 0.706 af

Subcatchment 5S: Subcat 5 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>4.33"
Flow Length=135' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=2.58 cfs 0.195 af

Subcatchment 6S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>4.11"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=94 Runoff=7.74 cfs 0.569 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 81.72% Impervious Runoff Depth>3.79"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=91 Runoff=4.72 cfs 0.337 af

Subcatchment 8S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>4.22"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=8.71 cfs 0.649 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>1.18"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=1.17 cfs 0.131 af

Total Runoff Area = 12.173 ac Runoff Volume = 3.331 af Average Runoff Depth = 3.28"
37.69% Pervious = 4.587 ac 62.31% Impervious = 7.586 ac

Summary for Subcatchment 1S: Subcat 1

Runoff = 7.81 cfs @ 12.07 hrs, Volume= 0.562 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
18,970	73	Woods/grass comb., Poor, HSG B
56,560	98	Paved parking, HSG B
75,530	92	Weighted Average
18,970		25.12% Pervious Area
56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.0	180	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	280	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 2S: Subcat 2

Runoff = 1.15 cfs @ 12.08 hrs, Volume= 0.080 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
12,360	61	>75% Grass cover, Good, HSG B
6,510	98	Paved parking, HSG B
18,870	74	Weighted Average
12,360		65.50% Pervious Area
6,510		34.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	130	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 3

Runoff = 1.51 cfs @ 12.07 hrs, Volume= 0.103 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
13,380	73	Woods/grass comb., Poor, HSG B
5,870	98	Paved parking, HSG B
19,250	81	Weighted Average
13,380		69.51% Pervious Area
5,870		30.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.3	50	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Subcat 4

Runoff = 8.35 cfs @ 12.16 hrs, Volume= 0.706 af, Depth> 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
67,610	61	>75% Grass cover, Good, HSG B
68,350	98	Paved parking, HSG B
135,960	80	Weighted Average
67,610		49.73% Pervious Area
68,350		50.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.5	260	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.3	360	Total			

Summary for Subcatchment 5S: Subcat 5

Runoff = 2.58 cfs @ 12.07 hrs, Volume= 0.195 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
1,360	61	>75% Grass cover, Good, HSG B
22,140	98	Paved parking, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.2	35	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 6S: Subcat 6

Runoff = 7.74 cfs @ 12.07 hrs, Volume= 0.569 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
12,350	73	Woods/grass comb., Poor, HSG B
60,040	98	Paved parking, HSG B
72,390	94	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.5	250	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	350	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 4.72 cfs @ 12.07 hrs, Volume= 0.337 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
8,510	61	>75% Grass cover, Good, HSG B
38,040	98	Paved parking, HSG B
46,550	91	Weighted Average
8,510		18.28% Pervious Area
38,040		81.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 8S: Subcat 8

Runoff = 8.71 cfs @ 12.07 hrs, Volume= 0.649 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
7,440	61	>75% Grass cover, Good, HSG B
72,920	98	Paved parking, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.6	75	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 1.17 cfs @ 12.26 hrs, Volume= 0.131 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>4.67"
Flow Length=280' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=9.28 cfs 0.675 af

Subcatchment 2S: Subcat 2 Runoff Area=18,870 sf 34.50% Impervious Runoff Depth>2.85"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=74 Runoff=1.50 cfs 0.103 af

Subcatchment 3S: Subcat 3 Runoff Area=19,250 sf 30.49% Impervious Runoff Depth>3.52"
Flow Length=150' Slope=0.0200 '/' Tc=5.0 min CN=81 Runoff=1.88 cfs 0.130 af

Subcatchment 4S: Subcat 4 Runoff Area=135,960 sf 50.27% Impervious Runoff Depth>3.42"
Flow Length=360' Slope=0.0200 '/' Tc=11.3 min CN=80 Runoff=10.49 cfs 0.888 af

Subcatchment 5S: Subcat 5 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>5.13"
Flow Length=135' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=3.02 cfs 0.230 af

Subcatchment 6S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>4.90"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=94 Runoff=9.13 cfs 0.678 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 81.72% Impervious Runoff Depth>4.56"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=91 Runoff=5.63 cfs 0.406 af

Subcatchment 8S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>5.01"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=10.25 cfs 0.770 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>1.66"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=1.73 cfs 0.183 af

Total Runoff Area = 12.173 ac Runoff Volume = 4.065 af Average Runoff Depth = 4.01"
37.69% Pervious = 4.587 ac 62.31% Impervious = 7.586 ac

Summary for Subcatchment 1S: Subcat 1

Runoff = 9.28 cfs @ 12.07 hrs, Volume= 0.675 af, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
18,970	73	Woods/grass comb., Poor, HSG B
56,560	98	Paved parking, HSG B
75,530	92	Weighted Average
18,970		25.12% Pervious Area
56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.0	180	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	280	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 2S: Subcat 2

Runoff = 1.50 cfs @ 12.08 hrs, Volume= 0.103 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
12,360	61	>75% Grass cover, Good, HSG B
6,510	98	Paved parking, HSG B
18,870	74	Weighted Average
12,360		65.50% Pervious Area
6,510		34.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	130	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 3

Runoff = 1.88 cfs @ 12.07 hrs, Volume= 0.130 af, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
13,380	73	Woods/grass comb., Poor, HSG B
5,870	98	Paved parking, HSG B
19,250	81	Weighted Average
13,380		69.51% Pervious Area
5,870		30.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.3	50	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Subcat 4

Runoff = 10.49 cfs @ 12.16 hrs, Volume= 0.888 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
67,610	61	>75% Grass cover, Good, HSG B
68,350	98	Paved parking, HSG B
135,960	80	Weighted Average
67,610		49.73% Pervious Area
68,350		50.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.5	260	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.3	360	Total			

Summary for Subcatchment 5S: Subcat 5

Runoff = 3.02 cfs @ 12.07 hrs, Volume= 0.230 af, Depth> 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
1,360	61	>75% Grass cover, Good, HSG B
22,140	98	Paved parking, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.2	35	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 6S: Subcat 6

Runoff = 9.13 cfs @ 12.07 hrs, Volume= 0.678 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
12,350	73	Woods/grass comb., Poor, HSG B
60,040	98	Paved parking, HSG B
72,390	94	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.5	250	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	350	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 5.63 cfs @ 12.07 hrs, Volume= 0.406 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
8,510	61	>75% Grass cover, Good, HSG B
38,040	98	Paved parking, HSG B
46,550	91	Weighted Average
8,510		18.28% Pervious Area
38,040		81.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 8S: Subcat 8

Runoff = 10.25 cfs @ 12.07 hrs, Volume= 0.770 af, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
7,440	61	>75% Grass cover, Good, HSG B
72,920	98	Paved parking, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.6	75	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 1.73 cfs @ 12.26 hrs, Volume= 0.183 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>6.05"
Flow Length=280' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=11.83 cfs 0.874 af

Subcatchment 2S: Subcat 2 Runoff Area=18,870 sf 34.50% Impervious Runoff Depth>4.04"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=74 Runoff=2.13 cfs 0.146 af

Subcatchment 3S: Subcat 3 Runoff Area=19,250 sf 30.49% Impervious Runoff Depth>4.80"
Flow Length=150' Slope=0.0200 '/' Tc=5.0 min CN=81 Runoff=2.55 cfs 0.177 af

Subcatchment 4S: Subcat 4 Runoff Area=135,960 sf 50.27% Impervious Runoff Depth>4.69"
Flow Length=360' Slope=0.0200 '/' Tc=11.3 min CN=80 Runoff=14.29 cfs 1.219 af

Subcatchment 5S: Subcat 5 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>6.52"
Flow Length=135' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=3.80 cfs 0.293 af

Subcatchment 6S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>6.28"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=94 Runoff=11.55 cfs 0.870 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 81.72% Impervious Runoff Depth>5.93"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=91 Runoff=7.22 cfs 0.528 af

Subcatchment 8S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>6.40"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=12.92 cfs 0.984 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>2.59"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=2.83 cfs 0.287 af

Total Runoff Area = 12.173 ac Runoff Volume = 5.378 af Average Runoff Depth = 5.30"
37.69% Pervious = 4.587 ac 62.31% Impervious = 7.586 ac

Summary for Subcatchment 1S: Subcat 1

Runoff = 11.83 cfs @ 12.07 hrs, Volume= 0.874 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
18,970	73	Woods/grass comb., Poor, HSG B
56,560	98	Paved parking, HSG B
75,530	92	Weighted Average
18,970		25.12% Pervious Area
56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.0	180	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.2	280	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 2S: Subcat 2

Runoff = 2.13 cfs @ 12.07 hrs, Volume= 0.146 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
12,360	61	>75% Grass cover, Good, HSG B
6,510	98	Paved parking, HSG B
18,870	74	Weighted Average
12,360		65.50% Pervious Area
6,510		34.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	130	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 3

Runoff = 2.55 cfs @ 12.07 hrs, Volume= 0.177 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
13,380	73	Woods/grass comb., Poor, HSG B
5,870	98	Paved parking, HSG B
19,250	81	Weighted Average
13,380		69.51% Pervious Area
5,870		30.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.3	50	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Subcat 4

Runoff = 14.29 cfs @ 12.15 hrs, Volume= 1.219 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
67,610	61	>75% Grass cover, Good, HSG B
68,350	98	Paved parking, HSG B
135,960	80	Weighted Average
67,610		49.73% Pervious Area
68,350		50.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.5	260	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.3	360	Total			

Summary for Subcatchment 5S: Subcat 5

Runoff = 3.80 cfs @ 12.07 hrs, Volume= 0.293 af, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
1,360	61	>75% Grass cover, Good, HSG B
22,140	98	Paved parking, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.2	35	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	135	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 6S: Subcat 6

Runoff = 11.55 cfs @ 12.07 hrs, Volume= 0.870 af, Depth> 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
12,350	73	Woods/grass comb., Poor, HSG B
60,040	98	Paved parking, HSG B
72,390	94	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.5	250	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	350	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 7.22 cfs @ 12.07 hrs, Volume= 0.528 af, Depth> 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
8,510	61	>75% Grass cover, Good, HSG B
38,040	98	Paved parking, HSG B
46,550	91	Weighted Average
8,510		18.28% Pervious Area
38,040		81.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 8S: Subcat 8

Runoff = 12.92 cfs @ 12.07 hrs, Volume= 0.984 af, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
7,440	61	>75% Grass cover, Good, HSG B
72,920	98	Paved parking, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
0.6	75	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 2.83 cfs @ 12.24 hrs, Volume= 0.287 af, Depth> 2.59"

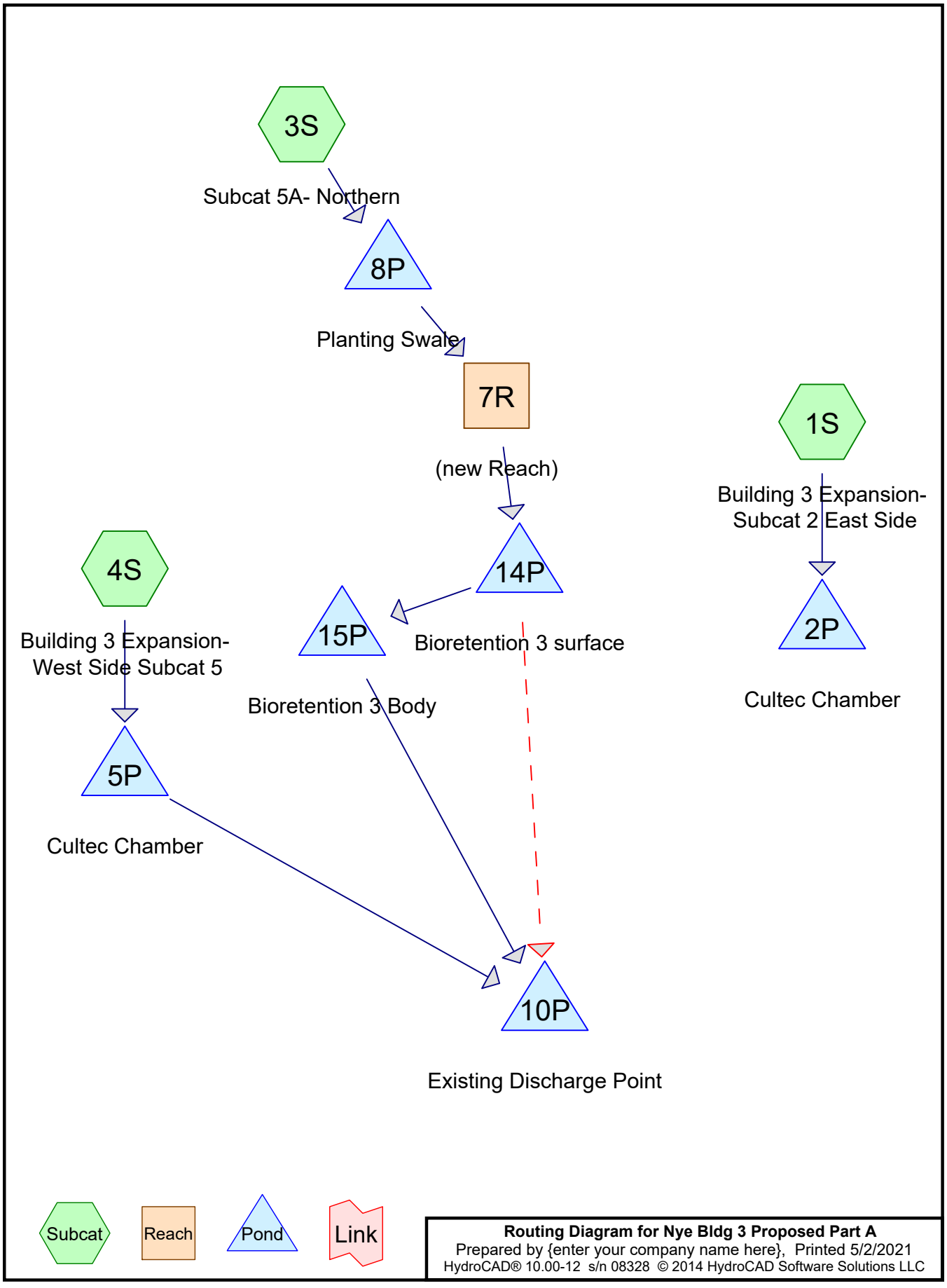
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Stormwater Report

Proposed Conditions HydroCAD model



Routing Diagram for Nye Bldg 3 Proposed Part A
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>3.16"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=2.36 cfs 0.182 af

Subcatchment 3S: Subcat 5A- Northern Runoff Area=35,290 sf 97.39% Impervious Runoff Depth>3.05"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=2.74 cfs 0.206 af

Subcatchment 4S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>3.16"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=2.36 cfs 0.182 af

Reach 7R: (new Reach) Avg. Flow Depth=0.29' Max Vel=0.73 fps Inflow=2.63 cfs 0.055 af
n=0.080 L=260.0' S=0.0088 '/' Capacity=4.07 cfs Outflow=1.72 cfs 0.055 af

Pond 2P: Cultec Chamber Peak Elev=6.84' Storage=0.046 af Inflow=2.36 cfs 0.182 af
Discarded=0.65 cfs 0.182 af Primary=0.00 cfs 0.000 af Outflow=0.65 cfs 0.182 af

Pond 5P: Cultec Chamber Peak Elev=5.52' Storage=0.054 af Inflow=2.36 cfs 0.182 af
Discarded=0.29 cfs 0.165 af Primary=0.59 cfs 0.016 af Outflow=0.88 cfs 0.182 af

Pond 8P: Planting Swale Peak Elev=6.04' Storage=0.035 af Inflow=2.74 cfs 0.206 af
Discarded=0.18 cfs 0.151 af Primary=2.63 cfs 0.055 af Outflow=2.81 cfs 0.206 af

Pond 10P: Existing Discharge Point Inflow=0.61 cfs 0.041 af
Primary=0.61 cfs 0.041 af

Pond 14P: Bioretention 3 surface Peak Elev=5.94' Storage=0.030 af Inflow=1.72 cfs 0.055 af
Primary=0.21 cfs 0.042 af Secondary=0.37 cfs 0.014 af Outflow=0.57 cfs 0.055 af

Pond 15P: Bioretention 3 Body Peak Elev=4.11' Storage=519 cf Inflow=0.21 cfs 0.042 af
Discarded=0.10 cfs 0.031 af Primary=0.05 cfs 0.011 af Outflow=0.15 cfs 0.042 af

Total Runoff Area = 2.188 ac Runoff Volume = 0.569 af Average Runoff Depth = 3.12"
0.97% Pervious = 0.021 ac 99.03% Impervious = 2.166 ac

Summary for Subcatchment 1S: Building 3 Expansion- Subcat 2 East Side

Runoff = 2.36 cfs @ 12.07 hrs, Volume= 0.182 af, Depth> 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 5A- Northern

Runoff = 2.74 cfs @ 12.07 hrs, Volume= 0.206 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
34,370	98	Paved parking, HSG B
920	61	>75% Grass cover, Good, HSG B
35,290	97	Weighted Average
920		2.61% Pervious Area
34,370		97.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Building 3 Expansion- West Side Subcat 5

Runoff = 2.36 cfs @ 12.07 hrs, Volume= 0.182 af, Depth> 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach 7R: (new Reach)

[81] Warning: Exceeded Pond 8P by 4.20' @ 0.00 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 0.82" for 2 yr Storm event
Inflow = 2.63 cfs @ 12.07 hrs, Volume= 0.055 af
Outflow = 1.72 cfs @ 12.24 hrs, Volume= 0.055 af, Atten= 35%, Lag= 10.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 0.73 fps, Min. Travel Time= 5.9 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 44.9 min

Peak Storage= 609 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 4.07 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 260.0' Slope= 0.0088 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 2P: Cultec Chamber

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 3.16" for 2 yr Storm event
Inflow = 2.36 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 0.65 cfs @ 12.40 hrs, Volume= 0.182 af, Atten= 72%, Lag= 19.6 min
Discarded = 0.65 cfs @ 12.40 hrs, Volume= 0.182 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 6.84' @ 12.40 hrs Surf.Area= 0.046 ac Storage= 0.046 af

Plug-Flow detention time= 24.6 min calculated for 0.182 af (100% of inflow)
Center-of-Mass det. time= 24.2 min (778.0 - 753.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.04'	0.037 af	**21.67'W x 92.50'L x 2.54'H Field A** 0.117 af Overall - 0.023 af Embedded = 0.094 af x 40.0% Voids
#2A	6.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.04'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 4.67'
#2	Primary	6.87'	**10.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.87' / 5.57' S= 0.0260 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.65 cfs @ 12.40 hrs HW=6.84' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.65 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5.04' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 5P: Cultec Chamber

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 3.16" for 2 yr Storm event
Inflow = 2.36 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 0.88 cfs @ 12.29 hrs, Volume= 0.182 af, Atten= 63%, Lag= 13.1 min
Discarded = 0.29 cfs @ 12.29 hrs, Volume= 0.165 af
Primary = 0.59 cfs @ 12.29 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 5.52' @ 12.29 hrs Surf.Area= 0.046 ac Storage= 0.054 af

Plug-Flow detention time= 61.9 min calculated for 0.181 af (100% of inflow)
Center-of-Mass det. time= 61.5 min (815.3 - 753.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.37'	0.031 af	**21.67'W x 92.50'L x 2.21'H Field A** 0.102 af Overall - 0.023 af Embedded = 0.078 af x 40.0% Voids
#2A	4.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.055 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.37'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'
#2	Primary	5.20'	**10.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5.20' / 4.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.29 cfs @ 12.29 hrs HW=5.52' (Free Discharge)
1=Exfiltration (Controls 0.29 cfs)

Primary OutFlow Max=0.59 cfs @ 12.29 hrs HW=5.52' (Free Discharge)
2=Culvert (Inlet Controls 0.59 cfs @ 1.52 fps)

Summary for Pond 8P: Planting Swale

[93] Warning: Storage range exceeded by 0.14'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=9)

Inflow Area =	0.810 ac, 97.39% Impervious, Inflow Depth >	3.05"	for 2 yr Storm event	
Inflow =	2.74 cfs @	12.07 hrs, Volume=	0.206 af	
Outflow =	2.81 cfs @	12.07 hrs, Volume=	0.206 af, Atten= 0%, Lag= 0.0 min	
Discarded =	0.18 cfs @	12.07 hrs, Volume=	0.151 af	
Primary =	2.63 cfs @	12.07 hrs, Volume=	0.055 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.04' @ 12.07 hrs Surf.Area= 0.048 ac Storage= 0.035 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 50.0 min (813.2 - 763.1)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.035 af	**8.00'W x 260.00'L x 2.10'H Prismatoid** 0.100 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.18 cfs @ 12.07 hrs HW=6.04' (Free Discharge)
1=Exfiltration (Controls 0.18 cfs)

Primary OutFlow Max=2.62 cfs @ 12.07 hrs HW=6.04' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 2.62 cfs @ 1.38 fps)

Summary for Pond 10P: Existing Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 0.33" for 2 yr Storm event
Inflow = 0.61 cfs @ 12.49 hrs, Volume= 0.041 af
Primary = 0.61 cfs @ 12.49 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 3 surface

[62] Hint: Exceeded Reach 7R OUTLET depth by 0.14' @ 12.67 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 0.82" for 2 yr Storm event
Inflow = 1.72 cfs @ 12.24 hrs, Volume= 0.055 af
Outflow = 0.57 cfs @ 12.60 hrs, Volume= 0.055 af, Atten= 67%, Lag= 21.5 min
Primary = 0.21 cfs @ 12.60 hrs, Volume= 0.042 af
Secondary = 0.37 cfs @ 12.60 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 5.94' @ 12.60 hrs Surf.Area= 0.043 ac Storage= 0.030 af

Plug-Flow detention time= 47.1 min calculated for 0.055 af (100% of inflow)
Center-of-Mass det. time= 47.1 min (797.4 - 750.3)

Volume	Invert	Avail.Storage	Storage Description
#1	5.20'	0.030 af	**27.00'W x 60.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.20'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.70'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.21 cfs @ 12.60 hrs HW=5.94' (Free Discharge)
1=Exfiltration (Controls 0.21 cfs)

Secondary OutFlow Max=0.37 cfs @ 12.60 hrs HW=5.94' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.37 cfs @ 1.68 fps)

Summary for Pond 15P: Bioretention 3 Body

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 0.62" for 2 yr Storm event
Inflow = 0.21 cfs @ 12.60 hrs, Volume= 0.042 af
Outflow = 0.15 cfs @ 14.80 hrs, Volume= 0.042 af, Atten= 26%, Lag= 132.2 min
Discarded = 0.10 cfs @ 14.80 hrs, Volume= 0.031 af
Primary = 0.05 cfs @ 14.80 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9

Peak Elev= 4.11' @ 14.80 hrs Surf.Area= 1,620 sf Storage= 519 cf

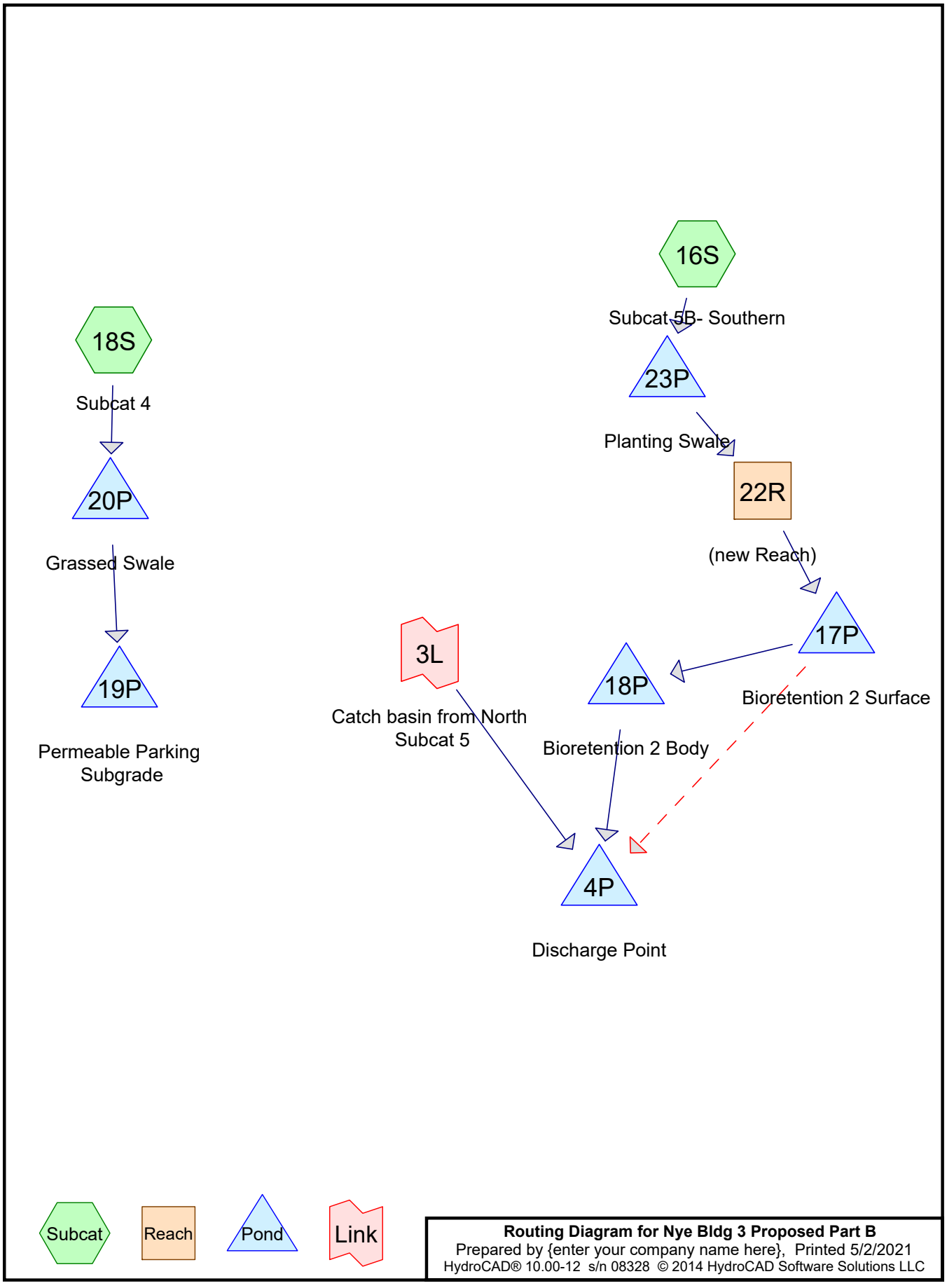
Plug-Flow detention time= 41.7 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 41.7 min (850.5 - 808.8)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	1,134 cf	**27.00'W x 60.00'L x 2.00'H Prismatoid** 3,240 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.20'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.40'	**0.2" Vert. Orifice/Grate X 60.00** C= 0.600

Discarded OutFlow Max=0.10 cfs @ 14.80 hrs HW=4.11' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.05 cfs @ 14.80 hrs HW=4.11' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 4.05 fps)



Routing Diagram for Nye Bldg 3 Proposed Part B
Prepared by {enter your company name here}, Printed 5/2/2021

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

Subcatchment 16S: Subcat 5B- Southern Runoff Area=21,310 sf 98.26% Impervious Runoff Depth>3.12"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=1.65 cfs 0.127 af

Subcatchment 18S: Subcat 4 Runoff Area=33,890 sf 27.47% Impervious Runoff Depth>1.19"
Flow Length=135' Slope=0.0100 '/' Tc=9.0 min CN=68 Runoff=0.81 cfs 0.077 af

Reach 22R: (new Reach) Avg. Flow Depth=0.22' Max Vel=0.87 fps Inflow=1.61 cfs 0.076 af
n=0.080 L=130.0' S=0.0177 '/' Capacity=5.76 cfs Outflow=1.53 cfs 0.076 af

Pond 4P: Discharge Point Inflow=1.58 cfs 0.089 af
Primary=1.58 cfs 0.089 af

Pond 17P: Bioretention 2 Surface Peak Elev=6.87' Storage=0.017 af Inflow=1.53 cfs 0.076 af
Primary=0.13 cfs 0.045 af Secondary=1.52 cfs 0.034 af Outflow=1.65 cfs 0.079 af

Pond 18P: Bioretention 2 Body Peak Elev=4.32' Storage=346 cf Inflow=0.13 cfs 0.045 af
Discarded=0.06 cfs 0.031 af Primary=0.04 cfs 0.014 af Outflow=0.10 cfs 0.045 af

Pond 19P: Permeable Parking Subgrade Peak Elev=7.47' Storage=639 cf Inflow=0.77 cfs 0.031 af
Discarded=0.12 cfs 0.031 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.031 af

Pond 20P: Grassed Swale Peak Elev=9.17' Storage=0.016 af Inflow=0.81 cfs 0.077 af
Discarded=0.04 cfs 0.040 af Primary=0.77 cfs 0.031 af Outflow=0.80 cfs 0.072 af

Pond 23P: Planting Swale Peak Elev=5.97' Storage=0.007 af Inflow=1.65 cfs 0.127 af
Discarded=0.03 cfs 0.049 af Primary=1.61 cfs 0.076 af Outflow=1.65 cfs 0.126 af

Link 2 yr Storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce Inflow=0.61 cfs 0.041 af
Area= 1.499 ac 98.59% Imperv. Primary=0.61 cfs 0.041 af

Total Runoff Area = 1.267 ac Runoff Volume = 0.204 af Average Runoff Depth = 1.93"
45.20% Pervious = 0.573 ac 54.80% Impervious = 0.694 ac

Summary for Subcatchment 16S: Subcat 5B- Southern

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.127 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
20,940	98	Paved parking, HSG B
370	61	>75% Grass cover, Good, HSG B
21,310	97	Weighted Average
370		1.74% Pervious Area
20,940		98.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 18S: Subcat 4

Runoff = 0.81 cfs @ 12.13 hrs, Volume= 0.077 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

	Area (sf)	CN	Description
	9,310	98	Paved parking, HSG B
	20,670	61	>75% Grass cover, Good, HSG B
*	3,910	30	Permeable Roadway
	33,890	68	Weighted Average
	24,580		72.53% Pervious Area
	9,310		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	135	0.0100	0.25		**Lag/CN Method,**

Summary for Reach 22R: (new Reach)

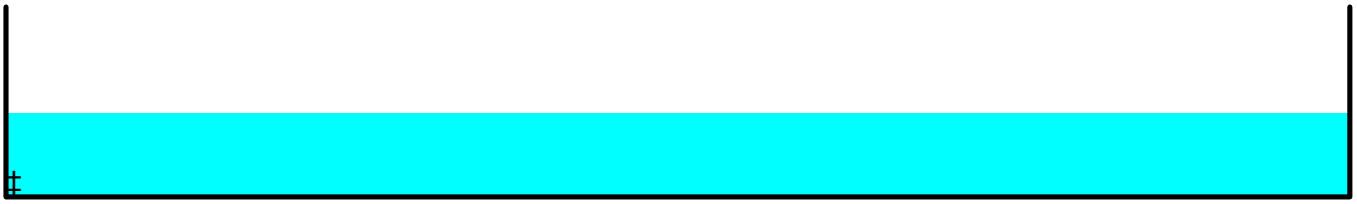
[81] Warning: Exceeded Pond 23P by 4.20' @ 1.00 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 1.87" for 2 yr Storm event
Inflow = 1.61 cfs @ 12.08 hrs, Volume= 0.076 af
Outflow = 1.53 cfs @ 12.14 hrs, Volume= 0.076 af, Atten= 5%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 0.87 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.21 fps, Avg. Travel Time= 10.5 min

Peak Storage= 229 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 5.76 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 130.0' Slope= 0.0177 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'



Summary for Pond 4P: Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.988 ac, 98.51% Impervious, Inflow Depth = 0.54" for 2 yr Storm event
Inflow = 1.58 cfs @ 12.19 hrs, Volume= 0.089 af
Primary = 1.58 cfs @ 12.19 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 17P: Bioretention 2 Surface

[93] Warning: Storage range exceeded by 0.27'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 22R OUTLET depth by 0.97' @ 12.16 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 1.87" for 2 yr Storm event
Inflow = 1.53 cfs @ 12.14 hrs, Volume= 0.076 af
Outflow = 1.65 cfs @ 12.14 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.14 hrs, Volume= 0.045 af
Secondary = 1.52 cfs @ 12.14 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 6.87' @ 12.14 hrs Surf.Area= 0.027 ac Storage= 0.017 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.7 min (773.7 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	5.90'	0.017 af	**22.00'W x 44.00'L x 0.70'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.90'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	6.36'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.13 cfs @ 12.14 hrs HW=6.87' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.13 cfs)

Secondary OutFlow Max=1.51 cfs @ 12.14 hrs HW=6.87' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.51 cfs @ 2.42 fps)

Summary for Pond 18P: Bioretention 2 Body

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 1.11" for 2 yr Storm event
Inflow = 0.13 cfs @ 12.14 hrs, Volume= 0.045 af
Outflow = 0.10 cfs @ 14.82 hrs, Volume= 0.045 af, Atten= 21%, Lag= 161.1 min
Discarded = 0.06 cfs @ 14.82 hrs, Volume= 0.031 af
Primary = 0.04 cfs @ 14.82 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.32' @ 14.82 hrs Surf.Area= 968 sf Storage= 346 cf

Plug-Flow detention time= 42.8 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 42.8 min (840.8 - 798.0)

Volume	Invert	Avail.Storage	Storage Description
#1	3.30'	881 cf	**22.00'W x 44.00'L x 2.60'H Prismatoid** 2,517 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.30'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.50'	**0.2" Vert. Orifice/Grate X 44.00** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 14.82 hrs HW=4.32' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.04 cfs @ 14.82 hrs HW=4.32' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 4.34 fps)

Summary for Pond 19P: Permeable Parking Subgrade

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth = 0.48" for 2 yr Storm event
Inflow = 0.77 cfs @ 12.18 hrs, Volume= 0.031 af
Outflow = 0.12 cfs @ 12.79 hrs, Volume= 0.031 af, Atten= 85%, Lag= 36.6 min
Discarded = 0.12 cfs @ 12.79 hrs, Volume= 0.031 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

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

Peak Elev= 7.47' @ 12.79 hrs Surf.Area= 3,910 sf Storage= 639 cf

Plug-Flow detention time= 55.1 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 55.0 min (825.4 - 770.4)

Volume	Invert	Avail.Storage	Storage Description
#1	7.00'	2,737 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 7,820 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.00	3,910	0	0
8.00	3,910	3,910	3,910
9.00	3,910	3,910	7,820

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.00'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	8.85'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.12 cfs @ 12.79 hrs HW=7.47' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=7.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 20P: Grassed Swale

[93] Warning: Storage range exceeded by 0.02'

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth > 1.19" for 2 yr Storm event
Inflow = 0.81 cfs @ 12.13 hrs, Volume= 0.077 af
Outflow = 0.80 cfs @ 12.18 hrs, Volume= 0.072 af, Atten= 1%, Lag= 3.0 min
Discarded = 0.04 cfs @ 12.18 hrs, Volume= 0.040 af
Primary = 0.77 cfs @ 12.18 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 9.17' @ 12.18 hrs Surf.Area= 0.028 ac Storage= 0.016 af

Plug-Flow detention time= 100.4 min calculated for 0.072 af (93% of inflow)
Center-of-Mass det. time= 61.1 min (859.0 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	8.40'	0.016 af	**3.00'W x 200.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.40'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	9.00'	**4.0' 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

Discarded OutFlow Max=0.04 cfs @ 12.18 hrs HW=9.17' (Free Discharge)
1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.77 cfs @ 12.18 hrs HW=9.17' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 0.77 cfs @ 1.11 fps)

Summary for Pond 23P: Planting Swale

[93] Warning: Storage range exceeded by 0.07'

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth > 3.12" for 2 yr Storm event
Inflow = 1.65 cfs @ 12.07 hrs, Volume= 0.127 af
Outflow = 1.65 cfs @ 12.08 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.6 min
Discarded = 0.03 cfs @ 12.08 hrs, Volume= 0.049 af
Primary = 1.61 cfs @ 12.08 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 5.97' @ 12.08 hrs Surf.Area= 0.009 ac Storage= 0.007 af

Plug-Flow detention time= 38.7 min calculated for 0.126 af (99% of inflow)
Center-of-Mass det. time= 31.0 min (785.2 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.007 af	**8.00'W x 50.00'L x 2.10'H Prismatoid** 0.019 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.03 cfs @ 12.08 hrs HW=5.97' (Free Discharge)
1=Exfiltration (Controls 0.03 cfs)

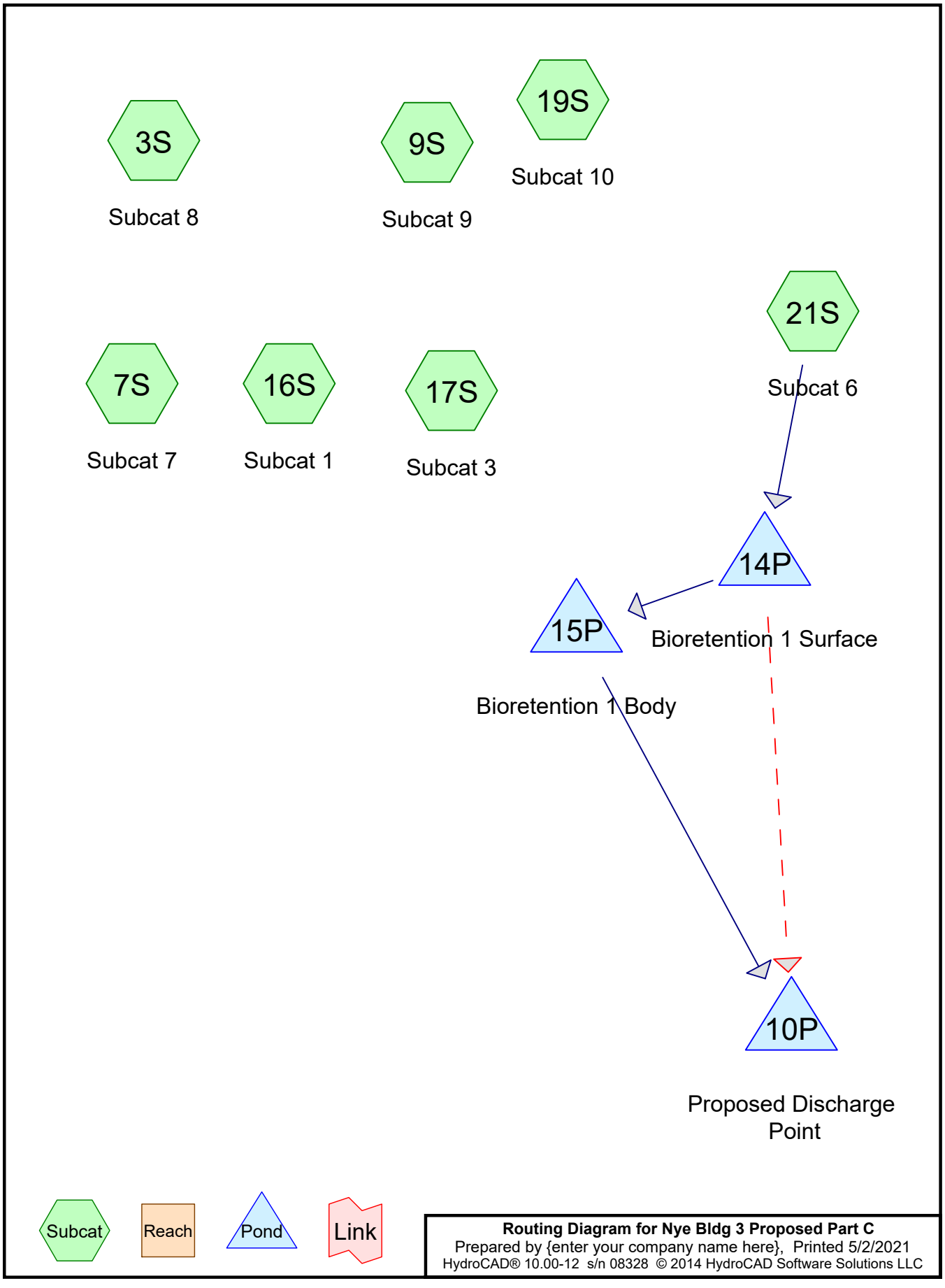
Primary OutFlow Max=1.61 cfs @ 12.08 hrs HW=5.97' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 1.61 cfs @ 1.16 fps)

Summary for Link 3L: Catch basin from North Subcat 5

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 0.33" for 2 yr Storm event
Inflow = 0.61 cfs @ 12.49 hrs, Volume= 0.041 af
Primary = 0.61 cfs @ 12.49 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

2 yr Storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce



Routing Diagram for Nye Bldg 3 Proposed Part C
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>2.84"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=6.00 cfs 0.436 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 78.97% Impervious Runoff Depth>2.35"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=3.02 cfs 0.210 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>0.49"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=0.36 cfs 0.054 af

Subcatchment 16S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>2.35"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=4.89 cfs 0.340 af

Subcatchment 17S: Subcat 3 Runoff Area=20,540 sf 28.58% Impervious Runoff Depth>1.05"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=72 Runoff=0.57 cfs 0.041 af

Subcatchment 19S: Subcat 10 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>2.94"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=1.79 cfs 0.132 af

Subcatchment 21S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>2.54"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=4.99 cfs 0.352 af

Pond 10P: Proposed Discharge Point Inflow=4.94 cfs 0.308 af
Primary=4.94 cfs 0.308 af

Pond 14P: Bioretention 1 Surface Peak Elev=6.49' Storage=0.010 af Inflow=4.99 cfs 0.352 af
Primary=0.08 cfs 0.092 af Secondary=4.91 cfs 0.254 af Outflow=4.99 cfs 0.346 af

Pond 15P: Bioretention 1 Body Peak Elev=5.63' Storage=111 cf Inflow=0.08 cfs 0.092 af
Discarded=0.03 cfs 0.037 af Primary=0.04 cfs 0.054 af Outflow=0.07 cfs 0.091 af

Total Runoff Area = 8.648 ac Runoff Volume = 1.565 af Average Runoff Depth = 2.17"
32.50% Pervious = 2.811 ac 67.50% Impervious = 5.838 ac

Summary for Subcatchment 3S: Subcat 8

Runoff = 6.00 cfs @ 12.07 hrs, Volume= 0.436 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
72,920	98	Paved parking, HSG B
7,440	61	>75% Grass cover, Good, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 3.02 cfs @ 12.07 hrs, Volume= 0.210 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
9,790	61	>75% Grass cover, Good, HSG B
36,760	98	Paved parking, HSG B
46,550	90	Weighted Average
9,790		21.03% Pervious Area
36,760		78.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 0.36 cfs @ 12.33 hrs, Volume= 0.054 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Summary for Subcatchment 16S: Subcat 1

Runoff = 4.89 cfs @ 12.07 hrs, Volume= 0.340 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

	Area (sf)	CN	Description
	56,560	98	Paved parking, HSG B
	14,470	73	Woods/grass comb., Poor, HSG B
*	4,500	39	Permeable walking path
	75,530	90	Weighted Average
	18,970		25.12% Pervious Area
	56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 17S: Subcat 3

Runoff = 0.57 cfs @ 12.08 hrs, Volume= 0.041 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
5,870	98	Paved parking, HSG B
14,670	61	>75% Grass cover, Good, HSG B
20,540	72	Weighted Average
14,670		71.42% Pervious Area
5,870		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 19S: Subcat 10

Runoff = 1.79 cfs @ 12.07 hrs, Volume= 0.132 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
22,140	98	Paved parking, HSG B
1,360	61	>75% Grass cover, Good, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 21S: Subcat 6

Runoff = 4.99 cfs @ 12.07 hrs, Volume= 0.352 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Storm Rainfall=3.40"

Area (sf)	CN	Description
60,040	98	Paved parking, HSG B
12,350	65	Woods/grass comb., Fair, HSG B
72,390	92	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond 10P: Proposed Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 2.23" for 2 yr Storm event
Inflow = 4.94 cfs @ 12.07 hrs, Volume= 0.308 af
Primary = 4.94 cfs @ 12.07 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 1 Surface

[93] Warning: Storage range exceeded by 0.74'

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 2.54" for 2 yr Storm event
Inflow = 4.99 cfs @ 12.07 hrs, Volume= 0.352 af
Outflow = 4.99 cfs @ 12.07 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.1 min
Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.092 af
Secondary = 4.91 cfs @ 12.07 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6.49' @ 12.07 hrs Surf.Area= 0.015 ac Storage= 0.010 af

Plug-Flow detention time= 20.0 min calculated for 0.346 af (99% of inflow)
Center-of-Mass det. time= 11.0 min (805.2 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	0.010 af	**20.00'W x 25.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.00'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.54'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 12.07 hrs HW=6.49' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.08 cfs)

Secondary OutFlow Max=4.90 cfs @ 12.07 hrs HW=6.49' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 4.90 cfs @ 3.32 fps)

Summary for Pond 15P: Bioretention 1 Body

[78] Warning: Submerged Pond 14P Primary device # 1 by 0.63'

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 0.67" for 2 yr Storm event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.092 af
Outflow = 0.07 cfs @ 15.62 hrs, Volume= 0.091 af, Atten= 15%, Lag= 212.9 min
Discarded = 0.03 cfs @ 15.62 hrs, Volume= 0.037 af
Primary = 0.04 cfs @ 15.62 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 5.63' @ 15.62 hrs Surf.Area= 500 sf Storage= 111 cf

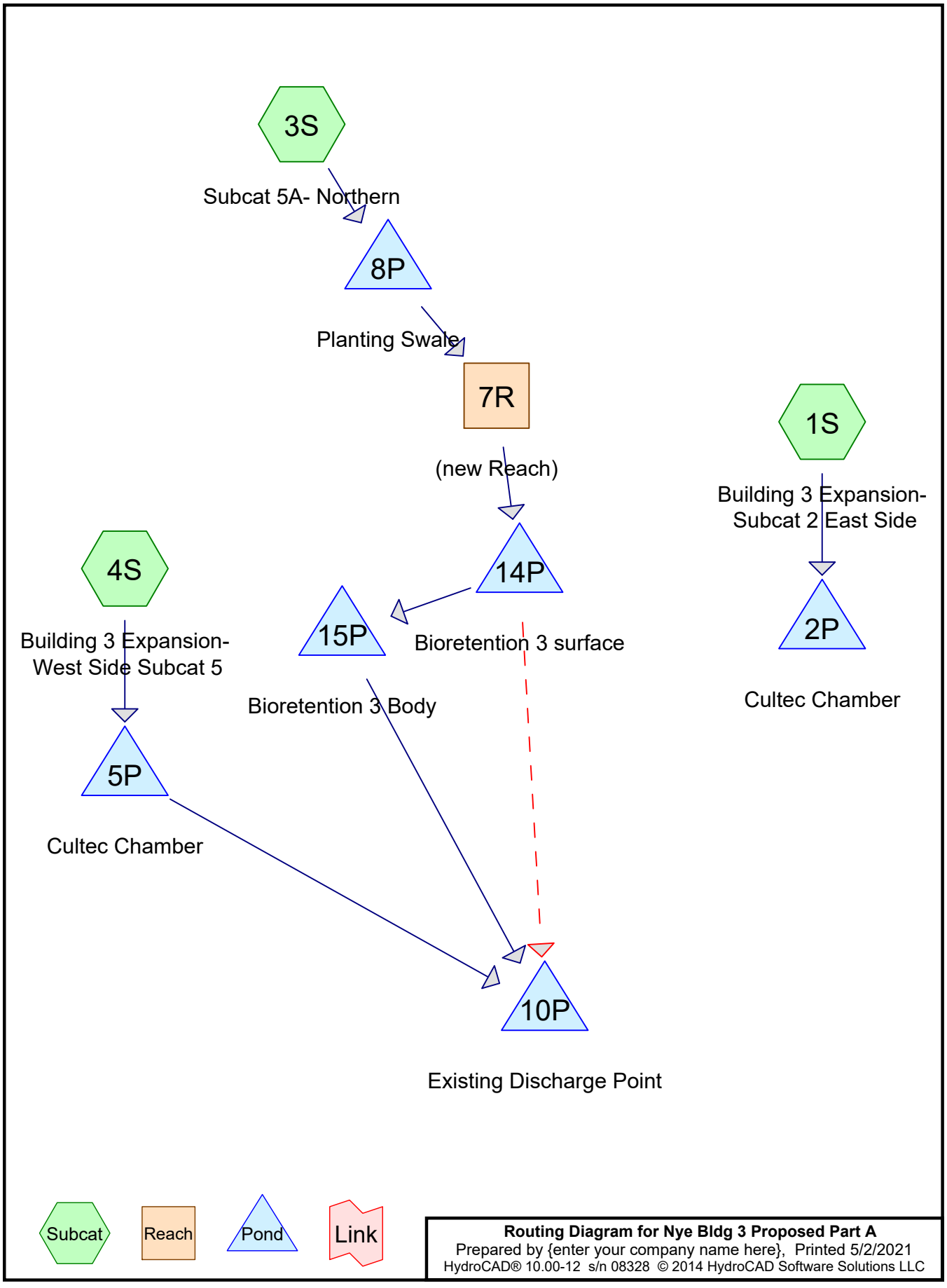
Plug-Flow detention time= 18.2 min calculated for 0.091 af (98% of inflow)
Center-of-Mass det. time= 10.5 min (941.0 - 930.5)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	350 cf	**20.00'W x 25.00'L x 2.00'H Prismatoid** 1,000 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.20'	**0.2" Vert. Orifice/Grate X 25.00** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 15.62 hrs HW=5.63' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 15.62 hrs HW=5.63' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.50 fps)



Routing Diagram for Nye Bldg 3 Proposed Part A
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>4.56"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=3.35 cfs 0.262 af

Subcatchment 3S: Subcat 5A- Northern Runoff Area=35,290 sf 97.39% Impervious Runoff Depth>4.44"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=3.91 cfs 0.300 af

Subcatchment 4S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>4.56"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=3.35 cfs 0.262 af

Reach 7R: (new Reach) Avg. Flow Depth=0.43' Max Vel=0.93 fps Inflow=3.94 cfs 0.115 af
n=0.080 L=260.0' S=0.0088 '/' Capacity=4.07 cfs Outflow=3.22 cfs 0.115 af

Pond 2P: Cultec Chamber Peak Elev=7.47' Storage=0.059 af Inflow=3.35 cfs 0.262 af
Discarded=0.84 cfs 0.242 af Primary=0.87 cfs 0.020 af Outflow=1.71 cfs 0.262 af

Pond 5P: Cultec Chamber Peak Elev=7.06' Storage=0.055 af Inflow=3.35 cfs 0.262 af
Discarded=0.41 cfs 0.205 af Primary=4.99 cfs 0.058 af Outflow=5.40 cfs 0.262 af

Pond 8P: Planting Swale Peak Elev=6.11' Storage=0.035 af Inflow=3.91 cfs 0.300 af
Discarded=0.19 cfs 0.185 af Primary=3.94 cfs 0.115 af Outflow=4.12 cfs 0.300 af

Pond 10P: Existing Discharge Point Inflow=6.45 cfs 0.136 af
Primary=6.45 cfs 0.136 af

Pond 14P: Bioretention 3 surface Peak Elev=6.62' Storage=0.030 af Inflow=3.22 cfs 0.115 af
Primary=0.23 cfs 0.053 af Secondary=4.56 cfs 0.063 af Outflow=4.80 cfs 0.116 af

Pond 15P: Bioretention 3 Body Peak Elev=4.24' Storage=587 cf Inflow=0.23 cfs 0.053 af
Discarded=0.10 cfs 0.038 af Primary=0.06 cfs 0.015 af Outflow=0.16 cfs 0.053 af

Total Runoff Area = 2.188 ac Runoff Volume = 0.824 af Average Runoff Depth = 4.52"
0.97% Pervious = 0.021 ac 99.03% Impervious = 2.166 ac

Summary for Subcatchment 1S: Building 3 Expansion- Subcat 2 East Side

Runoff = 3.35 cfs @ 12.07 hrs, Volume= 0.262 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 5A- Northern

Runoff = 3.91 cfs @ 12.07 hrs, Volume= 0.300 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
34,370	98	Paved parking, HSG B
920	61	>75% Grass cover, Good, HSG B
35,290	97	Weighted Average
920		2.61% Pervious Area
34,370		97.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Building 3 Expansion- West Side Subcat 5

Runoff = 3.35 cfs @ 12.07 hrs, Volume= 0.262 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach 7R: (new Reach)

[81] Warning: Exceeded Pond 8P by 4.20' @ 0.00 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 1.70" for 10 yr storm event
Inflow = 3.94 cfs @ 12.07 hrs, Volume= 0.115 af
Outflow = 3.22 cfs @ 12.19 hrs, Volume= 0.115 af, Atten= 18%, Lag= 7.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 0.93 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 35.7 min

Peak Storage= 899 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 4.07 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 260.0' Slope= 0.0088 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 2P: Cultec Chamber

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 4.56" for 10 yr storm event
Inflow = 3.35 cfs @ 12.07 hrs, Volume= 0.262 af
Outflow = 1.71 cfs @ 12.19 hrs, Volume= 0.262 af, Atten= 49%, Lag= 7.2 min
Discarded = 0.84 cfs @ 12.19 hrs, Volume= 0.242 af
Primary = 0.87 cfs @ 12.19 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 7.47' @ 12.19 hrs Surf.Area= 0.046 ac Storage= 0.059 af

Plug-Flow detention time= 24.7 min calculated for 0.262 af (100% of inflow)
Center-of-Mass det. time= 24.3 min (771.7 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.04'	0.037 af	**21.67'W x 92.50'L x 2.54'H Field A** 0.117 af Overall - 0.023 af Embedded = 0.094 af x 40.0% Voids
#2A	6.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.04'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 4.67'
#2	Primary	6.87'	**10.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.87' / 5.57' S= 0.0260 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.84 cfs @ 12.19 hrs HW=7.47' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.84 cfs)

Primary OutFlow Max=0.87 cfs @ 12.19 hrs HW=7.47' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.87 cfs @ 2.08 fps)

Summary for Pond 5P: Cultec Chamber

[93] Warning: Storage range exceeded by 1.49'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=11)

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 4.56" for 10 yr storm event
Inflow = 3.35 cfs @ 12.07 hrs, Volume= 0.262 af
Outflow = 5.40 cfs @ 12.06 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.41 cfs @ 12.06 hrs, Volume= 0.205 af
Primary = 4.99 cfs @ 12.06 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 7.06' @ 12.06 hrs Surf.Area= 0.046 ac Storage= 0.055 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 55.5 min (802.8 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.37'	0.031 af	**21.67'W x 92.50'L x 2.21'H Field A** 0.102 af Overall - 0.023 af Embedded = 0.078 af x 40.0% Voids
#2A	4.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.055 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.37'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'
#2	Primary	5.20'	**10.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5.20' / 4.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.41 cfs @ 12.06 hrs HW=7.06' (Free Discharge)
1=Exfiltration (Controls 0.41 cfs)

Primary OutFlow Max=4.99 cfs @ 12.06 hrs HW=7.06' (Free Discharge)
2=Culvert (Inlet Controls 4.99 cfs @ 4.57 fps)

Summary for Pond 8P: Planting Swale

[93] Warning: Storage range exceeded by 0.21'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=28)

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth > 4.44" for 10 yr storm event
Inflow = 3.91 cfs @ 12.07 hrs, Volume= 0.300 af
Outflow = 4.12 cfs @ 12.07 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.19 cfs @ 12.07 hrs, Volume= 0.185 af
Primary = 3.94 cfs @ 12.07 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.11' @ 12.07 hrs Surf.Area= 0.048 ac Storage= 0.035 af

Plug-Flow detention time= 46.9 min calculated for 0.300 af (100% of inflow)
Center-of-Mass det. time= 46.2 min (801.5 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.035 af	**8.00'W x 260.00'L x 2.10'H Prismatoid** 0.100 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.19 cfs @ 12.07 hrs HW=6.11' (Free Discharge)
1=Exfiltration (Controls 0.19 cfs)

Primary OutFlow Max=3.94 cfs @ 12.07 hrs HW=6.11' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 3.94 cfs @ 1.59 fps)

Summary for Pond 10P: Existing Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 1.09" for 10 yr storm event
Inflow = 6.45 cfs @ 12.20 hrs, Volume= 0.136 af
Primary = 6.45 cfs @ 12.20 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 3 surface

[93] Warning: Storage range exceeded by 0.67'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=20)
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.56' @ 12.22 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 1.70" for 10 yr storm event
Inflow = 3.22 cfs @ 12.19 hrs, Volume= 0.115 af
Outflow = 4.80 cfs @ 12.20 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.6 min
Primary = 0.23 cfs @ 12.20 hrs, Volume= 0.053 af
Secondary = 4.56 cfs @ 12.20 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.62' @ 12.20 hrs Surf.Area= 0.043 ac Storage= 0.030 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.4 min (778.0 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1	5.20'	0.030 af	**27.00'W x 60.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.20'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.70'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.23 cfs @ 12.20 hrs HW=6.62' (Free Discharge)
1=Exfiltration (Controls 0.23 cfs)

Secondary OutFlow Max=4.56 cfs @ 12.20 hrs HW=6.62' (Free Discharge)
2=Orifice/Grate (Orifice Controls 4.56 cfs @ 3.26 fps)

Summary for Pond 15P: Bioretention 3 Body

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 0.78" for 10 yr storm event
Inflow = 0.23 cfs @ 12.20 hrs, Volume= 0.053 af
Outflow = 0.16 cfs @ 15.13 hrs, Volume= 0.053 af, Atten= 30%, Lag= 175.8 min
Discarded = 0.10 cfs @ 15.13 hrs, Volume= 0.038 af
Primary = 0.06 cfs @ 15.13 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.24' @ 15.13 hrs Surf.Area= 1,620 sf Storage= 587 cf

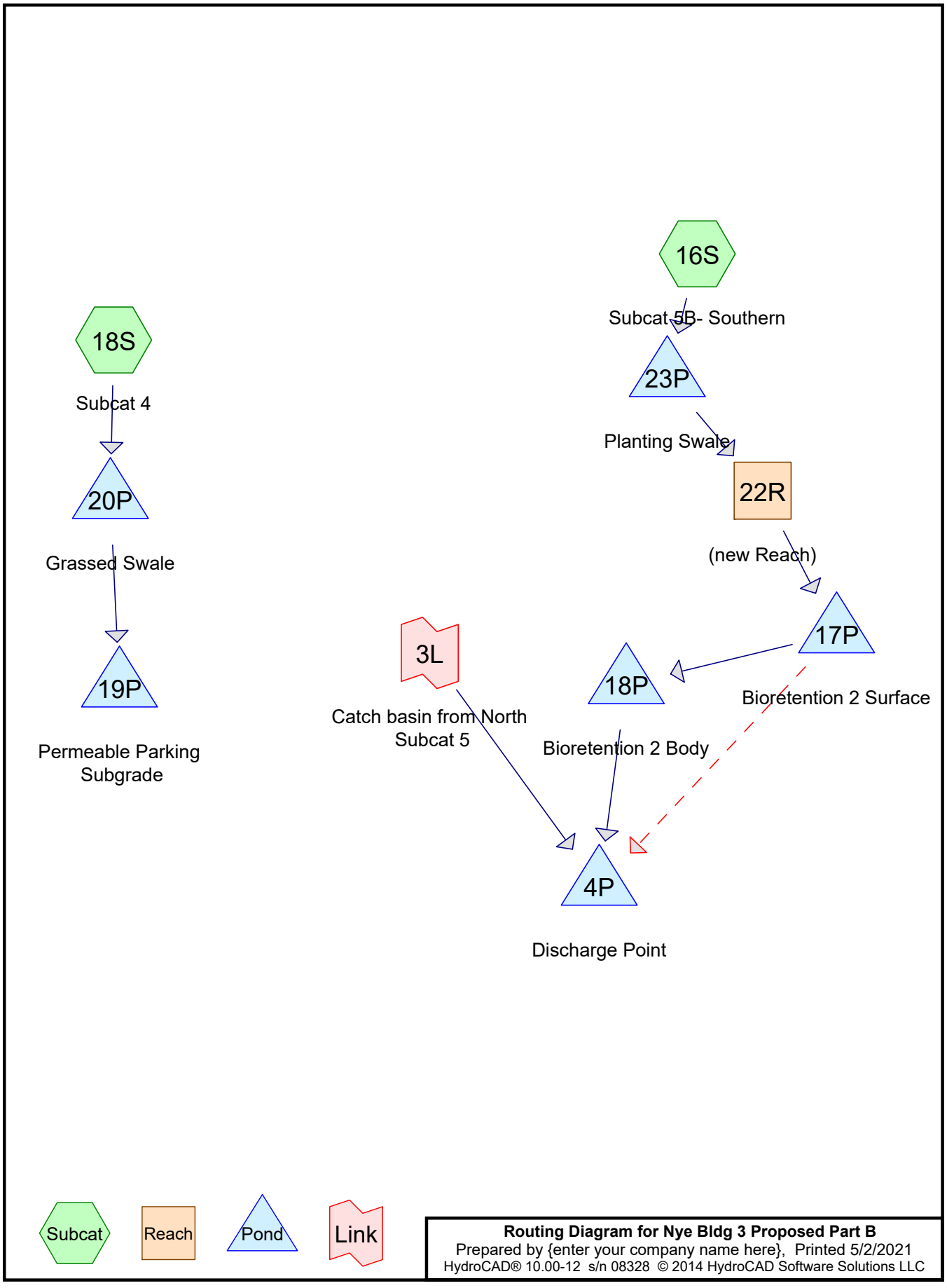
Plug-Flow detention time= 46.4 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 46.4 min (861.7 - 815.3)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	1,134 cf	**27.00'W x 60.00'L x 2.00'H Prismatoid** 3,240 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.20'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.40'	**0.2" Vert. Orifice/Grate X 60.00** C= 0.600

Discarded OutFlow Max=0.10 cfs @ 15.13 hrs HW=4.24' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.06 cfs @ 15.13 hrs HW=4.24' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 4.38 fps)



Routing Diagram for Nye Bldg 3 Proposed Part B
Prepared by {enter your company name here}, Printed 5/2/2021

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

Subcatchment 16S: Subcat 5B- Southern Runoff Area=21,310 sf 98.26% Impervious Runoff Depth>4.50"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=2.35 cfs 0.184 af

Subcatchment 18S: Subcat 4 Runoff Area=33,890 sf 27.47% Impervious Runoff Depth>2.01"
Flow Length=135' Slope=0.0100 '/' Tc=9.0 min CN=68 Runoff=1.46 cfs 0.131 af

Reach 22R: (new Reach) Avg. Flow Depth=0.28' Max Vel=1.00 fps Inflow=2.32 cfs 0.125 af
n=0.080 L=130.0' S=0.0177 '/' Capacity=5.76 cfs Outflow=2.21 cfs 0.125 af

Pond 4P: Discharge Point Inflow=7.73 cfs 0.208 af
Primary=7.73 cfs 0.208 af

Pond 17P: Bioretention 2 Surface Peak Elev=6.92' Storage=0.017 af Inflow=2.21 cfs 0.125 af
Primary=0.13 cfs 0.064 af Secondary=1.82 cfs 0.051 af Outflow=1.95 cfs 0.114 af

Pond 18P: Bioretention 2 Body Peak Elev=4.45' Storage=391 cf Inflow=0.13 cfs 0.064 af
Discarded=0.06 cfs 0.043 af Primary=0.04 cfs 0.021 af Outflow=0.11 cfs 0.064 af

Pond 19P: Permeable Parking Subgrade Peak Elev=8.33' Storage=1,819 cf Inflow=1.48 cfs 0.075 af
Discarded=0.13 cfs 0.075 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.075 af

Pond 20P: Grassed Swale Peak Elev=9.27' Storage=0.016 af Inflow=1.46 cfs 0.131 af
Discarded=0.04 cfs 0.045 af Primary=1.48 cfs 0.075 af Outflow=1.52 cfs 0.121 af

Pond 23P: Planting Swale Peak Elev=6.02' Storage=0.007 af Inflow=2.35 cfs 0.184 af
Discarded=0.04 cfs 0.055 af Primary=2.32 cfs 0.125 af Outflow=2.35 cfs 0.179 af

Link 10P: 10 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce Inflow=6.45 cfs 0.136 af
Area= 1.499 ac 98.59% Imperv. Primary=6.45 cfs 0.136 af

Total Runoff Area = 1.267 ac Runoff Volume = 0.314 af Average Runoff Depth = 2.97"
45.20% Pervious = 0.573 ac 54.80% Impervious = 0.694 ac

Summary for Subcatchment 16S: Subcat 5B- Southern

Runoff = 2.35 cfs @ 12.07 hrs, Volume= 0.184 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
20,940	98	Paved parking, HSG B
370	61	>75% Grass cover, Good, HSG B
21,310	97	Weighted Average
370		1.74% Pervious Area
20,940		98.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 18S: Subcat 4

Runoff = 1.46 cfs @ 12.13 hrs, Volume= 0.131 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

	Area (sf)	CN	Description
	9,310	98	Paved parking, HSG B
	20,670	61	>75% Grass cover, Good, HSG B
*	3,910	30	Permeable Roadway
	33,890	68	Weighted Average
	24,580		72.53% Pervious Area
	9,310		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	135	0.0100	0.25		**Lag/CN Method,**

Summary for Reach 22R: (new Reach)

[81] Warning: Exceeded Pond 23P by 4.20' @ 1.00 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 3.06" for 10 yr storm event
Inflow = 2.32 cfs @ 12.07 hrs, Volume= 0.125 af
Outflow = 2.21 cfs @ 12.13 hrs, Volume= 0.125 af, Atten= 4%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 1.00 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.23 fps, Avg. Travel Time= 9.4 min

Peak Storage= 288 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 5.76 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 130.0' Slope= 0.0177 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 4P: Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.988 ac, 98.51% Impervious, Inflow Depth = 1.25" for 10 yr storm event
Inflow = 7.73 cfs @ 12.20 hrs, Volume= 0.208 af
Primary = 7.73 cfs @ 12.20 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 17P: Bioretention 2 Surface

[93] Warning: Storage range exceeded by 0.32'
[62] Hint: Exceeded Reach 22R OUTLET depth by 0.96' @ 12.15 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 3.06" for 10 yr storm event
Inflow = 2.21 cfs @ 12.13 hrs, Volume= 0.125 af
Outflow = 1.95 cfs @ 12.13 hrs, Volume= 0.114 af, Atten= 12%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.13 hrs, Volume= 0.064 af
Secondary = 1.82 cfs @ 12.13 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 6.92' @ 12.13 hrs Surf.Area= 0.027 ac Storage= 0.017 af

Plug-Flow detention time= 46.2 min calculated for 0.114 af (92% of inflow)
Center-of-Mass det. time= 28.1 min (772.5 - 744.4)

Volume	Invert	Avail.Storage	Storage Description
#1	5.90'	0.017 af	**22.00'W x 44.00'L x 0.70'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.90'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

#2	Secondary	6.36'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.13 cfs @ 12.13 hrs HW=6.92' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.13 cfs)

Secondary OutFlow Max=1.82 cfs @ 12.13 hrs HW=6.92' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.82 cfs @ 2.54 fps)

Summary for Pond 18P: Bioretention 2 Body

Inflow Area =	0.489 ac, 98.26% Impervious,	Inflow Depth =	1.57"	for 10 yr storm event
Inflow =	0.13 cfs @	12.13 hrs, Volume=	0.064 af	
Outflow =	0.11 cfs @	15.11 hrs, Volume=	0.064 af,	Atten= 17%, Lag= 179.0 min
Discarded =	0.06 cfs @	15.11 hrs, Volume=	0.043 af	
Primary =	0.04 cfs @	15.11 hrs, Volume=	0.021 af	

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.45' @ 15.11 hrs Surf.Area= 968 sf Storage= 391 cf

Plug-Flow detention time= 46.2 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 46.2 min (843.8 - 797.7)

Volume	Invert	Avail.Storage	Storage Description
#1	3.30'	881 cf	**22.00'W x 44.00'L x 2.60'H Prismatoid** 2,517 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.30'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.50'	**0.2" Vert. Orifice/Grate X 44.00** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 15.11 hrs HW=4.45' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.04 cfs @ 15.11 hrs HW=4.45' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 4.68 fps)

Summary for Pond 19P: Permeable Parking Subgrade

Inflow Area =	0.778 ac, 27.47% Impervious,	Inflow Depth =	1.16"	for 10 yr storm event
Inflow =	1.48 cfs @	12.12 hrs, Volume=	0.075 af	
Outflow =	0.13 cfs @	13.18 hrs, Volume=	0.075 af,	Atten= 91%, Lag= 63.8 min
Discarded =	0.13 cfs @	13.18 hrs, Volume=	0.075 af	
Primary =	0.00 cfs @	1.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 8.33' @ 13.18 hrs Surf.Area= 3,910 sf Storage= 1,819 cf

Plug-Flow detention time= 152.5 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 152.4 min (931.8 - 779.4)

Volume	Invert	Avail.Storage	Storage Description
#1	7.00'	2,737 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 7,820 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.00	3,910	0	0
8.00	3,910	3,910	3,910
9.00	3,910	3,910	7,820

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.00'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	8.85'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.13 cfs @ 13.18 hrs HW=8.33' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=7.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 20P: Grassed Swale

[93] Warning: Storage range exceeded by 0.12'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=15)

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth > 2.01" for 10 yr storm event
Inflow = 1.46 cfs @ 12.13 hrs, Volume= 0.131 af
Outflow = 1.52 cfs @ 12.12 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.12 hrs, Volume= 0.045 af
Primary = 1.48 cfs @ 12.12 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 9.27' @ 12.12 hrs Surf.Area= 0.028 ac Storage= 0.016 af

Plug-Flow detention time= 68.2 min calculated for 0.121 af (92% of inflow)
Center-of-Mass det. time= 27.9 min (826.2 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	8.40'	0.016 af	**3.00'W x 200.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.40'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	9.00'	**4.0' 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

Discarded OutFlow Max=0.04 cfs @ 12.12 hrs HW=9.27' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=1.48 cfs @ 12.12 hrs HW=9.27' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.48 cfs @ 1.39 fps)

Summary for Pond 23P: Planting Swale

[93] Warning: Storage range exceeded by 0.12'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth > 4.50" for 10 yr storm event
Inflow = 2.35 cfs @ 12.07 hrs, Volume= 0.184 af
Outflow = 2.35 cfs @ 12.07 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.07 hrs, Volume= 0.055 af
Primary = 2.32 cfs @ 12.07 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.02' @ 12.07 hrs Surf.Area= 0.009 ac Storage= 0.007 af

Plug-Flow detention time= 32.5 min calculated for 0.179 af (98% of inflow)
Center-of-Mass det. time= 18.2 min (766.1 - 747.9)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.007 af	**8.00'W x 50.00'L x 2.10'H Prismatoid** 0.019 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.04 cfs @ 12.07 hrs HW=6.02' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

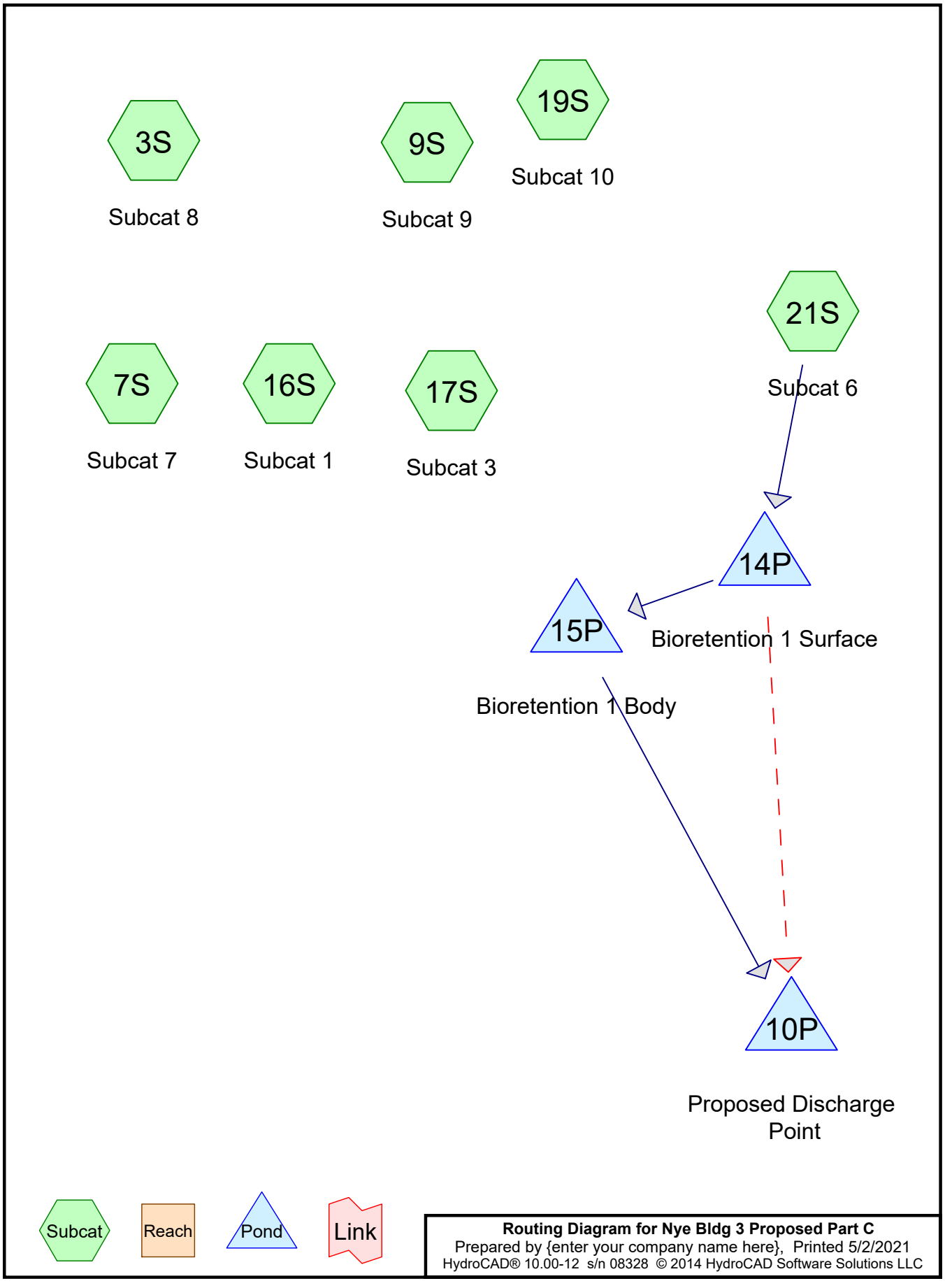
Primary OutFlow Max=2.32 cfs @ 12.07 hrs HW=6.02' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.32 cfs @ 1.32 fps)

Summary for Link 3L: Catch basin from North Subcat 5

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 1.09" for 10 yr storm event
Inflow = 6.45 cfs @ 12.20 hrs, Volume= 0.136 af
Primary = 6.45 cfs @ 12.20 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

10 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce



Routing Diagram for Nye Bldg 3 Proposed Part C
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>4.22"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=8.71 cfs 0.649 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 78.97% Impervious Runoff Depth>3.68"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=4.63 cfs 0.328 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>1.18"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=1.17 cfs 0.131 af

Subcatchment 16S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>3.68"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=7.51 cfs 0.532 af

Subcatchment 17S: Subcat 3 Runoff Area=20,540 sf 28.58% Impervious Runoff Depth>2.04"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=72 Runoff=1.16 cfs 0.080 af

Subcatchment 19S: Subcat 10 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>4.33"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=2.58 cfs 0.195 af

Subcatchment 21S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>3.89"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=7.48 cfs 0.539 af

Pond 10P: Proposed Discharge Point Inflow=7.44 cfs 0.489 af
Primary=7.44 cfs 0.489 af

Pond 14P: Bioretention 1 Surface Peak Elev=6.75' Storage=0.010 af Inflow=7.48 cfs 0.539 af
Primary=0.08 cfs 0.102 af Secondary=7.40 cfs 0.429 af Outflow=7.48 cfs 0.532 af

Pond 15P: Bioretention 1 Body Peak Elev=5.75' Storage=131 cf Inflow=0.08 cfs 0.102 af
Discarded=0.03 cfs 0.040 af Primary=0.04 cfs 0.060 af Outflow=0.07 cfs 0.100 af

Total Runoff Area = 8.648 ac Runoff Volume = 2.453 af Average Runoff Depth = 3.40"
32.50% Pervious = 2.811 ac 67.50% Impervious = 5.838 ac

Summary for Subcatchment 3S: Subcat 8

Runoff = 8.71 cfs @ 12.07 hrs, Volume= 0.649 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
72,920	98	Paved parking, HSG B
7,440	61	>75% Grass cover, Good, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 4.63 cfs @ 12.07 hrs, Volume= 0.328 af, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
9,790	61	>75% Grass cover, Good, HSG B
36,760	98	Paved parking, HSG B
46,550	90	Weighted Average
9,790		21.03% Pervious Area
36,760		78.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 1.17 cfs @ 12.26 hrs, Volume= 0.131 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Summary for Subcatchment 16S: Subcat 1

Runoff = 7.51 cfs @ 12.07 hrs, Volume= 0.532 af, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

	Area (sf)	CN	Description
	56,560	98	Paved parking, HSG B
	14,470	73	Woods/grass comb., Poor, HSG B
*	4,500	39	Permeable walking path
	75,530	90	Weighted Average
	18,970		25.12% Pervious Area
	56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 17S: Subcat 3

Runoff = 1.16 cfs @ 12.08 hrs, Volume= 0.080 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
5,870	98	Paved parking, HSG B
14,670	61	>75% Grass cover, Good, HSG B
20,540	72	Weighted Average
14,670		71.42% Pervious Area
5,870		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 19S: Subcat 10

Runoff = 2.58 cfs @ 12.07 hrs, Volume= 0.195 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
22,140	98	Paved parking, HSG B
1,360	61	>75% Grass cover, Good, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 21S: Subcat 6

Runoff = 7.48 cfs @ 12.07 hrs, Volume= 0.539 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr storm Rainfall=4.80"

Area (sf)	CN	Description
60,040	98	Paved parking, HSG B
12,350	65	Woods/grass comb., Fair, HSG B
72,390	92	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond 10P: Proposed Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 3.53" for 10 yr storm event
Inflow = 7.44 cfs @ 12.07 hrs, Volume= 0.489 af
Primary = 7.44 cfs @ 12.07 hrs, Volume= 0.489 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 1 Surface

[93] Warning: Storage range exceeded by 1.00'

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 3.89" for 10 yr storm event
Inflow = 7.48 cfs @ 12.07 hrs, Volume= 0.539 af
Outflow = 7.48 cfs @ 12.07 hrs, Volume= 0.532 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.102 af
Secondary = 7.40 cfs @ 12.07 hrs, Volume= 0.429 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6.75' @ 12.07 hrs Surf.Area= 0.015 ac Storage= 0.010 af

Plug-Flow detention time= 15.2 min calculated for 0.531 af (99% of inflow)
Center-of-Mass det. time= 6.8 min (789.4 - 782.6)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	0.010 af	**20.00'W x 25.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.00'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.54'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 12.07 hrs HW=6.74' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.08 cfs)

Secondary OutFlow Max=7.39 cfs @ 12.07 hrs HW=6.74' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 7.39 cfs @ 3.74 fps)

Summary for Pond 15P: Bioretention 1 Body

[78] Warning: Submerged Pond 14P Primary device # 1 by 0.75'
[81] Warning: Exceeded Pond 14P by 0.06' @ 16.64 hrs

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 0.74" for 10 yr storm event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.102 af
Outflow = 0.07 cfs @ 15.43 hrs, Volume= 0.100 af, Atten= 16%, Lag= 201.5 min
Discarded = 0.03 cfs @ 15.43 hrs, Volume= 0.040 af
Primary = 0.04 cfs @ 15.43 hrs, Volume= 0.060 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 5.75' @ 15.43 hrs Surf.Area= 500 sf Storage= 131 cf

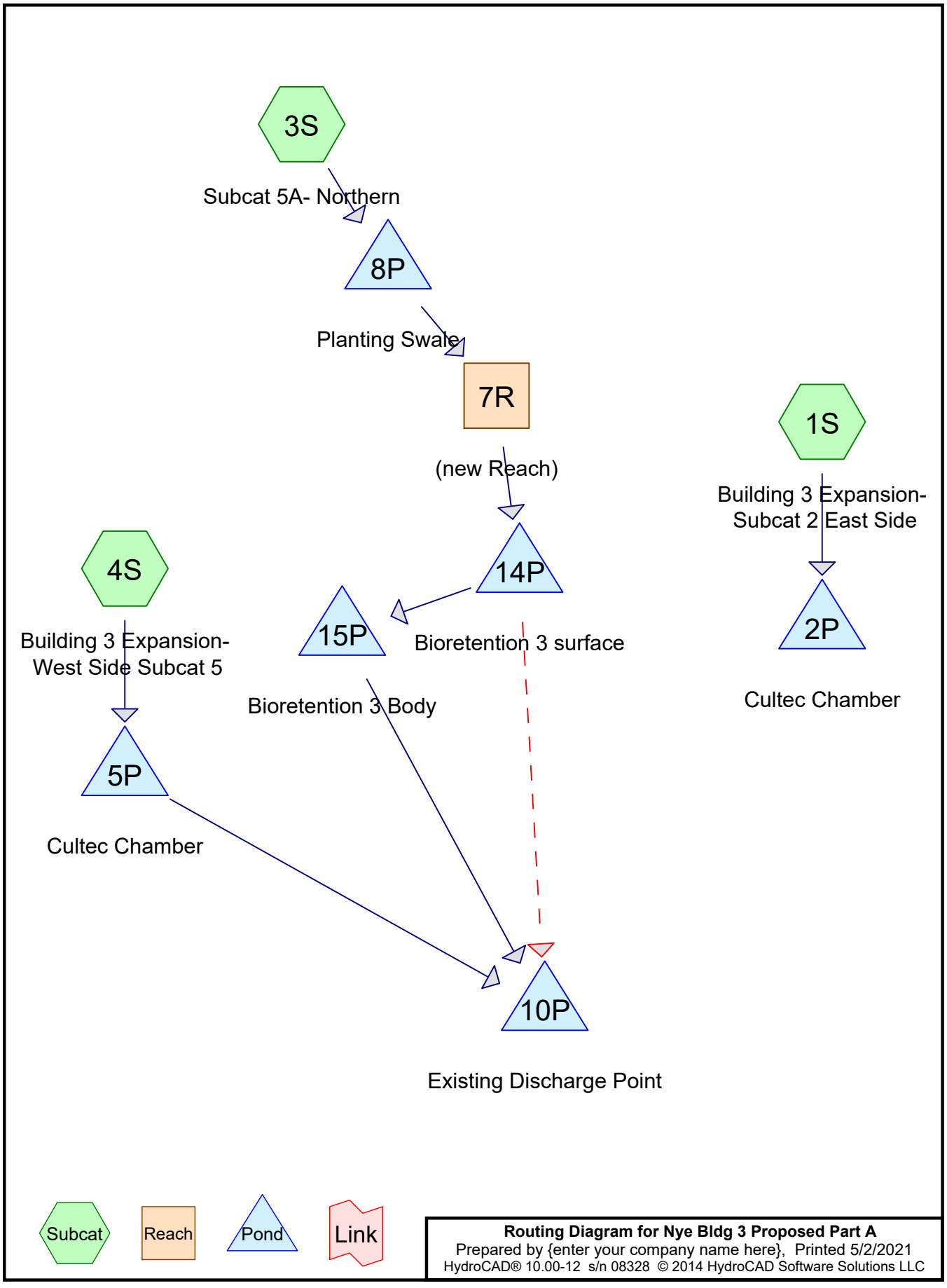
Plug-Flow detention time= 21.0 min calculated for 0.100 af (98% of inflow)
Center-of-Mass det. time= 10.0 min (900.9 - 890.8)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	350 cf	**20.00'W x 25.00'L x 2.00'H Prismatoid** 1,000 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.20'	**0.2" Vert. Orifice/Grate X 25.00** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 15.43 hrs HW=5.75' (Free Discharge)
↑**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 15.43 hrs HW=5.75' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.68 fps)



Routing Diagram for Nye Bldg 3 Proposed Part A
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>5.36"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=3.91 cfs 0.308 af

Subcatchment 3S: Subcat 5A- Northern Runoff Area=35,290 sf 97.39% Impervious Runoff Depth>5.24"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=4.58 cfs 0.354 af

Subcatchment 4S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>5.36"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=3.91 cfs 0.308 af

Reach 7R: (new Reach) Avg. Flow Depth=0.49' Max Vel=1.00 fps Inflow=4.48 cfs 0.152 af
n=0.080 L=260.0' S=0.0088 '/' Capacity=4.07 cfs Outflow=3.87 cfs 0.152 af

Pond 2P: Cultec Chamber Peak Elev=9.77' Storage=0.061 af Inflow=3.91 cfs 0.308 af
Discarded=1.53 cfs 0.272 af Primary=3.27 cfs 0.036 af Outflow=4.80 cfs 0.308 af

Pond 5P: Cultec Chamber Peak Elev=6.49' Storage=0.055 af Inflow=3.91 cfs 0.308 af
Discarded=0.37 cfs 0.225 af Primary=3.88 cfs 0.082 af Outflow=4.25 cfs 0.307 af

Pond 8P: Planting Swale Peak Elev=6.14' Storage=0.035 af Inflow=4.58 cfs 0.354 af
Discarded=0.19 cfs 0.202 af Primary=4.48 cfs 0.152 af Outflow=4.67 cfs 0.354 af

Pond 10P: Existing Discharge Point Inflow=7.26 cfs 0.191 af
Primary=7.26 cfs 0.191 af

Pond 14P: Bioretention 3 surface Peak Elev=6.72' Storage=0.030 af Inflow=3.87 cfs 0.152 af
Primary=0.24 cfs 0.060 af Secondary=5.57 cfs 0.091 af Outflow=5.81 cfs 0.151 af

Pond 15P: Bioretention 3 Body Peak Elev=4.30' Storage=626 cf Inflow=0.24 cfs 0.060 af
Discarded=0.11 cfs 0.042 af Primary=0.06 cfs 0.018 af Outflow=0.17 cfs 0.060 af

Total Runoff Area = 2.188 ac Runoff Volume = 0.969 af Average Runoff Depth = 5.32"
0.97% Pervious = 0.021 ac 99.03% Impervious = 2.166 ac

Summary for Subcatchment 1S: Building 3 Expansion- Subcat 2 East Side

Runoff = 3.91 cfs @ 12.07 hrs, Volume= 0.308 af, Depth> 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 5A- Northern

Runoff = 4.58 cfs @ 12.07 hrs, Volume= 0.354 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
34,370	98	Paved parking, HSG B
920	61	>75% Grass cover, Good, HSG B
35,290	97	Weighted Average
920		2.61% Pervious Area
34,370		97.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Building 3 Expansion- West Side Subcat 5

Runoff = 3.91 cfs @ 12.07 hrs, Volume= 0.308 af, Depth> 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach 7R: (new Reach)

[55] Hint: Peak inflow is 110% of Manning's capacity
[81] Warning: Exceeded Pond 8P by 4.20' @ 0.00 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 2.25" for 25 yr storm event
Inflow = 4.48 cfs @ 12.07 hrs, Volume= 0.152 af
Outflow = 3.87 cfs @ 12.18 hrs, Volume= 0.152 af, Atten= 14%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 1.00 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 31.2 min

Peak Storage= 1,009 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 4.07 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 260.0' Slope= 0.0088 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 2P: Cultec Chamber

[93] Warning: Storage range exceeded by 2.19'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 5.36" for 25 yr storm event
Inflow = 3.91 cfs @ 12.07 hrs, Volume= 0.308 af
Outflow = 4.80 cfs @ 12.11 hrs, Volume= 0.308 af, Atten= 0%, Lag= 2.4 min
Discarded = 1.53 cfs @ 12.11 hrs, Volume= 0.272 af
Primary = 3.27 cfs @ 12.11 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 9.77' @ 12.11 hrs Surf.Area= 0.046 ac Storage= 0.061 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 23.7 min (768.5 - 744.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.04'	0.037 af	**21.67'W x 92.50'L x 2.54'H Field A** 0.117 af Overall - 0.023 af Embedded = 0.094 af x 40.0% Voids
#2A	6.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.04'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 4.67'
#2	Primary	6.87'	**10.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.87' / 5.57' S= 0.0260 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=1.53 cfs @ 12.11 hrs HW=9.77' (Free Discharge)
↑—**1=Exfiltration** (Controls 1.53 cfs)

Primary OutFlow Max=3.26 cfs @ 12.11 hrs HW=9.76' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 3.26 cfs @ 5.98 fps)

Summary for Pond 5P: Cultec Chamber

[93] Warning: Storage range exceeded by 0.91'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=16)

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 5.36" for 25 yr storm event
Inflow = 3.91 cfs @ 12.07 hrs, Volume= 0.308 af
Outflow = 4.25 cfs @ 12.06 hrs, Volume= 0.307 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.37 cfs @ 12.06 hrs, Volume= 0.225 af
Primary = 3.88 cfs @ 12.06 hrs, Volume= 0.082 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 6.49' @ 12.06 hrs Surf.Area= 0.046 ac Storage= 0.055 af

Plug-Flow detention time= 55.0 min calculated for 0.307 af (100% of inflow)
Center-of-Mass det. time= 54.0 min (798.8 - 744.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.37'	0.031 af	**21.67'W x 92.50'L x 2.21'H Field A** 0.102 af Overall - 0.023 af Embedded = 0.078 af x 40.0% Voids
#2A	4.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.055 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.37'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'
#2	Primary	5.20'	**10.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5.20' / 4.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.37 cfs @ 12.06 hrs HW=6.49' (Free Discharge)
1=Exfiltration (Controls 0.37 cfs)

Primary OutFlow Max=3.88 cfs @ 12.06 hrs HW=6.49' (Free Discharge)
2=Culvert (Inlet Controls 3.88 cfs @ 3.56 fps)

Summary for Pond 8P: Planting Swale

[93] Warning: Storage range exceeded by 0.24'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=27)

Inflow Area =	0.810 ac,	97.39% Impervious,	Inflow Depth >	5.24" for 25 yr storm event
Inflow =	4.58 cfs @	12.07 hrs, Volume=	0.354 af	
Outflow =	4.67 cfs @	12.07 hrs, Volume=	0.354 af, Atten= 0%, Lag= 0.0 min	
Discarded =	0.19 cfs @	12.07 hrs, Volume=	0.202 af	
Primary =	4.48 cfs @	12.07 hrs, Volume=	0.152 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.14' @ 12.07 hrs Surf.Area= 0.048 ac Storage= 0.035 af

Plug-Flow detention time= 44.9 min calculated for 0.354 af (100% of inflow)
Center-of-Mass det. time= 44.6 min (796.7 - 752.1)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.035 af	**8.00'W x 260.00'L x 2.10'H Prismatoid** 0.100 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.19 cfs @ 12.07 hrs HW=6.14' (Free Discharge)
1=Exfiltration (Controls 0.19 cfs)

Primary OutFlow Max=4.48 cfs @ 12.07 hrs HW=6.14' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 4.48 cfs @ 1.67 fps)

Summary for Pond 10P: Existing Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 1.53" for 25 yr storm event
Inflow = 7.26 cfs @ 12.15 hrs, Volume= 0.191 af
Primary = 7.26 cfs @ 12.15 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 3 surface

[93] Warning: Storage range exceeded by 0.77'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=25)
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.63' @ 12.21 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 2.25" for 25 yr storm event
Inflow = 3.87 cfs @ 12.18 hrs, Volume= 0.152 af
Outflow = 5.81 cfs @ 12.19 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.5 min
Primary = 0.24 cfs @ 12.19 hrs, Volume= 0.060 af
Secondary = 5.57 cfs @ 12.19 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.72' @ 12.19 hrs Surf.Area= 0.043 ac Storage= 0.030 af

Plug-Flow detention time= 28.7 min calculated for 0.151 af (99% of inflow)
Center-of-Mass det. time= 27.3 min (774.9 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	5.20'	0.030 af	**27.00'W x 60.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.20'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.70'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.24 cfs @ 12.19 hrs HW=6.72' (Free Discharge)
1=Exfiltration (Controls 0.24 cfs)

Secondary OutFlow Max=5.55 cfs @ 12.19 hrs HW=6.72' (Free Discharge)
2=Orifice/Grate (Orifice Controls 5.55 cfs @ 3.44 fps)

Summary for Pond 15P: Bioretention 3 Body

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 0.88" for 25 yr storm event
Inflow = 0.24 cfs @ 12.19 hrs, Volume= 0.060 af
Outflow = 0.17 cfs @ 15.26 hrs, Volume= 0.060 af, Atten= 30%, Lag= 184.5 min
Discarded = 0.11 cfs @ 15.26 hrs, Volume= 0.042 af
Primary = 0.06 cfs @ 15.26 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.30' @ 15.26 hrs Surf.Area= 1,620 sf Storage= 626 cf

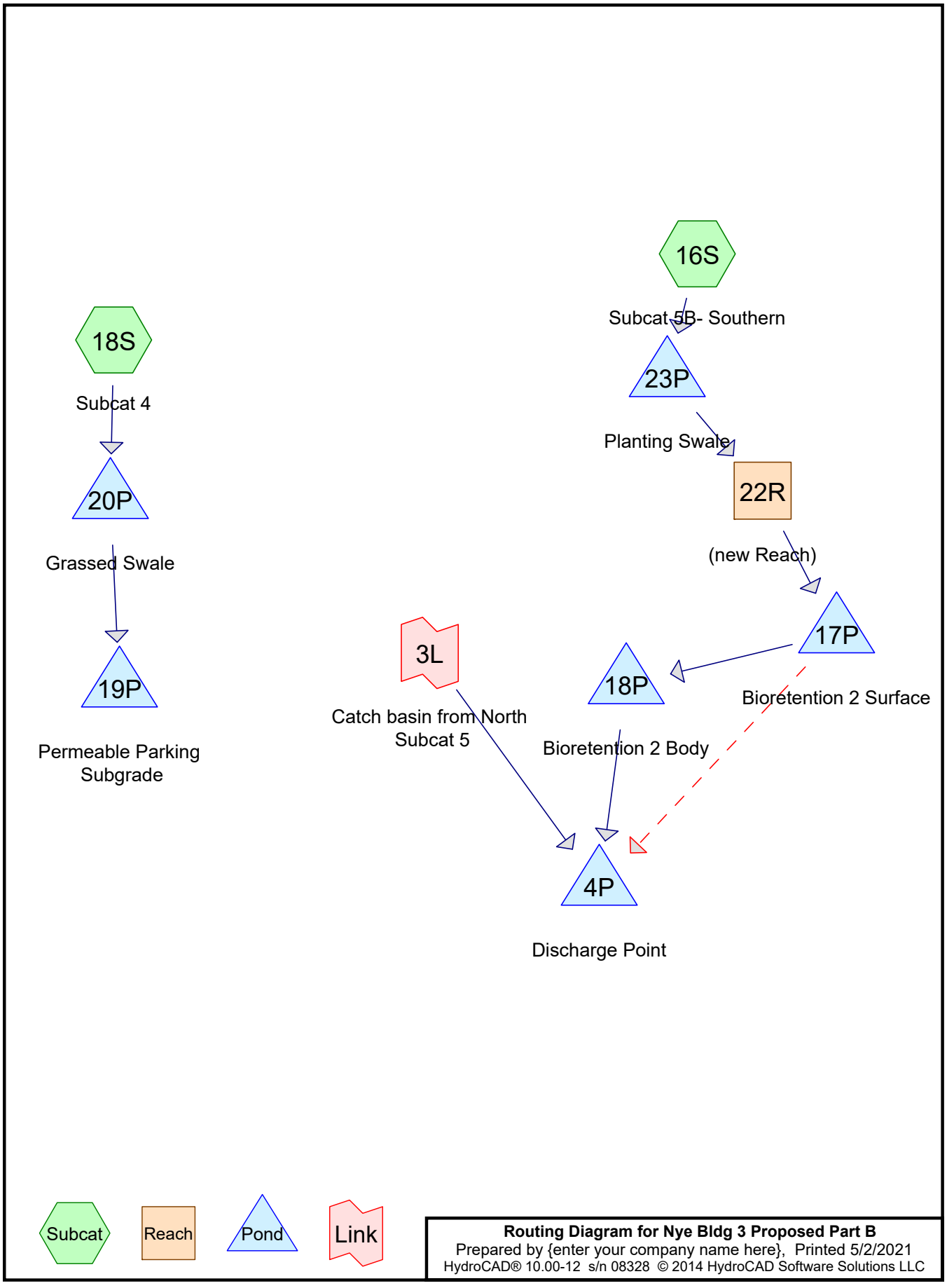
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 48.9 min (869.9 - 821.0)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	1,134 cf	**27.00'W x 60.00'L x 2.00'H Prismatoid** 3,240 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.20'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.40'	**0.2" Vert. Orifice/Grate X 60.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 15.26 hrs HW=4.30' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=0.06 cfs @ 15.26 hrs HW=4.30' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 4.56 fps)



Routing Diagram for Nye Bldg 3 Proposed Part B
Prepared by {enter your company name here}, Printed 5/2/2021

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

Subcatchment 16S: Subcat 5B- Southern Runoff Area=21,310 sf 98.26% Impervious Runoff Depth>5.30"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=2.75 cfs 0.216 af

Subcatchment 18S: Subcat 4 Runoff Area=33,890 sf 27.47% Impervious Runoff Depth>2.54"
Flow Length=135' Slope=0.0100 '/' Tc=9.0 min CN=68 Runoff=1.87 cfs 0.164 af

Reach 22R: (new Reach) Avg. Flow Depth=0.31' Max Vel=1.07 fps Inflow=2.72 cfs 0.154 af
n=0.080 L=130.0' S=0.0177 '/' Capacity=5.76 cfs Outflow=2.61 cfs 0.154 af

Pond 4P: Discharge Point Inflow=9.57 cfs 0.291 af
Primary=9.57 cfs 0.291 af

Pond 17P: Bioretention 2 Surface Peak Elev=7.01' Storage=0.017 af Inflow=2.61 cfs 0.154 af
Primary=0.13 cfs 0.074 af Secondary=2.40 cfs 0.075 af Outflow=2.53 cfs 0.150 af

Pond 18P: Bioretention 2 Body Peak Elev=4.51' Storage=411 cf Inflow=0.13 cfs 0.074 af
Discarded=0.06 cfs 0.049 af Primary=0.05 cfs 0.025 af Outflow=0.11 cfs 0.074 af

Pond 19P: Permeable Parking Subgrade Peak Elev=8.87' Storage=2,565 cf Inflow=1.95 cfs 0.106 af
Discarded=0.14 cfs 0.104 af Primary=0.06 cfs 0.002 af Outflow=0.19 cfs 0.106 af

Pond 20P: Grassed Swale Peak Elev=9.32' Storage=0.016 af Inflow=1.87 cfs 0.164 af
Discarded=0.04 cfs 0.047 af Primary=1.95 cfs 0.106 af Outflow=1.99 cfs 0.153 af

Pond 23P: Planting Swale Peak Elev=6.04' Storage=0.007 af Inflow=2.75 cfs 0.216 af
Discarded=0.04 cfs 0.057 af Primary=2.72 cfs 0.154 af Outflow=2.75 cfs 0.211 af

Link 25 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce Inflow=7.26 cfs 0.191 af
Area= 1.499 ac 98.59% Imperv. Primary=7.26 cfs 0.191 af

Total Runoff Area = 1.267 ac Runoff Volume = 0.380 af Average Runoff Depth = 3.60"
45.20% Pervious = 0.573 ac 54.80% Impervious = 0.694 ac

Summary for Subcatchment 16S: Subcat 5B- Southern

Runoff = 2.75 cfs @ 12.07 hrs, Volume= 0.216 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
20,940	98	Paved parking, HSG B
370	61	>75% Grass cover, Good, HSG B
21,310	97	Weighted Average
370		1.74% Pervious Area
20,940		98.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 18S: Subcat 4

Runoff = 1.87 cfs @ 12.13 hrs, Volume= 0.164 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

	Area (sf)	CN	Description
	9,310	98	Paved parking, HSG B
	20,670	61	>75% Grass cover, Good, HSG B
*	3,910	30	Permeable Roadway
	33,890	68	Weighted Average
	24,580		72.53% Pervious Area
	9,310		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	135	0.0100	0.25		**Lag/CN Method,**

Summary for Reach 22R: (new Reach)

[81] Warning: Exceeded Pond 23P by 4.20' @ 1.00 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 3.77" for 25 yr storm event
Inflow = 2.72 cfs @ 12.07 hrs, Volume= 0.154 af
Outflow = 2.61 cfs @ 12.12 hrs, Volume= 0.154 af, Atten= 4%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 1.07 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.23 fps, Avg. Travel Time= 9.2 min

Peak Storage= 318 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 5.76 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 130.0' Slope= 0.0177 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 4P: Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.988 ac, 98.51% Impervious, Inflow Depth = 1.76" for 25 yr storm event
Inflow = 9.57 cfs @ 12.15 hrs, Volume= 0.291 af
Primary = 9.57 cfs @ 12.15 hrs, Volume= 0.291 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 17P: Bioretention 2 Surface

[93] Warning: Storage range exceeded by 0.41'
[62] Hint: Exceeded Reach 22R OUTLET depth by 1.02' @ 12.14 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 3.77" for 25 yr storm event
Inflow = 2.61 cfs @ 12.12 hrs, Volume= 0.154 af
Outflow = 2.53 cfs @ 12.12 hrs, Volume= 0.150 af, Atten= 3%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.12 hrs, Volume= 0.074 af
Secondary = 2.40 cfs @ 12.12 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 7.01' @ 12.12 hrs Surf.Area= 0.027 ac Storage= 0.017 af

Plug-Flow detention time= 33.6 min calculated for 0.150 af (97% of inflow)
Center-of-Mass det. time= 24.8 min (769.3 - 744.5)

Volume	Invert	Avail.Storage	Storage Description
#1	5.90'	0.017 af	**22.00'W x 44.00'L x 0.70'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.90'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

#2	Secondary	6.36'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.13 cfs @ 12.12 hrs HW=7.00' (Free Discharge)
1=Exfiltration (Controls 0.13 cfs)

Secondary OutFlow Max=2.39 cfs @ 12.12 hrs HW=7.00' (Free Discharge)
2=Orifice/Grate (Orifice Controls 2.39 cfs @ 2.73 fps)

Summary for Pond 18P: Bioretention 2 Body

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 1.82" for 25 yr storm event
Inflow = 0.13 cfs @ 12.12 hrs, Volume= 0.074 af
Outflow = 0.11 cfs @ 15.27 hrs, Volume= 0.074 af, Atten= 17%, Lag= 188.9 min
Discarded = 0.06 cfs @ 15.27 hrs, Volume= 0.049 af
Primary = 0.05 cfs @ 15.27 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.51' @ 15.27 hrs Surf.Area= 968 sf Storage= 411 cf

Plug-Flow detention time= 47.6 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 47.6 min (847.1 - 799.5)

Volume	Invert	Avail.Storage	Storage Description
#1	3.30'	881 cf	**22.00'W x 44.00'L x 2.60'H Prismatoid** 2,517 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.30'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.50'	**0.2" Vert. Orifice/Grate X 44.00** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 15.27 hrs HW=4.51' (Free Discharge)
1=Exfiltration (Controls 0.06 cfs)

Primary OutFlow Max=0.05 cfs @ 15.27 hrs HW=4.51' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.05 cfs @ 4.82 fps)

Summary for Pond 19P: Permeable Parking Subgrade

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth = 1.63" for 25 yr storm event
Inflow = 1.95 cfs @ 12.13 hrs, Volume= 0.106 af
Outflow = 0.19 cfs @ 13.05 hrs, Volume= 0.106 af, Atten= 90%, Lag= 55.4 min
Discarded = 0.14 cfs @ 13.05 hrs, Volume= 0.104 af
Primary = 0.06 cfs @ 13.05 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 8.87' @ 13.05 hrs Surf.Area= 3,910 sf Storage= 2,565 cf

Plug-Flow detention time= 198.9 min calculated for 0.106 af (100% of inflow)
Center-of-Mass det. time= 198.8 min (985.4 - 786.5)

Volume	Invert	Avail.Storage	Storage Description
#1	7.00'	2,737 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 7,820 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.00	3,910	0	0
8.00	3,910	3,910	3,910
9.00	3,910	3,910	7,820

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.00'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	8.85'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.14 cfs @ 13.05 hrs HW=8.87' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.05 cfs @ 13.05 hrs HW=8.87' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.44 fps)

Summary for Pond 20P: Grassed Swale

[93] Warning: Storage range exceeded by 0.17'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=22)

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth > 2.54" for 25 yr storm event
Inflow = 1.87 cfs @ 12.13 hrs, Volume= 0.164 af
Outflow = 1.99 cfs @ 12.13 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.04 cfs @ 12.13 hrs, Volume= 0.047 af
Primary = 1.95 cfs @ 12.13 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 9.32' @ 12.13 hrs Surf.Area= 0.028 ac Storage= 0.016 af

Plug-Flow detention time= 57.2 min calculated for 0.153 af (93% of inflow)
Center-of-Mass det. time= 20.2 min (818.3 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	8.40'	0.016 af	**3.00'W x 200.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.40'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	9.00'	**4.0' 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

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=9.32' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=1.95 cfs @ 12.13 hrs HW=9.32' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.95 cfs @ 1.53 fps)

Summary for Pond 23P: Planting Swale

[93] Warning: Storage range exceeded by 0.14'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth > 5.30" for 25 yr storm event
Inflow = 2.75 cfs @ 12.07 hrs, Volume= 0.216 af
Outflow = 2.75 cfs @ 12.07 hrs, Volume= 0.211 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.07 hrs, Volume= 0.057 af
Primary = 2.72 cfs @ 12.07 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.04' @ 12.07 hrs Surf.Area= 0.009 ac Storage= 0.007 af

Plug-Flow detention time= 29.5 min calculated for 0.211 af (98% of inflow)
Center-of-Mass det. time= 14.2 min (759.7 - 745.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.007 af	**8.00'W x 50.00'L x 2.10'H Prismatoid** 0.019 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.04 cfs @ 12.07 hrs HW=6.04' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

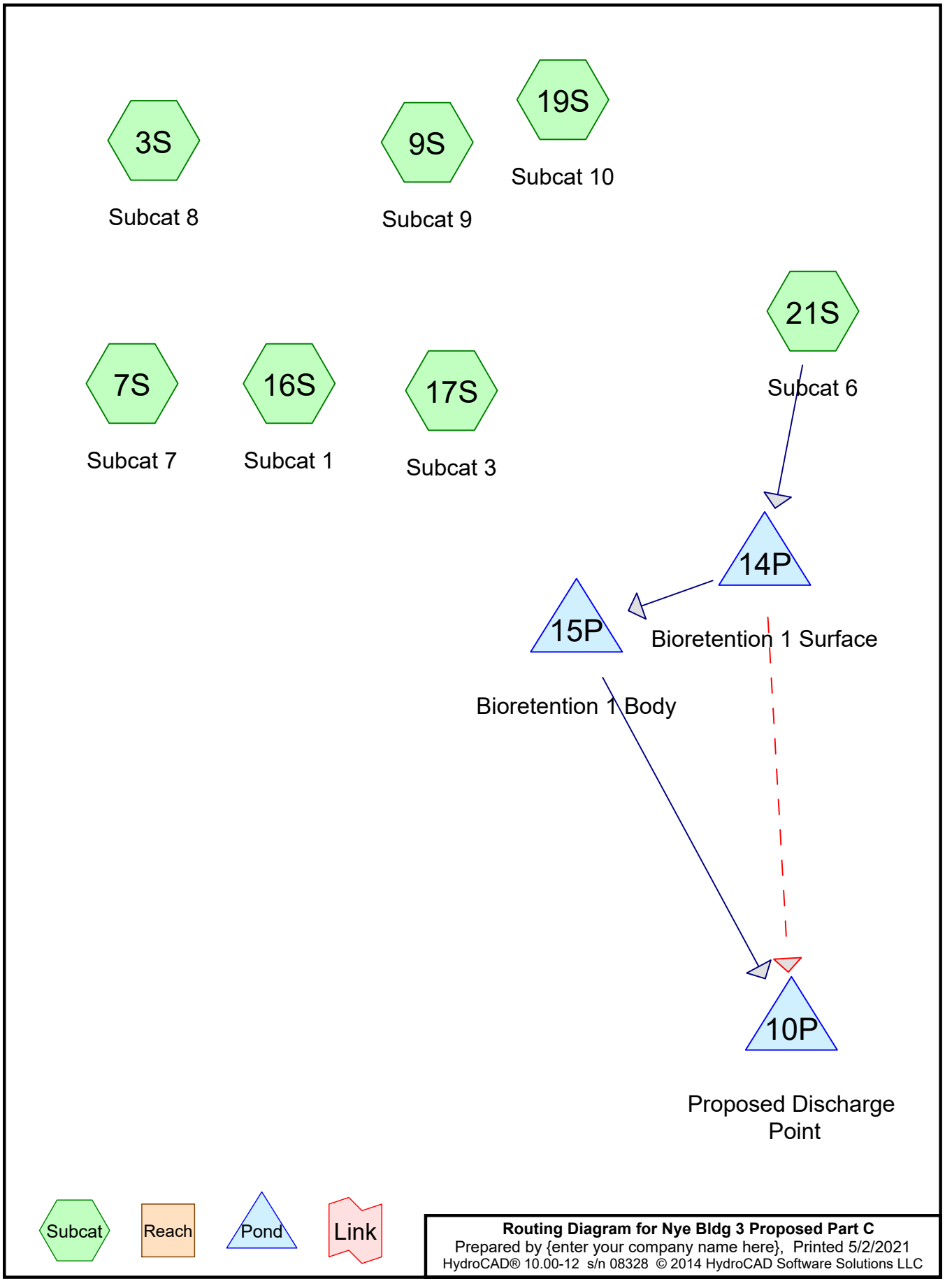
Primary OutFlow Max=2.72 cfs @ 12.07 hrs HW=6.04' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.72 cfs @ 1.39 fps)

Summary for Link 3L: Catch basin from North Subcat 5

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 1.53" for 25 yr storm event
Inflow = 7.26 cfs @ 12.15 hrs, Volume= 0.191 af
Primary = 7.26 cfs @ 12.15 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

25 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce



Routing Diagram for Nye Bldg 3 Proposed Part C
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>5.01"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=10.25 cfs 0.770 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 78.97% Impervious Runoff Depth>4.45"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=5.54 cfs 0.397 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>1.66"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=1.73 cfs 0.183 af

Subcatchment 16S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>4.45"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=8.99 cfs 0.644 af

Subcatchment 17S: Subcat 3 Runoff Area=20,540 sf 28.58% Impervious Runoff Depth>2.67"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=72 Runoff=1.52 cfs 0.105 af

Subcatchment 19S: Subcat 10 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>5.13"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=3.02 cfs 0.230 af

Subcatchment 21S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>4.67"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=8.89 cfs 0.647 af

Pond 10P: Proposed Discharge Point Inflow=8.86 cfs 0.595 af
Primary=8.86 cfs 0.595 af

Pond 14P: Bioretention 1 Surface Peak Elev=6.88' Storage=0.010 af Inflow=8.89 cfs 0.647 af
Primary=0.08 cfs 0.107 af Secondary=8.82 cfs 0.533 af Outflow=8.90 cfs 0.640 af

Pond 15P: Bioretention 1 Body Peak Elev=5.80' Storage=140 cf Inflow=0.08 cfs 0.107 af
Discarded=0.03 cfs 0.042 af Primary=0.04 cfs 0.062 af Outflow=0.07 cfs 0.105 af

Total Runoff Area = 8.648 ac Runoff Volume = 2.976 af Average Runoff Depth = 4.13"
32.50% Pervious = 2.811 ac 67.50% Impervious = 5.838 ac

Summary for Subcatchment 3S: Subcat 8

Runoff = 10.25 cfs @ 12.07 hrs, Volume= 0.770 af, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
72,920	98	Paved parking, HSG B
7,440	61	>75% Grass cover, Good, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 5.54 cfs @ 12.07 hrs, Volume= 0.397 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
9,790	61	>75% Grass cover, Good, HSG B
36,760	98	Paved parking, HSG B
46,550	90	Weighted Average
9,790		21.03% Pervious Area
36,760		78.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 1.73 cfs @ 12.26 hrs, Volume= 0.183 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Summary for Subcatchment 16S: Subcat 1

Runoff = 8.99 cfs @ 12.07 hrs, Volume= 0.644 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

	Area (sf)	CN	Description
	56,560	98	Paved parking, HSG B
	14,470	73	Woods/grass comb., Poor, HSG B
*	4,500	39	Permeable walking path
	75,530	90	Weighted Average
	18,970		25.12% Pervious Area
	56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 17S: Subcat 3

Runoff = 1.52 cfs @ 12.08 hrs, Volume= 0.105 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
5,870	98	Paved parking, HSG B
14,670	61	>75% Grass cover, Good, HSG B
20,540	72	Weighted Average
14,670		71.42% Pervious Area
5,870		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 19S: Subcat 10

Runoff = 3.02 cfs @ 12.07 hrs, Volume= 0.230 af, Depth> 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
22,140	98	Paved parking, HSG B
1,360	61	>75% Grass cover, Good, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 21S: Subcat 6

Runoff = 8.89 cfs @ 12.07 hrs, Volume= 0.647 af, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr storm Rainfall=5.60"

Area (sf)	CN	Description
60,040	98	Paved parking, HSG B
12,350	65	Woods/grass comb., Fair, HSG B
72,390	92	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond 10P: Proposed Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 4.30" for 25 yr storm event
Inflow = 8.86 cfs @ 12.07 hrs, Volume= 0.595 af
Primary = 8.86 cfs @ 12.07 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 1 Surface

[93] Warning: Storage range exceeded by 1.13'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 4.67" for 25 yr storm event
Inflow = 8.89 cfs @ 12.07 hrs, Volume= 0.647 af
Outflow = 8.90 cfs @ 12.07 hrs, Volume= 0.640 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.07 hrs, Volume= 0.107 af
Secondary = 8.82 cfs @ 12.07 hrs, Volume= 0.533 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 6.88' @ 12.07 hrs Surf.Area= 0.015 ac Storage= 0.010 af

Plug-Flow detention time= 13.4 min calculated for 0.639 af (99% of inflow)
Center-of-Mass det. time= 6.1 min (783.9 - 777.8)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	0.010 af	**20.00'W x 25.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.00'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.54'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 12.07 hrs HW=6.88' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.08 cfs)

Secondary OutFlow Max=8.81 cfs @ 12.07 hrs HW=6.88' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 8.81 cfs @ 3.94 fps)

Summary for Pond 15P: Bioretention 1 Body

[78] Warning: Submerged Pond 14P Primary device # 1 by 0.80'
[81] Warning: Exceeded Pond 14P by 0.09' @ 16.52 hrs

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 0.77" for 25 yr storm event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.107 af
Outflow = 0.07 cfs @ 15.44 hrs, Volume= 0.105 af, Atten= 17%, Lag= 202.4 min
Discarded = 0.03 cfs @ 15.44 hrs, Volume= 0.042 af
Primary = 0.04 cfs @ 15.44 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 5.80' @ 15.44 hrs Surf.Area= 500 sf Storage= 140 cf

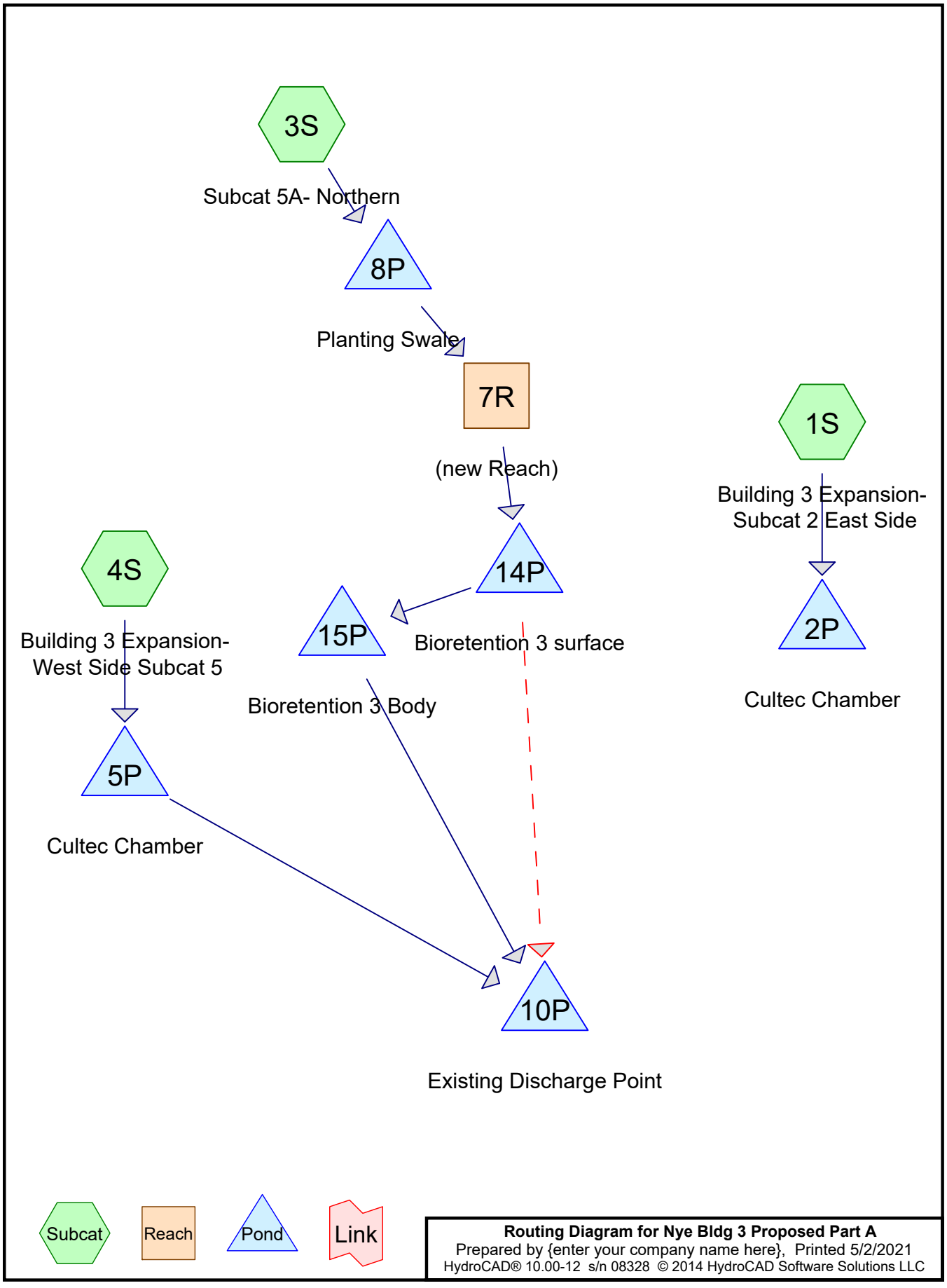
Plug-Flow detention time= 22.2 min calculated for 0.104 af (98% of inflow)
Center-of-Mass det. time= 10.4 min (882.4 - 872.0)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	350 cf	**20.00'W x 25.00'L x 2.00'H Prismatoid** 1,000 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.20'	**0.2" Vert. Orifice/Grate X 25.00** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 15.44 hrs HW=5.80' (Free Discharge)
↑**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 15.44 hrs HW=5.80' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.75 fps)



Routing Diagram for Nye Bldg 3 Proposed Part A
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>6.76"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=4.90 cfs 0.388 af

Subcatchment 3S: Subcat 5A- Northern Runoff Area=35,290 sf 97.39% Impervious Runoff Depth>6.64"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=5.74 cfs 0.448 af

Subcatchment 4S: Building 3 Expansion- Runoff Area=30,000 sf 100.00% Impervious Runoff Depth>6.76"
Flow Length=100' Slope=0.0100 '/' Tc=5.0 min CN=98 Runoff=4.90 cfs 0.388 af

Reach 7R: (new Reach) Avg. Flow Depth=0.57' Max Vel=1.09 fps Inflow=5.59 cfs 0.221 af
n=0.080 L=260.0' S=0.0088 '/' Capacity=4.07 cfs Outflow=4.96 cfs 0.221 af

Pond 2P: Cultec Chamber Peak Elev=11.35' Storage=0.061 af Inflow=4.90 cfs 0.388 af
Discarded=2.01 cfs 0.324 af Primary=4.18 cfs 0.062 af Outflow=6.19 cfs 0.386 af

Pond 5P: Cultec Chamber Peak Elev=6.93' Storage=0.055 af Inflow=4.90 cfs 0.388 af
Discarded=0.40 cfs 0.258 af Primary=4.76 cfs 0.130 af Outflow=5.16 cfs 0.388 af

Pond 8P: Planting Swale Peak Elev=6.19' Storage=0.035 af Inflow=5.74 cfs 0.448 af
Discarded=0.19 cfs 0.227 af Primary=5.59 cfs 0.221 af Outflow=5.77 cfs 0.448 af

Pond 10P: Existing Discharge Point Inflow=8.03 cfs 0.299 af
Primary=8.03 cfs 0.299 af

Pond 14P: Bioretention 3 surface Peak Elev=6.65' Storage=0.030 af Inflow=4.96 cfs 0.221 af
Primary=0.23 cfs 0.075 af Secondary=4.84 cfs 0.146 af Outflow=5.07 cfs 0.221 af

Pond 15P: Bioretention 3 Body Peak Elev=4.43' Storage=696 cf Inflow=0.23 cfs 0.075 af
Discarded=0.11 cfs 0.052 af Primary=0.06 cfs 0.023 af Outflow=0.17 cfs 0.075 af

Total Runoff Area = 2.188 ac Runoff Volume = 1.224 af Average Runoff Depth = 6.71"
0.97% Pervious = 0.021 ac 99.03% Impervious = 2.166 ac

Summary for Subcatchment 1S: Building 3 Expansion- Subcat 2 East Side

Runoff = 4.90 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 3S: Subcat 5A- Northern

Runoff = 5.74 cfs @ 12.07 hrs, Volume= 0.448 af, Depth> 6.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
34,370	98	Paved parking, HSG B
920	61	>75% Grass cover, Good, HSG B
35,290	97	Weighted Average
920		2.61% Pervious Area
34,370		97.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 4S: Building 3 Expansion- West Side Subcat 5

Runoff = 4.90 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
30,000	98	Roofs, HSG B
30,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0100	0.70		**Lag/CN Method,**
2.4	100	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach 7R: (new Reach)

[91] Warning: Storage range exceeded by 0.07'
[55] Hint: Peak inflow is 137% of Manning's capacity
[81] Warning: Exceeded Pond 8P by 4.20' @ 0.00 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 3.27" for 100 yr storm event
Inflow = 5.59 cfs @ 12.08 hrs, Volume= 0.221 af
Outflow = 4.96 cfs @ 12.17 hrs, Volume= 0.221 af, Atten= 11%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 1.09 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 25.7 min

Peak Storage= 1,184 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 4.07 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 260.0' Slope= 0.0088 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 2P: Cultec Chamber

[93] Warning: Storage range exceeded by 3.77'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=7)

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 6.76" for 100 yr storm event
Inflow = 4.90 cfs @ 12.07 hrs, Volume= 0.388 af
Outflow = 6.19 cfs @ 12.06 hrs, Volume= 0.386 af, Atten= 0%, Lag= 0.0 min
Discarded = 2.01 cfs @ 12.06 hrs, Volume= 0.324 af
Primary = 4.18 cfs @ 12.06 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 11.35' @ 12.06 hrs Surf.Area= 0.046 ac Storage= 0.061 af

Plug-Flow detention time= 26.3 min calculated for 0.386 af (100% of inflow)
Center-of-Mass det. time= 23.4 min (764.9 - 741.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.04'	0.037 af	**21.67'W x 92.50'L x 2.54'H Field A** 0.117 af Overall - 0.023 af Embedded = 0.094 af x 40.0% Voids
#2A	6.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.04'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 4.67'
#2	Primary	6.87'	**10.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 6.87' / 5.57' S= 0.0260 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=2.01 cfs @ 12.06 hrs HW=11.35' (Free Discharge)
1=Exfiltration (Controls 2.01 cfs)

Primary OutFlow Max=4.18 cfs @ 12.06 hrs HW=11.35' (Free Discharge)
2=Culvert (Inlet Controls 4.18 cfs @ 7.66 fps)

Summary for Pond 5P: Cultec Chamber

[93] Warning: Storage range exceeded by 1.36'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=25)

Inflow Area = 0.689 ac,100.00% Impervious, Inflow Depth > 6.76" for 100 yr storm event
Inflow = 4.90 cfs @ 12.07 hrs, Volume= 0.388 af
Outflow = 5.16 cfs @ 12.06 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.40 cfs @ 12.06 hrs, Volume= 0.258 af
Primary = 4.76 cfs @ 12.06 hrs, Volume= 0.130 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 6.93' @ 12.06 hrs Surf.Area= 0.046 ac Storage= 0.055 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 51.5 min (793.1 - 741.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.37'	0.031 af	**21.67'W x 92.50'L x 2.21'H Field A** 0.102 af Overall - 0.023 af Embedded = 0.078 af x 40.0% Voids
#2A	4.04'	0.023 af	**Cultec C-100HD** x 72 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		0.055 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.37'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'
#2	Primary	5.20'	**10.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 5.20' / 4.00' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.40 cfs @ 12.06 hrs HW=6.93' (Free Discharge)
1=Exfiltration (Controls 0.40 cfs)

Primary OutFlow Max=4.76 cfs @ 12.06 hrs HW=6.93' (Free Discharge)
2=Culvert (Inlet Controls 4.76 cfs @ 4.36 fps)

Summary for Pond 8P: Planting Swale

[93] Warning: Storage range exceeded by 0.29'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=32)

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth > 6.64" for 100 yr storm event
Inflow = 5.74 cfs @ 12.07 hrs, Volume= 0.448 af
Outflow = 5.77 cfs @ 12.08 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.6 min
Discarded = 0.19 cfs @ 12.08 hrs, Volume= 0.227 af
Primary = 5.59 cfs @ 12.08 hrs, Volume= 0.221 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.19' @ 12.08 hrs Surf.Area= 0.048 ac Storage= 0.035 af

Plug-Flow detention time= 42.5 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 42.4 min (790.4 - 748.0)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.035 af	**8.00'W x 260.00'L x 2.10'H Prismatoid** 0.100 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.19 cfs @ 12.08 hrs HW=6.19' (Free Discharge)
1=Exfiltration (Controls 0.19 cfs)

Primary OutFlow Max=5.58 cfs @ 12.08 hrs HW=6.19' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 5.58 cfs @ 1.81 fps)

Summary for Pond 10P: Existing Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.499 ac, 98.59% Impervious, Inflow Depth = 2.39" for 100 yr storm event
Inflow = 8.03 cfs @ 12.12 hrs, Volume= 0.299 af
Primary = 8.03 cfs @ 12.12 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 3 surface

[93] Warning: Storage range exceeded by 0.70'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=29)
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.47' @ 12.20 hrs

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 3.27" for 100 yr storm event
Inflow = 4.96 cfs @ 12.17 hrs, Volume= 0.221 af
Outflow = 5.07 cfs @ 12.18 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.4 min
Primary = 0.23 cfs @ 12.18 hrs, Volume= 0.075 af
Secondary = 4.84 cfs @ 12.18 hrs, Volume= 0.146 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.65' @ 12.18 hrs Surf.Area= 0.043 ac Storage= 0.030 af

Plug-Flow detention time= 23.6 min calculated for 0.221 af (100% of inflow)
Center-of-Mass det. time= 23.5 min (771.6 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1	5.20'	0.030 af	**27.00'W x 60.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.20'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.70'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.23 cfs @ 12.18 hrs HW=6.64' (Free Discharge)
└**1=Exfiltration** (Controls 0.23 cfs)

Secondary OutFlow Max=4.82 cfs @ 12.18 hrs HW=6.64' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 4.82 cfs @ 3.31 fps)

Summary for Pond 15P: Bioretention 3 Body

Inflow Area = 0.810 ac, 97.39% Impervious, Inflow Depth = 1.11" for 100 yr storm event
Inflow = 0.23 cfs @ 12.18 hrs, Volume= 0.075 af
Outflow = 0.17 cfs @ 15.50 hrs, Volume= 0.075 af, Atten= 26%, Lag= 199.2 min
Discarded = 0.11 cfs @ 15.50 hrs, Volume= 0.052 af
Primary = 0.06 cfs @ 15.50 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.43' @ 15.50 hrs Surf.Area= 1,620 sf Storage= 696 cf

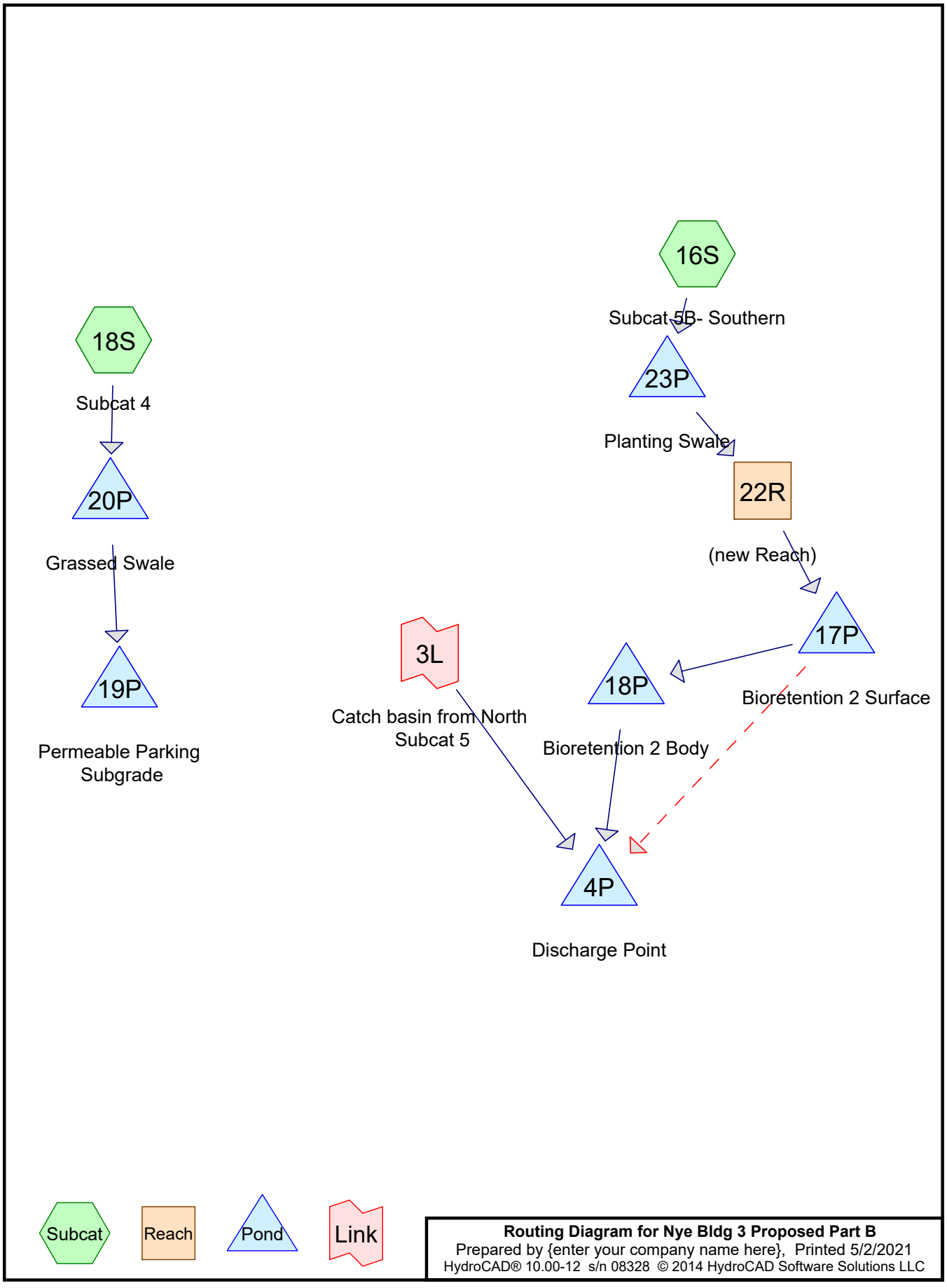
Plug-Flow detention time= 53.1 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 53.1 min (881.6 - 828.5)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	1,134 cf	**27.00'W x 60.00'L x 2.00'H Prismatoid** 3,240 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.20'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.40'	**0.2" Vert. Orifice/Grate X 60.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 15.50 hrs HW=4.43' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=0.06 cfs @ 15.50 hrs HW=4.43' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 4.86 fps)



Routing Diagram for Nye Bldg 3 Proposed Part B
Prepared by {enter your company name here}, Printed 5/2/2021

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

Subcatchment 16S: Subcat 5B- Southern Runoff Area=21,310 sf 98.26% Impervious Runoff Depth>6.68"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=97 Runoff=3.45 cfs 0.272 af

Subcatchment 18S: Subcat 4 Runoff Area=33,890 sf 27.47% Impervious Runoff Depth>3.52"
Flow Length=135' Slope=0.0100 '/' Tc=9.0 min CN=68 Runoff=2.64 cfs 0.228 af

Reach 22R: (new Reach) Avg. Flow Depth=0.35' Max Vel=1.17 fps Inflow=3.41 cfs 0.207 af
n=0.080 L=130.0' S=0.0177 '/' Capacity=5.76 cfs Outflow=3.30 cfs 0.207 af

Pond 4P: Discharge Point Inflow=10.91 cfs 0.425 af
Primary=10.91 cfs 0.425 af

Pond 17P: Bioretention 2 Surface Peak Elev=7.07' Storage=0.017 af Inflow=3.30 cfs 0.207 af
Primary=0.13 cfs 0.092 af Secondary=2.84 cfs 0.095 af Outflow=2.98 cfs 0.187 af

Pond 18P: Bioretention 2 Body Peak Elev=4.59' Storage=437 cf Inflow=0.13 cfs 0.092 af
Discarded=0.07 cfs 0.060 af Primary=0.05 cfs 0.031 af Outflow=0.11 cfs 0.092 af

Pond 19P: Permeable Parking Subgrade Peak Elev=9.09' Storage=2,737 cf Inflow=2.73 cfs 0.167 af
Discarded=0.14 cfs 0.126 af Primary=1.61 cfs 0.041 af Outflow=1.75 cfs 0.167 af

Pond 20P: Grassed Swale Peak Elev=9.40' Storage=0.016 af Inflow=2.64 cfs 0.228 af
Discarded=0.04 cfs 0.050 af Primary=2.73 cfs 0.167 af Outflow=2.77 cfs 0.217 af

Pond 23P: Planting Swale Peak Elev=6.08' Storage=0.007 af Inflow=3.45 cfs 0.272 af
Discarded=0.04 cfs 0.059 af Primary=3.41 cfs 0.207 af Outflow=3.45 cfs 0.266 af

Link 100 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce Inflow=8.03 cfs 0.299 af
Area= 1.499 ac 98.59% Imperv. Primary=8.03 cfs 0.299 af

Total Runoff Area = 1.267 ac Runoff Volume = 0.501 af Average Runoff Depth = 4.74"
45.20% Pervious = 0.573 ac 54.80% Impervious = 0.694 ac

Summary for Subcatchment 16S: Subcat 5B- Southern

Runoff = 3.45 cfs @ 12.07 hrs, Volume= 0.272 af, Depth> 6.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
20,940	98	Paved parking, HSG B
370	61	>75% Grass cover, Good, HSG B
21,310	97	Weighted Average
370		1.74% Pervious Area
20,940		98.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 18S: Subcat 4

Runoff = 2.64 cfs @ 12.13 hrs, Volume= 0.228 af, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

	Area (sf)	CN	Description
	9,310	98	Paved parking, HSG B
	20,670	61	>75% Grass cover, Good, HSG B
*	3,910	30	Permeable Roadway
	33,890	68	Weighted Average
	24,580		72.53% Pervious Area
	9,310		27.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	135	0.0100	0.25		**Lag/CN Method,**

Summary for Reach 22R: (new Reach)

[81] Warning: Exceeded Pond 23P by 4.20' @ 1.00 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 5.08" for 100 yr storm event
Inflow = 3.41 cfs @ 12.07 hrs, Volume= 0.207 af
Outflow = 3.30 cfs @ 12.12 hrs, Volume= 0.207 af, Atten= 3%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 7
Max. Velocity= 1.17 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.26 fps, Avg. Travel Time= 8.4 min

Peak Storage= 368 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.50' Flow Area= 4.0 sf, Capacity= 5.76 cfs

8.00' x 0.50' deep channel, n= 0.080 Earth, long dense weeds
Length= 130.0' Slope= 0.0177 '/'
Inlet Invert= 8.00', Outlet Invert= 5.70'

Summary for Pond 4P: Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.988 ac, 98.51% Impervious, Inflow Depth = 2.57" for 100 yr storm event
Inflow = 10.91 cfs @ 12.12 hrs, Volume= 0.425 af
Primary = 10.91 cfs @ 12.12 hrs, Volume= 0.425 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 17P: Bioretention 2 Surface

[93] Warning: Storage range exceeded by 0.47'
[62] Hint: Exceeded Reach 22R OUTLET depth by 1.04' @ 12.14 hrs

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth = 5.08" for 100 yr storm event
Inflow = 3.30 cfs @ 12.12 hrs, Volume= 0.207 af
Outflow = 2.98 cfs @ 12.12 hrs, Volume= 0.187 af, Atten= 10%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.12 hrs, Volume= 0.092 af
Secondary = 2.84 cfs @ 12.12 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 7.07' @ 12.12 hrs Surf.Area= 0.027 ac Storage= 0.017 af

Plug-Flow detention time= 55.7 min calculated for 0.187 af (90% of inflow)
Center-of-Mass det. time= 27.0 min (773.0 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	5.90'	0.017 af	**22.00'W x 44.00'L x 0.70'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.90'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

#2 Secondary 6.36' **24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.13 cfs @ 12.12 hrs HW=7.07' (Free Discharge)
1=Exfiltration (Controls 0.13 cfs)

Secondary OutFlow Max=2.84 cfs @ 12.12 hrs HW=7.07' (Free Discharge)
2=Orifice/Grate (Orifice Controls 2.84 cfs @ 2.86 fps)

Summary for Pond 18P: Bioretention 2 Body

Inflow Area = 0.489 ac, 98.26% Impervious, Inflow Depth > 2.25" for 100 yr storm event
Inflow = 0.13 cfs @ 12.12 hrs, Volume= 0.092 af
Outflow = 0.11 cfs @ 15.51 hrs, Volume= 0.092 af, Atten= 15%, Lag= 203.5 min
Discarded = 0.07 cfs @ 15.51 hrs, Volume= 0.060 af
Primary = 0.05 cfs @ 15.51 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 9
Peak Elev= 4.59' @ 15.51 hrs Surf.Area= 968 sf Storage= 437 cf

Plug-Flow detention time= 48.9 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 48.9 min (854.5 - 805.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.30'	881 cf	**22.00'W x 44.00'L x 2.60'H Prismatoid** 2,517 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.30'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.50'	**0.2" Vert. Orifice/Grate X 44.00** C= 0.600

Discarded OutFlow Max=0.07 cfs @ 15.51 hrs HW=4.59' (Free Discharge)
1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=0.05 cfs @ 15.51 hrs HW=4.59' (Free Discharge)
2=Orifice/Grate (Orifice Controls 0.05 cfs @ 5.01 fps)

Summary for Pond 19P: Permeable Parking Subgrade

[93] Warning: Storage range exceeded by 0.09'
[79] Warning: Submerged Pond 20P Primary device # 2 by 0.09'

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth > 2.57" for 100 yr storm event
Inflow = 2.73 cfs @ 12.12 hrs, Volume= 0.167 af
Outflow = 1.75 cfs @ 12.32 hrs, Volume= 0.167 af, Atten= 36%, Lag= 12.0 min
Discarded = 0.14 cfs @ 12.32 hrs, Volume= 0.126 af
Primary = 1.61 cfs @ 12.32 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 9.09' @ 12.32 hrs Surf.Area= 3,910 sf Storage= 2,737 cf

Plug-Flow detention time= 156.9 min calculated for 0.167 af (100% of inflow)

Center-of-Mass det. time= 156.8 min (954.5 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1	7.00'	2,737 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 7,820 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
7.00	3,910	0	0
8.00	3,910	3,910	3,910
9.00	3,910	3,910	7,820

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.00'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	8.85'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.14 cfs @ 12.32 hrs HW=9.08' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=1.61 cfs @ 12.32 hrs HW=9.09' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.61 cfs @ 1.37 fps)

Summary for Pond 20P: Grassed Swale

[93] Warning: Storage range exceeded by 0.25'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=31)

Inflow Area = 0.778 ac, 27.47% Impervious, Inflow Depth > 3.52" for 100 yr storm event
Inflow = 2.64 cfs @ 12.13 hrs, Volume= 0.228 af
Outflow = 2.77 cfs @ 12.12 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.12 hrs, Volume= 0.050 af
Primary = 2.73 cfs @ 12.12 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 9.40' @ 12.12 hrs Surf.Area= 0.028 ac Storage= 0.016 af

Plug-Flow detention time= 45.4 min calculated for 0.217 af (95% of inflow)
Center-of-Mass det. time= 16.4 min (813.6 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1	8.40'	0.016 af	**3.00'W x 200.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.40'	**1.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	9.00'	**4.0' 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

Discarded OutFlow Max=0.04 cfs @ 12.12 hrs HW=9.40' (Free Discharge)
1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=2.72 cfs @ 12.12 hrs HW=9.40' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 2.72 cfs @ 1.71 fps)

Summary for Pond 23P: Planting Swale

[82] Warning: Early inflow requires earlier time span
[93] Warning: Storage range exceeded by 0.18'

Inflow Area =	0.489 ac,	98.26% Impervious,	Inflow Depth >	6.68"	for 100 yr storm event
Inflow =	3.45 cfs @	12.07 hrs,	Volume=	0.272 af	
Outflow =	3.45 cfs @	12.07 hrs,	Volume=	0.266 af,	Atten= 0%, Lag= 0.0 min
Discarded =	0.04 cfs @	12.07 hrs,	Volume=	0.059 af	
Primary =	3.41 cfs @	12.07 hrs,	Volume=	0.207 af	

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6.08' @ 12.07 hrs Surf.Area= 0.009 ac Storage= 0.007 af

Plug-Flow detention time= 25.3 min calculated for 0.266 af (98% of inflow)
Center-of-Mass det. time= 10.6 min (753.2 - 742.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.80'	0.007 af	**8.00'W x 50.00'L x 2.10'H Prismatoid** 0.019 af Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.80'	**2.400 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	5.80'	**8.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.04 cfs @ 12.07 hrs HW=6.08' (Free Discharge)
1=Exfiltration (Controls 0.04 cfs)

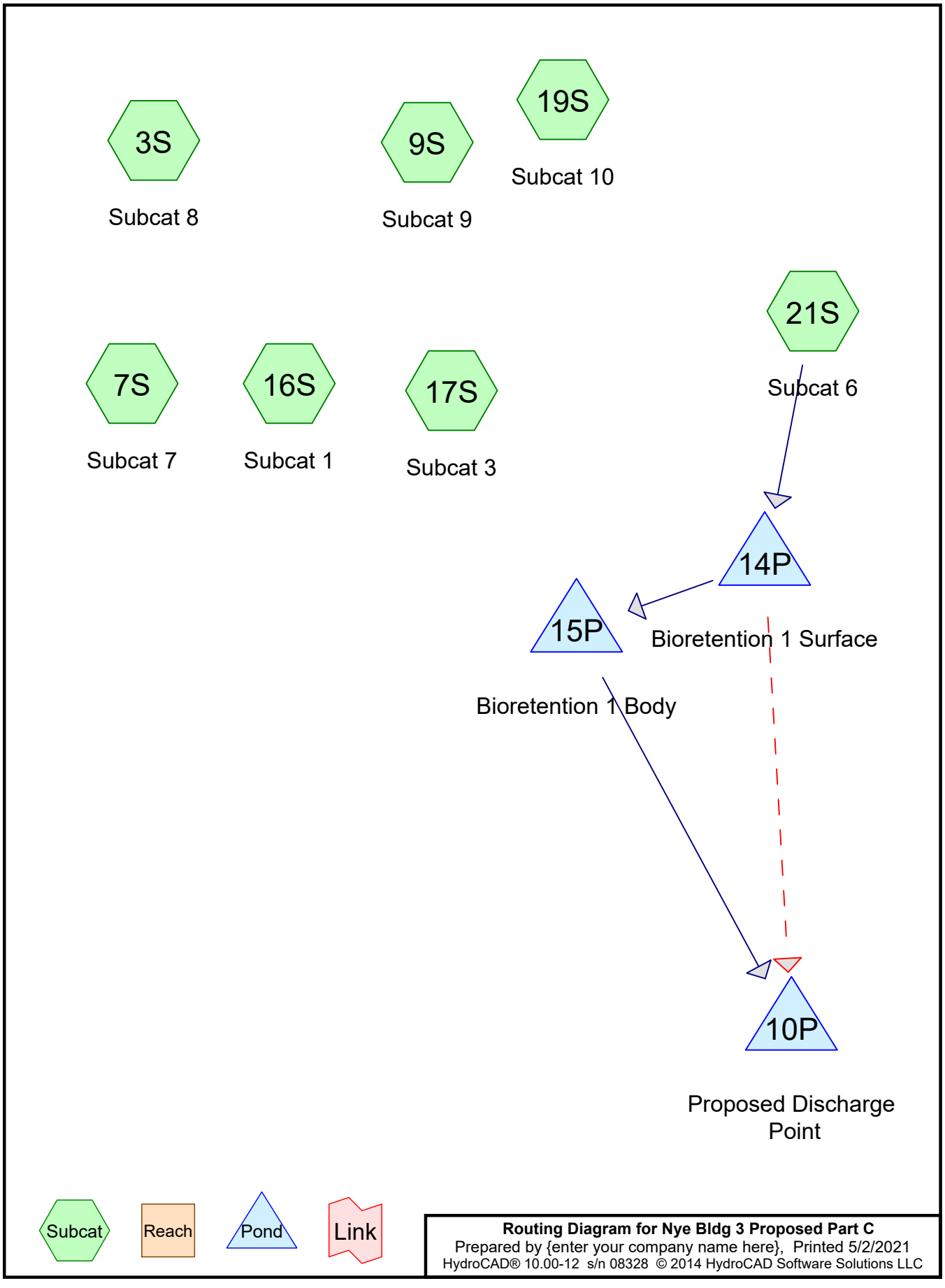
Primary OutFlow Max=3.41 cfs @ 12.07 hrs HW=6.08' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 3.41 cfs @ 1.51 fps)

Summary for Link 3L: Catch basin from North Subcat 5

Inflow Area =	1.499 ac,	98.59% Impervious,	Inflow Depth =	2.39"	for 100 yr storm event
Inflow =	8.03 cfs @	12.12 hrs,	Volume=	0.299 af	
Primary =	8.03 cfs @	12.12 hrs,	Volume=	0.299 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-24.00 hrs, dt= 0.01 hrs

100 yr storm Primary Outflow Imported from Nye Bldg 3 Proposed Part A~Pond 10P.hce



Routing Diagram for Nye Bldg 3 Proposed Part C
Prepared by {enter your company name here}, Printed 5/2/2021
HydroCAD® 10.00-12 s/n 08328 © 2014 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: Subcat 8 Runoff Area=80,360 sf 90.74% Impervious Runoff Depth>6.40"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=95 Runoff=12.92 cfs 0.984 af

Subcatchment 7S: Subcat 7 Runoff Area=46,550 sf 78.97% Impervious Runoff Depth>5.82"
Flow Length=175' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=7.13 cfs 0.518 af

Subcatchment 9S: Subcat 9 Runoff Area=57,850 sf 0.00% Impervious Runoff Depth>2.59"
Flow Length=350' Slope=0.0200 '/' Tc=16.8 min CN=60 Runoff=2.83 cfs 0.287 af

Subcatchment 16S: Subcat 1 Runoff Area=75,530 sf 74.88% Impervious Runoff Depth>5.82"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=90 Runoff=11.57 cfs 0.841 af

Subcatchment 17S: Subcat 3 Runoff Area=20,540 sf 28.58% Impervious Runoff Depth>3.83"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=72 Runoff=2.20 cfs 0.150 af

Subcatchment 19S: Subcat 10 Runoff Area=23,500 sf 94.21% Impervious Runoff Depth>6.52"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=96 Runoff=3.80 cfs 0.293 af

Subcatchment 21S: Subcat 6 Runoff Area=72,390 sf 82.94% Impervious Runoff Depth>6.05"
Flow Length=130' Slope=0.0200 '/' Tc=5.0 min CN=92 Runoff=11.34 cfs 0.838 af

Pond 10P: Proposed Discharge Point Inflow=11.31 cfs 0.783 af
Primary=11.31 cfs 0.783 af

Pond 14P: Bioretention 1 Surface Peak Elev=7.11' Storage=0.010 af Inflow=11.34 cfs 0.838 af
Primary=0.09 cfs 0.113 af Secondary=11.26 cfs 0.717 af Outflow=11.35 cfs 0.830 af

Pond 15P: Bioretention 1 Body Peak Elev=5.86' Storage=151 cf Inflow=0.09 cfs 0.113 af
Discarded=0.03 cfs 0.044 af Primary=0.04 cfs 0.066 af Outflow=0.07 cfs 0.111 af

Total Runoff Area = 8.648 ac Runoff Volume = 3.911 af Average Runoff Depth = 5.43"
32.50% Pervious = 2.811 ac 67.50% Impervious = 5.838 ac

Summary for Subcatchment 3S: Subcat 8

Runoff = 12.92 cfs @ 12.07 hrs, Volume= 0.984 af, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
72,920	98	Paved parking, HSG B
7,440	61	>75% Grass cover, Good, HSG B
80,360	95	Weighted Average
7,440		9.26% Pervious Area
72,920		90.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Subcat 7

Runoff = 7.13 cfs @ 12.07 hrs, Volume= 0.518 af, Depth> 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
9,790	61	>75% Grass cover, Good, HSG B
36,760	98	Paved parking, HSG B
46,550	90	Weighted Average
9,790		21.03% Pervious Area
36,760		78.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.4	75	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Subcat 9

Runoff = 2.83 cfs @ 12.24 hrs, Volume= 0.287 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
57,850	60	Woods, Fair, HSG B
57,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	350	0.0200	0.35		**Lag/CN Method,**

Summary for Subcatchment 16S: Subcat 1

Runoff = 11.57 cfs @ 12.07 hrs, Volume= 0.841 af, Depth> 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

	Area (sf)	CN	Description
	56,560	98	Paved parking, HSG B
	14,470	73	Woods/grass comb., Poor, HSG B
*	4,500	39	Permeable walking path
	75,530	90	Weighted Average
	18,970		25.12% Pervious Area
	56,560		74.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 17S: Subcat 3

Runoff = 2.20 cfs @ 12.08 hrs, Volume= 0.150 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
5,870	98	Paved parking, HSG B
14,670	61	>75% Grass cover, Good, HSG B
20,540	72	Weighted Average
14,670		71.42% Pervious Area
5,870		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 19S: Subcat 10

Runoff = 3.80 cfs @ 12.07 hrs, Volume= 0.293 af, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
22,140	98	Paved parking, HSG B
1,360	61	>75% Grass cover, Good, HSG B
23,500	96	Weighted Average
1,360		5.79% Pervious Area
22,140		94.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 21S: Subcat 6

Runoff = 11.34 cfs @ 12.07 hrs, Volume= 0.838 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr storm Rainfall=7.00"

Area (sf)	CN	Description
60,040	98	Paved parking, HSG B
12,350	65	Woods/grass comb., Fair, HSG B
72,390	92	Weighted Average
12,350		17.06% Pervious Area
60,040		82.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.42		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
0.2	30	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	130	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond 10P: Proposed Discharge Point

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 5.66" for 100 yr storm event
Inflow = 11.31 cfs @ 12.07 hrs, Volume= 0.783 af
Primary = 11.31 cfs @ 12.07 hrs, Volume= 0.783 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 14P: Bioretention 1 Surface

[93] Warning: Storage range exceeded by 1.36'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 6.05" for 100 yr storm event
Inflow = 11.34 cfs @ 12.07 hrs, Volume= 0.838 af
Outflow = 11.35 cfs @ 12.07 hrs, Volume= 0.830 af, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.07 hrs, Volume= 0.113 af
Secondary = 11.26 cfs @ 12.07 hrs, Volume= 0.717 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 7.11' @ 12.07 hrs Surf.Area= 0.015 ac Storage= 0.010 af

Plug-Flow detention time= 11.3 min calculated for 0.830 af (99% of inflow)
Center-of-Mass det. time= 5.3 min (776.6 - 771.3)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	0.010 af	**20.00'W x 25.00'L x 0.75'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	5.00'	**4.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	5.54'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 12.07 hrs HW=7.11' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.09 cfs)

Secondary OutFlow Max=11.26 cfs @ 12.07 hrs HW=7.11' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 11.26 cfs @ 4.26 fps)

Summary for Pond 15P: Bioretention 1 Body

[78] Warning: Submerged Pond 14P Primary device # 1 by 0.86'
[81] Warning: Exceeded Pond 14P by 0.13' @ 16.75 hrs

Inflow Area = 1.662 ac, 82.94% Impervious, Inflow Depth > 0.82" for 100 yr storm event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.113 af
Outflow = 0.07 cfs @ 15.00 hrs, Volume= 0.111 af, Atten= 19%, Lag= 175.9 min
Discarded = 0.03 cfs @ 15.00 hrs, Volume= 0.044 af
Primary = 0.04 cfs @ 15.00 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 5.86' @ 15.00 hrs Surf.Area= 500 sf Storage= 151 cf

Plug-Flow detention time= 23.9 min calculated for 0.111 af (98% of inflow)
Center-of-Mass det. time= 11.0 min (857.4 - 846.3)

Volume	Invert	Avail.Storage	Storage Description
#1	5.00'	350 cf	**20.00'W x 25.00'L x 2.00'H Prismatoid** 1,000 cf Overall x 35.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	**2.100 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	3.20'	**0.2" Vert. Orifice/Grate X 25.00** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 15.00 hrs HW=5.86' (Free Discharge)
↑**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 15.00 hrs HW=5.86' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.85 fps)

Stormwater Report

Stormwater Pollution Prevention Plan

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

Building 3 Expansion Project
12-16 Rio Way
Fairhaven, MA 02719
508-996-6721

SWPPP Prepared For:

Nye Lubricants, Inc.

12 Howland Road
Fairhaven, MA 02719
508-996-6721

SWPPP Prepared By:

Apex Companies, LLC

58H Connecticut Avenue
South Windsor, CT 06074
860-282-1700

SWPPP Preparation Date:

05/03/2021

Estimated Project Dates:

Project Start Date: 02/01/2022

Project Completion Date: 06/03/2022

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Instructions (see definition of "operator" at CGP Part 1.1.1):

- Identify the operator(s) who will be engaged in construction activities at the site. Indicate respective responsibilities, where appropriate. Also include the 24-hour emergency contact.
- List subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- Consider using Subcontractor Agreements such as the type included as a sample in Appendix G of the Template.

Operator(s):

Insert Company or Organization Name
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email
Insert area of control (if more than one operator at site)

[Repeat as necessary.]

Subcontractor(s):

Insert Company or Organization Name
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email
Insert area of control (if more than one operator at site)

[Repeat as necessary.]

Emergency 24-Hour Contact:

Insert Company or Organization Name
Insert Name
Insert Telephone Number

1.2 Stormwater Team

Instructions (see CGP Part 7.2.2):

- Identify the individuals (by name or position) that are part of the project's stormwater team, their individual responsibilities, and which members are responsible for inspections. At a minimum the stormwater team is comprised of individuals who are responsible for overseeing the development of the SWPPP, any later modifications to it, and for compliance with the permit requirements (i.e., installing and maintaining stormwater controls, conducting site inspections, and taking corrective actions where required).
- Each member of the stormwater team must have ready access to either an electronic or paper copy of applicable portions of the 2017 CGP and the SWPPP.

Stormwater Team		
Name and/or position, and contact	Responsibilities	I Have Read the CGP and Understand the Applicable Requirements
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.

[Insert or delete rows as necessary.]

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Instructions (see "Project/Site Information" section of Appendix J – NOI form):

- In this section, you are asked to compile basic site information that will be helpful when you file your NOI.

Project Name and Address

Project/Site Name: Building 3 Expansion Project
Project Street/Location: 12-16 Rio Way
City: Fairhaven
State: MA
ZIP Code: 02719
County or Similar Subdivision: Bristol

Business days and hours for the project: M-F 8-6

Project Latitude/Longitude

Latitude: 41°39'27.14"° N Longitude: - 70°54'46.40" ° W

Latitude/longitude data source:

☐ Map ☐ GPS ☒ Other (please specify): Google Earth

Horizontal Reference Datum:

☐ NAD 27 ☐ NAD 83 ☒ WGS 84

Additional Project Information

Are you requesting permit coverage as a "federal operator" as defined in Appendix A of the 2017 CGP? ☐ Yes ☒ No

Is the project/site located on Indian country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property:

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency *(e.g., natural disaster, extreme flooding conditions)*, information substantiating its occurrence *(e.g., state disaster declaration)*, and a description of the construction necessary to reestablish effective public services:

2.2 Discharge Information

Instructions (see "Discharge Information" section of Appendix J – NOI form):

- In this section, include information relating to your site's discharge. This information corresponds to the "Discharge Information" section of the NOI form.
- List all of the stormwater points of discharge from your site. Identify each point of discharge with a unique 3-digit ID (e.g., 001, 002).
- For each unique point of discharge you list, specify the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to. You may have multiple points of discharge that discharge to the same receiving water.
- Next, specify whether any waters of the U.S. that you discharge to are listed as "impaired" as defined in Appendix A, and the pollutants causing the impairment. Identify any Total Maximum Daily Loads (TMDL) that have been completed for any of the waters of the U.S. that you discharge to and the pollutants for which there is a TMDL. For more information on impaired waters and TMDLs, including a list of TMDL contacts and links by state, visit https://www.epa.gov/tmdl.
- Finally, indicate whether any water of the U.S. that you discharge to is designated as a Tier 2, Tier 2.5, or Tier 3 water and if so, what the designation is (2, 2.5, or 3). A list of Tier 2, 2.5, and 3 waters is provided in Appendix F.

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?	☒ Yes	☐ No
Are there any waters of the U.S. within 50 feet of your project's earth disturbances?	☒ Yes	☐ No

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:								
Point of Discharge ID	Name of receiving water:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
[001]	Acushnet River	☒ Yes ☐ No	Debris, Trash, Color, Dissolved Oxygen, Enteroccus, Fecal coliform, Metals, Nitrogen, Nutrient, Odor, Oil and Grease, PCBs	☐ Yes ☒ No			☐ Yes ☒ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[002]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[003]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[004]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]

[Include additional rows or delete as necessary.]

2.3 Nature of the Construction Activities

Instructions (see CGP Parts 1.2.1.c and 7.2.3):

- Provide a general description of the nature of the construction activities at your site.
- Describe the size of the property (in acres or in miles if a linear construction site), the total area expected to be disturbed by the construction activities (to the nearest quarter acre or quarter mile if a linear construction site), and the maximum area expected to be disturbed at any one time.
- Indicate the type of construction site, whether there will be certain demolition activities, and whether the predevelopment land use was for agriculture.
- Provide a list and description of all pollutant-generating activities (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations) and indicate for each activity the type of pollutant that will be generated (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels) and could be discharged in stormwater from your site.
- Describe the construction support activities covered by this permit (see Part 1.2.1.c of the permit).

General Description of Project

Provide a general description of the nature of your construction activities, including the age dates of past renovations for structures that are undergoing demolition:

The primary goal of the project is to create a 60,000 sf expansion of Building 3 to the east and southeast of the existing building. That building will be used for warehousing, bulk storage and manufacturing. To support the development of that project, there are several improvements being proposed that include:

- Providing public access to and along the river to comply with the Chapter 91 regulations;
- Upgrades and improvements to the Stormwater management system;
- Breaking up some of the asphalt parking area with landscaped areas and stormwater features;

Size of Construction Site

Size of Property	10.28 acres
Total Area Expected to be Disturbed by Construction Activities	4.6 acres
Maximum Area Expected to be Disturbed at Any One Time	4.6 acres

[Repeat as necessary for individual project phases.]

Type of Construction Site *(check all that apply)*:

☐ Single-Family Residential ☐ Multi-Family Residential ☐ Commercial ☒ Industrial

☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other _____

Will there be demolition of any structure built or renovated before January 1, 1980? ☐ Yes ☒ No

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space? ☐ Yes ☐ No ☒ N/A

Was the pre-development land use used for agriculture (see Appendix A for definition of "agricultural land")? ☐ Yes ☒ No

Pollutant-Generating Activities

List and describe all pollutant-generating activities and indicate for each activity the type of pollutant that will be generated. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

Pollutant-Generating Activity (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	**Pollutants or Pollutant Constituents** (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Excavation	Sediment, Legacy Contaminants in Soil
Concrete	Silica, Cement
Pavement Activities	Ashpalt
Solid Waste Disposal	Solid Waste
Refueling	Diesel, Gasolines
Plantings	Fertilizers, nutrients
Dewatering	Oils and Greases

[Include additional rows or delete as necessary.]

Construction Support Activities *(only provide if applicable)*

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas):

All work will be performed on site and materials will be stored on site

Contact information for construction support activity:

INSERT NAME

INSERT TELEPHONE NO.

INSERT EMAIL

INSERT ADDRESS AND/OR LATITUDE/LONGITUDE

[Repeat as necessary.]

2.4 Sequence and Estimated Dates of Construction Activities

Instructions (see CGP Part 7.2.5):

- Describe the intended construction sequence and duration of major activities.
- For each portion or phase of the construction site, include the following:
  - ✓ Commencement and duration of construction activities, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - ✓ Temporary or permanent cessation of construction activities;
  - ✓ Temporary or final stabilization of areas of exposed soil. The dates for stabilization must reflect the applicable deadlines to which you are subject to in Part 2.2.14; and
  - ✓ Removal of temporary stormwater controls and construction equipment or vehicles, and cessation of any pollutant-generating activities.
- The construction sequence must reflect the following requirements:
  - ✓ Part 2.1.3 (installation of stormwater controls); and
  - ✓ Parts 2.2.14 (stabilization deadlines).

Phase I

Site Work Preparations	
Estimated Start Date of Construction Activities for this Phase	2/1/2022
Estimated End Date of Construction Activities for this Phase	11/30/2022
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	5/31/2022 *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	4/30/2023 *[Add additional dates as necessary]*

Phase II

Building Construction	
Estimated Start Date of Construction Activities for this Phase	5/2/2022
Estimated End Date of Construction Activities for this Phase	6/1/2023
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	5/2/2022 *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	4/30/2023 *[Add additional dates as necessary]*

[Repeat as needed.]

2.5 Authorized Non-Stormwater Discharges

Instructions (see CGP Parts 1.2.2 and 7.2.5):

- Identify all authorized sources of non-stormwater discharges. The authorized non-stormwater discharges identified in Part 1.2.2 of the 2017 CGP include:
  - ✓ Discharges from emergency fire-fighting activities;
  - ✓ Fire hydrant flushings;
  - ✓ Landscape irrigation;
  - ✓ Waters used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
  - ✓ Water used to control dust;
  - ✓ Potable water including uncontaminated water line flushings;
  - ✓ External building washdown, provided soaps, solvents and detergents are not used, and external surfaces do not contain hazardous substances (e.g., paint or caulk containing PCBs);
  - ✓ Pavement wash waters provided spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
  - ✓ Uncontaminated air conditioning or compressor condensate;
  - ✓ Uncontaminated, non-turbid discharges of ground water or spring water;
  - ✓ Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
  - ✓ Construction dewatering water discharged in accordance with Part 2.4.

List of Authorized Non-Stormwater Discharges Present at the Site

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	☐ Yes ☒ No
Fire hydrant flushings	☐ Yes ☒ No
Landscape irrigation	☒ Yes ☐ No
Waters used to wash vehicles and equipment	☒ Yes ☐ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushings	☐ Yes ☒ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☐ Yes ☒ No
Pavement wash waters	☒ Yes ☐ No
Uncontaminated air conditioning or compressor condensate	☐ Yes ☒ No

Uncontaminated, non-turbid discharges of ground water or spring water	☐ Yes ☒ No
Foundation or footing drains	☐ Yes ☒ No
Construction dewatering water	☒ Yes ☐ No

(Note: You are required to identify the likely locations of these authorized non-stormwater discharges on your site map. See Section 2.6, below, of the SWPPP Template.)

2.6 Site Maps

Instructions (see CGP Part 7.2.4):

- Attach site maps in Appendix A of the Template. For most projects, a series of site maps is necessary and recommended. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or, for more complicated sites, show the major phases of development.

These maps must include the following features:

- Boundaries of the property and of the locations where construction will occur, including:
  - ✓ Locations where earth-disturbing activities will occur, noting any phasing of construction activities and any demolition activities;
  - ✓ Approximate slopes before and after major grading activities. Note areas of steep slopes, as defined in CGP Appendix A;
  - ✓ Locations where sediment, soil, or other construction materials will be stockpiled;
  - ✓ Locations of any crossings of waters of the U.S.;
  - ✓ Designated points where vehicles will exit onto paved roads;
  - ✓ Locations of structures and other impervious surfaces upon completion of construction; and
  - ✓ Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1.c).
- Locations of all waters of the U.S., including wetlands, on your site and within one mile downstream of the site's discharge point. Indicate which waterbodies are listed as impaired, and which are identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 waters.
- Areas of federally-listed critical habitat for endangered or threatened species within the site and/or at discharge locations.
- Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures)
- Drainage pattern(s) of stormwater and authorized non-stormwater before and after major grading activities.
- Stormwater and authorized non-stormwater discharge locations, including:
  - ✓ Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets; and
  - ✓ Locations where stormwater or allowable non-stormwater will be discharged to waters of the U.S. (including wetlands).
- Locations of all potential pollutant-generating activities.
- Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with the permit.
- Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 Endangered Species Protection

Instructions (see CGP Parts 1.1.5, 7.2.9.a, Appendix D, and the "Endangered Species Protection" section of the Appendix J – NOI form):

Using the instructions in Appendix D of the permit, determine under which criterion listed below (A-F) you are eligible for coverage under this permit with respect to the protection of endangered species. To make this determination, you must use information from **BOTH** the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Both the NMFS and USFWS maintain lists of Endangered Species Act-listed (ESA-listed) species and designated critical habitat. Operators must consult both when determining their eligibility.

- Check only 1 box, include the required information and provide a sound basis for supporting the criterion selected. Select the most conservative criterion that applies
- Include documentation supporting your determination of eligibility.
- A step-by-step guide and flow-chart on ESA provisions for EPA's CGP is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#species

Eligibility Criterion

Under which criterion listed in Appendix D are you eligible for coverage under this permit?

☐ **Criterion A**: No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of this permit, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion A should identify the USFWS and NMFS information sources used. Attaching aerial image(s) of the site to your NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers. Check the applicable source(s) of information you relied upon:

☐ Specific communication with staff of the USFWS and/or NMFS. INSERT DATE OF COMMUNICATION AND WHO YOU SPOKE WITH

☐ Species list from USFWS and/or NMFS. See the CGP ESA webpage, Step 2 for available websites. INSERT SPECIFIC DOCUMENT AND/OR WEBSITE RELIED UPON

☐ **Criterion B:** Eligibility requirements met by another operator under the 2017 CGP. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2017 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2017CGP operator's notification of authorization under this permit. If your certification is based on another 2017 CGP operator's certification under criterion C, you must provide EPA with the

relevant supporting information required of existing dischargers in criterion C in your NOI form.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion B should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.

- ✓ Provide the 9-digit NPDES ID number from the other operator's NOI under the 2017 CGP: __ __ __ __ __ __ __ __ __
- ✓ Authorization date of the other 2017 CGP operator: INSERT AUTHORIZATION DATE OF OTHER OPERATOR
- ✓ Eligibility criterion of the other 2017 CGP operator: ☐A ☐C ☐D ☐E ☐F
- ✓ Provide a brief summary of the basis the other operator used for selecting criterion A, C, D, E, or F: INSERT TEXT HERE

☐ **Criterion C:** Discharges not likely to adversely affect ESA-listed species and/or designated critical habitat. ESA-listed species and/or designated critical habitat(s) under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to EPA that your site's discharges and discharge-related activities are not likely to adversely affect ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in Appendix D of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion C should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

- ✓ Resources used to make determination: INSERT RESOURCES YOU USED TO DETERMINE THAT DISCHARGES ARE NOT LIKELY TO ADVERSELY AFFECT ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT
- ✓ ESA-listed Species/Critical Habitat in action area: INSERT LIST OF ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT LOCATED IN YOUR ACTION AREA
- ✓ Distance between site and ESA-listed Species/Critical Habitat: INSERT DISTANCE BETWEEN YOUR SITE AND THE ESA-LISTED SPECIES OR CRITICAL HABITAT (in miles)
- ✓ How adverse effects will be avoided: DESCRIBE SPECIFICALLY HOW ADVERSE EFFECTS TO ESA-LISTED SPECIES WILL BE AVOIDED FROM THE DISCHARGES AND DISCHARGE-RELATED ACTIVITIES

☐ **Criterion D**: Coordination with USFWS and/or NMFS has successfully concluded. Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities

on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site's discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion D should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional office(s) providing that coordination, and the date that coordination concluded.

- ✓ Agency coordinated with: ☐USFWS ☐ NMFS
- ✓ Field/regional office(s) providing coordination: INSERT FIELD/REGIONAL OFFICE(S) PROVIDING COORDINATION
- ✓ Date coordination concluded: INSERT DATE COORDINATION CONCLUDED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding coordination activities.

☐ **Criterion E:** ESA Section 7 consultation has successfully concluded. Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, Indicate the result of the consultation:

- ☐ Biological opinion from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or
- ☐ Written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and this NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion E should identify the federal action agency(ies) involved, the field office/regional office(s) providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the consultation was completed.

- ✓ Federal agency(ies) involved: INSERT FEDERAL AGENCY(IES) INVOLVED
- ✓ Field/regional office(s) providing consultation: INSERT FIELD/REGIONAL OFFICE(S) PROVIDING CONSULTATION
- ✓ Tracking numbers associated with consultation: INSERT CONSULTATION TRACKING NUMBER(S)
- ✓ Date consultation completed: INSERT DATE CONSULTATION COMPLETED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation.

☐ **Criterion F:** Issuance of section 10 permit. Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization

addresses the effects of the site's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

Basis statement content/Supporting documentation: A basis statement supporting the selection of Criterion F should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional office(s) providing permit(s), any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the permit was granted.

- ✓ Agency providing section 10 permit: ☐USFWS ☐NMFS
- ✓ Field/regional office(s) providing permit: INSERT FIELD/REGIONAL OFFICE(S) PROVIDING PERMIT
- ✓ Tracking numbers associated with consultation: INSERT CONSULTATION TRACKING NUMBER(S)
- ✓ Date permit granted: INSERT DATE PERMIT GRANTED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service.

3.2 Historic Preservation

Instructions (see CGP Part 1.1.6, 7.2.9.b, Appendix E, and the "Historic Preservation" section of the Appendix J – NOI form):

Follow the screening process in Appendix E of the permit for determining whether your installation of subsurface earth-disturbing stormwater controls will have an effect on historic properties.

- Include documentation supporting your determination of eligibility.
- To contact your applicable state or tribal historic preservation office, information is available at *www.achp.gov/programs/html*.

Appendix E, Step 1

Do you plan on installing any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

- ☐ Dike
- ☐ Berm
- ☐ Catch Basin
- ☐ Pond
- ☒ Stormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)
- ☐ Culvert
- ☒ Other type of ground-disturbing stormwater control: Subsurface storage, bioretention area

(Note: If you will not be installing any ground-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.)

Appendix E, Step 2

If you answered yes in Step 1, have prior surveys or evaluations conducted on the site already determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties? ☒ YES ☐ NO

- If yes, no further documentation is required for Section 3.2 of the Template.
- If no, proceed to Appendix E, Step 3.

Appendix E, Step 3

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☐ YES ☐ NO

If yes, provide documentation of the basis for your determination. INSERT REFERENCES TO DOCUMENTS, STUDIES, OR OTHER SOURCES RELIED UPON

If no, proceed to Appendix E, Step 4.

Appendix E, Step 4

If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☐ YES ☐ NO

If no, no further documentation is required for Section 3.2 of the Template.

If yes, describe the nature of their response:

- ☐ Written indication that no historic properties will be affected by the installation of stormwater controls. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
- ☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
- ☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
- ☐ Other: INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Instructions (see CGP Part 7.2.9.c):

- If you will use any of the identified controls in this section, include documentation of contact between you and the applicable state agency or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR Parts 144-147. \
- For state UIC program contacts, refer to the following EPA website: https://www.epa.gov/uic.

Do you plan to install any of the following controls? Check all that apply below.

☒ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

IF YES, INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE STATE AGENCY OR EPA REGIONAL OFFICE

SECTION 4: EROSION AND SEDIMENT CONTROLS

General Instructions (See CGP Parts 2.2 and 7.2.6):

- Describe the erosion and sediment controls that will be installed and maintained at your site.
- Describe any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon).
- Describe any routine stormwater control maintenance specifications.
- Describe the projected schedule for stormwater control installation/implementation.

4.1 Natural Buffers or Equivalent Sediment Controls

Instructions (see CGP Parts 2.2.1 and 7.2.6.b.i, and Appendix G):

This section only applies to you if a water of the U.S. is located within 50 feet of your site's earth disturbances. If this is the case, consult CGP Part 2.2.1 and Appendix G for information on how to comply with the buffer requirements.

- Describe the compliance alternative (CGP Part 2.2.1.a.i, ii, or iii) that was chosen to meet the buffer requirements, and include any required documentation supporting the alternative selected. The compliance alternative selected must be maintained throughout the duration of permit coverage. However, if you select a different compliance alternative during your period of permit coverage, you must modify your SWPPP to reflect this change.
- If you qualify for one of the exceptions in CGP Part 2.2.1.b, include documentation related to your qualification for such exceptions.

Buffer Compliance Alternatives

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? ☒ YES ☐ NO

(Note: If no, no further documentation is required for Part 4.1 in the SWPPP Template. Continue on to Part 4.2.)

Check the compliance alternative that you have chosen:

☐ (i) I will provide and maintain a 50-foot undisturbed natural buffer.

(Note (1): You must show the 50-foot boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)

☐ (ii) I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

(Note (1): You must show the boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and

sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)

- INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED
- INSERT EITHER ONE OF THE FOLLOWING:

  (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

  OR

  (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD REDUCTIONS FROM THE COMBINATION OF THE BUFFER AREA AND ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE COMBINATION OF YOUR BUFFER AREA AND THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER

☐ (iii) It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

- INSERT RATIONALE FOR CONCLUDING THAT IT IS INFEASIBLE TO PROVIDE AND MAINTAIN A NATURAL BUFFER OF ANY SIZE
- INSERT EITHER ONE OF THE FOLLOWING:

  (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

  OR

  (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD REDUCTIONS FROM THE EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER

☒ I qualify for one of the exceptions in Part 2.2.1.b. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

Buffer Exceptions

Which of the following exceptions to the buffer requirements applies to your site?

☐ There is no discharge of stormwater to the water of the U.S. that is located 50 feet from my construction disturbances.

(Note: If this exception applies, no further documentation is required for Section 4.1 of the Template.)

☐ No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

(Note (2): Where some natural buffer exists but portions of the area within 50 feet of the surface water are occupied by preexisting development disturbances, you must still comply with the one of the CGP Part 2.2.1.a compliance alternatives.)

☐ For a "linear construction sites" (defined in Appendix A), site constraints (e.g., limited right-of-way) make it infeasible to meet any of the CGP Part 2.2.1.a compliance alternatives. INCLUDE DOCUMENTATION HERE OF THE FOLLOWING: (1) WHY IT IS INFEASIBLE FOR YOU TO MEET ONE OF THE BUFFER COMPLIANCE ALTERNATIVES, AND (2) BUFFER WIDTH RETAINED AND/OR SUPPLEMENTAL EROSION AND SEDIMENT CONTROLS TO TREAT DISCHARGES TO THE SURFACE WATER

☐ The project qualifies as "small residential lot" construction (defined in Appendix A) (see Appendix G, Part G.3.2).

☐ For Alternative 1:

- INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED
- INSERT APPLICABLE REQUIREMENTS BASED ON TABLE G-1
- INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS

☐ For Alternative 2:

- INSERT (1) THE ASSIGNED RISK LEVEL BASED ON APP. G APPLICABLE TABLE G-2 THROUGH G-6 AND (2) THE PREDOMINANT SOIL TYPE AND AVERAGE SLOPE AT YOUR SITE
- INSERT APPLICABLE REQUIREMENTS BASED ON APP. G, TABLE G-7
- INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS

☐ Buffer disturbances are authorized under a CWA Section 404 permit. INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

(Note (2): This exception only applies to the limits of disturbance authorized under the Section 404 permit, and does not apply to any upland portion of the construction project.)

☒ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail). The project requires construction of a public access trail up to and along the river's edge.

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

4.2 Perimeter Controls

Instructions (see CGP Parts 2.2.3 and 7.2.6.b.ii):

- Describe sediment controls that will be used (e.g., silt fences, filter berms, temporary diversion dikes, or fiber rolls) to meet the Part 2.2.3 requirement to "install sediment controls along any perimeter areas of the site that will receive pollutant discharges."
- For linear projects, where you have determined that the use of perimeter controls in portions of the site is infeasible, document other practices that you will implement.

General

- All work will be surrounded by a line of silt fence and straw wattles.

Specific Perimeter Controls

Silt Fence and Straw Wattles	
Description: As shown on the project plans, the line of silt fence and straw wattles shall be installed around the limit of disturbance to prevent sediment runoff from going off-site	
Installation	2/1/2022
Maintenance Requirements	Remove sediment that has reached 25% of the height of the silt fence. Maintain silt fence posts and fabric as needed.
Design Specifications	See project plans

Stockpile Super Silt Fence	
Description: As shown on the project plans, the reinforced super silt fence will surround temporary stockpile areas to prevent sediment runoff from going off-site	
Installation	2/1/2022
Maintenance Requirements	Remove sediment that has reached 25% of the height of the silt fence. Maintain silt fence posts and fabric as needed.
Design Specifications	See project plans

[Repeat as needed for individual perimeter controls.]

4.3 Sediment Track-Out

Instructions (see CGP Parts 2.2.4 and 7.2.6.b.iii):

- Describe stormwater controls that will be used to minimize sediment track-out.
- Describe location(s) of vehicle exit(s), procedures to remove accumulated sediment off-site (e.g., vehicle tracking), and stabilization practices (e.g., stone pads or wash racks or both) to minimize off-site vehicle tracking of sediment. Also include the design, installation, and maintenance specifications for each control.

General

- Site acess will be controlled through the building's driveway. Wheel wash or anti-tracking pad are not anticipated as part of this work, but can be implemented if track out becomes an issue.

Specific Track-Out Controls

Site access controls	
Description: Control access through the driveway and monitor the adjacent roadway	
Installation	2/1/2022
Maintenance Requirements	Where sediment has been tracked-out from the site onto paved roads, sidewalks, or other paved areas outside of the site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. If there is a repeated issue, wheel wash stations or an anti-tracking pad on site may be implemented.
Design Specifications	INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

[Repeat as needed for individual track-out controls.]

4.4 Stockpiled Sediment or Soil

Instructions (see CGP Parts 2.2.5 and 7.2.6):

- Describe stormwater controls and other measures you will take to minimize the discharge of sediment or soil particles from stockpiled sediment or soil. Include a description of structural practices (e.g., diversions, berms, ditches, storage basins), including design, installation, and maintenance specifications, used to divert flows from stockpiled sediment or soil, retain or detain flows, or otherwise limit exposure and the discharge of pollutants from stockpiled sediment or soil.
- For piles that will be unused for 14 or more days, describe what cover or other appropriate temporary stabilization will be used.
- Also, describe any controls or procedures used to minimize exposure resulting from adding to or removing materials from the pile.

General

- Soil stockpiles shall be surrounded by super silt fence and vegetate if left unused for more than 14 days

Specific Stockpile Controls

Stockpile Super Silt Fence	
Description: As shown on the project plans, the reinforced super silt fence will surround temporary stockpile areas to prevent sediment runoff from going off-site	
Installation	2/1/2022
Maintenance Requirements	Remove sediment that has reached 25% of the height of the silt fence. Maintain silt fence posts and fabric as needed.
Design Specifications	See project plans

Seeding/Vegetating Stockpiles that are unused	
Description: Unused stockpiles shall be seeded and vegetated after 14 days	
Installation	4/15/2022
Maintenance Requirements	Stockpiles shall be seeded with a weed free erosion control mix . (Note: At a minimum, you must comply with following requirement in CGP Part 2.2.5.d: "You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.")
Design Specifications	See project plans

[Repeat as needed for individual stockpile controls.]

4.5 Minimize Dust

Instructions (see CGP Parts 2.2.6 and 7.2.6):

Describe controls and procedures you will use at your site to minimize the generation of dust.

General

- The contractor will wet the soil surface as needed to suppress the creation of dust. The application may be done with a water truck or done with fire hoses at the site.

Specific Dust Controls

Wetting the work area	
Description: Use water from hose or truck to wet work areas to control dust	
Installation	6/30/2022
Maintenance Requirements	Water needs to be available and continually sprayed as needed to prevent fugitive dusts
Design Specifications	N/A

[Repeat as needed for individual dust controls.]

4.6 Minimize Steep Slope Disturbances

Instructions (see CGP Parts 2.2.7 and 7.2.6):

- Describe how you will minimize the disturbance to steep slopes (as defined by CGP Appendix A).
- Describe controls (e.g., erosion control blankets, tackifiers), including design, installation and maintenance specifications, that will be implemented to minimize sediment discharges from slope disturbances.

General

- No slopes will be created steeper than 3 horizontal to 1 vertical

Specific Steep Slope Controls

Use stable slopes

Description: Slopes shall be 3H:1V at most and only for the public access trail.	
Installation	6/1/2022
Maintenance Requirements	None
Design Specifications	None

[Repeat as needed for individual steep slope controls.]

4.7 Topsoil

Instructions (see CGP Parts 2.2.8 and 7.2.6):

- Describe how topsoil will be preserved and identify these areas and associated control measures on your site map(s).
- If it is infeasible for you to preserve topsoil on your site, provide an explanation for why this is the case.

General

- Topsoil will only be disturbed within the delineated limits of disturbance on the project plans.

Specific Topsoil Controls

Limit of Areas of Disturbance	
Description: Only disturb areas as indicated on plans	
Installation	2/1/2022
Maintenance Requirements	Maintain work area within silt fence line that delineates the limit of disturbance.
Design Specifications	See project plans

[Repeat as needed for individual topsoil controls.]

4.8 Soil Compaction

Instructions (see CGP Parts 2.2.9 and 7.2.6):

- In areas where final vegetative stabilization will occur or where infiltration practices will be installed, describe the controls, including design, installation, and maintenance specifications that will be used to restrict vehicle or equipment access or condition the soil for seeding or planting.

General

- Limit vehicle access

Specific Soil Compaction Controls

Limit vehicle access	
Description: Only allow temporary construction equipment access to non-paved, non-stabilized areas. Advise crews of where access is limit and where circulation is possible	
Installation	2/1/2022

Maintenance Requirements	Soils that are over-compacted shall be re-excavated and re-placed under the direction of the engineer
Design Specifications	

[Repeat as needed for individual soil compaction controls.]

4.9 Storm Drain Inlets

Instructions (see CGP Parts 2.2.10 and 7.2.6):

- Describe controls (e.g., inserts, rock-filled bags, or block and gravel) including design, installation, and maintenance specifications that will be implemented to protect all inlets that carry stormwater flow from your site to a water of the U.S., provided you have the authority to access the storm drain inlet.

General

- Use catch basin inserts and protect receiving structures.

Specific Storm Drain Inlet Controls

Catch basin inserts	
Description: Place catch basin inserts in receiving structures	
Installation	2/1/2022
Maintenance Requirements	Clean, or remove and replace the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.
Design Specifications	N/A

[Repeat as needed for individual storm drain inlet controls.]

4.10 Stormwater Conveyance Channels

Instructions (see CGP Parts 2.2.11 and 7.2.6):

If you will be installing a stormwater conveyance channel, describe control practices (e.g., velocity dissipation devices), including design specifications and details (volume, dimensions, outlet structure), that will be implemented at the construction site.

General

- No discharge allowed until channels are stabilized with mulch or vegetation

Specific Conveyance Channel Controls

No discharge until stabilized
Description: Stormwater discharge will not be allowed until the receiving channels are stabilized with vegetation and/or mulch.

Installation	9/30/2022
Maintenance Requirements	If erosion of channel occurs, place angular crushed stone at entrance of stormwater and revegetate affected area.
Design Specifications	

[Repeat as needed for individual stormwater conveyance channel controls.]

4.11 Sediment Basins

Instructions (see CGP Parts 2.2.12 and 7.2.6.b.iv):

If you will install a sediment basin, include design specifications and other details (volume, dimensions, outlet structure) that will be implemented in conformance with CGP Part 2.2.12.

- Sediment basins must be situated outside waters of the U.S. and any natural buffers established under CGP Part 2.2.1; and designed to avoid collecting water from wetlands.
- At a minimum, sediment basins provide storage for either (1) the calculated volume of runoff from the 2-year, 24-hour storm (see CGP App. H), or (2) 3,600 cubic feet per acre drained
- Sediment basins must also utilize outlet structures that withdraw water from the surface, unless infeasible

General

- Not applicable to this project

Specific Sediment Basin Controls

N/A	
Description: N/A	
Installation	INSERT APPROXIMATE DATE OF INSTALLATION
Maintenance Requirements	N/A
Design Specifications	N/A

[Repeat as needed for individual sediment basin controls.]

4.12 Chemical Treatment

Instructions (see CGP Parts 2.2.13 and 7.2.6.v):

If you are using treatment chemicals at your site, provide details for each of the items below. This information is required as part of the SWPPP requirements in CGP Part 7.2.6.v.

Soil Types

List all the soil types (including soil types expected to be found in fill material) that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems: N/A

Treatment Chemicals

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics: N/A
Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage: N/A

Provide information from any applicable Safety Data Sheets (SDS): N/A

Describe how each of the chemicals will stored: N/A

Include references to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems: N/A

Special Controls for Cationic Treatment Chemicals (if applicable)
If the applicable EPA Regional Office authorized you to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards: N/A

Schematic Drawings of Stormwater Controls/Chemical Treatment Systems
Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals: N/A

Training
Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals: N/A

4.13 Dewatering Practices

Instructions (see CGP Parts 2.4 and 7.2.6):

If you will be discharging ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, include design specifications and details of all dewatering practices that are installed and maintained to comply with CGP Part 2.4.

General

- If needed, used a sediment frac tank or geobag

Specific Dewatering Practices

Sedimentation Filters prior to discharge	
Description: If needed, though not anticipated, water from excavations shall be pumped through a sedimentation filters such as a frac tank or geobag to reduce suspended solids, prior to discharge	
Installation	2/1/2022
Maintenance Requirements	Monitor discharge turbidity and adjust practices (increase retention time, remove accumulated sediment) to maintain compliance.
Design Specifications	N/A

[Repeat as needed for individual dewatering practices.]

4.14 Other Stormwater Controls

Instructions:

– Describe any other stormwater controls that do not fit into the above categories.

General

- Not applicable to this project

Specific Stormwater Control Practices

N/A	
Description: N/A	
Installation	INSERT APPROXIMATE DATE OF INSTALLATION
Maintenance Requirements	N/A
Design Specifications	N/A

4.15 Site Stabilization

Instructions (see CGP Parts 2.2.14 and 7.2.6.vi):

The CGP requires you to immediately initiate stabilization when work in an area of your site has permanently or temporarily stopped, and to complete certain stabilization activities within prescribed deadlines. Construction projects disturbing more than 5 acres at any one time have a different deadline than projects disturbing 5 acres or less at any one time. See CGP Part 2.2.14.a. The CGP also requires that stabilization measures meet certain minimum criteria. See CGP Part 2.2.14.b. For your SWPPP, you must include the following:

– Describe the specific vegetative and/or non-vegetative practices that will be used to stabilize exposed soils where construction activities have temporarily or permanently ceased. Avoid using impervious surfaces for stabilization whenever possible.
– The stabilization deadline(s) that will be met in accordance with Part 2.2.14.a
– Once you begin construction, consider using the Grading/Stabilization Activities log in Appendix H of the Template to document your compliance with the stabilization requirements in CGP Part 2.2.14.

Total Amount of Land Disturbance Occurring at Any One Time

☒ *Five Acres or less*

☐ *More than Five Acres*

Use this template box if you are <u>not</u> located in an arid, semi-arid, or drought-stricken area

Temporary Pavement

☐ *Vegetative* ☐ *Non-Vegetative* ☒ *Temporary* ☐ *Permanent*	
Description: ▪ Temporary paving for construction process ▪ This will minize amount of area that is disturbed and impacted by vehicle traffic	
Installation	7/1/2022
Completion	4/15/2023
Maintenance Requirements	Repair and fill areas of cracking or settlement
Design Specifications	

Vegetate Landscaped areas	
☒ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ After temporary paving and subgrades are achieved, site can be stabilized with vegetation ▪ Do not allow discharge to vegetated areas until they are well established	
Installation	7/1/2022
Completion	6/30/2023
Maintenance Requirements	Monitor vegetation and replace if not surviving
Design Specifications	

Permanent Paving	
☐ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☒ *Permanent*	
Description: ▪ Permanent paving for construction process ▪ This will minize amount of area that is disturbed and impacted by vehicle traffic	
Installation	4/15/2023
Completion	6/30/2023
Maintenance Requirements	Repair and fill areas of settlement or cracking
Design Specifications	

Use this template box if unforeseen circumstances have delayed the initiation and/or completion of vegetative stabilization. Note: You will not be able to include this information in your initial SWPPP. If you are affected by circumstances such as those described in CGP Part 2.2.14.a.iii, you will need to modify your SWPPP to include this information.

INSERT NAME OF SITE STABILIZATION PRACTICE

☐ *Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ INSERT DESCRIPTION OF STABILIZATION PRACTICE TO BE INSTALLED ▪ NOTE HOW DESIGN WILL MEET REQUIREMENTS OF PART 2.2.14.b	
Justification	INSERT DESCRIPTION OF CIRCUMSTANCES THAT PREVENT YOU FROM MEETING THE DEADLINES REQUIRED IN CGP PARTS 2.2.14.a
Installation and completion schedule	**Vegetative Measures:** DESCRIBE THE SCHEDULE YOU WILL FOLLOW FOR INITIATING AND COMPLETING VEGETATIVE STABILIZATION ▪ Approximate installation date: INSERT APPROXIMATE DATE ▪ Approximate completion date: INSERT APPROXIMATE DATE
	Non-Vegetative Measures: *(must be completed within 14 days of the cessation of construction if disturbing 5 acres or less; within 7 days if disturbing more than 5 acres)* ▪ Approximate installation date: INSERT APPROXIMATE DATE ▪ Approximate completion date: INSERT APPROXIMATE DATE
Maintenance Requirements	INSERT MAINTENANCE REQUIREMENTS FOR THE STABILIZATION PRACTICE
Design Specifications	INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

[Repeat as needed for additional stabilization practices.]

SECTION 5: POLLUTION PREVENTION STANDARDS

5.1 Potential Sources of Pollution

Instructions (see CGP Part 7.2.3.g):

- Identify and describe all pollutant-generating activities at your site (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal).
- For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents associated with that activity (e.g., sediment, fertilizers, and/or pesticides, paints, solvents, fuels), which could be exposed to rainfall or snowmelt, and could be discharged from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction.

Construction Site Pollutants

INSERT TEXT OR USE TABLE BELOW

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (that could be discharged if exposed to stormwater)	**Location on Site** (or reference SWPPP site map where this is shown)
Fuel	Diesel/Gasoline	Approved Storage container no closer than 100' from wetlands
Equipment Maintenance	Hydraulic Oil, Grease, Oil	Approved Storage container no closer than 100' from wetlands
Site grading and excavation	Fugitive Dust	In areas of disturbance
Solid Waste	Solid waste	Use appropriate containers placed on level impervious surface
Concrete/Mortar cleaning	Cement, mortar	For foundations and building construction

5.2 Spill Prevention and Response

Instructions (see CGP Parts 2.3.6 and 7.2.6.vii):

- Describe procedures you will use to prevent and respond to leaks, spills, and other releases. You must implement the following at a minimum:
  - ✓ Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or title of the employee(s) responsible for detection and response of spills or leaks; and
  - ✓ Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available.
- Some projects/site may be required to develop a Spill Prevention Control and Countermeasure (SPCC) plan under a separate regulatory program (40 CFR 112). If you are required to develop an SPCC plan, or you already have one, you should include references to the relevant requirements from your plan.

Oil containing materials are likely to be present in small quantities on site. When materials are transported on site using a forklift or heavy equipment, either a drum attachment is used or containers are strapped to pallets on the forklift to prevent the containers from falling during movement. If a barrel dolly is used, the operator will ensure that the barrel is compatible with the dolly and that the barrel is properly secured to the dolly. The following outlines delivery and transport procedures for small containers:

1. Containers are checked for damaged areas or signs of corrosion. If any is detected, the container contents are transferred to an appropriate container and labeled prior to moving.
2. Contractor's personnel ensure that containers are closed prior to moving.
3. Containers are secured on forks or pallets when using a forklift or heavy machinery or properly secured when using a dolly to prevent containers from falling during movement.

Discovery of a Release

The person discovering a release of material from a container, tank, or operating equipment should initiate certain actions immediately. These actions include the following:

First ensuring that no danger to human health exists, attempt to stop the release at its source. Simple procedures (turning valves, plugging leaks, etc.) may be attempted by the discoverer if there is no health or safety hazard and there is a reasonable certainty of the origin of the leak. All efforts to control leaks must be under the supervision of an appointed supervisor.

Extinguish any sources of ignition. Until the material is identified as nonflammable and noncombustible, all potential sources of ignition in the area should be removed. Vehicles should be turned off. If the ignition source is stationary, and cannot be extinguished, attempt to direct the spilled material away from the ignition source. Avoid sparks and movement creating static electricity.

Initiate spill notification and reporting procedures. Report the incident immediately to the Site Supervisor. If there is an immediate threat to human life (e.g., a fire in progress or fumes overcoming workers), an immediate alarm should be sounded to evacuate the building and the local Fire Department should be called. Request the assistance of a hazardous materials

response contractor if an uncontrollable spill has occurred and/or if the spill has migrated beyond the site boundaries.

Containment of a Release

If a release should occur, all regulated oil at the facility can be safely contained within secondary containment structures or otherwise diverted to be retained onsite without impact to surface water if a release occurs. However, if material is released outside the containment areas, it is critical that the material is accurately identified and appropriate control measures are taken in the safest possible manner. Immediate containment measures can include the following:

Attempt to stop the release at the source. If the source of the release has not been found; if special protective equipment is necessary to approach the release area; or if assistance is required to stop the release, the local Fire Department and an emergency spill contractor should be called to halt the discharge at its source. Contractor personnel should be available to guide the Fire Department's efforts.

Contain the material released into the environment. Following proper safety procedures, the spill should be contained by absorbent materials and dikes using shovels and brooms.

Continue the notification procedures. Obtain assistance from a hazardous material contractor if necessary. The hazardous material contractor will be called for assistance if the spill exceeds 10 gallons, or if the Site Supervisor determines that outside help is necessary or desirable.

Spill Cleanup

Cleanup of spills of more than 10 gallons of oil will be conducted by a hazardous material contractor. The MCP requires responsible parties to retain a Licensed Site Professional (LSP) to direct cleanup activities for all spills which are reportable under the MCP. The LSP should be contacted as soon as possible after the spill occurs so that they can direct and observe cleanup activities and ensure compliance with the applicable regulations.

Cleanup of spills less than 10 gallons of oil may be conducted by the Contractor's personnel using the following procedures, or may be cleaned up by an outside contractor, as determined by the Site Supervisor. Appropriate personal protective equipment and cleanup procedures can be found on material safety data sheets. Care must be taken when cleaning up spills to minimize the quantity waste generated, which is regulated as a hazardous waste by MassDEP.

Keep material separated from water if possible. An important facet of an effective response procedure during an oil or petroleum product release incident is to keep the material separated from water to minimize migration and the resulting potential increase in human and environmental exposure. Every effort should be made to prevent spills and emphasize substance containment at the source rather than resort to separation of the material from expanded portions of the environment or downstream waters.

Recover or cleanup the material spilled. As much material as possible should be recovered and reused where appropriate. Material that cannot be reused must be declared waste. Liquids absorbed by solid materials shall be shoveled into an open top, 55-gallon drum. When a drum is filled after a cleanup, the drum lid shall be secured and the drum shall be appropriately labeled identifying the substance(s) (i.e., Waste Oil), the hazard of the material (i.e. ignitable), the date of the spill/cleanup, and the location of the spill.

Do not mix non-compatible materials. Note that combining non-compatible materials can cause potentially dangerous chemical and/or physical reactions or may severely limit disposal options. Compatibility information can be found on material safety data sheets.

Cleanup of the spill area. Surfaces that are contaminated by the release shall be cleaned up by using an appropriate cleaner or water. Cleanup water must be minimized, contained, and

properly disposed. Occasionally, porous materials (such as wood, soil, or oil-dry) may be contaminated; such materials will require special handling for disposal.

Decontaminate tools and equipment used in cleanup. Even if dedicated to cleanup efforts, tools and equipment that have been used must be decontaminated before replacing them in the spill control kit. Tools which can't be decontaminated should be disposed of properly and replaced.

Post Cleanup Procedures

Notification and reports to outside agencies. The Site Supervisor shall determine if a reportable spill has occurred. A spill over 10 gallons of oil or other appropriate RQ in Massachusetts is a reportable spill under the MCP (See Section 6.2 for further information). Notifications to Fire Departments, MassDEP, the National Response Center, the EPA Regional Office, and internal contacts shall be executed if necessary.

Arrange for proper disposal of any waste material. The waste materials from the cleanup must be characterized. Representative sampling and analysis may be necessary to make this determination. In any case, the Site Supervisor shall assure that the waste is transported and disposed of in compliance with applicable laws and regulations. When manifests are needed, the Site Supervisor shall see that they are prepared and, when appropriate, returned in the allotted time by the disposal site.

Review the Contingency and Spill Plans. Management and operating personnel shall review spill response efforts, notification procedures and cleanup equipment usage to evaluate their adequacy during the episode. Where deficiencies are found, the Plan shall be revised and amended.

5.3 Fueling and Maintenance of Equipment or Vehicles

Instructions (see CGP Parts 2.3.1 and 7.2.6):

- Describe equipment/vehicle fueling and maintenance practices that will be implemented to eliminate the discharge of spilled or leaked chemicals (e.g., providing secondary containment *(examples: spill berms, decks, spill containment pallets)* and cover where appropriate, and/or having spill kits readily available.)

General

- Fueling will occur only in designated areas

Specific Pollution Prevention Practices

Keep fueling on designated areas, away from sensitive receptors	
Description: Fueling will occurring only on paved areas and contractor shall have spill kits available on site	
Installation	2/1/2022
Maintenance Requirements	Have spill kits available on site
Design Specifications	

5.4 Washing of Equipment and Vehicles

Instructions (see CGP Parts 2.3.2 and 7.2.6):

- Describe equipment/vehicle washing practices that will be used to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters (e.g., locating activities away from waters of the U.S. and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls).
- Describe how you will prevent the discharge of soaps, detergents, or solvents by providing either (1) cover (*examples: plastic sheeting or temporary roofs*) to prevent these detergents from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas.

General

- Equipment and Vehicle washing in a controlled manner.

Specific Pollution Prevention Practices

N/A	
Description: Vehicle and Equipment Washing to be done on paved areas only, draining to sump area lined with poly sheeting	
Installation	2/1/2022
Maintenance Requirements	Maintain plastic sheeting as necessary, do not allow sump pit to overflow or runoff in uncontrolled manner.
Design Specifications	

5.5 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

Instructions (see CGP Parts 2.3.3 and 7.2.6):

- For any of the types of building products, materials, and wastes below in Sections 5.5.1-5.5.6 below that you expect to use or store at your site, provide the information on how you will comply with the corresponding CGP provision and the specific practices that you will be employ.

General

- Minimize exterior storage of building materials

Specific Pollution Prevention Practices

Minimize exterior storage	
Description: Keep building materials covered or inside and protected from the elements	
Installation	2/2/2022
Maintenance Requirements	Move storage locations as materials arrive or in anticipation of storm events.
Design Specifications	

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General

- We do not anticipate the use of pesticides, herbicides, insecticides or fertilizers. Small areas of loam are to be placed on the southwest side of the building to match grades

Specific Pollution Prevention Practices

Place and loosely compact loam	
Description: Loosely compact loam to meet grades as called out on plan	
Installation	2/2/2022
Maintenance Requirements	Monitor and stabilize loam placement as necessary
Design Specifications	

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General

- Store in DOT approved containers and following fueling procedures

Specific Pollution Prevention Practices

Proper Storage	
Description: Store products in appropriate containers with proper labeling	
Installation	2/2/2022
Maintenance Requirements	Check containers for signs of fatigue or cracking, ensure labels are legible
Design Specifications	

5.5.4 Hazardous or Toxic Waste

(Note: Examples include paints, solvents, petroleum-based products, wood preservatives, additives, curing compounds, acids.)

General

- Store in appropriate containers in a protected location

Specific Pollution Prevention Practices

Proper storage	
Description: Material shall be stored in appropriately compatible containers, clearly and appropriately label, and protected from the elements.	
Installation	2/2/2022
Maintenance Requirements	Check containers for signs of fatigue or cracking, ensure labels are legible
Design Specifications	

5.5.5 Construction and Domestic Waste

(Note: Examples include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials.)

General

- Ensure proper storage and removal of wastes

Specific Pollution Prevention Practices

Proper storage and disposal	
Description: Provide appropriately sized and labeled receptacles for solid and construction waste	
Installation	2/2/2022
Maintenance Requirements	Ensure receptacles are labeled, have a licensed waste hauler remove accumulated waste after receptacles are at 75% capacity.
Design Specifications	

5.5.6 Sanitary Waste

General

- Provide temporary facilities on site

Specific Pollution Prevention Practices

Provide temporary sanitary facilities	
Description: Provide temporary facilities (portable toilets) for both male and female employees, with sufficient quantity based on estimated workforce	
Installation	2/2/2022
Maintenance Requirements	Have facilities cleaned regularly and waste pumped out or hauled off
Design Specifications	

5.6 Washing of Applicators and Containers used for Paint, Concrete or Other Materials

Instructions (see CGP Parts 2.3.4 and 7.2.6):

– Describe how you will comply with the CGP Part 2.3.4 requirement for washing applications and containers.

General

- Washing of applicators and containers will be controlled and collected for proper discharge

Specific Pollution Prevention Practices

These items will be washed and collected on site to be discharged in accordance with Municipal regulations	
Description: Control the washing and runoff generated, collect it and properly discharge it	
Installation	2/2/2022
Maintenance Requirements	Train staff and subcontractors
Design Specifications	

5.7 Fertilizers

Instructions (CGP Parts 2.3.5 and 7.2.6.ix):

Describe how you will comply with the CGP Part 2.3.5 requirement for the application of fertilizers.

General

- Not anticipated as part of this work

Specific Pollution Prevention Practices

INSERT NAME OF POLLUTION PREVENTION PRACTICE	
Description: INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED	
Installation	INSERT APPROXIMATE DATE OF INSTALLATION
Maintenance Requirements	INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE
Design Specifications	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

[Repeat as needed for individual fertilizer practices.]

5.8 Other Pollution Prevention Practices

Instructions:

Describe any additional pollution prevention practices that do not fit into the above categories.

General

- Not anticipated as part of this work

Specific Pollution Prevention Practices

INSERT NAME OF POLLUTION PREVENTION PRACTICE	
Description: INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED	
Installation	INSERT APPROXIMATE DATE OF INSTALLATION
Maintenance Requirements	INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

Design Specifications	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

[Repeat as needed.]

SECTION 6: INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

6.1 Inspection Personnel and Procedures

Instructions (see CGP Parts 3.2, 4, 5, and 7.2.7):

Describe the procedures you will follow for conducting inspections in accordance with CGP Parts 3.2, 4, 5, and 7.2.7.

Personnel Responsible for Inspections

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL WHO WILL BE CONDUCTING SITE INSPECTIONS HERE

Note: All personnel conducting inspections must be considered a "qualified person." CGP Part 4.1 clarifies that a "qualified person" is a person knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

Inspection Schedule

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)

Standard Frequency:
☒ Every 7 days ☐ Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge
Increased Frequency (if applicable):
For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3 ☐ Every 7 days and within 24 hours of a 0.25" rain
Reduced Frequency (if applicable)
For stabilized areas ☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month; ▪ SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED ▪ INSERT DATE THAT THEY WERE COMPLETED (Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information.)
For stabilized areas on "linear construction sites" ☐ Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain ▪ SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED ▪ INSERT DATE THAT THEY WERE COMPLETED

(Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information.)
For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought ☐ Once per month and within 24 hours of a 0.25" rain Insert beginning and ending dates of the seasonally-defined dry period for your area or the valid period of drought: ▪ Beginning date of seasonally dry period: INSERT APPROXIMATE DATE ▪ Ending date of seasonally dry period: INSERT APPROXIMATE DATE
For frozen conditions where earth-disturbing activities are being conducted ☐ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: INSERT APPROXIMATE DATE ▪ Ending date of frozen conditions: INSERT APPROXIMATE DATE

Rain Gauge Location (if applicable)
New Bedford Regional Airport
https://w1.weather.gov/data/obhistory/KEWB.html

Inspection Report Forms
See attached

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.2 Corrective Action

Instructions (CGP Parts 5 and 7.2.7):

- Describe the procedures for taking corrective action in compliance with CGP Part 5.

Personnel Responsible for Corrective Actions

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL RESPONSIBLE FOR CORRECTIVE ACTIONS

Corrective Action Forms

INSERT A COPY OF ANY CORRECTIVE ACTION FORMS YOU WILL USE HERE OR IN APPENDIX E OF THIS SWPPP TEMPLATE

(Note: EPA has developed a sample corrective action form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.3 Delegation of Authority

Instructions:

- Identify the individual(s) or positions within the company who have been delegated authority to sign inspection reports.
- Attach a copy of the signed delegation of authority (see example in Appendix J of the Template.)
- For more on this topic, see Appendix I, Subsection 11 of EPA's CGP.

Duly Authorized Representative(s) or Position(s):

Insert Company or Organization Name
Insert Name
Insert Position
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email

SECTION 7: TRAINING

Instructions (see CGP Part 6 and 7.2.8):

- Complete the table below to provide documentation that the personnel required to be trained in CGP Part 6 completed the appropriate training
- If personnel will be taking course training (which is not required as part of the CGP), consider using Appendix I of this SWPPP template to track completion of this training
- The following personnel, at a minimum, must receive training, and therefore should be listed out individually in the table below:
  - ✓ Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
  - ✓ Personnel responsible for the application and storage of treatment chemicals (if applicable);
  - ✓ Personnel who are responsible for conducting inspections as required in Part 4.1; and
  - ✓ Personnel who are responsible for taking corrective actions as required in Part 5.
- CGP Part 6 requires that the required personnel must be trained to understand the following if related to the scope of their job duties:
  - ✓ The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
  - ✓ The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
  - ✓ The proper procedures to follow with respect to the permit's pollution prevention requirements; and
  - ✓ When and how to conduct inspections, record applicable findings, and take corrective actions.

Table 7-1: Documentation for Completion of Training

Name	Describe Training	Date Training Completed
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
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INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions (CGP Appendix I, Part I.11.b):

- The following certification statement must be signed and dated by a person who meets the requirements of Appendix I, Part I.11.b.
- This certification must be re-signed in the event of a SWPPP Modification.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

[Repeat as needed for multiple construction operators at the site.]

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – Copy of 2017 CGP
(Note: The 2017 CGP is available at https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents)

Appendix C – NOI and EPA Authorization Email

Appendix D – Inspection Form
(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

Appendix E – Corrective Action Form
(Note: EPA has developed a sample corrective action form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Log

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix A – Site Maps

INSERT SITE MAPS CONSISTENT WITH TEMPLATE SECTION 2.6

Appendix B – Copy of 2017 CGP

INSERT COPY OF 2017 CGP

(Note: The 2017 CGP is available at https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents)

Appendix C – Copy of NOI and EPA Authorization email

INSERT COPY OF NOI AND EPA'S AUTHORIZATION EMAIL PROVIDING COVERAGE UNDER THE CGP

Appendix D – Copy of Inspection Form

INSERT COPY OF ANY INSPECTION FORMS YOU WILL USE TO PREPARE INSPECTION REPORTS

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

General Information (see reverse for instructions)					
Name of Project	Nye Building 3 Expansion	**NPDES ID No.**	N/A	**Inspection Date**	
Weather conditions during inspection		**Inspection start time**		**Inspection end time**	
Inspector Name, Title & Contact Information					
Present Phase of Construction					
Inspection Location (if multiple inspections are required, specify location where this inspection is being conducted)					

Inspection Frequency *(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)*

Standard Frequency:

☐ Every 7 days

☐ Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge

Increased Frequency:

☐ Every 7 days and within 24 hours of a 0.25" rain (for areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3)

Reduced Frequency:

☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month; (for stabilized areas)

☐ Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain (for stabilized areas on "linear construction sites")

☐ Once per month and within 24 hours of a 0.25" rain (for arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought)

☐ Once per month (for frozen conditions where earth-disturbing activities are being conducted)

Was this inspection triggered by a 0.25" storm event? ☐ Yes ☐ No

If yes, how did you determined whether a 0.25" storm event has occurred?

☐ Rain gauge on site ☐ Weather station representative of site. Specify weather station source:

Total rainfall amount that triggered the inspection (in inches)**:**

Was this inspection triggered by the occurrence of runoff from snowmelt sufficient to cause a discharge? ☐ Yes ☐ No

Unsafe Conditions for Inspection

Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5? ☐ Yes ☐ No

If "yes", complete the following:

- Describe the conditions that prevented you from conducting the inspection in this location:

- Location(s) where conditions were found:

Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2) (see reverse for instructions)				
Type/Location of E&S Control [Add an additional sheet if necessary]	**Maintenance Needed?***	**Corrective Action Required?***	**Date on Which Maintenance or Corrective Action First Identified?**	**Notes**
1.	☐Yes ☐No	☐Yes ☐No		
2.	☐Yes ☐No	☐Yes ☐No		
3.	☐Yes ☐No	☐Yes ☐No		
4.	☐Yes ☐No	☐Yes ☐No		
5.	☐Yes ☐No	☐Yes ☐No		
6.	☐Yes ☐No	☐Yes ☐No		
7.	☐Yes ☐No	☐Yes ☐No		
8.	☐Yes ☐No	☐Yes ☐No		
9.	☐Yes ☐No	☐Yes ☐No		
10.	☐Yes ☐No	☐Yes ☐No		

*** Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources. See Part 5 of the permit for more information.

Condition and Effectiveness of Pollution Prevention (P2) Practices (CGP Part 2.3) (see reverse for instructions)				
Type/Location of P2 Practices [Add an additional sheet if necessary]	**Maintenance Needed?***	**Corrective Action Required?***	**Date on Which Maintenance or Corrective Action First Identified?**	**Notes**
1.	☐Yes ☐No	☐Yes ☐No		
2.	☐Yes ☐No	☐Yes ☐No		
3.	☐Yes ☐No	☐Yes ☐No		
4.	☐Yes ☐No	☐Yes ☐No		
5.	☐Yes ☐No	☐Yes ☐No		
6.	☐Yes ☐No	☐Yes ☐No		
7.	☐Yes ☐No	☐Yes ☐No		
8.	☐Yes ☐No	☐Yes ☐No		
9.	☐Yes ☐No	☐Yes ☐No		
10.	☐Yes ☐No	☐Yes ☐No		

*** Note:** The permit differentiates between conditions requiring routine maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition. Corrective actions are triggered only for specific conditions, which include: 1) A stormwater control needs repair or replacement (beyond routine maintenance) if it is not operating as intended; 2) A stormwater control necessary to comply with the permit was never installed or was installed incorrectly; 3) You become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1; 4) One of the prohibited discharges in Part 1.3 is occurring or has occurred; or 5) EPA requires corrective actions as a result of a permit violation found during an inspection carried out under Part 4.8. If a condition on your site requires a corrective action, you must also fill out a corrective action form found at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources. See Part 5 of the permit for more information.

Stabilization of Exposed Soil (CGP Part 2.2.14) (see reverse for instructions)			
Stabilization Area **[Add an additional sheet if necessary]**	**Stabilization Method**	**Have You Initiated Stabilization?**	**Notes**
1.		☐ YES ☐ NO If yes, provide date:	
2.		☐ YES ☐ NO If yes, provide date:	
3.		☐ YES ☐ NO If yes, provide date:	
4.		☐ YES ☐ NO If yes, provide date:	
5.		☐ YES ☐ NO If yes, provide date:	

Description of Discharges (CGP Part 4.6.6) (see reverse for instructions)	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? ☐ Yes ☐ No **If "yes", provide the following information for each point of discharge:**	
Discharge Location **[Add an additional sheet if necessary]**	**Observations**
1.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge: At points of discharge and the channels and banks of waters of the U.S. in the immediate vicinity, are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Contractor or Subcontractor Signature and Certification
(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Contractor or Subcontractor: _____ **Date:**

Printed Name and Affiliation: _____

Operator Signature and Certification
(see reverse for instructions)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Operator or "Duly Authorized Representative": _____ **Date:**

Printed Name and Affiliation: _____

Appendix E – Copy of Corrective Action Form

INSERT COPY OF CORRECTIVE ACTION FORMS YOU WILL USE

(Note: EPA has developed a sample corrective action form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

Appendix F – *Sample* SWPPP Amendment Log

Instructions (see CGP Part 7.4):

- Create a log here of changes and updates to the SWPPP. You may use the table below to track these modifications.
- SWPPP modifications are required pursuant to CGP Part 7.4.1 in the following circumstances:
  - ✓ Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP;
  - ✓ To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - ✓ If inspections or investigations determine that SWPPP modifications are necessary for compliance with this permit;
  - ✓ Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet requirements of the permit; and
- To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater control measures implemented at the site.
- If applicable, if a change in chemical treatment systems or chemically-enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	

Appendix G – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix H – *Sample* Grading and Stabilization Activities Log

Date Grading Activity Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures Initiated
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE

Appendix I – *Sample* SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ☐ **Sediment and Erosion Controls**
- ☐ **Stabilization Controls**
- ☐ **Pollution Prevention Measures**
- ☐ **Emergency Procedures**
- ☐ **Inspections/Corrective Actions**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		

Appendix J – *Sample* Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit (CGP), at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix I of EPA's CGP, and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix I.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Appendix K – Endangered Species Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.1 AND CGP APPENDIX D

Appendix L – Historic Properties Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.2 AND CGP APPENDIX E

Appendix M – Rainfall Gauge Recording

Use the table below to record the rainfall gauge readings at the beginning and end of each work day. An example table follows.

Month/Year			Month/Year			Month/Year		
Day	Start time	End time	Day	Start time	End time	Day	Start time	End time
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
16			16			16		
17			17			17		
18			18			18		
19			19			19		
20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		

Example Rainfall Gauge Recording

April 2017			May 2017			June 2017		
Day	7:00 am	4:400 pm	Day	7:00 am	4:00 pm	Day	7:00 am	4:00 pm
1	--	--	1	0.2	0	1	0	0.4
2	--	--	2	0	0	2	0	0
3	0	0	3	0.1	0.3	3	--	--
4	0	0.3	4	0	0	4	--	--
5	0	0	5	0	0	5	0	0

In this example (for only partial months), 0.25-inch rainfall inspections would have been conducted on April 4 and June 1.