CITY OF DOVER

PLANNING TECHNICAL REVIEW COMMITTEE –AGENDA

Meeting Type: Regular Meeting
Meeting Location: Council Conference Room, City Hall, 288 Central Ave, Dover NH 03820
Meeting Date: **Thursday, July 24, 2025**
Meeting Time: **10:30 AM**

1. Site Plan for Richardson Estates of Dover, LLC and Mohamed & Lisa K. Hamcha, Assessor's Map 35, Lots 64 & 72, zoned R-12, located at 141 Sixth Street & 5 Dowaliby Court. (Proposal is to construct ten (10), two-family dwelling units on a private road.) *(SITE-2025-0010)
[Please note that a Conditional Use Permit (CUP) for impacts within the Secondary Groundwater Protection Zone will also go before the Planning Board. (COND-2025-0015)]

PLAN SNAPSHOT REPORT SITE-2025-0010
FOR CITY OF DOVER, N.H.

Plan Type: Site Plan - Major
Project:
App Date: 07/03/2025
Work Class: New Construction
District: None
Exp Date: 09/06/2025
Status: In Review
Square Feet: 0.00
Completed: NOT COMPLETED
Valuation: $0.00
Assigned To: Blonigen, Rachel
Approval Expire Date:
Description: Proposing 10, 2-family dwelling units on a 777' private roadway known as Fawn Drive.

Parcel: 35072-000000
35064-000000 Main

Address: 5 Dowaliby Ct
Dover, 03820
141 Sixth St Main
Dover, NH

Zone: R-12(Residential - Medium Density)

Owner
Dewayne Watson
Mobile: (603) 905-9004

Architect
Jason Aselin
Mobile: (603) 554-1199

Landscape Architect
Eric Buck
Home: (603) 491-2322
Business: (603) 491-4322
Mobile: (603) 491-4322

Soil Scientist
John Hayes III
Home: (603) 205-2396
Business: (603) 205-2396
Mobile: (603) 205-2396

Applicant
Eric Jackson
Mobile: (603) 898-0318

Wetlands Scientist
Deidra Benjamin
Home: (603) 332-2863

Engineer
Kenneth Berry
Home: (603) 332-2863
Business: (603) 332-2863
Mobile: (603) 332-2863

Applicant
Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
Business: (603) 332-2863
Mobile: (603) 781-3403

Owner
Lisa & Mohamed Hamcha
Mobile: (603) 609-5243

Plan Custom Fields

Total	0	Total2	0	Total3	0
Total4	0	Total5	0	Total6	0
Total7	0	Total8	0	Total9	0
Street Classification Type	Private	Net Change in # Parking Spaces (+/-)	0	Water Service	Municipal
Recording Number		Sewer Service	Municipal	Total Acres (GIS)	3.75
Deed Book	5194, 2794	Total SQFT	163350	Deed Page	651, 374
Deed Date		Proposed Property Use	Proposing 10, 2-family dwelling units (20 units total) on a 777 LF private road known as Fawn Drive.	Area of Parcel to be Developed (SQFT)	164500
Number of Parking Spaces Existing	0	Number of Parking Spaces Proposed	0	Number of Employees Total	0
Number of Employees in Max Shift	0	Distance to City Water	0	Distance to City Sewer	0
Type of Building to be Built	Wood frame construction	Estimated Construction Value	10000000.00	Refuse Removal	Private
Is there an existing Conservation Easement?	No	Existing Conservation Easement Details		TotalImpactFeeSDTOD	0.00
TotalImpactFeeTHTOD	0.00	TotalImpactFee23FTOD	0.00	TotalImpactFeeA4TOD	0.00
TotalImpactFeeMHTOD	0.00	TotalImpactFeeADUTOD	0.00	TotalImpactFeeAONRTOD	0.00
TotalImpactFeeAR55TOD	0.00	TotalImpactFeeAR62TOD	0.00	Sub Total Residential	0.00
TotalImpactFeeRIRCTOD	0.00	TotalImpactFeeOCSTOD	0.00	TotalImpactFeeITWCTOD	0.00

PLAN SNAPSHOT REPORT (SITE-2025-0010)

TotalImpactFeeNHALTOD	0.00	TotalImpactFeeOIUTOD	0.00	TotalImpactFeeAFAOTOD	0.00
Sub Total Non-Residential	0.00	Total of Impact Fees to be Assessed	0.00		

Attachment File Name	Added On	Added By	Attachment Group	Notes
Signature_Chris_Berry_7/3/2025.jpg	07/03/2025 11:36	Berry, Chris		Uploaded via CSS

Invoice No.	Fee	Fee Amount	Amount Paid
INV-2025013137	Planning General Application Fee	$200.00	$0.00
	Total for Invoice INV-2025013137	$200.00	$0.00
	Grand Total for Plan	**$200.00**	**$0.00**

Workflow Step / Action Name	Action Type	Start Date	End Date
Review v.1		07/03/2025 13:56	
Confirm application complete v.1	Generic Action		07/03/2025 14:08
Technical Review Committee Meeting Agenda v.1	Task	07/03/2025 14:08	
Land Use Plan Technical Review v.1	Receive Submittal		
Technical Review Committee Meeting v.1	Hold Meeting		
Planning Board v.1			
Planning Board Agenda v.1	Task		
Invoice for Notices v.1	Task		
Send Notices v.1	Task		
Planner Creates Staff Recommendations v.1	Plan Activity		
Distribute Planning Board Materials v.1	Task		
Planning Board Hearing v.1	Hold Hearing		
Planning Board Decision v.1	Plan Activity		
NOD Sent to Applicant v.1	Create Report		
Final Plan v.1			
Land Use Plan Stamped and Signed v.1	Generic Action		
Recording v.1	Task		
Document Archival v.1	Generic Action		
Internal Notification of Plan Completion v.1	Generic Action		
Building Official Notifies Address v.1	Generic Action		
Pre-Con Meeting v.1	Hold Meeting		
Create/Link to Records v.1			
Create / Link to Permit - Building Major v.1	Create Sub Permit		
Create / Link to Permit - Site Work, Construction v.1	Create Sub Permit		

City of Dover, New Hampshire
SITE REVIEW APPLICATION

[Revision Date: July 1, 2021]

Office Use Only	Project #:		Date Received:	
	Amount Paid:		Time Received:	

APPLICANT AND OWNER INFORMATION

Name of Applicant: The Stabile Companies Telephone # 603-898-0318

Address of Applicant: 20 Cotton Road, Suite 200, Nashua, NH 03063

E-Mail Address: Ejackson@stabilecompanies.com

Name of Property Owner (*if different from applicant*): Richardson Estates of Dover LLC (Lot 64) Lisa & Mohamed Hamcha (Lot 72) Telephone # 603-905-9004 603-609-5243

Address of Property Owner: 688 Calef Highway, Barrington, NH 03825 5 Dowaliby Court, Dover, NH 03820

PROPERTY INFORMATION

Address of Property: 141 Sixth Street, 5 Dowaliby Court

Assessor's Map # 35 Lot(s) # 64, 72

Zoning District(s) R-12 Overlay District(s) None

Size of Parcel: 163,417 14,211 sq. ft. 3.75 0.33 ac. Property Deed: Book 5,194 2,794 Page: 651 374

Existing Use of Property: Single family home

SITE PLAN INFORMATION

Describe Proposed Use: Residential, 10 new 2-family dwelling structures

Area of Parcel to be Developed: 164,500 sq. ft.

If Multi-family Residential: Number of Units 20 & Buildings Proposed 10

If lodging: Number of Units _____ & number of Buildings _____

Number of Parking Spaces: Existing _____ Proposed Driveways + Garages

Highway Access (check where applicable): x City Street ____ State Highway

Number of Employees Total: _____ In Maximum Shift: _____

Disposition of Parcel:

Building Footprint 28,422 Total sq. ft.

Total Building Area _____ sq. ft.

Paved Area 28,980 Total sq. ft.

Building Setbacks:

Front Yard 20' abut a street ft.

Rear Yard 30 ft.

Side Yard: Right 15 ft. Left 15 ft.

City Water? X Yes ___ No How far is city water from the property? Ex. Sixth Street

City Sewer? X Yes ___ No How far is city sewer from the property? Ex. Sixth Street

TRANSFER OF DEVELOPMENT RIGHTS INFORMATION

Type of TRANSFER OF DEVELOPMENT RIGHT REQUEST (Check All That Apply):

□ Residential □ Residential (reduced size) □ Industrial | □ Purchase □ Land Preservation

Relief sought (Check All That Apply):

□ Lot Size □ Frontage □ Setback □ 30' Buffer □ Increase by _____ units

Describe Proposed Use or Activity that requires TDR; describe any impacts and document mitigation:

TRAN-2025-003 Was Approved On May 13, 2025

BUILDING INFORMATION

Type of Building to be Built: 10 2-family dwellings

Height of Building: +/-30' Finished Floor Elevation: See plans

Number of Seats (where applicable) N/A

Estimated value of construction: 10,000,000 Refuse removal: Public/Private (circle one)

WAIVER REQUESTS

Site Review Regulations section(s) to be waived: Stormwater Runoff Volume (153-14-(3)(B)(4))

Justification for waiver request(s) (*attach additional sheets as needed*):

See written narrative

SURVEYOR INFORMATION

Name of Surveyor and Company (Licensed in N.H.) Kenneth A. Berry, PE, LLS

Address 335 Second Crown Point Road, Barrington, NH 03825 Telephone #: 603-332-2863

Professional License #: 805 E-mail address: K.berry@berrysurveying.com

ENGINEER INFORMATION

crberry@metrocast.net

Name of Engineer and Company (Licensed in N.H.) Kenneth A. Berry, PE, LLS

Address 335 Second Crown Point Road, Barrington, NH 03825 Telephone #: 603-332-2863

Professional License #: 14243 E-mail address: K.berry@berrysurveying.com

ARCHITECT INFORMATION

crberry@metrocast.net

Name of Architect and Company (Licensed in N.H.) Jade Design Group Inc
Jason Aselin

Address 10 Northern BLVD, AMherst, NH 03031 Telephone #: 603-554-1199

Professional License #: _____ E-mail address: _____

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) Terrain Planting & Design LLC
Eric Buck

Address 311 Kast Hill Road, Hopkinton NH 03229 Telephone #: 603-491-2322

Professional License #: 78 E-mail address: _____

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) John P. Hayes III, CSS, CWS

Address 7 Limestone Way, North Hampton NH 03862 Telephone #: 603-205-4396

Professional License #: 87 E-mail address: johnphayes@comcast.net

CONSERVATION EASEMENT HOLDER

Name of Easement Holder: _____ Telephone #_____

Address Easement Holder: _____

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. Furthermore, I/we submit that the existing conditions sheet of the plan represents the lot in question, and that no alteration of the site shall take place during Planning Board review up to and including the pre-construction meeting. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: 7-3-25

Signature of Applicant (*if different from owner*): _____ Date: _____

Signature of Agent: _____ Date: 7-3-25

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 7-3-25

AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

I, and my successors, hereby the City of Dover or its assigns to enter my property for the purpose of completing the site work as required by the approved plan should the letter or credit or other surety be called. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 7-3-25

Signature of Applicant (*if different from owner*): _____ Date: 7-3-25

CERTIFICATION OF FEES

I, and my successors, hereby certify that I understand that the City of Dover collects impact fees, utility investment fees and inspection fees for projects developed in Dover. Said fees must be paid before a Certificate of Occupancy can be obtained for a structure, unless a different payment schedule is agreed to by the applicant and the City prior to approvals being issued by the Dover Planning Board. Additionally, should the property be in "Current Use" it will be subject to the Land Use Change Tax.

Signature of Property Owner: _____ Date: 7-3-25

Signature of Applicant (*if different from owner*): _____ Date: 7-3-25

CITY OF DOVER SITE REVIEW
LIST OF ABUTTERS

Pursuant to RSA 676:4, the State Law of New Hampshire, the City of Dover is required to notify the applicant, abutters (including holders of conservation easements), and any professional whose seal is on the plan, of the public hearing by certified mail, return receipt requested. Staff will provide the abutter information, while the applicant must provide accurate contact information for the owner, applicant and professional agents representing the project.

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

PLANNING BOARD FEE SCHEDULE/INVOICE

(Revised July 24, 2023)

Below are the fees associated with plan review and are subject to a nonrefundable application fee to cover administrative expenses. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover".

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):

- ☐ SUBDIVISION Application fee $200.00 + $150.00 x # _____ new lots created = $_____
- ☐ LOT LINE ADJUSTMENT Application fee $200.00 + $100.00 X # ___ of lots involved = $_____
- ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee $200.00 = $_____
- ☐ SITE REVIEW – RESIDENTIAL Application fee $200.00+ $100.00 x # __ per dwelling unit =$_____
- ☐ SITE REVIEW – NON-RESIDENTIAL Application fee $200.00 + (not to exceed $10,000)
  - New construction $.15 sq. ft. x # _____ sq. ft.= $_____
  - Additions (new floor space) $.10 per sq. ft. x # _____sq. ft.= $_____
- ☐ MOTEL/HOTEL $35.00 x # ___ per lodging unit= $_____
- ☐ CHANGE OF USE Application fee $200.00 + (not to exceed $5,000)
  - Existing floor spaces $.10 per sq. ft. x # _____ sq. ft. = $_____
- ☐ CONDITIONAL USE PERMIT Application fee $200.00 x # _____ per Application = $_____
- ☐ GRAVEL PIT/ EXCAVATIONS
  - Application fee $50.00= $_____
  - Permit fee $75.00= $_____
- ☐ EXTENSIONS/AMENDMENTS/WAIVERS FOR AN APPROVED PLAN Application fee $200.00 = $_____
- ☐ REQUEST FOR REZONING Application fee $200.00 = $_____
- ☐ DRIVEWAY WAIVER Application fee $200.00 = $_____
- ☐ **TOTAL IMPERVIOUS PAVED AREA** (for new development, roadways or additions to existing parking lots, (not to exceed $10,000)) Application fee of $200.00 is N/A if it is part of a Site Review or Subdivision Plan. $200.00 + $.07 per sq. ft. x # _____ sq. ft. = $_____

SUBTOTAL PLAN REVIEW FEE = $_____

AND

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will review the list for accuracy and provide to us the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
  - Certified letters fee # _____ of x $10.00= $_____
- ☐ Certified letters fee: # of abutters _____ X $10.00= $_____
- ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters _____ X $1.00= $_____
- ☐ Creating/Printing Abutter Labels in triplicate per sheet _____ x $10.00= $_____

C. Foster's newspaper public notice fee $120.00 x # _____ applications = $_____

SUBTOTAL = $_____

TOTAL INVOICE AMOUNT = $_____

PLAN REVIEW FEE COLLECTED/PAID = $ _____

BALANCE DUE = $ _____

The amount due must be paid 28 hours prior to the Planning Board Meeting, to be heard.

City of Dover, New Hampshire
SITE PLAN REVIEW SUBMISSION CHECKLIST

[Revision Date: June 4, 2019]

This site plan review checklist, as required by Chapter 153-6-B(2), should be completed by the applicant. It is intended to assist the applicant in the planning process of preparing a Site Plan Review application for Planning Board action. The size of the project will determine the types of information required for review, therefore, a **pre-application conference** with the Planning Department to determine the list of items that must be completed is strongly encouraged.

The first step would be to appear before the Technical Review Committee, to apply, eight (8) folded copies of the site plan with scale of not less than 1"=50' or 1" =100' for larger site plans, need to be provided, along with payment of plan review fees.

Two weeks prior to Planning Board, three (3) full size and twelve (12) half size (11x17), folded, copies of the plan set and materials, including response to TRC comments, will be due. Abutter/Notice Fees will be invoiced and need to be paid 28 hours prior to the Planning Board meeting.

The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan Review Regulations for full details.

APPLICANT: The Stabile Companies File Number: _____

PROJECT TITLE: Richardson Estates

PROPERTY LOCATION: 141 Sixth Street Tax Map: 35 Lot: 64

	Where/How Provided	Reviewed
1. Completed and signed Application form	X	
2. Plan Review Fees are provided	X	
3. Electronic copy of the engineered/surveyed plan layout	X	
4. Electronic copy of supplementary materials and application	X	
5. Traffic Impact Assessment and Analysis (Standard or Advanced)	X	
6. Waiver requests to the Site Plan Review Regulations, with written justification	X	
7. Conditional Use Permit applications	X	
8. A colored rendering of the streetscape that will be created along the existing public right-of-way	X	
9. A colored architectural plan showing all sides of buildings	X	
10. Folded copies of site plan w/scale of not less than 1"=50' or 1"=100' for larger site plans, for TRC. Plans shall contain the following items as appropriate:	X	
Location map at appropriate scale	X	
Proposed Project name and title and Planning File #	X	
Date, north arrow and scale	X	
Names of all abutting property owners	X	
Name and address of owners and/or applicants	X	
Signature & stamp of NH licensed land surveyor and/or engineer	X	
Zoning District boundaries, including any special or overlay districts	X	
Location of Conservation District areas	X	
Location, names and widths of existing and proposed streets, including pavement widths, grades, curbs and crosswalks	X	
Location and widths of existing & proposed easements & right of ways	X	
Location and width of existing and proposed access/egress ways	X	

	Explain How Provided	Reviewed
Depict pedestrian walkways and accessible access	X	
Existing and proposed property lines with dimensions and bearings tied into Dover's Geographic Information System coordinate system	X	
Existing and proposed topographic information at two foot intervals	X	
Existing and proposed buildings and structure locations	X	
Minimum building setbacks or build to lines on all lots	X	
Location and size of existing and proposed electric, telephone, gas cable and other underground utilities	X	
Existing and proposed water lines and fire hydrants, including materials and capacity needed	X	
Location and materials of sanitary sewage facilities within project site and projected additional peak hour sewer load	X	
Existing and proposed stormwater lines and facilities	X	
Lighting plan depicting all existing and proposed exterior light fixtures and a lighting level analysis for parking lots	X	
Location of Flood Hazard Zone	N/A	
Location of all bodies of water and watercourses	N/A	
Location of wetlands and buffers	N/A	
Neighborhood plan with aerial underlay showing how project relates to abutting uses within the plan set	X	
Existing natural features and/or significant vegetation on property	X	
Depict existing contours up to 100 ft. beyond project limits	X	
Landscape plan depicting existing and proposed landscaping, prepared by a licensed Professional Landscape Architect	X	
Location of parking layout delineating spaces and arrangement; note addressing maximum required spaces	X	
Location, material and size of existing and proposed pavement area	X	
Location of proposed fire lanes	X	
Specify finished floor elevations of buildings	X	
Location of solid waste disposal facilities (dumpster, pad and screening, etc.), including required screening	X	
Depict all service, storage, loading bays and utility areas	N/A	
All applicable Dover Common Site Plan notes	X	
11. Additional Information if appropriate		
Stormwater Management Plan depicting the existing & proposed storm drainage system and engineered drainage analysis	X	
Stormwater Management System Operation and Maintenance Plan	X	
Letter to Serve from Public and Private Utilities	Will Provide	
Erosion and Sedimentation Control Plan	X	
Landscape Operation and Maintenance Plan	X	
Proposed restrictive covenants or homeowners association documents	X	
Dates and permit numbers of all required state and federal permits	Will Provide	
If wetland buffer, indicate placards locations, as applicable	N/A	
Depict test boring locations, groundwater elevations and soil profiles and/or soils types call-outs	X	
Location of proposed drive-in facilities	N/A	
Provide additional exhibits/technical data determined appropriate by the Planning Board or its staff as required	Will provide as needed	

REVIEWED BY: _____ DATE_____ TRC DATE_____

CITY OF DOVER, NEW HAMPSHIRE
PLANNING APPLICATION OWNER AUTHORIZATION

OWNER AUTHORIZATION

I/We hereby submit this application to the City of Dover / City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Property Owner Name: Richardson Estates of Dover, LLC

Signature(s) of Property Owner(s): _____ Date: 2025-07-03

Signature of Applicant: _____ Date: 2025-07-03
if different from owner

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As applicant or as agent, I attest that I am duly authorized to act in this capacity..

Property Owner Name: Richardson Estates of Dover, LLC

Signature(s) of Property Owner(s): _____ Date: 2025-07-03

Signature of Applicant: _____ Date: 2025-07-03
if different from owner

IF SIGN PERMIT, SIGN PERMIT APPLICATION INFORMATION

If the sign permit applicant is not the property owner, this form must be completed and included as part of application submission.

I have read this application and state that, to the best of my knowledge, the information provided is true and that the proposed sign(s) will comply with all applicable regulations in Section 170-32 of the Zoning Ordinance of the City of Dover and shall conform to the submitted materials and designs. Furthermore, after 90 days, any application still waiting information will be denied.

Address of Sign Location: _____

Sign Permit Application Type:
(check one)

- ☐ Permanent Sign
- ☐ Temporary Sign
- ☐ Community Sign

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4623
www.BerrySurveying.Com
crberry@metrocast.net
June 24, 2025

City of Dover Planning Board
Attention: Donna Benton, Director of Planning and Community Development
288 Central Ave
Dover, NH 03820

Re: Residential Transfer of Development (TDR) Site Plan Application
Richardson Estates
Project Narrative
Richardson Estates of Dover (Owner)
Lisa & Mohamed Hamcha (Owner)
The Stabile Companies (Applicant)
141 Sixth Street, Tax Map 35, Lot 64 – R12 Zone

Dear Mrs. Benton,

On behalf of our client and applicant, The Stabile Companies, the owner Richardson Estates of Dover LLC, & Lisa and Mohamed Hamcha, Berry Surveying & Engineering (BS&E) is submitting a Site Plan Application at 141 Sixth Street, which utilized the TDR program. The formerly requested TDR units were approved by the Planning Board. (TRANS-2025-0003) The property has recently gone through a lot line revision approval with the planning board which was completed and recorded, however the deeds for the transfer have yet to be transferred. (LOTA-2024-0011) Both owners involved in that revision are included as owners of the proposed TDR project.

Background and General Narrative:

The Stabile Companies, is proposing a duplex style development on land commonly known as 141 Sixth Street, Tax Map 35, Lot 64 which is located in the R12 Zone and is located in the Secondary Groundwater Recharge Overlay. The property is located east of Whittier Street and abuts a small street known as Dowaliby Court. Berry Surveying & Engineering has conducted an on-site survey of the parcels which includes a topographic analysis and wetlands analysis. No wetlands were found on site as determined by John P. Hayes III, CWS, CSS. The parcel contains a single-family home built in 1928 located in the front of the site along Sixth Street.

Topographic conditions on site are sloping from the west to east and range from 3-8%. No slopes are over 20% onsite. The site consists of some fine sandy loams, as well as

some tighter heavier loams and clays. There is one observation of exposed rock however a test pit in the same location found it to be a large boulder. Ledge was not observed within the test pits performed onsite. The soils are shown on the Site Specific Soils Map by John P Hayes, III, CSS. Most of the site is open maintained field with trees along the perimeter. It is of note that the property is located within the SGRO, however contains minimal soils which would aid in the recharge of ground water. As noted on the Site Specific Soils Report, the soils onsite are mostly hydrologic group C and have no infiltration capacity.

The Proposal:

The proposal is to construct ten (10) new duplex buildings with a private road. The duplexes are proposed vary in shape and size and provide architecture that is fitting in the zone and complies with the duplex requirements. The intent of the design is to provide a varying housing stock that includes first floor primary bedrooms where applicable. The proposed units are to be sold in a condominium format.

The project design is a site plan with a proposed hammerhead. The design off the end of the road is to ensure snow is stored out of the way of the final two driveways. The design includes a sidewalk to connect the project to Sixth Street as well as Dowaliby Court. In discussion with municipal staff the it was suggested to relocate the sidewalk to the inside curve of the proposed road. The applicant is still considering this whereas the suggestion has both pros and cons associated with it. The sidewalk is proposed to be constructed of porous pavement, and is currently situated over a fill slope.

The applicant held a neighborhood meeting prior to the Planning Board approval of the TDR units. The abutting land owners to the west requested vegetative buffering, which is proposed on the plan. Additional discussions between the applicant and the abutting land owner are on going to determine the final design. The abutting land owners to the east, requested a fence be installed. The current design is to set the fence 5’ from the existing boundary line, with the fence being stockade and painted brown. The fence is set back from the right of way line, and additional lilac bushes are proposed to create buffering from sweeping headlights.

The project is serviced by public water and sewer which is to be taken from Sixth Street. After discussion with municipal staff, it was suggested that a connection to the Dowaliby Court water line would be beneficial. The current design includes extending an 8” CLDI line to the end of Dowaliby with a 2” connection to the existing 2” line in the street. This will increase flow and water quality for the residents of Dowaliby Court.

There are three primary discharge locations for the existing stormwater onsite. Towards Sixth Street, towards the northeasterly corner and to abutting land owners on Dowaliby and Whittier. To reduce flow to Sixth Street the proposal is to discharge flow flow from the developed site to a small rain garden in the south east corner for treatment. This rain garden contains subsurface storage to attenuation prior to discharge to the municipal MS4 system. A gravel wetland is proposed in the north east corner of the project site which is designed to capture flow from the developed site for treatment and attenuation, prior to discharge onto private property. The area draining to the abutters on Dowaliby and Whittier is reduced in size. The roof lines for the two structures butting the analysis point have been captured and are proposed to be infiltration in an infiltration bed, to reduce flow and volume.

To promote ground water recharge on site the design includes infiltration beds for multiple roof lines. These are placed in the limited soils that allow for infiltration. In addition to this measurable benefit, the applicant is taking a Low Impact Development (LID) approach to the hard scape around the home sites. Each one of the walks and proposed patios are proposed to constructed of a porous material, which will increase the amount of water permitted to be infiltrated beyond what is modeled in the provided Drainage Analysis & Erosion and Sediment Control Plan. Additionally, these LID devises permit the disconnection of the impervious areas which contribute to them which reduces the effective impervious area.

The project requires the following approvals:

- Site Plan Approval with waiver requests.
- Conditional Use Permit for over 20% coverage.
- EPA Notice of Intent (NOI)
- NHDES Alteration of Terrain Permit
- NHDES Sewer Discharge Permit

Respectfully Submitted,

BERRY SURVEYING & ENGINEERING

Christopher R. Berry, LLS
Principal, President

BERRY SURVEYING & ENGINEERING
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City of Dover, New Hampshire
CONDITIONAL USE PERMIT APPLICATION

[Revision Date: October 19, 2020]

Office Use Only	Project #:		Date Received:	
	Amount Paid:		Time Received:	

APPLICANT AND OWNER INFORMATION

Name of Applicant: The Stabile Companies Telephone # 603-898-0318

Address of Applicant: 20 Cotton Road, Suite 200, Nashua, NH 03063

E-Mail Address: Ejackson@stabilecompanies.com

Richardson Estates of Dover LLC (Lot 64) Lisa & Mohamed Hamcha (Lot 72)

Name of Property Owner (if different from applicant): Telephone # 603-905-9004 603-609-5243

Address of Property Owner: 688 Calef Highway, Barrington, NH 03825

5 Dowaliby Court, Dover, NH 03820

PROPERTY INFORMATION

Assessor's Map # 35 Lot(s) # 64,72

Address of Property: 141 Sixth Street

Zoning District(s) R-12 Overlay District(s) Secondary Groundwater Recharge

Existing Use of Property: Single family home

CONDITIONAL USE PERMIT INFORMATION

Type of Conditional Use Permit (Check All That Apply):

☐ Conservation District	☐ RCM Use Overlay District	☐ Gateway District
☒ Groundwater Protection	☐ Off-Street Parking and Loading	☐ Alternative Treatment Center
☐ Wetland Protection District	☐ Central Business District	☐ Heritage Residential District

Describe Proposed Use or Activity That Requires Conditional Use Permit and Describe Any Impacts:

Please find attached narrative. Proposing 35.13% impervious where 20% is the max within the Secondary

List Any Associated State or Federal Permits That Have Been or Will Be Applied For and Indicate Their Status: NHDES Sewer Discharge, EPA NOI & SWPPP, NHDES AoT - All not submitted

Name of Professional That Prepared Plans: Kenneth A. Berry, PE, LLS

Address 335 Second Crown Point Road Telephone #: 603-332-2863

Professional License #: PE 14243, LLS 805 E-mail address: K.berry@berrysurveying.com
Crberry@metrocast.net (PM)

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: 6-24-25

Signature of Applicant (if different from owner): _____ Date: 6-24-25

Signature of Agent: _____ Date: 6-24-25

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 6-24-25

CITY OF DOVER CONDITIONAL USE
LIST OF ABUTTERS

Pursuant to RSA 676:4, the State Law of New Hampshire, the City of Dover is required to notify the applicant, abutters (including holders of conservation easements), and any professional whose seal is on the plan, of the public hearing by certified mail, return receipt requested. Staff will provide the abutter information, while the applicant must provide accurate contact information for the owner, applicant and professional agents representing the project.

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

PLANNING BOARD FEE SCHEDULE/INVOICE

(Revised July 24, 2023)

Below are the fees associated with plan review and are subject to a nonrefundable application fee to cover administrative expenses. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover".

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):

- ☐ SUBDIVISION Application fee $200.00 + $150.00 x # _____ new lots created = $_____
- ☐ LOT LINE ADJUSTMENT Application fee $200.00 + $100.00 X # ___ of lots involved = $_____
- ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee $200.00 = $_____
- ☐ SITE REVIEW – RESIDENTIAL Application fee $200.00+ $100.00 x # __ per dwelling unit =$_____
- ☐ SITE REVIEW – NON-RESIDENTIAL Application fee $200.00 + (not to exceed $10,000)
  - New construction $.15 sq. ft. x # _____ sq. ft.= $_____
  - Additions (new floor space) $.10 per sq. ft. x # _____sq. ft.= $_____
- ☐ MOTEL/HOTEL $35.00 x # ___ per lodging unit= $_____
- ☐ CHANGE OF USE Application fee $200.00 + (not to exceed $5,000)
  - Existing floor spaces $.10 per sq. ft. x # _____ sq. ft. = $_____
- ☐ CONDITIONAL USE PERMIT Application fee $200.00 x # _____ per Application = $_____
- ☐ GRAVEL PIT/ EXCAVATIONS
  - Application fee $50.00= $_____
  - Permit fee $75.00= $_____
- ☐ EXTENSIONS/AMENDMENTS/WAIVERS FOR AN APPROVED PLAN Application fee $200.00 = $_____
- ☐ REQUEST FOR REZONING Application fee $200.00 = $_____
- ☐ DRIVEWAY WAIVER Application fee $200.00 = $_____
- ☐ **TOTAL IMPERVIOUS PAVED AREA** (for new development, roadways or additions to existing parking lots, (not to exceed $10,000)) Application fee of $200.00 is N/A if it is part of a Site Review or Subdivision Plan. $200.00 + $.07 per sq. ft. x # _____ sq. ft. = $_____

SUBTOTAL PLAN REVIEW FEE = $_____

AND

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will review the list for accuracy and provide to us the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
  - Certified letters fee # _____ of x $10.00= $_____
- ☐ Certified letters fee: # of abutters _____ X $10.00= $_____
- ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters _____ X $1.00= $_____
- ☐ Creating/Printing Abutter Labels in triplicate per sheet _____ x $10.00= $_____

C. Foster's newspaper public notice fee $120.00 x # _____ applications = $_____

SUBTOTAL = $_____

TOTAL INVOICE AMOUNT = $_____

PLAN REVIEW FEE COLLECTED/PAID = $ _____

BALANCE DUE = $ _____

The amount due must be paid 28 hours prior to the Planning Board Meeting, to be heard.

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City of Dover Planning Board
288 Central Ave
Dover, NH 03820

June 24, 2025

Re: Residential Transfer of Development (TDR) Site Plan
Richardson Estates (Fawn Drive)
Environmental Conditional Use Permit Narrative
Richardson Estates of Dover, LLC (Owner)
Lisa & Mohamed Hamcha (Owner)
The Stabile Companies (Applicant)
141 Sixth Street, Tax Map 35, Lot 64

Mr. Hunt and the Dover Conservation Commission,

Berry Surveying & Engineering (BS&E,) on behalf of The Stabile Companies, respectfully requests the City of Dover Conservation Commission to accept the following Conditional Use Permit:

- More than 20% impervious (35.13%) (57,402 Sq. Ft.) within the Secondary Groundwater Protection Zone (SGPZ) overlay of the Medium Density Residential Zone (R-12). It has been demonstrated during the TDR Application process (TRAN-2025-0003) that a conceptual single family lot subdivision with the R-12 zone on the parcel would yield ten (10) lots. This yield with conventional zoning would produce an impervious coverage of 34.3% (56,000 Sq. Ft. +/-). The applicant is proposing ten (10) 2-family dwelling units for a total of 20 units on site. Of the proposed impervious percentage, 8,183 Sq. Ft. of roof area is disconnected from the surface water runoff treatment devices by routing the roof runoff directly to infiltration trenches, that infiltrate the 50 year storm event.

1. Identification of Conditional Use Permit

Regulations in the zoning ordinance do not allow for more than 20% impervious cover in the secondary groundwater recharge zone. However, Section 170-33 states that a conditional use permit may be granted by the planning board, given the following standards, as shown below, are met.

Below we show the project's compliance with the standards required to grant a Conditional Use Permit, and we provide justification for its approval.

2. Compliance with the following standards

a) The proposed development plan incorporates a stormwater drainage plan, approved by the Planning Board and prepared by a professional engineer certified to practice in the State of New Hampshire

- **A full drainage analysis was conducted as part of the application. The drainage analysis was designed to be not only compliant with the City of Dover regulations but also with Alteration of Terrain (AoT) regulations. A Site-Specific Soils Survey has been completed along with the application.**

b) The plan shall provide for the retention and percolation within the secondary groundwater protection zone of all development-generated stormwater runoff from a ten-year storm. Furthermore, the stormwater drainage plan shall provide for the removal of oil and gasoline from parking lot runoff by use of treatment swales, oil/gas separators or other device, prior to retention and percolation of the runoff.

- **A sediment forebay, conveyance swales, and a proprietary structural measure known as a Rain Guardian Fox Hole are proposed as pretreatment methods on site. These items are designed to remove debris, sediment, and hydrocarbons before the treatment stormwater control measures. The rain garden is proposed with 24" of bio media and porous pavement sidewalks with 18" filter course (as opposed to 18" or 12" typically required) as a consideration of the SGPZ and Alteration of Terrain Requirements. A subsurface gravel wetland is proposed as the primary stormwater treatment device for the development, which provides high values of TP & TN removal for larger scale subcatchment areas.**

3.) Section F Dover Performance Standards

a) Post-development Infiltrations Volumes shall be no greater than predevelopment volumes as determined by use of the Development Review Model as described in Subsection G below.

Infiltration within the stormwater model that is counted towards the required Ground Water Recharge Volume (GRV) (Required by NHDES Alteration of Terrain) occurs in isolated sandy, well-drained locations

around the site in four locations with the required separations from the ESHWT: Three stone infiltration trenches infiltrating exclusively roof and grassed runoff and a raised porous pavement sidewalk along the eastern side Fawn Drive. These locations are not exposed to the type of parking lot or roadway pollutants that would be generated by the locations implied by the standard. Additional incremental low-impact-development infiltration devices in the form of porous pavers and patios are proposed. These are not counted towards the GRV, as the under lying silt loam soil infiltration rate does not meet Env-Wq 1500 (Alteration of Terrain) standards on 0.5inches/hour, but still provide some underlying infiltration value.

Demonstrated in the following screenshot from the NHDES GRV sheet, a total of 1,012 CF would be required to be infiltrated and 3,223 is proposed to be infiltrated at the 2YR-24HR storm event.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

0.45	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
-	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
1.00	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.19	inches	Rd = Weighted groundwater recharge depth	
0.2788	ac-in	GRV = AI * Rd	
1,012	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

P201 2 YR Infiltration Volume: 0.020 AF = 871 CF
P202 2 YR Infiltration Volume: 0.018 AF = 784 CF
P203 2 YR Infiltration Volume: 0.016 AF = 697 CF
P103 2 YR Infiltration Volume: 0.020 AF = 871 CF

Total GRV provided in model = 3,223 CF

To account for the infiltration volume provided that would be provided by the pavers, the following table provided indicated the porous pavers would provide an additional 2,277 CF of infiltrated (0.052 AF). It is of note that areas shown under the GRV calculation, as the porous pavement sidewalks

are considered as part of the GRV calculation, but not part of the impervious surface calculation.

Additional Porous Paver and Patio Infiltration Volumes					
LCA #	Area Pavers (Sq. Ft.)	Stone Depth (Ft.)	Stone Storage Volume (40%) Voids (CF)	1" Runoff Volume Generated (CF)	Volume Infiltrated 2YR-24Hr Event 3.62" (CF)
64-1	798	1	319	67	241
64-2	798	1	319	67	241
64-3	798	1	319	67	241
64-4	788	1	315	66	238
64-5	798	1	319	67	241
64-6	826	1	330	69	249
64-7	716	1	286	60	216
64-8	473	1	189	39	143
64-9	754	1	302	63	227
64-10	798	1	319	67	241
TOTAL	7547			629	2277
Does not assume any adjacent grassed areas running onto the pavers, direct surface area only.					
Paver systems have capacity to infiltrate greater than the 2YR-24HR Storm event in a time span of greater than 24 hours					

The majority of stormwater runoff treated by the proposed gravel wetland or rain garden leaves the site as surface water or discharged into the closed municipal drainage system. It is the opinion of BS&E that the treatment level provided in the stormwater BMPs and incremental infiltration distributed across the site would meet the intent of this performance standard.

b) Stormwater shall be treated by the use of a stormwater treatment system designed to remove no less than 80% of the annual load of total suspended solids. The removal rate shall be accomplished using best management practices installed in advance of the final infiltration system.
Utilizing the UNH Stormwater Center 2023 published performance curve information, the following TSS performance can be expected from the respective stormwater control measures (SCMs):

Subsurface Gravel Wetland:
- *Total Suspended Solids (TSS) reduction of 97%*

Infiltration Trench (2.41in/hr data, 3.0in/hr proposed:
- *Total Suspended Solids (TSS) reduction of 100%*

Porous (Permeable) Pavement (24" Filter):
- *Total Suspended Solids (TSS) reduction of 96%*

Biofiltration:
- *Total Suspended Solids (TSS) reduction of 99%*

c) No stormwater infiltration system shall be located within the 200-day travel time of an existing or proposed municipal well as depicted on the map referenced in

Subsection B above. In absence of a defined 200-day-travel-time radius, the applicant shall submit a technical evaluation from a professional engineer, hydrologist or geologist that documents that the proposed discharge is consistent with the stated purposed and intent of this requirement.

As shown on the 1987 Dover Groundwater Protection Zone Map, the secondary zone was considered as a 180-day radius. It is important to consider the differences in stormwater treatment technology today versus when this zone was created. Stormwater treatment was not required in the 1980's for developed impervious areas. Since this time, with the implementation of stormwater treatment devices and the requirements of Dover Chapter 153-14, untreated stormwater discharges are no longer allowed in a development of this scale.

As discussed in item a, infiltration occurs in incremental, isolated locations that are not exposed to the type of pollutants of concern that would be observed in a parking lot or larger roadway and contribute in a positive manner towards the groundwater recharge volume (GRV). It is the opinion of BS&E that the infiltration opportunities provided are consistent the purpose and intent of this requirement.

BERRY SURVEYING & ENGINEERING

Kevin R. Poulin, PE
Project Engineer

Christopher R. Berry, LLS
Principal, President

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June 24, 2025

City of Dover Planning Board
Attention: Donna Benton, AICP, Director of Planning and Community Development
288 Central Ave
Dover, NH 03820

Re: Residential Transfer of Development (TDR) Site Plan
Richardson Estates (Fawn Drive)
Waiver Request
Richardson Estates of Dover, LLC (Owner)
Lisa & Mohamed Hamcha (Owner)
The Stabile Companies (Applicant)
141 Sixth Street, Tax Map 35, Lot 64

Chairperson & Members of the Dover Planning Board:

In accordance with Subdivision Regulations Article 157-40-B(5), the following waiver is hereby requested:

1. Identification of Waiver Request: An increase of stormwater runoff volume at Final Reach #100 (2YR-HR Storm Event) (Sixth Street) and #300 (10YR-24 HR, 25YR-24HR, 50YR-24 HR Storm Event) (Eastern Property Line) 153-14-(3)(B)(4).

- Post-development stormwater runoff volume greater than pre-development stormwater runoff volume over a 24-hour span, 2 locations, Final Reach #100 & 300.

1. Explanation:

The applicant is proposing a Residential TDR Site Plan supported by a subsurface gravel wetland, rain garden, porous pavement sidewalks, porous pavers/patios, and infiltration trenches. Stormwater control measures (SCMs) discharge primary to two major Final Reaches. Gravel Wetland #101 discharges to Final Reach #300 and Rain Garden #102 discharges to Final Reach #100. Soil conditions vary across the site from excessively drained Windsor Loamy Sandy to somewhat poorly drained Boxford silt loams. Areas of Windsor are located to two high points on the site and the area closest to Sixth Street. Silt loam type soils that do not provide infiltration rates within the "B" and "C" horizons to comply with NHDES Alteration of Terrain Standards occupy the remainder of the site. As the Gravel Wetland and Rain Garden are located at the low points of the site, there is no soil within the vicinity of the gravel wetland discharge to

provide infiltration. The rain garden contains a stormtech chamber storage system below the biomedia to attenuate peak rates of runoff, placing the system within the seasonal highwater table, removing the ability to infiltration adjacent to Sixth Street.

Figure #1, from the provided Drainage Analysis, demonstrates the peak rates of stormwater runoff and stormwater volume, at the previously mentioned Final Reach drainage points of analysis for the existing condition vs the proposed development condition:

3.1 FULL COMPARATIVE ANALYSIS

ANALYSIS COMPONENT: PEAK RATE DISCHARGE (Cubic Feet / Second)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #100	Existing	1.37	2.98	4.35	5.68
	Proposed	1.21	2.30	3.18	4.42
Final Reach #200	Existing	0.06	0.38	0.75	1.14
	Proposed	0.04	0.12	0.19	0.26
Final Reach #300	Existing	1.33	3.19	4.83	6.44
	Proposed	0.24	2.06	3.63	5.81
Final Reach #400	Existing	0.09	0.21	0.32	0.42
	Proposed	0.06	0.12	0.18	0.23
Final Reach #500	Existing	0.96	2.19	3.26	4.30
	Proposed	0.83	1.78	2.58	3.35
Final Reach #600	Existing	0.04	0.08	0.11	0.15
	Proposed	0.04	0.08	0.11	0.15

ANALYSIS COMPONENT: VOLUME (Acre Feet) (24 HOURS)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #100*	Existing	0.121	0.254	0.369	0.482
	Proposed	0.136	0.252	0.368	0.480
Final Reach #200	Existing	0.013	0.044	0.076	0.110
	Proposed	0.004	0.009	0.014	0.019
Final Reach #300*	Existing	0.175	0.391	0.586	0.779
	Proposed	0.161	0.477	0.746	1.006
Final Reach #400	Existing	0.010	0.022	0.032	0.043
	Proposed	0.004	0.009	0.013	0.017
Final Reach #500	Existing	0.128	0.277	0.409	0.538
	Proposed	0.112	0.239	0.349	0.456
Final Reach #600	Existing	0.003	0.006	0.008	0.011
	Proposed	0.003	0.006	0.008	0.011

Figure 1: Drainage Comparative Analysis Table

As demonstrated in the comparative analysis for the existing drainage condition vs the proposed condition: Final Reach #100 (Discharging to Sixth Street), shows a reduction in the peak rate of runoff across the 2YR-24HR through 50YR-24HR storm events. This an 11.7% decrease in the peak rate of runoff for the 2YR-24HR storm event, 22.8% decrease in the peak rate of stormwater runoff for the 10YR-24HR storm event, 26.9% decrease in the peak rate of runoff for the 25YR-24HR storm event, and a 22.1% decrease in the peak rate of runoff for the 50YR-24HR storm event.

As demonstrated in the comparative analysis for the existing drainage condition vs the proposed condition: Final Reach #300 (Discharging to eastern property line), shows a reduction in the peak rate of runoff across the 2YR-24HR through 50YR-24HR storm events. This is an 81.9% decrease in the peak rate of runoff for the 2YR-24HR storm event, 35.4% decrease in the peak rate of stormwater runoff for the 10YR-24HR storm event, 24.8% decrease in the peak rate of runoff for the 25YR-24HR storm event, and a 9.7% decrease in the peak rate of runoff for the 50YR-24HR storm event.

This reduction in peak rate of stormwater runoff is relevant in relation to the stormwater volumetric increase that is shown at Final Reach #100 & #300. The reduction in the peak rates of runoff affects the capacity of the downstream receiving area. The increase in total runoff volume is received by the downstream area in a more controlled and delayed manner than the existing condition (as shown by the reduction in peak rates of runoff and peak rate of runoff timing shown in Section 2A). For Final Reach #100, this increase in volume over the 24-hour period is only at the 2YR-24HR storm event, with volume reductions shown at the higher events, where the capacity of the downstream drainage system may be in question. For Final Reach #300, an attenuation of 52% or greater for the higher storm events, providing an opportunity for the volume to be received in a more controlled manner. Figure #2, from the W2-Proposed Conditions Drainage Plan, highlights the developed contributing area to the respective Final Reaches.

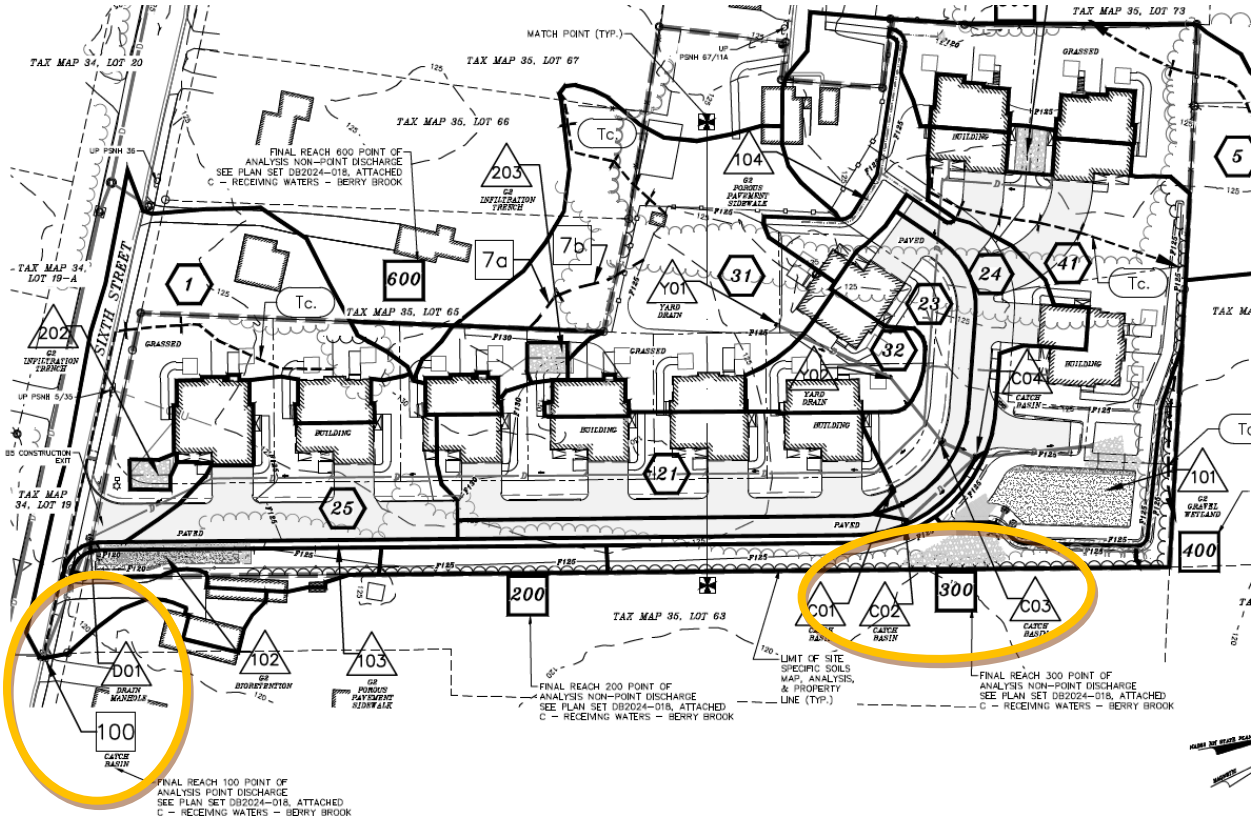

Figure 2: W2 Proposed Watershed Plan

2. Waiver Justification:

a. Granting the waiver will properly carry out the purpose and intent of the regulations.

The purpose and intent of the regulation is to protect downstream properties from upstream development. The stormwater BMP proposed results with significant reductions in the peak rate of runoff across all modeled storm events, resulting in the stormwater runoff volume reaching downstream areas at a reduced rate and different timing than the existing condition. This reduced rate of stormwater runoff would allow downstream stormwater features to discharge other off-site received flow and reduce the opportunity for downstream capacity issues (extended detention). The discharge from the developed area to Final Reach #100, from Rain Garden #102, is controlled by an orifice, which results in a slow controlled "metering" of stormwater discharge of the BMP from the developed site. Figure #3, from the Proposed Development HydroCAD model, demonstrates the slow "metering" of stormwater from the developed area to Rain Garden #102, with the timing of the discharge of the peak rate of runoff over 3.5 hours later than the peak inflow rate for the 2Yr-24HR storm event.

Inflow Area = 0.409 ac, 46.73% Impervious, Inflow Depth > 1.89" for 2Yr-24Hr event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.03 cfs @ 15.76 hrs, Volume= 0.035 af, Atten= 96%, Lag= 220.1 min
Primary = 0.03 cfs @ 15.76 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 115.73' @ 15.76 hrs Surf.Area= 1,996 sf Storage= 1,749 cf
Flood Elev= 121.00' Surf.Area= 4,643 sf Storage= 4,437 cf

Plug-Flow detention time= 341.3 min calculated for 0.035 af (54% of inflow)
Center-of-Mass det. time= 228.2 min (1,047.6 - 819.4)

Figure 3: Rain Garden #102 2YR-24HR Event

Figure #4, from the Proposed Development HydroCAD model, demonstrates the "metering" of stormwater from the developed area, with the timing of the discharge of the peak rate of runoff nearly 17 minutes later than the peak inflow rate for the 50Yr-24HR storm event.

Inflow Area = 2.429 ac, 36.17% Impervious, Inflow Depth > 5.81" for 50Yr-24Hr event
Inflow = 11.47 cfs @ 12.11 hrs, Volume= 1.176 af
Outflow = 5.55 cfs @ 12.39 hrs, Volume= 0.953 af, Atten= 52%, Lag= 16.9 min
Primary = 0.12 cfs @ 12.39 hrs, Volume= 0.127 af
Secondary = 5.43 cfs @ 12.39 hrs, Volume= 0.826 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 124.61' @ 12.39 hrs Surf.Area= 12,549 sf Storage= 18,886 cf
Flood Elev= 125.50' Surf.Area= 14,206 sf Storage= 26,155 cf

Plug-Flow detention time= 139.2 min calculated for 0.953 af (81% of inflow)
Center-of-Mass det. time= 65.8 min (869.0 - 803.1)

Figure 4: Gravel Wetland #101 50YR-24HR Event

It is the opinion of Berry Surveying & Engineering that the increases in stormwater runoff volume to Final Reach #100 & #300 are mitigated by the decrease in the peak rate of stormwater runoff and the slowed and controlled manner of discharge from the Gravel Wetland or Rain Garden of the developed area, properly carry out the purpose and intent of the regulations.

b. Strict conformity to the regulations would pose an unnecessary hardship to the applicant.

Requiring strict conformity of the regulations would pose an unnecessary hardship to the applicant. The silt loam soil conditions in low points of the site following stormwater discharge, present a difficulty for compliance with this regulation. Infiltration is conducted in isolated high points of the site, where only roof runoff is able

to be infiltrated due to vertical constraints. It is also of note that the peak rates of runoff and volume provided in the comparative analysis are compliant with Alteration of Terrain Standards, including Channel Protection Volume (CPV). The 2Yr.-24Hr. peak rate of runoff is less than 2CFS from the developed area, allowed by Env-Wq 1507.05(b)(1)(b) for Channel Protection Volume purposes.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

Kevin R. Poulin, PE
Project Engineer

Christopher R. Berry
Principal, President

BERRY SURVEYING & ENGINEERING
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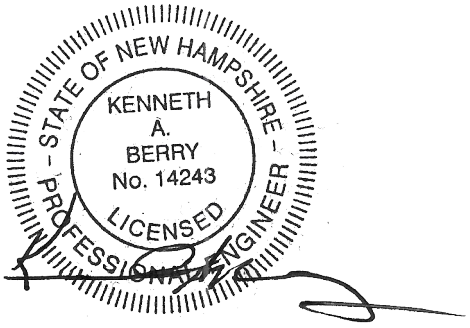
June 24, 2025

City of Dover Planning Department
Attn: Director of Department of Planning &
Community Development: Mrs. Donna Benton
288 Central Ave.
Dover, NH 03820



RE: Traffic Impact Analysis (TIA)
Fawn Drive Residential Site Plan
The Stabile Companies
Tax Map 35, Lot 64
141 Sixth Street
Dover, NH 03820

Mrs. Benton,

Pursuant to the City of Dover Site Review Regulations, Berry Surveying & Engineering (BS&E), on behalf of The Stabile Companies, has prepared a Standard Traffic Impact Analysis (TIA) for the construction of ten (10) 2-family dwelling structures (20 units) and the removal of the existing single-family dwelling on site, on a private roadway known as Fawn Drive. The point of analysis is the proposed intersection of Fawn Drive and Sixth Street.

The following conclusions/observations have been reached from the TIA:

- 144 total vehicle trips are predicted to occur on a weekday, 10 vehicle trips (2 enter/8 exit) are predicted to occur at the weekday AM peak hour and 11 vehicle trips (7 enter/4 exit) at the PM peak hour for Fawn Drive.

- It is the opinion of BS&E that the surrounding roadway infrastructure is sufficient to support the prosed development during the weekday peak hours and all other hours.

- There are public transit opportunities adjacent to the site that has the potential for a reduction in trips from what is demonstrated.

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Proposed Development & Introduction

The proposal is to redevelop Tax Map 35, Lots 64 to contain ten (10) 2-family dwelling structures (20 units). The access to the site is a 24-foot-wide roadway, known as Fawn Drive, with 24-foot pavement entrance radii for vehicle turning. Fawn Drive is 778 LF in length, with a hammerhead provided for emergency and passenger vehicle turn around. The centerline of Fawn Drive will be +/- 530LF to the east of the signalized intersection of Whittier Street and Sixth Street with sight distance provided in excess of AASHTO standards.

The purpose of this analysis is to determine the maximum number of trips coming to and leaving the proposed project site during certain peak periods of the day. This information is then used in determining the impact on safety as it relates to the existing roadway infrastructure. The following components of the analysis are typical for a project of this size pursuant to the Institute of Traffic Engineers (ITE) manual.

Existing Conditions

Existing Site Description

The subject parcel is known as Tax Map 35, Lots 64 and 72 containing 177,628 Sq. Ft. (4.08 Ac.) of land. Tax Map 35, Lot 64 currently contains a single-family dwelling unit with driveway cut at the southwestern edge of the frontage. The frontage of the property is grassed with woods dividing the two lots of the parcel. The subject parcel is located in the TDR and the R-12 District and contains lot frontage on Sixth Street. There are several residential driveways, local roads, and arterial roadways surrounding the subject parcel, which are discussed later in the analysis.

Sixth Street Roadway Description

Sixth Street is a two-lane major collector road according to the NHDOT Traffic Count (TCDS) System (NHDOT). This portion of Sixth Street is not under NHDOT jurisdiction. Sixth Street runs east to west perpendicular with N.H. Route 16 and Central Avenue and provides access to Rochester and NH Route 16 to the northeast and Central Ave/downtown Dover to the southwest). It has an Average Annual Daily Traffic (AADT) of approximately 4,390 (2024) divided between east and west in the parcel in the data publicly available from the NHDOT.

Sixth Street in the area of the project is composed of a twenty-nine-foot-wide paved surface (edge of pavement to edge of pavement) with an eleven-foot eastbound lane and an eleven-foot westbound lane. There is a variable width gravel shoulder on the South sides of the road, with shoulder granite curbing with a sidewalk on the

northern side. There is centerline delineation and fog / edge lines provided. The posted speed limit of the roadway is 30 miles per hour (MPH). The geometry of Sixth Street in the vicinity of the subject parcel is generally straight, gently sloped to the north and begins to slope at 4-6% south of the parcel. There are public transit opportunities within a ¼ mile of Fawn Drive that will be discussed later in the analysis.

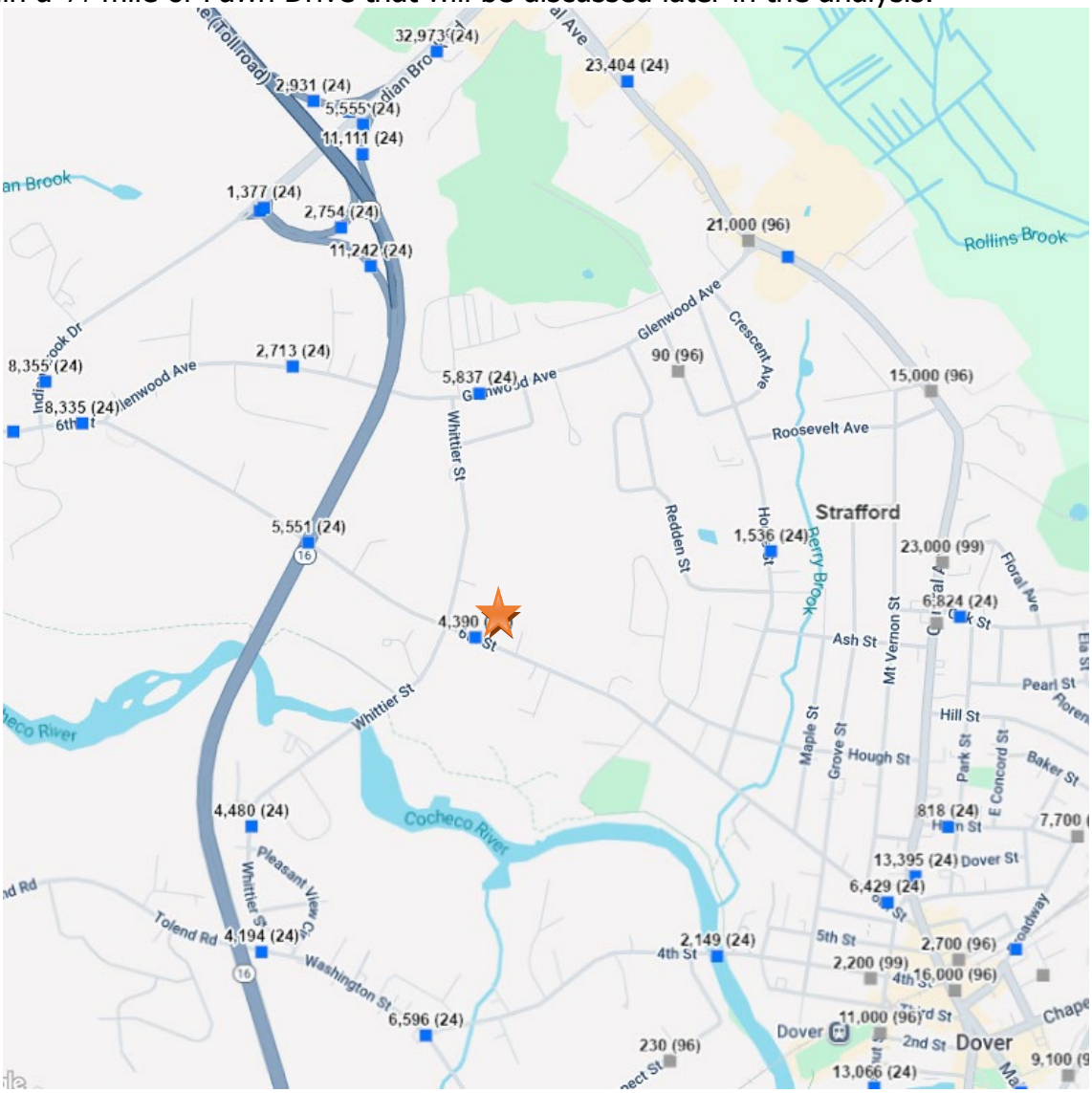


Figure 1: Sixth Street with surrounding roadways (NHDOT)

Existing Traffic Volumes

According to traffic counts recorded by NHDOT for July 25 - July 27, 2023, in the vicinity of 141 Sixth Street, AM and PM weekday two-way peaks were 402 trips and 526 trips, respectively. It is shown by NHDOT that this portion of Sixth Street has an AADT 4,390 (2024) divided between east and west in the data provided by NHDOT.

The highest weekday peak hour traffic volume on this section of Sixth Street eastbound occurred from 8:00-9:00 AM with 220 vehicles and from 4:30-5:30 PM with 267 vehicles. Westbound highest weekday peak hour traffic volume occurred from 7:15-8:15 AM with 216 vehicles and from 4:30-5:30 PM with 250 vehicles. Table #1 shows the traffic direction breakdown of Sixth Street and Tables #2-3 provide 15-minute interval data. Figures #2-4 are graphical representations of the traffic variations occurring throughout the day. It can be seen from the directional percent distribution that the primary direction of travel during the Weekday AM peak hour is equivalent in both directions meaning it is nearly a 50/50 directional split. The primary direction of travel during the PM peak hour is similar also generating a nearly 50/50 directional split. As this road is designated as a major collector roadway by the NHDOT, this type of directional distribution is similar to other major collector roadways. Traffic counts of Sixth Street provided by NHDOT are included in Appendix A.

Traffic Distribution Sixth Street						
Date	Eastbound		Westbound		Two-Way	
Tuesday 7/25/23	AM Peak	182	AM Peak	216	AM Peak	394
	PM Peak	244	PM Peak	250	PM Peak	494
Wednesday 7/26/23	AM Peak	220	AM Peak	216	AM Peak	402
	PM Peak	267	PM Peak	240	PM Peak	526
Thursday 7/27/23	AM Peak	194	AM Peak	210	AM Peak	364
	PM Peak	251	PM Peak	231	PM Peak	462
Average Peak Hour Traffic	AM Peak	199	AM Peak	214	AM Peak	387
	PM Peak	254	PM Peak	240	PM Peak	494
% Distribution	AM Peak	48.1	AM Peak	51.9		
	PM Peak	51.4	PM Peak	48.6		

Table 1: Directional breakdown of trips occurring on Sixth Street

Eastbound Vehicle Count Tuesday 7/25/23		Westbound Vehicle Count Tuesday 7/25/23		Two-Way Vehicle Count Tuesday 7/25/23	
7:00:00 AM	30	7:00:00 AM	23	7:00:00 AM	53
7:15:00 AM	44	7:15:00 AM	46	7:15:00 AM	90
7:30:00 AM	45	7:30:00 AM	61	7:30:00 AM	106
7:45:00 AM	49	7:45:00 AM	53	7:45:00 AM	102
8:00:00 AM	40	8:00:00 AM	56	8:00:00 AM	96
8:15:00 AM	48	8:15:00 AM	39	8:15:00 AM	87
8:30:00 AM	38	8:30:00 AM	46	8:30:00 AM	84
8:45:00 AM	50	8:45:00 AM	34	8:45:00 AM	84
4:00:00 PM	62	4:00:00 PM	64	4:00:00 PM	126
4:15:00 PM	50	4:15:00 PM	52	4:15:00 PM	102
4:30:00 PM	49	4:30:00 PM	72	4:30:00 PM	121
4:45:00 PM	57	4:45:00 PM	49	4:45:00 PM	106
5:00:00 PM	72	5:00:00 PM	57	5:00:00 PM	129
5:15:00 PM	66	5:15:00 PM	72	5:15:00 PM	138
5:30:00 PM	47	5:30:00 PM	52	5:30:00 PM	99
5:45:00 PM	54	5:45:00 PM	41	5:45:00 PM	95
AM Peak Veh	182	AM Peak Veh	216	AM Peak Veh	394
PM Peak Veh	244	PM Peak Veh	250	PM Peak Veh	494

Table 2: AM & PM Weekday Peak Hour 15-minute intervals

Eastbound Vehicle Count Wednesday 7/26/23		Westbound Vehicle Count Wednesday 7/26/23		Two-Way Vehicle Count Wednesday 7/26/23	
7:00:00 AM	34	7:00:00 AM	28	7:00:00 AM	62
7:15:00 AM	42	7:15:00 AM	36	7:15:00 AM	78
7:30:00 AM	38	7:30:00 AM	58	7:30:00 AM	96
7:45:00 AM	43	7:45:00 AM	60	7:45:00 AM	103
8:00:00 AM	49	8:00:00 AM	52	8:00:00 AM	101
8:15:00 AM	54	8:15:00 AM	46	8:15:00 AM	100
8:30:00 AM	63	8:30:00 AM	35	8:30:00 AM	98
8:45:00 AM	54	8:45:00 AM	42	8:45:00 AM	96
4:00:00 PM	62	4:00:00 PM	60	4:00:00 PM	122
4:15:00 PM	61	4:15:00 PM	66	4:15:00 PM	127
4:30:00 PM	66	4:30:00 PM	66	4:30:00 PM	132
4:45:00 PM	57	4:45:00 PM	48	4:45:00 PM	105
5:00:00 PM	67	5:00:00 PM	83	5:00:00 PM	150
5:15:00 PM	77	5:15:00 PM	62	5:15:00 PM	139
5:30:00 PM	52	5:30:00 PM	53	5:30:00 PM	105
5:45:00 PM	47	5:45:00 PM	34	5:45:00 PM	81
AM Peak Veh	220	AM Peak Veh	216	AM Peak Veh	402
PM Peak Veh	267	PM Peak Veh	240	PM Peak Veh	526

Table 3: AM & PM Weekday Peak Hour 15-minute intervals

Eastbound Vehicle Count Thursday 7/27/23		Westbound Vehicle Count Thursday 7/27/23		Two-Way Vehicle Count Thursday 7/27/23	
7:00:00 AM	40	7:00:00 AM	20	7:00:00 AM	60
7:15:00 AM	34	7:15:00 AM	43	7:15:00 AM	77
7:30:00 AM	31	7:30:00 AM	57	7:30:00 AM	88
7:45:00 AM	52	7:45:00 AM	51	7:45:00 AM	103
8:00:00 AM	43	8:00:00 AM	53	8:00:00 AM	96
8:15:00 AM	52	8:15:00 AM	49	8:15:00 AM	101
8:30:00 AM	46	8:30:00 AM	49	8:30:00 AM	95
8:45:00 AM	53	8:45:00 AM	22	8:45:00 AM	75
4:00:00 PM	52	4:00:00 PM	50	4:00:00 PM	102
4:15:00 PM	43	4:15:00 PM	67	4:15:00 PM	110
4:30:00 PM	53	4:30:00 PM	49	4:30:00 PM	102
4:45:00 PM	55	4:45:00 PM	48	4:45:00 PM	103
5:00:00 PM	80	5:00:00 PM	67	5:00:00 PM	147
5:15:00 PM	63	5:15:00 PM	37	5:15:00 PM	100
5:30:00 PM	35	5:30:00 PM	42	5:30:00 PM	77
5:45:00 PM	52	5:45:00 PM	33	5:45:00 PM	85
AM Peak Veh	194	AM Peak Veh	210	AM Peak Veh	364
PM Peak Veh	251	PM Peak Veh	231	PM Peak Veh	462

Table 4: AM & PM Weekday Peak Hour 15-minute intervals

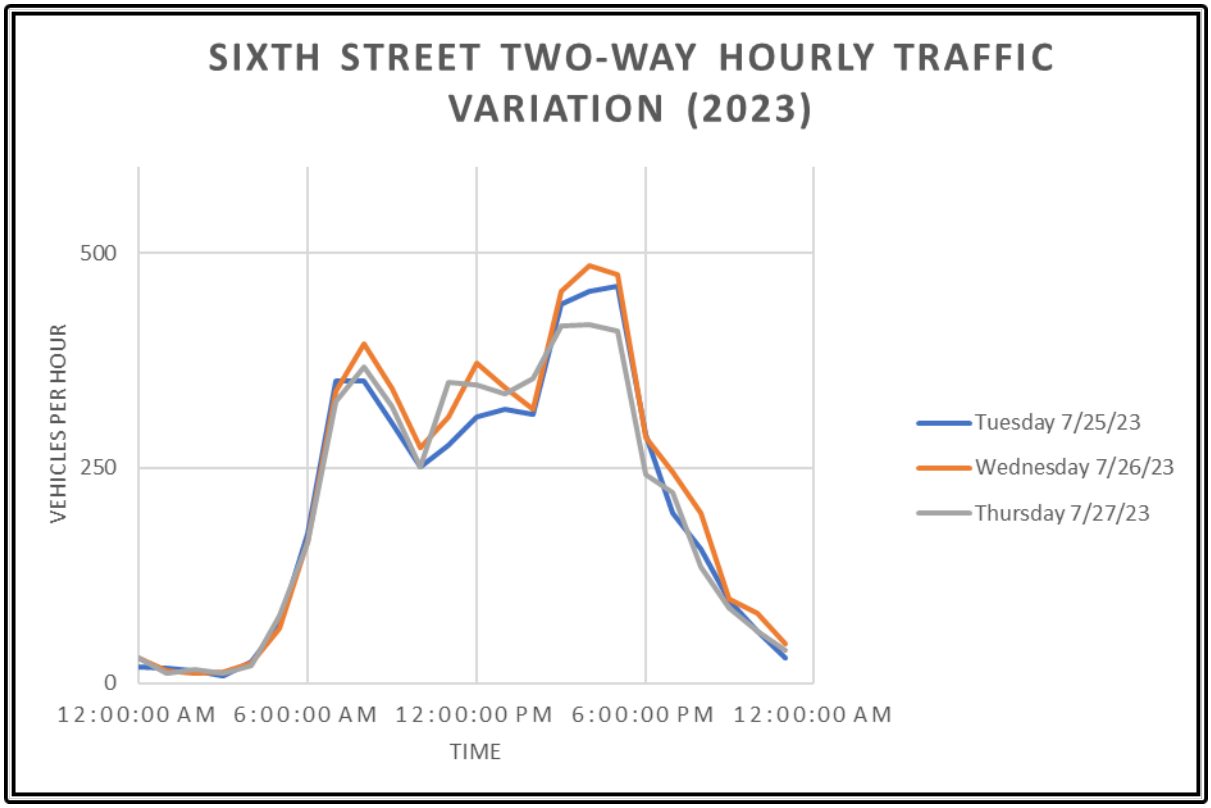


Figure 2: Sixth Street 2024 two-way hourly variation

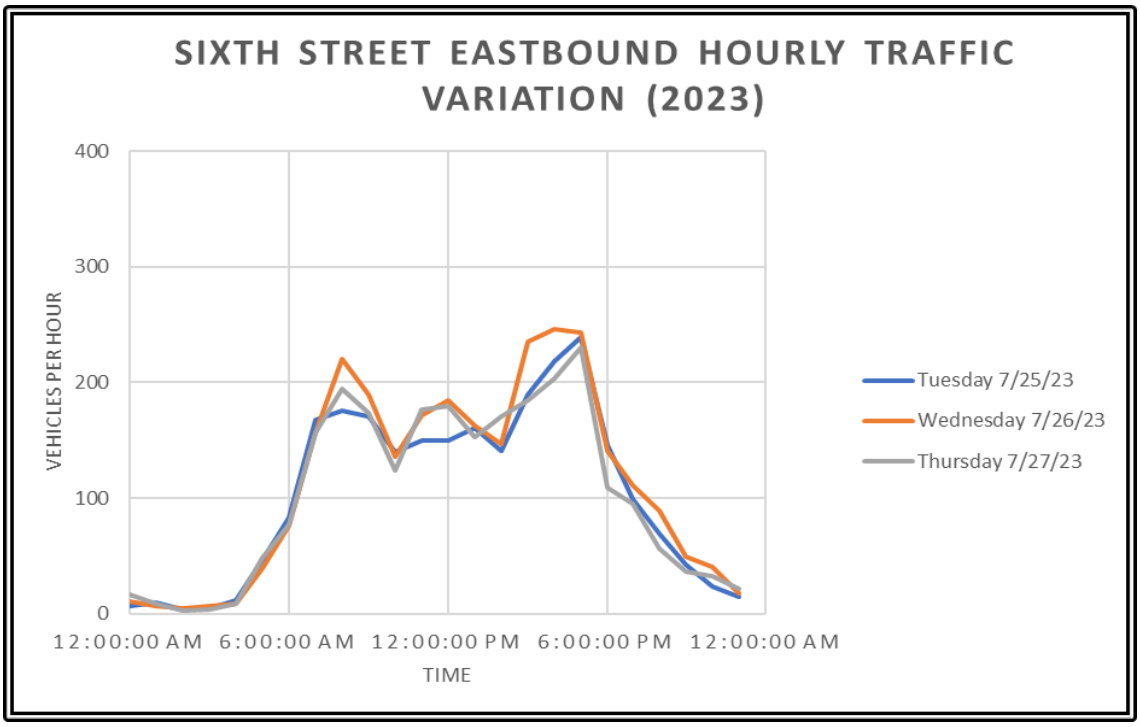


Figure 3: Sixth Street 2024 eastbound hourly variation

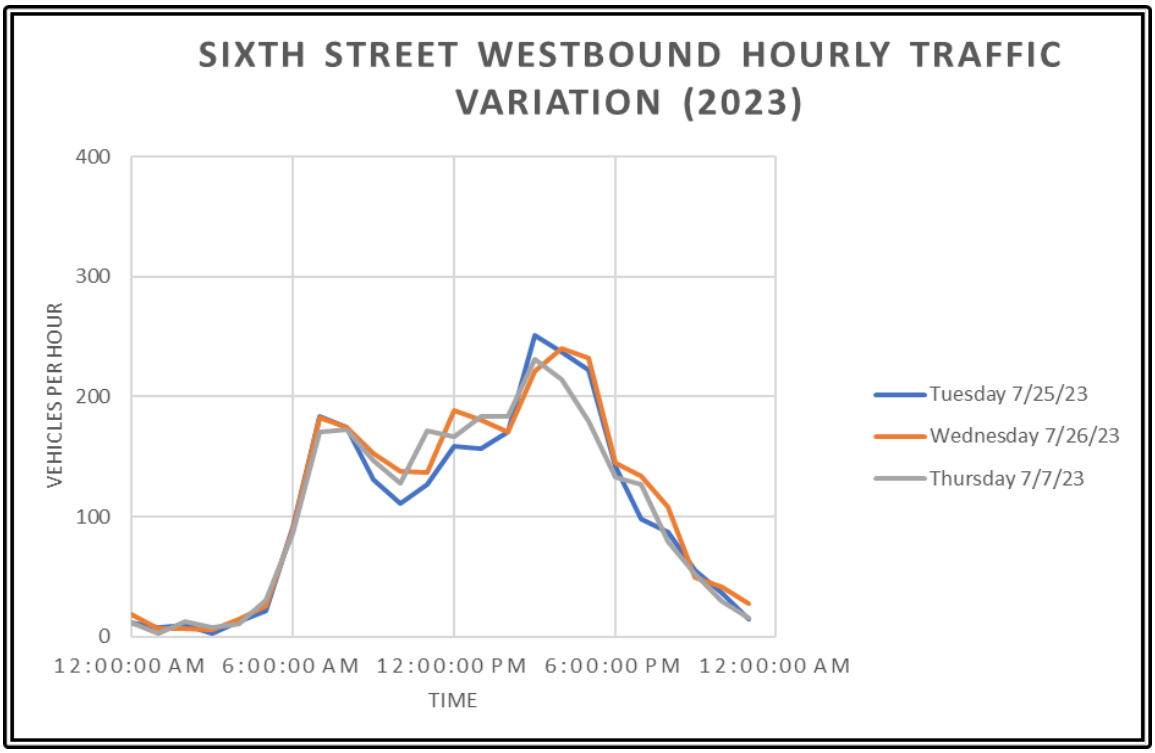


Figure 4: Sixth Street 2024 westbound hourly variation with peak values

Existing Vehicle Speeds

As previously mentioned, the posted speed limit of Sixth Street is 30 MPH. For the purposes of the safety analysis below, the 85th percentile of speed is required. This particular section of Sixth Street was observed by Berry Surveying & Engineering to analyze the pass by traffic, reviewing speed. Excessive speeds did occur, with most operators obeyed the posted speed limits within a deviation of 10 MPH. This is consistent with speeds found on urban roads. This is also impacted by the proximity to the signalized intersection of Sixth Street and Whitter Street. The 85th percentile derived by observation and consistency with general practice is 40 MPH.

Surrounding Roadways & Signalized Intersections

There are several local roadways within a half mile of proposed Sixth Street. To the east, local, residential serving, roads include: Autumn Street, Carmens Drive and Hillside Drive. To the west, local roads include Whittier Street and Amy Lane. Whittier Street is considered a signal-controlled intersection, with a single lane approached for both roadways. Whittier Street is a major collector roadway according to the NHDOT, with a 2024 AADT of 4,480. The other mentioned roadways are stop controlled at the minor residential legs.

Proximity to Public Transportation/Pedestrian Access

The proposed build out presents an excellent opportunity for the utilization of public transportation for residents and guests alike. Approximately 200 feet to the north west is a Coast bus stop, Sixth/Whitter Street. There is an existing sidewalk on the northern side of Sixth Street which provides access north to Whittier Street and south towards Central Ave. This connectivity to sidewalks and bus stop proximity has a potential for a reduction in vehicle trip generation.

Existing Trip Generation

The 11th Edition ITE Trip Generation Manual was used to determine the existing volume of trips from the subject parcel. Included is the percentage of entrance-to-exit traffic experienced during the weekday AM & PM peak hours between 7 and 9 AM and 4 and 6 PM, and total weekday volume. Land Use Code Single Family detached Housing (210) was used in deriving the existing trip generation from the project site. Table 5 provides average trip rate, total trips generated, enter to exit ratio, and the enter to exit distribution.

Single-Family Detached Housing Existing:

Time Method	Weekday Total Dwelling Units			Time Method	AM Peak Adj. Street Traffic Dwelling Units			Time Method	PM Peak Adj. Street Traffic Dwelling Units		
# Units	1			# Units	1			# Units	1		
Avg. Rate	9.43			Avg. Rate	0.70			Avg. Rate	0.94		
Total Trips	9			Total Trips	1			Total Trips	1		
% Enter	50	Total Enter	5	% Enter	25	Total Enter	0	% Enter	63	Total Enter	1
% Exit	50	Total Exit	4	% Exit	75	Total Exit	1	% Exit	37	Total Exit	0

Table 5: Peak hr of adjacent street traffic AM, PM, & weekday total

Proposed Trip Generation

The 11th Edition ITE Trip Generation Manual was used to determine the proposed volume of trips. Included is the percentage of entrance-to-exit traffic experienced during the weekday AM & PM peak hours between 7 and 9 AM and 4 and 6 PM, and total weekday volume. Land Use Code Single Family Attached Housing (215) was used in deriving the proposed trip generation from the project site. Table #6 provides average trip rate, total trips generated, enter to exit ratio, and the enter to exit distribution for the proposed trips at Fawn Drive. Table #7 provides the increase in trips from the existing condition.

Single-Family Attached Housing Fawn Drive:

Time Method	Weekday Total Dwelling Units			Time Method	AM Peak Adj. Street Traffic Dwelling Units			Time Method	PM Peak Adj. Street Traffic Dwelling Units		
# Units	20			# Units	20			# Units	20		
Avg. Rate	7.2			Avg. Rate	0.48			Avg. Rate	0.57		
Total Trips	144			Total Trips	10			Total Trips	11		
% Enter	50	Total Enter	72	% Enter	25	Total Enter	2	% Enter	59	Total Enter	7
% Exit	50	Total Exit	72	% Exit	75	Total Exit	8	% Exit	41	Total Exit	4

Table 6: Peak hr of adjacent street traffic AM, PM, & weekday total

Increase from Existing Trip Generation

Changes in Trip Generation	
Time	Change in Trips Generated
Weekday Total	135
Weekday AM Peak Hour	9
Weekday PM Peak Hour	10

Table 7: Increase from existing trip generation

Build Traffic Projections and Turning Analysis

Traffic data obtained from NHDOT in 2023 has been projected to 2026 and ten years further to 2036. This has been done using a July peak seasonal adjustment factor of 1.01 (Urban Highways Group 4, AM & PM) and using an annual growth rate of 1%, compounded annually. The derivation of the peak seasonal adjustment factor comes from an average series of values from other urban highways from across New Hampshire, which can be found as Table #9 in Appendix B. Figures #5 and #6 show the build turning movements to and from Fawn during weekday AM and PM peak hours. These figures also show the projected volume of traffic northbound and southbound on Sixth Street for 2026 and 2036. A visual of these turning movements is shown in the following figures.

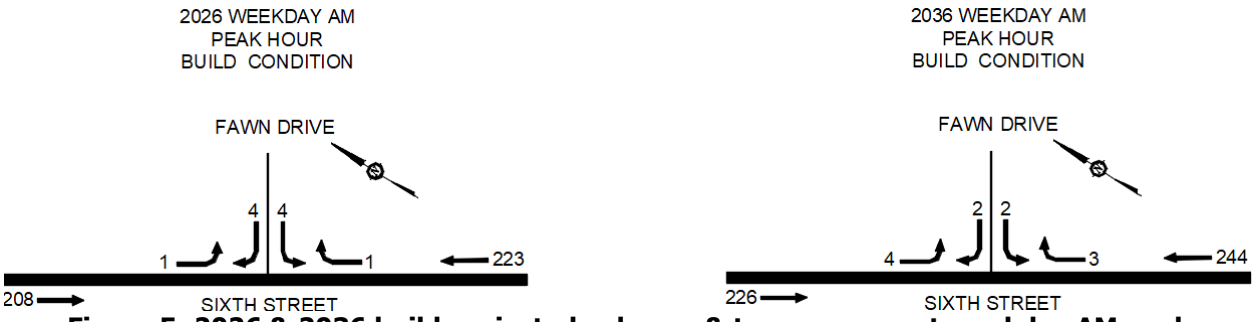


Figure 5: 2026 & 2036 build projected volumes & turn movement weekday AM peak

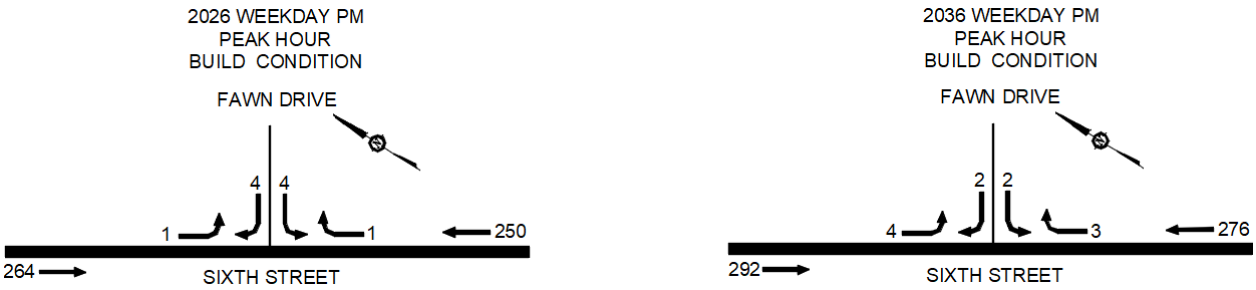


Figure 6: 2026 & 2036 build projected volumes & turn movement weekday PM peak

Tables #8 & #9 show in a tabular format the total trips that are calculated to occur to and from Fawn Drive are shown at the weekday peak hours analyzed in a build situation. These trips are further broken down into enter and exit to and from the site as well as percentage of left and right turns.

Time	AM Peak Hour	# Trips	Turn Type	% Distribution
Total Trips	10			
Trips Enter from Sixth Street Eastbound		1.0	Left	9.6
Trips Enter from Sixth Street Westbound		1.0	Right	10.4
Trips Exit to Sixth Street Eastbound		4.1	Left	41.5
Trips Exit to Sixth Street Westbound		3.9	Right	38.5

Table 8: Weekday AM peak hour build turning movements to and from Fawn Dr.

Time	PM Peak Hour	# Trips	Turn Type	% Distribution
Total Trips	11			
Trips Enter from Sixth Street Eastbound		3.6	Left	32.7
Trips Enter from Sixth Street Westbound		3.4	Right	30.9
Trips Exit to Sixth Street Eastbound		2.1	Left	18.7
Trips Exit to Sixth Street Westbound		1.9	Right	17.7

Table 9: Weekday PM peak hour build turning movements to and from Fawn Dr.

Sight Distance and Safety Analysis

Sight distance on Sixth Street to the north and south, as well as roadway alignment are the two determining factors of safety. Sight distance to the east and west is un-obstructed for well over 400 feet (measured, 305 feet, 40 MPH AASHTO requirement). See plans SD-1 & SD-2 within the plan set. It is the opinion of BS&E that the surrounding roadway infrastructure is sufficient to support the prosed development during the weekday peak hours and all other hours.

*AASHTO Geometric Design of Highways and Streets (2018)

Conclusions and Recommendations

1) 166 total vehicle trips are predicted to occur on a weekday, 10 vehicle trips (2 enter/8 exit) are predicted to occur at the weekday AM peak hour and 11 vehicle trips (7 enter/4 exit) at the PM peak hour for Fawn Drive.

2) A It is the opinion of BS&E that the surrounding roadway infrastructure is sufficient to support the prosed development during the weekday peak hours and all other hours.

3) There are public transit opportunities adjacent to the site that has the potential for a reduction in trips from what is demonstrated.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

Christopher R. Berry, LLS
Principal, President

Kenneth A. Berry, PE, LLS,
CPSWQ, CPESC, CESSWI
Principal, VP-Technical Operations
Engineer of Record

Kevin R. Poulin, PE
Project Engineer

Appendix A

Traffic Counts & Speed Data

List View | All DIRs

Record | 1 | of 1 | Goto Record | go

Location ID	82125064	MPO ID	
Type	SPOT	HPMS ID	
On NHS	No	On HPMS	Yes
LRS ID	L1250050__	LRS Loc Pt.	
SF Group	04 (2024)	Route Type	
AF Group	04 (2024)	Route	
GF Group	E (2024)	Active	Yes
Class Dist Grp	Default (2024)	Category	3
Seas Clss Grp	Default (2024)		
WIM Group	Default (2024)		
QC Group	Default		
Fnct'l Class	Major Collector	Milepost	
Located On	Sixth St		
Loc On Alias	SIXTH ST EAST OF WHITTIER ST (EB-WB) (81125124-81125125)		

More Detail

STATION DATA

Directions: 2-WAY | EB | WB

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2024	4,390[3]				4,065 (93%)	325 (7%)	Grown from 2023
2023	4,304	474	11	51	3,997 (93%)	307 (7%)	
2022	4,284[3]		12	52	4,013 (94%)	271 (6%)	Grown from 2021
2021	4,204[3]		12	52	3,823 (91%)	381 (9%)	Grown from 2020
2020	3,791	441	12	52	3,448 (91%)	343 (9%)	

Figure 7: History of AADT for 141 Sixth Street

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	9	3	2	5	19
1:00-2:00	3	5	8	2	18
2:00-3:00	2	4	7	1	14
3:00-4:00	2	2	0	4	8
4:00-5:00	6	8	6	5	25
5:00-6:00	8	13	26	21	68
6:00-7:00	33	28	42	71	174
7:00-8:00	53	90	106	102	351
8:00-9:00	96	87	84	84	351
9:00-10:00	79	75	72	76	302
10:00-11:00	65	62	59	65	251
11:00-12:00	71	75	71	60	277
12:00-13:00	62	86	77	84	309
13:00-14:00	67	77	94	80	318
14:00-15:00	88	67	80	77	312
15:00-16:00	95	103	132	110	440
16:00-17:00	126	102	121	106	455
17:00-18:00	129	138	99	95	461
18:00-19:00	81	88	65	54	288
19:00-20:00	53	51	46	47	197
20:00-21:00	44	51	38	23	156
21:00-22:00	32	30	20	15	97
22:00-23:00	19	15	17	9	60
23:00-24:00	7	11	9	3	30
Total					4,981
AADT					4,263
AM Peak					07:15-08:15 394
PM Peak					16:30-17:30 494

Figure 8: Tuesday July. 25, 2023 141 Sixth Street traffic count 2-way

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	4	2	1	0	7
1:00-2:00	2	3	5	0	10
2:00-3:00	2	1	1	0	4
3:00-4:00	1	1	0	3	5
4:00-5:00	3	3	4	2	12
5:00-6:00	6	7	16	17	46
6:00-7:00	17	13	22	31	83
7:00-8:00	30	44	45	49	168
8:00-9:00	40	48	38	50	176
9:00-10:00	46	40	43	42	171
10:00-11:00	38	40	26	36	140
11:00-12:00	45	35	36	34	150
12:00-13:00	30	38	39	43	150
13:00-14:00	37	39	40	45	161
14:00-15:00	42	29	36	34	141
15:00-16:00	40	43	59	47	189
16:00-17:00	62	50	49	57	218
17:00-18:00	72	66	47	54	239
18:00-19:00	40	44	35	27	146
19:00-20:00	20	33	22	24	99
20:00-21:00	17	25	14	13	69
21:00-22:00	15	9	10	8	42
22:00-23:00	7	5	6	6	24
23:00-24:00	5	5	3	2	15
Total					2,465
AM Peak					07:30-08:30 182
PM Peak					16:30-17:30 244

Figure 9: Tuesday July. 25, 2023 141 Sixth Street traffic count eastbound

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	5	1	1	5	12
1:00-2:00	1	2	3	2	8
2:00-3:00	0	3	6	1	10
3:00-4:00	1	1	0	1	3
4:00-5:00	3	5	2	3	13
5:00-6:00	2	6	10	4	22
6:00-7:00	16	15	20	40	91
7:00-8:00	23	46	61	53	183
8:00-9:00	56	39	46	34	175
9:00-10:00	33	35	29	34	131
10:00-11:00	27	22	33	29	111
11:00-12:00	26	40	35	26	127
12:00-13:00	32	48	38	41	159
13:00-14:00	30	38	54	35	157
14:00-15:00	46	38	44	43	171
15:00-16:00	55	60	73	63	251
16:00-17:00	64	52	72	49	237
17:00-18:00	57	72	52	41	222
18:00-19:00	41	44	30	27	142
19:00-20:00	33	18	24	23	98
20:00-21:00	27	26	24	10	87
21:00-22:00	17	21	10	7	55
22:00-23:00	12	10	11	3	36
23:00-24:00	2	6	6	1	15
Total					2,516
AM Peak					07:15-08:15 216
PM Peak					15:15-16:15 260

Figure 10: Tuesday July. 25, 2023 141 Sixth Street traffic count westbound

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	14	8	5	3	30
1:00-2:00	6	2	4	2	14
2:00-3:00	4	2	4	2	12
3:00-4:00	1	4	2	6	13
4:00-5:00	7	6	5	6	24
5:00-6:00	7	13	16	28	64
6:00-7:00	20	45	43	57	165
7:00-8:00	62	78	96	103	339
8:00-9:00	101	100	98	96	395
9:00-10:00	91	85	81	85	342
10:00-11:00	62	66	76	70	274
11:00-12:00	80	66	83	80	309
12:00-13:00	91	112	74	95	372
13:00-14:00	89	83	89	82	343
14:00-15:00	74	87	78	79	318
15:00-16:00	97	114	124	121	456
16:00-17:00	122	127	132	105	486
17:00-18:00	150	139	105	81	475
18:00-19:00	90	74	61	61	286
19:00-20:00	58	57	70	60	245
20:00-21:00	62	44	49	42	197
21:00-22:00	29	30	14	25	98
22:00-23:00	26	16	15	24	81
23:00-24:00	21	6	7	11	45
Total					5,383
AADT					4,481
AM Peak					07:45-08:45 402
PM Peak					16:30-17:30 526

Figure 11: Wednesday July. 26, 2023 141 Sixth Street traffic count 2-way

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	4	5	1	1	11
1:00-2:00	4	1	0	2	7
2:00-3:00	3	0	2	0	5
3:00-4:00	1	1	1	4	7
4:00-5:00	1	2	2	4	9
5:00-6:00	2	9	6	22	39
6:00-7:00	8	23	21	24	76
7:00-8:00	34	42	38	43	157
8:00-9:00	49	54	63	54	220
9:00-10:00	49	42	44	54	189
10:00-11:00	30	35	37	34	136
11:00-12:00	39	41	40	52	172
12:00-13:00	51	57	42	34	184
13:00-14:00	35	40	49	39	163
14:00-15:00	31	43	31	42	147
15:00-16:00	41	61	62	71	235
16:00-17:00	62	61	66	57	246
17:00-18:00	67	77	52	47	243
18:00-19:00	44	34	30	33	141
19:00-20:00	30	24	32	25	111
20:00-21:00	25	20	22	22	89
21:00-22:00	14	17	7	11	49
22:00-23:00	13	7	10	10	40
23:00-24:00	8	3	1	6	18
Total					2,694
AM Peak					08:00-09:00 220
PM Peak					16:30-17:30 267

Figure 12: Wednesday July. 26, 2023 141 Sixth Street traffic count eastbound

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	10	3	4	2	19
1:00-2:00	2	1	4	0	7
2:00-3:00	1	2	2	2	7
3:00-4:00	0	3	1	2	6
4:00-5:00	6	4	3	2	15
5:00-6:00	5	4	10	6	25
6:00-7:00	12	22	22	33	89
7:00-8:00	28	36	58	60	182
8:00-9:00	52	46	35	42	175
9:00-10:00	42	43	37	31	153
10:00-11:00	32	31	39	36	138
11:00-12:00	41	25	43	28	137
12:00-13:00	40	55	32	61	188
13:00-14:00	54	43	40	43	180
14:00-15:00	43	44	47	37	171
15:00-16:00	56	53	62	50	221
16:00-17:00	60	66	66	48	240
17:00-18:00	83	62	53	34	232
18:00-19:00	46	40	31	28	145
19:00-20:00	28	33	38	35	134
20:00-21:00	37	24	27	20	108
21:00-22:00	15	13	7	14	49
22:00-23:00	13	9	5	14	41
23:00-24:00	13	3	6	5	27
Total					2,689
AM Peak					07:30-08:30 216
PM Peak					16:15-17:15 263

Figure 13: Wednesday July. 26, 2023 141 Sixth Street traffic count westbound

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	16	4	3	6	29
1:00-2:00	3	2	3	4	12
2:00-3:00	7	3	1	5	16
3:00-4:00	0	3	4	5	12
4:00-5:00	4	9	2	5	20
5:00-6:00	13	8	23	34	78
6:00-7:00	24	31	46	62	163
7:00-8:00	60	77	88	103	328
8:00-9:00	96	101	95	75	367
9:00-10:00	84	79	74	84	321
10:00-11:00	53	64	70	65	252
11:00-12:00	67	94	93	95	349
12:00-13:00	85	80	87	94	346
13:00-14:00	88	75	81	92	336
14:00-15:00	70	83	92	109	354
15:00-16:00	90	98	109	118	415
16:00-17:00	102	110	102	103	417
17:00-18:00	147	100	77	85	409
18:00-19:00	62	72	59	49	242
19:00-20:00	59	70	52	41	222
20:00-21:00	36	36	32	31	135
21:00-22:00	31	18	23	16	88
22:00-23:00	14	17	14	16	61
23:00-24:00	16	4	10	8	38
Total					5,010
AADT					4,170
AM Peak					07:45-08:45 395
PM Peak					16:15-17:15 462

Figure 14: Thursday July. 27, 2023 141 Sixth Street traffic count 2-way

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	11	1	1	4	17
1:00-2:00	3	1	2	3	9
2:00-3:00	1	1	0	1	3
3:00-4:00	0	1	1	2	4
4:00-5:00	1	4	2	2	9
5:00-6:00	8	6	9	25	48
6:00-7:00	13	14	22	28	77
7:00-8:00	40	34	31	52	157
8:00-9:00	43	52	46	53	194
9:00-10:00	46	41	39	48	174
10:00-11:00	28	32	32	32	124
11:00-12:00	35	50	48	44	177
12:00-13:00	44	47	40	48	179
13:00-14:00	44	32	38	39	153
14:00-15:00	36	41	50	44	171
15:00-16:00	45	43	47	49	184
16:00-17:00	52	43	53	55	203
17:00-18:00	80	63	35	52	230
18:00-19:00	28	24	31	26	109
19:00-20:00	21	34	24	16	95
20:00-21:00	13	17	13	13	56
21:00-22:00	12	9	8	7	36
22:00-23:00	9	7	9	7	32
23:00-24:00	10	3	6	3	22
Total					2,463
AM Peak					08:15-09:15 197
PM Peak					16:30-17:30 251

Figure 15: Thursday July. 27, 2023 141 Sixth Street traffic count eastbound

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	5	3	2	2	12
1:00-2:00	0	1	1	1	3
2:00-3:00	6	2	1	4	13
3:00-4:00	0	2	3	3	8
4:00-5:00	3	5	0	3	11
5:00-6:00	5	2	14	9	30
6:00-7:00	11	17	24	34	86
7:00-8:00	20	43	57	51	171
8:00-9:00	53	49	49	22	173
9:00-10:00	38	38	35	36	147
10:00-11:00	25	32	38	33	128
11:00-12:00	32	44	45	51	172
12:00-13:00	41	33	47	46	167
13:00-14:00	44	43	43	53	183
14:00-15:00	34	42	42	65	183
15:00-16:00	45	55	62	69	231
16:00-17:00	50	67	49	48	214
17:00-18:00	67	37	42	33	179
18:00-19:00	34	48	28	23	133
19:00-20:00	38	36	28	25	127
20:00-21:00	23	19	19	18	79
21:00-22:00	19	9	15	9	52
22:00-23:00	5	10	5	9	29
23:00-24:00	6	1	4	5	16
Total					2,547
AM Peak	07:30-08:30 210				
PM Peak	15:30-16:30 248				

Figure 16: Thursday July. 27, 2023 141 Sixth Street traffic count westbound

Appendix B

Miscellaneous

Group 4 Averages:		Year 2024 Monthly Data Urban Highways	
		Adjustment to	
Month	ADT	Average	Peak
January	14,556	1.04	1.09
February	15,385	0.98	1.03
March	14,276	1.06	1.11
April	14,515	1.04	1.10
May	15,571	0.97	1.02
June	15,918	0.95	1.00
July	15,765	0.96	1.01
August	15,856	0.95	1.00
September	15,571	0.97	1.02
October	15,698	0.96	1.01
November	14,429	1.05	1.10
December	13,960	1.08	1.14
Average ADT:	15,125		
Peak ADT:	15,918		

Table 10: Derivation of the seasonal peaking factor

Table 3-1. Stopping Sight Distance on Level Roadways

U.S. Customary					Metric				
Design Speed (mph)	Brake Reaction Distance (ft)	Braking Distance on Level (ft)	Stopping Sight Distance		Design Speed (km/h)	Brake Reaction Distance (m)	Braking Distance on Level (m)	Stopping Sight Distance	
			Calculated (ft)	Design (ft)				Calculated (m)	Design (m)
15	55.1	21.6	76.7	80	20	13.9	4.6	18.5	20
20	73.5	38.4	111.9	115	30	20.9	10.3	31.2	35
25	91.9	60.0	151.9	155	40	27.8	18.4	46.2	50
30	110.3	86.4	196.7	200	50	34.8	28.7	63.5	65
35	128.6	117.6	246.2	250	60	41.7	41.3	83.0	85
40	147.0	153.6	300.6	305	70	48.7	56.2	104.9	105
45	165.4	194.4	359.8	360	80	55.6	73.4	129.0	130
50	183.8	240.0	423.8	425	90	62.6	92.9	155.5	160
55	202.1	290.3	492.4	495	100	69.5	114.7	184.2	185
60	220.5	345.5	566.0	570	110	76.5	138.8	215.3	220
65	238.9	405.5	644.4	645	120	83.4	165.2	248.6	250
70	257.3	470.3	727.6	730	130	90.4	193.8	284.2	285
75	275.6	539.9	815.5	820	140	97.3	224.8	322.1	325
80	294.0	614.3	908.3	910					
85	313.5	693.5	1007.0	1010					

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 11.2 ft/s² [3.4 m/s²] used to determine calculated sight distance.

Figure 17: Derivation of stopping sight distance requirement

Appendix C

Trip Generation Derivation

Land Use: 210
Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077,1078, 1079

Figure 18: ITE Trip Generation, 11th Edition Existing LUC Description

BERRY SURVEYING & ENGINEERING
335 Second Crown Pt. Rd., Barrington, NH 03825
(603) 332-2863 / (603) 335-4623 FAX
www.BerrySurveying.Com

Land Use: 215
Single-Family Attached Housing

Description

Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Additional Data

The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Utah, Virginia, and Wisconsin.

Source Numbers

168, 204, 211, 237, 305, 306, 319, 321, 357, 390, 418, 525, 571, 583, 638, 735, 868, 869, 870, 896, 912, 959, 1009, 1046, 1056, 1058, 1077

Figure 19: ITE Trip Generation, 11th Edition Proposed LUC Description

BERRY SURVEYING & ENGINEERING
335 Second Crown Pt. Rd., Barrington, NH 03825
(603) 332-2863 / (603) 335-4623 FAX
www.BerrySurveying.Com

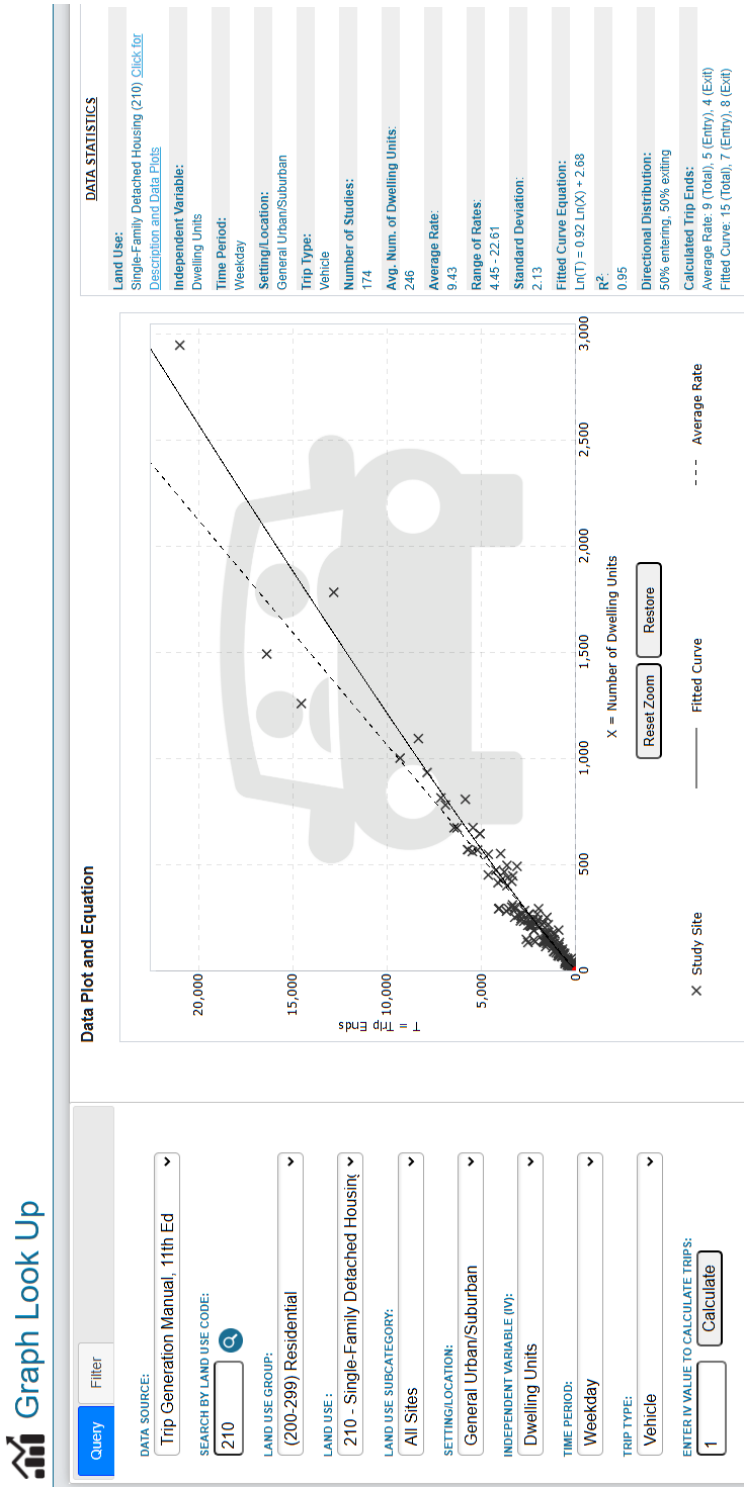


Figure 20: ITE Trip Generation, 11th Edition Ex Residential Weekday Total

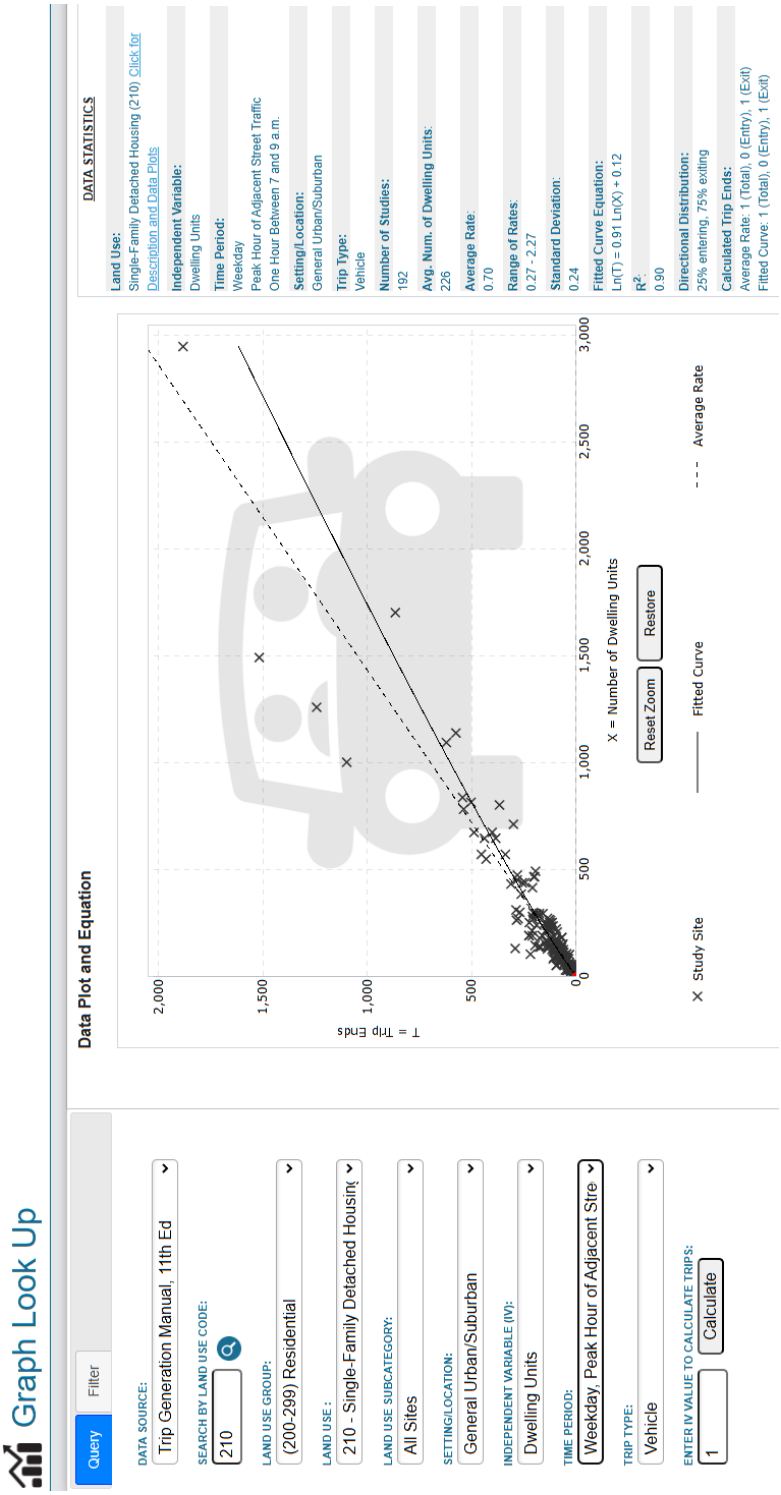


Figure 21: ITE Trip Generation, 11th Edition Ex Residential Weekday AM Peak hour

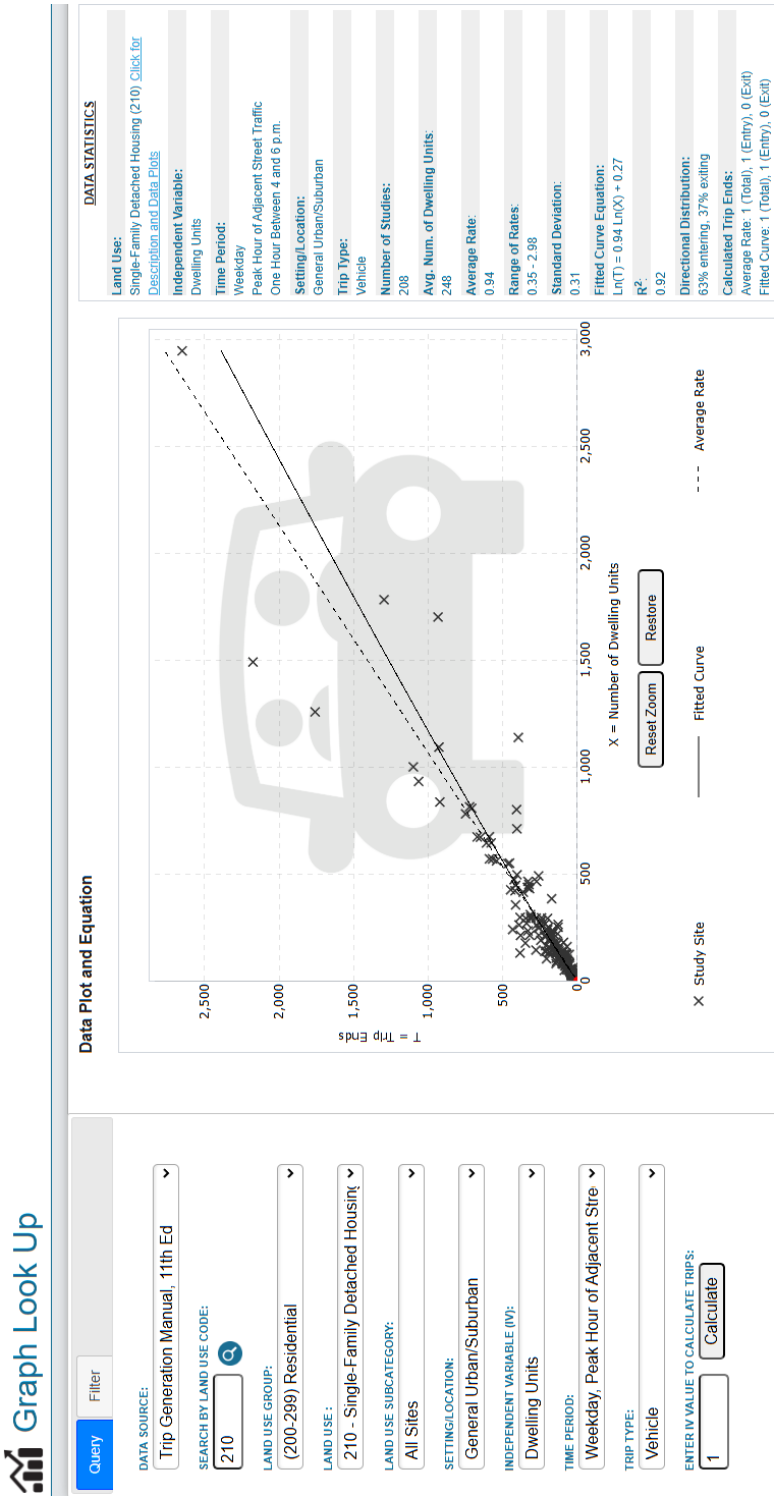


Figure 22: ITE Trip Generation, 11th Edition Ex Residential Weekday PM Peak Hour

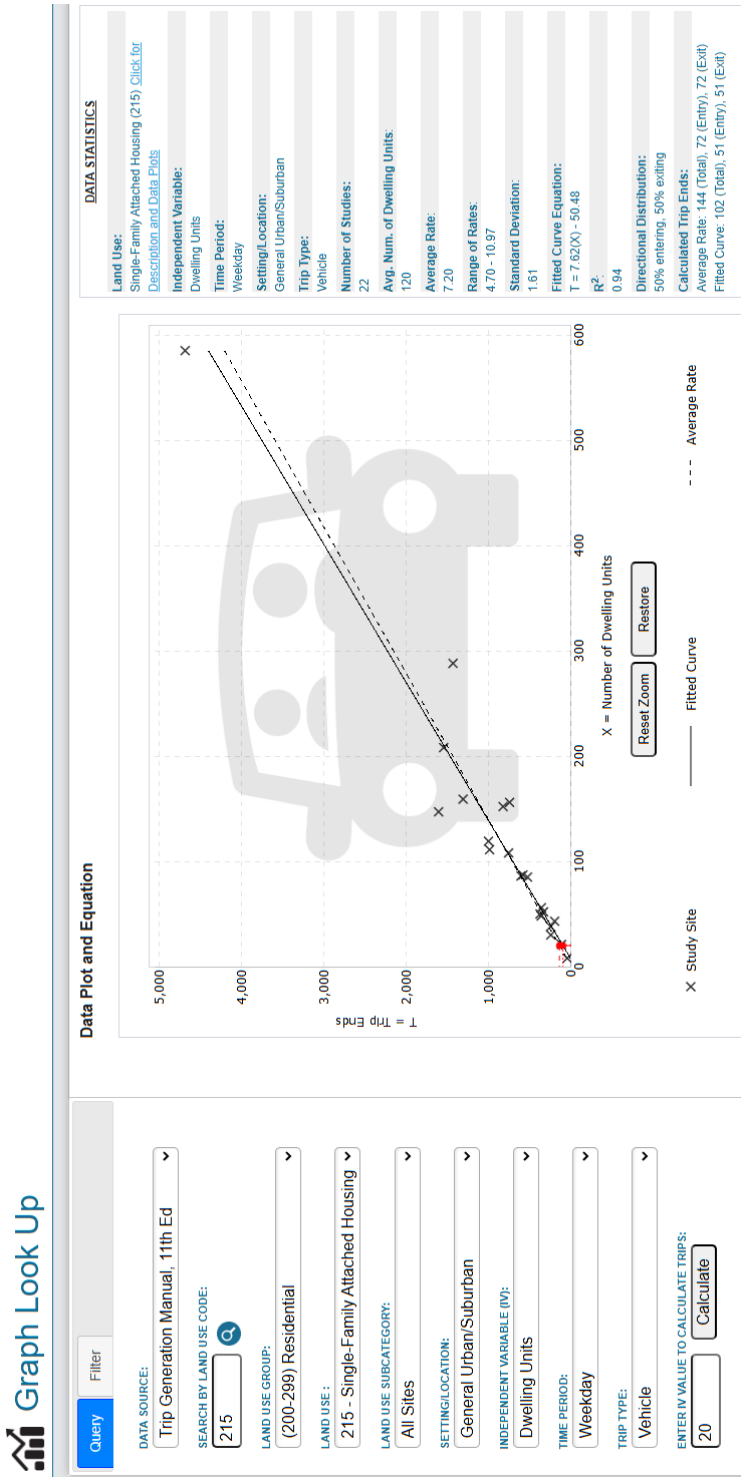


Figure 23: ITE Trip Generation, 11th Edition Prop Residential Weekday Total

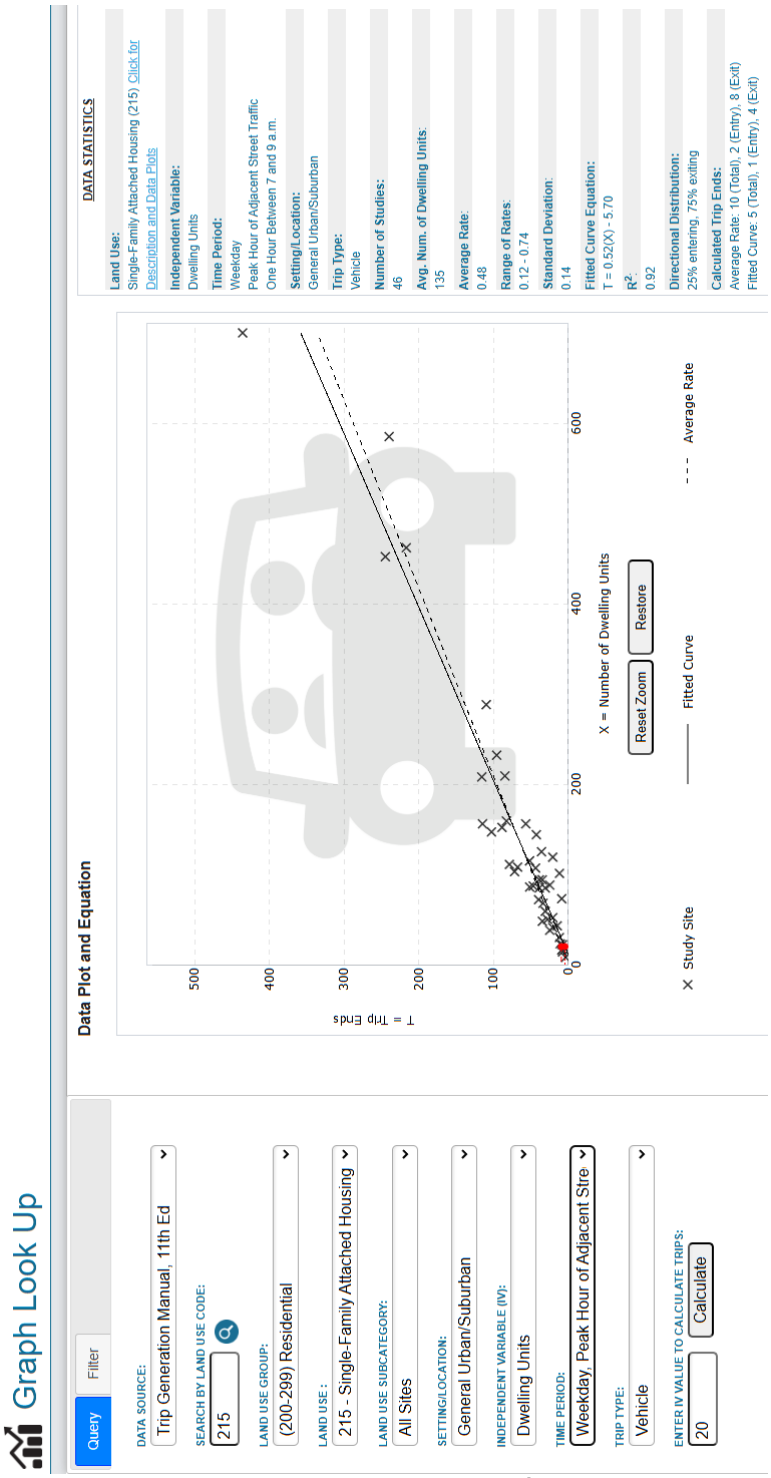


Figure 24: ITE Trip Generation, 11th Edition Prop Residential Weekday AM Peak hour

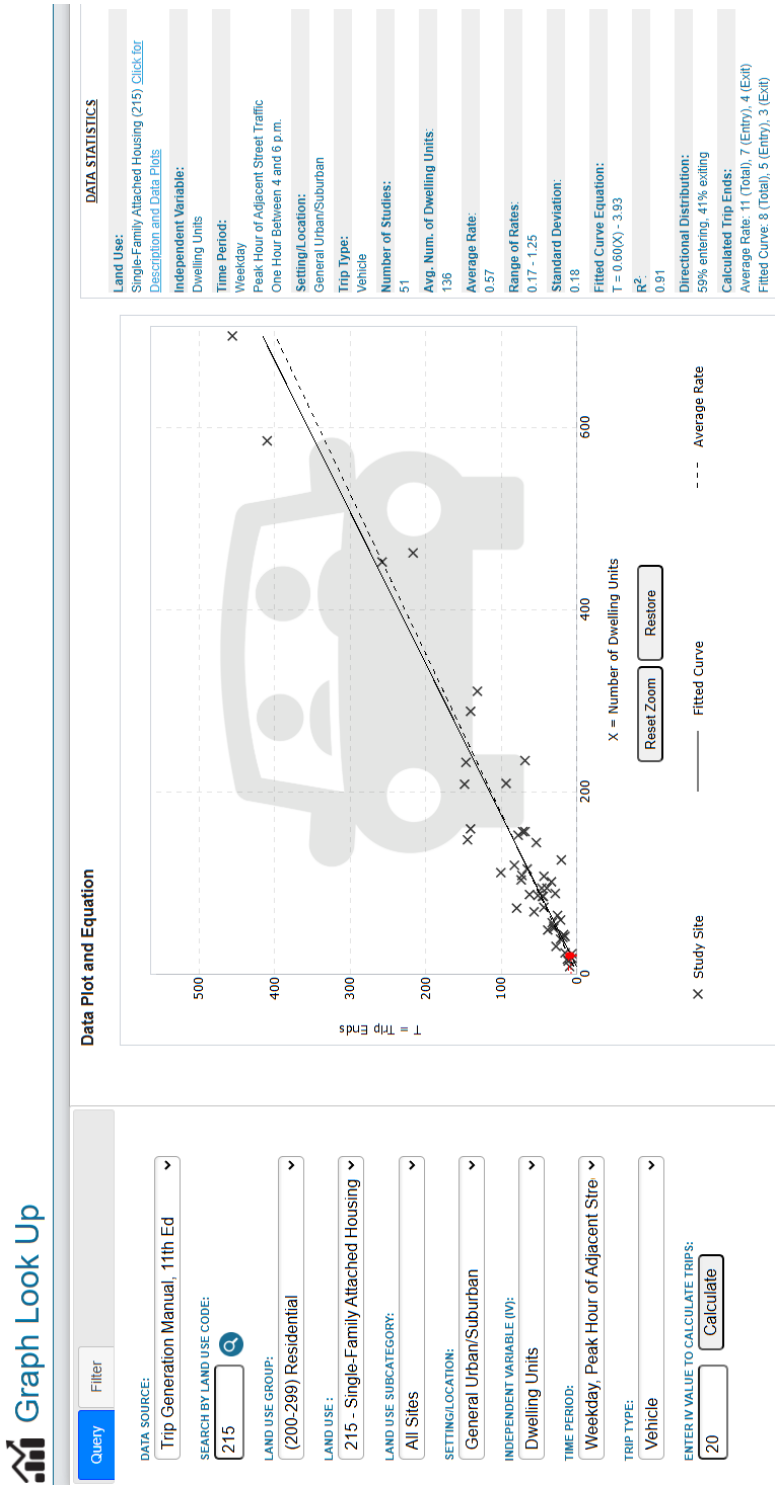


Figure 25: ITE Trip Generation, 11th Edition Prop Residential Weekday PM Peak Hour

24-018 Fawn Drive

#Units	8
# Bedrooms	24
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
15.00	
Flow Received from Infiltration (gpm)	
Inf. Rate = ((300 GPD*8IN*LF)/5280 LF)/1440 min/day	
0.032	
Cumulative Infiltration (gpm)	
0.032	
Total Flow Received (BR Flow + INF) (gpm)	
15.03	
Prop. SMH #105	
Rim Elev	126.75
Inv In (Units #15 & 16)	118.92
Inv In (Units #17 & 18)	118.92
Inv Out (SMH #104)	118.75
Depth SMH	8.00

Full Velocity (Manning Equation)	
V=(1.486/n)*(R^2/3)*(S^1/2)	
n	0.011
R	0.167
Pipe Dia (in)	8
Area (ft^2)	0.349
8" SDR 35	
Inv In (SMH #105)	118.75
Inv Out (SMH #104)	118.30
Length (ft)	100.00
Slope	0.0045
Full Velocity (ft/s)	2.74
Discharge Rate (gpm)	429.77

#Units	8
# Bedrooms	24
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
15.00	
Flow Received from Infiltration (gpm)	
Inf. Rate = ((300 GPD*8IN*LF)/5280 LF)/1440 min/day	
0.021	
Cumulative Infiltration (gpm)	
0.053	
Total Flow Received (BR Flow + INF) (gpm)	
15.05	
Prop. SMH #104	
Rim Elev	126.05
Inv In (SMH #105)	118.30
Inv Out (SMH #103)	118.20
Depth SMH	7.85

Full Velocity (Manning Equation)	
V=(1.486/n)*(R^2/3)*(S^1/2)	
n	0.011
R	0.167
Pipe Dia (in)	8
Area (ft^2)	0.349
8" SDR 35	
Inv In (SMH #104)	118.20
Inv Out (SMH #103)	117.90
Length (ft)	68.00
Slope	0.0044
Full Velocity (ft/s)	2.72
Discharge Rate (gpm)	425.53

#Units	10
# Bedrooms	30
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
18.75	
Flow Received from Infiltration (gpm)	
Inf. Rate = ((300 GPD*8IN*LF)/5280 LF)/1440 min/day	
0.036	
Cumulative Infiltration (gpm)	
0.089	
Total Flow Received (BR Flow + INF) (gpm)	
18.84	
Prop. SMH #103	
Rim Elev	126.55
Inv In (SMH #104)	117.90
Inv Out (SMH #102)	117.80
Depth SMH	8.75

Full Velocity (Manning Equation)	
V=(1.486/n)*(R^2/3)*(S^1/2)	
n	0.011
R	0.167
Pipe Dia (in)	8
Area (ft^2)	0.349
8" SDR 35	
Inv In (SMH #103)	117.80
Inv Out (SMH #102)	117.28
Length (ft)	115.00
Slope	0.0045
Full Velocity (ft/s)	2.75
Discharge Rate (gpm)	430.80

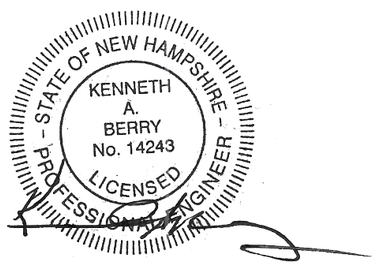
#Units	18
# Bedrooms	54
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
33.75	
Flow Received from Infiltration (gpm)	
Inf. Rate = ((300 GPD*8IN*LF)/5280 LF)/1440 min/day	
0.095	
Cumulative Infiltration (gpm)	
0.184	
Total Flow Received (BR Flow + INF) (gpm)	
33.93	
Prop. SMH #102	
Rim Elev	127.78
Inv In (SMH #103)	117.28
Inv Out (SMH #101)	117.18
Depth SMH	10.60

Full Velocity (Manning Equation)	
V=(1.486/n)*(R^2/3)*(S^1/2)	
n	0.011
R	0.167
Pipe Dia (in)	8
Area (ft^2)	0.349
8" SDR 35	
Inv In (SMH #102)	117.18
Inv Out (SMH #101)	115.85
Length (ft)	300.00
Slope	0.0044
Full Velocity (ft/s)	2.72
Discharge Rate (gpm)	426.57

#Units	20
# Bedrooms	60
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
37.50	
Flow Received from Infiltration (gpm)	
Inf. Rate = ((300 GPD*8IN*LF)/5280 LF)/1440 min/day	
0.039	
Cumulative Infiltration (gpm)	
0.223	
Total Flow Received (BR Flow + INF) (gpm)	
37.72	
Prop. SMH #101	
Rim Elev	123.92
Inv In (SMH #102) (Internal Drop)	115.85
Inv Out (SMH #100)	113.35
Depth SMH	10.57

Full Velocity (Manning Equation)	
V=(1.486/n)*(R^2/3)*(S^1/2)	
n	0.011
R	0.167
Pipe Dia (in)	8
Area (ft^2)	0.349
8" SDR 35	
Inv In (SMH #101)	113.35
Inv Out (SMH #100)	111.41
Length (ft)	122.00
Slope	0.0159
Full Velocity (ft/s)	5.16
Discharge Rate (gpm)	807.88

#Units	20
# Bedrooms	60
Flow Received from Units (gpm)	
GPM=(150GPD * #BR * 6)/1440min/day	
37.50	
Cumulative Infiltration (gpm)	
0.223	
Total Flow Received (BR Flow + INF) (gpm)	
37.72	
Prop. SMH #100	
Rim	120.39
Inv In (Prop. SMH #101) (Internal Drop)	111.41
Inv In (EX. upstream)	109.41
Inv Out (EX. EX. downstream)	109.39
Depth SMH	11.00



24-018 Sewer Calculations Summary		
Peaking Factor		6
Flow/Bedroom (gpd)		150
Each Unit on site is three bedrooms		
Total 8" SDR 35 Length (Ft)	Total Rate (Design Flow)(GPD):	Total Rate (Design Flow)(GPM):
	9,000	37.50
705.00	Total Rate (Infiltration)(GPD):	Total Rate (Infiltration)(GPM):
Berry Surveying & Engineering	320	0.22
Fawn Drive	Total Flow Received (GPD):	Total Flow Received (GPM):
24-Jun-25	9,320	37.72

BERRY SURVEYING & ENGINEERING
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DRAINAGE ANALYSIS & EROSION AND SEDIMENT CONTROL PLAN

Prepared for:

The Stabile Companies
20 Cotton Road, Suite 200
NASHUA, NH 03063

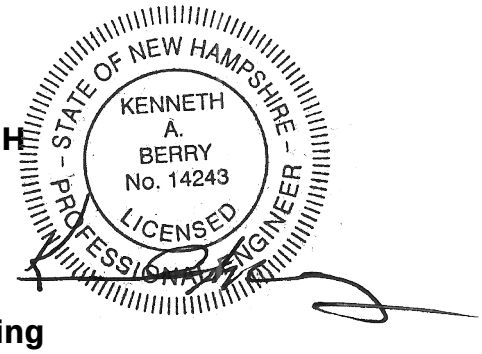
Land of

Richardson Estates of Dover, LLC
688 Calef Highway
BARRINGTON, NH 03825

141 SIXTH STREET, DOVER, NH
TAX MAP 35, LOT 64

Mohamed & Lisa K. Hamcha
5 Dowaliby Court
DOVER, NH 03820

5 DOWALIBY COURT, DOVER, NH
TAX MAP 35, LOT 72



Prepared by:

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825

Project Number:
DB 2024-018

June 24, 2025

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Filtrexx Specifications Sheets

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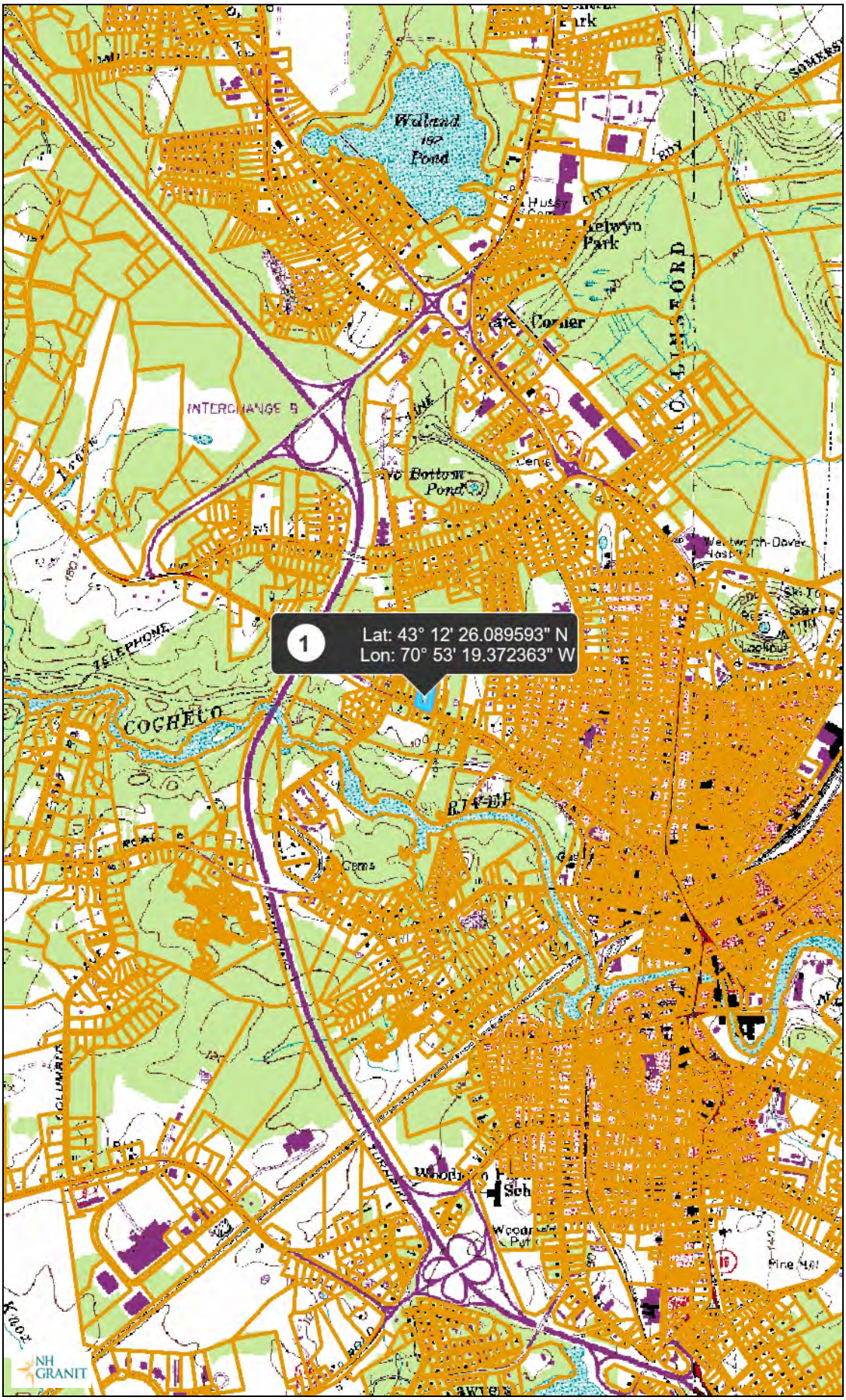
Map by NH GRANIT



Legend

- Parcels
- State
- County
- City/Town

Map Scale

1: 24,000

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Notes

Map by NH GRANIT

Legend

- Parcels
- State
- County
- City/Town

Map Scale

1: 10,000

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Notes

DESIGN METHOD OBJECTIVES

The owner / developer of Tax Map 35, Lot 64, Richardson Estates of Dover, LLC. is proposing to develop the property at 141 Sixth Street and a portion of Tax Map 35, Lot 72, 5 Dowaliby Court (lot line revision completed). The site is currently an existing single-family home with 2 larger grass areas intersected by a tree line. The proposal is to develop the property with a 777 ft private roadway and twenty dwelling units. The proposed units will all be a duplex style construction.

On-site topography was completed by field crews of Berry Surveying & Engineering in May and June of 2024 and a Site Specific Soil Survey was completed by John P. Hayes with a report generated on September 21, 2024. Soils on site are primarily included in two hydrologic soil groups: HSG A and HSG C. (See attached report.) A wetland delineation was completed prior to the original field work being conducted (none found on site). The off-site subcatchment which drains onto the locus parcel has been delineated by USDA / NRCS soils in Websoil and USGS Equivalent contours from public sources. (Google Tin & NH Lidar)

Existing and Proposed Conditions analyses were conducted for the purpose of estimating the peak rate of stormwater run-off and to subsequently design adequate mitigation of drainage. There are six existing drainage discharge points which were identified in the existing analysis and duplicated in the proposed conditions analysis. Designing two watershed models we have compared the differences in these rates of peak run-off and surface water volume. Sheet W1, Existing Conditions Watershed Plan, outlines the characteristics of the site in its existing or pre-construction conditions. The second analysis displays the proposed (post-construction) conditions (See Sheet W2). HydroCAD uses a series of node suffixes for numbering purposes (S = Subcatchment, P = Pond Device, R = Reach), to simplify annotation these suffixes are left off the watershed plans and node type is denoted by the symbol shape according to the displayed legend which coincides with HydroCAD graphics. The analysis was conducted using data for; 2 Yr - 24 Hr (3.62”), 10 Yr - 24 Hr (5.45”), 25 Yr - 24 Hr (6.89”), 50 Yr - 24 Hr (8.23”). Storm event analysis was accomplished using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. Rainfall quantities are based on the Extreme Precipitation Table for this location from the Northeast Regional Climate Center / Cornell University (http://precip.eas.cornell.edu). Dover is considered a part of the Coastal Region, and therefore a 15% escalation of rain fall depths has been applied to this application, reflected in the totals above.

1.0 Existing Conditions Analysis:

Reference: Sheet W1 - Existing Conditions Watershed Plan (Enclosed)
Existing Conditions Plan

The existing parcel currently consists of grassed and wooded vacant land as well as a single house on Lot 64 and a house on Lot 72 to remain as part of lot line revision. The soils within the locus parcel are made up of multiple soil types, containing Hydrologic Soil Group (HSG) A & C. See Site Specific Soils Map and report for more information. The land cover types involved are grassed land, woods, buildings, and road pavement. Off-site soils are likewise HSG C based on USDA / NRCS Websoil.

The land area analyzed consists of the 3.75 acre parcel as well as 1.44 acres of offsite land. The parcel is naturally divided into seven subcatchments. Each of the seven existing subcatchments are analyzed at an individual final reach. **Subcatchment #7** drains to the same final reach **as Subcatchment #3**.

Final Reach #100

Subcatchment #1 is land area along the Sixth Street frontage extending between two roadside catch basins on Sixth Street and extending northwest to a natural high point behind the existing house and garage on the parcel (mostly grassed). Runoff in this subcatchment flows southeast to a roadside catch basin on Sixth Street being analyzed as **Final Reach #100**.

Final Reach #200

Subcatchment #2 is made up of a small portion of partially wooded land north of **Subcatchment #1,** divided by the natural contours to the west. Runoff from this subcatchment drains over the eastern property line to an offsite point analyzed as **Final Reach #200**.

Final Reach #300

Subcatchment #3 consists of the majority of the land toward the middle of the parcel defined by two grass sections with an intersecting wooded area. The limits of this subcatchment are defined by two natural ridges to the north and the southeast as well as the natural topography of the abutting parcels to the west and southwest. Runoff in this subcatchment generally flows northeast to an offsite area over the eastern property line being analyzed as **Final Reach #300**.

Subcatchment #7 to the southwest of the parcel is located between subcatchments 1, 2, and 3 and is divided by the natural contours of the landscape (grassed). Runoff flows northwest offsite to the **Reaches 7a-7c** before flowing northeast back over the subject parcel to a point offsite analyzed as **Final Reach #300.**

Final Reach #400

Subcatchment #4 encompasses a small portion of mostly wooded land along the northern property line. Runoff generally flows in a northeasterly direction to the property line being analyzed as **Final Reach #400**.

Final Reach #500

Subcatchment #5 is comprised of the northwestern most portion of the parcel. The limits of this subcatchment are mainly defined by the limits of the associated parcel (Tax Map 35, Lot 72). The subcatchment extends to the east to the natural topography of the landscape and extends offsite to the north to a natural low point. Runoff flows generally southwest offsite to a point analyzed as **Final Reach #500**.

Final Reach #600

Subcatchment #6 is a small segment to the southwest of the parcel between subcatchments 1 and 7 created by the natural topography of the parcel (grassed). Runoff in the subcatchment flows west toward the boundary of the parcel to a point analyzed as **Final Reach #600**.

2.0 Proposed Conditions Analysis:

Reference: Sheet W2 - Proposed Conditions Watershed Plan (Enclosed)
Proposed Grading & Drainage Plan

The client is proposing to expand the existing development with 20 dwelling units (10 buildings) along a proposed roadway consisting of 778 feet. The existing structure will be removed prior to building the proposed units. The proposal is supported by a series of **Infiltration Trenches #201-203** and **Porous Pavement #103** that provide infiltration of stormwater to meet the ground water recharge volume requirements.

Porous paver walkways and patios are proposed for each unit. Cover types have been analyzed as grassed in these areas, with the model not accounting for the infiltration that would occur within these systems.

Final Reach #100

Subcatchment #1 Decreased in size due to the addition of new dwelling units and the crest of the roadway. Runoff in this subcatchment continues to flow southeast to a roadside catch basin on Sixth Street being analyzed as **Final Reach #100**.

Subcatchment #25 includes the southern end of Fawn Drive (paved) as well as the driveways and portions of roofs. This section of the subcatchment is limited by the perimeter of the roadway and construction of new dwellings to the west. Runoff from this section collects in an unmodeled rain guardian foxhole system and flows southeast toward

Rain Garden W/ Stormtech Storage #102 (Pond #102P) for treatment before flowing to **Drain Manhole #D01 (Pond #D01P)** and **Final Reach #100.**

Subcatchment #42 is the contributing area to **Rain Garden W/ Stormtech Storage #102 (Pond #102P)** to the southwest of Fawn Drive. This area includes the perimeter of the rain garden and a portion of the proposed tree line to the northeast. Runoff enters the pond where it is detained and controlled via stage discharge system to **Drain Manhole #D01 (Pond #D01P)** and **Final Reach #100.**

Subcatchment #52 to the southwest of Fawn Drive (grassed) is made up of a small stone area known as **Infiltration Trench #202 (Pond #202P).** Stormwater infiltrates through the crushed stone layer providing storage for the 50-year stormwater event.

Subcatchment #52a to the southwest of Fawn Drive (grassed) is made up of a roof system with a gutter and downspout on dwelling units #1 and 2. Runoff travels through the gutter into **Infiltration Trench #202 (Pond #202P)** for storage and infiltration. Stormwater infiltrates through the crushed stone layer providing storage for the 50-year stormwater event.

Final Reach #200

Subcatchment #2 decreased in size considerably due to the construction of the proposed roadway, some of the proposed dwelling units, and **Rain Garden W/ Stormtech Storage #102 (Pond #102P).** Runoff still flows west to **Final Reach #200**.

Subcatchment #43 is the contributing area to **Porous Pavement Sidewalk (Pond #103P)** (paved) and is located west of Fawn Drive. The subcatchment is limited to the perimeter of the porous sidewalk. Runoff within this subcatchment is treated and infiltrated through the porous sidewalk.

Final Reach #300

Subcatchment #3 is reduced in size considerably leaving only the portion northeast of Fawn Drive due to the construction of the proposed roadway, **Gravel Wetland #101 (Pond #101P),** as well as dwelling units and contributes to the same **Final Reach #300**.

Subcatchment #21 is a segment of Fawn Drive toward the center of the parcel that flows north to **Catch Basin #C01 (Pond C01P). Subcatchment #21** is defined by the crown of the paved roadway and the roofs of the surrounding structures. Land is made up of roofs, paved roadway and driveway, and grass. Runoff from this catch basin flows east toward **Catch Basin #C02 (Pond C02P).**

Subcatchment #22 is a segment of Fawn Drive toward the center of the parcel that flows north to **Catch Basin #C02 (Pond C02P). Subcatchment #22** is defined by

the crown of the paved roadway and the porous paved sidewalk. Land is made up of crowned paved roadway. Runoff from this catch basin flows northwest toward **Catch Basin #C04 (Pond C04P).**

Subcatchment #23 is a segment of grassed area toward the center of the parcel that flows northeast to **Catch Basin #C03 (Pond C03P). Subcatchment #23** is defined by the crown of the paved roadway and the roofs of the surrounding structures. Land is made up of roofs, paved roadway and driveway, and grass. Runoff from this catch basin flows northeast toward **Catch Basin #C04 (Pond C04P).**

Subcatchment #24 is a segment of Fawn Drive toward the north of the parcel that flows northeast to **Catch Basin #C04 (Pond C04P). Subcatchment #24** is defined by the crown of the paved roadway and the roofs of the surrounding structures. Land is made up of roofs, paved roadway and driveway, and grass. Runoff from this catch basin flows northeast toward **Gravel Wetland #101 (Pond 101P).**

Subcatchment #31 is a segment of grassed area toward the southwest of the parcel that flows northeast to **Yard Drain #Y01 (Pond #Y01P). Subcatchment #32** is defined by the roofs of the surrounding structures. Land is made up of roofs, grass and woods. Runoff from this yard drain flows northeast toward **Catch Basin #C03 (Pond C03P).**

Subcatchment #32 is a segment of grassed area toward the center of the parcel that flows northeast to **Yard Drain #Y02 (Pond Y02P). Subcatchment #32** is defined by the roofs of the surrounding structures and the natural contours of the landscape. Land is made up of roofs and grass. Runoff from this yard drain flows northeast toward **Yard Drain #Y01 (Pond #Y01P).**

Subcatchment #41 is the contributing area to **Gravel Wetland #101 (Pond #101P)** (grassed) and is located northeast of Fawn Drive. The subcatchment is limited to the perimeter of the gravel wetland, the perimeter of conventional pavement, and the roofs of the surrounding structures. Runoff within this subcatchment is drained off-site to **Final Reach #300**.

Subcatchment #7 is located to the west of the parcel (grassed) defined by the perimeter of the parcel and the surrounding structures. Runoff drains northwest through **Reach #7** before reaching **Yard Drain #Y01 (Pond #Y01P).**

Subcatchment #53, 53a, & 53b include two partial rooftops (dwelling units #5-8) toward the west of the parcel as well as a crushed stone layer known as **Infiltration Trench #203 (Pond #203P).** Stormwater infiltrates through the crushed stone layer providing storage for the 50-year stormwater event.

Final Reach #400

Subcatchment #4 is marginally reduced in size due to the construction of **Gravel Wetland #101 (Pond #101P)**. Runoff still flows to **Final Reach #400**.

Final Reach #500

Subcatchment #5 decreased in size considerably due to the construction of the proposed driveway and some of the proposed dwelling units**.** Runoff still flows southwest off-site to **Final Reach #200**.

Subcatchment #44 is a small section toward the northwest of the parcel that is determined by surrounding rooftops and the porous pavement sidewalk. This area mostly consists of grassed area but includes pavement form the sidewalk. Runoff in this area drains to **Porous Pavement Sidewalk #104 (Pond 104P)** where some infiltration will occur below the underdrain and remaining water drains toward **Final Reach #500**.

Subcatchment #51, 51a, & 51b include two partial rooftops (dwelling units #15-18) toward the northwest of the parcel as well as a crushed stone layer known as **Infiltration Trench #201 (Pond #201P).** Stormwater infiltrates through the crushed stone layer providing storage for the 50-year stormwater event.

Final Reach #600

Subcatchment #6 is unchanged in size and continues to contribute to the same **Final Reach #600**.

3.0a Stormwater Treatment:

Treatment takes place within the **Subsurface Gravel Wetland #101 (Pond #101P), Rain Garden W/ Stormtech #102 (Pond #102P)**, **Infiltration Trenches #201-203 (Pond #201-203P)**, **Porous Pavement Sidewalk #103** and **#104 (Ponds #103P and #104P)** designed to support the development on site. The stormwater quality volume capability is treated within provided treatment area of the practices.

3.0b Stormwater Infiltration:

Groundwater recharge volume requirements are satisfied by **Infiltration Trenches #201-203 (Ponds #201-203)** and **Porous Pavement Sidewalk With Infiltration #103 (Pond #103P)**. See Infiltration Feasibility Study also prepared by Berry Surveying & Engineering and published on the same day. Additional infiltration will occur on site through the porous pavers and porous patios, which is not accounted for in the model.

3.1 FULL COMPARATIVE ANALYSIS

ANALYSIS COMPONENT: PEAK RATE DISCHARGE (Cubic Feet / Second)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #100	Existing	1.37	2.98	4.35	5.68
	Proposed	1.21	2.30	3.18	4.42
Final Reach #200	Existing	0.06	0.38	0.75	1.14
	Proposed	0.04	0.12	0.19	0.26
Final Reach #300	Existing	1.33	3.19	4.83	6.44
	Proposed	0.24	2.06	3.63	5.81
Final Reach #400	Existing	0.09	0.21	0.32	0.42
	Proposed	0.06	0.12	0.18	0.23
Final Reach #500	Existing	0.96	2.19	3.26	4.30
	Proposed	0.83	1.78	2.58	3.35
Final Reach #600	Existing	0.04	0.08	0.11	0.15
	Proposed	0.04	0.08	0.11	0.15

ANALYSIS COMPONENT: VOLUME (Acre Feet) (24 HOURS)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #100*	Existing	0.121	0.254	0.369	0.482
	Proposed	0.136	0.252	0.368	0.480
Final Reach #200	Existing	0.013	0.044	0.076	0.110
	Proposed	0.004	0.009	0.014	0.019
Final Reach #300*	Existing	0.175	0.391	0.586	0.779
	Proposed	0.161	0.477	0.746	1.006
Final Reach #400	Existing	0.010	0.022	0.032	0.043
	Proposed	0.004	0.009	0.013	0.017
Final Reach #500	Existing	0.128	0.277	0.409	0.538
	Proposed	0.112	0.239	0.349	0.456
Final Reach #600	Existing	0.003	0.006	0.008	0.011
	Proposed	0.003	0.006	0.008	0.011

*See Dover waiver request for volumetric increase at Final Reach #100 & #300 due to on site soil conditions. A volumetric increase within the allotment for the Channel Protection Volume (CPV) (Env-Wq 1507.05) has been shown in the comparative analysis. The project as shown provides compliance with Env-Wq 1507.05(b)(1)b where this discharge from the developed area is less than 2 CFS and the 2 Year – 24 HR storm event peak rate of runoff is reduced to the final reaches. The groundwater recharge volume has been met on the project. However, with soils conducive to groundwater recharge are located almost entirely at the high points of the project, resulting in roof runoff being the infiltrated stormwater volumes for the project. There is no soil that will

provide infiltration in accordance with Env-Wq 1500 in the vicinity of Gravel Wetland #101 after treatment occurs.

4.0 EROSION AND SEDIMENT CONTROL PLAN & STORMWATER CONTROL MEASURES (SCMs)

Reference: Proposed Site Plan and Grading Plan
Erosion & Sediment Control Plan
Erosion & Sediment Control Details

The proposed site development is protected from erosion and the abutting properties are protected from sediment by the use of Stormwater Control Measures as outlined in the New Hampshire Stormwater Manual (February 2025, NHDES & US EPA). Any area disturbed by construction will be re-stabilized within 30 days and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Reference is also made to the Stormwater System Management: Inspection & Maintenance Manual and Stormwater Operations, Inspection & Maintenance Plan which has been developed specifically for this project and available to the owner.

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Perimeter Control (Silt Fence / SiltSoxx / Erosion Control Mix Berm)

Erosion Control Mix Berm

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B46-B50) (Direct Quotes)

2022 US CGP (As Amended) 2.2.3 (Direct Quotes)

Chapter Env-Wq 1506.05 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Descriptions (NH SWM):

An erosion control mix berm is a type of sediment barrier with trapezoidal berm in shape that intercepts sheet flow and ponds stormwater runoff, allowing sediment to settle, and filtering runoff through sediment as well. They are an environmentally sensitive and cost-effective alternative to silt fence. An alternative to a simple erosion control mix berm is a "continuous contained berm." consisting of erosion control mix compost encapsulated in a mesh fabric (or "filter sock"). Refer to the "Filter Sock" fact sheet in this Appendix for specifications.

This barrier is installed across or at the toe of a slope, to intercept and retain small amounts of sediment from disturbed or unprotected areas.

Erosion control mix berms and socks sometimes offer a better solution than silt fence and other sediment control methods, because the organic material does not require any special trenching, construction, or removal, unlike straw bales, silt fence or coir rolls. This makes the technique very cost-effective. Silt fence must be disposed of as a solid waste.

The erosion control mix is organic, biodegradable, renewable, and can be left onsite. This is particularly important below embankments near streams, as re-entry to remove or maintain a synthetic barrier can cause additional disturbance.

Erosion control mix berms can be easily and quickly fixed if they are disturbed during construction activity.

Considerations (NH SWM):

The erosion control mix berm is used where:

- Erosion will occur in the form of sheet erosion only and there is no concentration of water in a channel or other drainage way above the berm.
- The area upslope of the berm has a slope of less than 5 percent.

• Sedimentation can pollute or degrade adjacent wetland and/ or watercourses.
• Sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas.
• The contributing drainage area is less than 1/4 acre per 100 feet of barrier length, the maximum length of slope above the barrier is 100 feet, and the maximum gradient behind the barrier is 5 percent. If the slope length is greater, other measures such as diversions may be necessary to reduce the slope length.
• Sediment barriers should not be used in areas of concentrated flows. Under no circumstances should erosion control mix barriers be constructed in live streams or in swales where there is the possibility of a washout.
• Sediment barriers are effective only if installed and maintained properly.
• Sediment barriers should be installed prior to any soil disturbance of the contributing drainage area above them.
• Frozen ground, outcrops of bedrock and very rooted forested areas are locations where berms of erosion control mix are most practical and effective.
• Other Erosion and Sediment Control (E&SC) measures should be used at low points of concentrated stormwater runoff, below culvert outlet aprons, around catch basins and closed storm systems, and at bottom of steep perimeter slopes.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Filter berms should be inspected at least daily during prolonged rainfall. They should be repaired immediately if there are any signs of erosion or sedimentation below them. If there are signs of breaching of the barrier, or impounding of large volumes of water behind them, then they should be replaced with other measures to intercept and trap sediment (such as a diversion berm directing stormwater runoff to a sediment trap or basin).
• Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately 1/3 of the height of the barrier.
• Filter berms should be reshaped or reapplied as needed.
• Any sediment deposits remaining in place after the barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.
• See Chapter 6 for general information on inspection and maintenance of E&SC measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Erosion control mix can be manufactured on or off the project site. It must consist primarily of organic material, separated at the point of generation, and may include shredded bark, stump grindings, composted bark, or acceptable manufactured products. Wood and bark chips, ground construction debris or reprocessed wood products will not be acceptable as the organic component of the mix.

Specifications for erosion control mix berms include:

- Composition of the erosion control mix should be as follows:
    - o Erosion control mix should contain a well-graded mixture of particle sizes and may contain rocks less than 4 inches in diameter. Erosion control mix must be free of refuse, physical contaminants, and material toxic to plant growth.
    - o The mix composition should meet the following standards:
        - The organic matter content should be between 25 and 65 percent, dry weight basis.
        - Particle size by weight should be 100 percent passing a 3-inch screen, 90 percent to 100 percent passing a 1-inch screen, 70 percent to 100 percent passing a 0.75-inch screen, and a maximum of 30 percent to 75 percent, passing a 0.25-inch screen.
        - The organic portion needs to be fibrous and elongated.
        - The mix should not contain silts, clays, or fine sands.
        - Soluble salts content should be less than 4.0 millimhos per centimeter.
        - The pH should be between 5.0 and 8.0.
- The barrier must be placed along a relatively level contour and follow the contour of the land as closely as possible. It may be necessary to cut tall grasses or woody vegetation to avoid creating voids and bridges that would enable fines to wash under the barrier through the grass blades or plant stems.
- The barrier must be a minimum of 12 inches high, as measured on the uphill side of the barrier, and a minimum of 2 feet wide.

2022 CGP Requirements:

2.2.3 Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.

a. The perimeter control must be installed upgradient of any natural buffers established under Part 2.2.1, unless the control is being implemented pursuant to Part 2.2.1a.ii-iii;
b. To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line;

c. After installation, to ensure that perimeter controls continue to work effectively:

i. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control;

ii. and After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.

BS&E Considerations/Recommendations:

The erosion control mix berm is the preferred method of BS&E and other municipalities, such as Dover, as long as upslope conditions allow.

Filter Sock

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B51-B55) (Direct Quotes)

2022 US CGP (As Amended) 2.2.3. (Direct Quotes)

General Description (NH SWM):

Filter socks, also known as "continuous contained berms" or "straw wattles" are an alternative to simple erosion control mix berms that add containment and stability. Filter socks consist of stump grindings or erosion control mix compost encapsulated in mesh fabric. A straw wattle consists of straw encapsulated in mesh fabric. These controls are a type of temporary sediment barrier installed across or at the toe of a slope to intercept and retain small amounts of sediment from disturbed or unprotected areas. The primary function of filter socks is to slow and pond the water, allowing soil particles to settle.

Considerations (NH SWM):

• Filter socks are not for use across streams or channels. They should be located only where shallow pools can form and where areas only contribute sheet flow to the device.
• Filter socks should be used for small, disturbed areas such as for providing protection around a soil stockpile.
• Filter socks, similar to other sediment barriers, should be designed for a contributing drainage area of less than 1/4 acre per 100 feet of barrier or with a drainage distance of 100 feet or less.
• Filter socks should only receive sheet flow from upgradient areas.
• Filter socks work especially well in areas where trenching is not feasible such as over frozen ground, over pavement, or over ledge areas.
• Filter socks are especially useful on steep slopes if sufficient anchoring and preparation is made (i.e., remove heavy vegetation) to ensure good contact of sock and underlying soil along its entire length. Maximum gradient behind the barrier is 2h:1v (50 percent).
• Filter socks must be used in conjunction with other measures that prevent or control erosion, as this control measure is for sediment only. Improperly applied or installed sediment barriers may increase erosion.
• Filter socks and straw wattle barriers may also be used for check dams where installation access or other conditions prevent the use of materials such as stone.
• Mesh materials should be 100 percent biodegradable where feasible. The opening size should be less than or equal to 1/8 inches as required by Env-Wq 1506.15. Non-biodegradable mesh encapsulation materials should be removed from the site following 85 percent vegetative site stabilization.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Filter socks should be inspected at least daily during prolonged rainfall.
• At a minimum, sediment deposition should be removed when the silt deposition accumulates to one-half the height of the berm.
• These barriers can be entirely removed as a unit from the site following site stabilization.
• Biodegradable filter socks should last 6 months and may need to be replaced if disturbances are anticipated to last longer. B-52
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

• Filter socks can be manufactured on or off the project site.
• Filter socks can range in diameter from 8 inches to 32 inches. Socks with diameters less than 12 inches should only be used for residential projects disturbing a quarter acre or less.
• Filter socks should be staked using 2-inch by 2-inch wooden stakes placed at 10-foot lineal spacing to a depth of 12 inches, or staked per manufacturer specifications. Socks placed on slopes should be anchored with stakes driven through the center of the sock or immediately downslope of the sock.
• The barrier should be installed to maintain surface contact and avoid potential creation of voids that would allow fines to flow under the barrier (i.e., full contact with the ground is critical for filter socks to properly function). It may be necessary to cut tall grasses or woody vegetation.
• Filter socks must consist of primarily organic material including shredded bark, stump grindings, composted bark, or acceptable manufactured products. Unacceptable materials include wood and bark chips, ground construction debris or reprocessed wood projects.
• Seeds may be added to the organic filler material, which can permanently stabilize the shallow slope. The seed mix must not contain non-native or nuisance species seed sources.
• Installation with J-hooks or "smiles" will increase berm efficiency and reduce erosion-causing failures.

2022 CGP Requirements:

2.2.3 Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.

- The perimeter control must be installed upgradient of any natural buffers established under Part 2.2.1, unless the control is being implemented pursuant to Part 2.2.1a.ii-iii;
- To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line;
- After installation, to ensure that perimeter controls continue to work effectively:

  - Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control;
  - and After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.
- Exception. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (e.g., due to a limited or restricted right-of-way), implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

Silt Fence

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B58-B64) (Direct Quotes)

2022 US CGP (As Amended) 2.2.3 (Direct Quotes)

Chapter Env-Wq 1506.04 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Silt fences are temporary sediment barriers consisting of filter fabric attached to supporting posts and entrenched into the soil. This barrier is installed across or at the toe of a slope, to intercept and retain small amounts of sediment from disturbed or unprotected areas.

Silt fences have a useful life of one season. They function primarily to slow and pond the water and allow soil particles to settle. Silt fences are not designed to withstand high heads of water, and therefore should be located where only shallow pools can form. Their use is limited to areas where overland sheet flows are expected.

Silt fence is a sediment control measure, not an erosion control measure. It is intended to be used in conjunction with other measures that do prevent or control erosion. Improperly applied or installed silt fence will increase erosion.

Silt fences should not be used across streams, channels, swales, ditches, or other drainage ways. Silt fences are not capable of effectively filtering the high rates and volumes of water associated with channelized flow. Silt fences should not be designed to impound sediment or water more than 18 inches high. Silt fences installed across a concentrated flow path are subject to undercutting, end cutting, and overtopping. This frequently not only results in the bypass of sedimentladen water, but

also in the complete failure of the fence. Such failures typically release sediment accumulated on the upgradient side of the fence, and result in severe erosion of the channel both upstream and downstream of the fence.

Considerations (NH SWM):

- Silt fence barriers are used where:
    - o Erosion will occur only as of the result from sheet flow (flow depth of less than 0.1 feet) and there is no concentration of water in a channel or other drainage way above the fence.
    - o Sedimentation can pollute or degrade adjacent wetlands or watercourses.
    - o Sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas.
    - o The contributing drainage area is less than 1/4 acre per 100 feet of barrier length, the maximum length of slope above the barrier is 100 feet, and the maximum gradient behind the barrier is 50 percent (2h:1v). If any of these conditions are exceeded, other measures may be necessary to control erosion and to intercept and treat the sediment load.
    - o Sediment barriers should not be used in areas of concentrated flows. Under no circumstances should silt fences be constructed in streams or in swales where there is the possibility of a washout.
- Silt fences can be used for 60 days or longer depending on ultraviolet stability and manufacturer's recommendations. However, silt fences generally have a useful life of one season, and should be periodically replaced on longer duration construction projects.
- Avoid reinforcing silt fences with metal mesh or plastic mesh, which could potentially entangle and harm wildlife (USFWS, 2023).
- Silt fencing generally is a better sediment barrier than hay bale barriers.
- Potential causes of silt fence failure include:
    - o Improper placement on the site.
    - o Allowing excessive drainage area to the silt fence structure.
    - o Inadequate trenching depth and improper backfill and compaction of the bottom of the silt fence fabric.
    - o Improper attachment to posts.
    - o Inadequate maintenance of the silt fence after installation.
    - o Installing silt fence with a descending grade along the fence alignment, resulting in the diversion or concentration of stormwater runoff.
    - o Placement of fence at mid-slope of a cut or fill embankment. Because a silt fence works by impounding water, it should be placed at the toe of such slopes, to allow for this function, and to avoid potential diversion or concentration of flows.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Fences should be inspected and maintained at least daily during prolonged rainfall.
• Sediment deposition should be removed, at a minimum, when deposition accumulates to 1/3 the height of the fence, and moved to an appropriate location so the sediment is not readily transported back toward the silt fence.
• Silt fences should be repaired immediately if there are any signs of erosion or sedimentation below them. If there are signs of undercutting at the center or the edges of the barrier, or impounding of large volumes of water behind them, sediment barriers should be replaced with a temporary check dam.
• Should the fabric on a silt fence decompose or become ineffective prior to the end of the expected usable life and the barrier still is necessary, the fabric should be replaced promptly.
• Any sediment deposits remaining in place after the silt fence is no longer required should be dressed to conform to the existing grade, prepared and seeded.
• If there is evidence of end flow on properly installed barriers, extend barriers uphill or consider replacing them with other measures, such as temporary diversions and sediment traps.
• Silt fences have a useful life of one season. On longer construction projects, silt fence should be replaced periodically as required to maintain effectiveness.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Fences should be used in areas where erosion will occur only in the form of sheet erosion and there is no concentration of water in a channel or drainage way above the fence. Sediment barriers should be installed prior to any soil disturbance of the contributing drainage area above them.

Specifications for use of silt fences are as follows:

• The maximum contributing drainage area above the fence should be less than 1/4 acre per 100 linear feet of fence.
• The maximum length of slope above the fence should be 100 feet.
• The maximum slope above the fence should be 2h:1v.
• Fences should be installed following the contour of the land as closely as possible, and • The ends of the fence should be flared upslope. B-60
• The fabric should be embedded a minimum of 4 inches in depth and 4 inches in width in a trench excavated into the ground, or if site conditions include frozen ground, ledge, or the presence of heavy roots, the base of the fabric should be backfilled with a minimum thickness of 8 inches of 3/4-inch stone.
• The soil should be compacted over the embedded fabric.

• Adjoining sections of the fence should be overlapped by a minimum of 6 inches (24 inches is preferred), folded and stapled to a support post. If metal posts are used, fabric should be wire-tied directly to the posts with three diagonal ties.
• Silt fencing should not be stapled or nailed to trees.
• The height of a silt fence should not exceed 36 inches as higher fences may impound volumes of water sufficient to cause failure of the structure.
• The filter fabric should be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth should be spliced together only at support post, with a minimum 6-inch overlap, and securely sealed.
• A manufactured silt fence system with integral posts may be used.
• A trench should be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upgradient from the barrier. Post spacing should not exceed 6 feet. The trench should be backfilled and the soil compacted over the filter fabric.
• The filter fabric should be stapled or wired to the post, and 8 inches of the fabric should be extended into the trench. The fabric should not extend more than 36 inches above the original ground surface.
• Silt fence may be installed by "slicing" using mechanical equipment specifically designed for this procedure. The slicing method uses an implement towed behind a tractor to "plow" or slice the silt fence material into the soil. The slicing method minimally disrupts the soil upward and slightly displaces the soil, maintaining the soil's profile and creating an optimal condition for subsequent mechanical compaction.
• Silt fences should be installed with "smiles" or "J-hooks" to reduce the drainage area that any segment will impound (see diagrams). The ends of the fence should be turned uphill.
• Silt fences placed at the toe of a slope should be set at least 6 feet downgradient from the toe to allow space for shallow ponding and to allow for maintenance access without disturbing the slope.
• Silt fences should be removed when they have served their useful purpose, but not before the upslope areas have been permanently stabilized.

2022 CGP Requirements:

2.2.3 Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.

- The perimeter control must be installed upgradient of any natural buffers established under Part 2.2.1, unless the control is being implemented pursuant to Part 2.2.1a.ii-iii;
- To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line;
- After installation, to ensure that perimeter controls continue to work effectively:
    - Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control;
    - and After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.

- Exception. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (e.g., due to a limited or restricted right-of-way), implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

Catch Basin (No Sump) / Drain Manhole / Yard Drain / Rain Guardian Foxhole

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A18-A21) (Direct Quotes)

Chapter Env-Wq 1508.06 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Catch Basins and Yard Drains are used throughout the site to capture and, along with culvert pipes and manhole, route surface water runoff to stormwater treatment and detention infrastructure. During construction the catch basins will be protected by inlet protection per the approved construction plans. The practice of street sweeping on a bi-annual basis will help reduce maintenance of these catch basins and culvert pipes.

Note: Deep sump catch basins are not allowed to be used on this proposed development due to wildlife concerns and any manufacturer sump resulting in a catch basin must be filled with washed crushed stone. Sediment should be trapped in the sediment forebays but is also a concern in earlier structures. See construction details for specifications of these conveyance practices.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other method and disposed of in conformance with applicable state and federal regulations.
• See Rain Guardian Foxhole maintenance sheet attached for additional details.

Bioretention Systems

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A35-A47) (Direct Quotes)

Chapter Env-Wq 1508.08 & 1508.06 Alteration Of Terrain (RSA 485-A:17)

(As Amended September 4, 2024)

Description:

Bioretention systems collect stormwater runoff in a landscaped depression, where it ponds, filters through the engineered soil media, and infiltrates into the ground or is collected and discharged to the surface. Bioretention systems can reduce sediment, nutrients, oil and grease, and trace metals.

The major difference between bioretention systems and other filtration systems is the composition of the filter media and the use of vegetation. A typical surface sand filter is designed to be maintained with no vegetation, whereas a bioretention cell is planted with a variety of vegetation whose roots assist with pollutant uptake. The use of vegetation allows these systems to blend in with other landscaping features.

The primary types of bioretention systems are:

• **Infiltrating bioretention systems** have an elevated underdrain (or no underdrain) and are configured to infiltrate filtered stormwater runoff directly into the subsoil (preferred).
• **Filtering bioretention systems** have an underdrain that is installed in poor soils or is lined where infiltration is not desired (e.g., hot spot areas) such that limited or no infiltration is anticipated. The underdrain collects filtered stormwater runoff and conveys it to a discharge outlet.
• **Bioretention systems with internal storage reservoirs (ISR)** are designed to include a storage reservoir that remains in saturated conditions and creates an anoxic zone suitable for denitrification. Bioretention systems with ISR can be designed as infiltrating or filtering systems. Infiltrating bioretention systems with ISR are also called "hybrid" bioretention systems.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Special attention should be given to maintenance in the first two years of operation as vegetation is established.
• Systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24- hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
• Pre-treatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
• Trash and debris should be removed at each inspection.
• At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72 hours following a rainfall event, then a qualified professional should

assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to removal of accumulated sediments or reconstruction of the bioretention soil mixture.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Bioretention Systems/ Tree Filters" for an example inspection checklist.

ADS StormTech Chamber: Bioretention Stone Storage Volume

Description:

The StormTech Chamber System is a trademarked product of the Advance Drainage System (ADS) company. The purchase and installation of this system will conform to ADS proprietary rights. The design engineer has specifically used the StormTech SC-740 Chambers. The system is designed as a detention practice with under drain. The system has a perforated underdrain to collect and distribute runoff to the outlet structure. The volume in the washed crushed stone and in the specified chambers will act as detention in connection with the Outlet Structure discharge stack. P-102 contains 24 chambers in 2 rows of 12 chambers. The top of the outlet structure stack is designed to pass larger storm events. Multiple inspection ports are located throughout the system.

Inspection:

Semi-annual and severe rain storm event inspections will be conducted by a trained individual with the capability to observe the condition and the extent of sediment buildup. See list of known qualified inspection / maintenance professionals below. The outlet structure must also be inspected. The inspection process requires the removal of Drain Manhole covers.

Maintenance Considerations:

Sediment collected in the Isolator Row will be removed with the JetVac process, consisting of high-pressure water scouring and suction retrieval of the captured sediment and pollutants. The orifice cover plate installed to ensure that runoff is routed to the Isolator Row must be in place and if not re-installed to the original specifications. The stack in the outlet structure must be maintained to ensure that there is no buildup that prevents the proper operation of the outlet.

The stormwater practice should be dry within 72 hours of the end of a storm event.

A copy of the ADS StormTech SC-740 Chamber manual is attached.

After the system construction and before operation of the site, it is recommended that a long-term agreement for Inspection and Maintenance be established.

As for Isolator Row inspection and maintenance, Catch Basin maintenance, the regional ADS, Inc. representatives recommend using any of the following contacts:

Stormwater Compliance, LLC;
Attn: Nathan Marles, 1-877-271-9055; nmarles@lidtech.com
163 Thadeus Street, Portland, ME 04106
Info@stormwatercomp.com

Ted Berry Company;
Attn: Dave Beauchamp, 207-897-3348; david.beauchamp@tedberrycompany.com
521 Federal Road, Livermore, ME 04253
Info@tedberrycompany.com

Bellemore Septic Sewer & Drain
Attn: Ray Bellemore, 603-641-6640
raymond@bellemore.com
PO Box 10369
Bedford, NH 03110
ADS / StormTech Contact: Aaron Cheever, PE, Advance Drainage Systems, Inc.
aaron.cheever@ads-pipe.com 1-978-302-0650

Gravel Wetland

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A70-A73) (Direct Quotes)

Chapter Env-Wq 1508.05 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

The gravel wetland system consists of one or more flow-through constructed wetland cells, preceded by a pre-treatment structure. The cell(s) are filled with a gravel media, supporting an organic substrate that is planted with wetland vegetation. During low-flow storm events, the system is designed to promote subsurface horizontal flow through the gravel media, allowing contact with the root zone of the wetland vegetation. The gravel and planting media support a community of soil microorganisms. Water quality treatment occurs through microbial, chemical, and physical processes within this media. Treatment may also be enhanced by vegetative uptake and microbial activity.

To accommodate higher flows, the system is designed to permit ponding over the wetland surface, allowing the system to function similar to other constructed wetland or detention systems. Overflow from the wetland is provided by an outlet structure

designed for this "extended detention" condition. Following such an event, remaining water on the surface of the wetland infiltrates through engineered inlets into the gravel media, and flows horizontally through the media as in the lowflow condition.

The wetland is designed to sustain a saturated zone, called the internal storage reservoir, that typically begins 4 inches below the treatment surface, consistent with the invert elevation of the primary system outlet. This design permits anaerobic denitrification treatment and wetland vegetation growth. The gravel media consists of either crushed rock or processed gravel. An organic soil layer is placed on top of this material, and wetland plants are rooted in the media where they directly take up pollutants.

The system can be designed to integrate some stormwater storage and extended detention but generally does not provide infiltration unless specifically designed (see "Hybrid Bioretention Systems"). With these features, the practice would not only remove pollutants, but also contribute to attenuation of peak rates through temporary storage with minimal reduction in stormwater runoff volume through evapotranspiration. For more information on gravel wetland design, see the UNHSC Subsurface Gravel Wetland Design Specifications.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Removal of debris from inlet and outlet structures.
• Inspection and removal of sediment accumulation in the gravel bed.
• Depending on sediment accumulation, bed may require periodic replacement and replanting.
• Inspection and repair of containment structure (if applicable), inlet and outlet structures, and accessories.
• Wetland vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Subsurface Gravel Wetland Systems" for an example inspection checklist.

Infiltration Trench

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A53-A59) (Direct Quotes)

Chapter Env-Wq 1508.07 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

An infiltration trench is a stone-filled excavation used to temporarily store stormwater runoff and allow it to infiltrate into surrounding, natural soil. Typically, stormwater runoff enters the trench as overland flow or piped inlet flow after designed pre-treatment. Installations around the perimeter of parking lots, between residential lots, and along roads are most common. Infiltration trenches can also be incorporated along the center of a vegetated swale to increase its infiltration ability. Infiltration trenches must have an observation well along the centerline for monitoring water levels and drawdown rates.

An infiltration drip edge is constructed like an infiltration trench, except that a drip edge intercepts only roof stormwater runoff, and does not require pre-treatment. Roof drip edges may be designed to act as a filtering practice or an infiltration practice as follows:

- **Filtering roof drip edges** do not infiltrate. They have an underdrain that captures and conveys stormwater runoff downstream. Filtering roof drip edges may be lined.
- **Infiltrating roof drip edges** are designed to provide infiltration.

Maintenance Requirements:

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Pre-treatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- If an infiltration system does not drain within 72 hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Permeable Pavement/Pavers

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A60-A64) (Direct Quotes)

Chapter Env-Wq 1508.08 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Permeable pavement consists of a permeable/pervious surface, base, and subbase materials which allow penetration of stormwater runoff into underlying soils. The surface materials for permeable pavement can consist of paving blocks or grids, porous asphalt, or pervious concrete. These materials are installed on a base which serves as a filter and or reservoir course between the pavement surface and the underlying subbase material. The subbase material typically comprises of a layer of crushed stone that not only supports the overlying pavement structure, but also serves as a reservoir to store stormwater runoff that penetrates the pavement surface until it can percolate into the ground.

Porous asphalt is very similar to conventional asphalt except that it is mixed without particles smaller than coarse sand. Without these smaller size particles, water can pass through the surface and into a crushed stone storage area. An advantage to the use of porous asphalt is the reduced need for stormwater conveyance systems and other additional SCMs.

Pervious concrete uses carefully controlled amounts of water and cementitious materials to create a thick coating around aggregate particles, but retaining significant void space in the placement of the mixture. A pervious concrete mixture contains little or no sand, creating this void content.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Provision of signs is recommended, to indicate locations of permeable pavements and the applicability of special maintenance measures.
• No winter sanding of permeable pavements is permitted.
• Minimize application of salt for ice control.
• Never reseal or repave with impermeable materials.
• Inspect annually for pavement deterioration or concrete spalling.
• Monitor periodically to ensure that the pavement surface drains effectively after storms.
• For permeable pavements, clean periodically (one to two times per year) using a vacuum sweeper. Note, permeable surface selection will likely lead to different maintenance sensitivities and approaches.
• For vegetated paver systems, periodically reseed grass pavers to fill in bare spots.
• Major clogging may necessitate restoration or replacement of pavement surface.
• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Permeable Pavement" for an example inspection checklist.

Sediment Forebay

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A28-A30) (Direct Quotes)

Chapter Env-Wq 1508.12 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

A sediment forebay is an impoundment, basin, or other storage structure designed to dissipate the energy of incoming stormwater runoff and allow for initial settling of coarse sediments. Forebays are used for pre-treatment of stormwater runoff prior to discharge into the primary water quality treatment SCM. Forebays are generally integrated into the design of larger stormwater management structures.

Maintenance Requirements:

- Maintenance access must be provided.
- Embankment design must be engineered to meet applicable safety standards (see description of "Detention Basin").
- Exposed earth slopes and bottom of basin should be stabilized using seed mixes appropriate for soils, mowing practices, and exposure to inundation.
- Exit velocities from the forebay should be non-erosive using a level spreader, spillway, check dam, or other appropriate dissipation techniques.
- The bottom floor may be designed with a concrete pad or hardened bottom to aid in removal of accumulated sediment during maintenance.
- As an alternative to an earthen basin, an underground structure may serve as a forebay. However, use of fully enclosed structures must consider accessibility for inspection and cleaning.
- For guidance on sizing of riprap, refer to the Federal Highway Administration's Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance- Third Edition, Volume I and II (FHWANHI-09-111 and FHWA-NHI-09-112, Hydraulic Engineering Circular 23, 2009).

Permanent Outlet Protection

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A127-A131) (Direct Quotes)

Description:

Outlet protection is typically provided at stormwater discharge conduits from structural SCMs to reduce the velocity of concentrated stormwater flows to prevent scour and minimize the potential for downstream erosion. Outlet protection is also provided where conduits discharge stormwater runoff into an inground stormwater management practice (e.g., pond or swale) to prevent scour where flow enters the SCM.

Standard engineering practices allow for many different types of outlet protection which provide energy dissipation. Common outlet protection measures include:

- Riprap aprons, the design of which is covered within this section.
- Riprap lined scour holes, stilling basins or plunge pools. Design references for stilling basins are provided under 'References'.

Other outlet protection practices may be used, if documented by applicable technical literature.

Maintenance Requirements:

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- Remove sediment, debris, and woody vegetation.

Stone Berm Level Spreader

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A132-A134) (Direct Quotes)

Chapter Env-Wq 1508.19 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

A stone berm level spreader is an outlet structure constructed at zero percent grade across a slope used to convert concentrated flow to "sheet flow." It disperses or "spreads" flow thinly over a receiving area, usually consisting of undisturbed, vegetated ground. The conversion of concentrated flow to shallow, sheet flow allows stormwater runoff to be discharged at non-erosive velocities onto natural ground. To stabilize the spreader outlet, a stone berm is provided to dissipate flow energy, and help disperse flows along the length of the spreader.

Level spreaders are not designed to remove pollutants from stormwater; however, some suspended sediment and associated phosphorus, nitrogen, metals and

hydrocarbons will settle out of the stormwater runoff through settlement, filtration, infiltration, absorption, decomposition and volatilization.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel or down-slope of the spreader.
• Remove debris whenever observed during inspection.
• Remove sediment when accumulation exceeds 25 percent of spreader channel depth.
• Remove woody vegetation.
• Snow should not be stored within or down-slope of the level spreader or its approach channel.
• Repair any erosion and re-grade or replace stone berm material, as warranted by inspection.
• Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor regrading.

Conveyance Swale

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A115-A117) (Direct Quotes)

Chapter Env-Wq 1508.20 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Conveyance swales are stabilized channels designed to convey stormwater runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance swales may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pre-treatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/ Pre-treatment Practice as described elsewhere in this Appendix.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Grassed swales should be inspected periodically (at least annually) for sediment accumulation, erosion, and condition of surface lining (vegetation or riprap). Repairs, including stone or vegetation replacement, should be made based on this inspection.

• Remove sediment, debris, and invasive species annually, or more frequently as warranted by inspection.
• Mow vegetated swales based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Temporary Construction Exit

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B73-B75) (Direct Quotes)

2022 US CGP (As Amended) 2.2.4. (Direct Quotes)

Chapter Env-Wq 1506.09 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

A stabilized construction exit consists of a pad of stone aggregate placed on a geotextile filter fabric, located at any point where traffic will be leaving a construction site to an existing access roadway or other paved surface. Its purpose is to reduce or eliminate the tracking of sediment onto public roads by construction vehicles. This helps protect receiving waters from sediment carried by stormwater runoff from public roads.

Considerations (NH SWM):

• Only construction traffic leaving the site is required to use the temporary stabilized exit. Consider providing a separate, unprotected, entrance for traffic entering the site. This will increase the longevity of the stabilized exit by eliminating heavy loads entering the site and reducing the total traffic over the device.
• Locate construction exits to limit sediment leaving the site and to provide for maximum utility by all construction vehicles. Avoid entrances that have steep grades and entrances at curves in public roads to minimize sight distance issues.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• The exit should be maintained in a condition that will prevent tracking of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand, and repair and/ or maintenance of any measures used to trap sediment.
• When the control pad becomes ineffective, the stone should be removed along with the collected soil material, regraded on site, and stabilized. The entrance should then be reconstructed.

• The contractor should sweep the pavement at exits whenever soil materials are tracked onto the adjacent pavement or traveled way.
• When wheel washing is required, it should be conducted on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment should be prevented from entering storm drains, channels/ swales, or waterways.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Temporary construction exits should meet the following requirements:

• The stone should be 3-inch crushed stone (NHDOT Item No. 304.5).
• The minimum length of the pad should be 75 feet, except that the minimum length may be reduced to 50 feet if a 3-inch to 6-inch-high berm is installed at the entrance of the project site.
• The pad should extend the full width of the construction access road or 10 feet, whichever is greater.
• The pad should slope away from the existing roadway.
• The pad should be at least 6 inches thick.
• A geotextile filter fabric should be placed between the stone pad and the earth surface below the pad.
• The pad should be maintained or replaced when mud and soil particles clog the voids in the stone such that mud and soil particles are tracked off-site.
• Natural drainage that crosses the location of the stone pad should be intercepted and piped beneath the pad, as necessary, with suitable outlet protection.

2022 CGP Requirements:

2.2.10 Minimize sediment track-out.

a. Restrict vehicle use to properly designated exit points;

b. Use appropriate stabilization techniques at all points that exit onto paved roads;

i. Exception: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls are implemented to minimize sediment track-out;

c. Implement additional track-out controls as necessary to ensure that sediment removal occurs prior to vehicle exit; and

d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your 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. You are prohibited from hosing or sweeping tracked-out sediment

into any constructed or natural site drainage feature, storm drain inlet, or receiving water.

Temporary Check Dam

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B69-B72) (Direct Quotes)

2022 US CGP (As Amended) 2.2.11 (Direct Quotes)

Chapter Env-Wq 1506.07 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Temporary check dams are small temporary dams constructed across a swale, channel, or drainage ditch. Check dams are used to reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale, channel, or ditch.

Check dams may also trap small amounts of sediment generated in the swale, channel, or ditch itself. However, the check dam is not a sediment trapping measure and should not be used as such.

The measure is limited to use in small open channels that drain one acre or less. It should not be used in either perennially flowing streams or intermittent stream channels.

Check dams can be constructed of stone. In locations where stone is not available, timber check dams may be considered. Typical applications include temporary or permanent ditches, channels, or swales, which need protection during the establishment of grass linings.

Hay or straw bales should generally not be used as check dams, or in any location where there is concentrated flow. However, they may be used for check dams in applications where installation access or other conditions prevent the use of preferred materials such as stone; in such cases, installation must provide proper embedment of the straw or hay bale barrier, limit contributing drainage area to less than one acre, and provide for frequent monitoring of the barrier.

Considerations (NH SWM):

• This measure is intended for use in areas of concentrated flow, but must not be used in stream channels (whether perennial or intermittent).
• The check dam may be left in place permanently to avoid unnecessary disturbance of the soil on removal, but only if the project design has accounted for their hydraulic performance and construction plans call for them to be retained.
• If it is necessary to remove a stone check dam from a grass-lined channel that will be mowed, care should be taken to ensure that all stones are removed, including stones that have washed downstream.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Check dams should be inspected at least daily during prolonged rainfall.
• Inspections should verify that the center of the dam is lower than the edges.
• Erosion caused by high flows around the edges of the dam must be corrected immediately.
• If evidence of siltation in the water is apparent downstream from the check dam, the check dam should be inspected and adjusted immediately.
• Check dams should be checked for sediment accumulation after each significant rainfall. Sediment should be removed routinely and when it reaches a maximum depth of 1/2 of the original height.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Temporary check dams should conform to the following requirements:

• Check dams should be installed before stormwater runoff is directed to the swale, channel, or drainage ditch.
• The maximum contributing drainage area to the dam should be less than one acre.
• The maximum height of the dam should be 2 feet.
• The center of the dam should be at least 6 inches lower than the outer edges.
• The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the overflow elevation of the downstream dam.
• The check dam should not be used in a flowing stream.
• Hay bale check dams should be embedded into the ground at least 4 inches but no more than 6 inches.
• Stone check dams should be constructed of a well-graded angular 2-inch to 3-inch stone. 3/4-inch stone on the upgradient face is recommended for better filtering, with larger stone on the down-gradient face to provide stability.
• The stone should be keyed into swale/ channel/ ditch side slopes and extended by a minimum of 18 inches to prevent bypass or washout.

• If carefully installed and monitored, timber check dams may be used, and should be constructed of 4-inch to 6- inch logs embedded at least 18 inches deep into the soil. However, stone check dams are generally preferred. The stone has the ability to conform to the channel and settle if scour occurs, rendering stone check dams less susceptible to scour around the ends and downstream of the devices.
• If provided by design and construction plans, leave the dam in place permanently.
• Temporary structures should be removed once the swale, channel, or ditch has been stabilized:

- o In temporary ditches, channels, and swales, check dams should be removed, and the ditch/ channel/ swale filled in when it is no longer needed.
- o In permanent structures, check dams should be removed when a permanent lining has been established. If the permanent lining is vegetation, then the check dam should be retained until the grass has matured to protect the ditch, channel, or swale. The area beneath the check dam must be seeded and mulched immediately after removal.

2022 CGP Requirements:

2.2.11 Minimize Erosion of Stormwater Conveyances.

Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.

Examples of stormwater controls that can be used to comply with this requirement include the use of erosion controls and/or velocity dissipation devices (e.g., check dams, sediment traps), within and along the length of a constructed site drainage feature and at the outfall to slow down stormwater.

Temporary Sediment Basin

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B76-B81) (Direct Quotes)

2022 US CGP (As Amended) 2.2.12 (Direct Quotes)

Chapter Env-Wq 1506.12 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Descriptions (NH SWM):

General Description A sediment basin is a water impoundment constructed to capture and store sediment and/ or debris. Sediment is removed by temporarily detaining sediment-laden stormwater runoff, allowing time for the sediment particles to settle. In some instances, settling may be enhanced by the introduction of flocculants (see

separate "Flocculants" fact sheet in this Appendix). Flocculants should only be used upon approval by NHDES. Sediment basins may be made by constructing a dam or embankment or by excavating a depression. Sediment basins differ from sediment traps, in that basins are engineered impoundment structures, and may serve larger areas than sediment traps.

The sediment basin is designed to:

• Detain stormwater volume and slowly release it to the downstream waterways (if surface water quality standards can be met at discharge point).
• Trap sediment originating from construction site and prevent subsequent deposition in downstream drainage waterways.
• Provide storage of the trapped sediment and debris.

Considerations (NH SWM):

• Sediment basins should only be used where the following conditions exist:
    o Failure of the embankment or impoundment will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or interruption of the use or service of public utilities.
    o The basin is designed by a Professional Engineer licensed in New Hampshire.
    o The basin is designed in accordance with the measures applicable to impoundment embankments, as identified in the Appendix A "Detention Basin" fact sheet.
• Sediment basins must meet all applicable requirements if they meet New Hampshire's definition of a "dam" (https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/dam-definiton.pdf). Applicable requirements may be accessed at the NHDES Dam Bureau web page at https://www.des.nh.gov/water/dam-maintenance-andmanagement.
• It is possible to use a basin that is designed for eventual permanent use as a detention basin or water quality treatment facility for the final constructed project. However, this measure should not be undertaken unless specifically provided in the design of the project, and authorized by the design engineer. In some cases, the longterm operating integrity of a basin can be adversely affected by temporary use as a sediment basin (such as potential clogging of soils intended to provide future infiltration function).
• A sediment basin should be installed as close as possible to the disturbed area or sediment source.
• Sediment basins should be installed where stormwater runoff from undisturbed areas can be excluded from the drainage area to the basin and should be placed in compliance with the Construction General Permit Appendix F, which requires a 50 foot vegetative natural buffer from wetlands, streams, and other jurisdictional areas.
• Sediment basins mostly trap coarse-grained sediments. Fine-grained sediments such as silts and clays will remain suspended in the water and will travel off-site unless the water is detained for an extended period of time, or unless other treatment measures (such as use of flocculants or downstream filters) are implemented to enhance settling of these materials.

• Sediment basins, like detention basins, can result in warmer water temperatures than the natural condition (i.e., above ambient). Care must be exercised to not locate discharges from sediment basins near to cold-water streams.
• Basin locations and construction activities may affect downstream water quality, wetlands, and water-related wildlife habitats. These conditions must be considered in the design.
• Overall planning and design should be carefully considered to minimize the number of sediment basins required.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Sediment basin installations need to be regularly inspected during their installation. If there is any evidence of siltation downstream of the basin, corrective measures need to be implemented to keep sediment from entering downstream areas.
• Sediment basins should be inspected at least daily during prolonged rainfall.
• Outlet structures and emergency spillways should be examined at the time of inspection for any damage, and repaired immediately if any such damage is observed.
• Side slopes and embankments should be examined at the time of inspection to ensure that they are structurally sound, are not showing signs of seepage, and are not damaged by erosion or by construction activities.
• The water discharged from sediment basins should be monitored during storm events to determine how well they are functioning and if sedimentation is apparent, additional erosion control measures should be applied to eliminate the source of sedimentation.
• Geotextile fabric or stone used around a pipe-outlet riser should be checked periodically and replaced when the material has become clogged with sediment.
• Sediment should be removed, and the trap restored to original capacity when sediment has accumulated to the original design sediment storage volume.
• The materials removed from the basin should be properly disposed of and stabilized.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Sediment basins must meet the following requirements:

• Basins must be constructed and stabilized prior to disturbing the watershed above them. If sediment basins will be stabilized with vegetation, they must be installed early in the growing season.
• Erosion and Sediment Control (E&SC) measures should be employed during the construction of the sediment basin until stabilized to protect downstream waterbodies from sedimentation due to the construction disturbance required to install this E&SC measure.

• An outlet structure should be provided adequate to handle the 10-year frequency discharge without failure or significant erosion.

- o The outlet should be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.
- o Outlets should be designed so that the top of the embankment provides the minimum freeboard specified in Appendix A "Detention Basin" fact sheet.
- o The outlet should discharge to a stabilized area. The outlets must empty onto undisturbed or stabilized ground, into a watercourse, stabilized channel, or a storm sewer system. Any discharges must meet surface water quality standards. Outlet protection should be provided (see Appendix A "Permanent Outlet Protection" fact sheet) or control valves on outlet structures should be provided to hold or reduce discharge volume.

• The minimum sediment storage volume of the basin should be 3,600 cubic feet of storage for each acre of drainage area, or the calculated stormwater runoff volume from a 2-year, 24-hour storm. The capacity of the sediment basin should be equal to the stormwater volume to be detained plus the volume of sediment expected to be trapped. Periodic removal of sediment will be necessary to maintain the basin's capacity.
• The side slopes of the basin should be 3h:1v or flatter, and should be stabilized immediately after their construction.
• Embankments should be designed to meet applicable regulations, and should meet the design requirements identified in Appendix A "Detention Basin" fact sheet for embankment construction.
• The drainage area contributing to the basin must be protected against erosion so that expected sedimentation will not shorten the planned effective life of the structure. • Basins must be designed to be drained within 72 hours or less.
• An emergency spillway should be provided to safely pass the 50-year design storm without damage to the embankment, assuming that the basin is full to design depth at the beginning of the storm. The emergency spillway should not be installed in filled embankments.
• All areas disturbed during construction should be stabilized within 7 calendar days of that disturbance in accordance with the Permanent Vegetation E&SC measure, Temporary Mulching E&SC measure, or other appropriate structural E&SC measure. All construction of sediment basins must be completed and seeded by September 15 if vegetative measures will be used for final stabilization. Otherwise, side slopes must be stabilized with an alternative approved long-term stabilization measure. If structural measures such as riprap will be used for final stabilization, this time limit will not apply. Water should not be directed to the sediment basin until the basin is stabilized with vegetative or other measures.
• A sediment basin with a pipe outlet structure should be fitted with a perforated riser surrounded by a gravel cone. This will serve to filter fine particulate material. A geotextile filter should be installed around the riser prior to the placement of the gravel.

Additional Outlet Protection Considerations (NH SWM):

• Note that sediment basins are vulnerable to discharging sediment-laden water and may require additional protection at the outlet, particularly when construction sediment is fine (i.e., comprised mostly of fine silts or clays).
• Additional measures may include, but are not limited to stone filter rings, porous, baffling systems, and sediment skimmers as pictured below.

2022 CGP Requirements:

a. Situate the basin or impoundment outside of any receiving water. and any natural buffers established under Part 2.2.1;

b. Design the basin or impoundment to avoid collecting water from wetlands;

c. Design the basin or impoundment to provide storage for either: i. The calculated volume of runoff from a 2-year, 24-hour storm;33 or ii. 3,600 cubic feet per acre drained.

d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;

e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and

f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

Temporary Sediment Trap

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B82-B88) (Direct Quotes)

Chapter Env-Wq 1506.10 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH DWM):

A sediment trap is a small, temporary ponding area to intercept sediment-laden stormwater runoff from small, disturbed areas. Intercepted stormwater runoff is retained long enough to allow for settling of the coarser sediment particles. Sediment traps are usually installed at the outlet of stormwater diversion structures, channels, slope drains, construction exit wash areas, or other points of discharge from disturbed area.

Considerations (NH SWM):

• A sediment trap should be installed as close as possible to the disturbed area or sediment source.
• Sediment traps should be used in drainage ways with small watersheds (contributing drainage area less than 5 acres, but usually significantly smaller than this). For larger contributing areas, engineered sediment basins should be used instead.
• Sediment traps should be installed where stormwater runoff from undisturbed areas can be excluded from the trap.
• Traps should be located to obtain maximum storage benefit from the terrain, as well as for ease of removal and disposal of accumulated sediment.
• Sediment trap discharge should meet NH surface water quality standards at discharges to streams, rivers, or other waterbodies.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Sediment traps should be inspected at least daily during prolonged rainfall.
• Sediment should be removed, and the trap restored to original capacity when sediment has accumulated to 50 percent of the original volume.
• The materials removed from the trap should be properly disposed of and stabilized.
• Sediment trap outlets should be examined at the time of inspection for any damage, and repaired immediately if any such damage is observed.
• Geotextile fabric or stone used around a pipe-outlet riser should be checked periodically and replaced when the material has become clogged with sediment.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Temporary sediment traps should meet the following requirements:

• Sediment traps should be located so that they can be installed prior to disturbing the area they are to protect.
• The trap should be installed as close to the disturbed area or source of sediment as possible. B-83
• The maximum contributing drainage area to the trap should be less than 5 acres.
• The minimum volume of the trap should be 3,600 cubic feet of storage for each acre of drainage area.
• The side slopes of the trap should be 3h:1v or flatter, and should be stabilized immediately after their construction.

Embankments:

• The maximum height of the sediment trap embankment should be 4 feet when measured from the lowest point of natural ground on the downstream side of the embankment.
• The minimum top width of the embankment should be 6 feet.

Outlets (General Requirements):

• The outlet should be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.
• Outlets should be designed so that the top of the embankment is a minimum of 1 foot above the crest elevation of the outlet.
• The outlet should discharge to a stabilized area (see "Temporary and Permanent Mulching," "Temporary Erosion Control Blanket," or "Temporary Vegetation").
• Outlets may be constructed as earth spillways, stone outlets, or pipe outlets.

Earth Outlets:

• An earth outlet sediment trap has a discharge point that is located either over natural ground or cut into natural ground.
• The outlet width should be equal to 6 times the drainage area in acres.
• The embankment and outlet should be vegetated within 3 days of construction.

Stone Outlets:

• A stone outlet sediment trap has an outlet consisting of a crushed stone section in the embankment.
• The stone section should be located at the low point of the natural ground, as determined at the downstream side of the embankment.
• The outlet should be constructed of minimum size 1.5-inch crushed stone.

Pipe Outlets:

• A pipe outlet sediment trap has a pipe through the embankment, with an inlet consisting of a perforated riser.
• The pipe and riser should be constructed of corrugated metal. Plastic pipe (polyvinyl chloride or high-density polyethylene) may be considered, if the piping is located where it will not be subject to damage from vehicle traffic or from ice and frost conditions.
• The top 2/3 of the riser should be perforated with 1-inch diameter holes spaced 8 inches vertically and 10 to 12 inches horizontally around the pipe.
• Anchoring Weight: The riser should have a base with sufficient weight to prevent flotation of the riser. Two approved bases are: (1) A concrete base 12 inches thick with the riser embedded 9 inches into the concrete base, or (2) 1/4-inch minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate should be backfilled with a minimum of 2.5 feet of stone, gravel, or earth to prevent flotation. In either case, each side of the square base measurement should be the riser diameter plus 24 inches.

• To increase the efficiency of the trap, the riser can be wrapped with a geotextile fabric held in place by woven wire and secured by strapping. The cloth should cover an area at least 6 inches above the highest hole and 6 inches below the lowest hole. The top of the riser pipe should not be covered with filter cloth.
• Crushed stone can also be used around the riser to increase trap efficiency.
• The minimum pipe sizes should be determined as provided in the following table:

Maximum Drainage Area (acres)	Minimum Barrel Diameter (inches)	Minimum Riser Diameter (inches)
1	15	21
2	18	24
3	21	30
4	24	30
5	30	36

Combination of Earth, Stone, or Pipe Outlets:

• A temporary sediment trap may have a combination of outlets. For instance, an 18-foot earth spillway outlet (adequate for 3 acres) and a pipe outlet with an 18-inch CMP barrel with a 24-inch CMP riser (adequate for 2 acres) could be used for the maximum drainage area of 5 acres.

Vegetation:

• All embankments, earth spillways, and disturbed areas below the structure should be vegetated within 72 hours of completion of the construction of the structure.
• If the structure is not planned for more than one vegetative growing season, the structure may be vegetated using the recommendation for "Temporary Vegetation" described in this Appendix.
• Basins that will be carried over the winter and into the next vegetative growing season should be vegetated using the recommendations for "Permanent Vegetation" described in this Appendix.

Diversion Ditch/ Berm

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B7-B10) (Direct Quotes)

Chapter Env-Wq 1506.12 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

A diversion is a temporary channel constructed across the slope to intercept stormwater runoff and direct it to a stable outlet or sediment trapping structures. The channel may

be formed by excavation, placement of a berm (or dike), or a combination of these measures. This temporary measure is used immediately above a new cut or soil fill slope or around the perimeter of a disturbed area. Diversions can be used as follows:

• To divert stormwater runoff from upslope drainage areas away from unprotected disturbed areas and slopes to a stabilized outlet. In this case, the diversion is placed upslope of the construction area.
• To divert sediment-laden stormwater runoff from a disturbed area to a sediment-trapping structure such as a sediment trap or sediment basin. In this case, the diversion is placed below the disturbed area, to assure that sediment-laden stormwater runoff will not leave the site without treatment.

Diversions are intended to facilitate management of the site during construction, and should not be substituted for terracing, vegetated waterways, permanent land grading practices, and other permanent measures for providing long-term erosion control.

Considerations (NH SWM):

• If erosion of the temporary diversion measure occurs during construction, the basin, channel, and berm must be stabilized.
• The gradient along the flow path must have a positive grade to assure drainage, but should not be so steep as to result in erosion due to high velocity channel flow. If such erosion occurs during construction, corrective action should be taken to stabilize the channel and berm, flatten the gradient of the channel, or otherwise eliminate the cause of erosion. Channel slopes greater than 2 percent require stabilization.
• Diversions are typically installed using material available on the site and can usually be constructed with equipment needed for site grading. The useful life of the measure can be extended by stabilizing the berm with vegetation.
• Temporary diversion berms are often used as a perimeter control in association with a sediment trap or a sediment basin, or a series of sediment-trapping facilities, on moderate to large construction sites. If installed properly and in the first phase of grading, maintenance costs are very low.
• Diversions upslope of a construction area should not be located below high sediment-producing areas unless land treatment practices or structural measures designed to prevent damaging accumulations of sediment in the channels are installed with or before the diversions. (The exception is where the diversion is used to divert sediment-laden water to a sedimentation facility.)
• Where diversions carry concentrated flows, their outlets require treatment or structures to dissipate energy and re-disperse flow or re-create sheet flow into undisturbed upland areas, where stormwater runoff can be absorbed. Untreated, sediment-laden stormwater runoff should not be discharged to undisturbed areas.

• Temporary vegetative stabilization of slopes should be conducted on slopes that are not in the final configuration and will have no work for an extended time period, but will have more work in the future.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Diversion berms used to trap sediment should be inspected and cleaned out after every significant storm.
• Diversion ditches must be cleared of sediment whenever sediment accumulates.
• Damages caused by construction traffic or other activity must be repaired before the end of each working day.
• If inspection indicates vegetation has not been established or has been damaged, the affected areas must be reseeded immediately.
• Once diversions have been stabilized, they should be mowed periodically to maintain a healthy vegetative cover, but the grass should not be cut shorter than 4 inches. Diversion ridges can be hazardous to mow, and equipment operators should be made aware of this potential hazard.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Construction Specifications (NH SWM):

• Temporary diversion berms should be installed as an initial step in the land-disturbing activity. They must be functional prior to exposure of soils in the area being served by the diversion.
• Ditches or gullies within the limits of the diversion should be filled, and trees and other obstructions should be removed before or as part of construction.
• Berms should be located to minimize damages by construction operations and traffic.
• Where the diversion crosses an underground utility or other structure, measures should be employed to prevent damage to the utility, and to prevent settlement or displacement of trench backfill resulting from placement of the diversion.
• Once soil is exposed for a diversion channel, it should be immediately shaped, graded, and stabilized. Berms should be adequately compacted to prevent failure.
• Diversions must be completely stabilized prior to directing stormwater runoff to them.
• Where vegetation is used for stabilization, disturbed areas should be established to grass immediately after construction. Seedbed preparation, seeding, fertilizing, and mulching should comply with "Temporary and Permanent Vegetation" measures described in this Appendix.
• Temporary or permanent seeding and mulch should be applied to the berm immediately following its construction.

• If the soils or winter conditions preclude the use of vegetation and protection is needed, nonvegetative means, such as erosion control mats or an armor stone lining may be used.
• Each diversion must have an adequate outlet. The outlet must convey stormwater runoff to a point where outflow will not cause damage. The outlet should be installed and stabilized before the construction of the diversion.

Dust Control

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B11-B12) (Direct Quotes)

2022 US CGP (As Amended) 2.2.6. (Direct Quotes)

Chapter Env-Wq 1506.08 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

A diversion is a temporary channel constructed across the slope to intercept stormwater runoff and direct it to a stable outlet or sediment trapping structures. The channel may be formed by excavation, placement of a berm (or dike), or a combination of these measures. This temporary measure is used immediately above a new cut or soil fill slope or around the perimeter of a disturbed area. Diversions can be used as follows:

• To divert stormwater runoff from upslope drainage areas away from unprotected disturbed areas and slopes to a stabilized outlet. In this case, the diversion is placed upslope of the construction area.
• To divert sediment-laden stormwater runoff from a disturbed area to a sediment-trapping structure such as a sediment trap or sediment basin. In this case, the diversion is placed below the disturbed area, to assure that sediment-laden stormwater runoff will not leave the site without treatment.

Diversions are intended to facilitate management of the site during construction, and should not be substituted for terracing, vegetated waterways, permanent land grading practices, and other permanent measures for providing longterm erosion control.

Considerations (NH SWM):

• If erosion of the temporary diversion measure occurs during construction, the basin, channel, and berm must be stabilized.
• The gradient along the flow path must have a positive grade to assure drainage, but should not be so steep as to result in erosion due to high velocity channel flow. If such erosion occurs during construction, corrective action should be taken to stabilize the channel and berm, flatten

the gradient of the channel, or otherwise eliminate the cause of erosion. Channel slopes greater than 2 percent require stabilization.
• Diversions are typically installed using material available on the site and can usually be constructed with equipment needed for site grading. The useful life of the measure can be extended by stabilizing the berm with vegetation.
• Temporary diversion berms are often used as a perimeter control in association with a sediment trap or a sediment basin, or a series of sediment-trapping facilities, on moderate to large construction sites. If installed properly and in the first phase of grading, maintenance costs are very low.
• Diversions upslope of a construction area should not be located below high sediment-producing areas unless land treatment practices or structural measures designed to prevent damaging accumulations of sediment in the channels are installed with or before the diversions. (The exception is where the diversion is used to divert sediment-laden water to a sedimentation facility.)
• Where diversions carry concentrated flows, their outlets require treatment or structures to dissipate energy and re-disperse flow or re-create sheet flow into undisturbed upland areas, where stormwater runoff can be absorbed. Untreated, sediment-laden stormwater runoff should not be discharged to undisturbed areas.
• Temporary vegetative stabilization of slopes should be conducted on slopes that are not in the final configuration and will have no work for an extended time period, but will have more work in the future.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Diversion berms used to trap sediment should be inspected and cleaned out after every significant storm.
• Diversion ditches must be cleared of sediment whenever sediment accumulates.
• Damages caused by construction traffic or other activity must be repaired before the end of each working day.
• If inspection indicates vegetation has not been established or has been damaged, the affected areas must be reseeded immediately.
• Once diversions have been stabilized, they should be mowed periodically to maintain a healthy vegetative cover, but the grass should not be cut shorter than 4 inches. Diversion ridges can be hazardous to mow, and equipment operators should be made aware of this potential hazard.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Water Application:

• Periodically moisten exposed soil surfaces with adequate water to control dust.
• Avoid excessive application of water that would result in mobilizing sediment and subsequent deposition in natural waterbodies.

Stone Application:

• Cover surface with crushed stone or coarse gravel.
• In areas adjacent to waterways, use only chemically stable or washed aggregate.

Commercial Products:

• The use of other commercial products (i.e., tackifiers) to stabilize exposed surfaces or stockpiles for dust control will be subject to acceptance by NHDES on a project-specific basis.

Other Measures:

• Apply other temporary and permanent stabilization measures as specified in this Appendix.
• Calcium chloride cannot be applied in watersheds with chloride-impaired waterbodies. Elsewhere, it should only be used when other methods are not practical, and following these guidelines:
    o For dry application, use a commercial chemical product that is either loose dry granules or flakes, fine enough to feed through a spreader at a rate that will keep the surface moist but not cause pollution or plant damage.
    o For liquid applications, the application rate will vary depending on the relative quality of materials in a given road surface. Some calcium chloride suppliers may require a road sample before recommending an application rate. Typically, 30 percent calcium chloride is recommended for most gravel roads.

2022 CGP Requirements:

2.2.6 Minimize Dust

On areas of exposed soil, minimize dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site.

Soil Stockpile Protection Practices

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B18-B19) (Direct Quotes)

2022 US CGP (As Amended) 2.2.5. (Direct Quotes)

Chapter Env-Wq 1506.08 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Surface roughening is a technique for creating furrows in a bare soil surface, by tracking the slope with construction equipment. The purpose of surface roughening is to aid the establishment of vegetative cover from seed, to reduce stormwater runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping.

This measure applies to all construction slopes to facilitate long-term stabilization with vegetation, and particularly slopes steeper than 3h:1v.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Any sign of rill or gully erosion should be immediately investigated and repaired as needed.
• Periodically inspect seeded slopes for rills or other signs of erosion. Fill these areas slightly above the original grade, reseed, and mulch as soon as possible, but no more than 3 days following inspection.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications Cut Slope Roughening:

• Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

• In general, fill slopes with a gradient steeper than 3h:1v should be constructed in lifts not to exceed 12 inches, compacting each lift. The contractor should refer to the project geotechnical report for specific guidance.
• The face of the slope should consist of loose, uncompacted fill 4 to 6 inches deep.
• Use grooving or tracking to roughen the face of the slopes, if necessary.
• Apply seed, fertilizer, and straw mulch, and then track or punch in the mulch with the bulldozer.
• Avoid blading or scraping the final slope face.

Cuts, Fills, and Graded Areas:

• Make mowed slopes no steeper than 3h:1v.
• Roughen these areas to shallow grooves by normal tilling, disking, or harrowing. The final pass of any such tillage should be on the contour.
• Make grooves formed by such implements close together (less than 10 inches), and not less than 1-inch deep.
• Excessive roughness is undesirable where mowing is planned.

Roughening With Tracked Machinery:

• Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
• Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Avoid back-blading during the final grading operation.
• Immediately seed and mulch roughened areas to obtain optimum seed germination and growth.

2022 CGP Requirements:

2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:

- Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any constructed or natural site drainage features, storm drain inlets, and areas where stormwater flow is concentrated; Install a sediment barrier along all downgradient perimeter areas of stockpiled soil or land clearing debris piles;
- For piles that will be unused for 14 or more days, provide cover
- or appropriate temporary stabilization (consistent with Part 2.2.14);
- You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.

Surface Roughening

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B20-B22) (Direct Quotes)

General Description (NH SWM):

Surface roughening is a technique for creating furrows in a bare soil surface, by tracking the slope with construction equipment. The purpose of surface roughening is to aid the establishment of vegetative cover from seed, to reduce stormwater runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping.

This measure applies to all construction slopes to facilitate long-term stabilization with vegetation, and particularly slopes steeper than 3h:1v.

Considerations (NH SWM):

Graded areas with smooth, hard surfaces may be initially attractive, but such surfaces increase the potential for erosion. A rough, loose soil surface gives a mulching effect that provides more favorable moisture conditions than hard, smooth surfaces; this aids seed germination.

Methods for achieving a roughened soil surface on a slope include tracking, furrowing, and serrating (or grooving). Selection of the method is based on slope steepness, mowing requirements, and whether the slope is formed by cutting or filling.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Any sign of rill or gully erosion should be immediately investigated and repaired as needed.
• Periodically inspect seeded slopes for rills or other signs of erosion. Fill these areas slightly above the original grade, reseed, and mulch as soon as possible, but no more than 3 days following inspection.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Cut Slope Roughening:

• Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

• In general, fill slopes with a gradient steeper than 3h:1v should be constructed in lifts not to exceed 12 inches, compacting each lift. The contractor should refer to the project geotechnical report for specific guidance.
• The face of the slope should consist of loose, uncompacted fill 4 to 6 inches deep.
• Use grooving or tracking to roughen the face of the slopes, if necessary.
• Apply seed, fertilizer, and straw mulch, and then track or punch in the mulch with the bulldozer.
• Avoid blading or scraping the final slope face.

Cuts, Fills, and Graded Areas:

• Make mowed slopes no steeper than 3h:1v.
• Roughen these areas to shallow grooves by normal tilling, disking, or harrowing. The final pass of any such tillage should be on the contour.
• Make grooves formed by such implements close together (less than 10 inches), and not less than 1-inch deep.
• Excessive roughness is undesirable where mowing is planned.

Roughening With Tracked Machinery:

• Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
• Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Avoid back-blading during the final grading operation.
• Immediately seed and mulch roughened areas to obtain optimum seed germination and growth.

Temporary Erosion Control Blanket and Matting

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B33-B39) (Direct Quotes)

2022 US CGP (As Amended) 2.2.14. (Direct Quotes)

Chapter Env-Wq 1506.03 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Erosion control blankets or mats consist of protective manufactured mulch blankets installed on prepared soil surfaces to provide erosion protection and surface stability on steep slopes, vegetated channels, or shorelines during vegetation establishment.

Erosion control blankets temporarily stabilize and protect disturbed soil from raindrop impact and surface erosion. Like other types of mulch, the blankets help increase infiltration, decrease compaction, and soil crusting, and conserve soil moisture. Erosion control blankets increase germination rates for grasses and legumes and promote vegetation establishment. Erosion control blankets also protect seeds from predators and reduce desiccation and evaporation by insulating the soil and seed environment.

Erosion control blankets generally consist of machine-made mats made of organic, biodegradable mulch such as straw, curled wood fiber (excelsior), coconut fiber or a combination thereof, evenly distributed on or between netting. Netting should be

wildlife friendly (see wildlife friendly considerations below) and composed of biodegradable natural fiber. The blankets are provided in rolls for ease of handling and installation.

Note: This erosion control measure as described in this manual does not cover the selection and installation of turf reinforcement products. If such products are used on-site, they must be included in the project plans, designed by a Professional Engineer registered in New Hampshire, and included in permit approvals.

Consideration (NH SWM):

Erosion control blankets can be applied to steep slopes, vegetated waterways, and other areas sensitive to erosion, to supplement vegetation during initial establishment and help provide for safe conveyance of stormwater runoff over the protected surface.

The following considerations are important for proper use of erosion control blankets and matting:

- During the growing season (April 15 – September 15) use mats (or mulch and netting) on:
    - o The base of grassed waterways.
    - o Steep slopes (15 percent or greater).
    - o Any disturbed soil within 100 feet of lakes, ponds, rivers, streams, and wetlands.
- During late fall and winter (September 15 – April 15) use heavy grade mats on all areas noted above plus use lighter grade mats (or mulch and netting) on:
    - o Side slopes of grassed waterways.
    - o Moderate slopes (greater than 8 percent). There may be cases where mats will be needed on slopes flatter than 8 percent, depending on site conditions and length of the slope.
- The most critical aspect of installing mats is obtaining firm continuous contact between the mat and the soil. Without such contact, erosion will occur underneath the mat.
- Install mats and staple in accordance with the manufacturer's recommendations.
- The designer must exercise care to choose the type of blanket or matting which is appropriate for the specific objectives and site conditions of the project. There are many soil stabilization products available, and a thorough review by an engineer or erosion control professional is necessary to evaluate the advantages, disadvantages, and construction requirements of the manufactured products, and to select and specify a product for a particular application.

Maintenance Requirements (NH SWM):

- All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.

• Any failure should be repaired immediately. If washout of the slope, displacement of the mat, or damage to the mat occurs, the affected slope shall be repaired and reseeded, and the affected area of mat shall be re-installed or replaced.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Design Erosion Control Blankets and Matting to be Wildlife Friendly (NH SWM):
Blankets and matting should be designed to minimize potential harm to wildlife. Wildlife friendly considerations based on the United States Fish and Wildlife Service (USFWS, 2023) include:

• Use of natural fiber, loose weave netting or no netting. Avoid plastic netting of any type- including "photodegradable" netting.
• Use of 100 percent biodegradable materials.
• Rectangle (elongated) mesh is better than square.
• All edges of blankets and mats should be secured with wooden stakes and buried.
• Remove blankets and mats as soon as they are no longer needed for erosion control.

Specifications (NH SWM):

Site Preparation:

Proper site preparation is essential to ensure complete contact of the protection matting with the soil. Site preparation should include the following specifications:

• Grade and shape area of installation.
• Remove all rocks, clods, trash, vegetation, or other obstructions so that the installed blankets will have direct contact with the soil.
• Prepare seedbed by loosening 2 to 3 inches of topsoil above final grade.
• Incorporate amendments, such as lime and fertilizer, into the soil according to soil test and the seeding plan.

Seeding:

• Seed area before blanket installation for erosion control and re-vegetation. Seeding and top soil layering after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all check slots and other areas disturbed during installation must be reseeded.
• Where soil filling is specified, seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Installing and Anchoring Blankets:

• Blankets shall be installed and anchored per the manufacturer's specifications. If the manufacturer's instructions differ from those listed below, the manufacturer's instructions should be followed.
• Blankets shall be placed within 24 hours after sowing seed in that area.
• Lay blankets loosely and maintain direct contact with the soil – avoid stretching.
• U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats to the ground surface. Biodegradable anchors are preferred.
    o Wire staples should be a minimum gauge as specified by the manufacturer.
    o Metal stake pins should be 3/16-inch diameter steel with a 1.5-inch steel washer at the head of the pin, or as specified by the manufacturer.
• Wire staples and wood or metal stakes should be driven flush to the soil surface. All anchors should have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils.

Installation on Slopes:

• Blankets shall be installed on slopes per the manufacturer's specifications. If the manufacturer's instructions differ from those listed below, the manufacturer's instructions should be followed.
• Blankets shall be laid loosely over the soils, maintaining contact with the soil, and not stretched.
• Blankets shall be anchored at the top of the slope in a trench to prevent stormwater runoff from undermining the mat. Subsequent mats should be overlapped by the upslope mat. Backfill trench and tamp earth firmly.
• Blankets should be placed starting at the bottom (downslope) so proper overlap is achieved.
• Blankets shall be unrolled in the direction of the water flow, overlapping the edges by a minimum of 4 inches and stapling the edges, as directed by the manufacturer.
• When blankets must be spliced, they shall be placed end over end (shingle style) with 6-inch minimum overlap. Staple through overlapped area, approximately 12 inches apart, or as specified by manufacturer.
• Blankets shall be stapled sufficiently to anchor blanket and maintain contact with the soil. Staples shall be placed down the center and staggered with the staples placed along the edges. Stapling pattern and number of staples will depend on steepness of slope and manufacturer's anchoring methods; follow manufacturer's instructions.

Installation in Channels:

• Blankets shall be installed in channels per the manufacturer's specifications. If the manufacturer's instructions differ from those listed below, the manufacturer's instructions should be followed.
• Dig initial anchor trench across the channel at the lower end of the project area.
• Excavate intermittent check slots, across the channel at 25- to 30-foot intervals along the channel, or as specified by manufacturer.

• Cut longitudinal channel anchor slots along each side of the installation to bury edges of matting. Whenever possible extend matting 2 to 3 inches above the crest of channel side slopes.
• Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices, as directed by the manufacturer. Note: matting will initially be upside down in anchor trench.
• In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 inches.
• Secure these initial ends of mats with anchors at manufacturer's specified intervals, backfill and compact soil.
• Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench.
• Unroll adjacent mats upstream in similar fashion, maintaining a 3-inch minimum overlap.
• Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at manufacturer's specified intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
• Alternative method for noncritical installations: place two rows of anchors on 6-inch centers at 25 to 30 feet intervals in lieu of excavated check slots.
• Shingle-lap spliced ends by a minimum of 1-foot with upstream mat on top to prevent uplifting by water or begin new rolls in a check slot. Anchor overlapped area by placing two rows of anchors, 1-foot apart on 1-foot intervals.
• Place edges of outside mats in previously excavated longitudinal slots, anchor using prescribed staple pattern, backfill and compact soil.
• Anchor, fill, and compact upstream end of mat in a terminal trench, as directed by manufacturer.
• Secure mat to ground surface using U-shaped wire staples, geotextile pins, wooden stakes, or other anchors as recommended by the manufacturer.

2022 CGP Requirements:

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from any areas of exposed soil on the site in accordance with Part.

BS&E Considerations/Recommendations:

BS&E typically requires rolled erosion control blanket within the interior side slopes of stormwater SCMs, regardless of if the interior is 2:1 or flatter.

Construction Dewatering

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B42-B45) (Direct Quotes)

2022 US CGP (As Amended) 2.4 (Direct Quotes)

Chapter Env-Wq 1506.11 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

This construction dewatering measure is intended to prevent sedimentation associated with the management of water removed during construction from excavations, cofferdams, and other work areas that trap stormwater and groundwater. Dewatering activities must meet state surface water quality standards.

Construction sites in New Hampshire typically require construction dewatering operations. For example, excavations within the work area can trap rainwater or groundwater. This water needs to be removed before certain operations can be performed or to keep work conditions safe. Dewatering may also be required for water from cofferdams and when bypassing stream flows (both of which would require a permit from the Wetlands Bureau). Contractors typically use ditch pumps to dewater these enclosed areas. If care is not taken to select the point of discharge and provide adequate treatment, the pumped water may discharge to down-gradient natural resources such as lakes, ponds, rivers, streams, or wetlands with subsequent sedimentation of those waterbodies.

Construction dewatering activities must be conducted in a proper manner to:

- Prevent the discharged water from eroding soil on the site.
- Remove sediment from the collected water.
- Preserve down-gradient natural resources and property.

Considerations (NH SWM):

- Choose the best location for discharge to meet the above objectives. The discharge areas should be chosen with careful consideration to the down-gradient water resources and the existing landscape's ability to treat water flows from the dewatering process. Wooded buffers and flat to moderate slopes provide the best opportunity for filtration and absorption of such discharges.
- Care must be exercised to prevent contact of water from construction dewatering with oil, grease, other petroleum products, or toxic and hazardous materials. Contaminated stormwater runoff must be contained, treated, and discharged or removed in accordance with NHDES requirements.
- All requirements of state law and permit requirements of local, state, and federal agencies must be met, including the Dewatering and Remediation General Permit for projects that propose to discharge construction dewatering water to surface waters such as lakes, ponds, rivers, streams, and wetlands.

• The discharge should be stopped immediately if the receiving area shows any sign of instability or erosion.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• During the active dewatering process, inspection of the dewatering facility should be reviewed at least daily, with more frequent or continuous supervision as warranted by site conditions.
• Special attention should be paid to the buffer area for any sign of erosion or concentration of flow that may damage the buffer's vegetation or underlying soil. B-43
• The visual quality of the effluent should be monitored to assess whether additional treatment can be provided to prevent sedimentation of downstream receiving waters.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Dewatering excavated areas is conducted in three distinct operations: the removal of the collected water within the excavation, the treatment of the collected water, and the controlled discharge of water in a non-erosive manner.

Water Removal:

• Install diversion ditches or berms to minimize the amount of clean stormwater runoff allowed into the excavated area.
• For trench excavation, limit the trench length to 500 feet and place the excavated material on the upgradient side of the trench.
• The removal of water from the excavated area can be accomplished by numerous methods, including but not limited to gravity drainage through channels, mechanical pumping, siphoning, and using the bucket of construction equipment to scoop and dump water from the excavation. Water may also be withdrawn from the ground adjacent to an excavation by pumping of well points.
• All channels, swales, and ditches dug for discharging water from the excavated area should be stable prior to directing discharge to them. If flow velocities cause erosion within these channels, then the channel should be restabilized; if necessary, a stone lining or other stabilizing measure should be used.
• Bucketed water should be discharged in a stable manner to the sediment removal area. A splash pad of riprap underlain with geotextile may be necessary to prevent scouring of the soil in the basin.
• Dewatering during periods of intense, heavy rain should be avoided.

Sediment Removal:

• There are several methods for settling or filtering sediment that a contractor may use. Typical measures include temporary basins or sediment traps, sedimentation tanks, and manufactured fabric bags designed for filtering pumped discharges.
• Flow to the sediment removal structure must not exceed the structure's capacity to settle or filter the receiving flow.
• Sediment removal structures should discharge wherever possible to a well-vegetated buffer through sheet flow and should maximize the distance to the nearest water resources and minimizing the slope of the buffer area.

Temporary Basin Designs:

Temporary basin designs include but are not limited to:

• An enclosure of Jersey Barriers lined with geotextile fabric.
• A temporary enclosure constructed with hay bales, silt fence, or both. Erosion control mix also may be incorporated with silt fence or hay bales. A silt fence must be supported to prevent it from collapsing under the weight of impounded water.
• Chambered settling system fabricated of concrete or steel and designed for sediment removal.
• Excavated or bermed sedimentation trap. See the description of "Temporary Sediment Trap" in this Appendix.
• A sediment basin (including temporarily modified stormwater detention ponds), if designed in accordance with the description of "Temporary Sediment Basin" in this Appendix.

Frac Tanks:

• Frac tanks can provide storage for large volumes of water during construction dewatering measures. As water is held in the frac tank, sediment in the water will settle to the bottom of the tank.
• Frac tanks are commonly used with a flocculant (see "Flocculants") to increase sediment removal effectiveness.
• Frac tanks are commonly deployed in constrained construction sites.
• Frac tanks must be carefully sized in accordance with manufacturer instructions and based on the anticipated amount of dewatering volume needed.

Manufactured Filter Bags:

• Water from construction operations may be discharged to a manufactured filter structure specifically designed for sediment removal, such as a manufactured silt "bag" or other similar product.
• The filter bag should be used in accordance with the manufacturer's recommended guidelines.
• The type of fabric should be based on the size of the soil particles to be trapped (i.e., woven material for coarse particles and nonwoven material for fine particles).
• Filter bags have finite capacity. Avoid over-pressurizing the bag and routinely inspect for tears or other malfunctions.

Discharges:

• Water that is visibly clear of sediment, and has not come into contact with other contaminants, may be directly discharged into well-vegetated buffered areas with less than 2 percent slope, as long as a method is used to spread flow into sheet flow as it enters the buffer.
• Never discharge to areas that are bare or newly vegetated.
• The discharge should be stopped immediately if the receiving area is showing any sign of instability or erosion.
• Stilling basins may require a properly sized and stabilized spillway for discharge.

2022 CGP Requirements:

2.4 Construction Dewatering Requirements

Comply with the following requirements to minimize the discharge of pollutants from dewatering operations.

2.4.1 Route dewatering water through a sediment control (e.g., sediment trap or basin, pumped water filter bag) designed to prevent discharges with visual turbidity;

2.4.2 Do not discharge visible floating solids or foam;

2.4.3 The discharge must not cause the formation of a visible sheen on the water surface, or visible oily deposits on the bottom or shoreline of the receiving water. Use an oil-water separator or suitable filtration device (such as a cartridge filter) designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials;

2.4.4 To the extent feasible, use well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using receiving waters as part of the treatment area;

2.4.5 To prevent dewatering-related erosion and related sediment discharges: Use stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment) to discharge from dewatering controls; Do not place dewatering controls, such as pumped water filter bags, on steep slopes (as defined in Appendix A); and At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11.

2.4.6 For backwash water, either haul it away for disposal or return it to the beginning of the treatment process;

2.4.7 Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications; and

2.4.8 Comply with dewatering-specific inspection requirements in Part 4.

Temporary and Permanent Mulching

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B23-B25) (Direct Quotes)

2022 US CGP (As Amended) 2.2.14. (Direct Quotes)

Chapter Env-Wq 1506.01 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Temporary mulching consists of the application of plant residues or other suitable materials to the soil surface. Mulching reduces erosion potential by protecting the exposed soil surface from direct impact by rainfall. It also aids in the growth of vegetation by conserving available moisture, controlling weeds, and providing protection against extreme heat and cold. Mulches can also protect the infiltration rate of the soil, prevent soil compaction, and provide a suitable microclimate for seed germination. This is the quickest and most cost-effective method of preventing erosion on disturbed soils and its value should not be underestimated.

Permanent mulching consists of the application of long-term surface cover such as bark, wood chips, or erosion control mix. Permanent mulch can be used as a permanent ground cover, as an overwinter stabilization mulch, or left to naturalize. It is not designed to support grass vegetation, but legumes or woody vegetation may be established for additional stability. Permanent mulch must not be used in areas of concentrated water flows. Slopes with evidence of groundwater seepage may require the use of other treatments such as riprap.

The composition of "erosion control mix" is further described in the "Erosion Control Mix Berm" fact sheet. In addition to its use for the temporary or semi-permanent stabilization of slopes, it can be applied to protect areas from erosion during spring thaw. It can also be used in construction yards to mitigate muddy conditions. In these applications, the erosion control mix application rate will need to be adjusted for site conditions, use, and long-term effectiveness. With time, the organic component of the erosion control mix will decompose and become ineffective. Any required repairs should be made immediately, with additional erosion control mix placed on top to reach the desired thickness.

Timing of Temporary versus Permanent Stabilization (NH SWM):

All areas of exposed or disturbed soil should be temporarily stabilized as soon as practicable but no later than 45 days from the time of initial disturbance unless a shorter time is specified by local authorities, the construction sequence approved as

part of the issued permit, or an independent monitor. Permanent stabilization must be completed as soon as practicable but no later than 3 days following final grading (Env-Wq 1505.03).

The EPA Construction General Permit also requires any area that is inactive for 14 days to be temporarily stabilized; however, it is generally good practice to stabilize any area that will be inactive for 7 days.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• If less than 90 percent of the soil surface is covered by mulch, additional mulch should be immediately applied. Anchor nets must be inspected after rain events for dislocation or failure. If washouts or breakages occur, repair any damage to the slope and re-install or replace netting as necessary. Inspections should take place until grasses are firmly established (85 percent soil surface uniformly covered with healthy stand of grass).
• Erosion control mix mulch used for temporary stabilization should be left in place and incorporated into any permanent mulching or final stabilization phase. Vegetation adds stability and should be promoted.
• Where permanent mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface. Repair as needed.
• Permanently mulched areas should be inspected at least annually, and after each large rainfall (2.5 inches or more in a 24-hour period). Any repairs required to restore erosion control functionality should be made immediately. Where erosion control mix has been used, place additional mix on top of the mulch to maintain recommended thickness. When the mulch is decomposed, clogged with sediment, eroded or ineffective, it must be replaced or repaired.
• If the mulch needs to be removed, spread it out into the landscape if feasible.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

General:

• Apply mulch prior to a storm event. This is especially applicable in extremely sensitive areas such as within 100 feet of lakes, ponds, rivers, streams, and wetlands. It will be necessary to closely monitor weather predictions to have adequate warning of significant storms.

• Mulching should be completed within the following specified time periods from original soil exposure:
    - o Within 100 feet of rivers, streams, wetlands, and in lake and pond watersheds, the time period should be no greater than 7 days. This 7-day limit should be reduced further during wet weather periods.
    - o In other areas, the time period can range from 14 to 30 days, the length of time varying with site conditions (soil erodibility, season of year, extent of disturbance, proximity to sensitive resources) and the potential impact of erosion on adjacent areas. Other state or local restrictions may also apply.
• The choice of mulch material should be based on site conditions, soils, slope, flow conditions, and time of year.
• Jute and fibrous mats and wood excelsior should be installed according to the applicable manufacturer's instructions.

Hay or Straw Mulches:

• Organic mulches including hay and straw should be air-dried, free of undesirable seeds and coarse materials.
• Application rate should be 2 bales (70 to 90 pounds) per 1000 square feet or 1.5 to 2 tons (90 to 100 bales) per acre to cover 75 to 90 percent of the ground surface.
• Hay or straw mulch should be anchored to prevent displacement by wind or flowing water, using one of the following methods:
    - o Netting: Install jute, wood fiber, or other biodegradable netting over hay or straw to anchor it to the soil surface. Install netting material according to manufacturer's recommendation. Netting should be used sensibly, as wildlife can become entangled in the materials. Use of plastic netting should be avoided as indicated in Env-Wt 104.64.
    - o Tackifier: Apply polymer or organic tackifier to anchor hay or straw mulch. Application rates vary by manufacturer: typically, 40 to 60 pounds per acre for polymer material, and 80 to 120 pounds per acre for organic material. Liquid mulch binders are also typically applied heavier at edges, in valleys, and at crests than other areas.
• When mulch is applied to provide protection over winter (past the growing season), it should be applied to a depth of 4 inches (150 to 200 pounds of hay or straw per 1,000 square feet, or double standard application rate). Seeding cannot generally be expected to grow up through this depth of mulch and will be smothered. If vegetation is desired, the mulch will need to be removed in the springtime and the area seeded and mulched.

Wood Chips or Bark:

• Wood chips or ground bark should be applied to a thickness of 2 to 6 inches.
• Wood chips or ground bark should be applied at a rate of 10 to 20 tons per acre or 460 to 920 pounds per 1,000 square feet.

Erosion Control Mix:

Erosion control mix can be manufactured on or off the project site. It must consist primarily of organic material, separated at the point of generation, and may include shredded bark, stump grindings, composted bark, or acceptable manufactured products. Wood and bark chips, ground construction debris or reprocessed wood products will not be acceptable as the organic component of the mix. Erosion control mix must be placed at a thickness of 2 inches or more. See the "Erosion Control Mix Berm" fact sheet for detailed erosion control mix requirements.

Erosion Control Blankets and Mats:

Mats are manufactured combinations of mulch and netting designed to protect against erosion and to retain soil moisture and modify soil temperature. See specifications on "Temporary Erosion Control Blanket and Matting" fact sheet.

2022 CGP Requirements:

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from any areas of exposed soil on the site in accordance with Part.

Temporary and Permanent Vegetation

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B26-B32) (Direct Quotes)

2022 US CGP (As Amended) 2.2.14. (Direct Quotes)

Chapter Env-Wq 1505.04 & 1506.02 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Temporary vegetation consists of the establishment of a grass and legume cover on exposed soils for periods of up to 12 months. The purpose is to reduce erosion and sedimentation by stabilizing disturbed areas that will not be brought to final grade for a year or less and to reduce problems associated with mud and dust production from exposed soil surfaces during construction. Temporary seeding is also essential to preserve the integrity of earthen structures used to control sediment, such as diversions and embankments of sediment basins.

Temporary vegetative cover should be applied where exposed soil surfaces will not be final graded within 45 days from initial disturbance. Such areas include excavated areas,

soil stockpiles, berms, embankments and sides of sediment basins, temporary road banks, and other earthworks. Annual plants that sprout rapidly and survive for only one growing season are suitable temporary vegetative cover.

Permanent vegetation should be established on disturbed areas where permanent, long-lived vegetative cover is needed to stabilize soil, reduce damages from sediment and stormwater runoff, and enhance the environment. A site is considered stable when it has a minimum of 85% vegetative cover.

Stormwater runoff and sheet erosion caused by splash erosion (raindrop impact on bare soil) is the source of most fine particles in sediment. To reduce sediment load in stormwater runoff, the soil surface itself should be protected. The most effective and economical means of controlling sheet and rill erosion is to establish a vegetative cover.

Timing of Temporary versus Permanent Stabilization (NH SWM):

All areas of exposed or disturbed soil should be temporarily stabilized as soon as practicable but no later than 45 days from the time of initial disturbance, unless a shorter time is specified by local authorities, the construction sequence approved as part of the issued permit, or an independent monitor. Permanent stabilization must be completed as soon as practicable but no later than 3 days following final grading (Env-Wq 1505.03).

The EPA Construction General Permit also requires any area that is inactive for 14 days to be temporarily stabilized; however, it is generally good practice to stabilize any area that will be inactive for 7 days.

Maintenance Requirements (NH SWM):

- All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
- Temporary seeding should also be inspected just prior to September 15, to ascertain whether additional seeding is required to provide stabilization over the winter period.
- Permanent seeded areas should be inspected at least monthly during the course of construction. Inspections, maintenance, and corrective actions should continue until the owner assumes permanent operation of the site.
- Based on inspection, areas should be reseeded to achieve full stabilization of exposed soils. If it is too late in the planting season to apply additional seed, then other temporary stabilization measures should be implemented.
- At a minimum, 85 percent of the soil surface should be covered by vegetation. Reseeding may be required to achieve or retain 85 percent vegetative cover.

• Seeded areas should be mowed as required to maintain a healthy stand of vegetation, with mowing height and frequency dependent on type of grass cover.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• If any evidence of erosion or sedimentation is apparent, repairs should be made and areas should be reseeded, with other temporary measures (e.g., mulch) used to provide erosion protection during the period of vegetation establishment.
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

Site Preparation:

• Install erosion and sediment control measures such as siltation barriers, diversions, and sediment traps as needed.
• Grade as needed for the access of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring.
• Stormwater runoff should be diverted from the seeded area.
• On slopes 4h:1v or steeper, the final preparation should include creating horizontal grooves perpendicular to the direction of the slope to catch seed and reduce stormwater runoff.

Seedbed Preparation:

• Remove all stones 2 inches or larger in any dimension from the surface. Remove all other debris such as wire, cable, tree roots, concrete, clods, lumps, trash, or other unsuitable material.
• Where the soil has been compacted by construction operations, loosen soil to a depth of 2 inches before applying fertilizer, limestone, and seed.
• If needed to ensure growth, fertilizer and organic soil amendments should be applied during the growing season.
    o Apply limestone and fertilizer according to soil test recommendations. If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 600 pounds per acre or 13.8 pounds per 1,000 square feet of low phosphate fertilizer (N-P2O5-K2O) or equivalent. Apply limestone (equivalent to 50 percent calcium plus magnesium oxide) at a rate of 3 tons per acre (138 pounds per 1,000 square feet).
    o Fertilizer should be restricted to a low phosphate, slow-release nitrogen fertilizer when applied to areas between 25 feet and 250 feet from a surface water body. No fertilizer except limestone should be applied within 25 feet of a surface water body. These limitations are requirements for any water body protected by the Shoreland Water Quality Protection Act (RSA 483-B; Env-Wq 1400).

Additional Requirements for Permanent Seedbed Preparation:

• Inspect seedbed just before seeding. If traffic has compacted the soil, the area must be tilled and firmed as above.
• Work limestone and fertilizer into the soil as practical to a depth of 4 inches with a disc, spring tooth harrow or other suitable equipment. The final harrowing operation should be on the general contour. Continue tillage until a reasonably uniform, fine seedbed is prepared. All but clay or silty soils and coarse sands should be rolled to firm the seedbed wherever feasible.

Seeding:

• For temporary vegetation, select seed from recommendations in the "Seeding Recommendations for Temporary Vegetation" table below.
• For permanent vegetation, select a seed mixture in Seed Mixture Selection Based on Soil Type table that is appropriate for the soil type and moisture content as found at the site, the amount of sun exposure and for level of use. Select seed from recommendations in Seed Mixtures for Permanent Vegetation.
• Apply seed uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder (slurry including seed and fertilizer). Normal seeding depth is from 1/4- to 1/2-inch. Hydroseeding that includes mulch may be left on soil surface. Seeding operations should be on the contour.
• Spring seeding usually gives the best results for all seed mixes or with legumes. Permanent seeding should be completed 45 days prior to the first killing frost. When crown vetch is seeded in later summer, at least 35 percent of the seed should be hard seed (unscarified). If seeding cannot be done within the specified seeding dates, mulch according to the "Temporary and Permanent Mulching" fact sheet and delay seeding until the next recommended seeding period.
o Temporary seeding should typically occur prior to September 15 of the year in which the area being seeded was disturbed.
o Areas seeded between May 15 and August 15 should be covered with hay or straw mulch, according to the "Temporary and Permanent Mulching" fact sheet.
• Vegetated growth covering at least 85 percent of the disturbed area should be achieved prior to October 15. If this condition is not achieved, implement other temporary stabilization measures for overwinter protection, and if applicable, complete permanent seed stabilization during the next growing season.
• Inoculate all legume seed with the correct type and amount of inoculant.
• For permanent seeding, except where either a cultipacker type seeder or hydroseeder is used, the seedbed should be firmed following seeding operations with a roller, or light drag.

Seeding Notes:

Low phosphorus fertilizer is defined by the Shoreland Water Quality Protection Act as less than 2 percent phosphorus. The University of New Hampshire (UNH) Cooperative Extension has found through soil tests that New Hampshire's soils have ample phosphorus and recommend low phosphorus fertilizers with 0 percent to 1 percent

phosphorus such as 3:1:3 or 10:0:10 N:P:K. They discourage the use of imbalanced fertilizers.

Slow-release fertilizers must be at least 50 percent slow-release nitrogen component, which means that half of the nitrogen will not be immediately available. Typically, it takes 2 to 24 weeks for all slow-release nitrogen to become available. Slow-release fertilizers do not necessarily reduce nitrogen loading. Nitrogen fertilizers are necessary for grass lawns, however, according to the UNH Cooperative Extension, nitrogen fertilizers for lawns that consist of legume and clover are not necessary.

Hydroseeding:

• When hydroseeding (hydraulic application), prepare the seedbed as specified above or by hand raking to loosen and smooth the soil and remove surface stones larger than 2 inches in diameter.
• Slopes must be no steeper than 2h:1v.
• Lime and fertilizer may be applied simultaneously with the seed. The use of fiber mulch on critical areas is not recommended (unless it is used to hold straw or hay). Better protection is gained by using straw mulch and holding it with adhesive materials or 500 pounds per acre of wood fiber mulch.
• Seeding rates must be increased 10 percent when hydroseeding.

Seeding Recommendations for Temporary Vegetation

Species	Per Acre Bushels (BU) or Pounds (lbs)	Per 1,000 Square Feet	Remarks
Winter Rye	2 BU or 112 lbs	2.5 lbs	Best for fall seeding. Seed from August 15 for best cover. Seed to a depth of 1-inch.
Oats	2.5 BU or 80 lbs	2 lbs	Best for spring seedings. Seed no later than May 15 for summer protection. Seed to a depth of 1-inch.
Annual Ryegrass	40 lbs	1 lb	Grows quickly but is of short duration. Use where appearances are important. Seed early spring and/ or between August 15 and September 15. Cover the seed with no more than 1/4-inch of soil.
Perennial Ryegrass	30 lbs	0.7 lb	Good cover which is longer lasting than annual ryegrass. Seed between April 1 and June 1 and/ or between August 15 and September 15. Mulching will allow seeding throughout the growing season. Seed to a depth of approximately 1/2-inch.

Seed Mixture Selection Based on Soil Type

Use	Seed Mixture (see table below)	Soil Drainage: Droughty	Soil Drainage: Well Drained	Soil Drainage: Moderately Well Drained	Soil Drainage: Poorly Drained
Steep cuts and fills, borrow and disposal areas	A B C D E	Fair Poor Poor Fair Fair	Good Good Good Fair Excellent	Good Fair Excellent Good Excellent	Fair Fair Good Excellent Poor
Waterways, emergency spillways, and other channels with flowing water	A C D	Good Good Good	Good Excellent Excellent	Good Excellent Excellent	Fair Fair Fair
Lightly used parking lots, unused lands, and low intensity use recreation sites	A B C D	Good Good Good Fair	Good Good Excellent Good	Good Fair Excellent Good	Fair Poor Fair Excellent
Play areas and athletic fields. (Topsoil is essential for good turf.)	F G	Fair Fair	Excellent Excellent	Excellent Excellent	See Note See Note
Gravel pit	Consult with USDA Natural Resource Conservation Service.				

Seed Mixtures for Permanent Vegetation

Mixture	Species	Pounds Per Acre	Pounds Per 1,000 Square Feet
A	Tall fescue Creeping red fescue Redtop *Total*	20 20 2 42	0.45 0.45 0.05 0.95
B[3]	Tall fescue Creeping red fescue Crown vetch Or Flatpea *Total*	15 10 15 – 30 40 or 55	0.35 0.25 0.35 – 0.75 0.95 or 1.35
C[3]	Tall fescue Creeping red fescue Birdsfoot trefoil *Total*	20 20 8 48	0.45 0.45 .20 1.10
D[3]	Birdsfoot trefoil Redtop Reed canary grass *Total*	10 5 15 30	0.25 0.10 0.35 0.70
E	Tall fescue Flatpea *Total*	20 30 50	0.45 0.75 1.20
F	Creeping red fescue[2] Kentucky bluegrass[2] *Total*	50 50 100	1.15 1.15 2.30
G	Tall fescue[2]	150	3.60

2022 CGP Requirements:

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from any areas of exposed soil on the site in accordance with Part.

BS&E Considerations/Recommendations:

Conservation Mix

Virginia Wild Rye	Native	FACW-
Little Bluestem	Native	FACU
Big Bluestem	Native	FAC
Red Fescue	Native	FACU
Switch Grass	Native	FAC
Partridge Pea	Native	FACU
Showy Tick Trefoil	Native	FAC
Butterfly Milkweed	Native	NI
Beggar Ticks	Native	FACW
Purple Joe Pye Weed	Native	FAC
Black Eyed Susan	Native	FACU-
Total	**25**	**0.57**

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the wetland buffer (not applicable). As the site is to be stabilized with erosion control mix as a mulch, the vegetation should be established with a high percentage of white

clover for growth to be established. Conservation Mix will also be used to plant and stabilize the erosion control mix mulch. Seed will originally be applied by hydroseeding which includes a tackifier.

Rain Garden

The grass that is planted within a rain garden bio-filtration system within the bio-media must consist of a combination of warm season grass seed and cold season grass seed in order for the grass to start growing for stabilization and continue growing in the sandy well-drained environment. Planting specification will meet the requirements as outlined in 'Vegetation New Hampshire Sand and Gravel Pits' mix 1 (warm season grasses) (15 lbs/ac) and include annual and perennial rye grass seed (15 lbs/ac); the New England native warm season grass mix (23 lbs/ac) by New England Wetland Plants, inc.; Rain Garden Mix 180 (15 lbs/ac & 15 lbs/ac of rye) or Rain Garden Grass Mix 180-1 (20 lbs/ac & 10 lbs/ac of rye) by Ernst Conservation Seeds.

Subsurface Gravel Wetland Mix:
The grass that is planted within a subsurface gravel wetland will be a mix designed for both inundation and dry conditions such as Ernst Seeds, Retention Basin Floor Mix ERNMX-126.

Straw or Hay Bale Barrier

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B65-B68) (Direct Quotes)

Chapter Env-Wq 1506.06 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

Straw and hay bale barriers are a type of temporary sediment barrier installed across or at the toe of a slope, to intercept and retain small amounts of sediment from disturbed or unprotected areas.

Straw or hay bale barriers have a useful life of less than six months. They function primarily to slow and pond the water and allow soil particles to settle. They are not designed to withstand high heads of water, and therefore should be located where only shallow pools can form. Their use is limited to areas that only contribute sheet flow to the device.

Straw or hay bale barriers constitute a sediment control measure, not an erosion control measure. They must be used in conjunction with other measures that prevent or control erosion. Improperly applied or installed sediment barriers will increase erosion.

Straw or hay bale barriers should generally not be used across streams, channels, swales, ditches, or other drainage ways or areas with concentrated flows. Such barriers are not capable of effectively filtering the high rates and volumes of water associated with channelized flow. However, they may be used for check dams in applications where installation access or other conditions prevent the use of preferred materials such as stone; in such cases, installation must provide proper embedment of the straw or hay bale barrier, limit contributing drainage area to less than an acre, and provide for frequent monitoring of the barrier. Straw or hay bale barriers installed across a concentrated flow path are subject to undercutting, end cutting, and overtopping. This can frequently result in the bypass of sediment-laden water, but also in the complete failure of the barrier. Such failures typically release the sediment accumulated on the upgradient side of the barrier, and severe erosion of the channel both upstream and downstream of the device.

Hay Bale Alternatives (NH SWM):

Construction sites have historically used straw or hay bales for erosion and sediment control as check dams, inlet protection, outlet protection and perimeter control. Many applications of straw hale bales for erosion and sediment control are ineffective due to their composition, inappropriate placement, inadequate installation, lack of maintenance, or a combination of these factors. Some local regulations limit the use of hay bales. For these reasons, the United States Environmental Protection Agency (EPA) recommends carefully considering other E&SC measure first. For example, consider silt fence for perimeter controls, stone check dams for diversion channels, erosion control blanket and matting for slope protection, filter sacks for inlet protection, and prefabricated washout containers for concrete washout structures. Refer to the U.S. EPA Fact Sheet for Straw or Hay Bales for more information.

Considerations (NH SWM):

- Straw or hay bale barriers principally trap sediment by temporarily ponding water, allowing particles to settle. These barriers are not designed to withstand high heads of water; therefore, they should be located where only shallow pools can form.
- Straw or hay bale barriers are used where:
    - Erosion will occur only in the form of sheet erosion and there is no concentration of water in a channel or other drainage way above the barrier.
    - Sedimentation can pollute or degrade adjacent wetlands or watercourses.

o Sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas.
o The contributing drainage area is less than 1/4 acre per 100 feet of barrier length, the maximum length of slope above the barrier is 100 feet, and the maximum gradient behind the barrier is 50 percent (2h:1v). If any of these conditions are exceeded, other measures may be necessary to control erosion and to intercept and treat the sediment load.
o Sediment barriers should not be used in areas of concentrated flows. However, they may be used for check dams in applications where installation access or other conditions prevent the use of preferred materials such as stone; in such cases, installation must provide proper embedment of the straw or hay bale barrier, limit contributing drainage area to less than one acre, and provide for frequent monitoring of the barrier. Under no circumstances should sediment barriers be constructed in live streams or in swales where there is the possibility of a washout.

- Straw or hay bales should only be used as a temporary barrier for no longer than 60 days.
- Potential causes of straw or hay bale barrier failure include:
  - o Improper placement on the site.
  - o Allowing excessive drainage area to the barrier.
  - o Inadequate keying of the bales into the ground surface.
  - o Inadequate maintenance after installation.

Maintenance Requirements (NH SWM):

- All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
- Hay bale barriers should be inspected at least daily during prolonged rainfall.
- Barriers should be repaired immediately if there are any signs of erosion or sedimentation below them. If there are signs of undercutting at the center or the edges of the barrier or impounding of large volumes of water behind the barrier, the barrier should be replaced with an alternative measure to intercept and capture sediment (e.g., a diversion berm directing sediment-laden stormwater runoff to a sediment trap or basin).
- Damaged or decomposed bales should be replaced promptly.
- Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately 1/3 the height of the barrier.
- Any sediment deposits remaining in place after the filter barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.
- See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

- Sediment barriers should be installed prior to any soil disturbance of the contributing drainage area above them.

• Bales should be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. The ends of the barrier should be flared up slope. Barriers should follow the contour or run parallel across slopes of the land as closely as possible.
• Barriers should not be constructed more than 1 bale high.
• All bales should be either wire-bound or string-tied. Bales should be installed so that bindings are oriented around the sides, parallel to the ground surface to prevent deterioration of the bindings.
• The barrier should be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. • After the bales are staked and chinked, the excavated soil should be backfilled against the barrier. Backfill soil should conform to the ground level on the downhill side and should be built up 4 inches against the uphill side of the barrier. Ideally, bales should be placed 10 feet downgradient from the toe of slope.
• At least two stakes driven through the bale and penetrating at least 18 inches into the ground, should securely anchor each bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.
• The gaps between bales should be chinked (filled by wedging) with hay or straw to prevent water from escaping between the bales.
• Inspection should be frequent, and repair or replacement should be made promptly as needed. Bale barriers should be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

Control of Invasive Plants

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and

resisting control except by hazardous chemical.

Construction Sequence

1.) Cut and remove trees in construction area only as required, relocate any project T.B.M.
2.) Construct and/or install temporary and permanent sediment erosion and detention control facilities as specified. Erosion and sediment control measures shall be installed prior to any soil land disturbance and must be reviewed and approved by the Community Services Department.
3.) Erosion, sediment and detention control facility shall be installed & stabilized prior to directing runoff to them. Temporary diversions may be required. Post construction storm water management practices must be initiated and stabilized early in the process.
4.) Clear, cut and dispose of debris in approved facility.
5.) Construct temporary culverts as required, or directed.
6.) Construct roadways for access to desired construction areas. All roads shall be stabilized immediately. Construct Stormwater Control measures.
7.) Start building construction and install perimeter fence where shown.
8.) Install pipe and construction associated appurtenances as required or directed. All disturbed areas shall stabilized immediately after grading.
9.) Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded or mulched as required, or directed. No area is allowed to be disturbed for a length of time that exceeds 45 days before being stabilized. Daily, or as required. All roadways and parking areas shall be stabilized within 72 hours of achieving finished grades. All cut and fill slopes shall be stabilized within 72 hours of achieving finished grades.
10.) Construct temporary berms, drains ditches, silt fences, sediment traps, etc. Mulch and seed as required.
11.) Inspect and maintain all erosion and sediment control measures during construction. All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and storm water inspector (CESSWI), or a certified professional in storm water quality (CPSWQ). Inspection reports shall be submitted to the community services department.
12.) Complete permanent seeding and landscaping.
13.) Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete.
14.) Smooth and revegetate all disturbed areas.
15.) Finish paving all roadways.

Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion, sediment and detention measures shall be installed as shown on the plans and at locations as required, directed by the engineer.
3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than one pound of seed per 50 square yards of area. (see seed specifications this sheet)
4. All disturbed areas will be restabilized within 45 days. At any one time, no more than 5 acres, (217,800 Sq. Ft.) Will be disturbed.
5. Silt fences and perimeter barriers shall be inspected periodically and after every rain during the life of the project. All damaged areas shall be repaired, sediment deposits shall periodically be removed and disposed of.
6. After all disturbed areas have been stabilized, the temporary erosion and sediment control measures are to be removed and the area disturbed by the removal smoothed and re-vegetated.
7. Per the EPA CGP requirements there will be reports of the erosion control inspections IAW SWPPP prepared by BS&E. All erosion controls shall be inspected weekly and within 24 hours after 0.25" or greater rain event.
8. Ditches, swales, and basins shall be stabilized prior to directing runoff to them.
9. Do not traffic exposed soil surfaces with construction equipment. If feasible, perform excavations with equipment positioned outside the limits of the infiltration system.
10. Roadways, driveways and cut and fill slopes must be stabilized within 72 hours of achieving final grade.
11. Stabilization means:

11.1. A minimum of 85% of vegetative cover has been established.

11.2. A minimum of 3 inches of non-erosive material such as stone or rip rap has been installed, or

11.3. Erosion control blankets have been installed.

12. This project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and chapter AGR 3800 relative to invasive species.
13. The NHDES stormwater manual, dated February 2025, is a part of this plan set and the more restrictive will govern. (NH SWM)

Winter Weather Stabilization

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (B96-B98) (Direct Quotes)

Chapter Env-Wq 1505.06 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

General Description (NH SWM):

A project involving construction activity extending beyond one construction season will require measures to stabilize the site for the over-winter period. If a construction site is

not stabilized with pavement, a road gravel base, 85 percent mature vegetation cover, or riprap by October 15, then the site must be protected with over-winter stabilization. The winter construction period is from October 15 through May 1.

Considerations (NH SWM):

Winter excavation and earthwork activities need to be limited in extent and duration, to minimize potential erosion and sedimentation impacts.

The following considerations are important for winter weather stabilization:

• No more than one acre of the site should be exposed (without stabilization) at any one time. Generally, the exposed area should be limited to only those areas in which work will occur during the following 15 days and that can be mulched in one day prior to any snow or rainfall event.
• Subsequent work areas should not be exposed until the previously exposed work area has been fully stabilized.
• An area is considered "exposed" until stabilized with pavement, vegetation, mulching, erosion control mix, erosion control mats, or riprap (or gravel base on a road or parking area).
• All erosion and sediment control measures installed for the project should have routine maintenance and cleaning completed prior to winter work by October 15. These should be inspected and repaired as needed in preparation for the winter season. Temporary embankments should be fully vegetated or otherwise stabilized by accepted methods.

Maintenance Requirements (NH SWM):

• All E&SC measures should be inspected at least once per week and within 24 hours of any storm event exceeding 1/4-inch in a 24-hour period, or as stipulated by the applicable permits. Repairs should be made as necessary.
• Inspection and maintenance measures should continue as needed throughout construction, including the overwinter period, after each snowstorm or period of thawing and stormwater runoff.
• For any area stabilized by temporary or permanent seeding prior to the onset of the winter season, the contractor should conduct an inspection in the spring to ascertain the condition of vegetation cover, and repair any damage areas or bare spots and reseed as required to achieve an established vegetative cover (at least 85 percent of area vegetated with healthy, vigorous growth).
• See Chapter 6 for general information on inspection and maintenance of Erosion and Sediment Control (E&SC) measures (e.g., inspection frequency, corrective actions, documentation requirements, etc.).

Specifications (NH SWM):

To adequately protect water quality during cold weather and during spring stormwater runoff, the following stabilization techniques should be employed during the period from October 15 through May 1:

• Before winter:
    - o Stabilization as follows should be completed within a day of establishing the grade that is final or that otherwise will exist for more than 5 days:
        - All proposed vegetated areas having a slope of less than 15 percent which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are

disturbed after October 15, should be seeded and covered with 3 to 4 tons of hay or straw mulch per acre secured with anchored netting, or 2 inches of erosion control mix (see "Erosion Control Mix Berm" fact sheet for material specifications).

- All proposed vegetated areas having a slope of greater than 15 percent which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, should be seeded and covered with a properly installed and anchored erosion control blanket or with a minimum 4- inch thickness of erosion control mix, unless otherwise specified by the manufacturer. Note that erosion control blankets, with compost, should not exceed 2 inches in thickness or they may overheat.

o All stone-covered slopes must be constructed and stabilized by October 15.
o Stockpiles of soil materials should be mulched for over winter protection with hay or straw at twice the normal rate or with a 4-inch layer of erosion control mix. Mulching should be done within 24 hours of stocking, and reestablished prior to any rainfall or snowfall. No soil stockpile should be placed (even covered with mulch) within 100 feet from any wetland or other water resource area.
o Installation of erosion control blankets should not occur over snow of greater than 1-inch in depth or on frozen ground.
o All grass-lined ditches, swales, and channels should be constructed and stabilized by September 1. All ditches, swales, or channels which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, should be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions, as determined by a qualified Professional Engineer or a Certified Professional in Erosion and Sediment Control as certified by the CSPESC Council of EnviroCert International, Inc. If a stone lining is necessary, the contractor may need to re-grade the ditch, swale, or channel as required to provide adequate cross-section after allowing for placement of the stone.
o All stone-lined ditches, swales, and channels must be constructed and stabilized by October 15.

• During winter:

o The area of exposed, unstabilized soil should be limited to one acre and should be protected against erosion by the methods described in this section prior to any thaw or spring melt event. Subject to applicable regulations, the allowable area of exposed soil may be increased if activities are conducted according to a winter construction plan, developed by a Professional Engineer licensed to practice in the state of New Hampshire or a Certified Professional in Erosion and Sediment Control as certified by the CSPESC Council of EnviroCert International, Inc.
o Installation of anchored hay mulch or erosion control mix should not occur over snow of greater than 1-inch in depth or on frozen ground.
o All mulch applied during winter should be anchored (e.g., by netting, tracking, wood cellulose fiber).
o Frozen materials, (e.g., frost layer that is removed during winter construction), should be stockpiled separately and in a location that is away from any area needing to be protected. Stockpiles of frozen material can melt in the spring and become unworkable and difficult to transport due to the high moisture content in the soil.
o After October 15, incomplete road or parking areas where active construction of the road or parking area has stopped for the winter season should be protected with a minimum 3-inch layer of base course gravels B-98 meeting the graduation requirements

of NHDOT Standard Specification for Road and Bridge Construction Table 304-1, Item No. 304.1, 304.2, or 304.3.

o Sediment barriers that are installed during frozen conditions should consist of erosion control mix berms, or continuous contained berms. Silt fences and hay bales should not be installed when frozen conditions prevent proper embedment of these barriers.

Inspection and Maintenance Schedule

Sediment control measures will be inspected during and after storm events to ensure that the practice still has integrity and is not allowing sediment to pass. Depending on SWPPP criteria, all controls will be inspected once every 7 days and after storm events. Inspection reports must be submitted to City of Dover Engineering Department and in conformance with the NHDES Alteration of Terrain Permit if required. Sediment build-up in swales and level spreaders will be removed if it is deeper than six inches. See also Stormwater System Operation: Inspection & Maintenance Manual published separately also by Berry Surveying & Engineering. See also Storm Water Pollution Prevention Plan (SWPPP) and / or Stormwater Management Plan (SWMP) developed in accordance with EPA NPDES or City of Dover requirements.

Corrective Action measures will be made in accordance with Stormwater Management Plan (SWMP) / SWPPP requirements and records maintained on site by the Contractor.

5.0 Demonstration of Compliance with Dover Chapter 153-14

The following list of standards from chapter 153-14 are shown to demonstrate compliance with Dover stormwater regulations, starting with section 3: Design Standards. Our demonstration of compliance is *italicized* after each standard:

(3) Design standards.

(a) Minimum protections and management standards.

[1] Where applicable, all development must comply with the EPA Phase II Stormwater Rules and the City's MS4 permit, as amended.

Acknowledgement of project compliance with the EPA Phase II stormwater rules is shown in project specific notes, E&SC Plan, Note #9. As the impact of the proposal is greater than one acre, a Stormwater Pollution Prevention Plan (SWPPP) will be developed and a Notice of Intent (NOI) submitted to the EPA.

[2] Existing surface waters, including ponds, rivers, perennial and intermittent streams (natural or channelized), and wetlands (including vernal pools), shall be protected by the minimum buffer setback as specified in Chapter 170, Zoning, § 170-27.1. Stormwater and erosion and sediment control

stormwater control measures (SCMs) shall be located outside the specified buffer zone unless otherwise approved by the Planning Board.

Please find Grading & Drainage/Watershed Plans showing stormwater SCMs locations. There are no wetlands located on the site.

[3] Low-impact development (LID) site planning and design strategies shall be used to the most extent practicable (MEP) in order to reduce the generation of the stormwater runoff volume for both new and redevelopment projects. An owner/applicant must document why LID strategies are not appropriate if not used to manage stormwater.

Please find Rain Garden, Porous Pavement Sidewalks, Infiltration Trenches, and Gravel Wetland designs. Reference is made to the US EPA Low Impact Development (LID) and green infrastructure resources.

[4] All proposed stormwater practices and measures shall be installed and maintained in accordance with manufacturers' specifications and performance specifications outlined in the New Hampshire Stormwater Management Manual Volume 2 (December 2008 or current revision) a copy of which can be found on the NHDES website.

Please find Inspection & Maintenance Manual included in the drainage binder. The NH Stormwater Manuals are referenced in the I & M Manual in the Introduction on Page 3.

[5] All storage facilities for fuel, chemicals, chemical or industrial wastes, and biodegradable raw materials shall meet the regulations of the NHDES, including but not limited to those involving underground storage tanks, aboveground storage tanks, hazardous waste and stormwater control measures for groundwater protection (Part Env-Wq 401).

Please find the note added to E&SC Plan, Note #8, regarding storage facilities. Prior to construction, a Stormwater Pollution Prevention Plan (SWPPP) will be developed in accordance with US EPA CGP 2022.

[6] Salt and other deicing materials shall be stored under cover or located such that no direct discharges to receiving waters are possible. Snow storage areas shall be located such that no direct discharges to receiving waters are possible. See the NHDES guidance fact sheet on road salt and snow disposal.

Please find the topic Snow Storage Areas & Winter Maintenance within the Inspection & Maintenance Manual included in the drainage binder.

[7] The use of sodium-chloride-based materials for winter maintenance shall be the minimum necessary for safety. The use of sodium-chloride-based materials is discouraged within the groundwater protection districts.

Please find the topic Snow Storage Areas & Winter Maintenance within the Inspection & Maintenance Manual included in the drainage binder.

[8] Impervious surfaces for parking areas and roads shall be minimized to the extent possible.

Impervious surfaces for parking surfaces and roads are minimized by the use of porous pavement sidewalk and porous pavers.

[9] Stormwater runoff from new impervious surfaces shall be directed to a stormwater control measure for flow mitigation, treatment and/or infiltration.

Stormwater runoff is conveyed by porous pavement, porous pavers, a rain garden, a gravel wetland and infiltration trenches for treatment.

(b) Stormwater management for new development.

[1] Runoff of impervious surfaces shall be treated to provide 80% removal of total suspended solids (TSS) and 50% removal of both total nitrogen and phosphorus. Removal rates shall be determined using approved manufacturer's pollutant removal efficiency analysis or the pollutant removal efficiencies outlined in the New Hampshire Stormwater Management Manual (February 2025), a copy of which is available from the NHDES website.

The following guidance has been utilized from the Pollutant Removal Efficiencies published by the UNH Stormwater Center SCM Performance Curves (2023):

Subsurface Gravel Wetland:
- *Total Suspended Solids (TSS) reduction of 97%*
- *Total Nitrogen (TN) reduction of 68%*
- *Total Phosphorous (TP) reduction of 61%*

Infiltration Trench (2.41in/hr data, 3.0in/hr proposed:
- *Total Suspended Solids (TSS) reduction of 100%*
- *Total Nitrogen (TN) reduction of 100%*
- *Total Phosphorous (TP) reduction of 98%*

Porous (Permeable) Pavement (24" Filter):
- *Total Suspended Solids (TSS) reduction of 96%*
- *Total Nitrogen (TN) reduction of 77%*
- *Total Phosphorous (TP) reduction of 75%*

Biofiltration:

- *Total Suspended Solids (TSS) reduction of 99%*
- *Total Nitrogen (TN) reduction of 32%*
- *Total Phosphorous (TP) reduction of 53%*

It is of note that the biofiltration provides 32% TN reduction based on the UNHSC performance curves. It is assumed this calculation utilizes an 18" filter course, where a 24" filter course is proposed on site, likely providing additional removal efficiency. BS&E has selected this practice type due to site constraints, where a practice such as a gravel wetland or bioretention with ISR are unable to be located do to the practice size. As this project requires an Alteration of Terrain Permit, biofiltration is an allowed method to achieve Pollutant Discharge Minimization Requirements (Env-Wq. 1503.03(a)).

[2] Rainfall amount shall be based on current extreme precipitation estimates obtained from the Northeast Regional Climate Center.

Extreme Precipitation Tables are included in the drainage binder and have been used for analysis with a 115% escalation as a seacoast community.

[3] Measures shall be taken to control the post-development peak rate runoff so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events.

Please find comparative analysis, Section 3.1 of this document, for this demonstration at all final reaches.

[4] Measures shall be taken to control the post-development surface water runoff volume so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events. For sites where infiltration/recharge is limited or not practicable, the owner/applicant must demonstrate that the project will not cause or contribute to flooding or functional impairments to streets, adjacent properties, and downstream properties.

Please find comparative analysis, Section 3.1 of this document, for this demonstration at all final reach. A waiver has been requested for volume at Final Reach #100 and #300, with justification in the waiver request.

[5] Infiltration rates for designing groundwater recharge practices shall be determined in accordance with Section Env-Wq 1504.14.

An Infiltration Feasibility Study is attached as a separate document within the drainage binder. The infiltration rate is determined via methodology from Env-Wq 1504.14. Additional infiltration occurs within the porous pavers and patio that is not accounted for in model.

[6] Stormwater conveyance practices shall be sized appropriately to convey the ten-year, twenty-four-hour storm event without overtopping or causing flooding on the property.

All Practices have been sized within these parameters.

[7] For large projects adding greater than or equal to 10 acres of impervious cover, or projects located in known areas of flooding concern, or specifically within areas with a 1% chance of being inundated by water in any given year, the owner/applicant shall submit a supplementary report that describes how the project will not increase the future flooding potential and complies with the AoT requirements pertaining to floodplain impacts as described in Section Env-Wq 1503.09, regardless of whether an AoT permit is required.

This standard is not applicable for this project.

[8] The design of the stormwater management systems shall take into account upstream and upgradient runoff that flows onto, over, or through the site to be developed or redeveloped and provide for this contribution of runoff.

Off-site stormwater flow has been accounted for in the project design. Please find watershed sheets within the drainage binder.

[9] Seasonal high-water table elevations must be accounted for in all SCM design criteria.

The seasonal high-water table elevations are shown in the test pit data.

[10] Access for maintenance of stormwater facilities must be included as part of the design, where necessary. Access easements may be required.

All practices have been designed to be maintained and located in open or paved areas. See the appropriate sections of the Inspection and Maintenance Manual for specified maintenance activity.

[11] Plantings in treatment areas shall be native grasses, shrubs and/or other native plants in sufficient numbers and density to prevent soil erosion and to achieve water-quality treatment.

See Section 4.24 Vegetative Stabilization, of this narrative, for SCM plantings and stabilization seeding descriptions. The applicant is following USDA NRCS seeding recommendations and NH Stormwater Manual (February 2025).

(c) Stormwater management for redevelopment. In order to determine the stormwater requirements for redevelopment projects, the percentage of the site covered by existing impervious areas must be calculated. Stormwater

requirements for redevelopment will vary based upon the amount of site surface area that is covered by existing impervious surfaces.

[1] For sites meeting the definition of a redevelopment project and having less than 40% existing impervious surface coverage, the stormwater management requirements will be the same as new development projects, with the important distinction that the applicant can meet those requirements either on site or at an approved off-site location (i.e., off-site mitigation). The applicant must satisfactorily demonstrate that impervious area reduction, LID strategies and SCMs have been implemented on site to the MEP.

This standard has been met with the proposed design.

[2] For sites meeting the definition of a redevelopment project and having more than 40% existing impervious surface coverage, stormwater shall be managed in accordance with one or more of the following techniques, listed in order of preference:

This standard is not applicable for this project.

[a] Implement measures on site that result in mitigation and treatment of at least 30% of the existing impervious cover as well as 50% of the additional proposed impervious surfaces and pavement areas through the application of LID; or

[b] Implement other LID techniques on site to the MEP to provide mitigation and treatment for at least 50% of the entire site area.

This standard is not applicable for this project.

[3] The owner/applicant may utilize off-site mitigation to meet the redevelopment requirements when the following standards have been met:

This standard is not applicable for this project.

[a] The owner/applicant shall demonstrate, to the satisfaction of the Planning Board, that on-site treatment has been implemented to the MEP.

[b] The owner/applicant shall find an approved, off-site location within the same watershed as the project site or within the drainage area of the same receiving water body.

[c] Off-site mitigation shall be equivalent to no less than the total area of impervious cover not treated on site.

[d] The owner/applicant shall submit a full design of the proposed off-site measures for review and approval.

[e] The owner/applicant must also demonstrate that there is no downstream drainage or flooding impact as a result of not providing on-site management.

(d) Erosion control standards during construction. The following standards shall be applied in project planning and shall be implemented prior to and during construction activity:

[1] All proposed measures shall meet, at a minimum, the design standards for stormwater control measure practices set forth in the New Hampshire Stormwater Management Manual (February 2025), a copy of which is available from the NHDES website.

See Inspection & Maintenance Manual and Erosion & Sediment Control Plan, Note #10A.

[2] When a project requires a stormwater permit from the EPA Construction General Permit (CGP) Program, copies of the stormwater pollution prevention plan (SWPPP) inspections shall be provided to the Community Services Department.

Copies will be provided when developed and published prior to NOI submittal and construction. See Erosion & Sediment Control Plans, Note #10G.

[3] Stripping of vegetation shall be done in a manner that minimizes soil erosion. Whenever practical, natural vegetation shall be retained, protected, or supplemented.

There is to be no disturbance outside of the limit of construction. Erosion & sediment control measures are to be in place prior to the start of land grubbing. See Erosion & Sediment Control Plan, Note #10B.

[4] The area of land disturbance shall be kept to a minimum and be limited to an area only large enough to accommodate construction activities for a particular construction phase.

This project is constrained by the property lines and development objectives. Low Impact Development practices have been implemented and landscaping steps proposed to mitigate the level of development, and will be conducted in one phase.

[5] Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas where feasible, or measures to convey

stormwater through the project area without causing erosion of sediment must be included. Integrity of downstream drainage systems shall be maintained.

Please find Erosion & Sediment Control Plan.

[6] Appropriate erosion and sediment control measures shall be installed prior to any soil land disturbance and must be reviewed and approved by the Community Services Department.

Please find Erosion & Sediment Control Plans, Note #10B.

[7] Perimeter site controls shall not be placed within wetland areas, stream channels or wetland buffers.

No wetlands exist on the subject parcel.

[8] Disturbed soil areas shall be either temporarily or permanently stabilized. In areas where final grading has not occurred, temporary stabilization measures should be in place within seven calendar days for exposed soil areas that are within 100 feet of a surface water body or a wetland and no more than 14 calendar days for all other areas. Permanent stabilization should be in place within three calendar days following completion of final grading of exposed soil areas.

Please find Erosion & Sediment Control Plan, Note #10C. There is no surface water body within 100' of the site.

[9] All temporary erosion and sediment control measures shall be maintained in functioning condition until final site stabilization is accomplished. A proposed SCM inspection schedule shall be included in the submittal.

Please find Erosion & Sediment Control Plan, Note #10D, Inspection & Maintenance Manual.

[10] Additional temporary stabilization for the winter season consistent with NHDES guidelines shall be in place for disturbed areas that are not permanently stabilized by October 1, or at the discretion of the Community Services Department.

Please find winter stabilization note E22, sheet E-102.

[11] Special stabilization details shall be provided with the submission for any land disturbance on slopes equal to or steeper than 3:1.

Please find Rolled Erosion Control Blanket (RECB) Slope Stabilization Detail E21, sheet E-102.

[10] All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 calendar days unless conditions dictate otherwise.

Please see Erosion and Sediment Control Plan, Note #10D, and find Inspection & Maintenance Manual containing this statement.

[13] For projects proposing to disturb and expose soils in areas of 10 acres or more at one time, a temporary (or permanent) sediment basin must be provided with storage for a calculated volume of runoff from a drainage area from a two-year, twenty-four-hour storm, or equivalent control measures, where attainable, until final stabilization of the site. Alternatively, the sediment basin can be sized to provide 3,600 cubic feet of storage per acre of drainage area until final stabilization of the site. In determining appropriate locations and number of sediment basins needed, the operators may consider such factors as erodibility of site soils, slope lengths, available area on site, construction period and other unique site considerations.

This standard is not applicable for this project.

[14] Use of temporary sediment basins should avoid any additional vegetation clearing or site land disturbance not otherwise needed for post-construction. Sediment basin locations must be reviewed by the Community Services Department prior to construction and must consider the potential for off-site impacts, including public safety, especially as it relates to sediment movement and/or sediment basin failure, and alternative sediment controls must be used where site limitations preclude a safe design.

The limit of construction is not to be expanded beyond the staked construction limits. See Erosion and Sediment Control Plan, Note #7.

(e) Installation and construction inspections. The owner/applicant shall be responsible for inspection requirements as follow:

[1] The Community Services Department or its designated agent shall have access to the site to complete routine inspections.

The applicant acknowledges this standard. See Erosion and Sediment Control Plan, Note 10E.

[2] The Community Services Department shall be notified 24 hours prior to installation of a stormwater SCM in order to schedule an inspection. These inspections shall be completed during normal working hours.

See Erosion & Sediment Control Plan, Note #10E.

[3] The Planning Board or Community Services Department may require the design engineer and/or an independent third party to provide inspection and oversight of the construction of the stormwater management facilities and erosion and sediment control measures at its discretion. Such oversight may be especially important for implementing techniques such as porous pavement or subsurface stormwater infiltration systems. The owner/applicant shall be responsible for all fees associated with third-party inspections.

See Erosion & Sediment Control Plan, Note #10E.

[4] All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and stormwater inspector (CESSWI), or a certified professional in stormwater quality (CPSWQ). Inspection reports shall be submitted to the Community Services Department.

See Erosion & Sediment Control Plan, Note 10G.

[5] The owner is ultimately responsible for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of these regulations.

See Erosion & Sediment Control Plan, Note 10H.

(f) Stormwater management plan (SWMP) submittal requirements. At the discretion of the Planning Board or Community Services Department, a technical review by an independent third party may be required of any SWMP prepared under these regulations. Such a review shall be performed by a qualified professional consultant and the expense of which shall be the full responsibility of the owner/applicant.

Much of the standards required in the Stormwater Management Plan (SWMP) are already covered in the Erosion & Sediment Control Plan in Section 4 above. Some items are already covered in the Stormwater System Management: Inspection and Maintenance Manual which is an attached document. The Stormwater Pollution Prevention Plan, as required by the US EPA CGP must be prepared prior to the submittal of a Notice of Intent which is required for this project as it exceeds one-acre in area of disturbance. This is noted on the Erosion & Sediment Control Plan, Note 10I.

[1] For projects requiring minimum protection standards, a plan including the following information shall be submitted:

[a] Description of erosion and sediment control measures as well as sequence for final stabilization of the project site.

Please find Erosion & Sediment Control Plan Section 4 of this document, specifically section 4.0.

[b] Proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns.

Please find W1 Existing watershed and W2 Proposed watershed plans within the drainage binder. This is covered in detail in Section 1 and Section 2 of this document.

[c] Description of LID proposed measures.

Please see Section 4.0 of this drainage narrative. Low impact development measures include the implementation of rain garden, porous pavement, infiltration trenches, and gravel wetland SCMs for treatment.

[2] For projects requiring new development or redevelopment standards, a drainage report that contains the following items shall be submitted:

[a] Description of construction period and earth movement schedule, including anticipated project start and completion dates, sequence and duration of grading and construction activities, sequence and timing of installation and/or application of soil erosion and sediment control measures as well as sequence for final stabilization of the project site.

Please find Section 4.0 in this drainage narrative containing the construction sequence.

[b] Description of the on-site and adjacent wetlands, streams and other water resources, including methods used to identify these resources, and a description of any buffer setbacks that may apply, steep slopes, critical habitat, existing vegetation, areas with a 1% chance of being inundated by water in any given year, and whether any downstream water bodies are listed as impaired according to NHDES's most recent 303(d) list.

Please find Existing Conditions Plan. There is no flood zone, steep slopes, or other sensitive natural areas that would require a buffer.

[c] Soils information for proposed disturbed areas shall be delineated by a certified soil scientist. For all other areas that contribute runoff to the project site, soil types may be identified in accordance with Natural Resources Conservation Service (NRCS) countywide soil survey.

Please find Site Specific Soils Survey (sheet #4) and W-1 Existing Watershed Plans.

[d] Description of existing drainage patterns, receiving water bodies or drainage infrastructure and soil types for recharge potential.

Please find W-1 Existing Watershed Plan, Site Specific Soils Survey (sheet #4).

[e] Watershed area limits, including any off-site and upstream areas contributing flow to shared drainage channels and/or infrastructure.

Please find W-1 Existing Watershed Plan & W-2 Proposed Watershed Plan within the drainage binder.

[f] Description of proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns.

Please find sections 1.0 and 2.0 of this narrative as well as W-1 Existing Watershed Plan, Existing Drainage Analysis, W-2 Proposed Watershed Plan & Proposed Drainage Analysis. The existing impervious area and proposed impervious area are documented on the Site Plan.

[g] Methods and assumptions used to calculate pre- and post-development runoff volume, peak discharge, and discharge velocity for the specified design storm events.

Please find Section 1.0 & 2.0 of this drainage narrative discussing the existing and proposed development conditions.

[h] Methods and assumptions used to calculate the pollutant load removal.

The following guidance has been utilized from the Pollutant Removal Efficiencies published by the UNH Stormwater Center SCM Performance Curves (2023):

Subsurface Gravel Wetland:
- *Total Suspended Solids (TSS) reduction of 97%*
- *Total Nitrogen (TN) reduction of 68%*
- *Total Phosphorous (TP) reduction of 61%*

Infiltration Trench (2.41in/hr data, 3.0in/hr proposed:
- *Total Suspended Solids (TSS) reduction of 100%*
- *Total Nitrogen (TN) reduction of 100%*
- *Total Phosphorous (TP) reduction of 98%*

Porous (Permeable) Pavement (24" Filter):
- *Total Suspended Solids (TSS) reduction of 96%*
- *Total Nitrogen (TN) reduction of 77%*
- *Total Phosphorous (TP) reduction of 75%*

Biofiltration:
- *Total Suspended Solids (TSS) reduction of 99%*
- *Total Nitrogen (TN) reduction of 32%*
- *Total Phosphorous (TP) reduction of 53%*

It is of note that the biofiltration provides 32% TN reduction based on the UNHSC performance curves. It is assumed this calculation utilizes an 18" filter course, where a 24" filter course is proposed on site, likely providing additional removal efficiency. BS&E has selected this practice type due to site constraints, where a practice such as a gravel wetland or bioretention with ISR are unable to be located do to the practice size. As this project requires an Alteration of Terrain Permit, biofiltration is an allowed method to achieve Pollutant Discharge Minimization Requirements (Env-Wq. 1503.03(a)).

[i] Description of LID measures that are proposed to limit the development footprint, preserve existing vegetation and mimic existing hydrology to the extent feasible.

Please find Section 4.0 of this drainage narrative describing stormwater SCMs used for the design. Low impact development measures include the implementation of rain garden with stormtech, porous pavement, porous pavers, infiltration trenches, and gravel wetland.

[j] If not used, provide rationale why LID measures are not practical for the site.

Rain Garden, Porous Pavement, Porous Pavers, Infiltration Trench and Gravel Wetland SCMs are proposed on site and qualify as low impact development.

[k] Describe measures and calculations for proposed practices used to achieve no net increase in runoff volumes leaving the site.

Please find comparative analysis, Section 3.1 of this document, for this demonstration at all final reach. A waiver has been requested for volume at Final Reach #100 and #300, with justification in the waiver request.

[l] Provide calculations for the infiltration or exfiltration system.

Please see the attached Infiltration Feasibility Study. Discussion on Infiltration Rates is provided within the study.

[m] If an increase in post-development runoff volume is anticipated due to limited applicability for LID measures and site constraints, provide an assessment and supporting calculations to demonstrate no adverse impacts to downstream infrastructure, adjacent properties or aquatic habitat.

Please find waiver request attached with the Site Plan submission for justification of the stormwater volume increase at Final Reach #100 & #300.

[n] Descriptions, details, and design criteria and calculations for all structural, nonstructural, permanent, and temporary erosion and sedimentation control measures and SCMs. This information should include seeding mixtures and rates, types of sod, methods of seedbed preparation, expected seeding dates (or limitations on seeding time frames), type and rate of lime and fertilizer application, and type and quantity of mulching for temporary and permanent control facilities.

Please find section 4.0 of this narrative, the Inspection & Maintenance Manual and Plan, as well as the Erosion & Sediment Control Plan. Type and rate of lime and fertilizer will be determined on site by testing the topsoil for requirements.

[o] Where proposed changes are anticipated within mapped limits of the areas with a 1% chance of being inundated by water in any given year, provide hydrologic and hydraulic analysis to show no net increase in flood elevations.

There is no disturbance proposed within any flood zones.

[p] Proposed schedule for the inspection and maintenance of all erosion control measures on site prior to achieving final site stabilization.

Please find Section 4.0 of this document, and the Stormwater System Operation: Inspection & Maintenance Manual. EPA and NHDES will require an inspection every 7 days and after a storm event greater than 0.25".

[q] Describe procedures for removing temporary erosion control measures and removal of accumulated sediment captured by such measures.

The maintenance requirements for each erosion and sediment control method are detailed within the Construction Detail on Sheets E-101 and E-102

[r] Any other specific study, calculation, or investigation as requested by the City.

No additional studies or investigations have been requested at this time.

[s] Describe procedures to limit and/or optimize the use of deicing materials and minimize off-site increases in chloride levels in adjacent surface water and groundwater.

Please find Inspection & Maintenance Manual. Additionally references can be found on Erosion and Sediment Control Plan and project notes, note #4.

[t] Provide a maintenance and inspection plan for post-construction monitoring of stormwater SCMs to ensure long-term performance and functionality, including details of who will be responsible for inspections and maintenance, proposed schedule, documentation, submittal procedures and contingency plans if future maintenance is required.

Please find Inspection & Maintenance Manual and plan with stormwater control measure design plans.

[u] Provide copies of pertinent state and federal permits.

Copies of all state and federal permits will be provided when received.

(g) Long-term operation and maintenance. The owner shall be responsible for continued inspection and maintenance requirements.

[1] An operation and maintenance manual shall be created with the following information:

[a] The names of the responsible qualified professionals who will implement the required reporting, inspections, and maintenance activities.

Please find Inspection & Maintenance Manual.

[b] An inspection checklist, identifying item or SCM, inspection frequency, and components to be inspected. The list shall clearly outline performance thresholds and triggers for maintenance.

Please find Inspection & Maintenance Manual.

[c] Snow and ice removal shall be performed by a contractor certified by the "Green SnoPro" Program, or approved equivalent, following stormwater control measure for the application of deicing materials.

Please find Inspection & Maintenance Manual.

[d] Deicing log to track amount and type of deicing material applied.

Please find Inspection & Maintenance Manual.

[e] A site plan clearly identifying the locations of all stormwater practices to be inspected and maintained.

Please find Inspection & Maintenance Plans within the drainage binder.

[f] Inspection and maintenance log to be submitted to the City of Dover Community Services Department on an annual basis. Documents shall be submitted no later than December 15 of each year.

Please find Inspection & Maintenance Manual.

[2] The owner of record shall record at the Registry of Deeds documentation sufficient to provide notice to all persons that may acquire any property subject to the requirements and responsibilities described in the approved stormwater management plan. The notice shall comply with the applicable requirements for recording contained in RSA 477 and 478. The notice need not set forth the requirements at length, so long as it is sufficient to provide notice to prospective purchasers of the requirements for maintenance and reporting.

Please find note #26 of project specific notes, sheet #2.

5.0 CONCLUSION

Peak rates of runoff flow are modeled to be reduced in the post-construction analysis, as compared to the pre-construction analysis. This reduction occurs at all storm events due to the installation of the low impact development stormwater devices.

The volume of runoff has been reduced at **Final Reach #200, #400, #500, and #60**0. See Dover waiver request for volumetric increase at **Final Reach #100 & #300** due to on-site soil conditions. A volumetric increase within the allotment for the Channel Protection Volume (CPV) (Env-Wq 1507.05) has been shown in the comparative analysis. The project as shown provides compliance with Env-Wq 1507.05(b)(1)b where this discharge from the developed area is less than 2 CFS and the 2 Year – 24 HR storm event peak rate of runoff is reduced to the final reaches. The groundwater recharge volume has been met on the project. However, with soils conducive to groundwater recharge are located almost entirely at the high points of the project, resulting in roof runoff being the infiltrated stormwater volumes for the project. There is no soil that will provide infiltration in accordance with Env-Wq 1500 in the vicinity of Gravel Wetland #101 after treatment occurs. Over a 24-hour time span, Final Reach #100 shows an increase in volume at the 2Yr-24Hr volume and reductions at the remaining higher analyzed events. Over a 24-hour time span, Final Reach #300 shows an decrease in volume at the 2Yr-24Hr volume and increases in volume at the remaining higher analyzed events.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is required for this site plan due to the area of disturbance being greater than 100,000 SF. The impact is approximately 164,500 square feet, therefore an EPA Notice of Intent is required to be filed prior to construction and a Stormwater Pollution Prevention Plan prepared.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

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Principal, President

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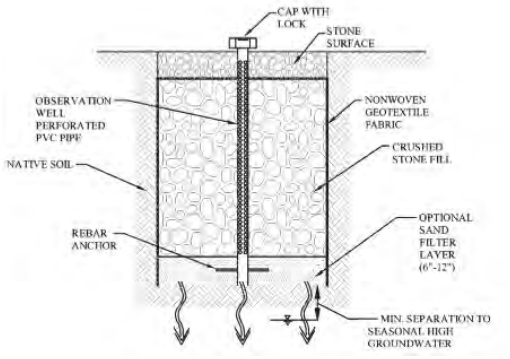
Design Engineer

Infiltration Trench Factsheet

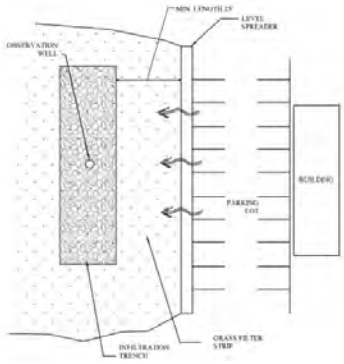
Infiltration Trench is a practice that provides temporary storage of runoff using the void spaces within the soil/sand/gravel mixture that is used to backfill the trench for subsequent infiltration into the surrounding sub-soils. Performance results for the infiltration trench can be used for all subsurface infiltration practices including systems that include pipes and/or chambers that provide temporary storage. Also, the results for this BMP type can be used for bio-retention systems that rely on infiltration when the majority of the temporary storage capacity is provided in the void spaces of the soil filter media and porous pavements that allow infiltration to occur. General design specifications for infiltration trench systems are provided in the most recent version of *The New Hampshire Stormwater Manual, Volume 2: Post-Construction Best Management Practices Selection and Design*.

Sample Design

Cross Section



Plan View



Examples images from the *New Hampshire Stormwater Manual, Volume 2*, p. 86

Pollutant Export Rate by Land Use[1]

Source Category by Land Use	Land Surface Cover	P Load Export Rate[1] (lbs./acre/year)	N Load Export Rate[2] (lbs./acre/year)
Commercial (COM) and Industrial (IND)	Directly connected impervious	1.78	15
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	14.1
Medium-Density Residential (MDR)	Directly connected impervious	1.96	14.1
Low-Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	14.1

[1] From NH Small MS4 General Permit, Appendix F

General Equations

Physical Storage Capacity: Depth of Runoff * Drainage Area
Cost: Physical Storage Capacity * Cost Index * Adjustment Factor[1]
Yearly Pollutant Removal: Pollutant Load Export Rate * Drainage Area * Efficiency

Cost (2023)[1,2]

	Materials and Installation Cost ($/ft^3)	Design Cost ($/ft^3)	Total Cost ($/ft^3)
Rural	9.69	5.22	14.91
Mixed	19.38	10.44	29.82
Urban	29.08	15.66	44.73

[1] EPA Memorandum "Methodology for developing cost estimates for Opti-Tool." Februrary 20, 2016
[2] Converted from 2010 to 2023 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. http://www.bls.gov/data/inflation_calculator.htm

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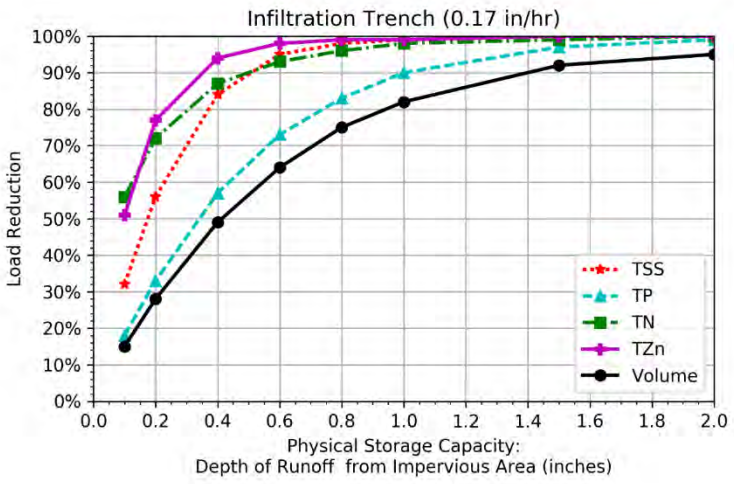
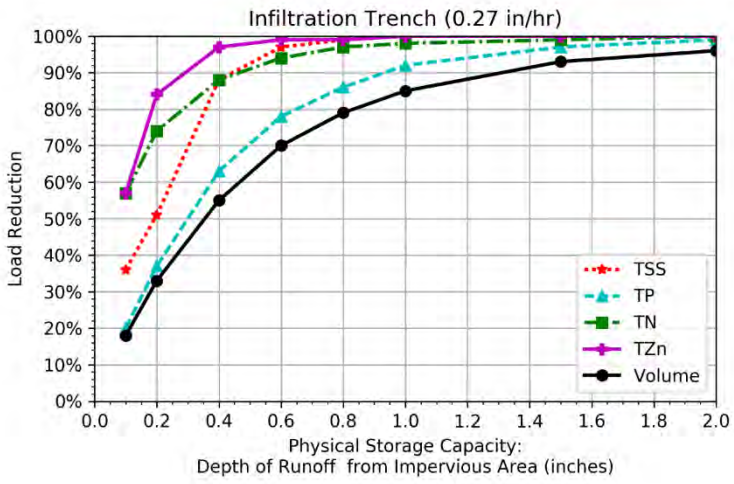
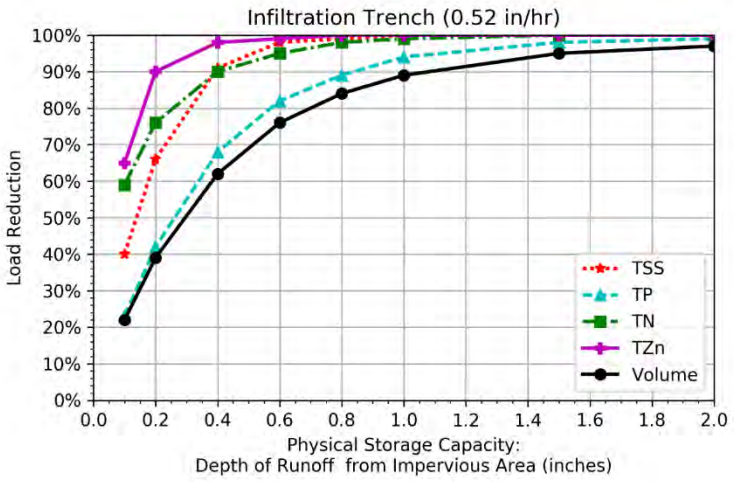
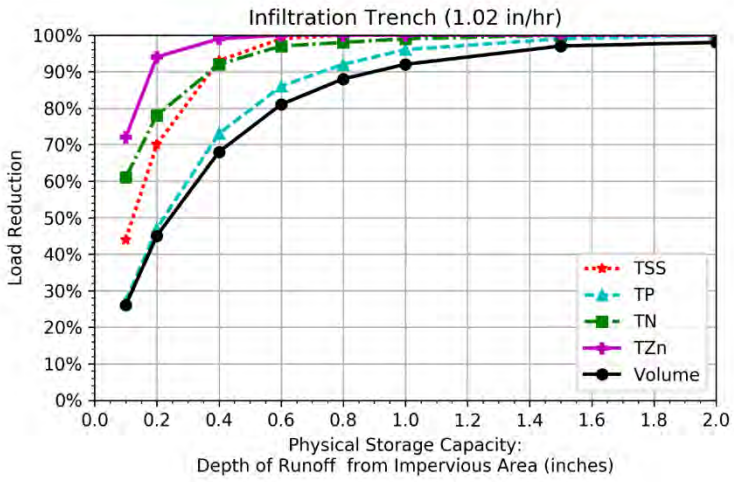
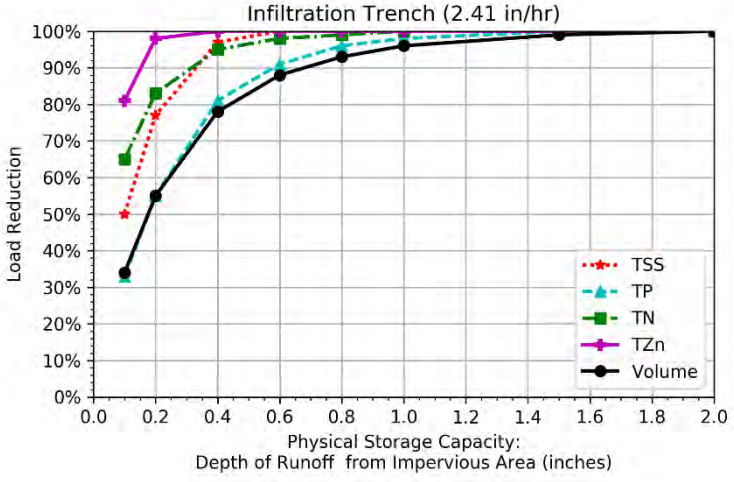
BMP Performance Curves for Soil Infiltration Rate: Infiltration Trench

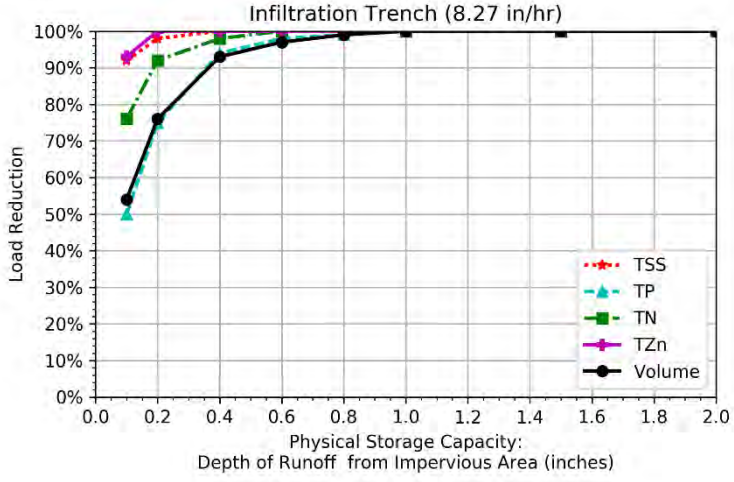












BMP Performance Tables for Soil Infiltration Rate: Infiltration Trench

		Cumulative Load Reduction				
Infiltration Rate (in/hr)	Depth of Runoff from Impervious Area (inches)	TSS	Phosphorus	Nitrogen	Zinc	Runoff Volume
0.17	0.1	32%	18%	56%	51%	15%
	0.2	56%	33%	72%	77%	28%
	0.4	84%	57%	87%	94%	49%
	0.6	95%	73%	93%	98%	64%
	0.8	98%	83%	96%	99%	75%
	1.0	99%	90%	98%	99%	82%
	1.5	100%	97%	99%	100%	92%
	2.0	100%	99%	100%	100%	95%
0.27	0.1	36%	20%	57%	57%	18%
	0.2	51%	37%	74%	84%	33%
	0.4	88%	63%	88%	97%	55%
	0.6	97%	78%	94%	99%	70%
	0.8	99%	86%	97%	99%	79%
	1.0	100%	92%	98%	100%	85%
	1.5	100%	97%	99%	100%	93%
	2.0	100%	99%	100%	100%	96%
0.52	0.1	40%	23%	59%	65%	22%
	0.2	66%	42%	76%	90%	39%
	0.4	91%	68%	90%	98%	62%
	0.6	98%	82%	95%	99%	76%
	0.8	99%	89%	98%	100%	84%
	1.0	100%	94%	99%	100%	89%
	1.5	100%	98%	100%	100%	95%
	2.0	100%	99%	100%	100%	97%

BMP Performance Tables for Soil Infiltration Rate: Infiltration Trench

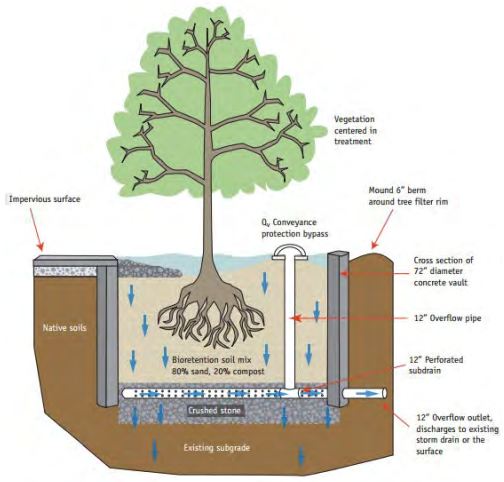
		Cumulative Load Reduction				
Infiltration Rate (in/hr)	Depth of Runoff from Impervious Area (inches)	TSS	Phosphorus	Nitrogen	Zinc	Runoff Volume
1.02	0.1	44%	27%	61%	72%	26%
	0.2	70%	47%	78%	94%	45%
	0.4	93%	73%	92%	99%	68%
	0.6	99%	86%	97%	100%	81%
	0.8	100%	92%	98%	100%	88%
	1.0	100%	96%	99%	100%	92%
	1.5	100%	99%	100%	100%	97%
	2.0	100%	100%	100%	100%	98%
2.41	0.1	50%	33%	65%	81%	34%
	0.2	77%	55%	83%	98%	55%
	0.4	97%	81%	95%	100%	78%
	0.6	100%	91%	98%	100%	88%
	0.8	100%	96%	99%	100%	93%
	1.0	100%	98%	100%	100%	96%
	1.5	100%	100%	100%	100%	99%
	2.0	100%	100%	100%	100%	100%
8.27	0.1	92%	50%	76%	93%	54%
	0.2	98%	75%	92%	100%	76%
	0.4	100%	94%	98%	100%	93%
	0.6	100%	98%	100%	100%	97%
	0.8	100%	99%	100%	100%	99%
	1.0	100%	100%	100%	100%	100%
	1.5	100%	100%	100%	100%	100%
	2.0	100%	100%	100%	100%	100%

Biofiltration Factsheet

Biofiltration is a practice that provides temporary storage of runoff for filtering through an engineered soil media. The storage capacity is typically made of void spaces in the filter media and temporary ponding at the surface of the practice. Once the runoff has passed through the filter media it is collected by an under-drain pipe for discharge. The performance curve for this control practice assumes zero infiltration. If a filtration system has subsurface soils that are suitable for infiltration, then user should use either the performance curves for the infiltration trench or the infiltration basin depending on the predominance of storage volume made up by free standing storage or void space storage. Depending on the design of the manufactured or packaged bio-filter systems such as tree box filters may be suitable for using the bio-filtration performance results. Design specifications for biofiltration systems are provided in the most recent version of *The New Hampshire Stormwater Manual, Volume 2: Post-Construction Best Management Practices Selection and Design*.

Sample Design

Profile view of a Tree Box Filter. The underdrain makes the system one example of a biofiltration system.



Examples images from the *New Hampshire Stormwater Manual, Volume 2,* p. 116

Pollutant Export Rate by Land Use[1]

Source Category by Land Use	Land Surface Cover	P Load Export Rate[1] (lbs./acre/year)	N Load Export Rate[2] (lbs./acre/year)
Commercial (COM) and Industrial (IND)	Directly connected impervious	1.78	15
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	14.1
Medium-Density Residential (MDR)	Directly connected impervious	1.96	14.1
Low-Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	14.1

[1] From NH Small MS4 General Permit, Appendix F

General Equations

Physical Storage Capacity: Depth of Runoff * Drainage Area
Cost: Physical Storage Capacity * Cost Index * Adjustment Factor[1]
Yearly Pollutant Removal: Pollutant Load Export Rate * Drainage Area * Efficiency

Cost (2023)[1,2]

	Materials and Installation Cost ($/ft^3)	Design Cost ($/ft^3)	Total Cost ($/ft^3)
Rural	12.00	6.46	18.46
Mixed	24.00	12.92	36.92
Urban	36.00	19.38	55.38

[1] EPA Memorandum "Methodology for developing cost estimates for Opti-Tool." Februrary 20, 2016
[2] Converted from 2010 to 2023 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. http://www.bls.gov/data/inflation_calculator.htm

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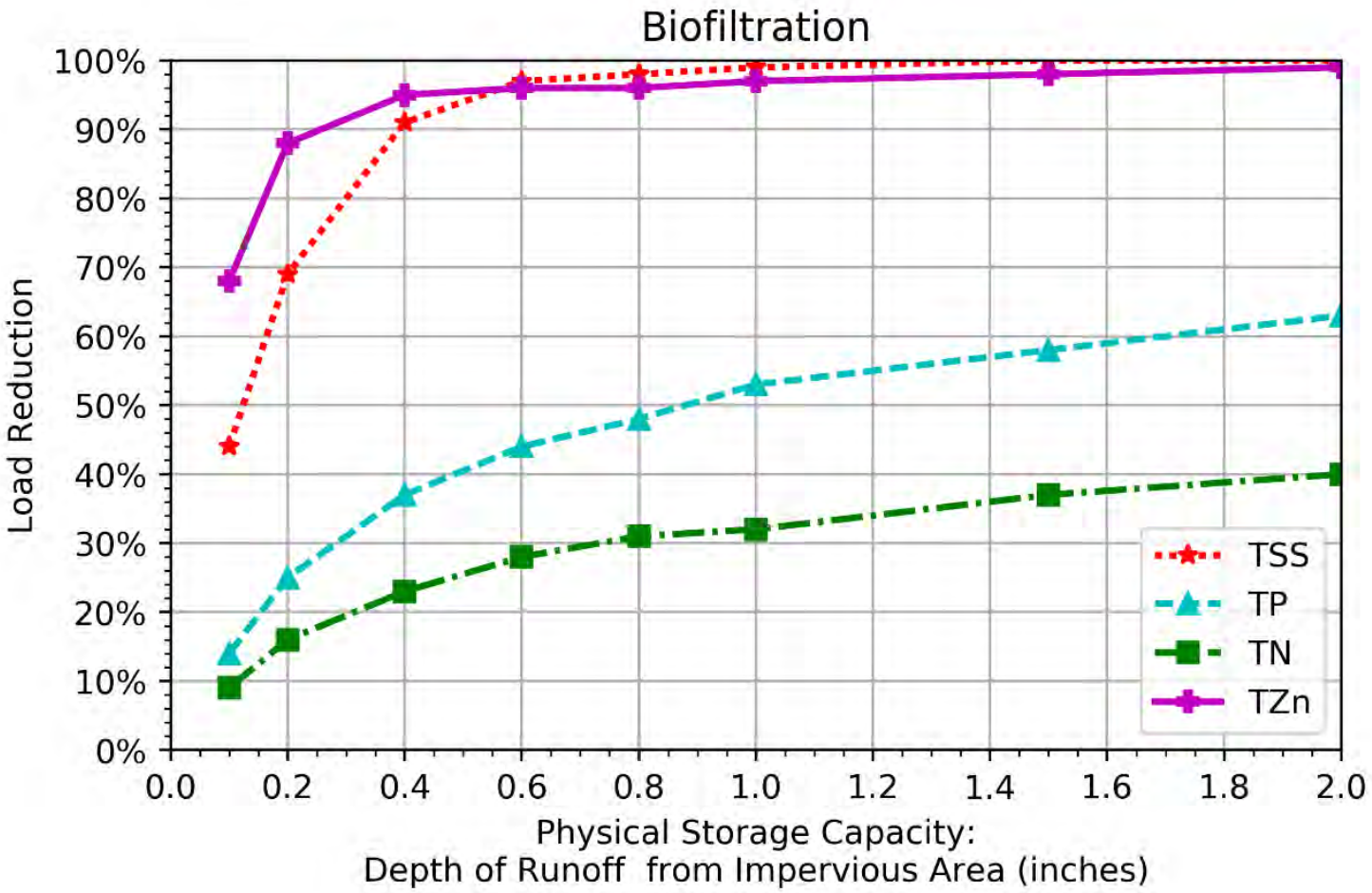
February 2023

BMP Performance Curve for Biofiltration



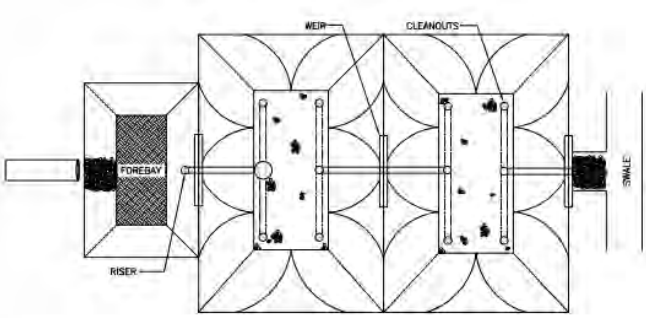
Biofiltration BMP Performance Table								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative TSS Phosphorus Load Reduction	44%	69%	91%	97%	98%	99%	100%	100%
Cumulative Phosphorus Load Reduction	14%	25%	37%	44%	48%	53%	58%	63%
Cumulative Nitrogen Load Reduction	9%	16%	23%	28%	31%	32%	37%	40%
Cumulative Zinc Phosphorus Load Reduction	68%	88%	95%	96%	96%	97%	98%	99%

Gravel Wetlands Factsheet

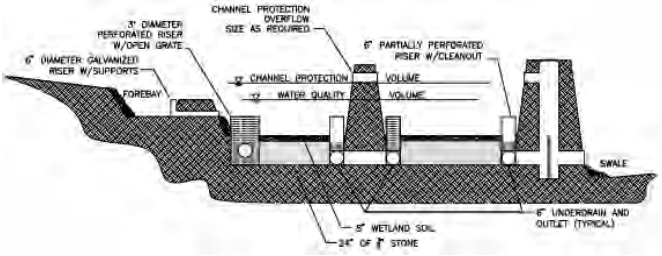
Gravel Wetlands consists of one or more flow-through constructed wetland cells, preceded by a forebay. The cells are filled with a gravel media, supporting an organic substrate that is planted with wetland vegetation. During low-flow storm events, the systems is designed to promote subsurface horizontal flow through the gravel media, allowing contact with the root zone of the wetland vegetation. The gravel and planting media support a community of soil microorganisms. Water quality treatment occurs through microbial, chemical, and physical processes within this media. Treatment may also be enhanced by vegetative uptake.. General design specifications for infiltration basin systems are provided in the most recent version of *The New Hampshire Stormwater Manual, Volume 2: Post-Construction Best Management Practices Selection and Design*.

Sample Design

Plan View



Profile View



Examples images from the *New Hampshire Stormwater Manual, Volume 2*, p. 80

Pollutant Export Rate by Land Use[1]

Source Category by Land Use	Land Surface Cover	P Load Export Rate[1] (lbs./acre/year)	N Load Export Rate[2] (lbs./acre/year)
Commercial (COM) and Industrial (IND)	Directly connected impervious	1.78	15
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	14.1
Medium-Density Residential (MDR)	Directly connected impervious	1.96	14.1
Low-Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	14.1

[1] From NH Small MS4 General Permit, Appendix F

General Equations

Physical Storage Capacity: Depth of Runoff * Drainage Area
Cost: Physical Storage Capacity * Cost Index * Adjustment Factor[1]
Yearly Pollutant Removal: Pollutant Load Export Rate * Drainage Area * Efficiency

Cost (2023)[1,2]

	Materials and Installation Cost ($/ft^3)	Design Cost ($/ft^3)	Total Cost ($/ft^3)
Rural	6.81	3.67	10.48
Mixed	13.62	7.34	20.96
Urban	20.43	11.00	31.44

[1] EPA Memorandum "Methodology for developing cost estimates for Opti-Tool." Februrary 20, 2016
[2] Converted from 2010 to 2023 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. http://www.bls.gov/data/inflation_calculator.htm

Prepared By:
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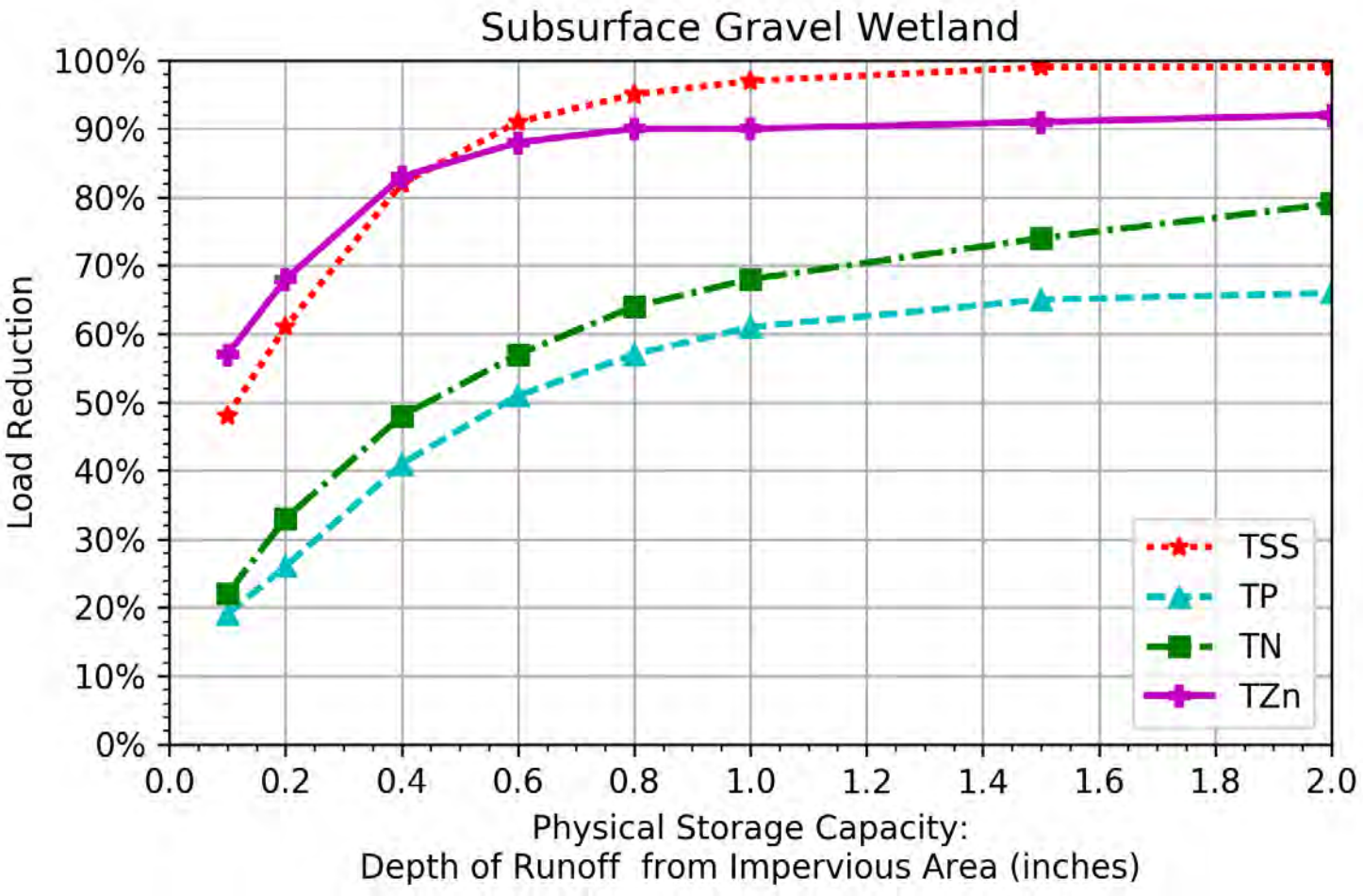
February 2023

BMP Performance Curve for Gravel Wetlands



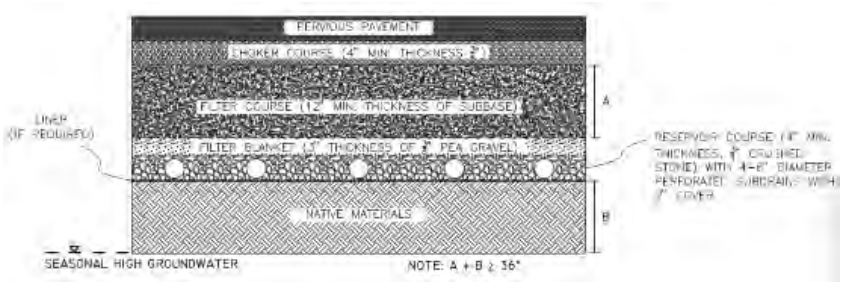
Gravel Wetland BMP Performance Table								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative TSS Phosphorus Load Reduction	48%	61%	82%	91%	95%	97%	99%	99%
Cumulative Phosphorus Load Reduction	19%	26%	41%	51%	57%	61%	65%	66%
Cumulative Nitrogen Load Reduction	22%	33%	48%	57%	64%	68%	74%	79%
Cumulative Zinc Phosphorus Load Reduction	57%	68%	83%	88%	90%	90%	91%	92%

Porous Pavement Factsheet

Porous Pavement consists of a porous surface, base, and sub-base materials which allow penetration of runoff through the surface into underlying soils. The surface materials for porous pavements can consist of paving blocks or grids, pervious asphalt, or pervious concrete. These materials are installed on a base which serves as a filter course between the pavement surface and the underlying sub-base material. The sub-base material typically comprises a layer of crushed stone that not only supports the overlying pavement structure, but also serves as a reservoir to store runoff that penetrates the pavement surface until it can percolate into the ground. General design specifications for porous pavement systems are provided in the most recent version of *The New Hampshire Stormwater Manual, Volume 2: Post-Construction Best Management Practices Selection and Design*.

Sample Design

Profile View



Examples images from the *New Hampshire Stormwater Manual, Volume 2*, p. 120

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Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	14.1
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[1] From NH Small MS4 General Permit, Appendix F

General Equations

Physical Storage Capacity: Depth of Runoff * Drainage Area
Cost: Physical Storage Capacity * Cost Index * Adjustment Factor[1]
Yearly Pollutant Removal: Pollutant Load Export Rate * Drainage Area * Efficiency

Cost (2023)[1,2]

	Materials and Installation Cost ($/ft^3)		Design Cost ($/ft^3)		Total Cost ($/ft^3)	
	Porous Asphalt	Porous Concrete	Porous Asphalt	Porous Concrete	Porous Asphalt	Porous Concrete
Rural	4.13	14.03	2.22	7.55	6.35	21.58
Mixed	8.26	28.05	4.45	15.11	12.70	43.16
Urban	12.38	42.08	6.67	22.66	19.05	64.74

[1] EPA Memorandum "Methodology for developing cost estimates for Opti-Tool." Februrary 20, 2016
[2] Converted from 2010 to 2023 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. http://www.bls.gov/data/inflation_calculator.htm

Prepared By:
University of New Hampshire
Stormwater Center
Durham, NH
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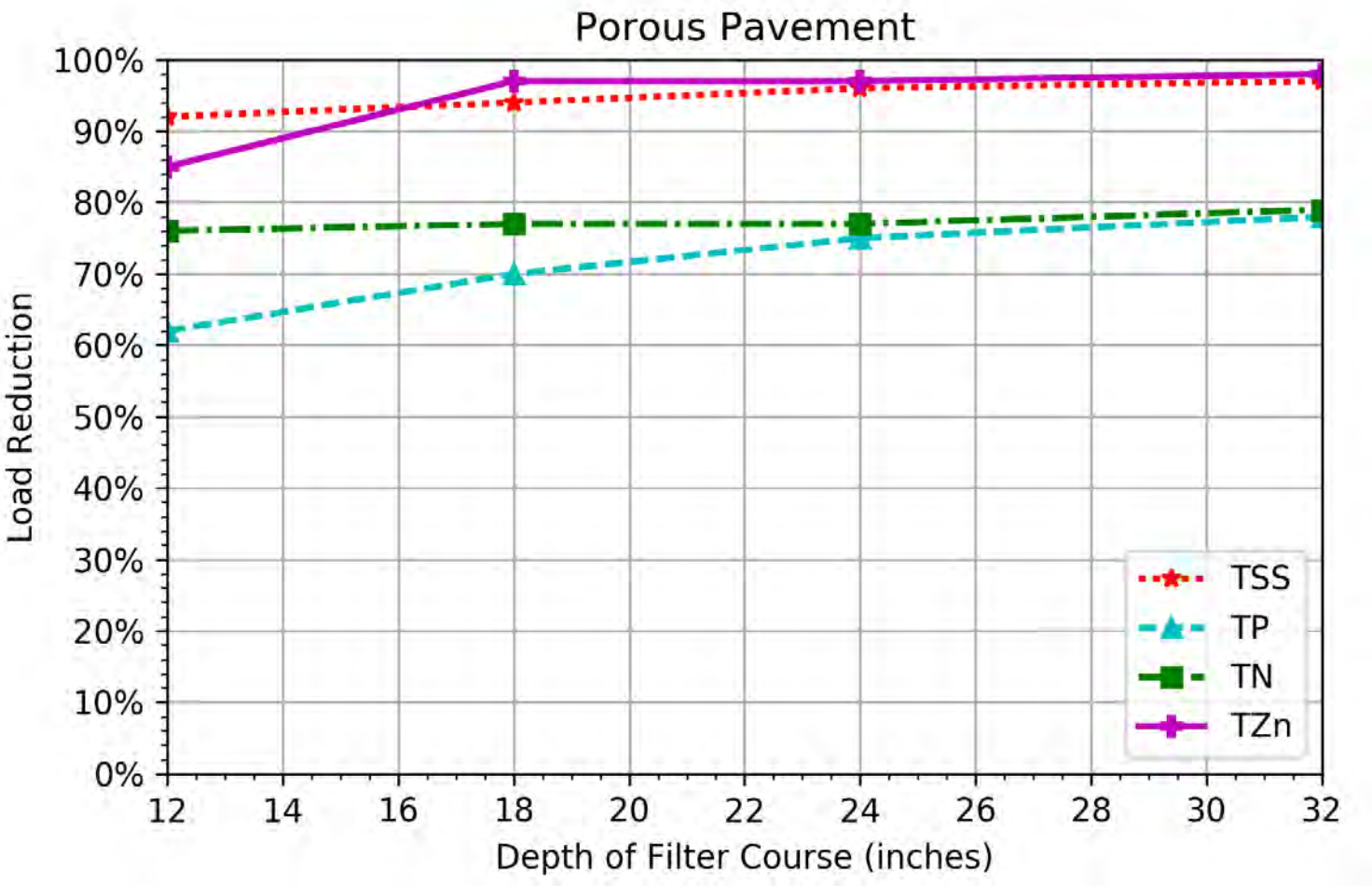
February 2023

BMP Performance Curve for Porous Pavement



Porous Pavement BMP Performance Table				
BMP Capacity: Depth of Filter Course Area (inches)	12	18	24	32
Cumulative TSS Phosphorus Load Reduction	92%	94%	96%	97%
Cumulative Phosphorus Load Reduction	62%	70%	75%	78%
Cumulative Nitrogen Load Reduction	76%	77%	77%	79%
Cumulative Zinc Phosphorus Load Reduction	85%	97%	97%	98%

Appendix I –Existing Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing

STATE OF NEW HAMPSHIRE
JOHN P. HAYES III
CERTIFIED SOILS SCIENTIST
2011

STATE OF NEW HAMPSHIRE
DEIDRA L. BENJAMIN
No. 295
CERTIFIED WETLAND SCIENTIST

WETLAND NOTE:

WETLANDS WERE DELINEATED BY DEIDRA L. BENJAMIN, CWS, IN JUNE OF 2024 USING THE FOLLOWING CRITERIA: (NO WETLANDS WERE FOUND ON SITE)

1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.
2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.
3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.
5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

LEGEND:

299	EXISTING CONTOUR MINOR
300	EXISTING CONTOUR MAJOR
	LIMIT OF SITE SPECIFIC SOIL SURVEY
	SITE SPECIFIC SOIL LINE
448A	SITE SPECIFIC SOIL SERIES
	NRCS SOIL LINE
HyB	NRCS SOIL LABEL
	LIMIT OF WATERSHED
	TIME OF CONCENTRATION PATH
	FLOW REACH
S.C.R.D.	STRAFFORD COUNTY REGISTRY OF DEEDS
TYP.	TYPICAL
FND	FOUND
TBR	TO BE REMOVED

SOILS LEGEND

Site Specific Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
26	A,B,C	Windsor	A
32	A,B	Boxford	C
238	B	Elmridge	C
327	B,C	Windsor (Clay Subsoil)	C
500	A, B	Udorthents (Loamy)	C
953	B	Boxford (Somewhat Poorly Drained)	C

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+

Denominators: /ED = Excessively Drained /MWD = Moderately Well Drained /SPD = Somewhat Poorly Drained /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

NRCS Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
Bz	B	Buxton Silt Loam	C

NOTES:

1.) PARCEL #1
Owner: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
Owner: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

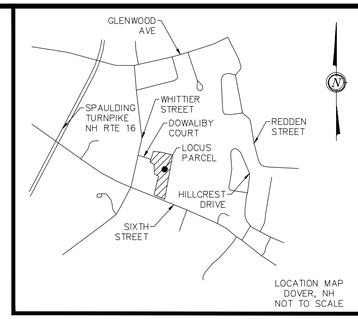
3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

4.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

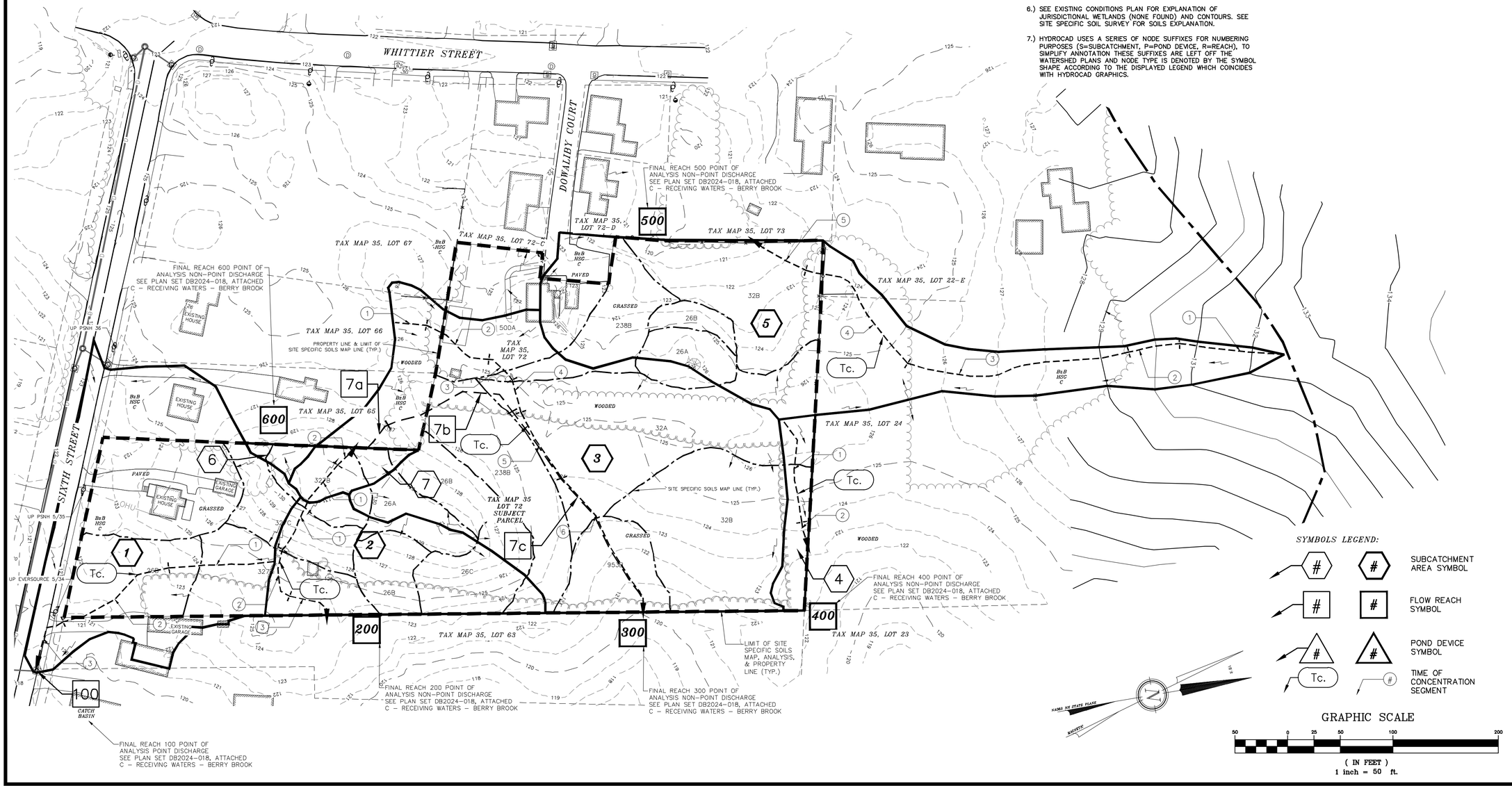
5.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING WATERSHED CONDITIONS OF TAX MAP 35, LOT 64 AND 72 AS OF THE DATE OF SURVEY.

6.) SEE EXISTING CONDITIONS PLAN FOR EXPLANATION OF JURISDICTIONAL WETLANDS (NONE FOUND) AND CONTOURS. SEE SITE SPECIFIC SOIL SURVEY FOR SOILS EXPLANATION.

7.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.



LOCATION MAP
DOVER, NH
NOT TO SCALE



SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL

FLOW REACH SYMBOL

POND DEVICE SYMBOL

TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

HARN NH STATE PLANE
MAGNETIC

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (EXISTING)

W-1 EXISTING WATERSHED PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

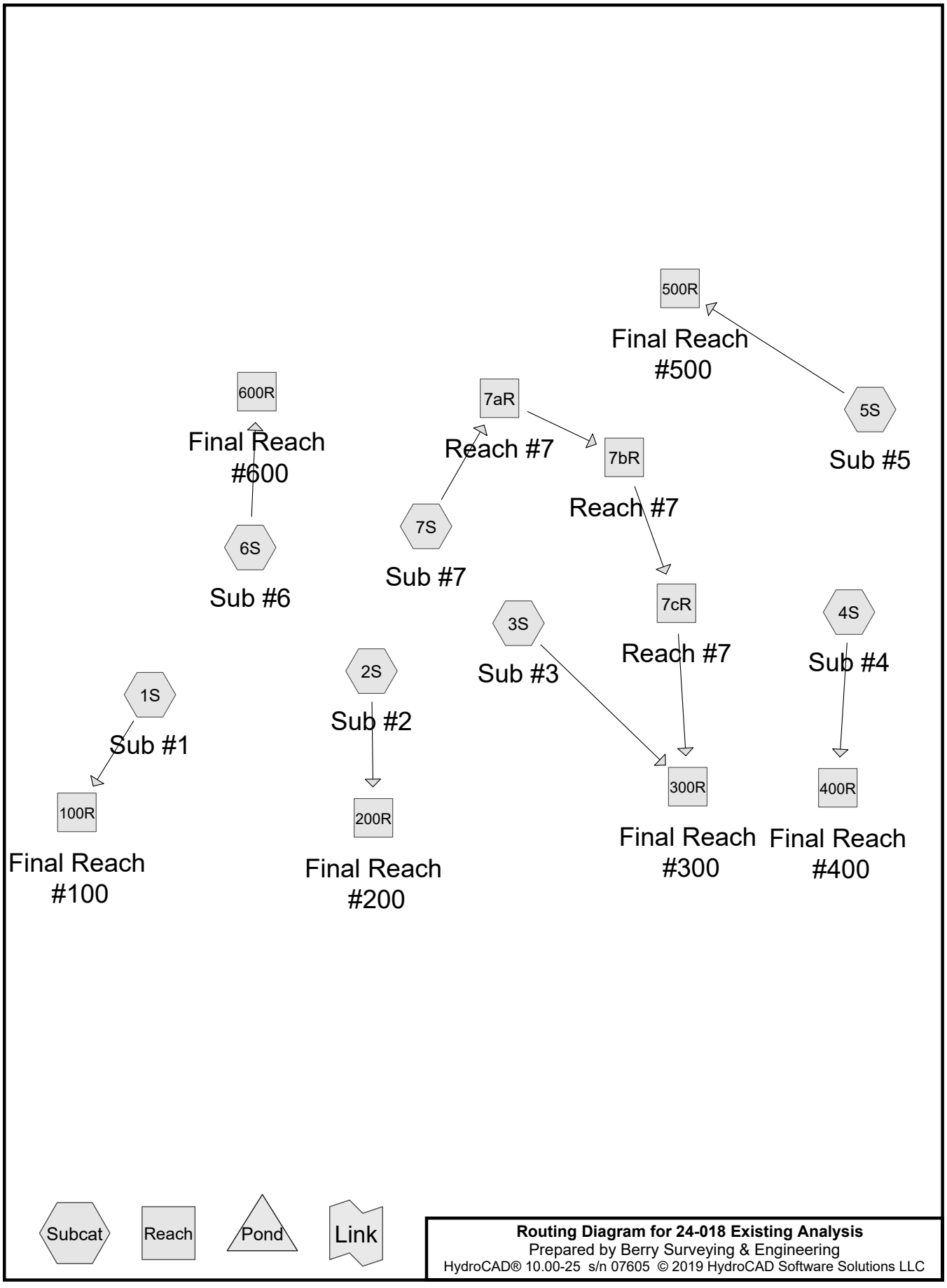
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7913
LICENSED PROFESSIONAL ENGINEER

SHEET 1 OF 4

NOT FOR CONSTRUCTION



Routing Diagram for 24-018 Existing Analysis
Prepared by Berry Surveying & Engineering
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.749	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 5S, 7S)
3.033	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S)
0.202	98	Paved parking, HSG C (1S, 5S)
0.106	98	Roofs, HSG C (1S, 2S, 3S, 5S)
0.097	30	Woods, Good, HSG A (1S, 2S)
1.032	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S)
5.219	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.847	HSG A	1S, 2S, 3S, 5S, 7S
0.000	HSG B	
4.373	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	HSG D	
0.000	Other	
5.219		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.749	0.000	3.033	0.000	0.000	3.783	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	0.000	0.202	0.000	0.000	0.202	Paved parking	1S, 5S
0.000	0.000	0.106	0.000	0.000	0.106	Roofs	1S, 2S, 3S, 5S
0.097	0.000	1.032	0.000	0.000	1.129	Woods, Good	1S, 2S, 3S, 4S, 5S, 6S
0.847	**0.000**	**4.373**	**0.000**	**0.000**	**5.219**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=50,376 sf 20.84% Impervious Runoff Depth>3.83"
Flow Length=272' Tc=11.2 min CN=73 Runoff=4.35 cfs 0.369 af

Subcatchment 2S: Sub #2 Runoff Area=21,239 sf 0.59% Impervious Runoff Depth>1.87"
Flow Length=144' Tc=13.7 min CN=53 Runoff=0.75 cfs 0.076 af

Subcatchment 3S: Sub #3 Runoff Area=86,684 sf 0.18% Impervious Runoff Depth>3.40"
Flow Length=388' Tc=27.4 min CN=69 Runoff=4.68 cfs 0.565 af

Subcatchment 4S: Sub #4 Runoff Area=4,828 sf 0.00% Impervious Runoff Depth>3.51"
Flow Length=123' Tc=18.3 min CN=70 Runoff=0.32 cfs 0.032 af

Subcatchment 5S: Sub #5 Runoff Area=59,209 sf 4.42% Impervious Runoff Depth>3.61"
Flow Length=560' Tc=30.1 min CN=71 Runoff=3.26 cfs 0.409 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth>3.84"
Tc=6.0 min CN=73 Runoff=0.11 cfs 0.008 af

Subcatchment 7S: Sub #7 Runoff Area=3,883 sf 0.00% Impervious Runoff Depth>2.91"
Flow Length=66' Tc=6.3 min CN=64 Runoff=0.29 cfs 0.022 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.05' Max Vel=1.07 fps Inflow=0.29 cfs 0.022 af
n=0.030 L=29.7' S=0.0421 '/' Capacity=40.68 cfs Outflow=0.29 cfs 0.022 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.07' Max Vel=0.68 fps Inflow=0.29 cfs 0.022 af
n=0.035 L=133.4' S=0.0169 '/' Capacity=22.07 cfs Outflow=0.27 cfs 0.022 af

Reach 7cR: Reach #7 Avg. Flow Depth=0.05' Max Vel=0.90 fps Inflow=0.27 cfs 0.022 af
n=0.030 L=230.1' S=0.0304 '/' Capacity=34.59 cfs Outflow=0.24 cfs 0.021 af

Reach 100R: Final Reach #100 Inflow=4.35 cfs 0.369 af
Outflow=4.35 cfs 0.369 af

Reach 200R: Final Reach #200 Inflow=0.75 cfs 0.076 af
Outflow=0.75 cfs 0.076 af

Reach 300R: Final Reach #300 Inflow=4.83 cfs 0.586 af
Outflow=4.83 cfs 0.586 af

Reach 400R: Final Reach #400 Inflow=0.32 cfs 0.032 af
Outflow=0.32 cfs 0.032 af

Reach 500R: Final Reach #500 Inflow=3.26 cfs 0.409 af
Outflow=3.26 cfs 0.409 af

Reach 600R: Final Reach #600 Inflow=0.11 cfs 0.008 af
Outflow=0.11 cfs 0.008 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.481 af Average Runoff Depth = 3.40"
94.11% Pervious = 4.912 ac 5.89% Impervious = 0.307 ac

Summary for Subcatchment 1S: Sub #1

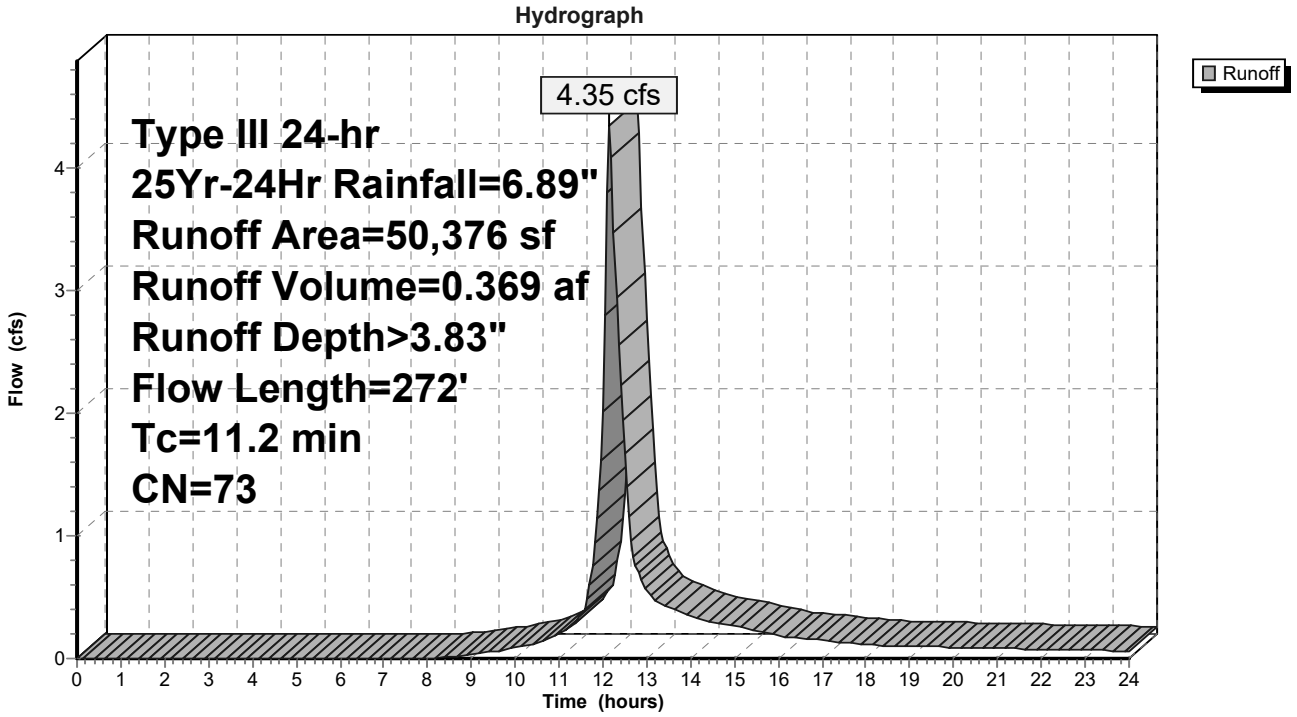
Runoff = 4.35 cfs @ 12.16 hrs, Volume= 0.369 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
7,296	39	>75% Grass cover, Good, HSG A
1,428	30	Woods, Good, HSG A
3,529	98	Roofs, HSG C
28,879	74	>75% Grass cover, Good, HSG C
6,967	98	Paved parking, HSG C
2,277	70	Woods, Good, HSG C
50,376	73	Weighted Average
39,880		79.16% Pervious Area
10,496		20.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0200	0.18		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
1.8	116	0.0237	1.08		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
0.2	56	0.0402	4.07		**Shallow Concentrated Flow, Segment #3** Paved Kv= 20.3 fps
11.2	272	Total			

Subcatchment 1S: Sub #1



Summary for Subcatchment 2S: Sub #2

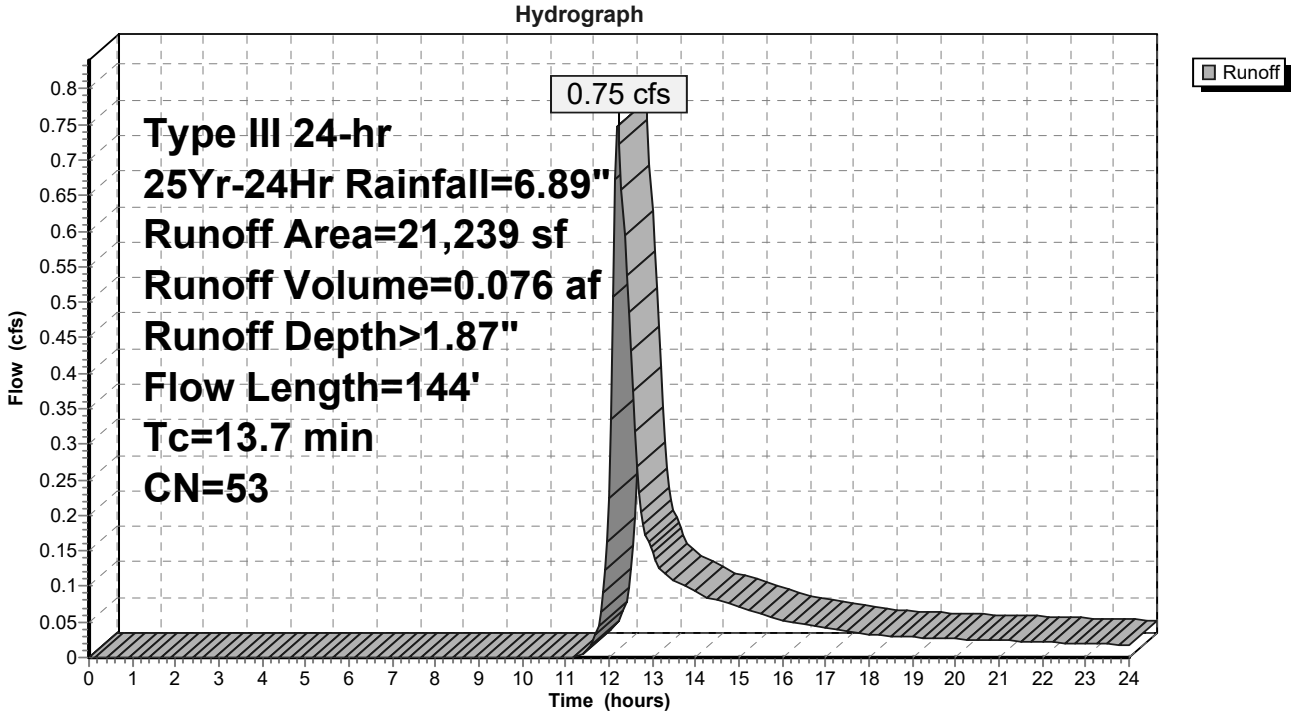
Runoff = 0.75 cfs @ 12.21 hrs, Volume= 0.076 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
8,689	39	>75% Grass cover, Good, HSG A
2,800	30	Woods, Good, HSG A
125	98	Roofs, HSG C
5,638	74	>75% Grass cover, Good, HSG C
3,987	70	Woods, Good, HSG C
21,239	53	Weighted Average
21,114		99.41% Pervious Area
125		0.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	50	0.0997	0.30		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
9.8	50	0.0301	0.08		**Sheet Flow, Segment #2** Woods: Light underbrush n= 0.400 P2= 3.62"
1.1	44	0.0171	0.65		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
13.7	144	Total			

Subcatchment 2S: Sub #2



Summary for Subcatchment 3S: Sub #3

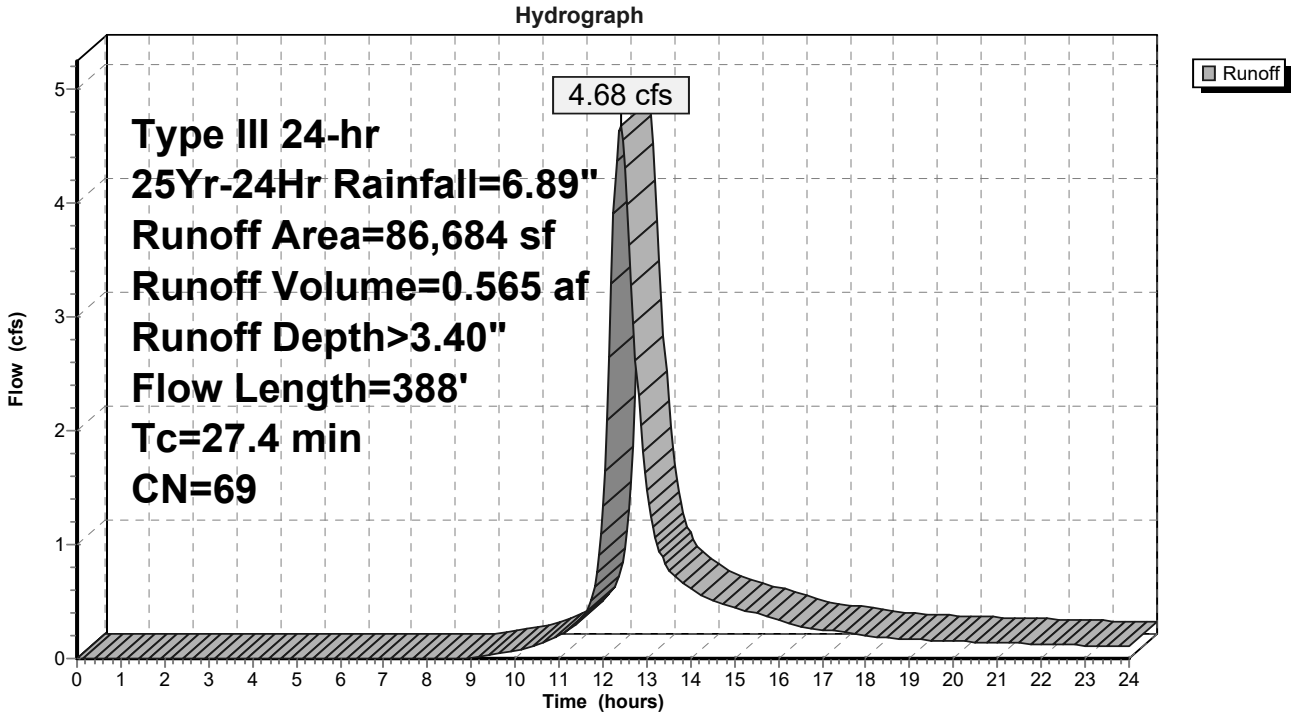
Runoff = 4.68 cfs @ 12.39 hrs, Volume= 0.565 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
10,459	39	>75% Grass cover, Good, HSG A
156	98	Roofs, HSG C
60,344	74	>75% Grass cover, Good, HSG C
15,725	70	Woods, Good, HSG C
86,684	69	Weighted Average
86,528		99.82% Pervious Area
156		0.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	30	0.0084	0.05		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.62"
10.5	70	0.0071	0.11		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.62"
0.8	30	0.0082	0.63		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
1.2	32	0.0078	0.44		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
1.8	74	0.0101	0.70		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
2.2	152	0.0263	1.14		**Shallow Concentrated Flow, Segment #6** Short Grass Pasture Kv= 7.0 fps
27.4	388	Total			

Subcatchment 3S: Sub #3



Summary for Subcatchment 4S: Sub #4

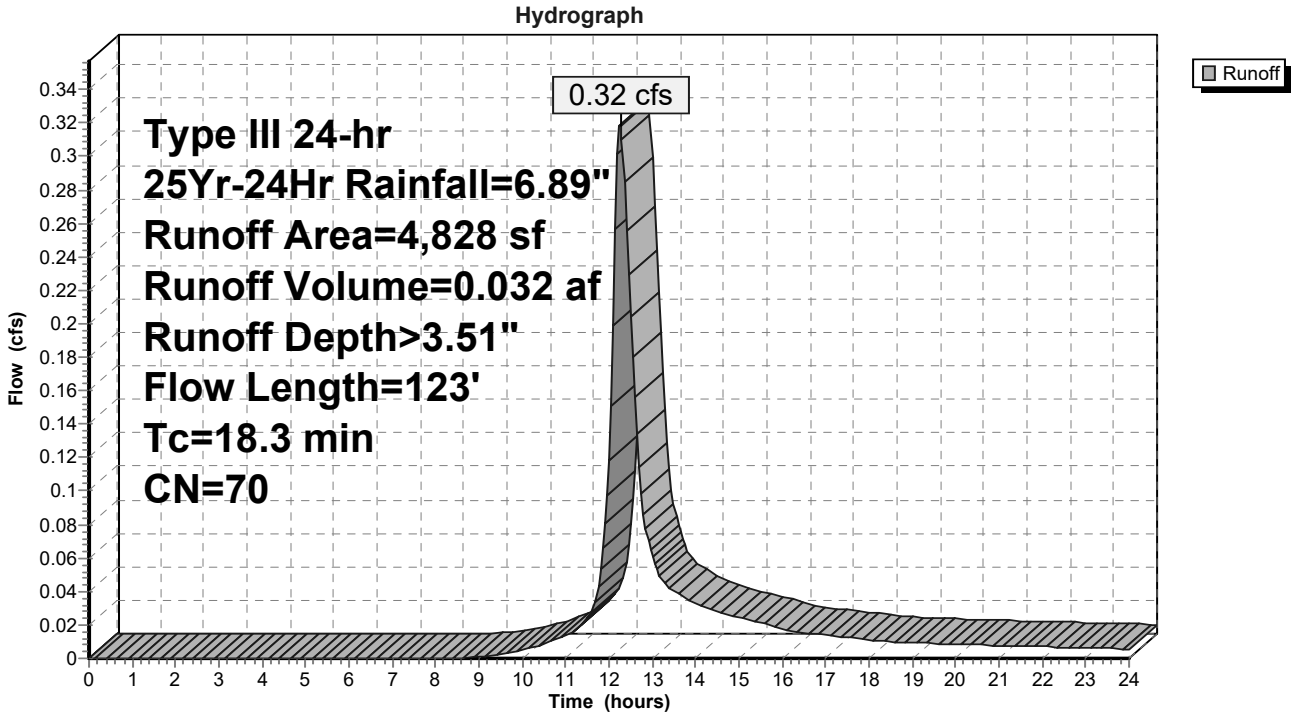
Runoff = 0.32 cfs @ 12.26 hrs, Volume= 0.032 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
589	74	>75% Grass cover, Good, HSG C
4,239	70	Woods, Good, HSG C
4,828	70	Weighted Average
4,828		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0275	0.09		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.62"
0.5	23	0.0204	0.71		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
18.3	123	Total			

Subcatchment 4S: Sub #4



Summary for Subcatchment 5S: Sub #5

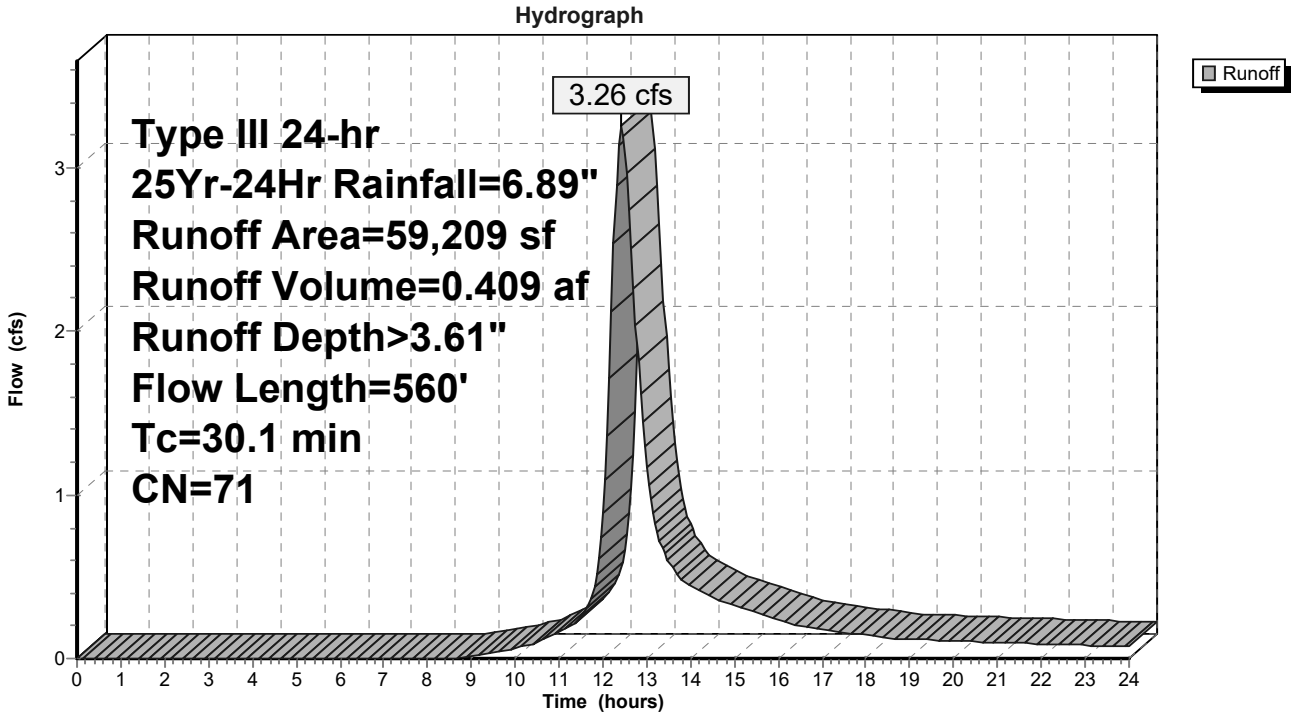
Runoff = 3.26 cfs @ 12.42 hrs, Volume= 0.409 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
5,060	39	>75% Grass cover, Good, HSG A
790	98	Roofs, HSG C
33,000	74	>75% Grass cover, Good, HSG C
1,826	98	Paved parking, HSG C
18,533	70	Woods, Good, HSG C
59,209	71	Weighted Average
56,593		95.58% Pervious Area
2,616		4.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0175	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.62"
1.1	49	0.0205	0.72		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
3.7	214	0.0187	0.96		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
3.3	139	0.0198	0.70		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
0.7	58	0.0348	1.31		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
30.1	560	Total			

Subcatchment 5S: Sub #5



Summary for Subcatchment 6S: Sub #6

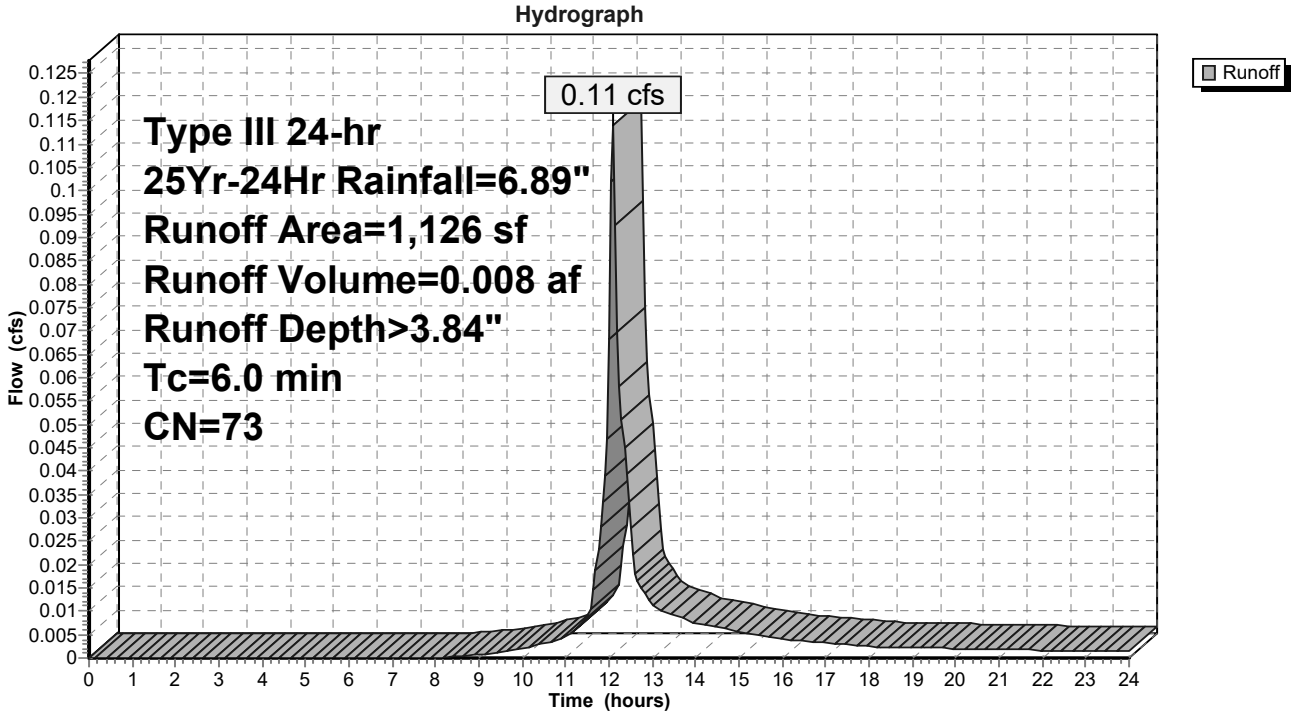
Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
937	74	>75% Grass cover, Good, HSG C
189	70	Woods, Good, HSG C
1,126	73	Weighted Average
1,126		100.00% Pervious Area

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

Subcatchment 6S: Sub #6



Summary for Subcatchment 7S: Sub #7

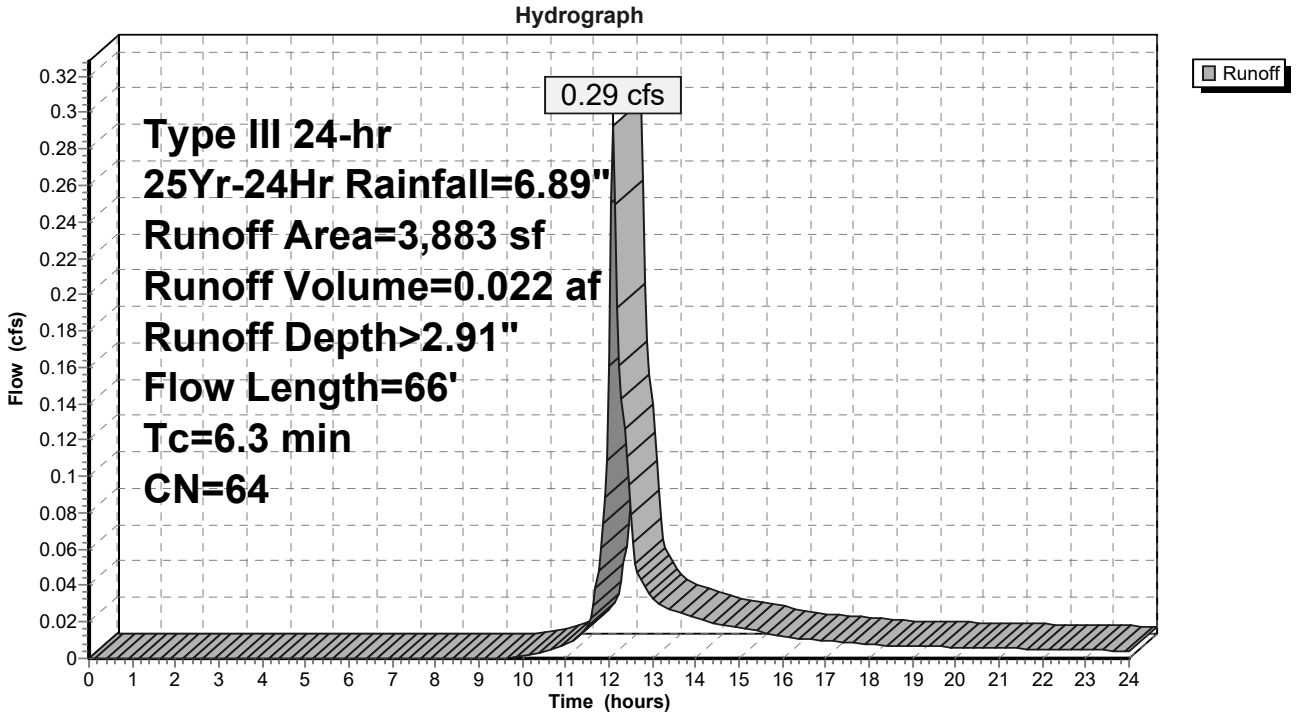
Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,143	39	>75% Grass cover, Good, HSG A
2,740	74	>75% Grass cover, Good, HSG C
3,883	64	Weighted Average
3,883		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	43	0.0234	0.16		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
1.9	23	0.0543	0.20		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.62"
6.3	66	Total			

Subcatchment 7S: Sub #7



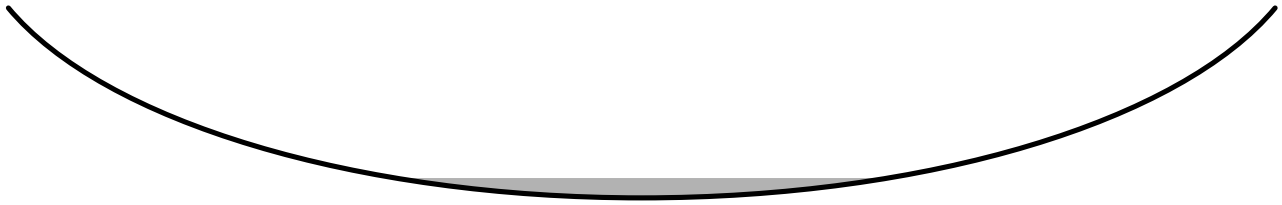
Summary for Reach 7aR: Reach #7

Inflow Area = 0.089 ac, 0.00% Impervious, Inflow Depth > 2.91" for 25Yr-24Hr event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.29 cfs @ 12.11 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.07 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.40 fps, Avg. Travel Time= 1.2 min

Peak Storage= 8 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 40.68 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 29.7' Slope= 0.0421 '/'
Inlet Invert= 128.25', Outlet Invert= 127.00'



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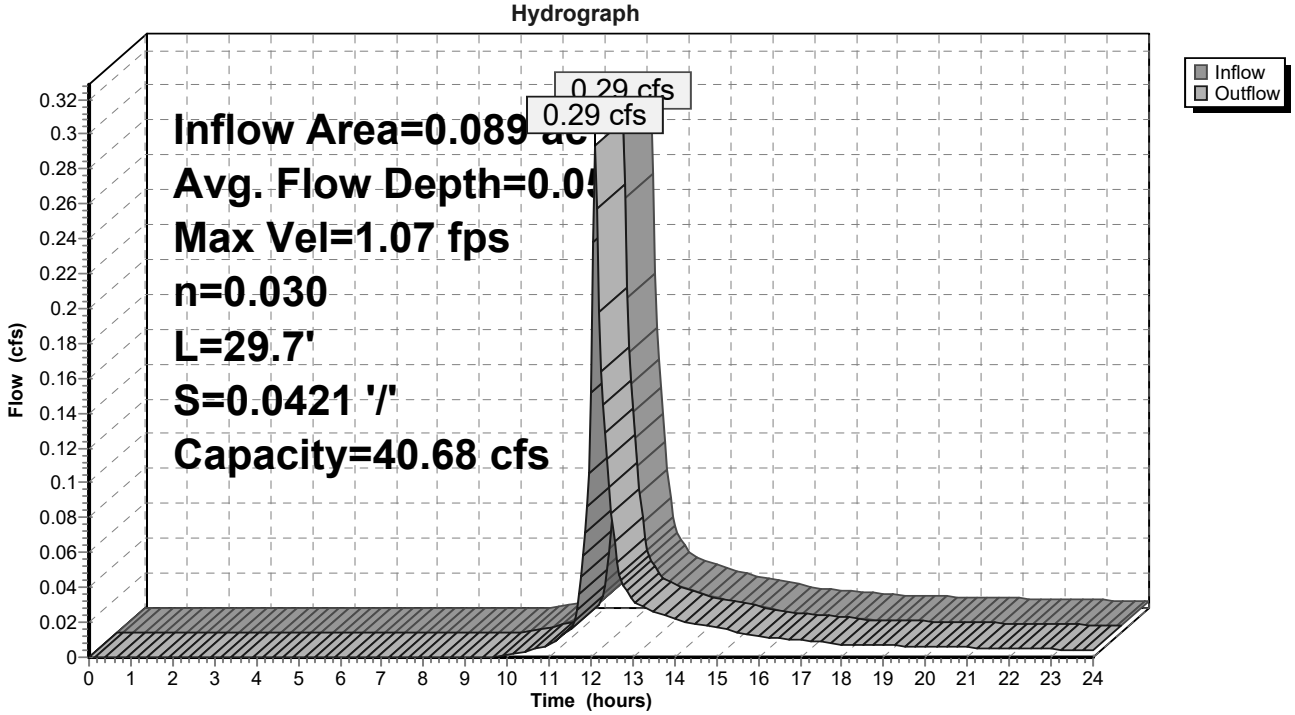
Reach 7aR: Reach #7



Summary for Reach 7bR: Reach #7

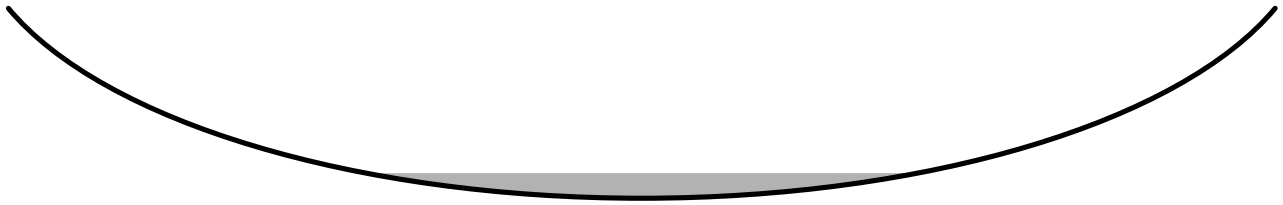
[62] Hint: Exceeded Reach 7aR OUTLET depth by 0.02' @ 12.20 hrs

Inflow Area = 0.089 ac, 0.00% Impervious, Inflow Depth > 2.91" for 25Yr-24Hr event
Inflow = 0.29 cfs @ 12.11 hrs, Volume= 0.022 af
Outflow = 0.27 cfs @ 12.15 hrs, Volume= 0.022 af, Atten= 9%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.68 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.26 fps, Avg. Travel Time= 8.6 min

Peak Storage= 52 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 22.07 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 133.4' Slope= 0.0169 '/'
Inlet Invert= 127.00', Outlet Invert= 124.75'



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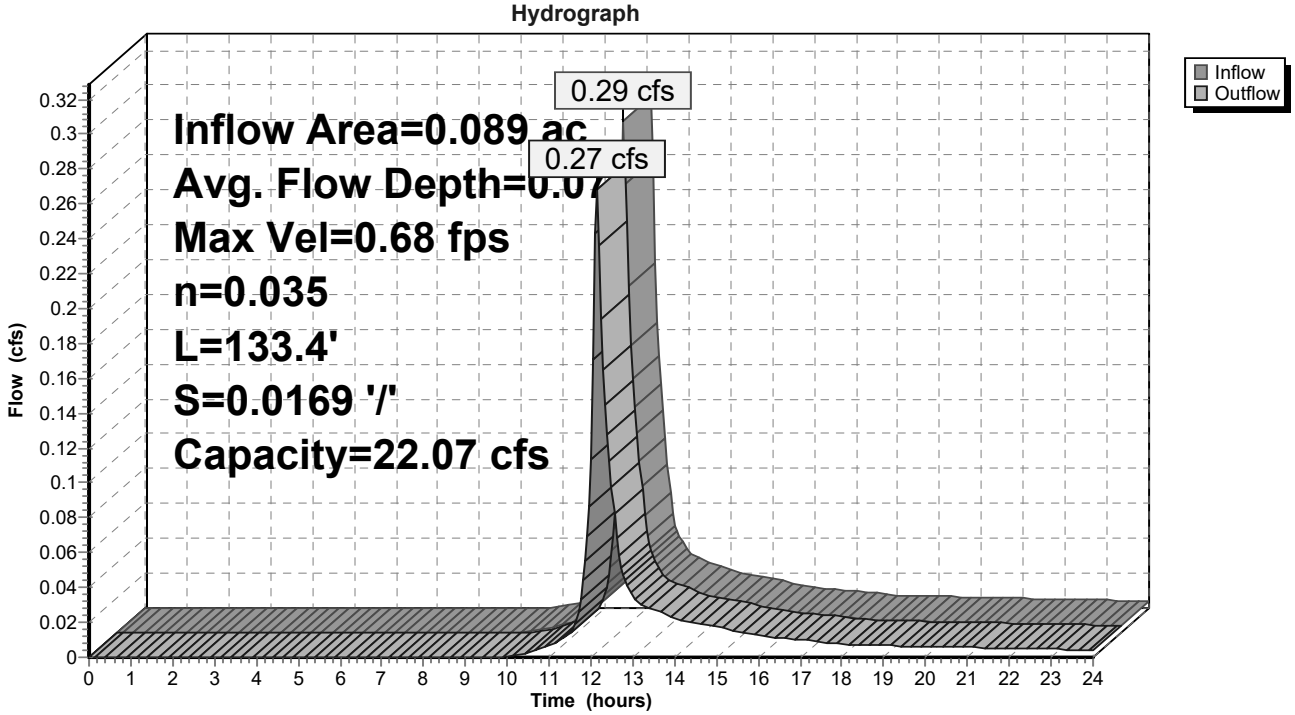
Reach 7bR: Reach #7



Summary for Reach 7cR: Reach #7

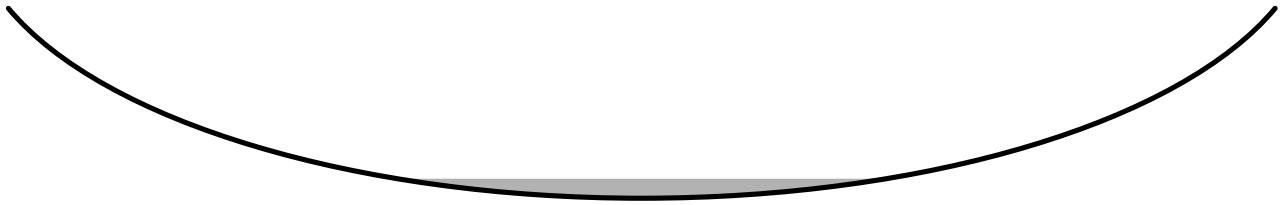
[62] Hint: Exceeded Reach 7bR OUTLET depth by 2.25' @ 0.00 hrs

Inflow Area = 0.089 ac, 0.00% Impervious, Inflow Depth > 2.90" for 25Yr-24Hr event
Inflow = 0.27 cfs @ 12.15 hrs, Volume= 0.022 af
Outflow = 0.24 cfs @ 12.20 hrs, Volume= 0.021 af, Atten= 9%, Lag= 3.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.90 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 10.7 min

Peak Storage= 62 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 34.59 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 230.1' Slope= 0.0304 '/'
Inlet Invert= 127.00', Outlet Invert= 120.00'



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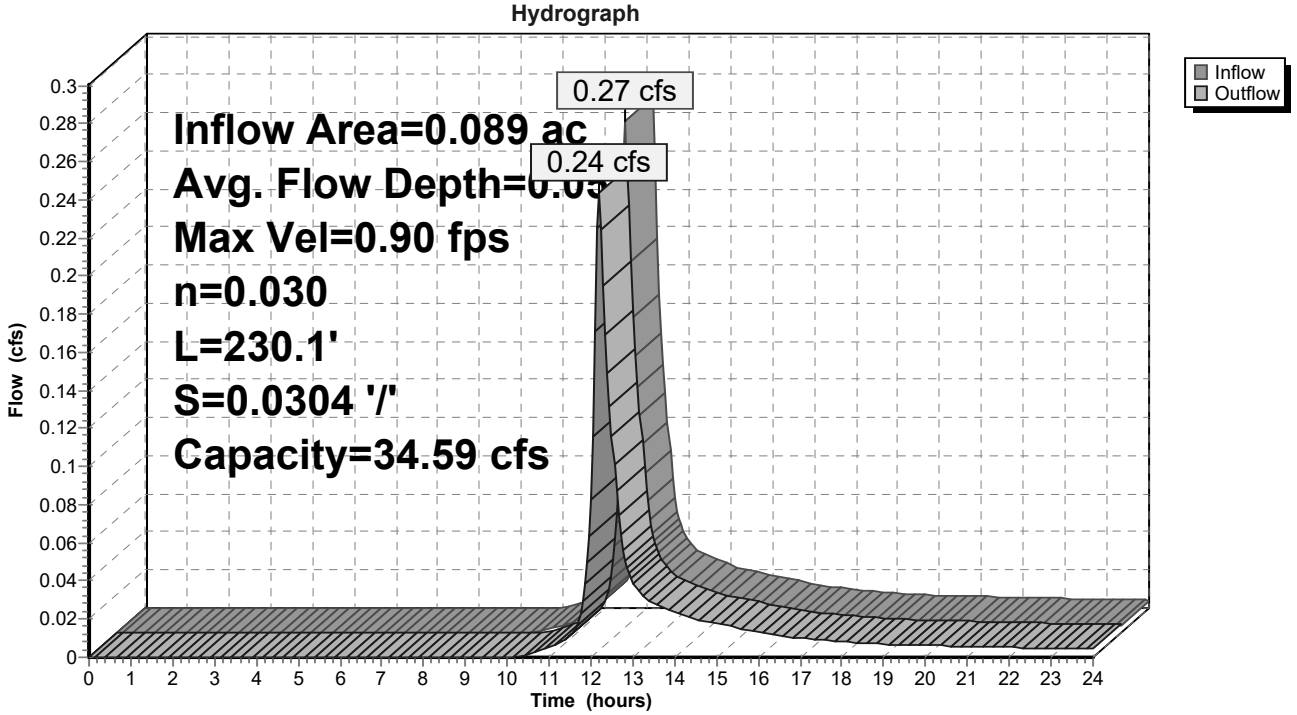
Reach 7cR: Reach #7



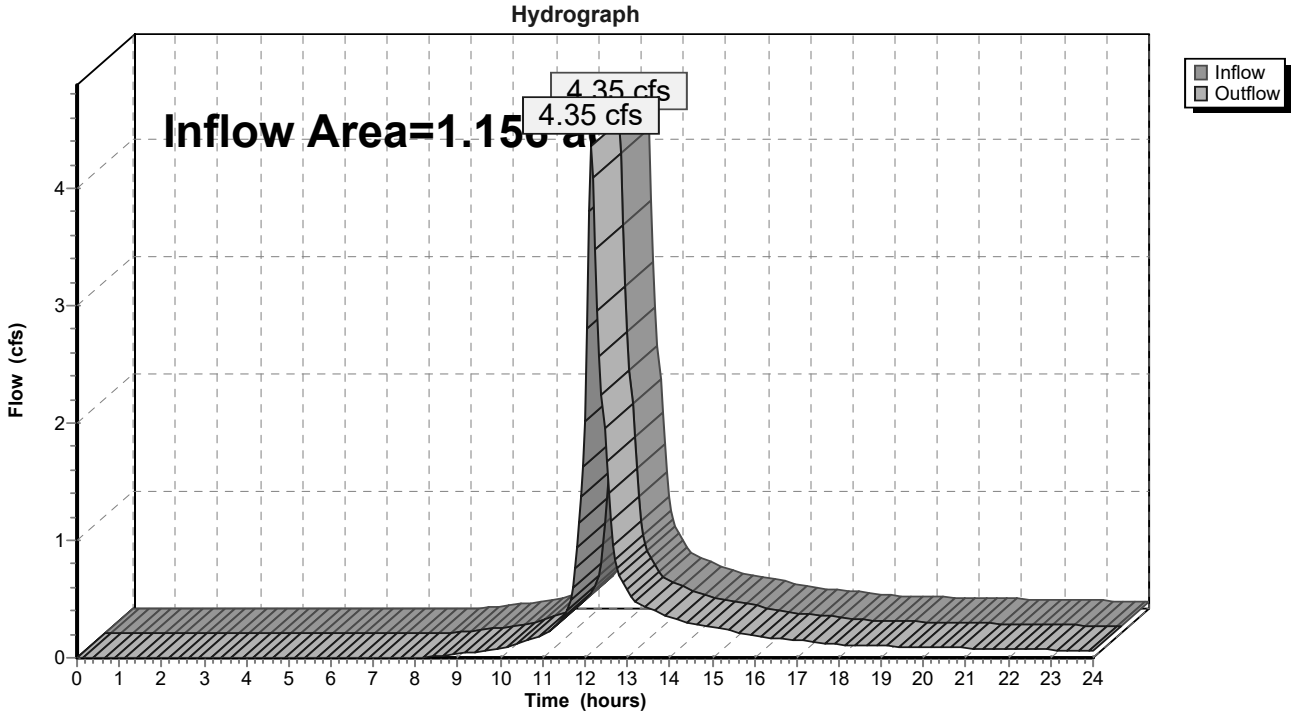
Summary for Reach 100R: Final Reach #100

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

Inflow Area = 1.156 ac, 20.84% Impervious, Inflow Depth > 3.83" for 25Yr-24Hr event
Inflow = 4.35 cfs @ 12.16 hrs, Volume= 0.369 af
Outflow = 4.35 cfs @ 12.16 hrs, Volume= 0.369 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 100R: Final Reach #100



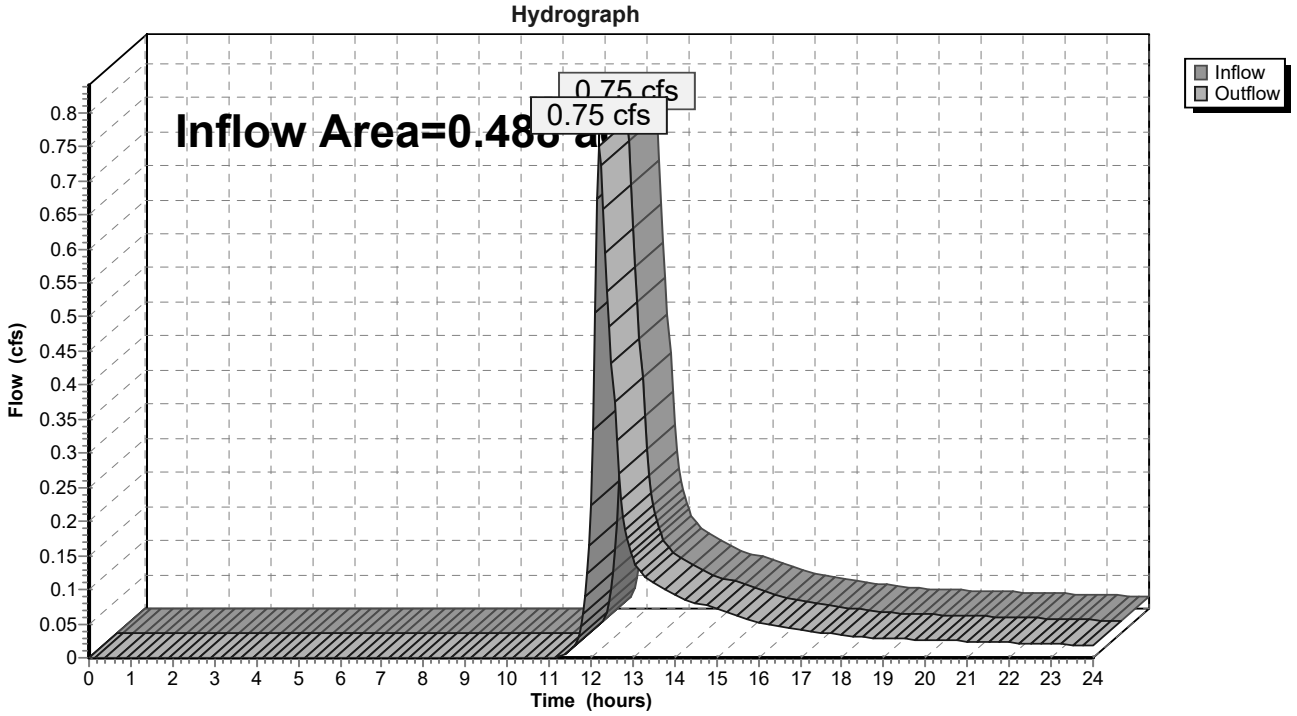
Summary for Reach 200R: Final Reach #200

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

Inflow Area = 0.488 ac, 0.59% Impervious, Inflow Depth > 1.87" for 25Yr-24Hr event
Inflow = 0.75 cfs @ 12.21 hrs, Volume= 0.076 af
Outflow = 0.75 cfs @ 12.21 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 200R: Final Reach #200



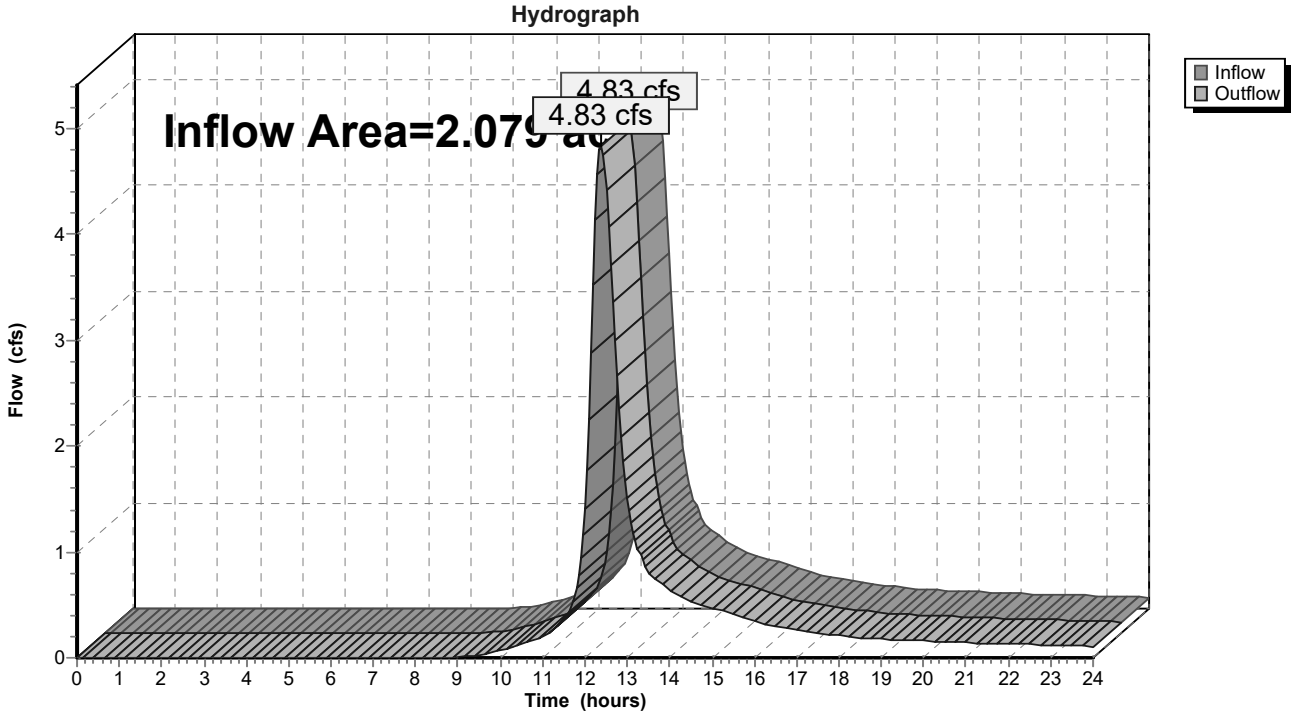
Summary for Reach 300R: Final Reach #300

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

Inflow Area = 2.079 ac, 0.17% Impervious, Inflow Depth > 3.38" for 25Yr-24Hr event
Inflow = 4.83 cfs @ 12.38 hrs, Volume= 0.586 af
Outflow = 4.83 cfs @ 12.38 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 300R: Final Reach #300



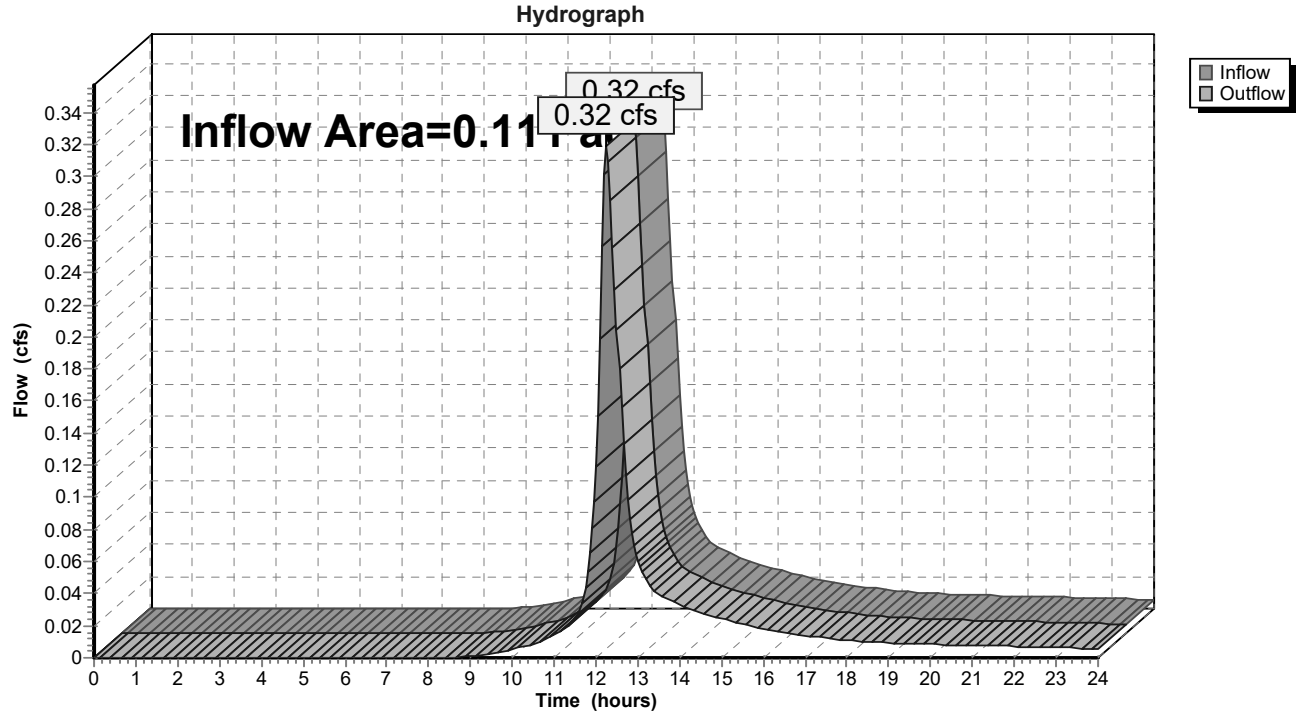
Summary for Reach 400R: Final Reach #400

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

Inflow Area = 0.111 ac, 0.00% Impervious, Inflow Depth > 3.51" for 25Yr-24Hr event
Inflow = 0.32 cfs @ 12.26 hrs, Volume= 0.032 af
Outflow = 0.32 cfs @ 12.26 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 400R: Final Reach #400



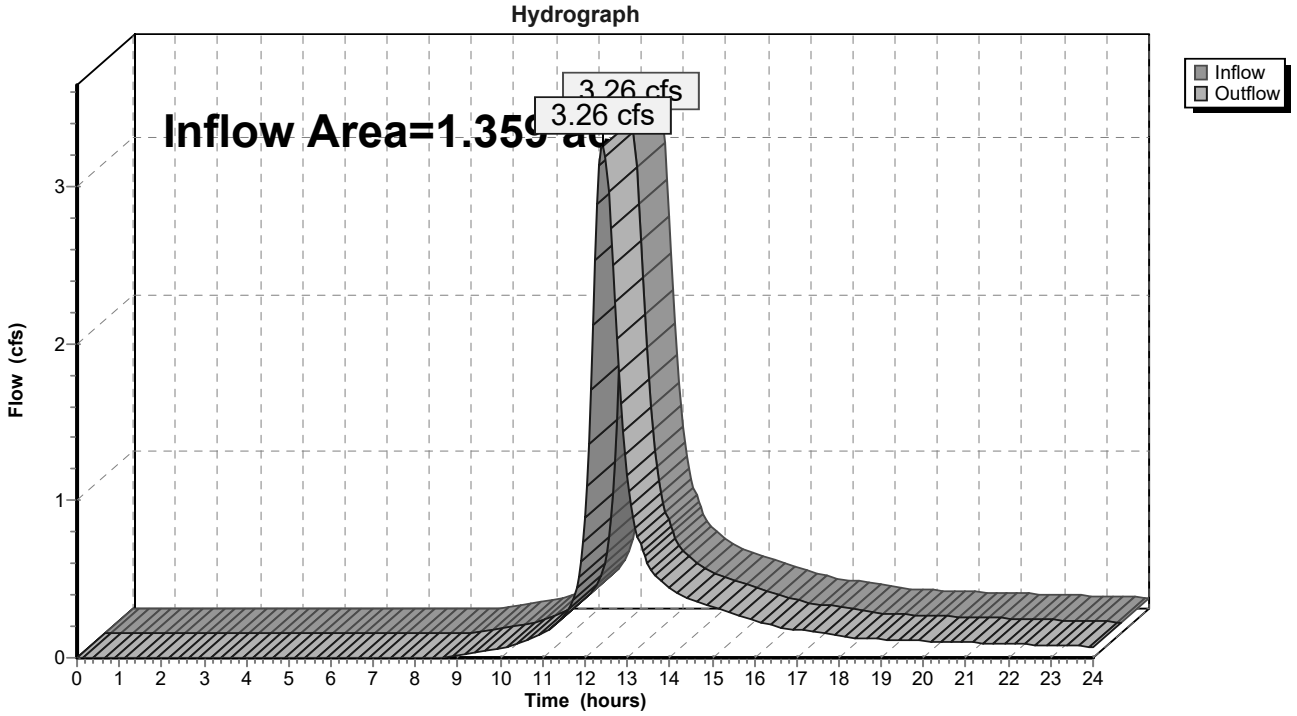
Summary for Reach 500R: Final Reach #500

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

Inflow Area = 1.359 ac, 4.42% Impervious, Inflow Depth > 3.61" for 25Yr-24Hr event
Inflow = 3.26 cfs @ 12.42 hrs, Volume= 0.409 af
Outflow = 3.26 cfs @ 12.42 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 500R: Final Reach #500



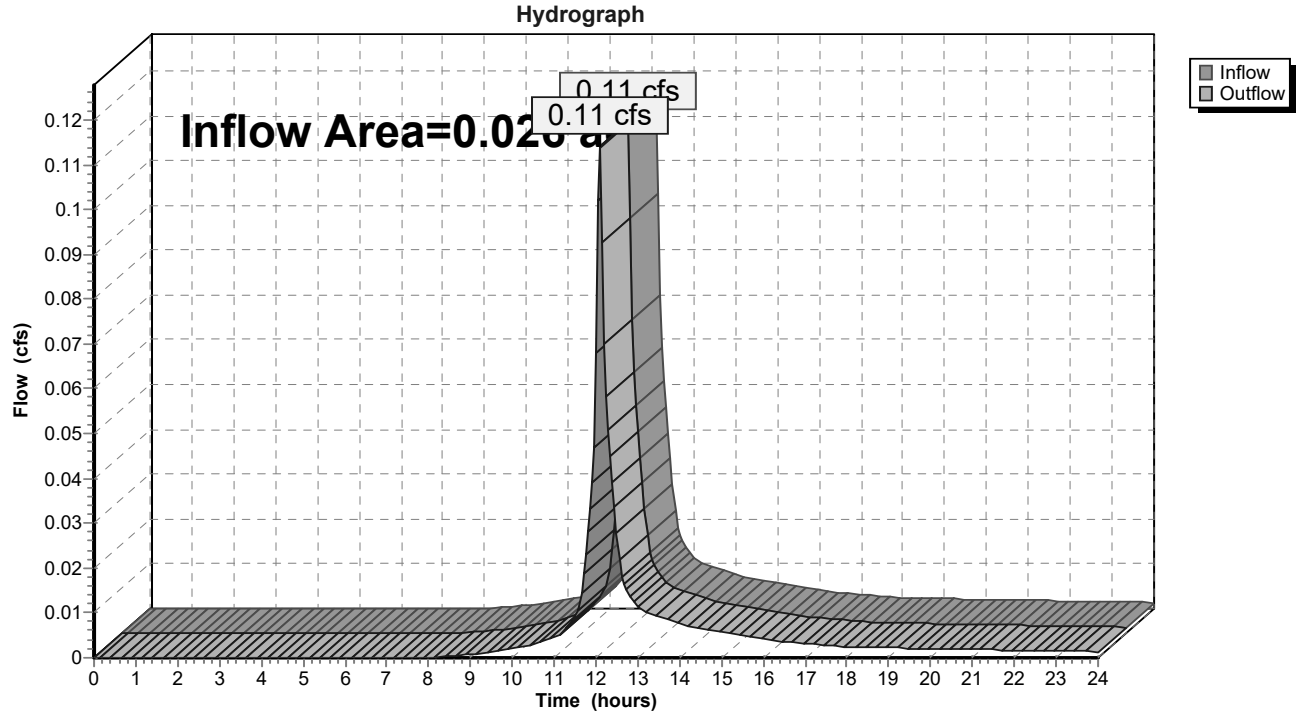
Summary for Reach 600R: Final Reach #600

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

Inflow Area = 0.026 ac, 0.00% Impervious, Inflow Depth > 3.84" for 25Yr-24Hr event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 600R: Final Reach #600



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=50,376 sf 20.84% Impervious Runoff Depth>1.26"
Flow Length=272' Tc=11.2 min CN=73 Runoff=1.37 cfs 0.121 af

Subcatchment 2S: Sub #2 Runoff Area=21,239 sf 0.59% Impervious Runoff Depth>0.32"
Flow Length=144' Tc=13.7 min CN=53 Runoff=0.06 cfs 0.013 af

Subcatchment 3S: Sub #3 Runoff Area=86,684 sf 0.18% Impervious Runoff Depth>1.02"
Flow Length=388' Tc=27.4 min CN=69 Runoff=1.29 cfs 0.169 af

Subcatchment 4S: Sub #4 Runoff Area=4,828 sf 0.00% Impervious Runoff Depth>1.08"
Flow Length=123' Tc=18.3 min CN=70 Runoff=0.09 cfs 0.010 af

Subcatchment 5S: Sub #5 Runoff Area=59,209 sf 4.42% Impervious Runoff Depth>1.13"
Flow Length=560' Tc=30.1 min CN=71 Runoff=0.96 cfs 0.128 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth>1.26"
Tc=6.0 min CN=73 Runoff=0.04 cfs 0.003 af

Subcatchment 7S: Sub #7 Runoff Area=3,883 sf 0.00% Impervious Runoff Depth>0.77"
Flow Length=66' Tc=6.3 min CN=64 Runoff=0.06 cfs 0.006 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.03' Max Vel=0.67 fps Inflow=0.06 cfs 0.006 af
n=0.030 L=29.7' S=0.0421 '/' Capacity=40.68 cfs Outflow=0.06 cfs 0.006 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.03' Max Vel=0.42 fps Inflow=0.06 cfs 0.006 af
n=0.035 L=133.4' S=0.0169 '/' Capacity=22.07 cfs Outflow=0.05 cfs 0.006 af

Reach 7cR: Reach #7 Avg. Flow Depth=0.02' Max Vel=0.54 fps Inflow=0.05 cfs 0.006 af
n=0.030 L=230.1' S=0.0304 '/' Capacity=34.59 cfs Outflow=0.04 cfs 0.006 af

Reach 100R: Final Reach #100 Inflow=1.37 cfs 0.121 af
Outflow=1.37 cfs 0.121 af

Reach 200R: Final Reach #200 Inflow=0.06 cfs 0.013 af
Outflow=0.06 cfs 0.013 af

Reach 300R: Final Reach #300 Inflow=1.33 cfs 0.175 af
Outflow=1.33 cfs 0.175 af

Reach 400R: Final Reach #400 Inflow=0.09 cfs 0.010 af
Outflow=0.09 cfs 0.010 af

Reach 500R: Final Reach #500 Inflow=0.96 cfs 0.128 af
Outflow=0.96 cfs 0.128 af

Reach 600R: Final Reach #600 Inflow=0.04 cfs 0.003 af
Outflow=0.04 cfs 0.003 af

Total Runoff Area = 5.219 ac Runoff Volume = 0.450 af Average Runoff Depth = 1.03"
94.11% Pervious = 4.912 ac 5.89% Impervious = 0.307 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=50,376 sf 20.84% Impervious Runoff Depth>2.63"
Flow Length=272' Tc=11.2 min CN=73 Runoff=2.98 cfs 0.254 af

Subcatchment 2S: Sub #2 Runoff Area=21,239 sf 0.59% Impervious Runoff Depth>1.07"
Flow Length=144' Tc=13.7 min CN=53 Runoff=0.38 cfs 0.044 af

Subcatchment 3S: Sub #3 Runoff Area=86,684 sf 0.18% Impervious Runoff Depth>2.28"
Flow Length=388' Tc=27.4 min CN=69 Runoff=3.09 cfs 0.377 af

Subcatchment 4S: Sub #4 Runoff Area=4,828 sf 0.00% Impervious Runoff Depth>2.37"
Flow Length=123' Tc=18.3 min CN=70 Runoff=0.21 cfs 0.022 af

Subcatchment 5S: Sub #5 Runoff Area=59,209 sf 4.42% Impervious Runoff Depth>2.45"
Flow Length=560' Tc=30.1 min CN=71 Runoff=2.19 cfs 0.277 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth>2.64"
Tc=6.0 min CN=73 Runoff=0.08 cfs 0.006 af

Subcatchment 7S: Sub #7 Runoff Area=3,883 sf 0.00% Impervious Runoff Depth>1.88"
Flow Length=66' Tc=6.3 min CN=64 Runoff=0.18 cfs 0.014 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.04' Max Vel=0.93 fps Inflow=0.18 cfs 0.014 af
n=0.030 L=29.7' S=0.0421 '/' Capacity=40.68 cfs Outflow=0.18 cfs 0.014 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.05' Max Vel=0.59 fps Inflow=0.18 cfs 0.014 af
n=0.035 L=133.4' S=0.0169 '/' Capacity=22.07 cfs Outflow=0.16 cfs 0.014 af

Reach 7cR: Reach #7 Avg. Flow Depth=0.04' Max Vel=0.77 fps Inflow=0.16 cfs 0.014 af
n=0.030 L=230.1' S=0.0304 '/' Capacity=34.59 cfs Outflow=0.15 cfs 0.014 af

Reach 100R: Final Reach #100 Inflow=2.98 cfs 0.254 af
Outflow=2.98 cfs 0.254 af

Reach 200R: Final Reach #200 Inflow=0.38 cfs 0.044 af
Outflow=0.38 cfs 0.044 af

Reach 300R: Final Reach #300 Inflow=3.19 cfs 0.391 af
Outflow=3.19 cfs 0.391 af

Reach 400R: Final Reach #400 Inflow=0.21 cfs 0.022 af
Outflow=0.21 cfs 0.022 af

Reach 500R: Final Reach #500 Inflow=2.19 cfs 0.277 af
Outflow=2.19 cfs 0.277 af

Reach 600R: Final Reach #600 Inflow=0.08 cfs 0.006 af
Outflow=0.08 cfs 0.006 af

Total Runoff Area = 5.219 ac Runoff Volume = 0.993 af Average Runoff Depth = 2.28"
94.11% Pervious = 4.912 ac 5.89% Impervious = 0.307 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=50,376 sf 20.84% Impervious Runoff Depth>3.83"
Flow Length=272' Tc=11.2 min CN=73 Runoff=4.35 cfs 0.369 af

Subcatchment 2S: Sub #2 Runoff Area=21,239 sf 0.59% Impervious Runoff Depth>1.87"
Flow Length=144' Tc=13.7 min CN=53 Runoff=0.75 cfs 0.076 af

Subcatchment 3S: Sub #3 Runoff Area=86,684 sf 0.18% Impervious Runoff Depth>3.40"
Flow Length=388' Tc=27.4 min CN=69 Runoff=4.68 cfs 0.565 af

Subcatchment 4S: Sub #4 Runoff Area=4,828 sf 0.00% Impervious Runoff Depth>3.51"
Flow Length=123' Tc=18.3 min CN=70 Runoff=0.32 cfs 0.032 af

Subcatchment 5S: Sub #5 Runoff Area=59,209 sf 4.42% Impervious Runoff Depth>3.61"
Flow Length=560' Tc=30.1 min CN=71 Runoff=3.26 cfs 0.409 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth>3.84"
Tc=6.0 min CN=73 Runoff=0.11 cfs 0.008 af

Subcatchment 7S: Sub #7 Runoff Area=3,883 sf 0.00% Impervious Runoff Depth>2.91"
Flow Length=66' Tc=6.3 min CN=64 Runoff=0.29 cfs 0.022 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.05' Max Vel=1.07 fps Inflow=0.29 cfs 0.022 af
n=0.030 L=29.7' S=0.0421 '/' Capacity=40.68 cfs Outflow=0.29 cfs 0.022 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.07' Max Vel=0.68 fps Inflow=0.29 cfs 0.022 af
n=0.035 L=133.4' S=0.0169 '/' Capacity=22.07 cfs Outflow=0.27 cfs 0.022 af

Reach 7cR: Reach #7 Avg. Flow Depth=0.05' Max Vel=0.90 fps Inflow=0.27 cfs 0.022 af
n=0.030 L=230.1' S=0.0304 '/' Capacity=34.59 cfs Outflow=0.24 cfs 0.021 af

Reach 100R: Final Reach #100 Inflow=4.35 cfs 0.369 af
Outflow=4.35 cfs 0.369 af

Reach 200R: Final Reach #200 Inflow=0.75 cfs 0.076 af
Outflow=0.75 cfs 0.076 af

Reach 300R: Final Reach #300 Inflow=4.83 cfs 0.586 af
Outflow=4.83 cfs 0.586 af

Reach 400R: Final Reach #400 Inflow=0.32 cfs 0.032 af
Outflow=0.32 cfs 0.032 af

Reach 500R: Final Reach #500 Inflow=3.26 cfs 0.409 af
Outflow=3.26 cfs 0.409 af

Reach 600R: Final Reach #600 Inflow=0.11 cfs 0.008 af
Outflow=0.11 cfs 0.008 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.481 af Average Runoff Depth = 3.40"
94.11% Pervious = 4.912 ac 5.89% Impervious = 0.307 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=50,376 sf 20.84% Impervious Runoff Depth>5.00"
Flow Length=272' Tc=11.2 min CN=73 Runoff=5.68 cfs 0.482 af

Subcatchment 2S: Sub #2 Runoff Area=21,239 sf 0.59% Impervious Runoff Depth>2.71"
Flow Length=144' Tc=13.7 min CN=53 Runoff=1.14 cfs 0.110 af

Subcatchment 3S: Sub #3 Runoff Area=86,684 sf 0.18% Impervious Runoff Depth>4.52"
Flow Length=388' Tc=27.4 min CN=69 Runoff=6.23 cfs 0.750 af

Subcatchment 4S: Sub #4 Runoff Area=4,828 sf 0.00% Impervious Runoff Depth>4.65"
Flow Length=123' Tc=18.3 min CN=70 Runoff=0.42 cfs 0.043 af

Subcatchment 5S: Sub #5 Runoff Area=59,209 sf 4.42% Impervious Runoff Depth>4.75"
Flow Length=560' Tc=30.1 min CN=71 Runoff=4.30 cfs 0.538 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth>5.01"
Tc=6.0 min CN=73 Runoff=0.15 cfs 0.011 af

Subcatchment 7S: Sub #7 Runoff Area=3,883 sf 0.00% Impervious Runoff Depth>3.96"
Flow Length=66' Tc=6.3 min CN=64 Runoff=0.40 cfs 0.029 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.06' Max Vel=1.18 fps Inflow=0.40 cfs 0.029 af
n=0.030 L=29.7' S=0.0421 '/' Capacity=40.68 cfs Outflow=0.40 cfs 0.029 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.08' Max Vel=0.75 fps Inflow=0.40 cfs 0.029 af
n=0.035 L=133.4' S=0.0169 '/' Capacity=22.07 cfs Outflow=0.37 cfs 0.029 af

Reach 7cR: Reach #7 Avg. Flow Depth=0.06' Max Vel=1.00 fps Inflow=0.37 cfs 0.029 af
n=0.030 L=230.1' S=0.0304 '/' Capacity=34.59 cfs Outflow=0.34 cfs 0.029 af

Reach 100R: Final Reach #100 Inflow=5.68 cfs 0.482 af
Outflow=5.68 cfs 0.482 af

Reach 200R: Final Reach #200 Inflow=1.14 cfs 0.110 af
Outflow=1.14 cfs 0.110 af

Reach 300R: Final Reach #300 Inflow=6.44 cfs 0.779 af
Outflow=6.44 cfs 0.779 af

Reach 400R: Final Reach #400 Inflow=0.42 cfs 0.043 af
Outflow=0.42 cfs 0.043 af

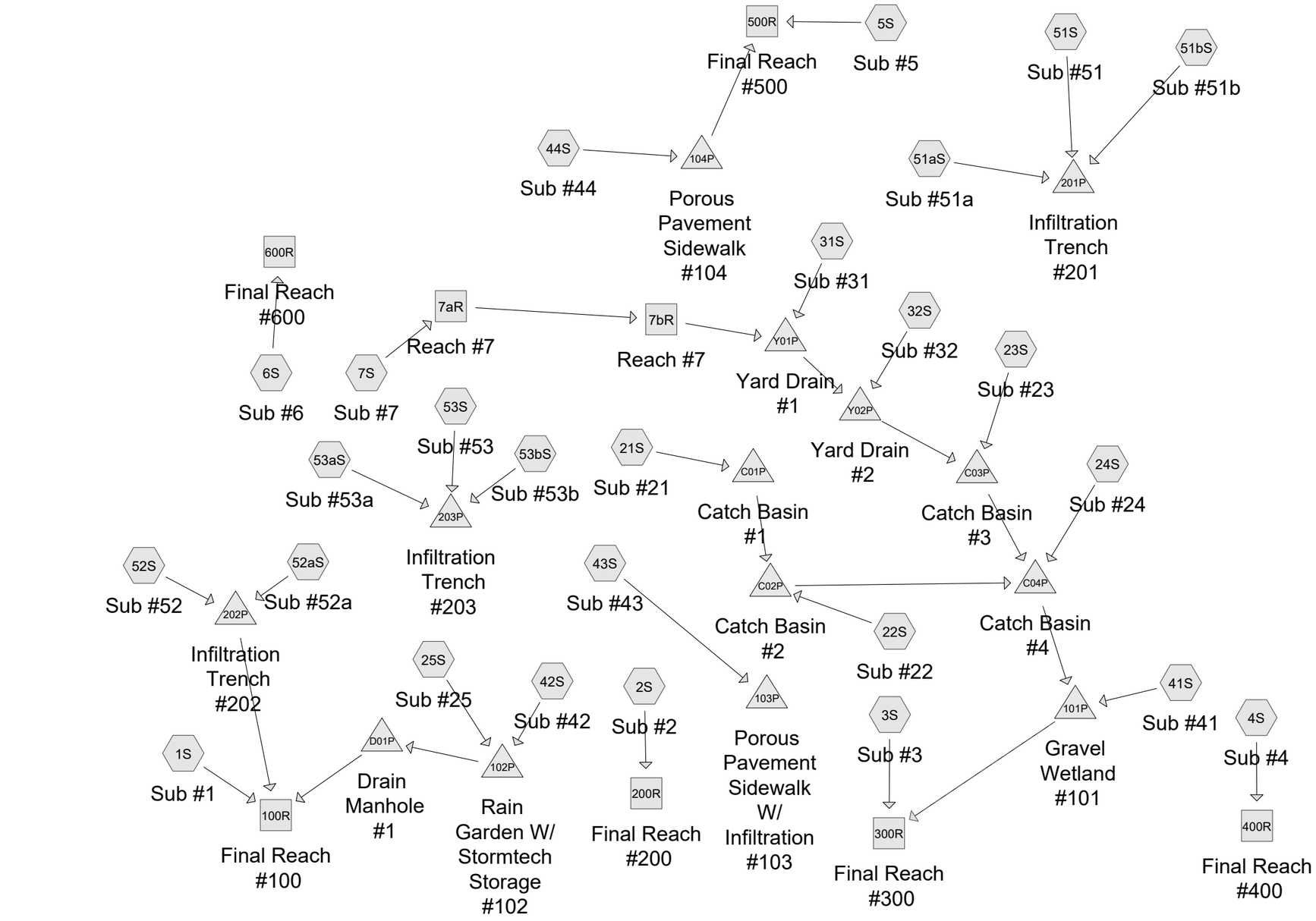
Reach 500R: Final Reach #500 Inflow=4.30 cfs 0.538 af
Outflow=4.30 cfs 0.538 af

Reach 600R: Final Reach #600 Inflow=0.15 cfs 0.011 af
Outflow=0.15 cfs 0.011 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.964 af Average Runoff Depth = 4.51"
94.11% Pervious = 4.912 ac 5.89% Impervious = 0.307 ac

Appendix II - Proposed Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing



Routing Diagram for 24-018 Proposed Analysis

Prepared by Berry Surveying & Engineering

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JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

WETLAND NOTE:

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SOILS LEGEND

Site Specific Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
26	A,B,C	Windsor	A
32	A,B	Boxford	C
238	B	Elmridge	C
327	B,C	Windsor (Clay Subsoil)	C
500	A, B	Udorthents (Loamy)	C
953	B	Boxford (Somewhat Poorly Drained)	C

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+

Denominators: /ED = Excessively Drained /MWD = Moderately Well Drained /SPD = Somewhat Poorly Drained /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

NRCS Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
Bz	B	Buxton Silt Loam	C

NOTES (CONT.):

8.) EPA CGP 7.2.4 SITE MAP LEGEND

B5 VEHICLE EXIT
C RECEIVING WATERS
G2 STORMWATER BEST MANAGEMENT PRACTICE

SEE ALSO:

GRADING & DRAINAGE PLAN
EROSION & SEDIMENT CONTROL PLAN
DRAINAGE ANALYSIS & EROSION AND SEDIMENT CONTROL MANUAL
DRAINAGE OPERATION: INSPECTION & MAINTENANCE MANUAL

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

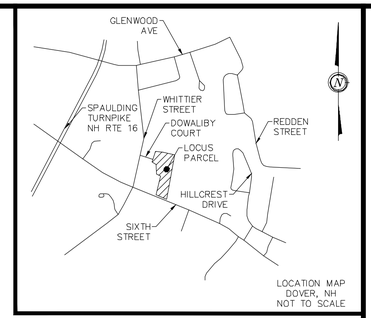
3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

4.) SEE EXISTING CONDITIONS PLAN FOR EXPLANATION OF JURISDICTIONAL WETLANDS AND CONTOURS. SEE SITE SPECIFIC SOIL SURVEY FOR SOILS EXPLANATION.

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE POST CONSTRUCTION WATERSHED CONDITIONS OF TAX MAP 35, LOTS 64 AND 72 AS OF THE DATE OF SURVEY.

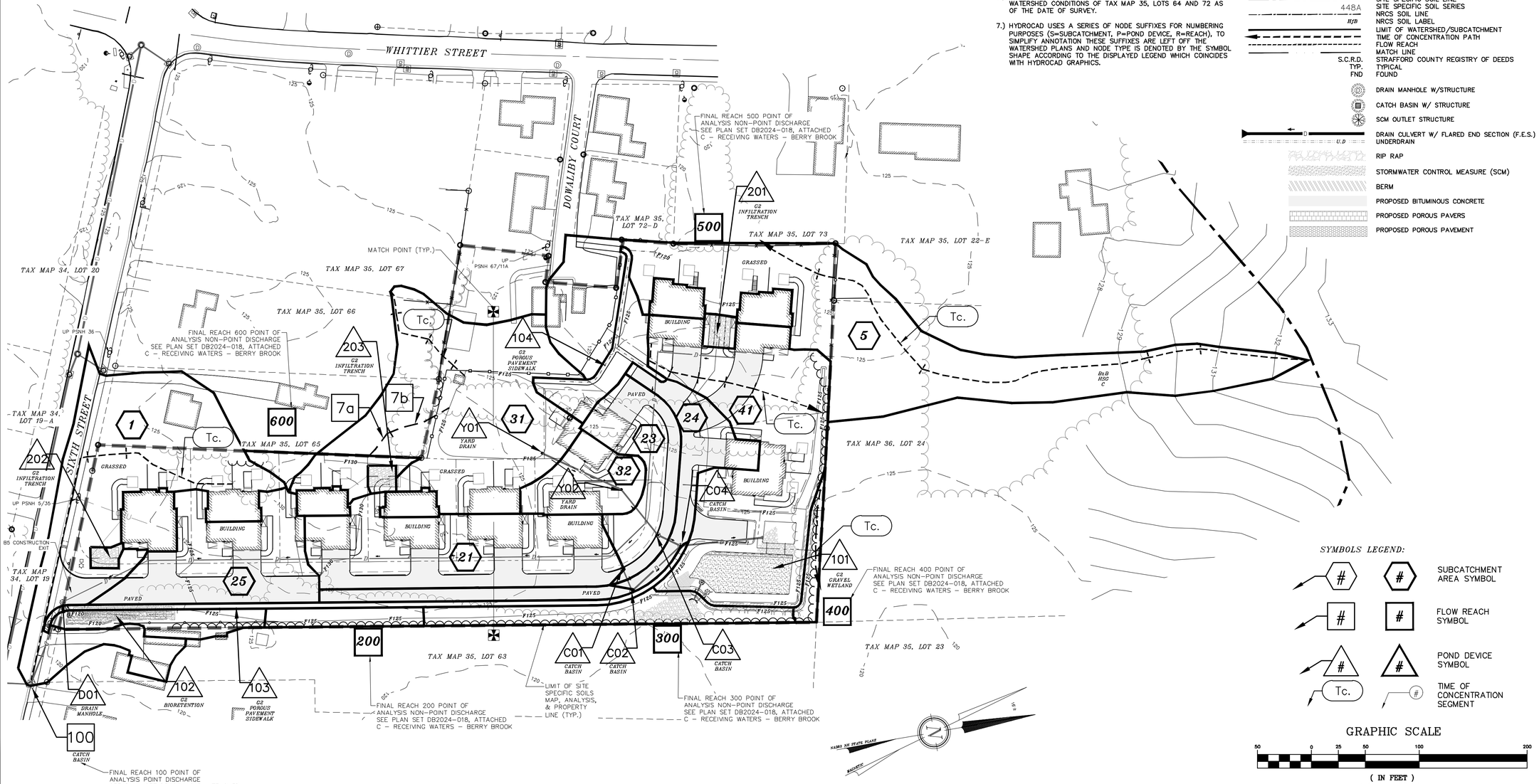
7.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.



LOCATION MAP
DOVER, NH
NOT TO SCALE

LEGEND:

- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- LIMIT OF SITE SPECIFIC SOIL SURVEY MAPPING
- SITE SPECIFIC SOIL LINE
- SITE SPECIFIC SOIL SERIES
- NRCS SOIL LINE
- NRCS SOIL LABEL
- LIMIT OF WATERSHED/SUBCATCHMENT
- TIME OF CONCENTRATION PATH
- FLOW REACH
- MATCH LINE
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND
- DRAIN MANHOLE W/STRUCTURE
- CATCH BASIN W/ STRUCTURE
- SCM OUTLET STRUCTURE
- DRAIN CULVERT W/ FLARED END SECTION (F.E.S.) UNDERDRAIN
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT



SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (PROPOSED)

OVERVIEW W-2 PROPOSED WATERSHED PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7424
LICENSED PROFESSIONAL ENGINEER

SHEET 2 OF 4

NOT FOR CONSTRUCTION

JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

WETLAND NOTE:

WETLANDS WERE DELINEATED BY DEIDRA L. BENJAMIN, CWS, IN JUNE OF 2024 USING THE FOLLOWING CRITERIA: (NO WETLANDS WERE FOUND ON SITE)

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4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.
5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

SOILS LEGEND

Site Specific Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
26	A,B,C	Windsor	A
32	A,B	Boxford	C
238	B	Elmridge	C
327	B,C	Windsor (Clay Subsoil)	C
500	A, B	Udorthents (Loamy)	C
953	B	Boxford (Somewhat Poorly Drained)	C

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+

Denominators: /ED = Excessively Drained /MWD = Moderately Well Drained /SPD = Somewhat Poorly Drained /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

NRCS Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
Bz	B	Buxton Silt Loam	C

LEGEND:

- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- LIMIT OF SITE SPECIFIC SOIL SURVEY MAPPING
- SITE SPECIFIC SOIL LINE
- SITE SPECIFIC SOIL SERIES
- NRCS SOIL LINE
- NRCS SOIL LABEL
- LIMIT OF WATERSHED/SUBCATCHMENT
- TIME OF CONCENTRATION PATH
- FLOW REACH
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- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
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- SCM OUTLET STRUCTURE
- DRAIN CULVERT W/ FLARED END SECTION (F.E.S.) UNDERDRAIN
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
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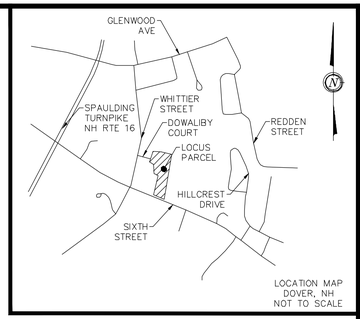

NOTES:

1.) PARCEL #1
Owner: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
Owner: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

4.) SEE EXISTING CONDITIONS PLAN FOR EXPLANATION OF JURISDICTIONAL WETLANDS AND CONTOURS. SEE SITE SPECIFIC SOIL SURVEY FOR SOILS EXPLANATION.

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

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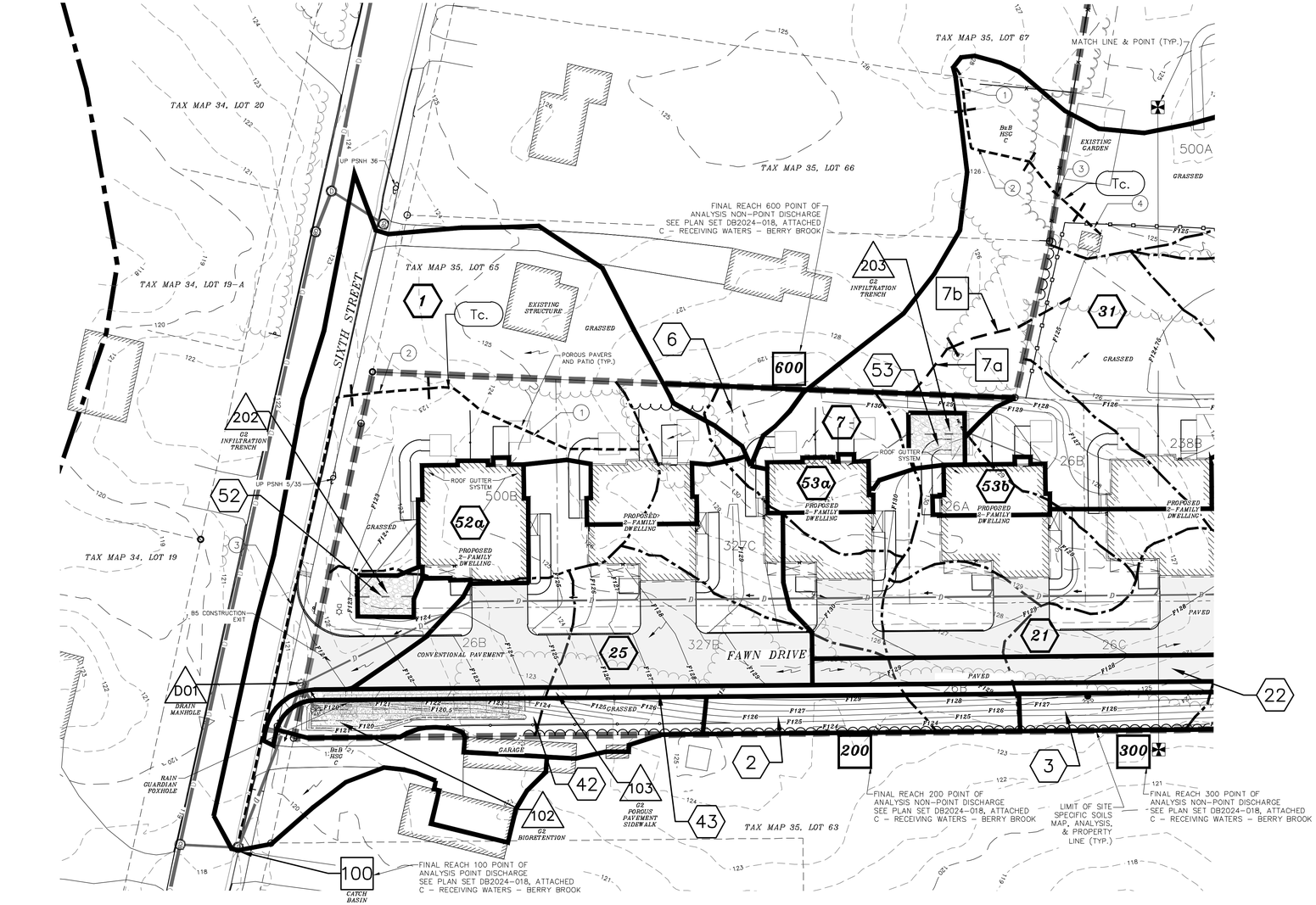
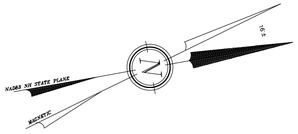
8.) EPA CGP 7.2.4 SITE MAP LEGEND

B5 VEHICLE EXIT
C RECEIVING WATERS
G2 STORMWATER BEST MANAGEMENT PRACTICE

SEE ALSO:

GRADING & DRAINAGE PLAN
EROSION & SEDIMENT CONTROL PLAN
DRAINAGE ANALYSIS & EROSION AND SEDIMENT CONTROL MANUAL
DRAINAGE OPERATION: INSPECTION & MAINTENANCE MANUAL





SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (PROPOSED)

DETAIL SOUTH W-2 PROPOSED WATERSHED PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

KENNETH A. BERRY No. 7809 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

NOT FOR CONSTRUCTION

JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

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- PROPOSED BITUMINOUS CONCRETE
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- PROPOSED POROUS PAVEMENT

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BARRINGTON, NH 03825

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DOVER, NH 03820

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NASHUA, NH 03063

3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

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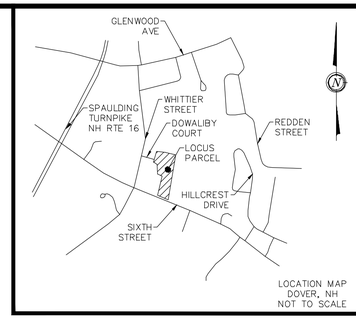

NOTES (CONT.):

8.) EPA CGP 7.2.4 SITE MAP LEGEND

B5 VEHICLE EXIT
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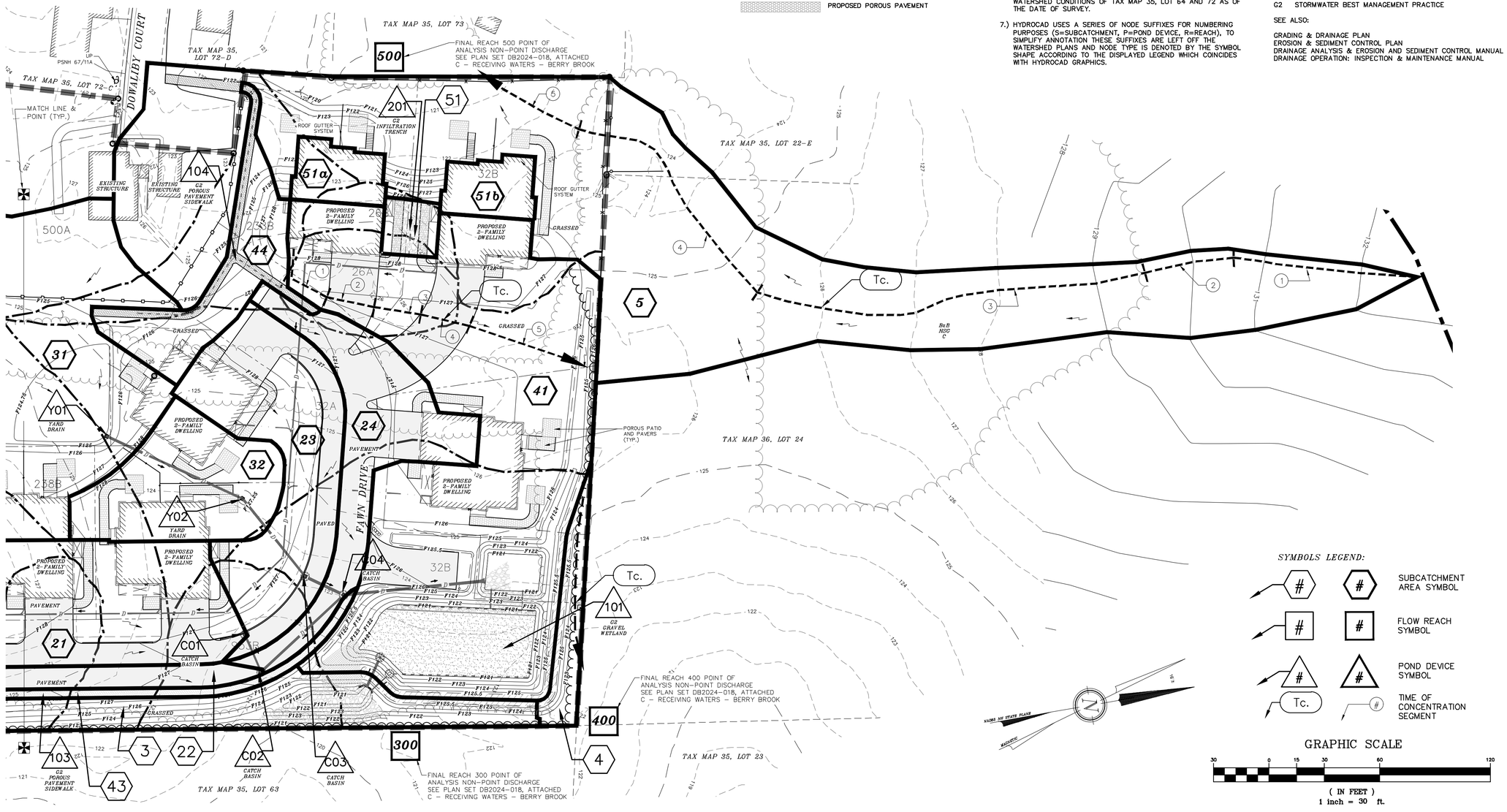
G2 STORMWATER BEST MANAGEMENT PRACTICE

SEE ALSO:

GRADING & DRAINAGE PLAN
EROSION & SEDIMENT CONTROL PLAN
DRAINAGE ANALYSIS & EROSION AND SEDIMENT CONTROL MANUAL
DRAINAGE OPERATION: INSPECTION & MAINTENANCE MANUAL



SYMBOLS LEGEND:

- # SUBCATCHMENT AREA SYMBOL
- # FLOW REACH SYMBOL
- # POND DEVICE SYMBOL
- Tc. # TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (PROPOSED)

DETAIL NORTH W-2 PROPOSED WATERSHED PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

KENNETH A. BERRY No. 7929 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

SHEET 4 OF 4

NOT FOR CONSTRUCTION

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.397	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 5S, 7S, 21S, 24S, 25S, 31S, 41S, 42S, 44S, 51S, 52S, 53S)
2.352	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S, 21S, 23S, 24S, 25S, 31S, 32S, 41S, 42S, 44S, 52S)
0.172	65	Brush, Good, HSG C (1S)
0.014	96	Gravel surface, HSG A (1S, 21S, 25S)
0.022	96	Gravel surface, HSG C (1S, 21S, 23S, 25S)
0.277	98	Paved parking, HSG A (1S, 21S, 22S, 24S, 25S, 41S, 43S, 44S)
0.719	98	Paved parking, HSG C (1S, 5S, 21S, 22S, 23S, 24S, 25S, 41S, 43S, 44S)
0.156	98	Roofs, HSG A (21S, 31S, 41S, 51aS, 51S, 52aS, 53bS)
0.567	98	Roofs, HSG C (1S, 5S, 21S, 23S, 24S, 25S, 31S, 32S, 41S, 42S, 44S, 51aS, 51bS, 51S, 52aS, 53aS)
0.003	30	Woods, Good, HSG A (42S)
0.540	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 31S, 42S)
5.219	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.847	HSG A	1S, 2S, 3S, 5S, 7S, 21S, 22S, 24S, 25S, 31S, 41S, 42S, 43S, 44S, 51aS, 51S, 52aS, 52S, 53bS, 53S
0.000	HSG B	
4.373	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 21S, 22S, 23S, 24S, 25S, 31S, 32S, 41S, 42S, 43S, 44S, 51aS, 51bS, 51S, 52aS, 52S, 53aS
0.000	HSG D	
0.000	Other	
5.219		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.397	0.000	2.352	0.000	0.000	2.750	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S, 21S, 23S, 24S, 25S, 31S, 32S, 41S, 42S, 44S, 51S, 52S, 53S
0.000	0.000	0.172	0.000	0.000	0.172	Brush, Good	1S
0.014	0.000	0.022	0.000	0.000	0.036	Gravel surface	1S, 21S, 23S, 25S
0.277	0.000	0.719	0.000	0.000	0.996	Paved parking	1S, 5S, 21S, 22S, 23S, 24S, 25S, 41S, 43S, 44S
0.156	0.000	0.567	0.000	0.000	0.723	Roofs	1S, 5S, 21S, 23S, 24S, 25S, 31S, 32S, 41S, 42S, 44S, 51aS, 51bS, 51S, 52aS, 53aS, 53bS
0.003	0.000	0.540	0.000	0.000	0.543	Woods, Good	1S, 2S, 3S, 4S, 5S, 6S, 31S, 42S

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.847	**0.000**	**4.373**	**0.000**	**0.000**	**5.219**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	101P	120.67	120.50	12.0	0.0142	0.012	6.0	0.0	0.0
2	101P	120.67	120.50	16.0	0.0106	0.012	15.0	0.0	0.0
3	102P	114.00	113.85	10.0	0.0150	0.012	12.0	0.0	0.0
4	104P	120.33	120.00	25.0	0.0132	0.012	8.0	0.0	0.0
5	C01P	121.94	121.85	18.0	0.0050	0.012	15.0	0.0	0.0
6	C02P	121.75	121.46	57.2	0.0051	0.012	15.0	0.0	0.0
7	C03P	121.59	121.49	19.2	0.0052	0.012	15.0	0.0	0.0
8	C04P	121.36	121.00	72.0	0.0050	0.012	18.0	0.0	0.0
9	D01P	113.75	113.35	78.0	0.0051	0.012	12.0	0.0	0.0
10	Y01P	122.35	121.95	78.0	0.0051	0.012	15.0	0.0	0.0
11	Y02P	121.95	121.69	51.2	0.0051	0.012	15.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=30,592 sf 40.83% Impervious Runoff Depth=4.59"
Flow Length=354' Tc=11.2 min CN=80 Runoff=3.14 cfs 0.269 af

Subcatchment 2S: Sub #2 Runoff Area=2,572 sf 0.00% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=63 Runoff=0.19 cfs 0.014 af

Subcatchment 3S: Sub #3 Runoff Area=6,674 sf 0.00% Impervious Runoff Depth=3.12"
Tc=6.0 min CN=66 Runoff=0.55 cfs 0.040 af

Subcatchment 4S: Sub #4 Runoff Area=1,732 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=80' Slope=0.0437 '/' Tc=6.0 min CN=73 Runoff=0.18 cfs 0.013 af

Subcatchment 5S: Sub #5 Runoff Area=43,058 sf 6.58% Impervious Runoff Depth=3.95"
Flow Length=560' Tc=30.1 min CN=74 Runoff=2.58 cfs 0.325 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=73 Runoff=0.11 cfs 0.008 af

Subcatchment 7S: Sub #7 Runoff Area=2,571 sf 0.00% Impervious Runoff Depth=3.12"
Flow Length=66' Tc=6.3 min CN=66 Runoff=0.21 cfs 0.015 af

Subcatchment 21S: Sub #21 Runoff Area=19,583 sf 61.58% Impervious Runoff Depth=4.81"
Tc=6.0 min CN=82 Runoff=2.44 cfs 0.180 af

Subcatchment 22S: Sub #22 Runoff Area=3,495 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.53 cfs 0.044 af

Subcatchment 23S: Sub #23 Runoff Area=9,200 sf 49.46% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=87 Runoff=1.25 cfs 0.095 af

Subcatchment 24S: Sub #24 Runoff Area=6,707 sf 90.62% Impervious Runoff Depth=6.41"
Tc=6.0 min CN=96 Runoff=1.01 cfs 0.082 af

Subcatchment 25S: Sub #25 Runoff Area=13,785 sf 57.46% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=87 Runoff=1.88 cfs 0.142 af

Subcatchment 31S: Sub #31 Runoff Area=28,821 sf 6.23% Impervious Runoff Depth=3.74"
Flow Length=115' Tc=22.0 min CN=72 Runoff=1.87 cfs 0.206 af

Subcatchment 32S: Sub #32 Runoff Area=6,003 sf 32.52% Impervious Runoff Depth=4.81"
Tc=6.0 min CN=82 Runoff=0.75 cfs 0.055 af

Subcatchment 41S: Sub #41 Runoff Area=29,420 sf 28.35% Impervious Runoff Depth=4.48"
Flow Length=176' Slope=0.0075 '/' Tc=13.3 min CN=79 Runoff=2.77 cfs 0.252 af

Subcatchment 42S: Sub #42 Runoff Area=4,020 sf 9.93% Impervious Runoff Depth=2.43"
Tc=6.0 min CN=59 Runoff=0.25 cfs 0.019 af

Subcatchment 43S: Sub #43 Runoff Area=3,134 sf 100.00% Impervious Runoff Depth=6.65"
Tc=293.0 min CN=98 Runoff=0.07 cfs 0.040 af

Subcatchment 44S: Sub #44 Runoff Area=4,580 sf 33.47% Impervious Runoff Depth=4.81"
Tc=293.0 min CN=82 Runoff=0.08 cfs 0.042 af

Subcatchment 51aS: Sub #51a Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 51bS: Sub #51b Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 51S: Sub #51 Runoff Area=901 sf 12.32% Impervious Runoff Depth=1.27"
Tc=6.0 min CN=46 Runoff=0.02 cfs 0.002 af

Subcatchment 52aS: Sub #52a Runoff Area=2,765 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.035 af

Subcatchment 52S: Sub #52 Runoff Area=558 sf 0.00% Impervious Runoff Depth=0.80"
Tc=6.0 min CN=40 Runoff=0.01 cfs 0.001 af

Subcatchment 53aS: Sub #53a Runoff Area=1,188 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 53bS: Sub #53b Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 53S: Sub #53 Runoff Area=645 sf 0.00% Impervious Runoff Depth=0.73"
Tc=6.0 min CN=39 Runoff=0.01 cfs 0.001 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.04' Max Vel=1.20 fps Inflow=0.21 cfs 0.015 af
n=0.022 L=29.7' S=0.0421 '/' Capacity=55.48 cfs Outflow=0.21 cfs 0.015 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.04' Max Vel=0.99 fps Inflow=0.21 cfs 0.015 af
n=0.022 L=78.0' S=0.0256 '/' Capacity=43.30 cfs Outflow=0.20 cfs 0.015 af

Reach 100R: Final Reach #100 Inflow=3.18 cfs 0.425 af
Outflow=3.18 cfs 0.425 af

Reach 200R: Final Reach #200 Inflow=0.19 cfs 0.014 af
Outflow=0.19 cfs 0.014 af

Reach 300R: Final Reach #300 Inflow=3.63 cfs 0.901 af
Outflow=3.63 cfs 0.901 af

Reach 400R: Final Reach #400 Inflow=0.18 cfs 0.013 af
Outflow=0.18 cfs 0.013 af

Reach 500R: Final Reach #500 Inflow=2.58 cfs 0.351 af
Outflow=2.58 cfs 0.351 af

Reach 600R: Final Reach #600 Inflow=0.11 cfs 0.008 af
Outflow=0.11 cfs 0.008 af

Pond 101P: Gravel Wetland #101 Peak Elev=124.31' Storage=16,769 cf Inflow=9.16 cfs 0.930 af
Primary=0.11 cfs 0.272 af Secondary=3.40 cfs 0.589 af Tertiary=0.00 cfs 0.000 af Outflow=3.51 cfs 0.861 af

Pond 102P: Rain Garden W/ Stormtech Peak Elev=117.91' Storage=3,495 cf Inflow=2.12 cfs 0.160 af
Outflow=0.41 cfs 0.156 af

Pond 103P: Porous Pavement Sidewalk W/ Peak Elev=118.35' Storage=657 cf Inflow=0.07 cfs 0.040 af
Outflow=0.02 cfs 0.040 af

Pond 104P: Porous Pavement Sidewalk #104 Peak Elev=120.47' Storage=229 cf Inflow=0.08 cfs 0.042 af
Discarded=0.01 cfs 0.016 af Primary=0.07 cfs 0.026 af Outflow=0.08 cfs 0.042 af

Pond 201P: Infiltration Trench #201 Peak Elev=125.79' Storage=627 cf Inflow=0.48 cfs 0.041 af
Outflow=0.04 cfs 0.041 af

Pond 202P: Infiltration Trench #202 Peak Elev=122.72' Storage=551 cf Inflow=0.42 cfs 0.036 af
Discarded=0.04 cfs 0.036 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.036 af

Pond 203P: Infiltration Trench #203 Peak Elev=128.23' Storage=432 cf Inflow=0.37 cfs 0.031 af
Outflow=0.04 cfs 0.031 af

Pond C01P: Catch Basin #1 Peak Elev=124.40' Storage=0.001 af Inflow=2.44 cfs 0.180 af
15.0" Round Culvert n=0.012 L=18.0' S=0.0050 '/' Outflow=2.42 cfs 0.180 af

Pond C02P: Catch Basin #2 Peak Elev=124.40' Storage=0.001 af Inflow=2.95 cfs 0.225 af
15.0" Round Culvert n=0.012 L=57.2' S=0.0051 '/' Outflow=2.91 cfs 0.225 af

Pond C03P: Catch Basin #3 Peak Elev=124.51' Storage=0.001 af Inflow=3.03 cfs 0.371 af
15.0" Round Culvert n=0.012 L=19.2' S=0.0052 '/' Outflow=3.00 cfs 0.371 af

Pond C04P: Catch Basin #4 Peak Elev=124.39' Storage=0.001 af Inflow=6.88 cfs 0.678 af
18.0" Round Culvert n=0.012 L=72.0' S=0.0050 '/' Outflow=6.87 cfs 0.678 af

Pond D01P: Drain Manhole #1 Peak Elev=114.11' Storage=0.000 af Inflow=0.41 cfs 0.156 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0051 '/' Outflow=0.42 cfs 0.156 af

Pond Y01P: Yard Drain #1 Peak Elev=124.78' Storage=256 cf Inflow=1.98 cfs 0.221 af
Outflow=1.91 cfs 0.221 af

Pond Y02P: Yard Drain #2 Peak Elev=124.60' Storage=8 cf Inflow=2.19 cfs 0.276 af
15.0" Round Culvert n=0.012 L=51.2' S=0.0051 '/' Outflow=2.19 cfs 0.276 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.950 af Average Runoff Depth = 4.48"
67.07% Pervious = 3.501 ac 32.93% Impervious = 1.719 ac

Summary for Subcatchment 1S: Sub #1

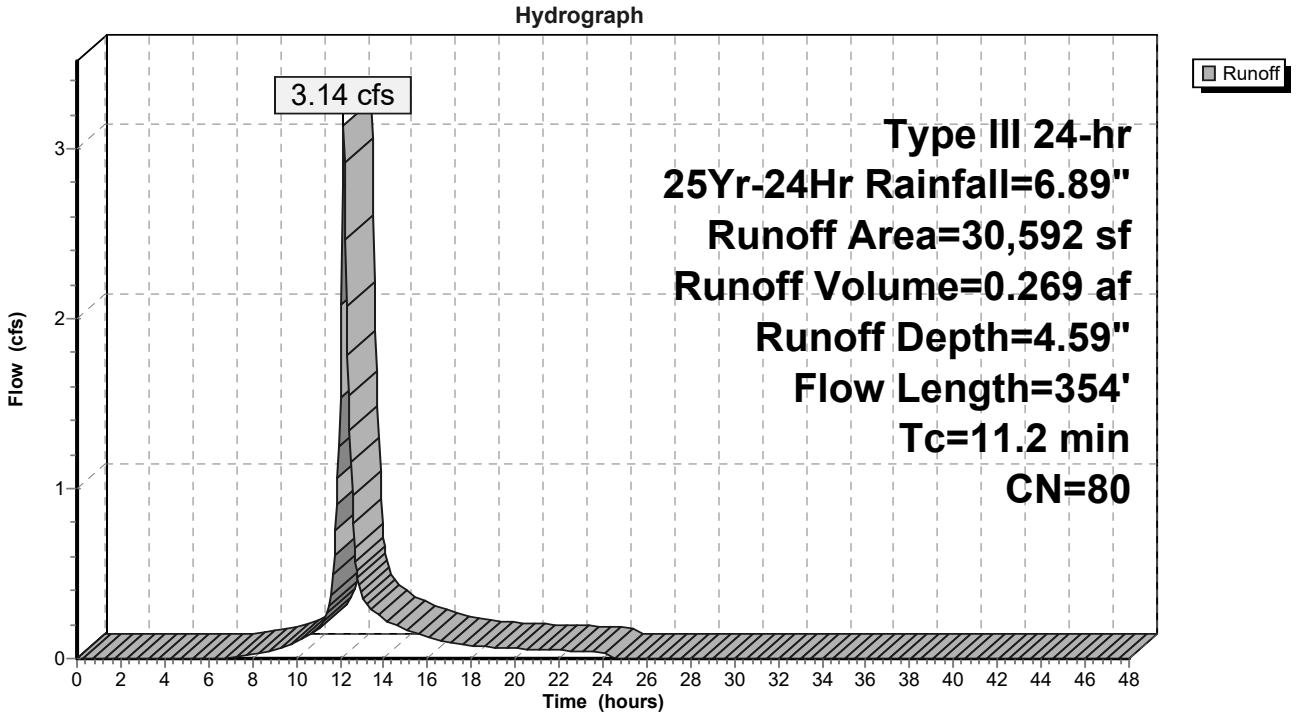
Runoff = 3.14 cfs @ 12.16 hrs, Volume= 0.269 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,050	39	>75% Grass cover, Good, HSG A
961	98	Paved parking, HSG A
159	96	Gravel surface, HSG A
3,227	98	Roofs, HSG C
8,803	74	>75% Grass cover, Good, HSG C
8,303	98	Paved parking, HSG C
576	70	Woods, Good, HSG C
34	96	Gravel surface, HSG C
7,479	65	Brush, Good, HSG C
30,592	80	Weighted Average
18,101		59.17% Pervious Area
12,491		40.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0490	0.18		**Sheet Flow, Segment #1** Grass: Dense n= 0.240 P2= 3.62"
0.5	36	0.0250	1.11		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
1.3	218	0.0180	2.72		**Shallow Concentrated Flow, Segment #3** Paved Kv= 20.3 fps
11.2	354	Total			

Subcatchment 1S: Sub #1



Summary for Subcatchment 2S: Sub #2

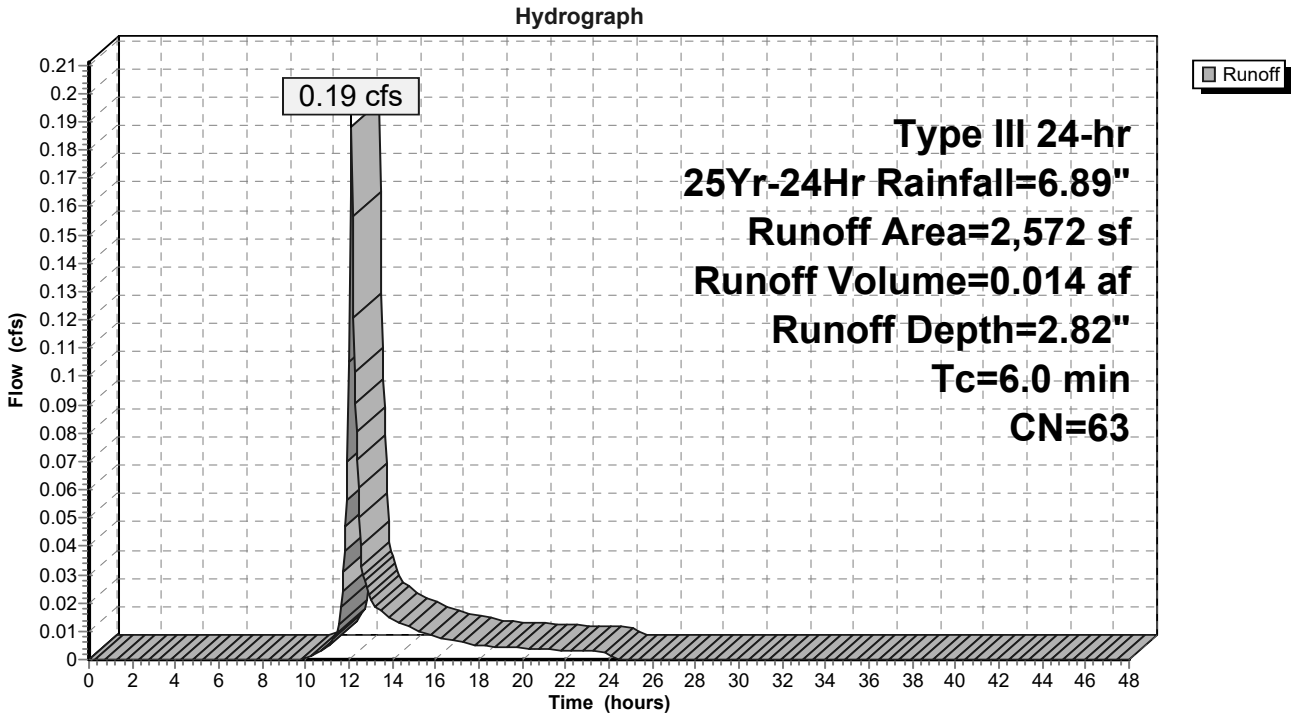
Runoff = 0.19 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
805	39	>75% Grass cover, Good, HSG A
1,528	74	>75% Grass cover, Good, HSG C
239	70	Woods, Good, HSG C
2,572	63	Weighted Average
2,572		100.00% Pervious Area

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

Subcatchment 2S: Sub #2



Summary for Subcatchment 3S: Sub #3

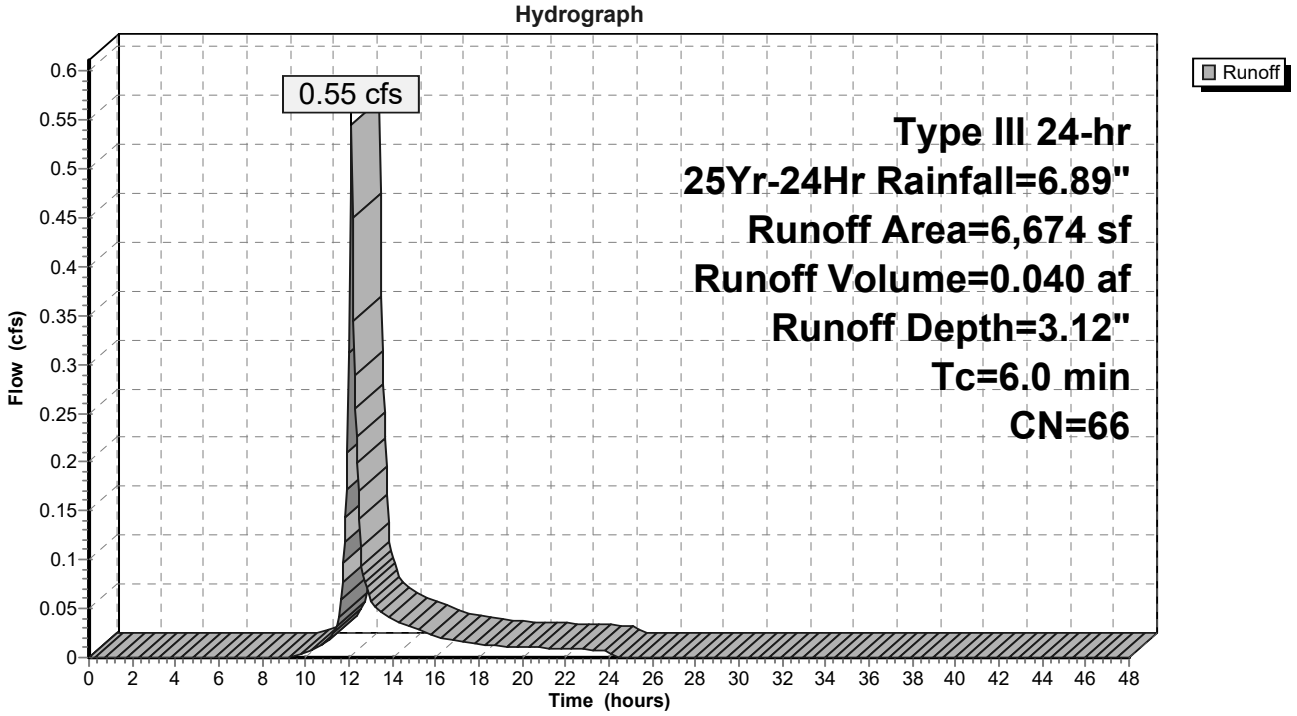
Runoff = 0.55 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,474	39	>75% Grass cover, Good, HSG A
4,503	74	>75% Grass cover, Good, HSG C
697	70	Woods, Good, HSG C
6,674	66	Weighted Average
6,674		100.00% Pervious Area

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

Subcatchment 3S: Sub #3



Summary for Subcatchment 4S: Sub #4

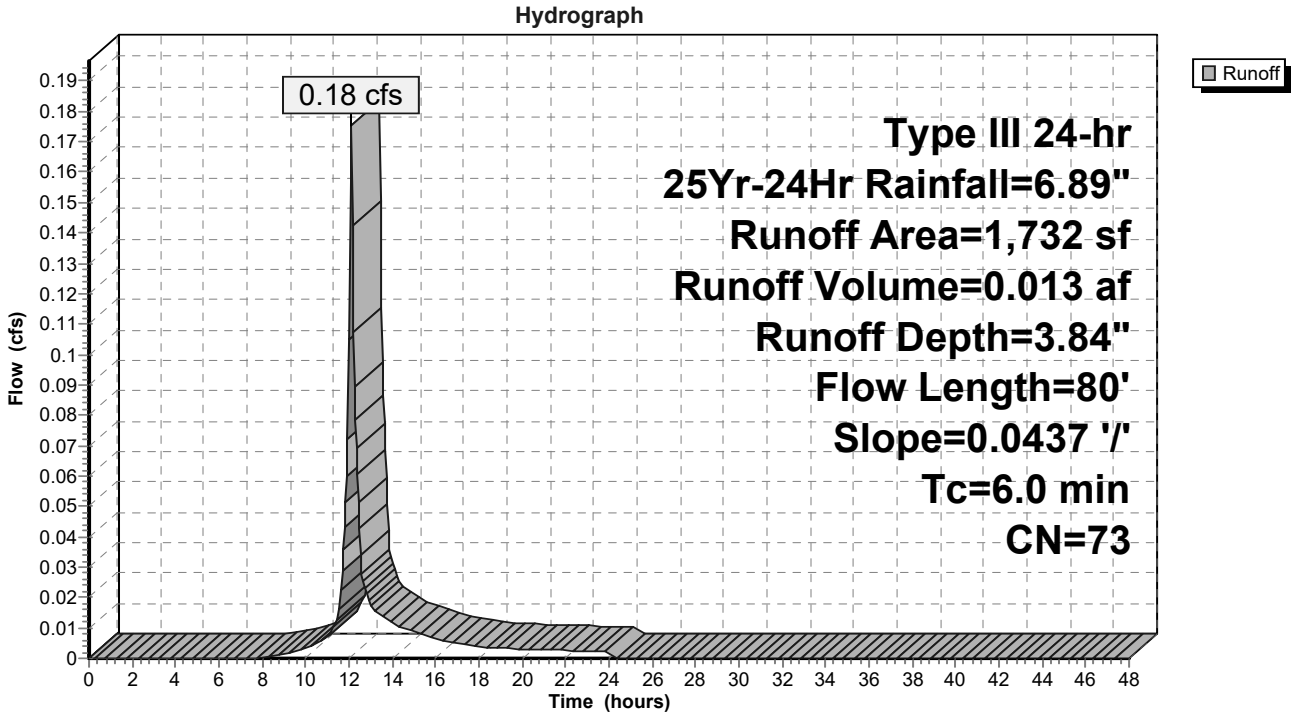
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,209	74	>75% Grass cover, Good, HSG C
523	70	Woods, Good, HSG C
1,732	73	Weighted Average
1,732		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	80	0.0437	0.24		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
5.6	80	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Sub #4



Summary for Subcatchment 5S: Sub #5

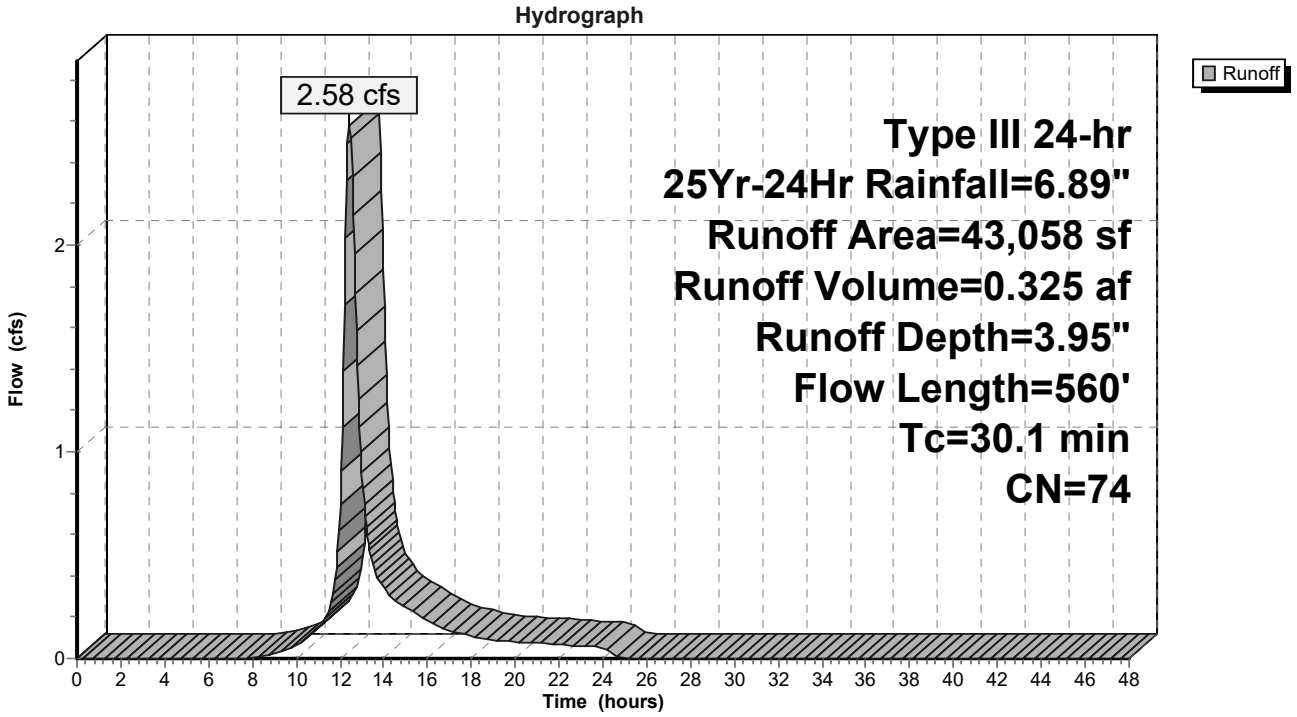
Runoff = 2.58 cfs @ 12.42 hrs, Volume= 0.325 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
66	39	>75% Grass cover, Good, HSG A
881	98	Roofs, HSG C
23,738	74	>75% Grass cover, Good, HSG C
1,952	98	Paved parking, HSG C
16,421	70	Woods, Good, HSG C
43,058	74	Weighted Average
40,225		93.42% Pervious Area
2,833		6.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.3	100	0.0175	0.08		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.62"
1.1	49	0.0205	0.72		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
3.7	214	0.0187	0.96		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
3.3	139	0.0198	0.70		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
0.7	58	0.0348	1.31		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
30.1	560	Total			

Subcatchment 5S: Sub #5



Summary for Subcatchment 6S: Sub #6

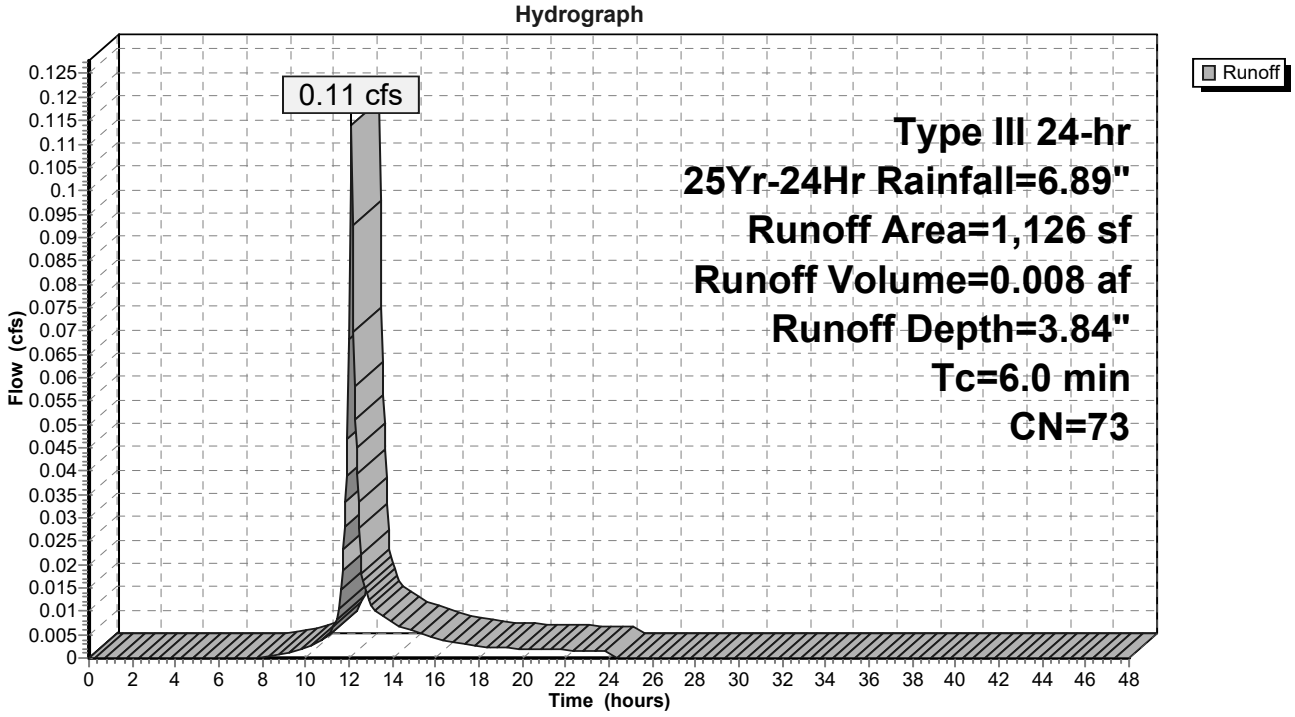
Runoff = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
937	74	>75% Grass cover, Good, HSG C
189	70	Woods, Good, HSG C
1,126	73	Weighted Average
1,126		100.00% Pervious Area

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

Subcatchment 6S: Sub #6



Summary for Subcatchment 7S: Sub #7

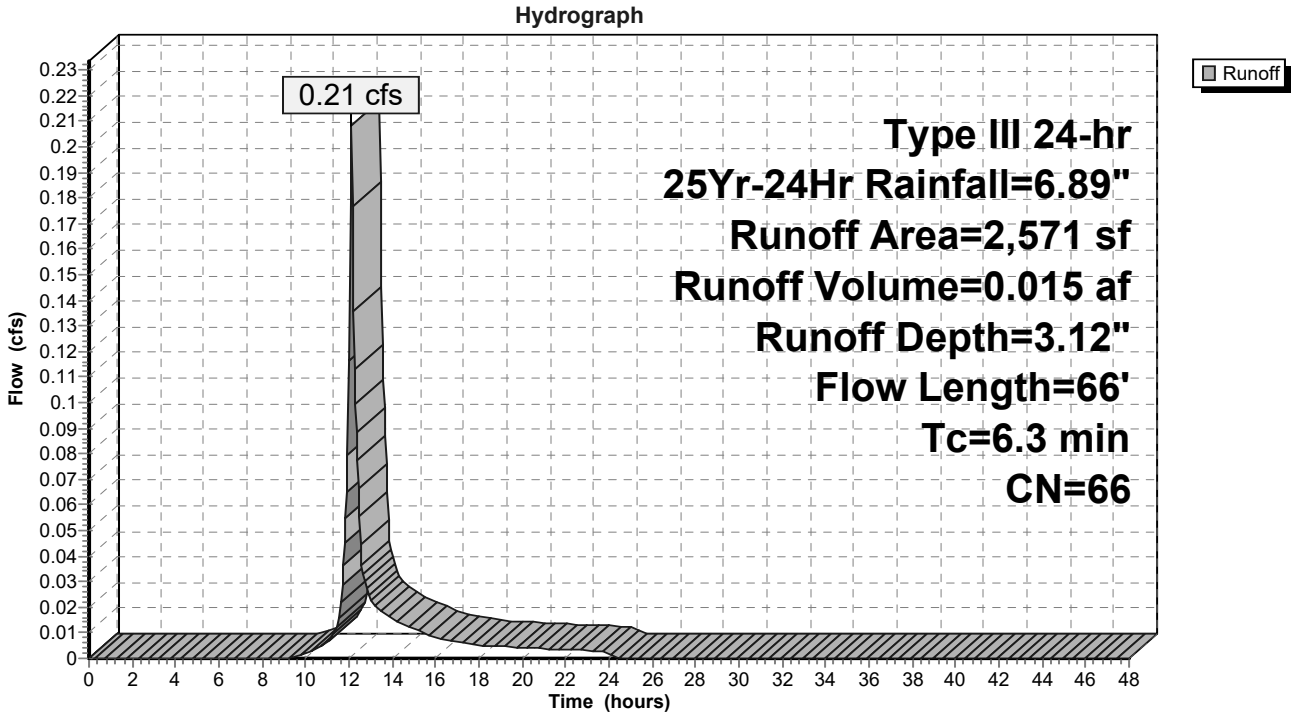
Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
623	39	>75% Grass cover, Good, HSG A
1,948	74	>75% Grass cover, Good, HSG C
2,571	66	Weighted Average
2,571		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	43	0.0234	0.16		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
1.9	23	0.0543	0.20		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.62"
6.3	66	Total			

Subcatchment 7S: Sub #7



Summary for Subcatchment 21S: Sub #21

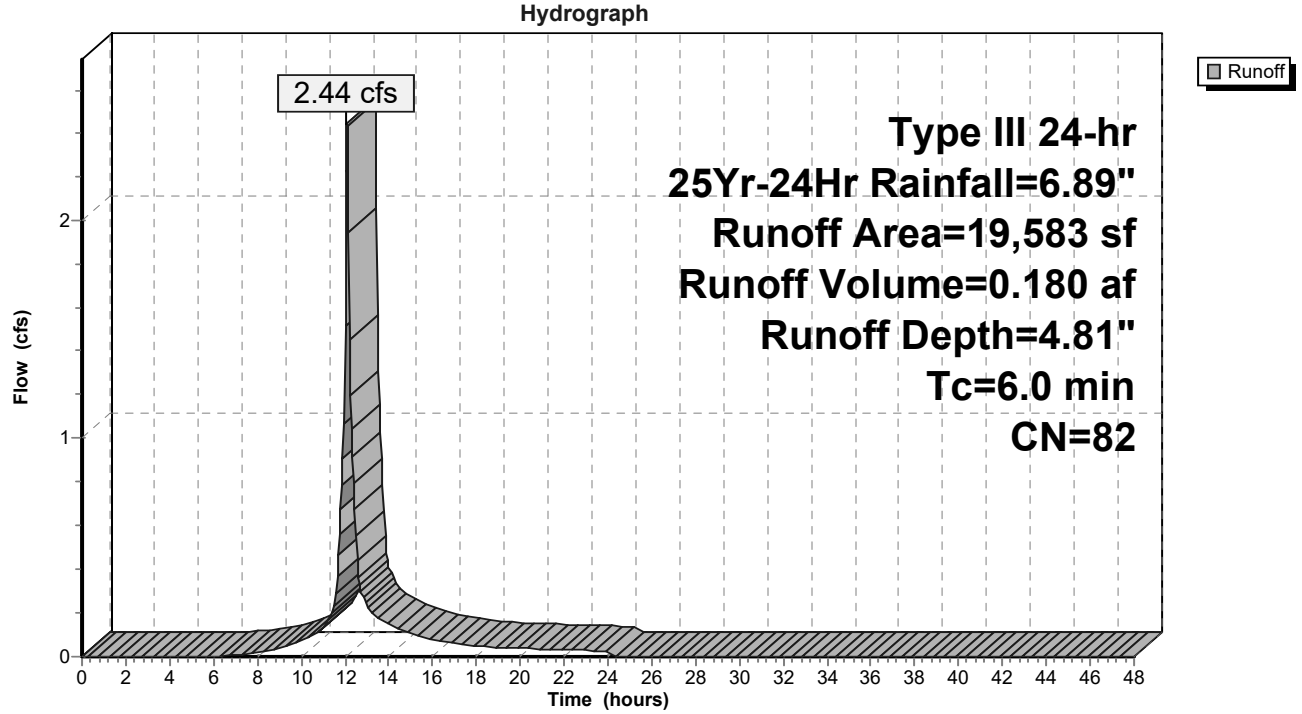
Runoff = 2.44 cfs @ 12.09 hrs, Volume= 0.180 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
4,211	39	>75% Grass cover, Good, HSG A
3,374	98	Paved parking, HSG A
3,027	98	Roofs, HSG A
341	96	Gravel surface, HSG A
2,798	74	>75% Grass cover, Good, HSG C
2,623	98	Paved parking, HSG C
3,036	98	Roofs, HSG C
173	96	Gravel surface, HSG C
19,583	82	Weighted Average
7,523		38.42% Pervious Area
12,060		61.58% Impervious Area

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

Subcatchment 21S: Sub #21



Summary for Subcatchment 22S: Sub #22

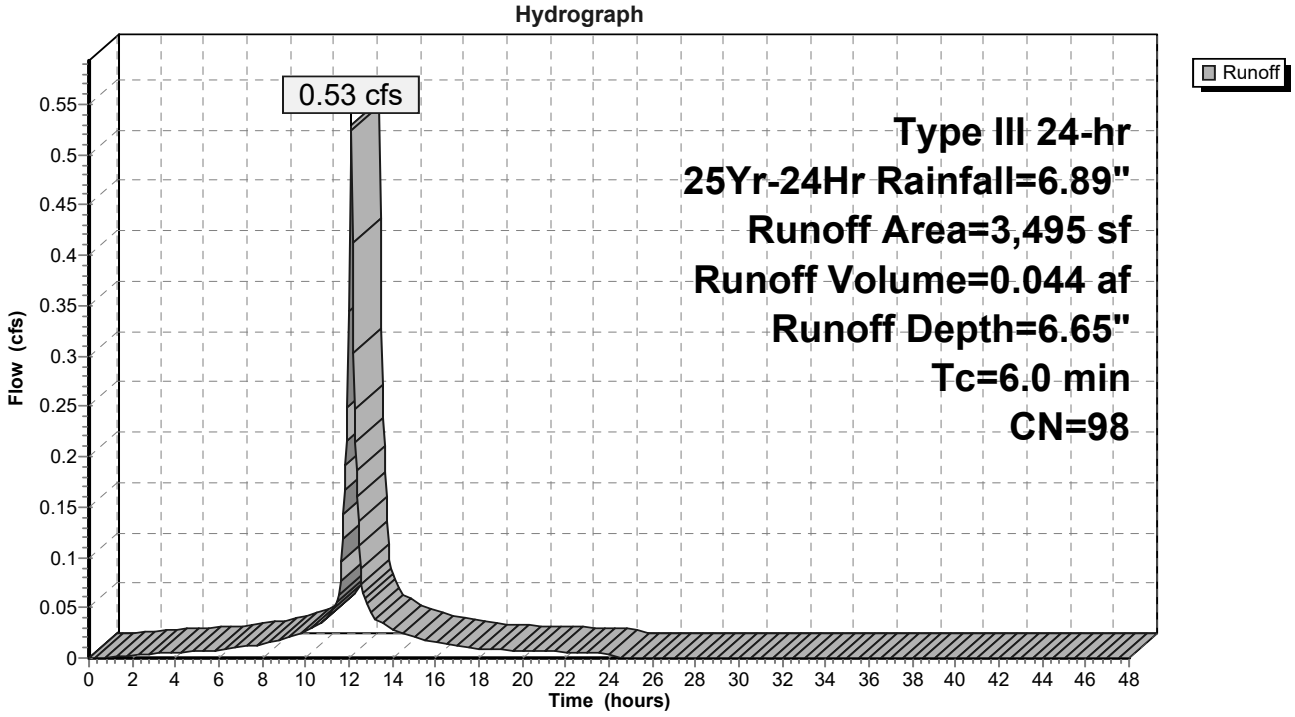
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,910	98	Paved parking, HSG A
1,585	98	Paved parking, HSG C
3,495	98	Weighted Average
3,495		100.00% Impervious Area

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

Subcatchment 22S: Sub #22



Summary for Subcatchment 23S: Sub #23

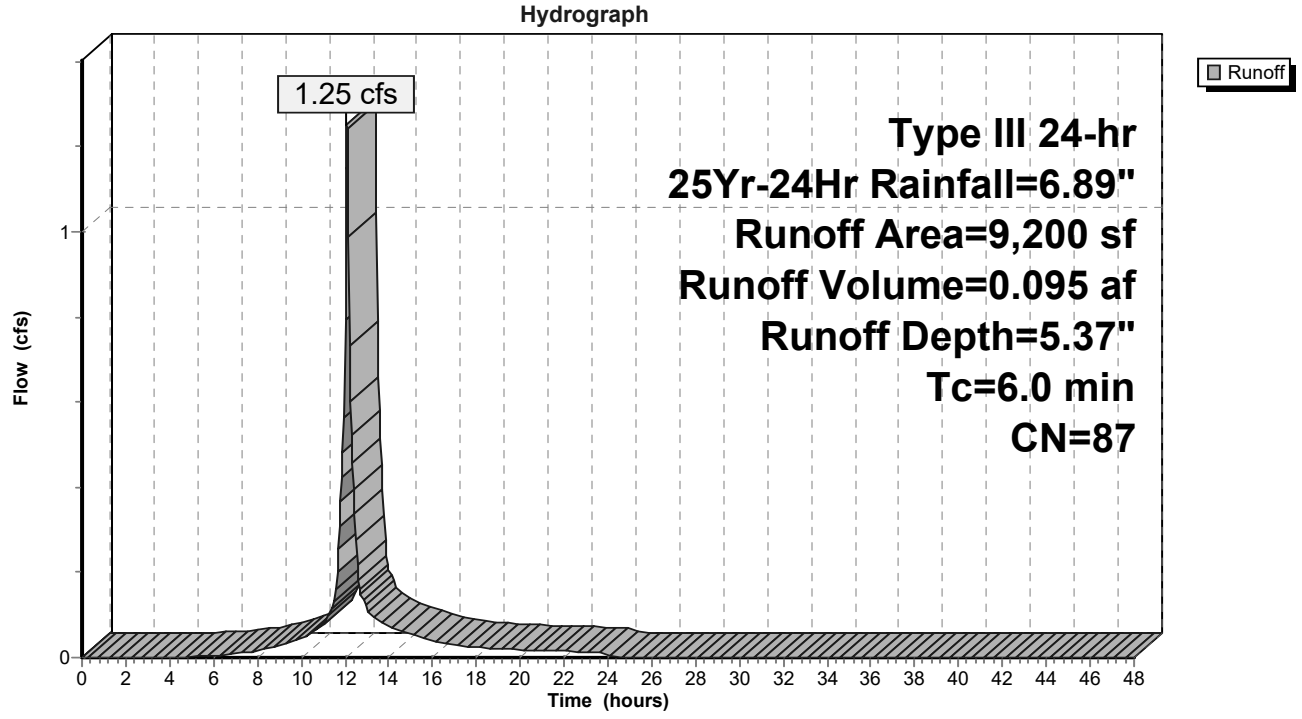
Runoff = 1.25 cfs @ 12.09 hrs, Volume= 0.095 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
4,139	74	>75% Grass cover, Good, HSG C
3,332	98	Paved parking, HSG C
1,218	98	Roofs, HSG C
511	96	Gravel surface, HSG C
9,200	87	Weighted Average
4,650		50.54% Pervious Area
4,550		49.46% Impervious Area

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

Subcatchment 23S: Sub #23



Summary for Subcatchment 24S: Sub #24

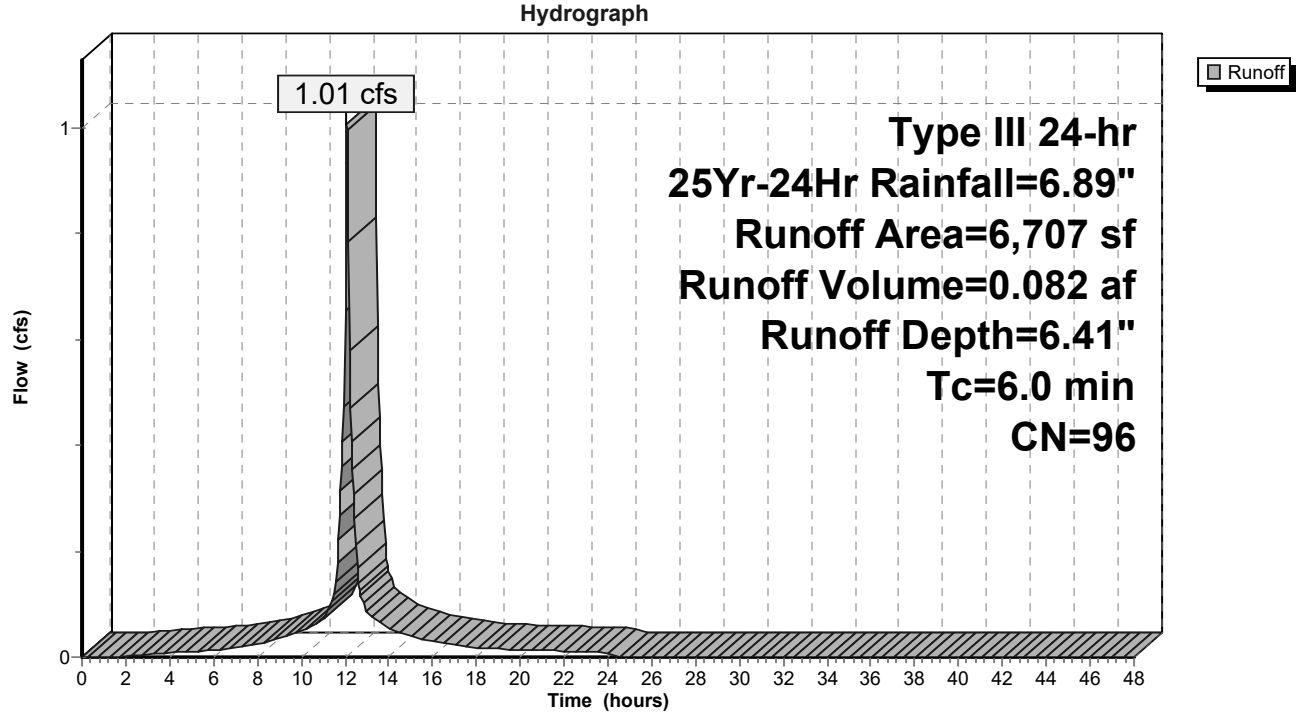
Runoff = 1.01 cfs @ 12.09 hrs, Volume= 0.082 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
278	98	Paved parking, HSG A
23	39	>75% Grass cover, Good, HSG A
606	74	>75% Grass cover, Good, HSG C
4,940	98	Paved parking, HSG C
860	98	Roofs, HSG C
6,707	96	Weighted Average
629		9.38% Pervious Area
6,078		90.62% Impervious Area

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

Subcatchment 24S: Sub #24



Summary for Subcatchment 25S: Sub #25

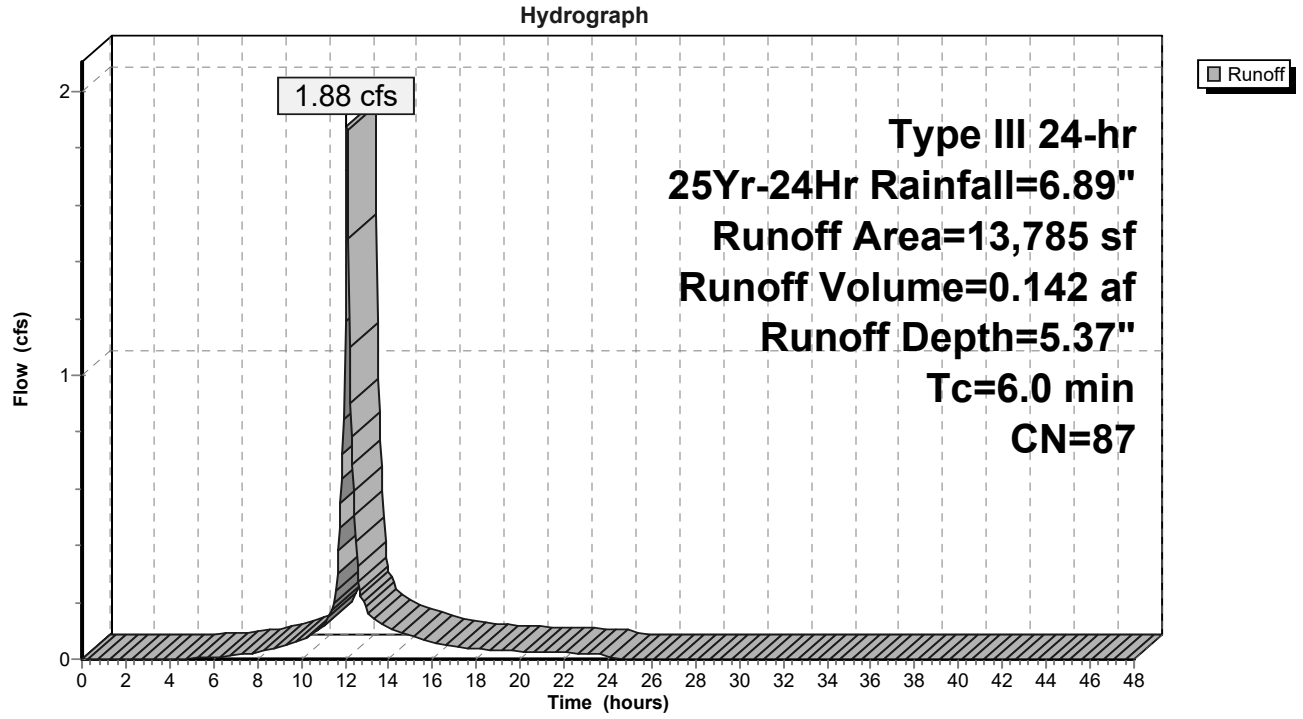
Runoff = 1.88 cfs @ 12.09 hrs, Volume= 0.142 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
690	39	>75% Grass cover, Good, HSG A
2,611	98	Paved parking, HSG A
114	96	Gravel surface, HSG A
4,811	74	>75% Grass cover, Good, HSG C
3,558	98	Paved parking, HSG C
1,752	98	Roofs, HSG C
249	96	Gravel surface, HSG C
13,785	87	Weighted Average
5,864		42.54% Pervious Area
7,921		57.46% Impervious Area

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

Subcatchment 25S: Sub #25



Summary for Subcatchment 31S: Sub #31

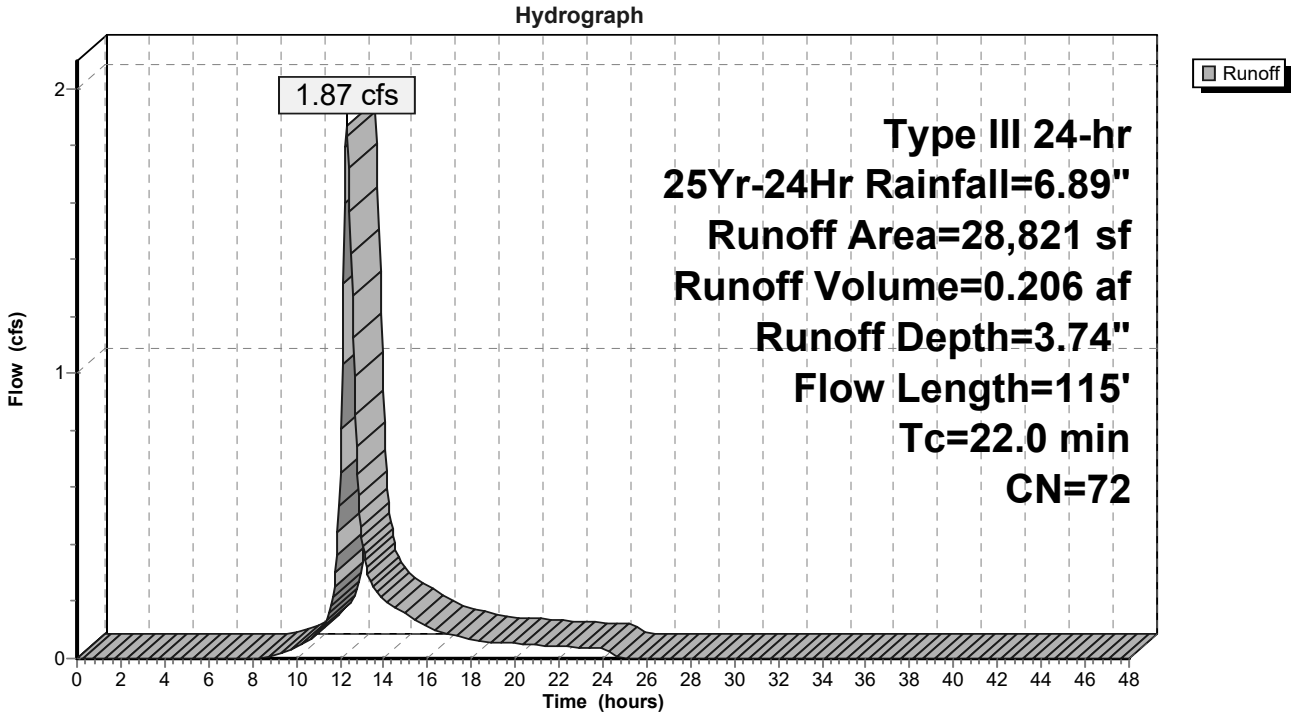
Runoff = 1.87 cfs @ 12.31 hrs, Volume= 0.206 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
2,746	39	>75% Grass cover, Good, HSG A
694	98	Roofs, HSG A
19,998	74	>75% Grass cover, Good, HSG C
1,102	98	Roofs, HSG C
4,281	70	Woods, Good, HSG C
28,821	72	Weighted Average
27,025		93.77% Pervious Area
1,796		6.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	21	0.1048	0.12		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.62"
13.8	46	0.0109	0.06		**Sheet Flow, Segment #2** Woods: Light underbrush n= 0.400 P2= 3.62"
4.8	33	0.0109	0.11		**Sheet Flow, Segment #3** Grass: Short n= 0.150 P2= 3.62"
0.4	15	0.0100	0.70		**Shallow Concentrated Flow, Segment #4** Short Grass Pasture Kv= 7.0 fps
22.0	115	Total			

Subcatchment 31S: Sub #31



Summary for Subcatchment 32S: Sub #32

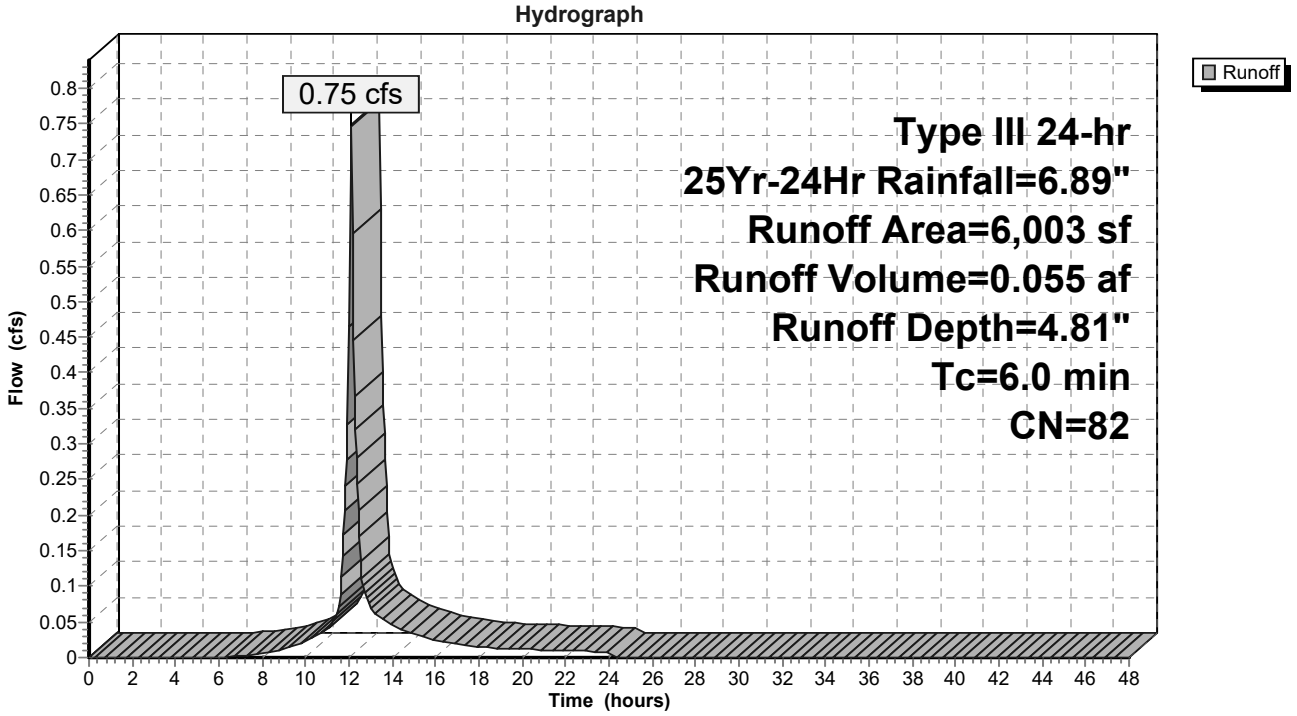
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 0.055 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
4,051	74	>75% Grass cover, Good, HSG C
1,952	98	Roofs, HSG C
6,003	82	Weighted Average
4,051		67.48% Pervious Area
1,952		32.52% Impervious Area

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

Subcatchment 32S: Sub #32



Summary for Subcatchment 41S: Sub #41

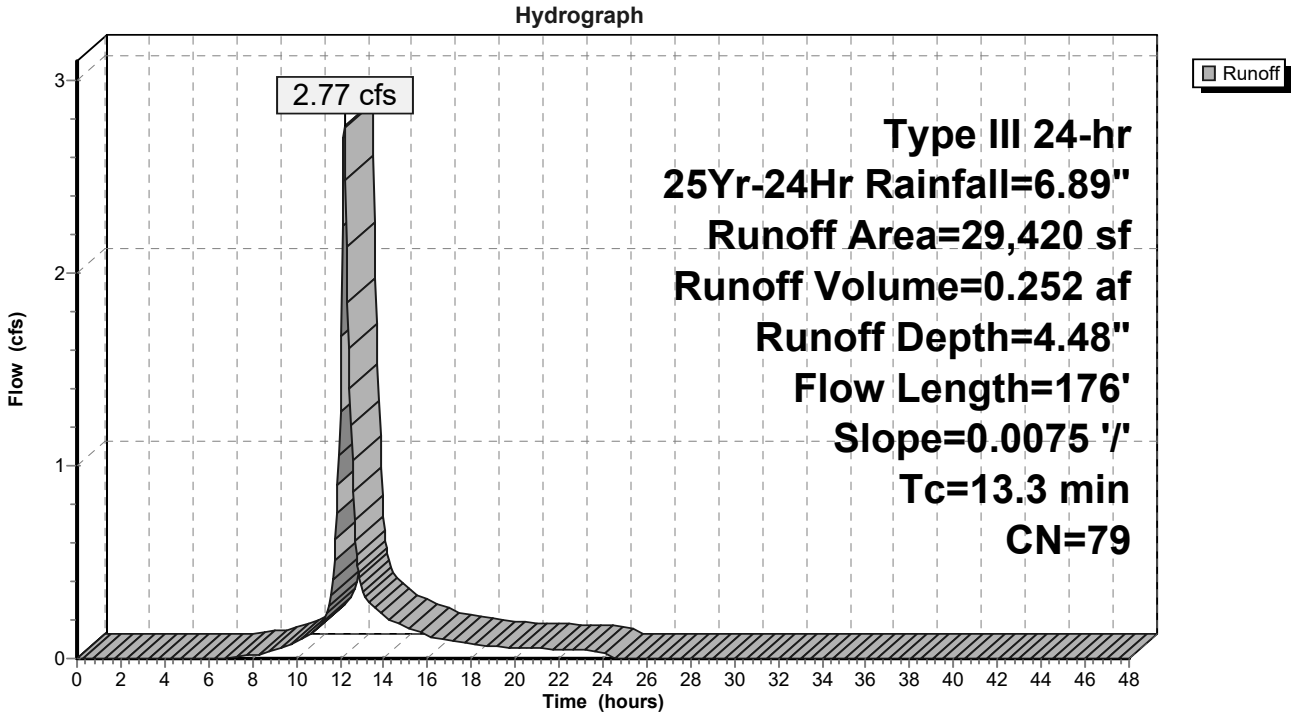
Runoff = 2.77 cfs @ 12.18 hrs, Volume= 0.252 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,880	39	>75% Grass cover, Good, HSG A
1,501	98	Paved parking, HSG A
1,380	98	Roofs, HSG A
19,200	74	>75% Grass cover, Good, HSG C
2,111	98	Paved parking, HSG C
3,348	98	Roofs, HSG C
29,420	79	Weighted Average
21,080		71.65% Pervious Area
8,340		28.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	38	0.0075	0.10		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.62"
0.6	26	0.0075	0.75		**Sheet Flow, Segment #2** Smooth surfaces n= 0.011 P2= 3.62"
4.6	26	0.0075	0.09		**Sheet Flow, Segment #3** Grass: Short n= 0.150 P2= 3.62"
0.2	26	0.0075	1.76		**Shallow Concentrated Flow, Segment #4** Paved Kv= 20.3 fps
1.6	60	0.0075	0.61		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
13.3	176	Total			

Subcatchment 41S: Sub #41



Summary for Subcatchment 42S: Sub #42

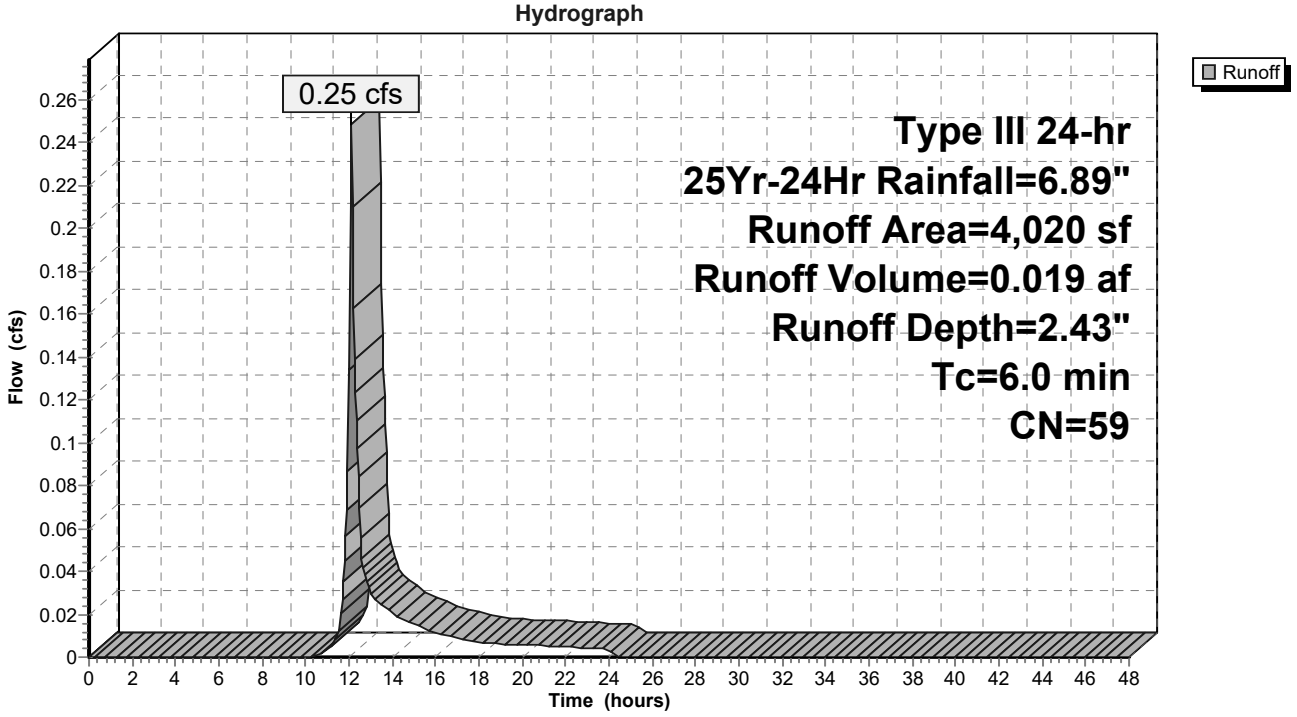
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,749	39	>75% Grass cover, Good, HSG A
124	30	Woods, Good, HSG A
1,148	74	>75% Grass cover, Good, HSG C
600	70	Woods, Good, HSG C
399	98	Roofs, HSG C
4,020	59	Weighted Average
3,621		90.07% Pervious Area
399		9.93% Impervious Area

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

Subcatchment 42S: Sub #42



Summary for Subcatchment 43S: Sub #43

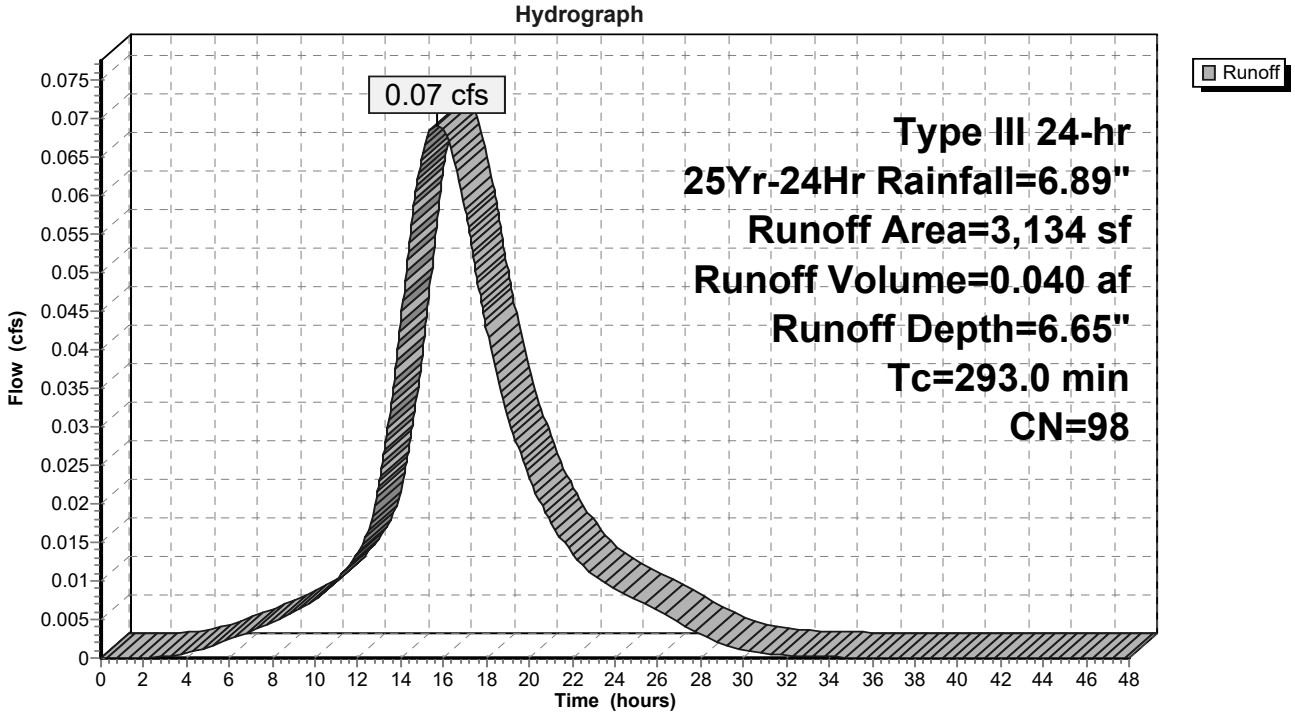
Runoff = 0.07 cfs @ 15.66 hrs, Volume= 0.040 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,295	98	Paved parking, HSG A
1,839	98	Paved parking, HSG C
3,134	98	Weighted Average
3,134		100.00% Impervious Area

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

Subcatchment 43S: Sub #43



Summary for Subcatchment 44S: Sub #44

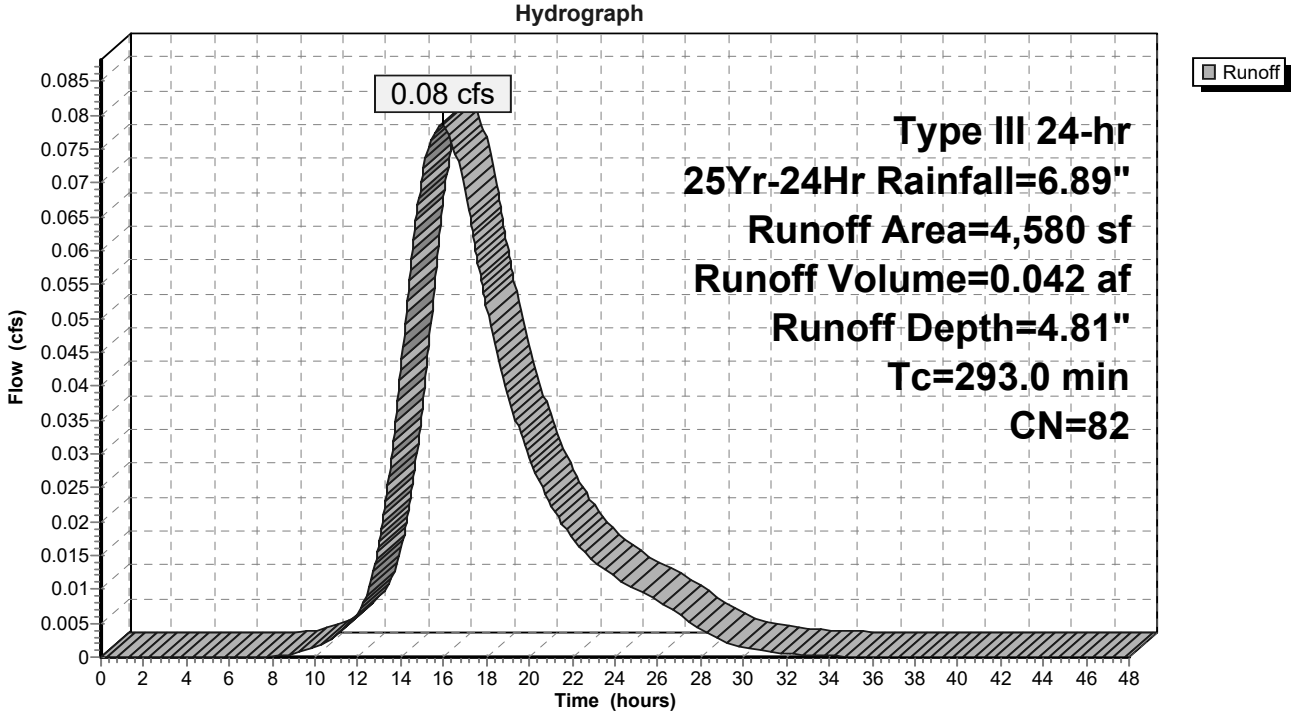
Runoff = 0.08 cfs @ 15.94 hrs, Volume= 0.042 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
11	39	>75% Grass cover, Good, HSG A
118	98	Paved parking, HSG A
3,036	74	>75% Grass cover, Good, HSG C
1,098	98	Paved parking, HSG C
317	98	Roofs, HSG C
4,580	82	Weighted Average
3,047		66.53% Pervious Area
1,533		33.47% Impervious Area

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

Subcatchment 44S: Sub #44



Summary for Subcatchment 51aS: Sub #51a

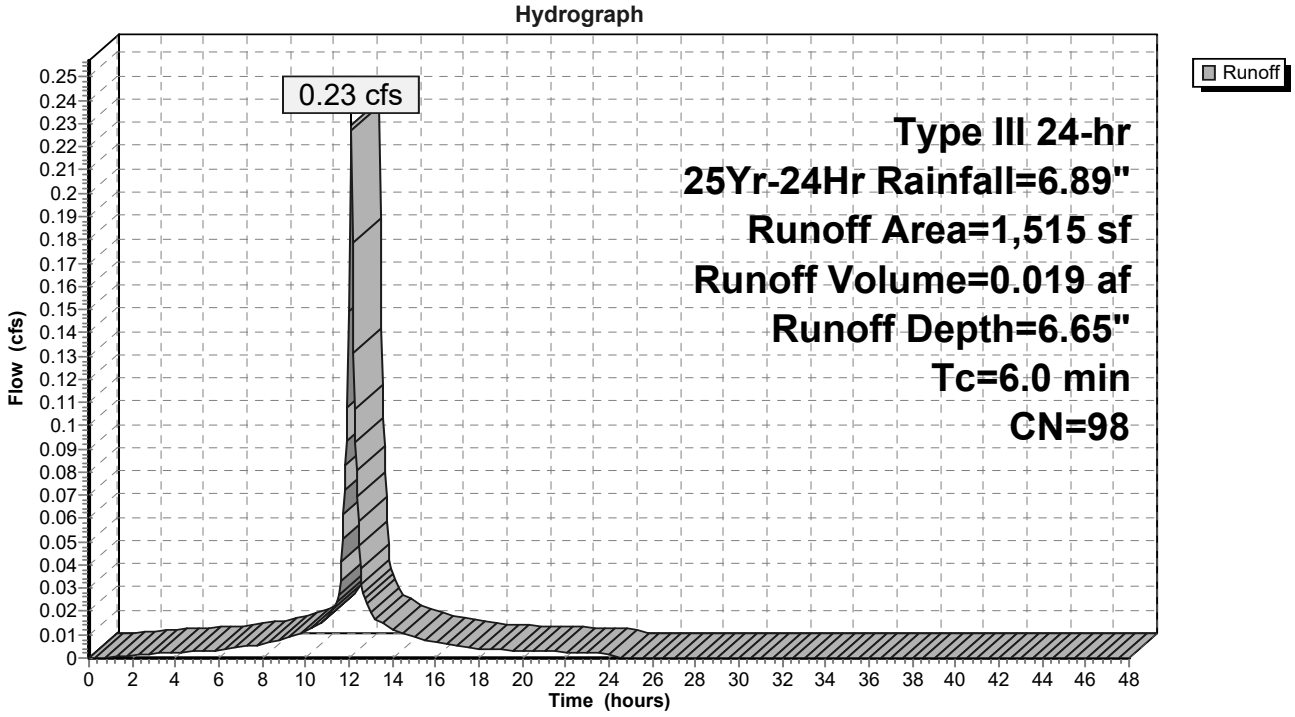
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
341	98	Roofs, HSG A
1,174	98	Roofs, HSG C
1,515	98	Weighted Average
1,515		100.00% Impervious Area

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

Subcatchment 51aS: Sub #51a



Summary for Subcatchment 51bS: Sub #51b

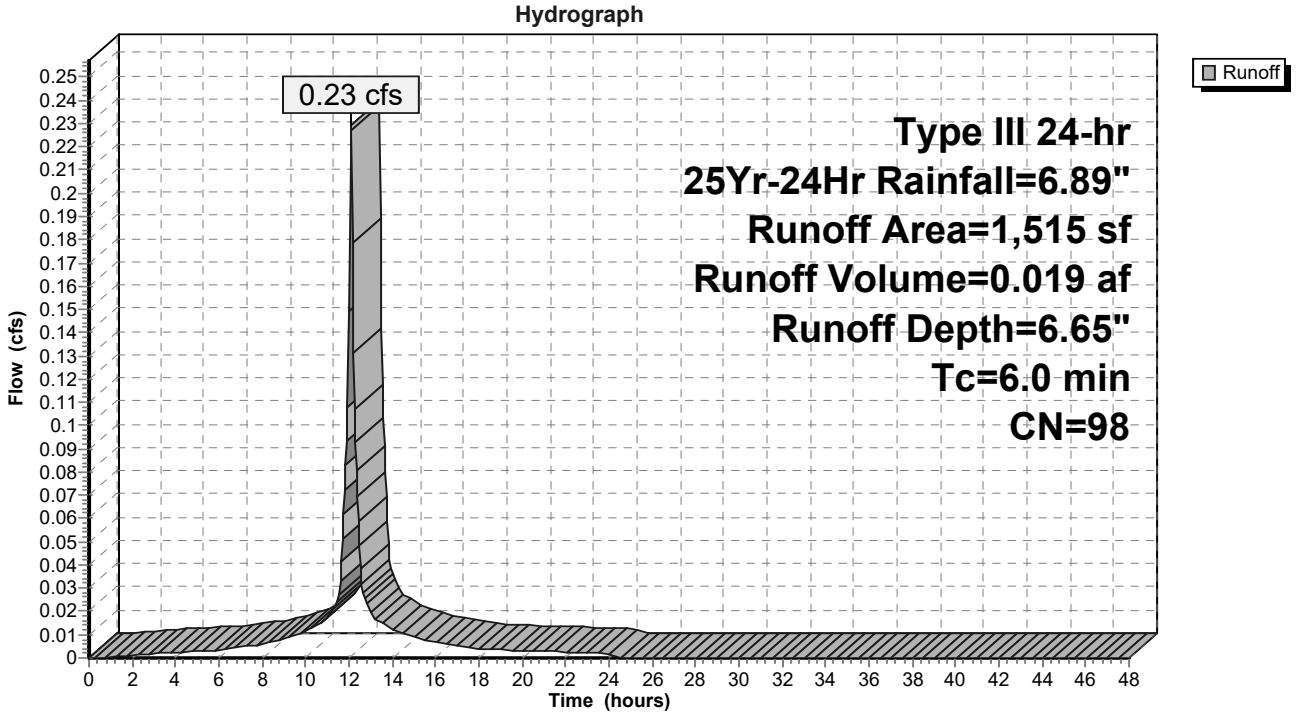
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,515	98	Roofs, HSG C
1,515		100.00% Impervious Area

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

Subcatchment 51bS: Sub #51b



Summary for Subcatchment 51S: Sub #51

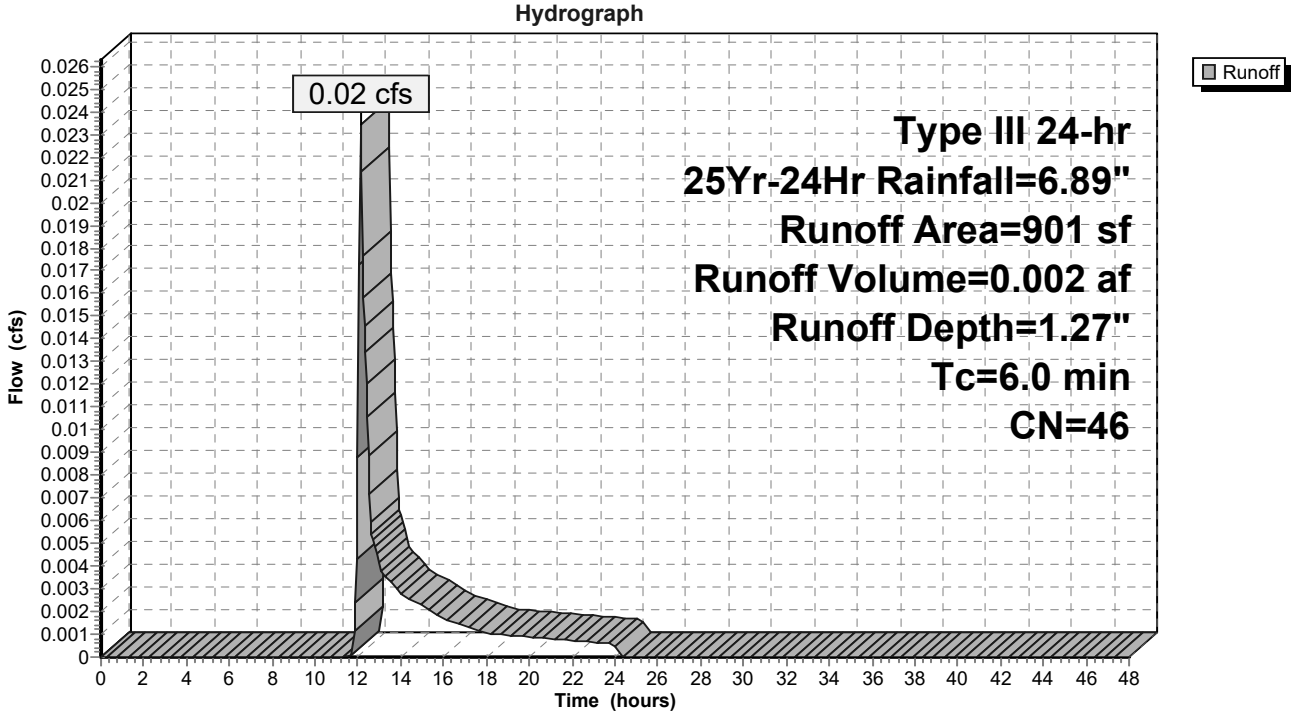
Runoff = 0.02 cfs @ 12.11 hrs, Volume= 0.002 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
790	39	>75% Grass cover, Good, HSG A
15	98	Roofs, HSG C
96	98	Roofs, HSG A
901	46	Weighted Average
790		87.68% Pervious Area
111		12.32% Impervious Area

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

Subcatchment 51S: Sub #51



Summary for Subcatchment 52aS: Sub #52a

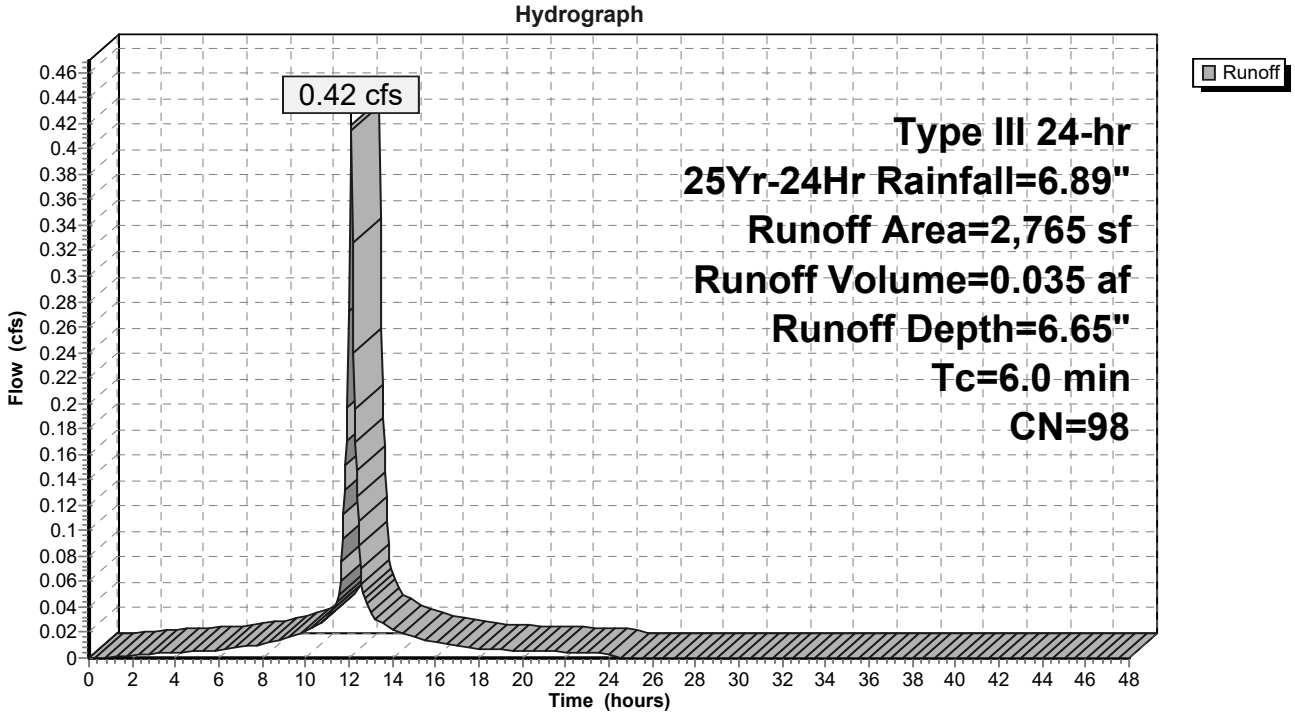
Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
51	98	Roofs, HSG A
2,714	98	Roofs, HSG C
2,765	98	Weighted Average
2,765		100.00% Impervious Area

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

Subcatchment 52aS: Sub #52a



Summary for Subcatchment 52S: Sub #52

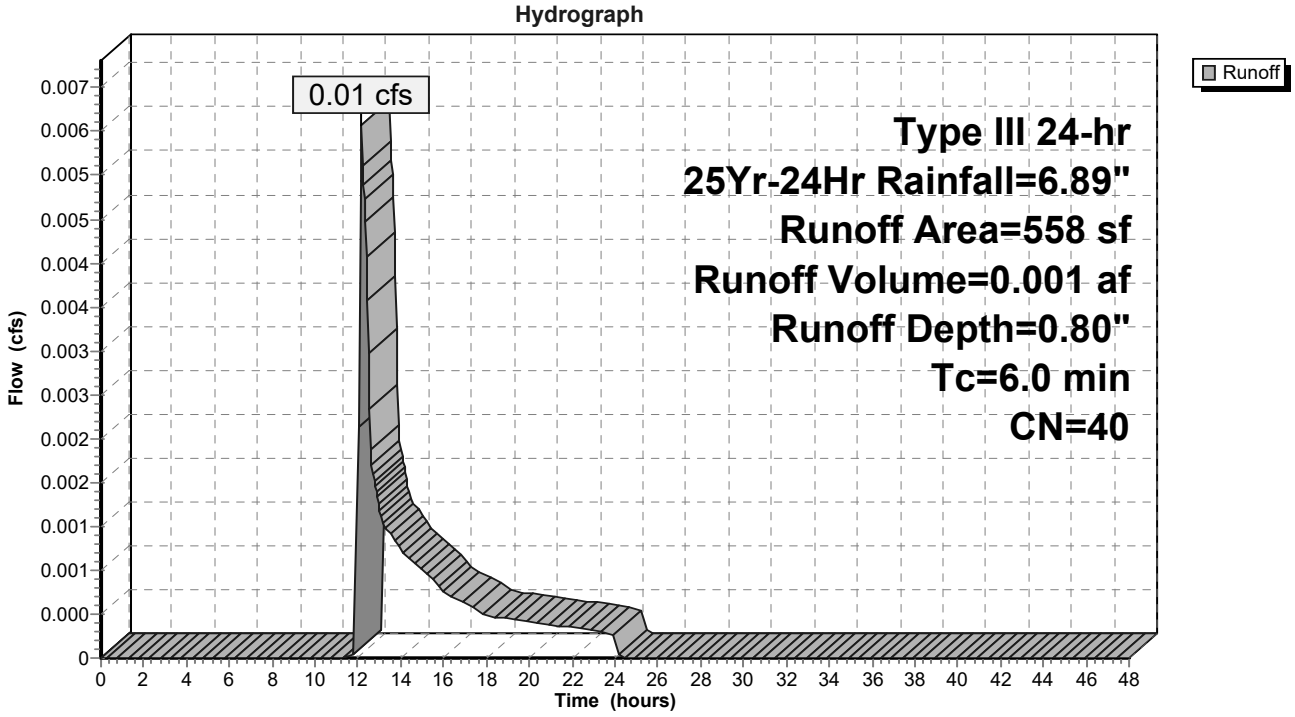
Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
540	39	>75% Grass cover, Good, HSG A
18	74	>75% Grass cover, Good, HSG C
558	40	Weighted Average
558		100.00% Pervious Area

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

Subcatchment 52S: Sub #52



Summary for Subcatchment 53aS: Sub #53a

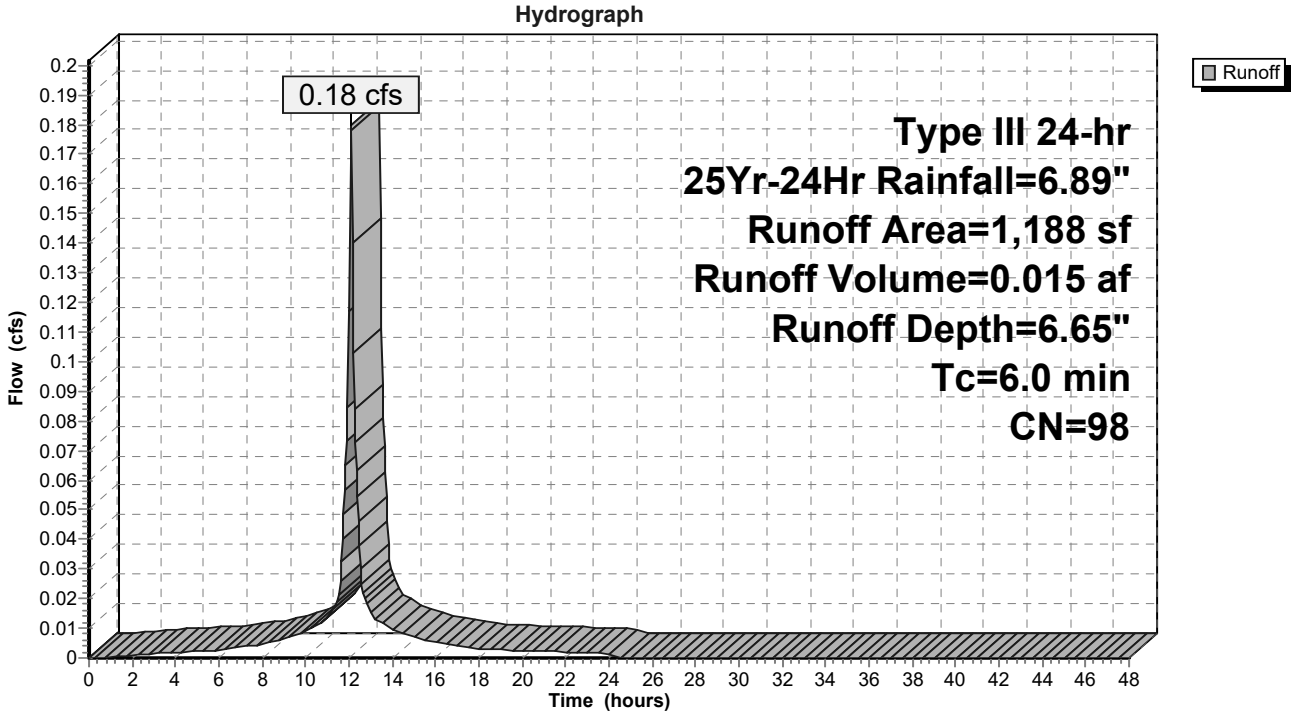
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,188	98	Roofs, HSG C
1,188		100.00% Impervious Area

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

Subcatchment 53aS: Sub #53a



Summary for Subcatchment 53bS: Sub #53b

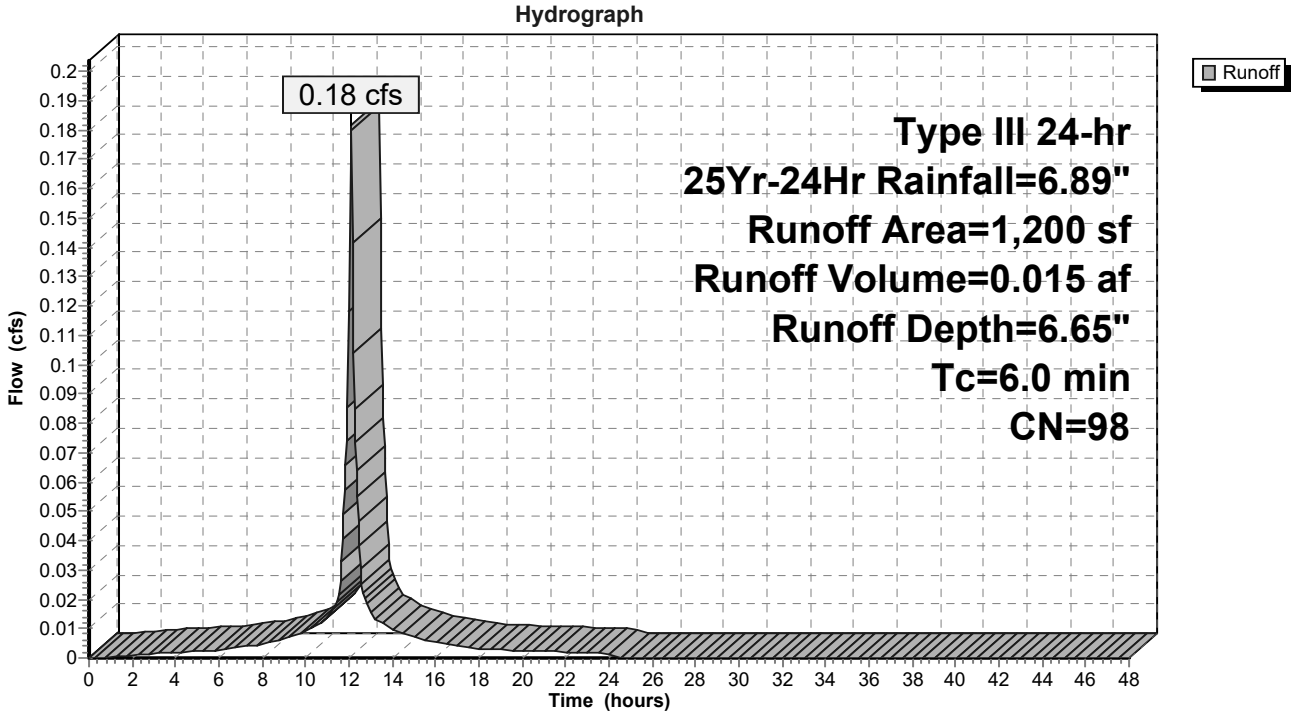
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
1,200	98	Roofs, HSG A
1,200		100.00% Impervious Area

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

Subcatchment 53bS: Sub #53b



Summary for Subcatchment 53S: Sub #53

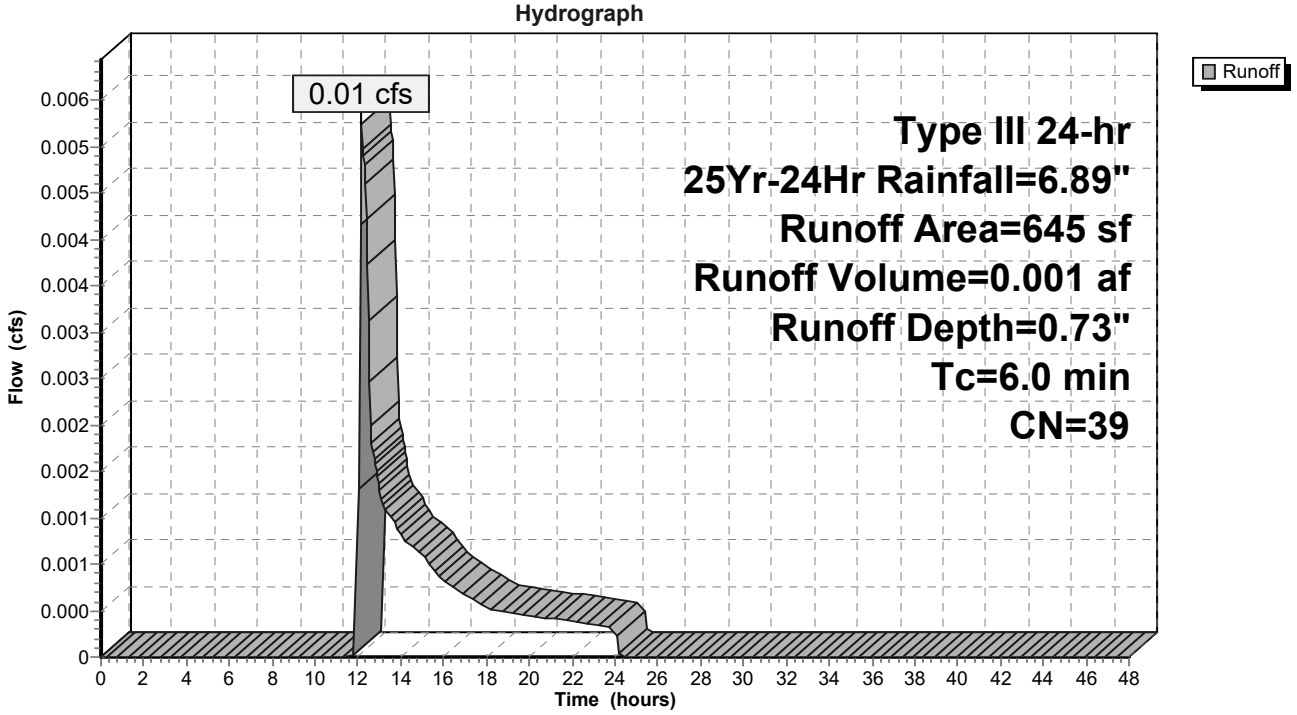
Runoff = 0.01 cfs @ 12.17 hrs, Volume= 0.001 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25Yr-24Hr Rainfall=6.89"

Area (sf)	CN	Description
645	39	>75% Grass cover, Good, HSG A
645		100.00% Pervious Area

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

Subcatchment 53S: Sub #53



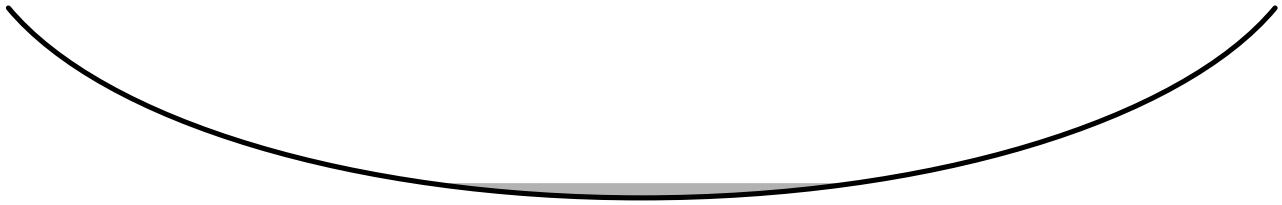
Summary for Reach 7aR: Reach #7

Inflow Area = 0.059 ac, 0.00% Impervious, Inflow Depth = 3.12" for 25Yr-24Hr event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af
Outflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.20 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 1.1 min

Peak Storage= 5 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 55.48 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 29.7' Slope= 0.0421 '/'
Inlet Invert= 128.25', Outlet Invert= 127.00'



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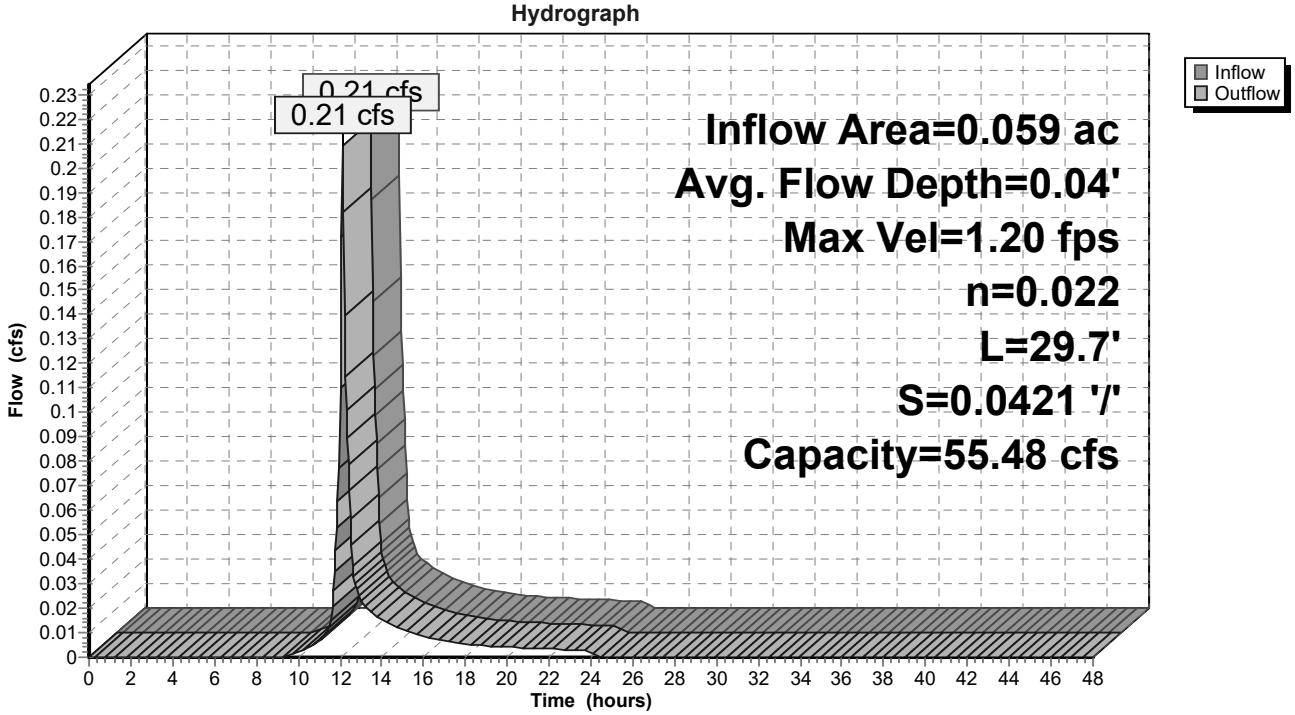
Reach 7aR: Reach #7



Summary for Reach 7bR: Reach #7

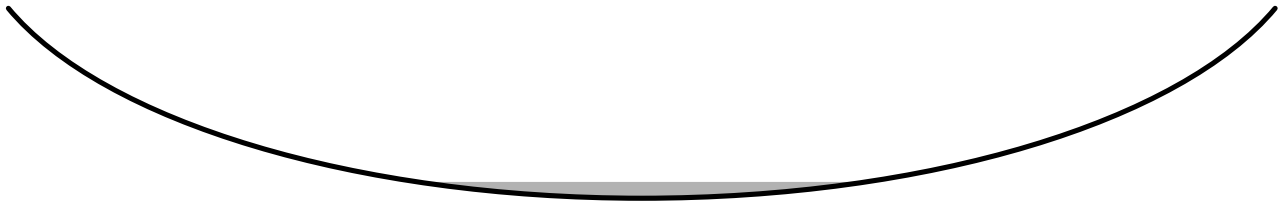
[62] Hint: Exceeded Reach 7aR OUTLET depth by 0.01' @ 12.15 hrs

Inflow Area = 0.059 ac, 0.00% Impervious, Inflow Depth = 3.12" for 25Yr-24Hr event
Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.015 af
Outflow = 0.20 cfs @ 12.12 hrs, Volume= 0.015 af, Atten= 2%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.99 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 3.5 min

Peak Storage= 16 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.50' Flow Area= 8.3 sf, Capacity= 43.30 cfs

25.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 78.0' Slope= 0.0256 '/'
Inlet Invert= 127.00', Outlet Invert= 125.00'



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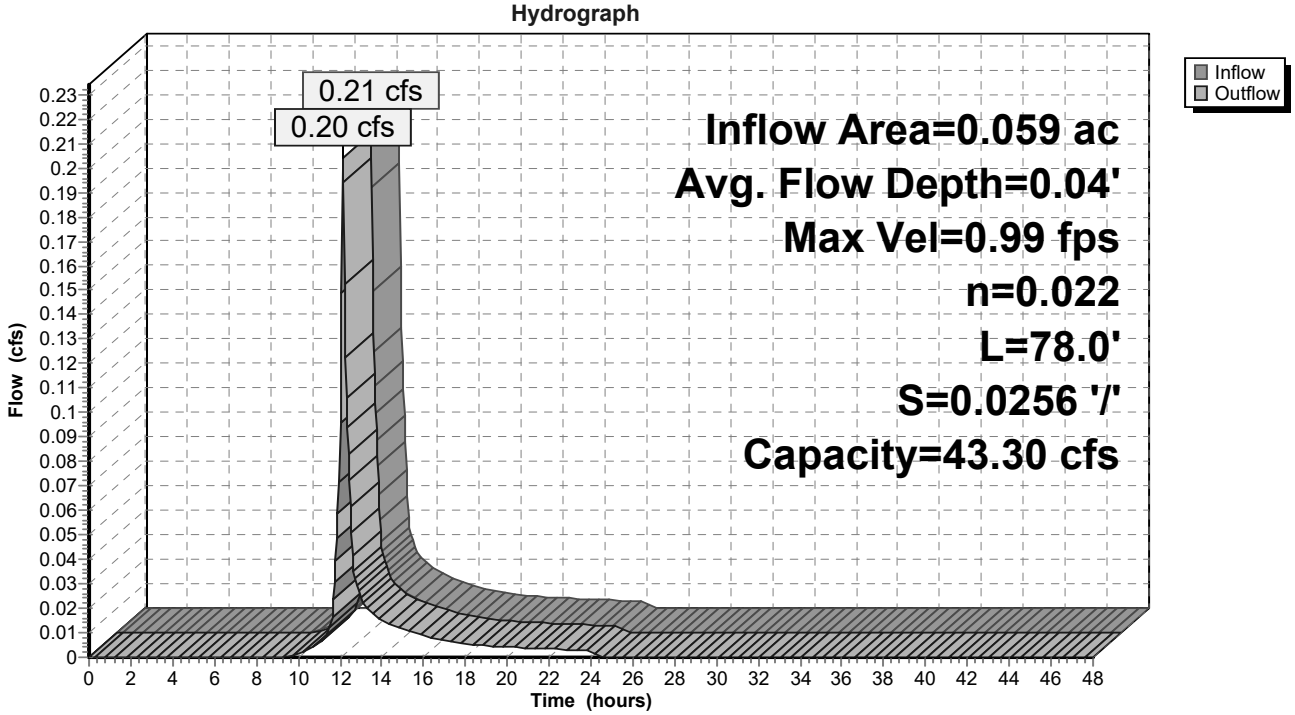
Reach 7bR: Reach #7



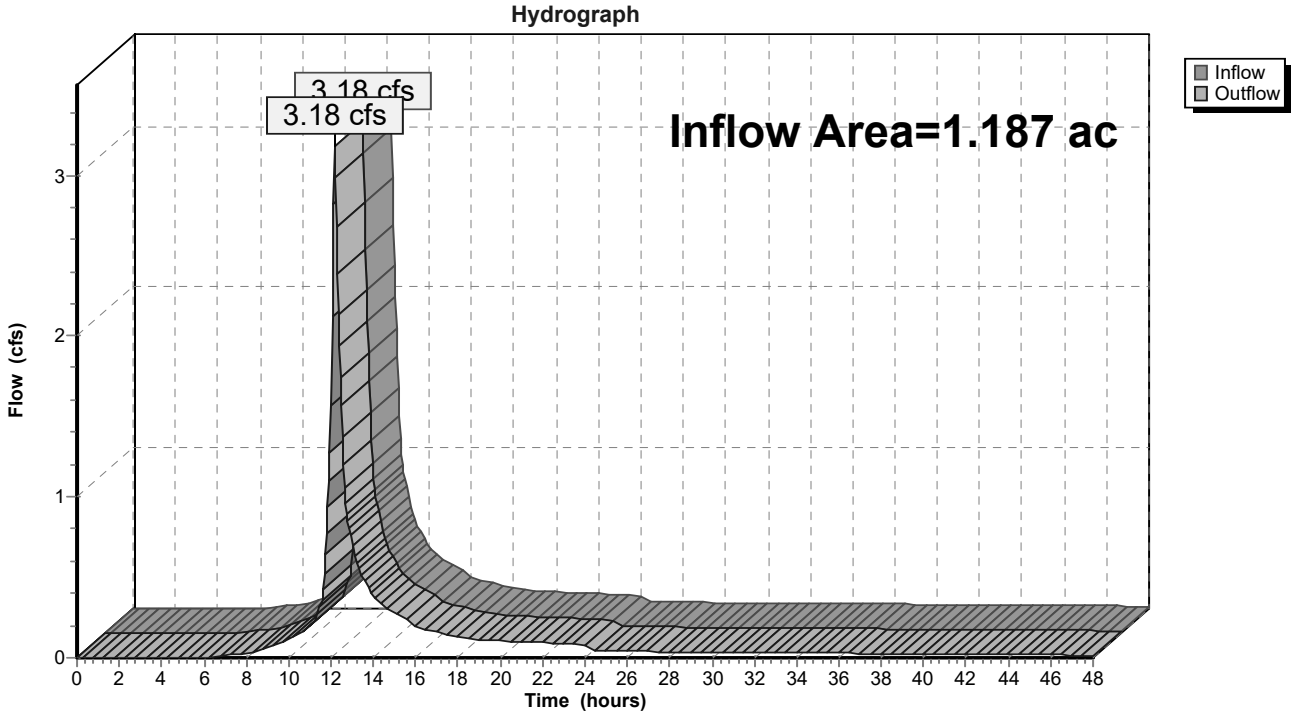
Summary for Reach 100R: Final Reach #100

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

Inflow Area = 1.187 ac, 45.58% Impervious, Inflow Depth > 4.29" for 25Yr-24Hr event
Inflow = 3.18 cfs @ 12.16 hrs, Volume= 0.425 af
Outflow = 3.18 cfs @ 12.16 hrs, Volume= 0.425 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 100R: Final Reach #100



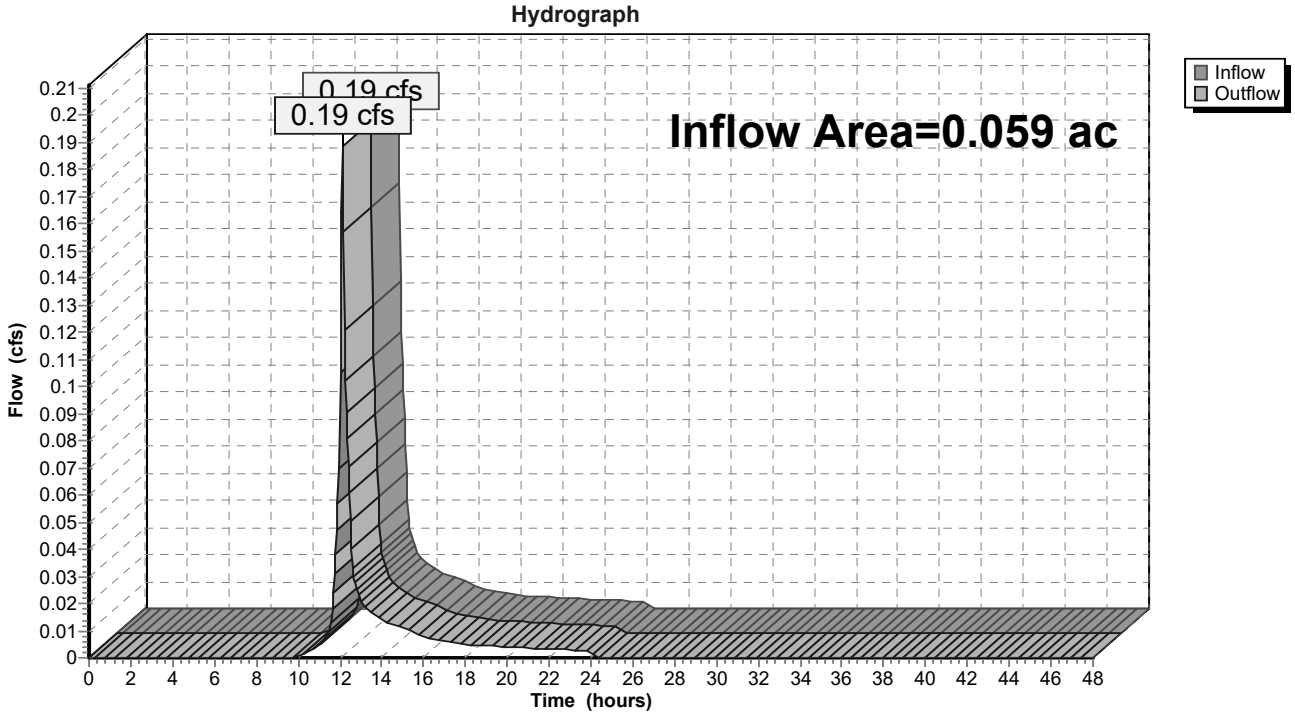
Summary for Reach 200R: Final Reach #200

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

Inflow Area = 0.059 ac, 0.00% Impervious, Inflow Depth = 2.82" for 25Yr-24Hr event
Inflow = 0.19 cfs @ 12.10 hrs, Volume= 0.014 af
Outflow = 0.19 cfs @ 12.10 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 200R: Final Reach #200



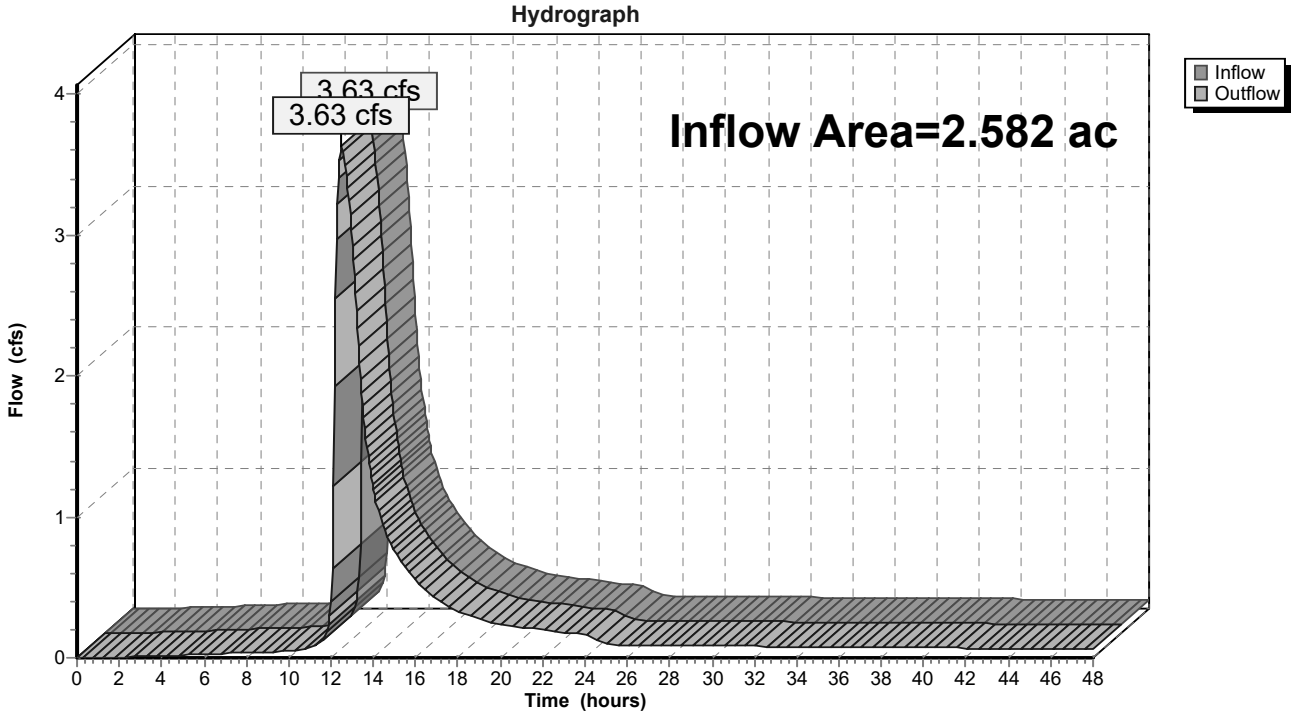
Summary for Reach 300R: Final Reach #300

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

Inflow Area = 2.582 ac, 34.03% Impervious, Inflow Depth > 4.19" for 25Yr-24Hr event
Inflow = 3.63 cfs @ 12.51 hrs, Volume= 0.901 af
Outflow = 3.63 cfs @ 12.51 hrs, Volume= 0.901 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 300R: Final Reach #300



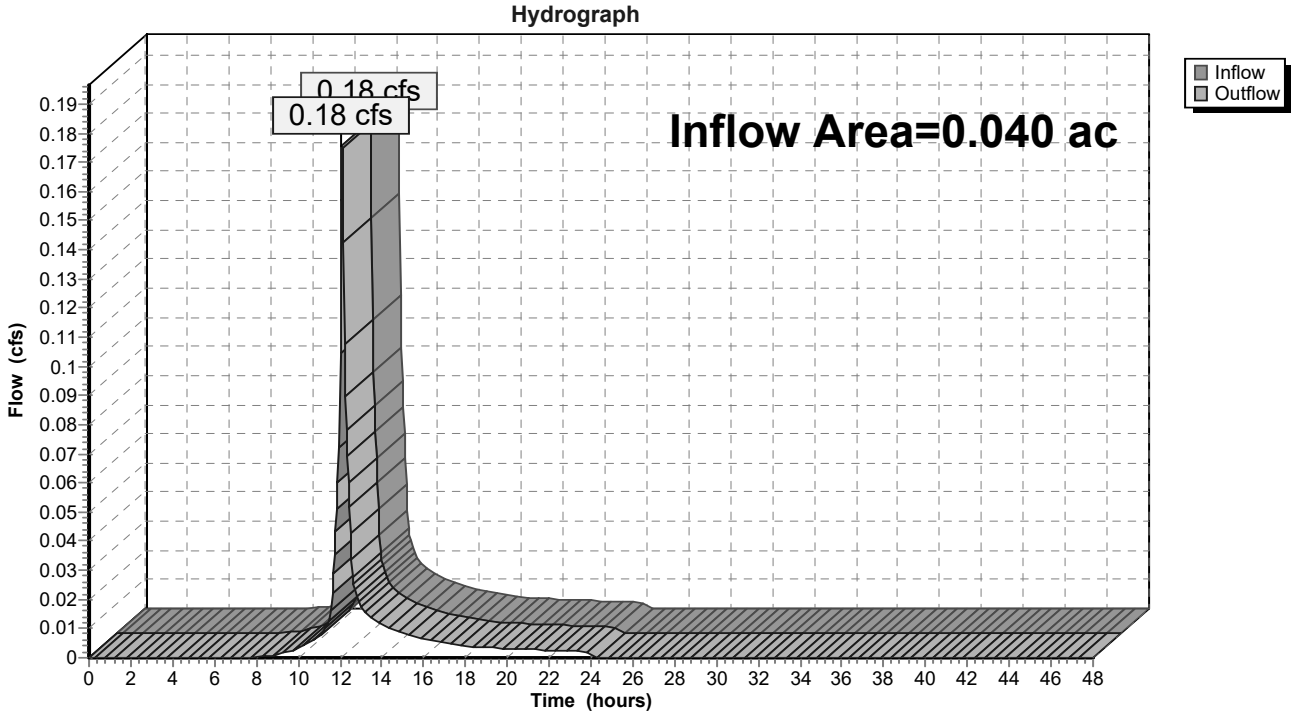
Summary for Reach 400R: Final Reach #400

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

Inflow Area = 0.040 ac, 0.00% Impervious, Inflow Depth = 3.84" for 25Yr-24Hr event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 400R: Final Reach #400



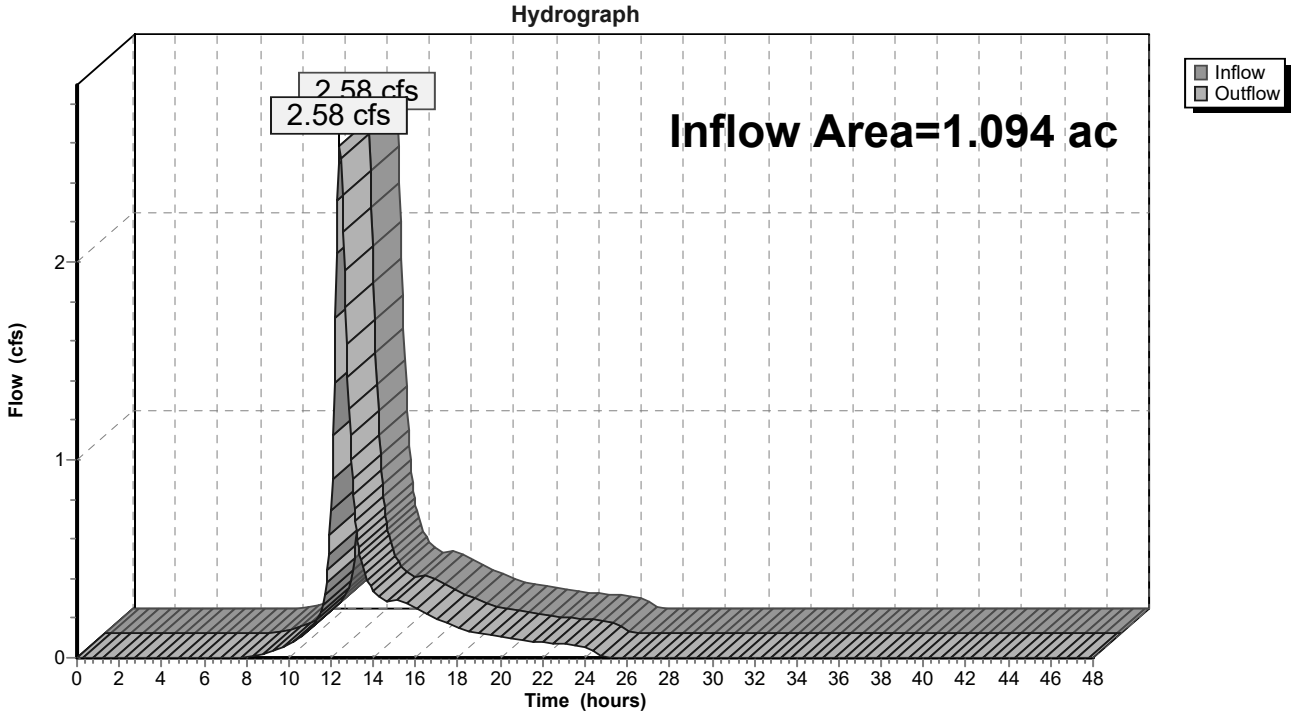
Summary for Reach 500R: Final Reach #500

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

Inflow Area = 1.094 ac, 9.16% Impervious, Inflow Depth = 3.85" for 25Yr-24Hr event
Inflow = 2.58 cfs @ 12.42 hrs, Volume= 0.351 af
Outflow = 2.58 cfs @ 12.42 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 500R: Final Reach #500



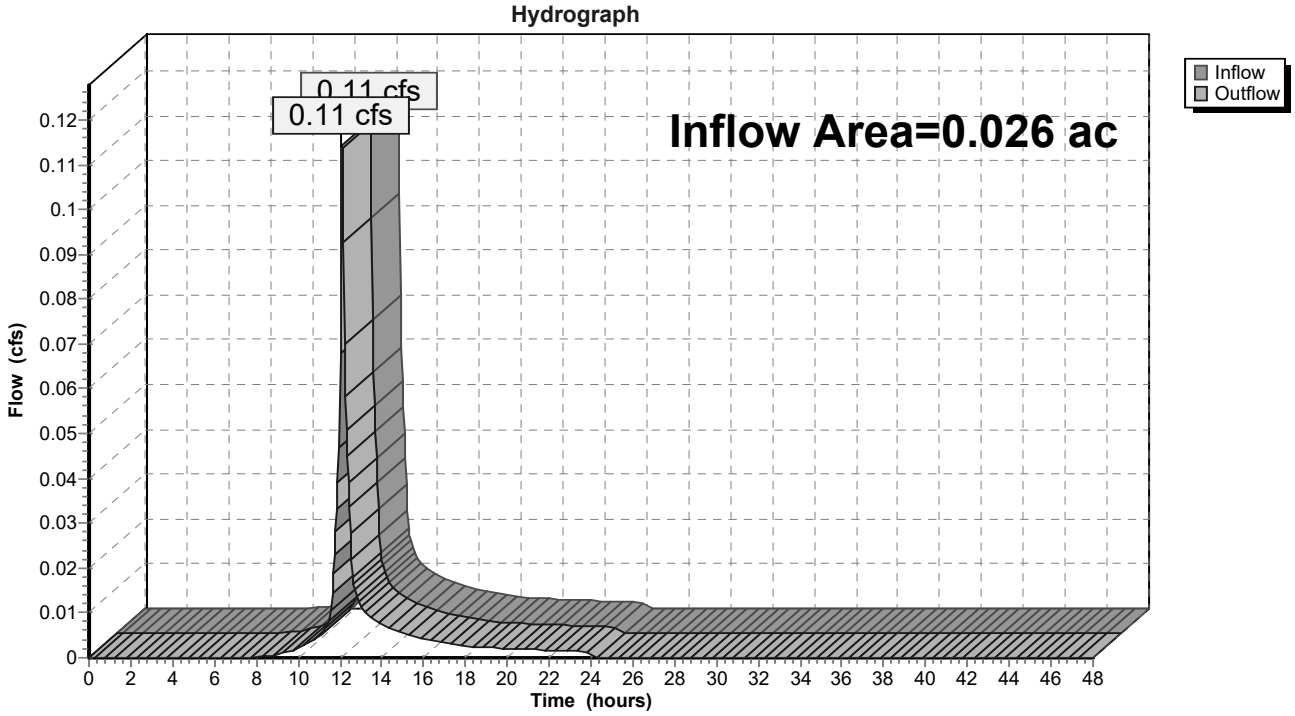
Summary for Reach 600R: Final Reach #600

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

Inflow Area = 0.026 ac, 0.00% Impervious, Inflow Depth = 3.84" for 25Yr-24Hr event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 600R: Final Reach #600



Summary for Pond 101P: Gravel Wetland #101

[80] Warning: Exceeded Pond C04P by 0.05' @ 26.30 hrs (1.70 cfs 1.128 af)

Inflow Area =	2.429 ac,	36.17% Impervious,	Inflow Depth =	4.60" for 25Yr-24Hr event
Inflow =	9.16 cfs @	12.11 hrs,	Volume=	0.930 af
Outflow =	3.51 cfs @	12.56 hrs,	Volume=	0.861 af, Atten= 62%, Lag= 26.8 min
Primary =	0.11 cfs @	12.56 hrs,	Volume=	0.272 af
Secondary =	3.40 cfs @	12.56 hrs,	Volume=	0.589 af
Tertiary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.31' @ 12.56 hrs Surf.Area= 11,996 sf Storage= 16,769 cf
Flood Elev= 125.50' Surf.Area= 14,206 sf Storage= 26,155 cf

Plug-Flow detention time= 326.4 min calculated for 0.860 af (92% of inflow)
Center-of-Mass det. time= 287.3 min (1,098.3 - 811.0)

Volume	Invert	Avail.Storage	Storage Description
#1	120.67'	50 cf	**4.00'D x 4.00'H Outlet Structure A**
#2	121.00'	1,583 cf	**Sediment Forebay (Irregular)**Listed below (Recalc)
#3	121.00'	7,303 cf	**Cell #1 (Irregular)**Listed below (Recalc)
#4	123.00'	17,219 cf	**Open Water Storage (Irregular)**Listed below (Recalc)
		26,155 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	582	96.6	0	0	582
122.00	788	109.2	682	682	813
123.00	1,019	121.2	901	1,583	1,061

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	3,117	240.3	0	0	3,117
122.00	3,646	241.3	3,378	3,378	3,361
123.00	4,210	270.9	3,925	7,303	4,594

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	5,491	369.5	0	0	5,491
124.00	6,211	428.9	5,847	5,847	9,286
125.00	8,063	728.1	7,117	12,964	36,840
125.50	8,964	747.0	4,255	17,219	39,089

Device	Routing	Invert	Outlet Devices
#1	Primary	120.67'	**6.0" Round 6" HDPE N-12** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.67' / 120.50' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	120.67'	**15.0" Round 15" HDPE N-12** L= 16.0' CPP, square edge headwall, Ke= 0.500

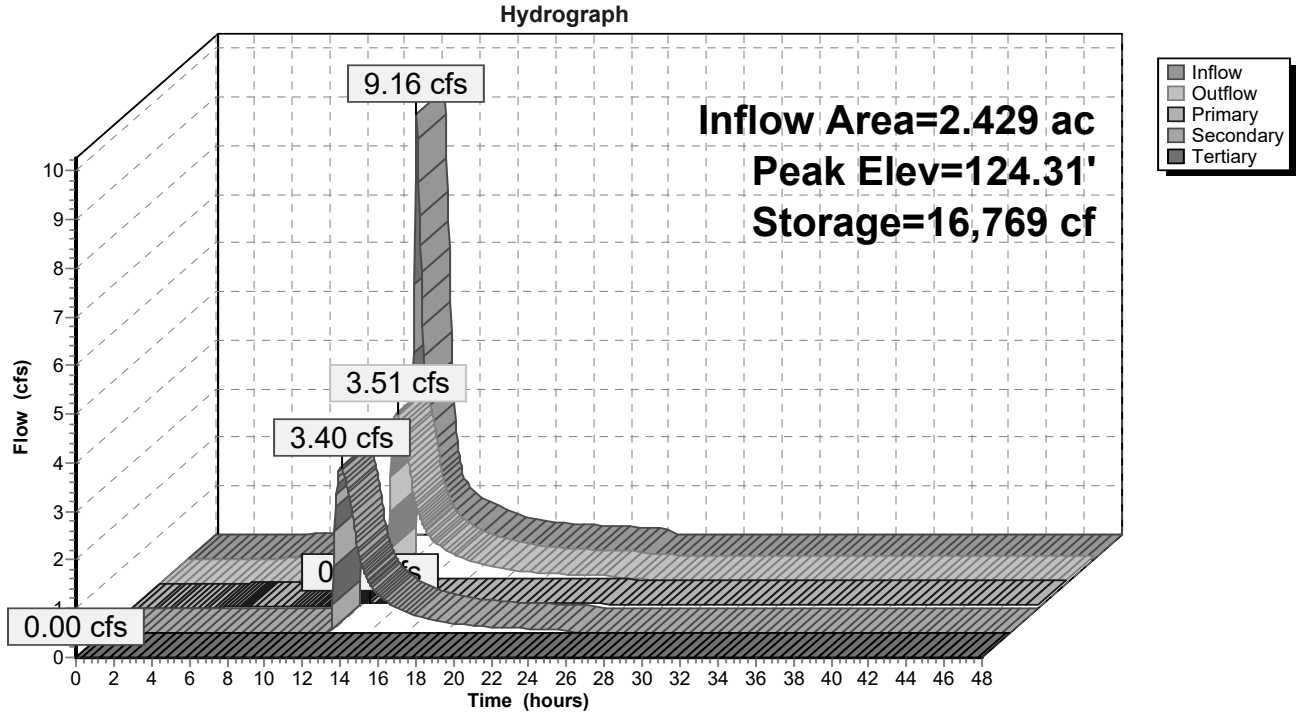
			Inlet / Outlet Invert= 120.67' / 120.50' S= 0.0106 '/' Cc= 0.900
			n= 0.012, Flow Area= 1.23 sf
#3	Device 1	120.67'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	123.00'	**12.0" Vert. 12" Orifice** C= 0.600
#5	Device 2	124.50'	**48.0" Horiz. 48" Outlet Structure** C= 0.600
			Limited to weir flow at low heads
#6	Tertiary	125.00'	**20.0' long x 8.0' breadth 20' Spillway**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.11 cfs @ 12.56 hrs HW=124.31' TW=0.00' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.11 cfs of 1.74 cfs potential flow)
└─**3=1.5" Orifice** (Orifice Controls 0.11 cfs @ 9.10 fps)

Secondary OutFlow Max=3.40 cfs @ 12.56 hrs HW=124.31' TW=0.00' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 3.40 cfs of 10.25 cfs potential flow)
└─**4=12" Orifice** (Orifice Controls 3.40 cfs @ 4.32 fps)
└─**5=48" Outlet Structure** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.67' TW=0.00' (Dynamic Tailwater)
└─**6=20' Spillway** (Controls 0.00 cfs)

Pond 101P: Gravel Wetland #101



Summary for Pond 102P: Rain Garden W/ Stormtech Storage #102

Inflow Area = 0.409 ac, 46.73% Impervious, Inflow Depth = 4.71" for 25Yr-24Hr event
Inflow = 2.12 cfs @ 12.09 hrs, Volume= 0.160 af
Outflow = 0.41 cfs @ 12.54 hrs, Volume= 0.156 af, Atten= 80%, Lag= 26.8 min
Primary = 0.41 cfs @ 12.54 hrs, Volume= 0.156 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 117.91' @ 12.54 hrs Surf.Area= 3,134 sf Storage= 3,495 cf
Flood Elev= 121.00' Surf.Area= 4,643 sf Storage= 4,437 cf

Plug-Flow detention time= 543.0 min calculated for 0.156 af (97% of inflow)
Center-of-Mass det. time= 526.7 min (1,324.4 - 797.7)

Volume	Invert	Avail.Storage	Storage Description
#1	114.00'	1,794 cf	**Lower Stone Storage (Irregular)** Listed below (Recalc) 4,485 cf Overall x 40.0% Voids
#2	117.00'	655 cf	**Stone Storage Under Biomedia (Irregular)** Listed below (Recalc) 1,638 cf Overall x 40.0% Voids
#3	118.00'	270 cf	**Bio Media (Irregular)** Listed below (Recalc) 1,350 cf Overall x 20.0% Voids
#4	120.00'	615 cf	**Open Water Storage (Irregular)** Listed below (Recalc)
#5	114.50'	1,103 cf	**ADS_StormTech SC-740 +Cap** x 24 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		4,437 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.00	1,495	229.4	0	0	1,495
117.00	1,495	229.4	4,485	4,485	2,183

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.00	1,638	233.4	0	0	1,638
118.00	1,638	233.4	1,638	1,638	1,871

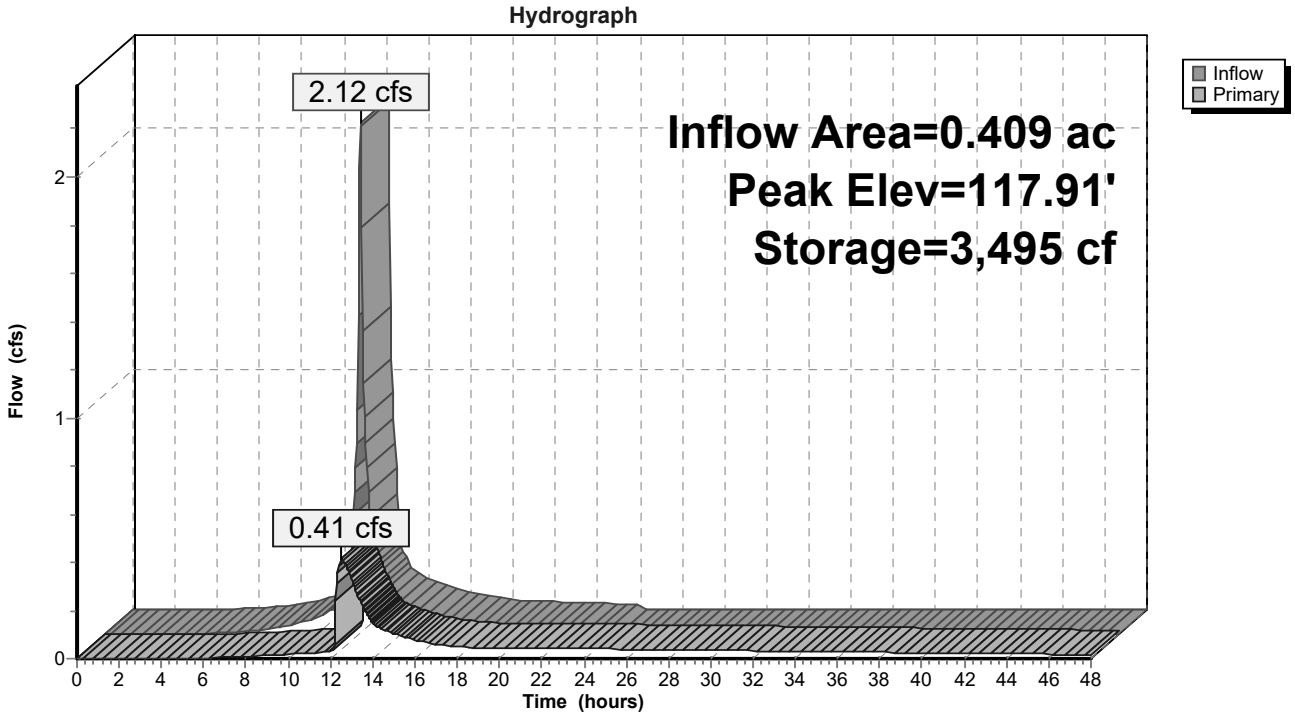
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
118.00	675	149.2	0	0	675
120.00	675	149.2	1,350	1,350	973

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	405	138.0	0	0	405
120.50	617	198.5	254	254	2,027
121.00	834	217.0	361	615	2,648

Device	Routing	Invert	Outlet Devices
#1	Primary	114.00'	**12.0" Round 12" HDPE N-12** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 114.00' / 113.85' S= 0.0150 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	114.00'	**1.0" Vert. 1" Orifice** C= 0.600
#3	Device 1	117.00'	**4.0" Vert. 4" Orifice** C= 0.600
#4	Device 1	120.80'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 12.54 hrs HW=117.91' TW=114.11' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 0.41 cfs of 6.98 cfs potential flow)
  ├─**2=1" Orifice** (Orifice Controls 0.05 cfs @ 9.39 fps)
  ├─**3=4" Orifice** (Orifice Controls 0.36 cfs @ 4.15 fps)
  └─**4=48" Outlet Structure** (Controls 0.00 cfs)

Pond 102P: Rain Garden W/ Stormtech Storage #102



Summary for Pond 103P: Porous Pavement Sidewalk W/ Infiltration #103

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=30)

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 6.65" for 25Yr-24Hr event
Inflow = 0.07 cfs @ 15.66 hrs, Volume= 0.040 af
Outflow = 0.02 cfs @ 14.00 hrs, Volume= 0.040 af, Atten= 69%, Lag= 0.0 min
Discarded = 0.02 cfs @ 14.00 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 118.35' @ 20.24 hrs Surf.Area= 3,134 sf Storage= 657 cf
Flood Elev= 120.67' Surf.Area= 3,134 sf Storage= 2,620 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 260.7 min (1,270.3 - 1,009.6)

Volume	Invert	Avail.Storage	Storage Description
#1	117.83'	1,254 cf	**Stone Reservoir (Irregular)**Listed below (Recalc) 3,134 cf Overall x 40.0% Voids
#2	118.83'	940 cf	**Filter Media (Irregular)**Listed below (Recalc) -Impervious 4,701 cf Overall x 20.0% Voids
#3	120.33'	426 cf	**Choker Course (Irregular)**Listed below (Recalc) -Impervious 1,066 cf Overall x 40.0% Voids
		2,620 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.83	3,134	1,268.0	0	0	3,134
118.83	3,134	1,268.0	3,134	3,134	4,402

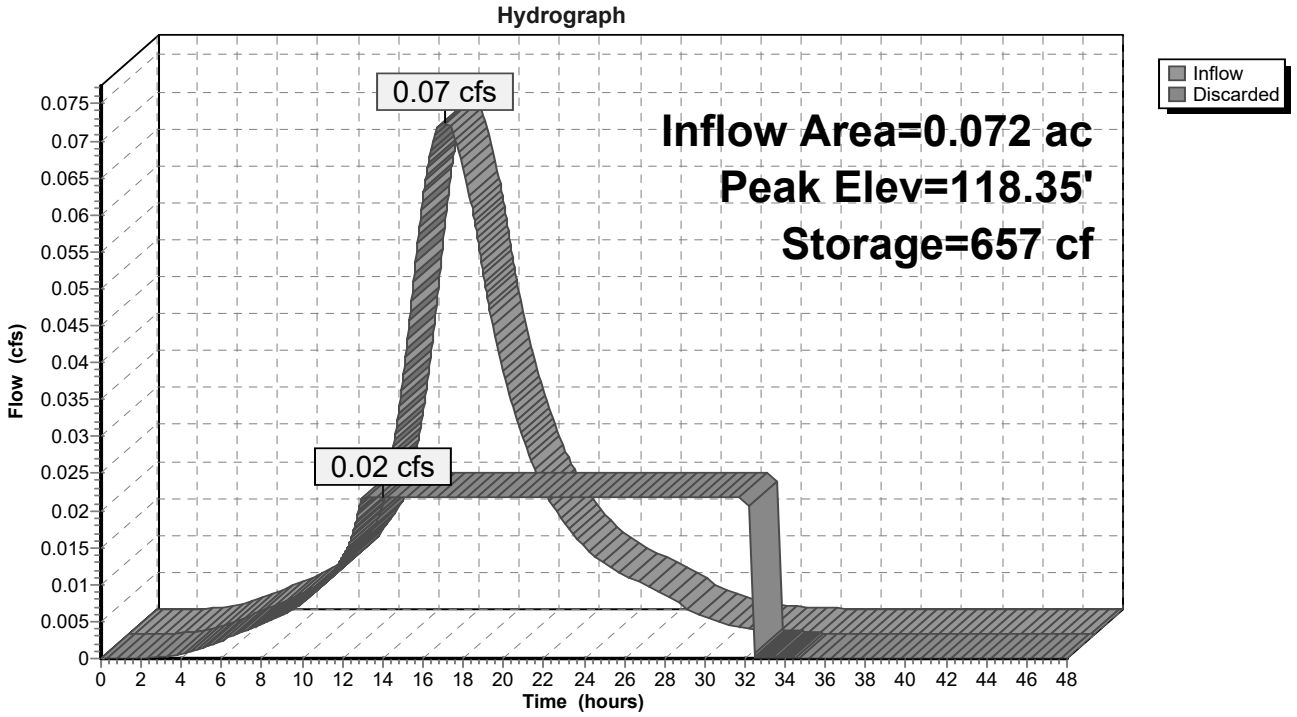
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
118.83	3,134	1,268.0	0	0	3,134
120.33	3,134	1,268.0	4,701	4,701	5,036

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.33	3,134	1,268.0	0	0	3,134
120.67	3,134	1,268.0	1,066	1,066	3,565

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.83'	**0.300 in/hr 0.3in/Hr Infiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 14.00 hrs HW=117.86' (Free Discharge)
↑**1=0.3in/Hr Infiltration** (Exfiltration Controls 0.02 cfs)

Pond 103P: Porous Pavement Sidewalk W/ Infiltration #103



Summary for Pond 104P: Porous Pavement Sidewalk #104

Inflow Area = 0.105 ac, 33.47% Impervious, Inflow Depth = 4.81" for 25Yr-24Hr event
Inflow = 0.08 cfs @ 15.94 hrs, Volume= 0.042 af
Outflow = 0.08 cfs @ 16.02 hrs, Volume= 0.042 af, Atten= 0%, Lag= 4.8 min
Discarded = 0.01 cfs @ 13.15 hrs, Volume= 0.016 af
Primary = 0.07 cfs @ 16.02 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 120.47' @ 16.02 hrs Surf.Area= 1,211 sf Storage= 229 cf
Flood Elev= 123.00' Surf.Area= 1,211 sf Storage= 1,008 cf

Plug-Flow detention time= 104.2 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 104.1 min (1,174.1 - 1,070.0)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	484 cf	**Stone Reservoir (Irregular)**Listed below (Recalc) 1,211 cf Overall x 40.0% Voids
#2	121.00'	363 cf	**Filter Media (Irregular)**Listed below (Recalc) -Impervious 1,817 cf Overall x 20.0% Voids
#3	122.50'	160 cf	**Choker Course (Irregular)**Listed below (Recalc) -Impervious 400 cf Overall x 40.0% Voids
		1,008 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	1,211	492.7	0	0	1,211
121.00	1,211	492.7	1,211	1,211	1,704

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	1,211	492.7	0	0	1,211
122.50	1,211	492.7	1,817	1,817	1,950

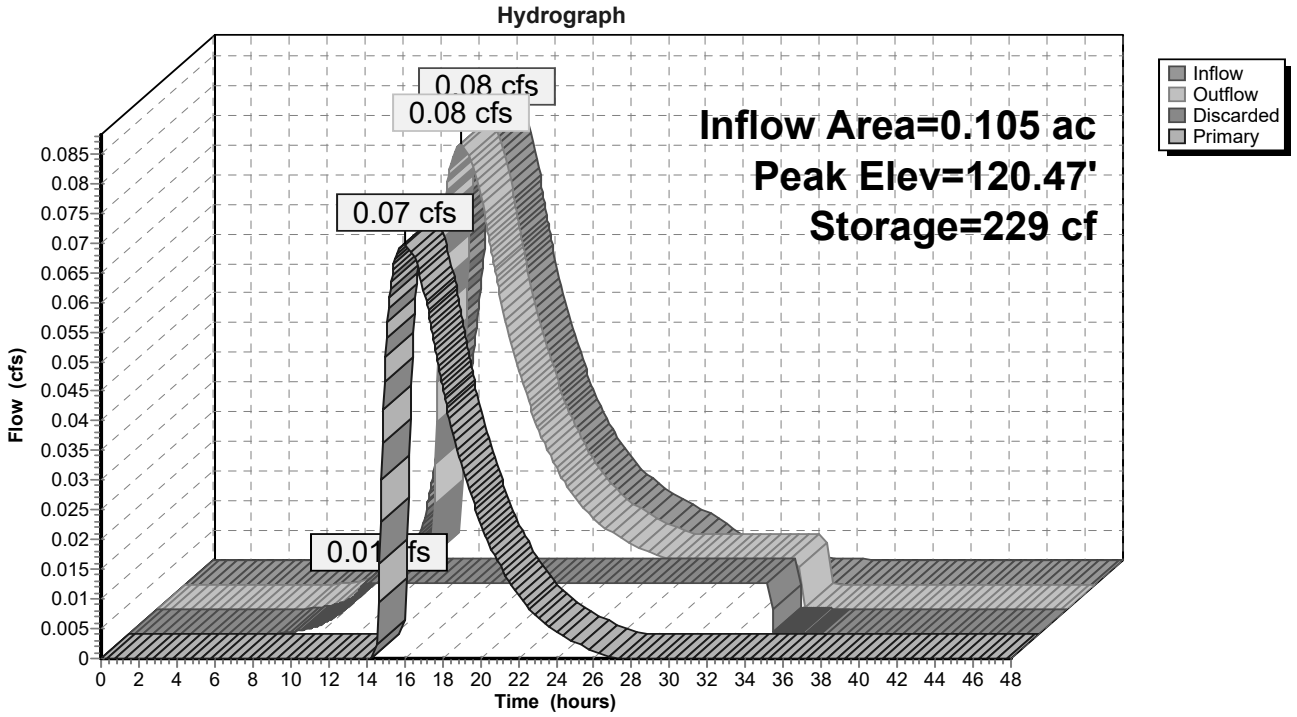
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.50	1,211	492.7	0	0	1,211
122.83	1,211	492.7	400	400	1,374

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**0.300 in/hr 0.3in/Hr Infiltration over Surface area**
#2	Primary	120.33'	**8.0" Round 8" HDPE N-12** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.33' / 120.00' S= 0.0132 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.01 cfs @ 13.15 hrs HW=120.03' (Free Discharge)
↑**1=0.3in/Hr Infiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.07 cfs @ 16.02 hrs HW=120.47' TW=0.00' (Dynamic Tailwater)
↑**2=8" HDPE N-12** (Inlet Controls 0.07 cfs @ 1.28 fps)

Pond 104P: Porous Pavement Sidewalk #104



Summary for Pond 201P: Infiltration Trench #201

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=35)

Inflow Area = 0.090 ac, 79.90% Impervious, Inflow Depth = 5.42" for 25Yr-24Hr event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.04 cfs @ 11.55 hrs, Volume= 0.041 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.55 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 125.79' @ 13.12 hrs Surf.Area= 562 sf Storage= 627 cf
Flood Elev= 127.50' Surf.Area= 562 sf Storage= 1,012 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 115.5 min (866.9 - 751.4)

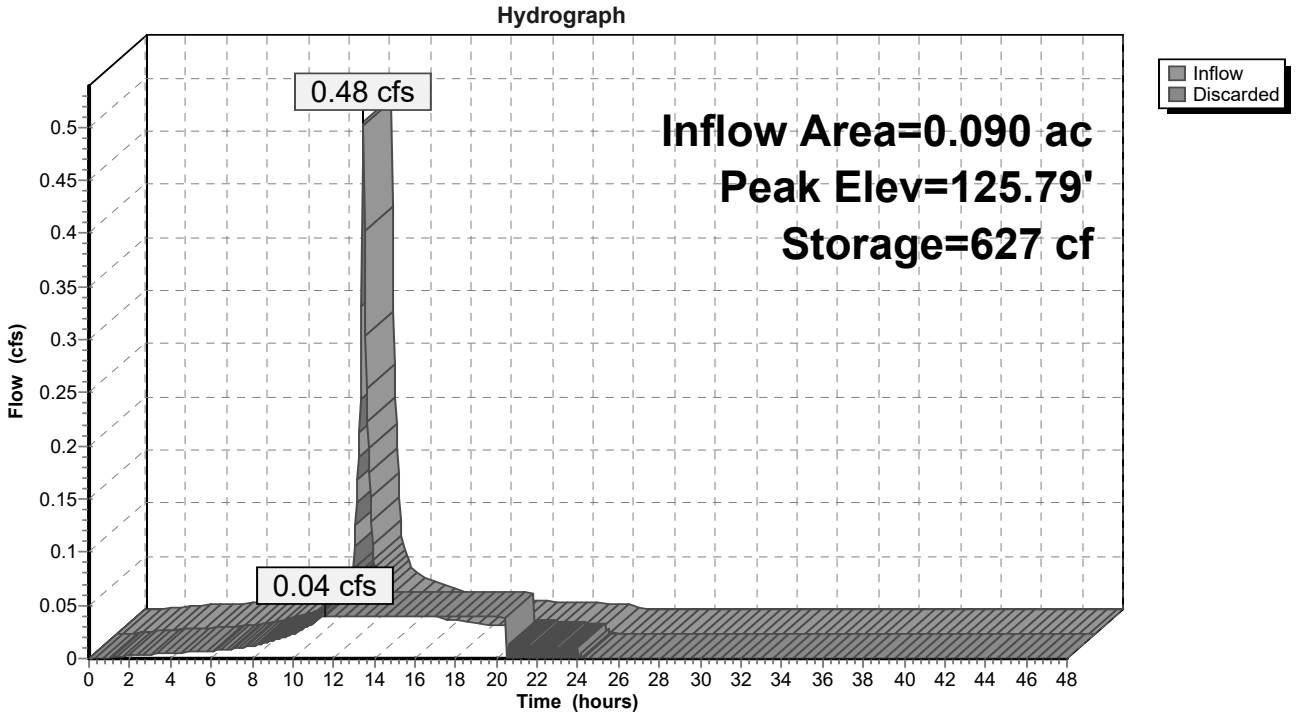
Volume	Invert	Avail.Storage	Storage Description
#1	123.00'	1,012 cf	**Stone (Irregular)** Listed below (Recalc) 2,529 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	562	96.8	0	0	562
127.50	562	96.8	2,529	2,529	998

Device	Routing	Invert	Outlet Devices
#1	Discarded	123.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.55 hrs HW=123.05' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Pond 201P: Infiltration Trench #201



Summary for Pond 202P: Infiltration Trench #202

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=38)

Inflow Area = 0.076 ac, 83.21% Impervious, Inflow Depth = 5.67" for 25Yr-24Hr event
Inflow = 0.42 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.04 cfs @ 11.55 hrs, Volume= 0.036 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.55 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 122.72' @ 13.07 hrs Surf.Area= 506 sf Storage= 551 cf
Flood Elev= 124.00' Surf.Area= 506 sf Storage= 810 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 110.3 min (857.8 - 747.5)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	860 cf	**Stone (Irregular)** Listed below (Recalc) 2,151 cf Overall x 40.0% Voids

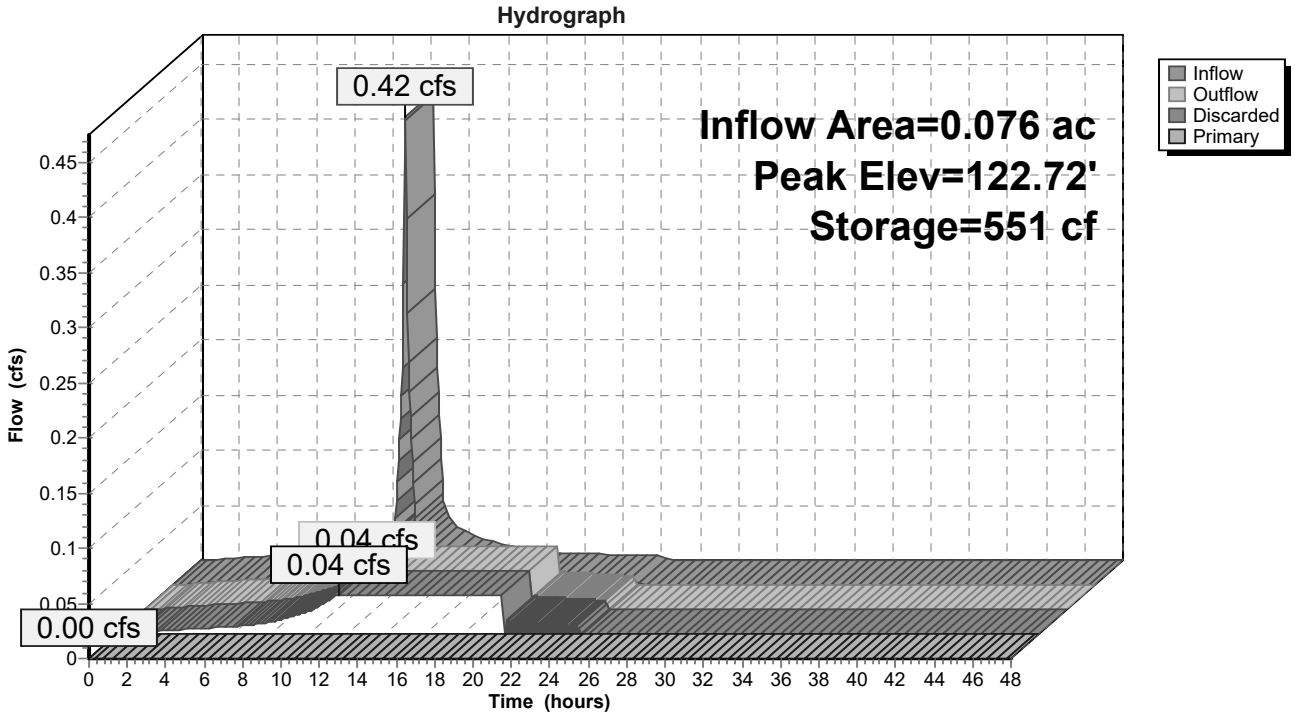
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	506	91.0	0	0	506
124.00	506	91.0	2,024	2,024	870
124.25	506	91.0	127	2,151	893

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**
#2	Primary	124.00'	**26.0' long x 2.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 11.55 hrs HW=120.05' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Overflow** (Controls 0.00 cfs)

Pond 202P: Infiltration Trench #202



Summary for Pond 203P: Infiltration Trench #203

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=58)

Inflow Area = 0.070 ac, 78.73% Impervious, Inflow Depth = 5.39" for 25Yr-24Hr event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.04 cfs @ 11.65 hrs, Volume= 0.031 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.65 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 128.23' @ 12.86 hrs Surf.Area= 545 sf Storage= 432 cf
Flood Elev= 129.00' Surf.Area= 545 sf Storage= 600 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 74.2 min (822.8 - 748.6)

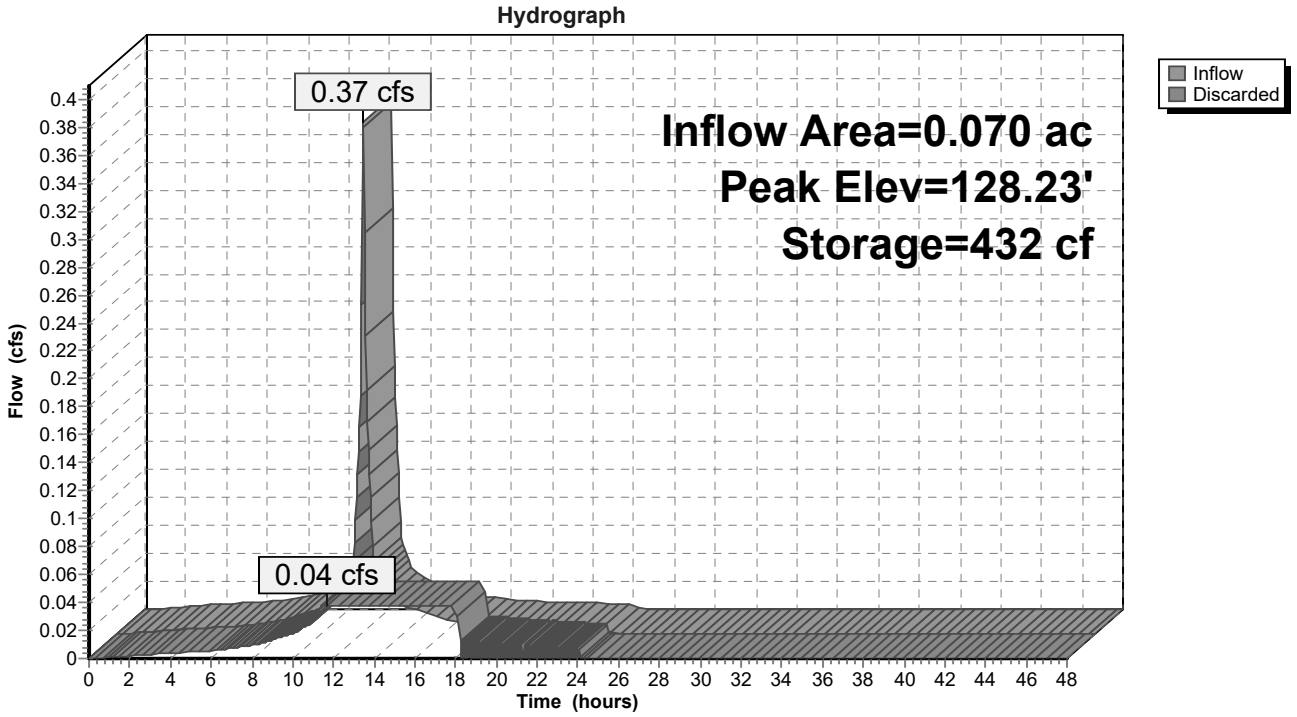
Volume	Invert	Avail.Storage	Storage Description
#1	126.25'	600 cf	**Stone (Irregular)** Listed below (Recalc) 1,499 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.25	545	95.0	0	0	545
129.00	545	95.0	1,499	1,499	806

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.25'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.65 hrs HW=126.28' (Free Discharge)
1=Infiltration 3in/hr (Exfiltration Controls 0.04 cfs)

Pond 203P: Infiltration Trench #203



Summary for Pond C01P: Catch Basin #1

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=17)

Inflow Area = 0.450 ac, 61.58% Impervious, Inflow Depth = 4.81" for 25Yr-24Hr event
Inflow = 2.44 cfs @ 12.09 hrs, Volume= 0.180 af
Outflow = 2.42 cfs @ 12.09 hrs, Volume= 0.180 af, Atten= 1%, Lag= 0.0 min
Primary = 2.42 cfs @ 12.09 hrs, Volume= 0.180 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.40' @ 12.58 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 126.44' Surf.Area= 0.000 ac Storage= 0.001 af

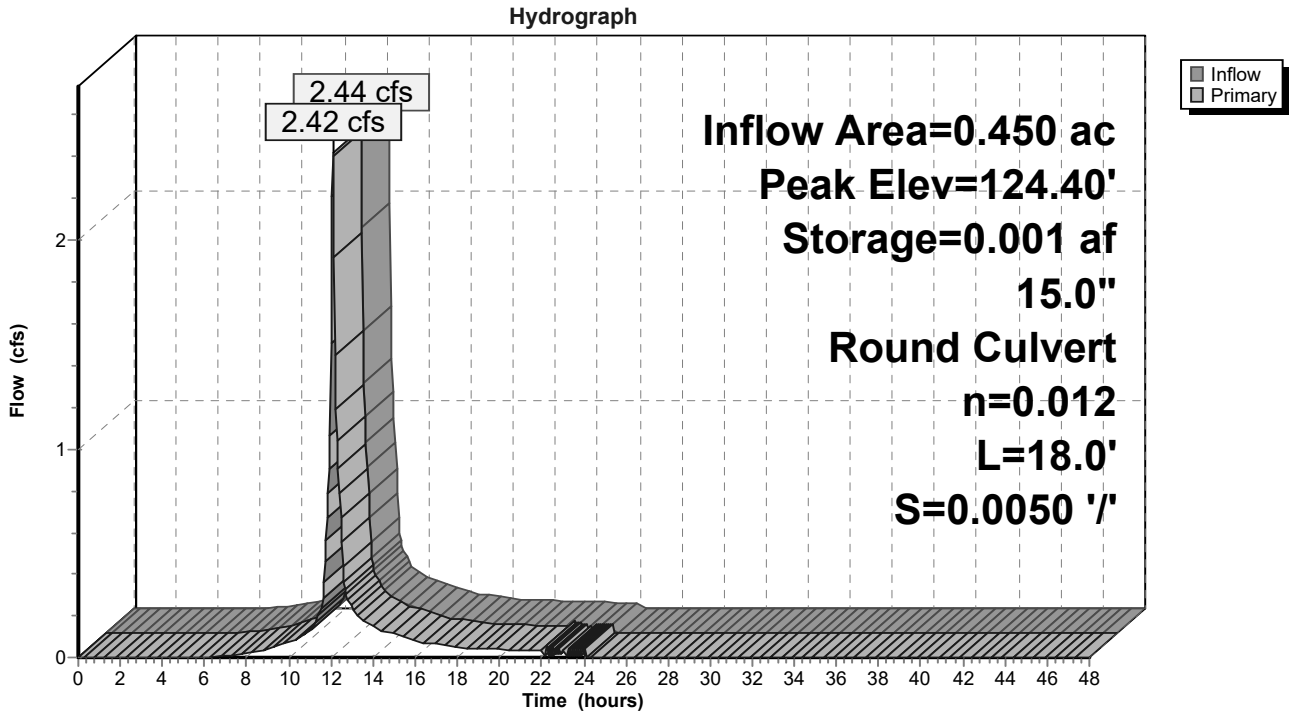
Plug-Flow detention time= 3.0 min calculated for 0.180 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (806.3 - 803.6)

Volume	Invert	Avail.Storage	Storage Description
#1	121.94'	0.001 af	**4.00'D x 4.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	121.94'	**15.0" Round 15" HDPE N-12** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.94' / 121.85' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=123.33' TW=123.58' (Dynamic Tailwater)
↑**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C01P: Catch Basin #1



Summary for Pond C02P: Catch Basin #2

[80] Warning: Exceeded Pond C01P by 0.29' @ 12.10 hrs (3.15 cfs 0.694 af)

Inflow Area = 0.530 ac, 67.40% Impervious, Inflow Depth = 5.09" for 25Yr-24Hr event
Inflow = 2.95 cfs @ 12.09 hrs, Volume= 0.225 af
Outflow = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af, Atten= 1%, Lag= 0.0 min
Primary = 2.91 cfs @ 12.09 hrs, Volume= 0.225 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.40' @ 12.54 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 126.44' Surf.Area= 0.000 ac Storage= 0.001 af

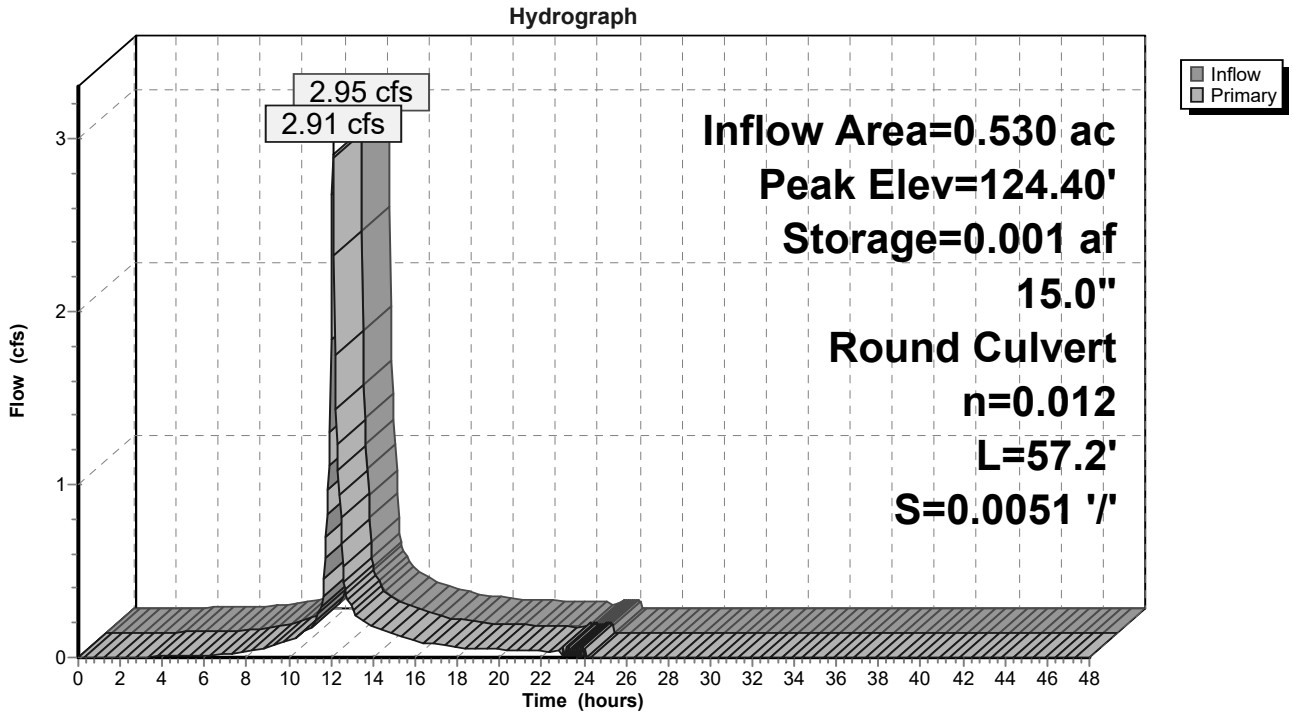
Plug-Flow detention time= 2.5 min calculated for 0.224 af (100% of inflow)
Center-of-Mass det. time= 2.6 min (796.4 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	121.75'	0.001 af	**4.00'D x 4.66'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	121.75'	**15.0" Round 15" HDPE N-12** L= 57.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.75' / 121.46' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=123.57' TW=123.70' (Dynamic Tailwater)
↑**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C02P: Catch Basin #2



Summary for Pond C03P: Catch Basin #3

[80] Warning: Exceeded Pond Y02P by 0.38' @ 12.10 hrs (3.63 cfs 0.553 af)

Inflow Area = 1.070 ac, 17.81% Impervious, Inflow Depth = 4.16" for 25Yr-24Hr event
Inflow = 3.03 cfs @ 12.11 hrs, Volume= 0.371 af
Outflow = 3.00 cfs @ 12.11 hrs, Volume= 0.371 af, Atten= 1%, Lag= 0.1 min
Primary = 3.00 cfs @ 12.11 hrs, Volume= 0.371 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.51' @ 12.47 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 126.04' Surf.Area= 0.000 ac Storage= 0.001 af

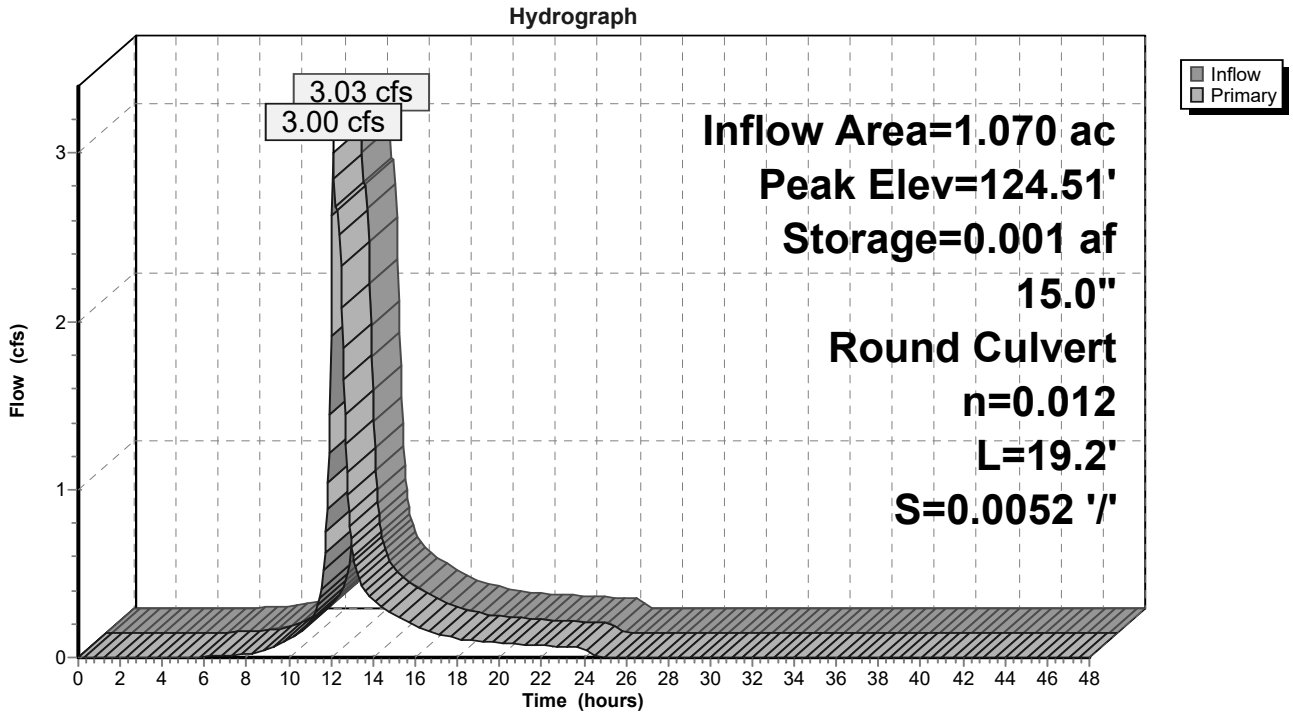
Plug-Flow detention time= 1.2 min calculated for 0.371 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (825.9 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	121.59'	0.001 af	**4.00'D x 4.45'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	121.59'	**15.0" Round 15" HDPE N-12** L= 19.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.59' / 121.49' S= 0.0052 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=123.76' TW=123.80' (Dynamic Tailwater)
↑**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond C03P: Catch Basin #3



Summary for Pond C04P: Catch Basin #4

[80] Warning: Exceeded Pond C02P by 0.21' @ 12.05 hrs (2.72 cfs 0.740 af)
[80] Warning: Exceeded Pond C03P by 0.22' @ 12.05 hrs (2.76 cfs 0.948 af)

Inflow Area = 1.753 ac, 39.19% Impervious, Inflow Depth = 4.64" for 25Yr-24Hr event
Inflow = 6.88 cfs @ 12.10 hrs, Volume= 0.678 af
Outflow = 6.87 cfs @ 12.10 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min
Primary = 6.87 cfs @ 12.10 hrs, Volume= 0.678 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.39' @ 12.51 hrs Surf.Area= 0.000 ac Storage= 0.001 af
Flood Elev= 126.02' Surf.Area= 0.000 ac Storage= 0.001 af

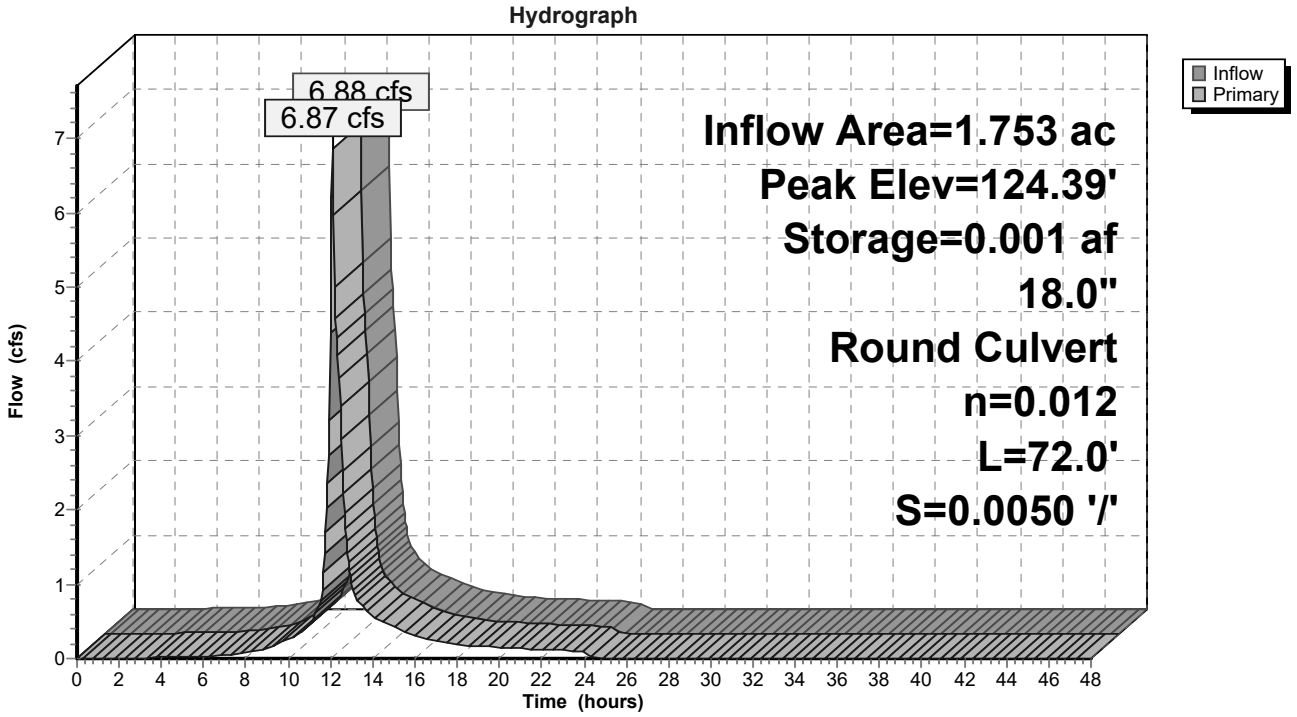
Plug-Flow detention time= 1.2 min calculated for 0.678 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (808.5 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	121.36'	0.001 af	**4.00'D x 4.66'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	121.36'	**18.0" Round 18" HDPE N-12** L= 72.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.36' / 121.00' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=5.31 cfs @ 12.10 hrs HW=123.75' TW=123.36' (Dynamic Tailwater)
↑**1=18" HDPE N-12** (Inlet Controls 5.31 cfs @ 3.00 fps)

Pond C04P: Catch Basin #4



Summary for Pond D01P: Drain Manhole #1

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.409 ac, 46.73% Impervious, Inflow Depth > 4.58" for 25Yr-24Hr event
Inflow = 0.41 cfs @ 12.54 hrs, Volume= 0.156 af
Outflow = 0.42 cfs @ 12.51 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min
Primary = 0.42 cfs @ 12.51 hrs, Volume= 0.156 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 114.11' @ 12.51 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 120.43' Surf.Area= 0.000 ac Storage= 0.002 af

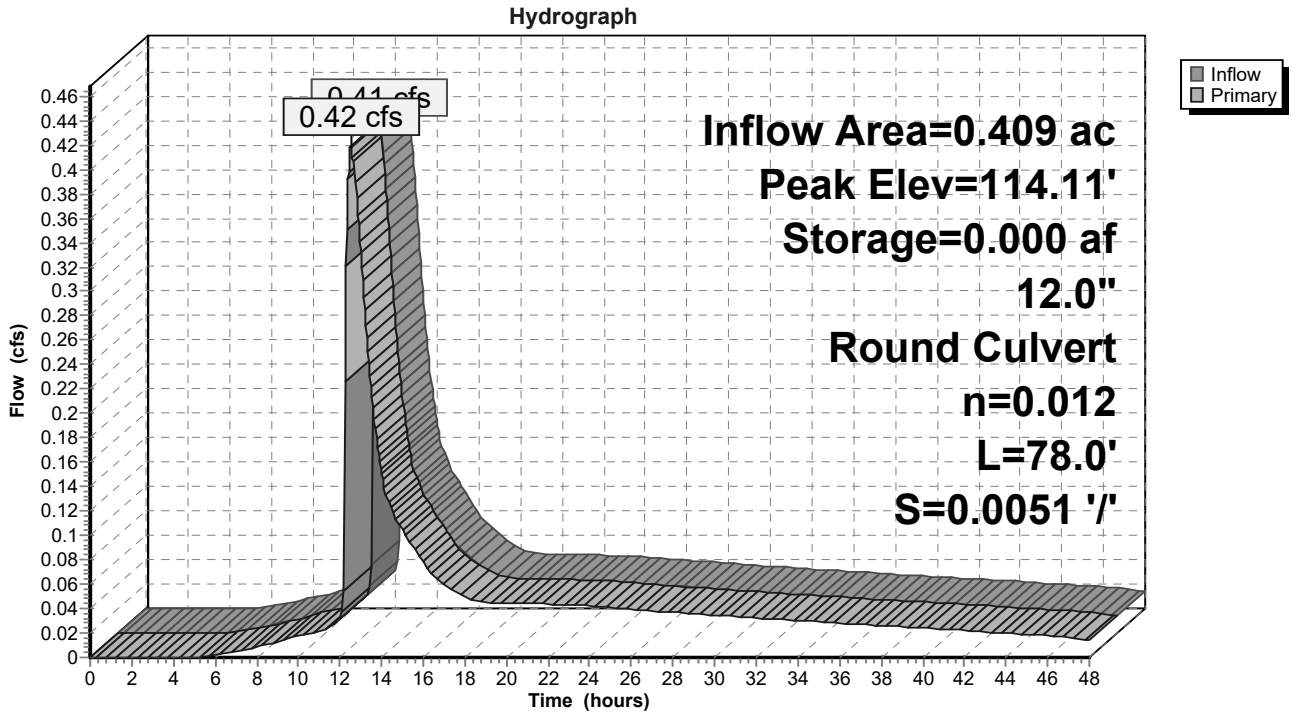
Plug-Flow detention time= 0.5 min calculated for 0.156 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (1,324.7 - 1,324.4)

Volume	Invert	Avail.Storage	Storage Description
#1	113.75'	0.002 af	**4.00'D x 6.68'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	113.75'	**12.0" Round 12" HDPE N-12** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 113.75' / 113.35' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.51 hrs HW=114.11' TW=0.00' (Dynamic Tailwater)
1=12" HDPE N-12 (Barrel Controls 0.42 cfs @ 2.42 fps)

Pond D01P: Drain Manhole #1



Summary for Pond Y01P: Yard Drain #1

Inflow Area = 0.721 ac, 5.72% Impervious, Inflow Depth = 3.68" for 25Yr-24Hr event
Inflow = 1.98 cfs @ 12.30 hrs, Volume= 0.221 af
Outflow = 1.91 cfs @ 12.36 hrs, Volume= 0.221 af, Atten= 3%, Lag= 3.5 min
Primary = 1.91 cfs @ 12.36 hrs, Volume= 0.221 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.78' @ 12.36 hrs Surf.Area= 3,023 sf Storage= 256 cf
Flood Elev= 125.00' Surf.Area= 6,802 sf Storage= 1,331 cf

Plug-Flow detention time= 1.7 min calculated for 0.221 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (843.4 - 842.1)

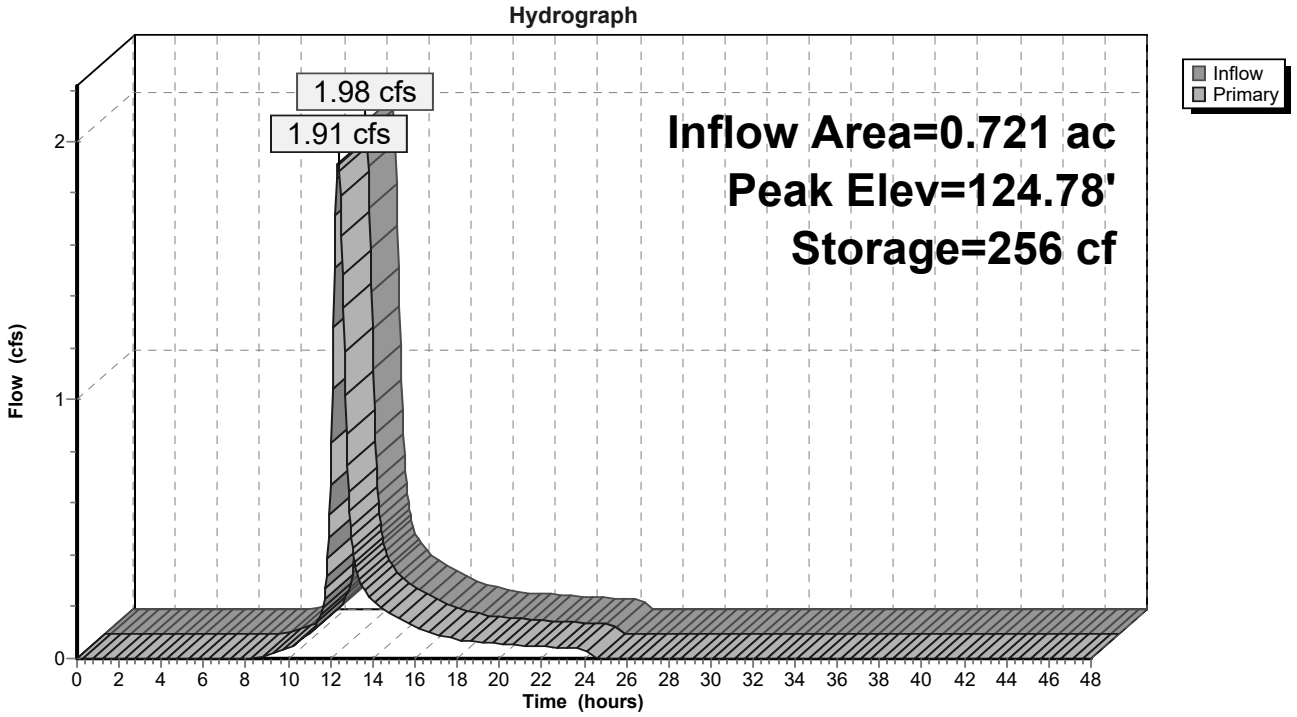
Volume	Invert	Avail.Storage	Storage Description
#1	122.35'	7 cf	**2.00'D x 2.22'H 2' Structure**
#2	124.56'	3,024 cf	**Ponding Area (Irregular)**Listed below (Recalc)
		3,031 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
124.56	4	4.0	0	0	4
124.75	2,688	182.0	177	177	2,639
125.00	6,799	290.6	1,147	1,324	6,723
125.25	6,799	290.6	1,700	3,024	6,796

Device	Routing	Invert	Outlet Devices
#1	Primary	122.35'	**15.0" Round 15" HDPE N-12** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.35' / 121.95' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	124.57'	**24.0" Horiz. 2' Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.91 cfs @ 12.36 hrs HW=124.77' TW=124.46' (Dynamic Tailwater)
└**1=15" HDPE N-12** (Passes 1.91 cfs of 3.16 cfs potential flow)
└**2=2' Structure** (Weir Controls 1.91 cfs @ 1.48 fps)

Pond Y01P: Yard Drain #1



Summary for Pond Y02P: Yard Drain #2

Inflow Area = 0.858 ac, 10.02% Impervious, Inflow Depth = 3.86" for 25Yr-24Hr event
Inflow = 2.19 cfs @ 12.34 hrs, Volume= 0.276 af
Outflow = 2.19 cfs @ 12.34 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 2.19 cfs @ 12.34 hrs, Volume= 0.276 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 124.60' @ 12.49 hrs Surf.Area= 3 sf Storage= 8 cf
Flood Elev= 127.25' Surf.Area= 183 sf Storage= 33 cf

Plug-Flow detention time= 0.3 min calculated for 0.276 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (835.9 - 835.4)

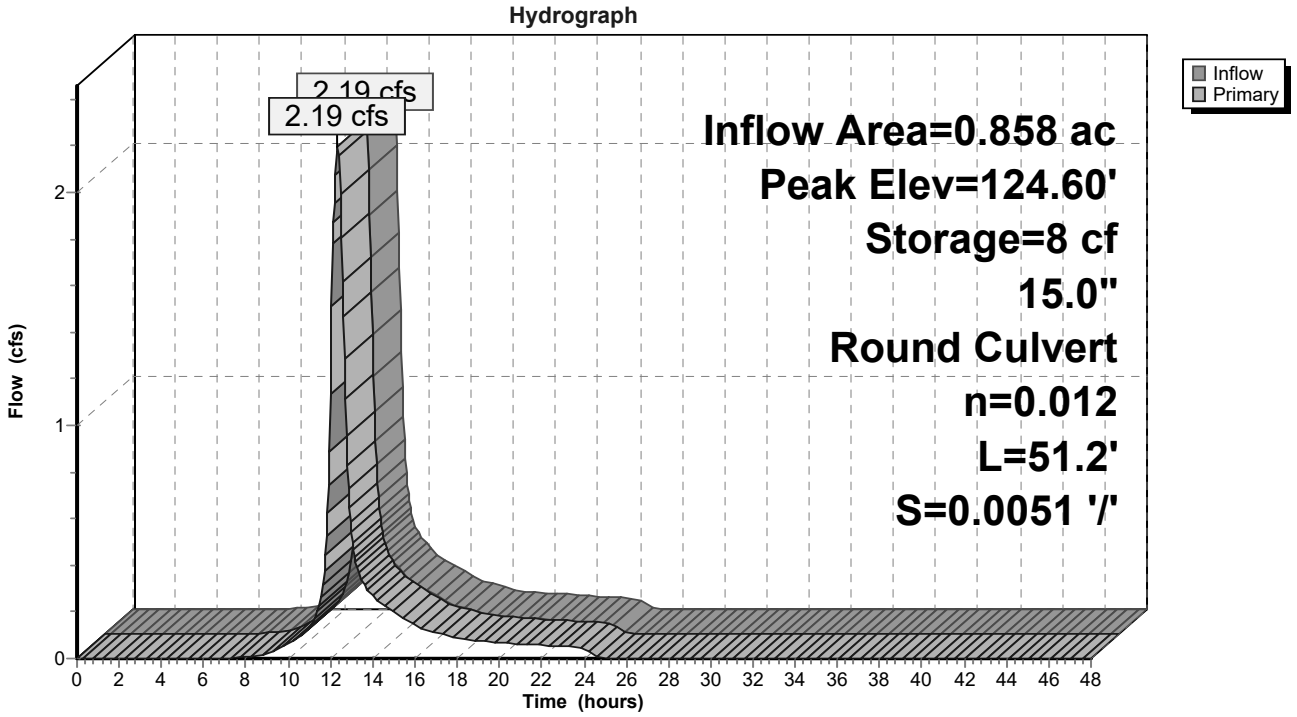
Volume	Invert	Avail.Storage	Storage Description
#1	121.95'	16 cf	**2.00'D x 5.05'H 2' Structure**
#2	127.00'	18 cf	**Ponding Area (Irregular)**Listed below (Recalc)
		33 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.00	4	4.0	0	0	4
127.25	180	47.6	18	18	183

Device	Routing	Invert	Outlet Devices
#1	Primary	121.95'	**15.0" Round 15" HDPE N-12** L= 51.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.95' / 121.69' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.86 cfs @ 12.34 hrs HW=124.41' TW=124.39' (Dynamic Tailwater)
1=15" HDPE N-12 (Inlet Controls 0.86 cfs @ 0.70 fps)

Pond Y02P: Yard Drain #2



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=30,592 sf 40.83% Impervious Runoff Depth=1.73"
Flow Length=354' Tc=11.2 min CN=80 Runoff=1.19 cfs 0.101 af

Subcatchment 2S: Sub #2 Runoff Area=2,572 sf 0.00% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=63 Runoff=0.04 cfs 0.004 af

Subcatchment 3S: Sub #3 Runoff Area=6,674 sf 0.00% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=66 Runoff=0.13 cfs 0.011 af

Subcatchment 4S: Sub #4 Runoff Area=1,732 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=80' Slope=0.0437 '/' Tc=6.0 min CN=73 Runoff=0.06 cfs 0.004 af

Subcatchment 5S: Sub #5 Runoff Area=43,058 sf 6.58% Impervious Runoff Depth=1.32"
Flow Length=560' Tc=30.1 min CN=74 Runoff=0.83 cfs 0.109 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=73 Runoff=0.04 cfs 0.003 af

Subcatchment 7S: Sub #7 Runoff Area=2,571 sf 0.00% Impervious Runoff Depth=0.87"
Flow Length=66' Tc=6.3 min CN=66 Runoff=0.05 cfs 0.004 af

Subcatchment 21S: Sub #21 Runoff Area=19,583 sf 61.58% Impervious Runoff Depth=1.88"
Tc=6.0 min CN=82 Runoff=0.97 cfs 0.071 af

Subcatchment 22S: Sub #22 Runoff Area=3,495 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af

Subcatchment 23S: Sub #23 Runoff Area=9,200 sf 49.46% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=87 Runoff=0.55 cfs 0.040 af

Subcatchment 24S: Sub #24 Runoff Area=6,707 sf 90.62% Impervious Runoff Depth=3.16"
Tc=6.0 min CN=96 Runoff=0.52 cfs 0.041 af

Subcatchment 25S: Sub #25 Runoff Area=13,785 sf 57.46% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=87 Runoff=0.83 cfs 0.060 af

Subcatchment 31S: Sub #31 Runoff Area=28,821 sf 6.23% Impervious Runoff Depth=1.20"
Flow Length=115' Tc=22.0 min CN=72 Runoff=0.57 cfs 0.066 af

Subcatchment 32S: Sub #32 Runoff Area=6,003 sf 32.52% Impervious Runoff Depth=1.88"
Tc=6.0 min CN=82 Runoff=0.30 cfs 0.022 af

Subcatchment 41S: Sub #41 Runoff Area=29,420 sf 28.35% Impervious Runoff Depth=1.66"
Flow Length=176' Slope=0.0075 '/' Tc=13.3 min CN=79 Runoff=1.02 cfs 0.093 af

Subcatchment 42S: Sub #42 Runoff Area=4,020 sf 9.93% Impervious Runoff Depth=0.54"
Tc=6.0 min CN=59 Runoff=0.04 cfs 0.004 af

Subcatchment 43S: Sub #43 Runoff Area=3,134 sf 100.00% Impervious Runoff Depth=3.39"
Tc=293.0 min CN=98 Runoff=0.04 cfs 0.020 af

Subcatchment 44S: Sub #44 Runoff Area=4,580 sf 33.47% Impervious Runoff Depth=1.88"
Tc=293.0 min CN=82 Runoff=0.03 cfs 0.016 af

Subcatchment 51aS: Sub #51a Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment 51bS: Sub #51b Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment 51S: Sub #51 Runoff Area=901 sf 12.32% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=46 Runoff=0.00 cfs 0.000 af

Subcatchment 52aS: Sub #52a Runoff Area=2,765 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 52S: Sub #52 Runoff Area=558 sf 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=40 Runoff=0.00 cfs 0.000 af

Subcatchment 53aS: Sub #53a Runoff Area=1,188 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.008 af

Subcatchment 53bS: Sub #53b Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.008 af

Subcatchment 53S: Sub #53 Runoff Area=645 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.02' Max Vel=0.77 fps Inflow=0.05 cfs 0.004 af
n=0.022 L=29.7' S=0.0421 '/' Capacity=55.48 cfs Outflow=0.05 cfs 0.004 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.02' Max Vel=0.65 fps Inflow=0.05 cfs 0.004 af
n=0.022 L=78.0' S=0.0256 '/' Capacity=43.30 cfs Outflow=0.05 cfs 0.004 af

Reach 100R: Final Reach #100 Inflow=1.21 cfs 0.166 af
Outflow=1.21 cfs 0.166 af

Reach 200R: Final Reach #200 Inflow=0.04 cfs 0.004 af
Outflow=0.04 cfs 0.004 af

Reach 300R: Final Reach #300 Inflow=0.24 cfs 0.308 af
Outflow=0.24 cfs 0.308 af

Reach 400R: Final Reach #400 Inflow=0.06 cfs 0.004 af
Outflow=0.06 cfs 0.004 af

Reach 500R: Final Reach #500 Inflow=0.83 cfs 0.113 af
Outflow=0.83 cfs 0.113 af

Reach 600R: Final Reach #600 Inflow=0.04 cfs 0.003 af
Outflow=0.04 cfs 0.003 af

Pond 101P: Gravel Wetland #101 Peak Elev=123.18' Storage=9,915 cf Inflow=3.68 cfs 0.359 af
Primary=0.09 cfs 0.250 af Secondary=0.14 cfs 0.047 af Tertiary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.297 af

Pond 102P: Rain Garden W/ Stormtech Peak Elev=115.73' Storage=1,749 cf Inflow=0.86 cfs 0.065 af
Outflow=0.03 cfs 0.064 af

Pond 103P: Porous Pavement Sidewalk W/ Peak Elev=117.93' Storage=131 cf Inflow=0.04 cfs 0.020 af
Outflow=0.02 cfs 0.020 af

Pond 104P: Porous Pavement Sidewalk #104 Peak Elev=120.40' Storage=193 cf Inflow=0.03 cfs 0.016 af
Discarded=0.01 cfs 0.013 af Primary=0.02 cfs 0.004 af Outflow=0.02 cfs 0.016 af

Pond 201P: Infiltration Trench #201 Peak Elev=124.00' Storage=224 cf Inflow=0.24 cfs 0.020 af
Outflow=0.04 cfs 0.020 af

Pond 202P: Infiltration Trench #202 Peak Elev=121.02' Storage=206 cf Inflow=0.22 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond 203P: Infiltration Trench #203 Peak Elev=126.96' Storage=154 cf Inflow=0.19 cfs 0.015 af
Outflow=0.04 cfs 0.016 af

Pond C01P: Catch Basin #1 Peak Elev=123.18' Storage=0.000 af Inflow=0.97 cfs 0.071 af
15.0" Round Culvert n=0.012 L=18.0' S=0.0050 '/' Outflow=0.97 cfs 0.070 af

Pond C02P: Catch Basin #2 Peak Elev=123.18' Storage=0.000 af Inflow=1.24 cfs 0.093 af
15.0" Round Culvert n=0.012 L=57.2' S=0.0051 '/' Outflow=1.24 cfs 0.093 af

Pond C03P: Catch Basin #3 Peak Elev=123.18' Storage=0.000 af Inflow=1.13 cfs 0.132 af
15.0" Round Culvert n=0.012 L=19.2' S=0.0052 '/' Outflow=1.12 cfs 0.132 af

Pond C04P: Catch Basin #4 Peak Elev=123.18' Storage=0.001 af Inflow=2.86 cfs 0.266 af
18.0" Round Culvert n=0.012 L=72.0' S=0.0050 '/' Outflow=2.87 cfs 0.265 af

Pond D01P: Drain Manhole #1 Peak Elev=113.85' Storage=0.000 af Inflow=0.03 cfs 0.064 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0051 '/' Outflow=0.03 cfs 0.064 af

Pond Y01P: Yard Drain #1 Peak Elev=124.66' Storage=39 cf Inflow=0.60 cfs 0.070 af
Outflow=0.59 cfs 0.070 af

Pond Y02P: Yard Drain #2 Peak Elev=123.18' Storage=4 cf Inflow=0.72 cfs 0.092 af
15.0" Round Culvert n=0.012 L=51.2' S=0.0051 '/' Outflow=0.72 cfs 0.092 af

Total Runoff Area = 5.219 ac Runoff Volume = 0.746 af Average Runoff Depth = 1.72"
67.07% Pervious = 3.501 ac 32.93% Impervious = 1.719 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=30,592 sf 40.83% Impervious Runoff Depth=3.29"
Flow Length=354' Tc=11.2 min CN=80 Runoff=2.26 cfs 0.192 af

Subcatchment 2S: Sub #2 Runoff Area=2,572 sf 0.00% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=63 Runoff=0.12 cfs 0.009 af

Subcatchment 3S: Sub #3 Runoff Area=6,674 sf 0.00% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=66 Runoff=0.35 cfs 0.026 af

Subcatchment 4S: Sub #4 Runoff Area=1,732 sf 0.00% Impervious Runoff Depth=2.64"
Flow Length=80' Slope=0.0437 '/' Tc=6.0 min CN=73 Runoff=0.12 cfs 0.009 af

Subcatchment 5S: Sub #5 Runoff Area=43,058 sf 6.58% Impervious Runoff Depth=2.73"
Flow Length=560' Tc=30.1 min CN=74 Runoff=1.78 cfs 0.225 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth=2.64"
Tc=6.0 min CN=73 Runoff=0.08 cfs 0.006 af

Subcatchment 7S: Sub #7 Runoff Area=2,571 sf 0.00% Impervious Runoff Depth=2.04"
Flow Length=66' Tc=6.3 min CN=66 Runoff=0.13 cfs 0.010 af

Subcatchment 21S: Sub #21 Runoff Area=19,583 sf 61.58% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=82 Runoff=1.79 cfs 0.131 af

Subcatchment 22S: Sub #22 Runoff Area=3,495 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.035 af

Subcatchment 23S: Sub #23 Runoff Area=9,200 sf 49.46% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=87 Runoff=0.94 cfs 0.070 af

Subcatchment 24S: Sub #24 Runoff Area=6,707 sf 90.62% Impervious Runoff Depth=4.98"
Tc=6.0 min CN=96 Runoff=0.79 cfs 0.064 af

Subcatchment 25S: Sub #25 Runoff Area=13,785 sf 57.46% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=87 Runoff=1.42 cfs 0.105 af

Subcatchment 31S: Sub #31 Runoff Area=28,821 sf 6.23% Impervious Runoff Depth=2.55"
Flow Length=115' Tc=22.0 min CN=72 Runoff=1.27 cfs 0.141 af

Subcatchment 32S: Sub #32 Runoff Area=6,003 sf 32.52% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=82 Runoff=0.55 cfs 0.040 af

Subcatchment 41S: Sub #41 Runoff Area=29,420 sf 28.35% Impervious Runoff Depth=3.19"
Flow Length=176' Slope=0.0075 '/' Tc=13.3 min CN=79 Runoff=1.98 cfs 0.180 af

Subcatchment 42S: Sub #42 Runoff Area=4,020 sf 9.93% Impervious Runoff Depth=1.50"
Tc=6.0 min CN=59 Runoff=0.15 cfs 0.012 af

Subcatchment 43S: Sub #43 Runoff Area=3,134 sf 100.00% Impervious Runoff Depth=5.21"
Tc=293.0 min CN=98 Runoff=0.05 cfs 0.031 af

Subcatchment 44S: Sub #44 Runoff Area=4,580 sf 33.47% Impervious Runoff Depth=3.48"
Tc=293.0 min CN=82 Runoff=0.06 cfs 0.031 af

Subcatchment 51aS: Sub #51a Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 51bS: Sub #51b Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 51S: Sub #51 Runoff Area=901 sf 12.32% Impervious Runoff Depth=0.65"
Tc=6.0 min CN=46 Runoff=0.01 cfs 0.001 af

Subcatchment 52aS: Sub #52a Runoff Area=2,765 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.028 af

Subcatchment 52S: Sub #52 Runoff Area=558 sf 0.00% Impervious Runoff Depth=0.34"
Tc=6.0 min CN=40 Runoff=0.00 cfs 0.000 af

Subcatchment 53aS: Sub #53a Runoff Area=1,188 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment 53bS: Sub #53b Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment 53S: Sub #53 Runoff Area=645 sf 0.00% Impervious Runoff Depth=0.30"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.03' Max Vel=1.04 fps Inflow=0.13 cfs 0.010 af
n=0.022 L=29.7' S=0.0421 '/' Capacity=55.48 cfs Outflow=0.13 cfs 0.010 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.03' Max Vel=0.86 fps Inflow=0.13 cfs 0.010 af
n=0.022 L=78.0' S=0.0256 '/' Capacity=43.30 cfs Outflow=0.13 cfs 0.010 af

Reach 100R: Final Reach #100 Inflow=2.30 cfs 0.306 af
Outflow=2.30 cfs 0.306 af

Reach 200R: Final Reach #200 Inflow=0.12 cfs 0.009 af
Outflow=0.12 cfs 0.009 af

Reach 300R: Final Reach #300 Inflow=2.06 cfs 0.628 af
Outflow=2.06 cfs 0.628 af

Reach 400R: Final Reach #400 Inflow=0.12 cfs 0.009 af
Outflow=0.12 cfs 0.009 af

Reach 500R: Final Reach #500 Inflow=1.78 cfs 0.240 af
Outflow=1.78 cfs 0.240 af

Reach 600R: Final Reach #600 Inflow=0.08 cfs 0.006 af
Outflow=0.08 cfs 0.006 af

Pond 101P: Gravel Wetland #101 Peak Elev=123.76' Storage=13,290 cf Inflow=6.73 cfs 0.669 af
Primary=0.10 cfs 0.264 af Secondary=1.89 cfs 0.338 af Tertiary=0.00 cfs 0.000 af Outflow=2.00 cfs 0.602 af

Pond 102P: Rain Garden W/ Stormtech Peak Elev=117.18' Storage=3,014 cf Inflow=1.56 cfs 0.117 af
Outflow=0.12 cfs 0.114 af

Pond 103P: Porous Pavement Sidewalk W/ Peak Elev=118.15' Storage=406 cf Inflow=0.05 cfs 0.031 af
Outflow=0.02 cfs 0.031 af

Pond 104P: Porous Pavement Sidewalk #104 Peak Elev=120.45' Storage=217 cf Inflow=0.06 cfs 0.031 af
Discarded=0.01 cfs 0.015 af Primary=0.05 cfs 0.016 af Outflow=0.06 cfs 0.031 af

Pond 201P: Infiltration Trench #201 Peak Elev=124.91' Storage=430 cf Inflow=0.37 cfs 0.031 af
Outflow=0.04 cfs 0.031 af

Pond 202P: Infiltration Trench #202 Peak Elev=121.90' Storage=385 cf Inflow=0.33 cfs 0.028 af
Discarded=0.04 cfs 0.028 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.028 af

Pond 203P: Infiltration Trench #203 Peak Elev=127.63' Storage=300 cf Inflow=0.29 cfs 0.024 af
Outflow=0.04 cfs 0.024 af

Pond C01P: Catch Basin #1 Peak Elev=123.79' Storage=0.001 af Inflow=1.79 cfs 0.131 af
15.0" Round Culvert n=0.012 L=18.0' S=0.0050 '/' Outflow=1.78 cfs 0.130 af

Pond C02P: Catch Basin #2 Peak Elev=123.78' Storage=0.001 af Inflow=2.20 cfs 0.165 af
15.0" Round Culvert n=0.012 L=57.2' S=0.0051 '/' Outflow=2.19 cfs 0.165 af

Pond C03P: Catch Basin #3 Peak Elev=123.81' Storage=0.001 af Inflow=2.18 cfs 0.261 af
15.0" Round Culvert n=0.012 L=19.2' S=0.0052 '/' Outflow=2.17 cfs 0.261 af

Pond C04P: Catch Basin #4 Peak Elev=123.78' Storage=0.001 af Inflow=5.12 cfs 0.490 af
18.0" Round Culvert n=0.012 L=72.0' S=0.0050 '/' Outflow=5.12 cfs 0.490 af

Pond D01P: Drain Manhole #1 Peak Elev=113.94' Storage=0.000 af Inflow=0.12 cfs 0.114 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0051 '/' Outflow=0.12 cfs 0.114 af

Pond Y01P: Yard Drain #1 Peak Elev=124.73' Storage=134 cf Inflow=1.34 cfs 0.151 af
Outflow=1.31 cfs 0.150 af

Pond Y02P: Yard Drain #2 Peak Elev=123.82' Storage=6 cf Inflow=1.52 cfs 0.190 af
15.0" Round Culvert n=0.012 L=51.2' S=0.0051 '/' Outflow=1.52 cfs 0.190 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.399 af Average Runoff Depth = 3.22"
67.07% Pervious = 3.501 ac 32.93% Impervious = 1.719 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=30,592 sf 40.83% Impervious Runoff Depth=4.59"
Flow Length=354' Tc=11.2 min CN=80 Runoff=3.14 cfs 0.269 af

Subcatchment 2S: Sub #2 Runoff Area=2,572 sf 0.00% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=63 Runoff=0.19 cfs 0.014 af

Subcatchment 3S: Sub #3 Runoff Area=6,674 sf 0.00% Impervious Runoff Depth=3.12"
Tc=6.0 min CN=66 Runoff=0.55 cfs 0.040 af

Subcatchment 4S: Sub #4 Runoff Area=1,732 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=80' Slope=0.0437 '/' Tc=6.0 min CN=73 Runoff=0.18 cfs 0.013 af

Subcatchment 5S: Sub #5 Runoff Area=43,058 sf 6.58% Impervious Runoff Depth=3.95"
Flow Length=560' Tc=30.1 min CN=74 Runoff=2.58 cfs 0.325 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=73 Runoff=0.11 cfs 0.008 af

Subcatchment 7S: Sub #7 Runoff Area=2,571 sf 0.00% Impervious Runoff Depth=3.12"
Flow Length=66' Tc=6.3 min CN=66 Runoff=0.21 cfs 0.015 af

Subcatchment 21S: Sub #21 Runoff Area=19,583 sf 61.58% Impervious Runoff Depth=4.81"
Tc=6.0 min CN=82 Runoff=2.44 cfs 0.180 af

Subcatchment 22S: Sub #22 Runoff Area=3,495 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.53 cfs 0.044 af

Subcatchment 23S: Sub #23 Runoff Area=9,200 sf 49.46% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=87 Runoff=1.25 cfs 0.095 af

Subcatchment 24S: Sub #24 Runoff Area=6,707 sf 90.62% Impervious Runoff Depth=6.41"
Tc=6.0 min CN=96 Runoff=1.01 cfs 0.082 af

Subcatchment 25S: Sub #25 Runoff Area=13,785 sf 57.46% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=87 Runoff=1.88 cfs 0.142 af

Subcatchment 31S: Sub #31 Runoff Area=28,821 sf 6.23% Impervious Runoff Depth=3.74"
Flow Length=115' Tc=22.0 min CN=72 Runoff=1.87 cfs 0.206 af

Subcatchment 32S: Sub #32 Runoff Area=6,003 sf 32.52% Impervious Runoff Depth=4.81"
Tc=6.0 min CN=82 Runoff=0.75 cfs 0.055 af

Subcatchment 41S: Sub #41 Runoff Area=29,420 sf 28.35% Impervious Runoff Depth=4.48"
Flow Length=176' Slope=0.0075 '/' Tc=13.3 min CN=79 Runoff=2.77 cfs 0.252 af

Subcatchment 42S: Sub #42 Runoff Area=4,020 sf 9.93% Impervious Runoff Depth=2.43"
Tc=6.0 min CN=59 Runoff=0.25 cfs 0.019 af

Subcatchment 43S: Sub #43 Runoff Area=3,134 sf 100.00% Impervious Runoff Depth=6.65"
Tc=293.0 min CN=98 Runoff=0.07 cfs 0.040 af

Subcatchment 44S: Sub #44 Runoff Area=4,580 sf 33.47% Impervious Runoff Depth=4.81"
Tc=293.0 min CN=82 Runoff=0.08 cfs 0.042 af

Subcatchment 51aS: Sub #51a Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 51bS: Sub #51b Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 51S: Sub #51 Runoff Area=901 sf 12.32% Impervious Runoff Depth=1.27"
Tc=6.0 min CN=46 Runoff=0.02 cfs 0.002 af

Subcatchment 52aS: Sub #52a Runoff Area=2,765 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.42 cfs 0.035 af

Subcatchment 52S: Sub #52 Runoff Area=558 sf 0.00% Impervious Runoff Depth=0.80"
Tc=6.0 min CN=40 Runoff=0.01 cfs 0.001 af

Subcatchment 53aS: Sub #53a Runoff Area=1,188 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 53bS: Sub #53b Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.65"
Tc=6.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 53S: Sub #53 Runoff Area=645 sf 0.00% Impervious Runoff Depth=0.73"
Tc=6.0 min CN=39 Runoff=0.01 cfs 0.001 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.04' Max Vel=1.20 fps Inflow=0.21 cfs 0.015 af
n=0.022 L=29.7' S=0.0421 '/' Capacity=55.48 cfs Outflow=0.21 cfs 0.015 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.04' Max Vel=0.99 fps Inflow=0.21 cfs 0.015 af
n=0.022 L=78.0' S=0.0256 '/' Capacity=43.30 cfs Outflow=0.20 cfs 0.015 af

Reach 100R: Final Reach #100 Inflow=3.18 cfs 0.425 af
Outflow=3.18 cfs 0.425 af

Reach 200R: Final Reach #200 Inflow=0.19 cfs 0.014 af
Outflow=0.19 cfs 0.014 af

Reach 300R: Final Reach #300 Inflow=3.63 cfs 0.901 af
Outflow=3.63 cfs 0.901 af

Reach 400R: Final Reach #400 Inflow=0.18 cfs 0.013 af
Outflow=0.18 cfs 0.013 af

Reach 500R: Final Reach #500 Inflow=2.58 cfs 0.351 af
Outflow=2.58 cfs 0.351 af

Reach 600R: Final Reach #600 Inflow=0.11 cfs 0.008 af
Outflow=0.11 cfs 0.008 af

Pond 101P: Gravel Wetland #101 Peak Elev=124.31' Storage=16,769 cf Inflow=9.16 cfs 0.930 af
Primary=0.11 cfs 0.272 af Secondary=3.40 cfs 0.589 af Tertiary=0.00 cfs 0.000 af Outflow=3.51 cfs 0.861 af

Pond 102P: Rain Garden W/ Stormtech Peak Elev=117.91' Storage=3,495 cf Inflow=2.12 cfs 0.160 af
Outflow=0.41 cfs 0.156 af

Pond 103P: Porous Pavement Sidewalk W/ Peak Elev=118.35' Storage=657 cf Inflow=0.07 cfs 0.040 af
Outflow=0.02 cfs 0.040 af

Pond 104P: Porous Pavement Sidewalk #104 Peak Elev=120.47' Storage=229 cf Inflow=0.08 cfs 0.042 af
Discarded=0.01 cfs 0.016 af Primary=0.07 cfs 0.026 af Outflow=0.08 cfs 0.042 af

Pond 201P: Infiltration Trench #201 Peak Elev=125.79' Storage=627 cf Inflow=0.48 cfs 0.041 af
Outflow=0.04 cfs 0.041 af

Pond 202P: Infiltration Trench #202 Peak Elev=122.72' Storage=551 cf Inflow=0.42 cfs 0.036 af
Discarded=0.04 cfs 0.036 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.036 af

Pond 203P: Infiltration Trench #203 Peak Elev=128.23' Storage=432 cf Inflow=0.37 cfs 0.031 af
Outflow=0.04 cfs 0.031 af

Pond C01P: Catch Basin #1 Peak Elev=124.40' Storage=0.001 af Inflow=2.44 cfs 0.180 af
15.0" Round Culvert n=0.012 L=18.0' S=0.0050 '/' Outflow=2.42 cfs 0.180 af

Pond C02P: Catch Basin #2 Peak Elev=124.40' Storage=0.001 af Inflow=2.95 cfs 0.225 af
15.0" Round Culvert n=0.012 L=57.2' S=0.0051 '/' Outflow=2.91 cfs 0.225 af

Pond C03P: Catch Basin #3 Peak Elev=124.51' Storage=0.001 af Inflow=3.03 cfs 0.371 af
15.0" Round Culvert n=0.012 L=19.2' S=0.0052 '/' Outflow=3.00 cfs 0.371 af

Pond C04P: Catch Basin #4 Peak Elev=124.39' Storage=0.001 af Inflow=6.88 cfs 0.678 af
18.0" Round Culvert n=0.012 L=72.0' S=0.0050 '/' Outflow=6.87 cfs 0.678 af

Pond D01P: Drain Manhole #1 Peak Elev=114.11' Storage=0.000 af Inflow=0.41 cfs 0.156 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0051 '/' Outflow=0.42 cfs 0.156 af

Pond Y01P: Yard Drain #1 Peak Elev=124.78' Storage=256 cf Inflow=1.98 cfs 0.221 af
Outflow=1.91 cfs 0.221 af

Pond Y02P: Yard Drain #2 Peak Elev=124.60' Storage=8 cf Inflow=2.19 cfs 0.276 af
15.0" Round Culvert n=0.012 L=51.2' S=0.0051 '/' Outflow=2.19 cfs 0.276 af

Total Runoff Area = 5.219 ac Runoff Volume = 1.950 af Average Runoff Depth = 4.48"
67.07% Pervious = 3.501 ac 32.93% Impervious = 1.719 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Sub #1 Runoff Area=30,592 sf 40.83% Impervious Runoff Depth=5.84"
Flow Length=354' Tc=11.2 min CN=80 Runoff=3.96 cfs 0.342 af

Subcatchment 2S: Sub #2 Runoff Area=2,572 sf 0.00% Impervious Runoff Depth=3.85"
Tc=6.0 min CN=63 Runoff=0.26 cfs 0.019 af

Subcatchment 3S: Sub #3 Runoff Area=6,674 sf 0.00% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=66 Runoff=0.74 cfs 0.054 af

Subcatchment 4S: Sub #4 Runoff Area=1,732 sf 0.00% Impervious Runoff Depth=5.01"
Flow Length=80' Slope=0.0437 '/' Tc=6.0 min CN=73 Runoff=0.23 cfs 0.017 af

Subcatchment 5S: Sub #5 Runoff Area=43,058 sf 6.58% Impervious Runoff Depth=5.13"
Flow Length=560' Tc=30.1 min CN=74 Runoff=3.35 cfs 0.423 af

Subcatchment 6S: Sub #6 Runoff Area=1,126 sf 0.00% Impervious Runoff Depth=5.01"
Tc=6.0 min CN=73 Runoff=0.15 cfs 0.011 af

Subcatchment 7S: Sub #7 Runoff Area=2,571 sf 0.00% Impervious Runoff Depth=4.20"
Flow Length=66' Tc=6.3 min CN=66 Runoff=0.28 cfs 0.021 af

Subcatchment 21S: Sub #21 Runoff Area=19,583 sf 61.58% Impervious Runoff Depth=6.08"
Tc=6.0 min CN=82 Runoff=3.06 cfs 0.228 af

Subcatchment 22S: Sub #22 Runoff Area=3,495 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.63 cfs 0.053 af

Subcatchment 23S: Sub #23 Runoff Area=9,200 sf 49.46% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=87 Runoff=1.54 cfs 0.117 af

Subcatchment 24S: Sub #24 Runoff Area=6,707 sf 90.62% Impervious Runoff Depth=7.75"
Tc=6.0 min CN=96 Runoff=1.21 cfs 0.099 af

Subcatchment 25S: Sub #25 Runoff Area=13,785 sf 57.46% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=87 Runoff=2.30 cfs 0.176 af

Subcatchment 31S: Sub #31 Runoff Area=28,821 sf 6.23% Impervious Runoff Depth=4.90"
Flow Length=115' Tc=22.0 min CN=72 Runoff=2.46 cfs 0.270 af

Subcatchment 32S: Sub #32 Runoff Area=6,003 sf 32.52% Impervious Runoff Depth=6.08"
Tc=6.0 min CN=82 Runoff=0.94 cfs 0.070 af

Subcatchment 41S: Sub #41 Runoff Area=29,420 sf 28.35% Impervious Runoff Depth=5.72"
Flow Length=176' Slope=0.0075 '/' Tc=13.3 min CN=79 Runoff=3.51 cfs 0.322 af

Subcatchment 42S: Sub #42 Runoff Area=4,020 sf 9.93% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=59 Runoff=0.35 cfs 0.026 af

Subcatchment 43S: Sub #43 Runoff Area=3,134 sf 100.00% Impervious Runoff Depth=7.99"
Tc=293.0 min CN=98 Runoff=0.08 cfs 0.048 af

Subcatchment 44S: Sub #44 Runoff Area=4,580 sf 33.47% Impervious Runoff Depth=6.08"
Tc=293.0 min CN=82 Runoff=0.10 cfs 0.053 af

Subcatchment 51aS: Sub #51a Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment 51bS: Sub #51b Runoff Area=1,515 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment 51S: Sub #51 Runoff Area=901 sf 12.32% Impervious Runoff Depth=1.96"
Tc=6.0 min CN=46 Runoff=0.04 cfs 0.003 af

Subcatchment 52aS: Sub #52a Runoff Area=2,765 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.50 cfs 0.042 af

Subcatchment 52S: Sub #52 Runoff Area=558 sf 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=40 Runoff=0.01 cfs 0.001 af

Subcatchment 53aS: Sub #53a Runoff Area=1,188 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 53bS: Sub #53b Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 53S: Sub #53 Runoff Area=645 sf 0.00% Impervious Runoff Depth=1.25"
Tc=6.0 min CN=39 Runoff=0.01 cfs 0.002 af

Reach 7aR: Reach #7 Avg. Flow Depth=0.04' Max Vel=1.31 fps Inflow=0.28 cfs 0.021 af
n=0.022 L=29.7' S=0.0421 '/' Capacity=55.48 cfs Outflow=0.28 cfs 0.021 af

Reach 7bR: Reach #7 Avg. Flow Depth=0.05' Max Vel=1.10 fps Inflow=0.28 cfs 0.021 af
n=0.022 L=78.0' S=0.0256 '/' Capacity=43.30 cfs Outflow=0.28 cfs 0.021 af

Reach 100R: Final Reach #100 Inflow=4.42 cfs 0.539 af
Outflow=4.42 cfs 0.539 af

Reach 200R: Final Reach #200 Inflow=0.26 cfs 0.019 af
Outflow=0.26 cfs 0.019 af

Reach 300R: Final Reach #300 Inflow=5.81 cfs 1.163 af
Outflow=5.81 cfs 1.163 af

Reach 400R: Final Reach #400 Inflow=0.23 cfs 0.017 af
Outflow=0.23 cfs 0.017 af

Reach 500R: Final Reach #500 Inflow=3.35 cfs 0.459 af
Outflow=3.35 cfs 0.459 af

Reach 600R: Final Reach #600 Inflow=0.15 cfs 0.011 af
Outflow=0.15 cfs 0.011 af

Pond 101P: Gravel Wetland #101 Peak Elev=124.61' Storage=18,886 cf Inflow=11.47 cfs 1.180 af
Primary=0.12 cfs 0.279 af Secondary=5.43 cfs 0.831 af Tertiary=0.00 cfs 0.000 af Outflow=5.55 cfs 1.110 af

Pond 102P: Rain Garden W/ Stormtech Peak Elev=120.33' Storage=3,977 cf Inflow=2.66 cfs 0.202 af
Outflow=0.81 cfs 0.197 af

Pond 103P: Porous Pavement Sidewalk W/ Peak Elev=118.55' Storage=906 cf Inflow=0.08 cfs 0.048 af
Outflow=0.02 cfs 0.048 af

Pond 104P: Porous Pavement Sidewalk #104 Peak Elev=120.49' Storage=239 cf Inflow=0.10 cfs 0.053 af
Discarded=0.01 cfs 0.017 af Primary=0.09 cfs 0.037 af Outflow=0.10 cfs 0.053 af

Pond 201P: Infiltration Trench #201 Peak Elev=126.72' Storage=835 cf Inflow=0.59 cfs 0.050 af
Outflow=0.04 cfs 0.050 af

Pond 202P: Infiltration Trench #202 Peak Elev=123.58' Storage=724 cf Inflow=0.51 cfs 0.044 af
Discarded=0.04 cfs 0.044 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.044 af

Pond 203P: Infiltration Trench #203 Peak Elev=128.87' Storage=572 cf Inflow=0.45 cfs 0.038 af
Outflow=0.04 cfs 0.038 af

Pond C01P: Catch Basin #1 Peak Elev=125.00' Storage=0.001 af Inflow=3.06 cfs 0.228 af
15.0" Round Culvert n=0.012 L=18.0' S=0.0050 '/' Outflow=3.02 cfs 0.228 af

Pond C02P: Catch Basin #2 Peak Elev=124.96' Storage=0.001 af Inflow=3.65 cfs 0.281 af
15.0" Round Culvert n=0.012 L=57.2' S=0.0051 '/' Outflow=3.60 cfs 0.281 af

Pond C03P: Catch Basin #3 Peak Elev=125.22' Storage=0.001 af Inflow=3.83 cfs 0.478 af
15.0" Round Culvert n=0.012 L=19.2' S=0.0052 '/' Outflow=3.78 cfs 0.478 af

Pond C04P: Catch Basin #4 Peak Elev=124.92' Storage=0.001 af Inflow=8.55 cfs 0.858 af
18.0" Round Culvert n=0.012 L=72.0' S=0.0050 '/' Outflow=8.54 cfs 0.858 af

Pond D01P: Drain Manhole #1 Peak Elev=114.27' Storage=0.000 af Inflow=0.81 cfs 0.197 af
12.0" Round Culvert n=0.012 L=78.0' S=0.0051 '/' Outflow=0.82 cfs 0.197 af

Pond Y01P: Yard Drain #1 Peak Elev=125.09' Storage=1,924 cf Inflow=2.59 cfs 0.291 af
Outflow=3.03 cfs 0.290 af

Pond Y02P: Yard Drain #2 Peak Elev=125.23' Storage=10 cf Inflow=3.40 cfs 0.360 af
15.0" Round Culvert n=0.012 L=51.2' S=0.0051 '/' Outflow=3.39 cfs 0.360 af

Total Runoff Area = 5.219 ac Runoff Volume = 2.480 af Average Runoff Depth = 5.70"
67.07% Pervious = 3.501 ac 32.93% Impervious = 1.719 ac

Appendix III - Calculations, Charts, & Graphs

Extreme Precipitation Tables
Rip Rap Calculations
AoT Stormwater Treatment Spreadsheets
NCRS USDA Web-soil Map
Site Specific Soil Survey Report & Plan
Infiltration Feasibility Study & Report
Ksat New Hampshire Manual
Stormwater System Management: Inspection & Maintenance Manual & Plan
UNHSC Gravel Wetland Inspection Documentation
Stormtech Sc-740 Chamber Submittal Documentation
Rain Guardian Foxhole Documentation
Watershed Report Card, 303(d) List, & ORW List
Filtrexx Specifications Sheets

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.207 degrees North
Longitude	70.889 degrees West
Elevation	30 feet
Date/Time	Tue Apr 09 2024 12:40:31 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	2.00	2.60	2.87	**1yr**	2.30	2.76	3.16	3.88	4.45	**1yr**
2yr	0.32	0.49	0.61	0.81	1.01	1.29	**2yr**	0.88	1.17	1.50	1.91	2.45	3.15	3.50	**2yr**	2.79	3.37	3.86	4.60	5.23	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.07	3.97	4.49	**5yr**	3.52	4.32	4.94	5.80	6.56	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.85	**10yr**	1.22	1.69	2.18	2.82	3.66	4.74	5.42	**10yr**	4.19	5.21	5.95	6.93	7.79	**10yr**
25yr	0.46	0.74	0.94	1.30	1.72	2.27	**25yr**	1.49	2.09	2.70	3.53	4.60	5.99	6.94	**25yr**	5.30	6.68	7.61	8.75	9.78	**25yr**
50yr	0.52	0.83	1.06	1.49	2.00	2.67	**50yr**	1.73	2.46	3.18	4.18	5.48	7.16	8.39	**50yr**	6.33	8.06	9.18	10.46	11.61	**50yr**
100yr	0.58	0.94	1.21	1.71	2.32	3.12	**100yr**	2.01	2.89	3.75	4.95	6.52	8.55	10.13	**100yr**	7.57	9.74	11.07	12.49	13.81	**100yr**
200yr	0.64	1.05	1.36	1.95	2.70	3.67	**200yr**	2.33	3.40	4.43	5.89	7.77	10.22	12.24	**200yr**	9.04	11.77	13.36	14.94	16.42	**200yr**
500yr	0.76	1.25	1.62	2.36	3.31	4.54	**500yr**	2.85	4.22	5.50	7.37	9.79	12.94	15.73	**500yr**	11.46	15.12	17.12	18.92	20.66	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.61	0.74	0.90	**1yr**	0.64	0.88	0.92	1.25	1.56	2.11	2.46	**1yr**	1.87	2.36	2.90	3.38	4.05	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.16	1.36	1.83	2.35	3.05	3.40	**2yr**	2.70	3.27	3.75	4.47	5.06	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.15	2.78	3.70	4.12	**5yr**	3.28	3.96	4.61	5.40	6.10	**5yr**
10yr	0.38	0.59	0.73	1.02	1.31	1.60	**10yr**	1.13	1.56	1.81	2.44	3.13	4.26	4.78	**10yr**	3.77	4.59	5.32	6.23	7.00	**10yr**
25yr	0.44	0.66	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.84	3.65	4.99	5.78	**25yr**	4.41	5.56	6.48	7.53	8.39	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.19	**50yr**	1.52	2.14	2.35	3.19	4.10	5.70	6.66	**50yr**	5.04	6.40	7.52	8.68	9.61	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.51	**100yr**	1.74	2.46	2.63	3.57	4.57	6.50	7.67	**100yr**	5.76	7.38	8.74	10.00	10.99	**100yr**
200yr	0.60	0.90	1.14	1.65	2.29	2.88	**200yr**	1.98	2.81	2.93	4.00	5.11	7.42	8.83	**200yr**	6.56	8.49	10.13	11.53	12.59	**200yr**
500yr	0.70	1.04	1.33	1.93	2.75	3.46	**500yr**	2.37	3.39	3.40	4.64	5.93	8.79	10.63	**500yr**	7.78	10.22	12.32	13.94	15.02	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.23	1.74	2.21	2.86	3.08	**1yr**	2.53	2.97	3.42	4.21	4.79	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.25	**2yr**	0.90	1.22	1.47	1.95	2.50	3.27	3.62	**2yr**	2.90	3.49	4.00	4.75	5.43	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.55	1.85	2.49	3.19	4.23	4.85	**5yr**	3.75	4.67	5.28	6.23	6.99	**5yr**
10yr	0.46	0.70	0.87	1.22	1.57	1.92	**10yr**	1.36	1.88	2.23	3.04	3.85	5.20	6.06	**10yr**	4.61	5.83	6.66	7.64	8.52	**10yr**
25yr	0.56	0.84	1.05	1.50	1.97	2.47	**25yr**	1.70	2.42	2.87	3.95	4.94	6.98	8.14	**25yr**	6.18	7.83	8.92	10.06	11.10	**25yr**
50yr	0.64	0.98	1.22	1.75	2.35	2.99	**50yr**	2.03	2.92	3.49	4.81	6.00	8.61	10.20	**50yr**	7.62	9.81	11.15	12.37	13.57	**50yr**
100yr	0.75	1.13	1.41	2.04	2.80	3.61	**100yr**	2.42	3.53	4.23	5.89	7.30	10.63	12.78	**100yr**	9.41	12.29	13.93	15.24	16.60	**100yr**
200yr	0.87	1.30	1.65	2.39	3.33	4.37	**200yr**	2.88	4.27	5.14	7.20	8.85	13.15	16.04	**200yr**	11.64	15.42	17.42	18.77	20.33	**200yr**
500yr	1.06	1.58	2.03	2.95	4.19	5.61	**500yr**	3.61	5.49	6.64	9.41	11.47	17.44	21.65	**500yr**	15.44	20.82	23.43	24.74	26.61	**500yr**

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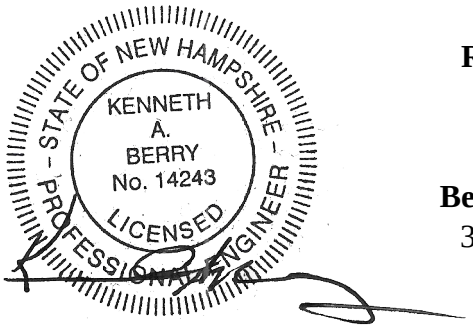


RIP RAP CALCULATIONS

24-018 The Stabile Companies
141 Sixth Street
Dover, NH

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH
24-Jun-25

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.* Rip Rap was sized for the 25 year storm event. (Some d50 sizes and T values have been modified)

TAILWATER < HALF THE Do

La = (1.8 x Q) / Do 1.5 + (7 x Do) Q = Peak Flow & Do is Pipe Diameter
W = La + 3*Do or defined channel width
d50 = (0.02 x Q4/3) / (Tw x Do) Tw = Tailwater Depth
T = Largest Stone Size x 1.5

Culvert or Catch Basin	Tailwater (Feet) Tw	Discharge (C.F.S.) Q	Diameter of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	d50-Stone Rip Rap d50(ft.)	Actual Size	Thickness
6" HDPE (Pond #101P)	0.10	0.11	0.50	3.8	5.3	0.02	0.50	1.20
15" HDPE (Pond #101P)	0.25	3.40	1.25	12.0	15.8	0.31	0.50	1.20
6" HDPE (Pond #104P)	0.30	0.07	0.50	3.7	5.2	0.00	0.50	1.20

TAILWATER > HALF THE Do

La = (3.0 x Q) / Do 3/2 + (7 x Do) Q = Peak Flow & Do is Pipe Diameter
W = 0.4La + 3*Do or defined channel width
d50 = (0.02 x Q4/3) / (Tw x Do) Tw = Tailwater Depth
T = Largest Stone Size x 1.5

Culvert or Catch Basin	Tailwater (Feet) Tw	Discharge (C.F.S.) Q	Diameter of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	d50-Stone Rip Rap d50(ft.)	Actual Size	Thickness
18" HDPE (Pond #C04P)	3.31	6.87	1.50	19.7	12.4	0.05	0.50	1.20

Please note that the designer chose to use the 25 Year Event for the dimensional calculations.

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.5	Feet	6	Inches
% of Weight Smaller	Size of Stone (Inches)			
Than the Given d50 Size	From		To	
100%	9		12	
85%	8		11	
50%	6		9	
15%	2		3	

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION (Env-Wq 1507.04)

0.45	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
-	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
1.00	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.19	inches	Rd = Weighted groundwater recharge depth	
0.2788	ac-in	GRV = AI * Rd	
1,012	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

P201 2 YR Infiltration Volume: 0.020 AF = 871 CF

P202 2 YR Infiltration Volume: 0.018 AF = 784 CF

P203 2 YR Infiltration Volume: 0.016 AF = 697 CF

P103 2 YR Infiltration Volume: 0.020 AF = 871 CF

Total GRV provided in model = 3,223 CF

Summary for Pond 103P: Porous Pavement Sidewalk W/ Infiltration #103

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=121)

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 3.39" for 2Yr-24Hr event
Inflow = 0.04 cfs @ 15.66 hrs, Volume= 0.020 af
Outflow = 0.02 cfs @ 15.25 hrs, Volume= 0.020 af, Atten= 39%, Lag= 0.0 min
Discarded = 0.02 cfs @ 15.25 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 117.93' @ 18.06 hrs Surf.Area= 3,134 sf Storage= 131 cf
Flood Elev= 120.67' Surf.Area= 3,134 sf Storage= 2,620 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 42.7 min (1,063.0 - 1,020.3)

Volume	Invert	Avail.Storage	Storage Description
#1	117.83'	1,254 cf	**Stone Reservoir (Irregular)**Listed below (Recalc) 3,134 cf Overall x 40.0% Voids
#2	118.83'	940 cf	**Filter Media (Irregular)**Listed below (Recalc) -Impervious 4,701 cf Overall x 20.0% Voids
#3	120.33'	426 cf	**Choker Course (Irregular)**Listed below (Recalc) -Impervious 1,066 cf Overall x 40.0% Voids
		2,620 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.83	3,134	1,268.0	0	0	3,134
118.83	3,134	1,268.0	3,134	3,134	4,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
118.83	3,134	1,268.0	0	0	3,134
120.33	3,134	1,268.0	4,701	4,701	5,036

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.33	3,134	1,268.0	0	0	3,134
120.67	3,134	1,268.0	1,066	1,066	3,565

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.83'	**0.300 in/hr 0.3in/Hr Infiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 15.25 hrs HW=117.86' (Free Discharge)
1=0.3in/Hr Infiltration (Exfiltration Controls 0.02 cfs)

Summary for Pond 203P: Infiltration Trench #203

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=94)

Inflow Area = 0.070 ac, 78.73% Impervious, Inflow Depth > 2.67" for 2Yr-24Hr event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.04 cfs @ 11.85 hrs, Volume= 0.016 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.85 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 126.96' @ 12.51 hrs Surf.Area= 545 sf Storage= 154 cf
Flood Elev= 129.00' Surf.Area= 545 sf Storage= 600 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 20.1 min (774.1 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1	126.25'	600 cf	**Stone (Irregular)** Listed below (Recalc) 1,499 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.25	545	95.0	0	0	545
129.00	545	95.0	1,499	1,499	806

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.25'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.85 hrs HW=126.29' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Summary for Pond 202P: Infiltration Trench #202

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=85)

Inflow Area = 0.076 ac, 83.21% Impervious, Inflow Depth > 2.82" for 2Yr-24Hr event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.018 af
Outflow = 0.04 cfs @ 11.80 hrs, Volume= 0.018 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.80 hrs, Volume= 0.018 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 121.02' @ 12.56 hrs Surf.Area= 506 sf Storage= 206 cf
Flood Elev= 124.00' Surf.Area= 506 sf Storage= 810 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.7 min (785.8 - 754.1)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	860 cf	**Stone (Irregular)** Listed below (Recalc) 2,151 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	506	91.0	0	0	506
124.00	506	91.0	2,024	2,024	870
124.25	506	91.0	127	2,151	893

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**
#2	Primary	124.00'	**26.0' long x 2.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 11.80 hrs HW=120.05' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Overflow** (Controls 0.00 cfs)

Summary for Pond 201P: Infiltration Trench #201

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=85)

Inflow Area = 0.090 ac, 79.90% Impervious, Inflow Depth > 2.64" for 2Yr-24Hr event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.04 cfs @ 11.80 hrs, Volume= 0.020 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.80 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 124.00' @ 12.56 hrs Surf.Area= 562 sf Storage= 224 cf
Flood Elev= 127.50' Surf.Area= 562 sf Storage= 1,012 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.9 min (787.2 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1	123.00'	1,012 cf	**Stone (Irregular)** Listed below (Recalc) 2,529 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	562	96.8	0	0	562
127.50	562	96.8	2,529	2,529	998

Device	Routing	Invert	Outlet Devices
#1	Discarded	123.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.80 hrs HW=123.05' (Free Discharge)
1=Infiltration 3in/hr (Exfiltration Controls 0.04 cfs)

GRAVEL WETLAND DESIGN CRITERIA
(Env-Wq 1508.05)

Type/Node Name: **Gravel Wetland #101 (Pond 101P)**

Enter the node name in the drainage analysis if applicable.

2.43	ac	A = Area draining to the practice	
0.88	ac	A_I = Impervious area draining to the practice	
0.36	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.38	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.91	ac-in	WQV= 1" x Rv x A	
3,311	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
331	cf	10% x WQV (check calc for sediment forebay)	
1,490	cf	45% x WQV (check calc for gravel wetland treatment bay volume)	
1,583	cf	V_{SED} = Sediment forebay volume	**≥ 10%WQV**
7,303	cf	V_{TB1} = Volume of treatment bay 1 [1]	**≥ 45%WQV**
N/A	cf	V_{TB2} = Volume of treatment bay 2 [1]	**≥ 45%WQV**
0.08	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec) [2]	
121.83	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.06	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{avg}$**
30.66	hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
2.00	:1	Pond side slopes	**≥ 3:1**
119.90	ft	Elevation of SHWT	
117.90	ft	SHWT - 2 feet	
120.67	ft	Epp = Elevation of the permanent pool (elevation of lowest orifice) [3]	**≤ E_{SHWT} - 2 ft**
36.30	ft	Length of the flow path between the inlet and outlet in each cell	**≥ 15 ft**
Angle	Grate	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
124.61	ft	Peak elevation of the 50-year storm event (E_{50})	
125.50	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**
Qualified professional that developed the planting plan			
Name, Profession:		KRP/KAB	

1. Volume stored above the wetland soil and below the high flow by-pass.

2. To ensure orifice is sized so that WQV is released at a relatively stable rate.

3. 4" to 8" below the wetland soil. If lowest orifice is higher than (SHWT - 2 feet), and saturated hydraulic conductivity (Ksat) is greater than 0.015 in/hr, the system must be lined.

Designer's Notes:

Waiver requested for 2:1 pond side slopes

System to be lined with low perm material, the underlying material may qualify. Coord.with design engineer

Summary for Pond 101P: Gravel Wetland #101

Inflow Area = 2.429 ac, 36.17% Impervious, Inflow Depth > 5.81" for 50Yr-24Hr event
Inflow = 11.47 cfs @ 12.11 hrs, Volume= 1.176 af
Outflow = 5.55 cfs @ 12.39 hrs, Volume= 0.953 af, Atten= 52%, Lag= 16.9 min
Primary = 0.12 cfs @ 12.39 hrs, Volume= 0.127 af
Secondary = 5.43 cfs @ 12.39 hrs, Volume= 0.826 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 124.61' @ 12.39 hrs Surf.Area= 12,549 sf Storage= 18,886 cf
Flood Elev= 125.50' Surf.Area= 14,206 sf Storage= 26,155 cf

Plug-Flow detention time= 139.2 min calculated for 0.953 af (81% of inflow)
Center-of-Mass det. time= 65.8 min (869.0 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	120.67'	50 cf	**4.00'D x 4.00'H Outlet Structure A**
#2	121.00'	1,583 cf	**Sediment Forebay (Irregular)**Listed below (Recalc)
#3	121.00'	7,303 cf	**Cell #1 (Irregular)**Listed below (Recalc)
#4	123.00'	17,219 cf	**Open Water Storage (Irregular)**Listed below (Recalc)
		26,155 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	582	96.6	0	0	582
122.00	788	109.2	682	682	813
123.00	1,019	121.2	901	1,583	1,061

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	3,117	240.3	0	0	3,117
122.00	3,646	241.3	3,378	3,378	3,361
123.00	4,210	270.9	3,925	7,303	4,594

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	5,491	369.5	0	0	5,491
124.00	6,211	428.9	5,847	5,847	9,286
125.00	8,063	728.1	7,117	12,964	36,840
125.50	8,964	747.0	4,255	17,219	39,089

Device	Routing	Invert	Outlet Devices
#1	Primary	120.67'	**6.0" Round 6" HDPE N-12** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.67' / 120.50' S= 0.0142 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	120.67'	**15.0" Round 15" HDPE N-12** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.67' / 120.50' S= 0.0106 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

#3	Device 1	120.67'	**1.5" Vert. 1.5" Orifice** C= 0.600
#4	Device 2	123.00'	**12.0" Vert. 12" Orifice** C= 0.600
#5	Device 2	124.50'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	125.00'	**20.0' long x 8.0' breadth 20' Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.12 cfs @ 12.39 hrs HW=124.61' TW=0.00' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.12 cfs of 1.81 cfs potential flow)
  └─**3=1.5" Orifice** (Orifice Controls 0.12 cfs @ 9.48 fps)

Secondary OutFlow Max=5.38 cfs @ 12.39 hrs HW=124.61' TW=0.00' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 5.38 cfs of 10.75 cfs potential flow)
  ├─**4=12" Orifice** (Orifice Controls 3.98 cfs @ 5.06 fps)
  └─**5=48" Outlet Structure** (Weir Controls 1.40 cfs @ 1.06 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.67' TW=0.00' (Dynamic Tailwater)
└─**6=20' Spillway** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 101P: Gravel Wetland #101

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
120.67	0	123.32	10,712
120.72	1	123.37	11,000
120.77	1	123.42	11,289
120.82	2	123.47	11,580
120.87	3	123.52	11,873
120.92	3	123.57	12,167
120.97	4	123.62	12,463
121.02	79	123.67	12,762
121.07	266	123.72	13,062
121.12	455	123.77	13,363
121.17	645	123.82	13,667
121.22	838	123.87	13,972
121.27	1,032	123.92	14,280
121.32	1,228	123.97	14,589
121.37	1,426	124.02	14,900
121.42	1,626	124.07	15,215
121.47	1,827	124.12	15,535
121.52	2,030	124.17	15,858
121.57	2,235	124.22	16,187
121.62	2,442	124.27	16,520
121.67	2,651	124.32	16,857
121.72	2,862	124.37	17,199
121.77	3,075	124.42	17,545
121.82	3,289	124.47	17,896
121.87	3,506	124.52	18,251
121.92	3,724	124.57	18,611
121.97	3,944	124.62	18,976
122.02	4,166	124.67	19,346
122.07	4,390	124.72	19,719
122.12	4,616	124.77	20,098
122.17	4,844	124.82	20,481
122.22	5,074	124.87	20,869
122.27	5,306	124.92	21,262
122.32	5,539	124.97	21,660
122.37	5,775	125.02	22,062
122.42	6,013	125.07	22,469
122.47	6,252	125.12	22,881
122.52	6,494	125.17	23,297
122.57	6,737	125.22	23,717
122.62	6,983	125.27	24,142
122.67	7,230	125.32	24,572
122.72	7,480	125.37	25,006
122.77	7,732	125.42	25,444
122.82	7,985	125.47	**25,887**
122.87	8,241		
122.92	8,499		
122.97	8,759		
123.02	9,026		
123.07	9,302		
123.12	9,581		
123.17	9,861		
123.22	10,143		
123.27	10,427		

WQV Storage Calculation:
WQV = 3,311 CF
WQV Elev.: = 121.83

Stage-Discharge for Pond 101P: Gravel Wetland #101

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
120.67	0.00	0.00	0.00	0.00
120.77	0.01	0.01	0.00	0.00
120.87	0.02	0.02	0.00	0.00
120.97	0.03	0.03	0.00	0.00
121.07	0.03	0.03	0.00	0.00
121.17	0.04	0.04	0.00	0.00
121.27	0.04	0.04	0.00	0.00
121.37	0.05	0.05	0.00	0.00
121.47	0.05	0.05	0.00	0.00
121.57	0.05	0.05	0.00	0.00
121.67	0.06	0.06	0.00	0.00
121.77	0.06	0.06	0.00	0.00
121.87	0.06	0.06	0.00	0.00
121.97	0.07	0.07	0.00	0.00
122.07	0.07	0.07	0.00	0.00
122.17	0.07	0.07	0.00	0.00
122.27	0.07	0.07	0.00	0.00
122.37	0.08	0.08	0.00	0.00
122.47	0.08	0.08	0.00	0.00
122.57	0.08	0.08	0.00	0.00
122.67	0.08	0.08	0.00	0.00
122.77	0.08	0.08	0.00	0.00
122.87	0.09	0.09	0.00	0.00
122.97	0.09	0.09	0.00	0.00
123.07	0.11	0.09	0.02	0.00
123.17	0.22	0.09	0.12	0.00
123.27	0.40	0.09	0.30	0.00
123.37	0.64	0.10	0.55	0.00
123.47	0.94	0.10	0.85	0.00
123.57	1.29	0.10	1.19	0.00
123.67	1.66	0.10	1.56	0.00
123.77	2.04	0.10	1.94	0.00
123.87	2.41	0.10	2.30	0.00
123.97	2.72	0.11	2.61	0.00
124.07	2.96	0.11	2.86	0.00
124.17	3.20	0.11	3.10	0.00
124.27	3.43	0.11	3.32	0.00
124.37	3.64	0.11	3.53	0.00
124.47	3.84	0.11	3.72	0.00
124.57	4.79	0.12	4.67	0.00
124.67	7.09	0.12	6.97	0.00
124.77	10.15	0.12	10.03	0.00
124.87	11.29	0.12	11.17	0.00
124.97	11.45	0.12	11.33	0.00
125.07	12.50	0.12	11.48	0.90
125.17	15.16	0.12	11.63	3.41
125.27	18.83	0.13	11.78	6.93
125.37	23.41	0.13	11.93	11.36
125.47	**28.93**	**0.13**	**12.07**	**16.73**

WQV Elev.: = 121.83
WQV Discharge = 0.06 CFS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Rain Garden W/ Stormtech #102**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.41	ac	A = Area draining to the practice	
0.19	ac	A_I = Impervious area draining to the practice	
0.47	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.19	ac-in	WQV= 1" x Rv x A	
698	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
175	cf	25% x WQV (check calc for sediment forebay volume)	
524	cf	75% x WQV (check calc for surface sand filter volume)	
Guardian Foxhole		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
120.76	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
***	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
118.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
114.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
117.73	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
115.23	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
2.77	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
0.27	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
120.33	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
121.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
727	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	P102	Note what sheet in the plan set contains the filter course specification	
2.0	:1	Pond side slopes	**≥ 3:1**
Sheet	P102	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Waiver requested for 2:1 side slopes

See Drain Down Time sheet of 41 hours for the 2year, 24HR storm event***

The SCM is controlled by a 1" orifice at the bottom of the control stack of the outlet strucuture.

Summary for Pond 102P: Rain Garden W/ Stormtech Storage #102

Inflow Area = 0.409 ac, 46.73% Impervious, Inflow Depth > 5.93" for 50Yr-24Hr event
Inflow = 2.66 cfs @ 12.09 hrs, Volume= 0.202 af
Outflow = 0.81 cfs @ 12.42 hrs, Volume= 0.139 af, Atten= 69%, Lag= 19.6 min
Primary = 0.81 cfs @ 12.42 hrs, Volume= 0.139 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 120.33' @ 12.42 hrs Surf.Area= 4,349 sf Storage= 3,977 cf
Flood Elev= 121.00' Surf.Area= 4,643 sf Storage= 4,437 cf

Plug-Flow detention time= 182.8 min calculated for 0.138 af (69% of inflow)
Center-of-Mass det. time= 88.7 min (880.4 - 791.7)

Volume	Invert	Avail.Storage	Storage Description
#1	114.00'	1,794 cf	**Lower Stone Storage (Irregular)** Listed below (Recalc) 4,485 cf Overall x 40.0% Voids
#2	117.00'	655 cf	**Stone Storage Under Biomedia (Irregular)** Listed below (Recalc) 1,638 cf Overall x 40.0% Voids
#3	118.00'	270 cf	**Bio Media (Irregular)** Listed below (Recalc) 1,350 cf Overall x 20.0% Voids
#4	120.00'	615 cf	**Open Water Storage (Irregular)** Listed below (Recalc)
#5	114.50'	1,103 cf	**ADS_StormTech SC-740 +Cap** x 24 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		4,437 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.00	1,495	229.4	0	0	1,495
117.00	1,495	229.4	4,485	4,485	2,183

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.00	1,638	233.4	0	0	1,638
118.00	1,638	233.4	1,638	1,638	1,871

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
118.00	675	149.2	0	0	675
120.00	675	149.2	1,350	1,350	973

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	405	138.0	0	0	405
120.50	617	198.5	254	254	2,027
121.00	834	217.0	361	615	2,648

Device	Routing	Invert	Outlet Devices
#1	Primary	114.00'	**12.0" Round 12" HDPE N-12** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 114.00' / 113.85' S= 0.0150 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	114.00'	**1.0" Vert. 1" Orifice** C= 0.600
#3	Device 1	117.00'	**4.0" Vert. 4" Orifice** C= 0.600
#4	Device 1	120.80'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.81 cfs @ 12.42 hrs HW=120.33' TW=114.27' (Dynamic Tailwater)
└─**1=12" HDPE N-12** (Passes 0.81 cfs of 9.13 cfs potential flow)
  ├─**2=1" Orifice** (Orifice Controls 0.06 cfs @ 11.85 fps)
  ├─**3=4" Orifice** (Orifice Controls 0.75 cfs @ 8.56 fps)
  └─**4=48" Outlet Structure** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
114.00	0	115.06	981	116.12	2,165
114.02	12	115.08	1,005	116.14	2,186
114.04	24	115.10	1,029	116.16	2,206
114.06	36	115.12	1,052	116.18	2,226
114.08	48	115.14	1,076	116.20	2,246
114.10	60	115.16	1,100	116.22	2,265
114.12	72	115.18	1,123	116.24	2,285
114.14	84	115.20	1,147	116.26	2,304
114.16	96	115.22	1,171	116.28	2,324
114.18	108	115.24	1,194	116.30	2,343
114.20	120	115.26	1,217	116.32	2,362
114.22	132	115.28	1,241	116.34	2,381
114.24	144	115.30	1,264	116.36	2,400
114.26	155	115.32	1,287	116.38	2,419
114.28	167	115.34	1,311	116.40	2,438
114.30	179	115.36	1,334	116.42	2,456
114.32	191	115.38	1,357	116.44	2,474
114.34	203	115.40	1,380	116.46	2,493
114.36	215	115.42	1,403	116.48	2,511
114.38	227	115.44	1,426	116.50	2,529
114.40	239	115.46	1,449	116.52	2,546
114.42	251	115.48	1,472	116.54	2,564
114.44	263	115.50	1,495	116.56	2,581
114.46	275	115.52	1,517	116.58	2,598
114.48	287	115.54	1,540	116.60	2,615
114.50	299	115.56	1,563	116.62	2,632
114.52	324	115.58	1,585	116.64	2,648
114.54	348	115.60	1,608	116.66	2,665
114.56	373	115.62	1,630	116.68	2,681
114.58	398	115.64	1,652	116.70	2,696
114.60	422	115.66	1,675	116.72	2,711
114.62	447	115.68	1,697	116.74	2,726
114.64	472	115.70	1,719	116.76	2,741
114.66	496	115.72	1,741	116.78	2,755
114.68	521	115.74	1,763	116.80	2,769
114.70	545	115.76	1,785	116.82	2,783
114.72	570	115.78	1,807	116.84	2,796
114.74	594	115.80	1,828	116.86	2,809
114.76	619	115.82	1,850	116.88	2,822
114.78	643	115.84	1,872	116.90	2,835
114.80	667	115.86	1,893	116.92	2,847
114.82	692	115.88	1,915	116.94	2,860
114.84	716	115.90	1,936	116.96	2,872
114.86	740	115.92	1,957	116.98	2,885
114.88	765	115.94	1,978	117.00	2,897
114.90	789	115.96	2,000	117.02	2,910
114.92	813	115.98	2,021	117.04	2,923
114.94	837	116.00	2,042	117.06	2,936
114.96	861	116.02	2,062	117.08	2,949
114.98	885	116.04	2,083	117.10	2,962
115.00	909	116.06	2,104	117.12	2,975
115.02	933	116.08	2,124	117.14	2,988
115.04	957	116.10	2,145	117.16	3,001

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
117.18	3,014	118.24	3,584	119.30	3,727
117.20	3,028	118.26	3,587	119.32	3,730
117.22	3,041	118.28	3,590	119.34	3,733
117.24	3,054	118.30	3,592	119.36	3,735
117.26	3,067	118.32	3,595	119.38	3,738
117.28	3,080	118.34	3,598	119.40	3,741
117.30	3,093	118.36	3,600	119.42	3,743
117.32	3,106	118.38	3,603	119.44	3,746
117.34	3,119	118.40	3,606	119.46	3,749
117.36	3,132	118.42	3,608	119.48	3,752
117.38	3,146	118.44	3,611	119.50	3,754
117.40	3,159	118.46	3,614	119.52	3,757
117.42	3,172	118.48	3,617	119.54	3,760
117.44	3,185	118.50	3,619	119.56	3,762
117.46	3,198	118.52	3,622	119.58	3,765
117.48	3,211	118.54	3,625	119.60	3,768
117.50	3,224	118.56	3,627	119.62	3,770
117.52	3,237	118.58	3,630	119.64	3,773
117.54	3,250	118.60	3,633	119.66	3,776
117.56	3,263	118.62	3,635	119.68	3,779
117.58	3,277	118.64	3,638	119.70	3,781
117.60	3,290	118.66	3,641	119.72	3,784
117.62	3,303	118.68	3,644	119.74	3,787
117.64	3,316	118.70	3,646	119.76	3,789
117.66	3,329	118.72	3,649	119.78	3,792
117.68	3,342	118.74	3,652	119.80	3,795
117.70	3,355	118.76	3,654	119.82	3,797
117.72	3,368	118.78	3,657	119.84	3,800
117.74	3,381	118.80	3,660	119.86	3,803
117.76	3,395	118.82	3,662	119.88	3,806
117.78	3,408	118.84	3,665	119.90	3,808
117.80	3,421	118.86	3,668	119.92	3,811
117.82	3,434	118.88	3,671	119.94	3,814
117.84	3,447	118.90	3,673	119.96	3,816
117.86	3,460	118.92	3,676	119.98	3,819
117.88	3,473	118.94	3,679	120.00	3,822
117.90	3,486	118.96	3,681	120.02	3,830
117.92	3,499	118.98	3,684	120.04	3,838
117.94	3,512	119.00	3,687	120.06	3,847
117.96	3,526	119.02	3,689	120.08	3,855
117.98	3,539	119.04	3,692	120.10	3,864
118.00	3,552	119.06	3,695	120.12	3,873
118.02	3,554	119.08	3,698	120.14	3,882
118.04	3,557	119.10	3,700	120.16	3,892
118.06	3,560	119.12	3,703	120.18	3,901
118.08	3,563	119.14	3,706	120.20	3,911
118.10	3,565	119.16	3,708	120.22	3,920
118.12	3,568	119.18	3,711	120.24	3,930
118.14	3,571	119.20	3,714	120.26	3,940
118.16	3,573	119.22	3,716	120.28	3,951
118.18	3,576	119.24	3,719	120.30	3,961
118.20	3,579	119.26	3,722	120.32	3,972
118.22	3,581	119.28	3,725	120.34	3,983

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102 (continued)

Elevation (feet)	Storage (cubic-feet)
120.36	3,994
120.38	4,005
120.40	4,016
120.42	4,028
120.44	4,039
120.46	4,051
120.48	4,063
120.50	4,075
120.52	4,088
120.54	4,100
120.56	4,113
120.58	4,126
120.60	4,139
120.62	4,152
120.64	4,166
120.66	4,179
120.68	4,193
120.70	4,207
120.72	4,221
120.74	4,235
120.76	4,250
120.78	4,264
120.80	4,279
120.82	4,294
120.84	4,309
120.86	4,325
120.88	4,340
120.90	4,356
120.92	4,372
120.94	4,388
120.96	4,404
120.98	4,420
121.00	**4,437**

WQV Storage Table
Inv. Biomedia: 118.00

WQV = 698 CF

3,552 CF + 698 CF = 4,250 CF

WQV Elev: = 120.76'

Hydrograph for Pond 102P: Rain Garden W/ Stormtech Storage #102

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	114.00	0.00
1.00	0.00	0	114.00	0.00
2.00	0.00	0	114.00	0.00
3.00	0.00	0	114.00	0.00
4.00	0.00	0	114.00	0.00
5.00	0.00	0	114.00	0.00
6.00	0.00	0	114.00	0.00
7.00	0.00	0	114.00	0.00
8.00	0.00	8	114.01	0.00
9.00	0.01	28	114.05	0.00
10.00	0.02	64	114.11	0.01
11.00	0.04	135	114.23	0.01
12.00	**0.52**	542	114.70	0.02
13.00	**0.09**	1,545	115.54	0.03
14.00	0.06	1,678	115.66	0.03
15.00	0.04	**1,736**	**115.72**	**0.03**
16.00	0.03	**1,748**	**115.73**	**0.03**
17.00	0.02	1,725	115.71	0.03
18.00	0.02	1,683	115.67	0.03
19.00	0.02	1,628	115.62	0.03
20.00	0.02	1,569	115.57	0.03
21.00	0.01	1,506	115.51	0.03
22.00	0.01	1,441	115.45	0.03
23.00	0.01	1,374	115.39	0.03
24.00	0.01	1,304	115.33	0.03
25.00	0.00	1,202	115.25	0.03
26.00	0.00	1,100	115.16	0.03
27.00	0.00	1,002	115.08	0.03
28.00	0.00	908	115.00	0.03
29.00	0.00	817	114.92	0.02
30.00	0.00	730	114.85	0.02
31.00	0.00	647	114.78	0.02
32.00	0.00	567	114.72	0.02
33.00	0.00	491	114.66	0.02
34.00	0.00	419	114.60	0.02
35.00	0.00	350	114.54	0.02
36.00	0.00	285	114.48	0.02
37.00	0.00	227	114.38	0.02
38.00	0.00	176	114.29	0.01
39.00	0.00	132	114.22	0.01
40.00	0.00	96	114.16	0.01
41.00	0.00	67	114.11	0.01
42.00	0.00	46	114.08	0.00
43.00	0.00	32	114.05	0.00
44.00	0.00	24	114.04	0.00
45.00	0.00	19	114.03	0.00
46.00	0.00	15	114.03	0.00
47.00	0.00	13	114.02	0.00
48.00	0.00	11	114.02	0.00

The 2YR-24HR Stormevent is drained from the system in 41 hours. The intent of this sheet is to demonstrate that the WQV drains in less than 72 hours.

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
114.00	0	115.06	981	116.12	2,165
114.02	12	115.08	1,005	116.14	2,186
114.04	24	115.10	1,029	116.16	2,206
114.06	36	115.12	1,052	116.18	2,226
114.08	48	115.14	1,076	116.20	2,246
114.10	60	115.16	1,100	116.22	2,265
114.12	72	115.18	1,123	116.24	2,285
114.14	84	115.20	1,147	116.26	2,304
114.16	96	115.22	1,171	116.28	2,324
114.18	108	115.24	1,194	116.30	2,343
114.20	120	115.26	1,217	116.32	2,362
114.22	132	115.28	1,241	116.34	2,381
114.24	144	115.30	1,264	116.36	2,400
114.26	155	115.32	1,287	116.38	2,419
114.28	167	115.34	1,311	116.40	2,438
114.30	179	115.36	1,334	116.42	2,456
114.32	191	115.38	1,357	116.44	2,474
114.34	203	115.40	1,380	116.46	2,493
114.36	215	115.42	1,403	116.48	2,511
114.38	227	115.44	1,426	116.50	2,529
114.40	239	115.46	1,449	116.52	2,546
114.42	251	115.48	1,472	116.54	2,564
114.44	263	115.50	1,495	116.56	2,581
114.46	275	115.52	1,517	116.58	2,598
114.48	287	115.54	1,540	116.60	2,615
114.50	299	115.56	1,563	116.62	2,632
114.52	324	115.58	1,585	116.64	2,648
114.54	348	115.60	1,608	116.66	2,665
114.56	373	115.62	1,630	116.68	2,681
114.58	398	115.64	1,652	116.70	2,696
114.60	422	115.66	1,675	116.72	2,711
114.62	447	115.68	1,697	116.74	2,726
114.64	472	115.70	1,719	116.76	2,741
114.66	496	115.72	1,741	116.78	2,755
114.68	521	115.74	1,763	116.80	2,769
114.70	545	115.76	1,785	116.82	2,783
114.72	570	115.78	1,807	116.84	2,796
114.74	594	115.80	1,828	116.86	2,809
114.76	619	115.82	1,850	116.88	2,822
114.78	643	115.84	1,872	116.90	2,835
114.80	667	115.86	1,893	116.92	2,847
114.82	692	115.88	1,915	116.94	2,860
114.84	716	115.90	1,936	116.96	2,872
114.86	740	115.92	1,957	116.98	2,885
114.88	765	115.94	1,978	117.00	2,897
114.90	789	115.96	2,000	117.02	2,910
114.92	813	115.98	2,021	117.04	2,923
114.94	837	116.00	2,042	117.06	2,936
114.96	861	116.02	2,062	117.08	2,949
114.98	885	116.04	2,083	117.10	2,962
115.00	909	116.06	2,104	117.12	2,975
115.02	933	116.08	2,124	117.14	2,988
115.04	957	116.10	2,145	117.16	3,001

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102 (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
117.18	3,014	118.24	3,584	119.30	3,727
117.20	3,028	118.26	3,587	119.32	3,730
117.22	3,041	118.28	3,590	119.34	3,733
117.24	3,054	118.30	3,592	119.36	3,735
117.26	3,067	118.32	3,595	119.38	3,738
117.28	3,080	118.34	3,598	119.40	3,741
117.30	3,093	118.36	3,600	119.42	3,743
117.32	3,106	118.38	3,603	119.44	3,746
117.34	3,119	118.40	3,606	119.46	3,749
117.36	3,132	118.42	3,608	119.48	3,752
117.38	3,146	118.44	3,611	119.50	3,754
117.40	3,159	118.46	3,614	119.52	3,757
117.42	3,172	118.48	3,617	119.54	3,760
117.44	3,185	118.50	3,619	119.56	3,762
117.46	3,198	118.52	3,622	119.58	3,765
117.48	3,211	118.54	3,625	119.60	3,768
117.50	3,224	118.56	3,627	119.62	3,770
117.52	3,237	118.58	3,630	119.64	3,773
117.54	3,250	118.60	3,633	119.66	3,776
117.56	3,263	118.62	3,635	119.68	3,779
117.58	3,277	118.64	3,638	119.70	3,781
117.60	3,290	118.66	3,641	119.72	3,784
117.62	3,303	118.68	3,644	119.74	3,787
117.64	3,316	118.70	3,646	119.76	3,789
117.66	3,329	118.72	3,649	119.78	3,792
117.68	3,342	118.74	3,652	119.80	3,795
117.70	3,355	118.76	3,654	119.82	3,797
117.72	3,368	118.78	3,657	119.84	3,800
117.74	3,381	118.80	3,660	119.86	3,803
117.76	3,395	118.82	3,662	119.88	3,806
117.78	3,408	118.84	3,665	119.90	3,808
117.80	3,421	118.86	3,668	119.92	3,811
117.82	3,434	118.88	3,671	119.94	3,814
117.84	3,447	118.90	3,673	119.96	3,816
117.86	3,460	118.92	3,676	119.98	3,819
117.88	3,473	118.94	3,679	120.00	3,822
117.90	3,486	118.96	3,681	120.02	3,830
117.92	3,499	118.98	3,684	120.04	3,838
117.94	3,512	119.00	3,687	120.06	3,847
117.96	3,526	119.02	3,689	120.08	3,855
117.98	3,539	119.04	3,692	120.10	3,864
118.00	3,552	119.06	3,695	120.12	3,873
118.02	3,554	119.08	3,698	120.14	3,882
118.04	3,557	119.10	3,700	120.16	3,892
118.06	3,560	119.12	3,703	120.18	3,901
118.08	3,563	119.14	3,706	120.20	3,911
118.10	3,565	119.16	3,708	120.22	3,920
118.12	3,568	119.18	3,711	120.24	3,930
118.14	3,571	119.20	3,714	120.26	3,940
118.16	3,573	119.22	3,716	120.28	3,951
118.18	3,576	119.24	3,719	120.30	3,961
118.20	3,579	119.26	3,722	120.32	3,972
118.22	3,581	119.28	3,725	120.34	3,983

Stage-Area-Storage for Pond 102P: Rain Garden W/ Stormtech Storage #102 (continued)

Elevation (feet)	Storage (cubic-feet)
120.36	3,994
120.38	4,005
120.40	4,016
120.42	4,028
120.44	4,039
120.46	4,051
120.48	4,063
120.50	4,075
120.52	4,088
120.54	4,100
120.56	4,113
120.58	4,126
120.60	4,139
120.62	4,152
120.64	4,166
120.66	4,179
120.68	4,193
120.70	4,207
120.72	4,221
120.74	4,235
120.76	4,250
120.78	4,264
120.80	4,279
120.82	4,294
120.84	4,309
120.86	4,325
120.88	4,340
120.90	4,356
120.92	4,372
120.94	4,388
120.96	4,404
120.98	4,420
121.00	**4,437**

WQV Storage Table
Inv. Biomedia: 118.00
Inv. top outlet structure: 120.80
(lowest orifice above the biomedia)

4,279 CF - 3,552 CF = 727 CF

Total Storage Volume above biomedia = 727 CF

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Porous Pavement W/ Infiltration #103 (103P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

YES		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.07	ac	A = Area draining to the practice	
0.07	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.07	ac-in	WQV= 1" x Rv x A	
248	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
62	cf	25% x WQV (check calc for sediment forebay volume)	
186	cf	75% x WQV (check calc for surface sand filter volume)	
N/A		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
3,134	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
N/A	Yes/No	(Use the calculations below)	
3.2	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
118.83	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
-	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
117.73	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
115.23	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
118.83	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.60	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.10	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
118.55	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
120.67	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Asphalt		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.1	acres	A_{SA} = Surface area of the pervious pavement	
1.0	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
18.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet	P103	Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes: No area other than the surface of the porous pavement sidewalk contributes to the SCM.

P103 crosses several soil types including Windsor (0+00-1+40, 3+05-4+50), Windsor Variant (1+40-3+05) Elmridge (4+50-4+95) and Boxford (4+95-6+10).

See Infiltration Feasibility Report for further discussion of the determination of the infiltration rate.

It can be seen from the project cross sections that the sidewalk is primarily a fill, creating a receiving infiltration area, even in the soils with less underlying infiltration capacity.

3,134 SF Surface Area

Calculations provided at elevation 121 where the porous pavement sidewalk starts at Sixth Street

Summary for Pond 103P: Porous Pavement Sidewalk W/ Infiltration #103

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 7.99" for 50Yr-24Hr event
Inflow = 0.08 cfs @ 15.66 hrs, Volume= 0.048 af
Outflow = 0.02 cfs @ 13.70 hrs, Volume= 0.048 af, Atten= 74%, Lag= 0.0 min
Discarded = 0.02 cfs @ 13.70 hrs, Volume= 0.048 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 118.55' @ 20.88 hrs Surf.Area= 3,134 sf Storage= 906 cf
Flood Elev= 120.67' Surf.Area= 3,134 sf Storage= 2,620 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 361.7 min (1,368.9 - 1,007.3)

Volume	Invert	Avail.Storage	Storage Description
#1	117.83'	1,254 cf	**Stone Reservoir (Irregular)**Listed below (Recalc) 3,134 cf Overall x 40.0% Voids
#2	118.83'	940 cf	**Filter Media (Irregular)**Listed below (Recalc) -Impervious 4,701 cf Overall x 20.0% Voids
#3	120.33'	426 cf	**Choker Course (Irregular)**Listed below (Recalc) -Impervious 1,066 cf Overall x 40.0% Voids
		2,620 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.83	3,134	1,268.0	0	0	3,134
118.83	3,134	1,268.0	3,134	3,134	4,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
118.83	3,134	1,268.0	0	0	3,134
120.33	3,134	1,268.0	4,701	4,701	5,036

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.33	3,134	1,268.0	0	0	3,134
120.67	3,134	1,268.0	1,066	1,066	3,565

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.83'	**0.300 in/hr 0.3in/Hr Infiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 13.70 hrs HW=117.86' (Free Discharge)
↑**1=0.3in/Hr Infiltration** (Exfiltration Controls 0.02 cfs)

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Porous Pavement Sidewalk #104 (104P)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

YES		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.11	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.33	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.35	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.04	ac-in	WQV= 1" x Rv x A	
134	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
33	cf	25% x WQV (check calc for sediment forebay volume)	
100	cf	75% x WQV (check calc for surface sand filter volume)	
N/A		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
121.55	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
1.58	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.05	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
121.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
120.33	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
121.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
118.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
0.67	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.00	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
-	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
120.49	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
123.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
Asphalt		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.0	acres	A_{SA} = Surface area of the pervious pavement	
3.8	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
18.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet	P104	Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Surface Area = 1,211 Sq. Ft.

Summary for Pond 104P: Porous Pavement Sidewalk #104

Inflow Area = 0.105 ac, 33.47% Impervious, Inflow Depth > 5.61" for 50Yr-24Hr event
Inflow = 0.10 cfs @ 15.93 hrs, Volume= 0.049 af
Outflow = 0.10 cfs @ 16.00 hrs, Volume= 0.045 af, Atten= 0%, Lag= 3.7 min
Discarded = 0.01 cfs @ 12.80 hrs, Volume= 0.009 af
Primary = 0.09 cfs @ 16.00 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 120.49' @ 16.00 hrs Surf.Area= 1,211 sf Storage= 239 cf
Flood Elev= 123.00' Surf.Area= 1,211 sf Storage= 1,008 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.5 min (1,047.3 - 1,019.8)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	484 cf	**Stone Reservoir (Irregular)**Listed below (Recalc) 1,211 cf Overall x 40.0% Voids
#2	121.00'	363 cf	**Filter Media (Irregular)**Listed below (Recalc) -Impervious 1,817 cf Overall x 20.0% Voids
#3	122.50'	160 cf	**Choker Course (Irregular)**Listed below (Recalc) -Impervious 400 cf Overall x 40.0% Voids
		1,008 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	1,211	492.7	0	0	1,211
121.00	1,211	492.7	1,211	1,211	1,704

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.00	1,211	492.7	0	0	1,211
122.50	1,211	492.7	1,817	1,817	1,950

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.50	1,211	492.7	0	0	1,211
122.83	1,211	492.7	400	400	1,374

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**0.300 in/hr 0.3in/Hr Infiltration over Surface area**
#2	Primary	120.33'	**8.0" Round 8" HDPE N-12** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.33' / 120.00' S= 0.0132 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf

Discarded OutFlow Max=0.01 cfs @ 12.80 hrs HW=120.03' (Free Discharge)
↑**1=0.3in/Hr Infiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 16.00 hrs HW=120.49' TW=0.00' (Dynamic Tailwater)
↑**2=8" HDPE N-12** (Inlet Controls 0.09 cfs @ 1.37 fps)

Stage-Area-Storage for Pond 104P: Porous Pavement Sidewalk #104

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
120.00	**1,211**	0
120.05	1,211	24
120.10	1,211	48
120.15	1,211	73
120.20	1,211	97
120.25	1,211	121
120.30	1,211	145
120.35	1,211	170
120.40	1,211	194
120.45	1,211	218
120.50	1,211	242
120.55	1,211	266
120.60	1,211	291
120.65	1,211	315
120.70	1,211	339
120.75	1,211	363
120.80	1,211	388
120.85	1,211	412
120.90	1,211	436
120.95	1,211	460
121.00	1,211	484
121.05	1,211	497
121.10	1,211	509
121.15	1,211	521
121.20	1,211	533
121.25	1,211	545
121.30	1,211	557
121.35	1,211	569
121.40	1,211	581
121.45	1,211	593
121.50	1,211	606
121.55	1,211	618
121.60	1,211	630
121.65	1,211	642
121.70	1,211	654
121.75	1,211	666
121.80	1,211	678
121.85	1,211	690
121.90	1,211	702
121.95	1,211	714
122.00	1,211	727
122.05	1,211	739
122.10	1,211	751
122.15	1,211	763
122.20	1,211	775
122.25	1,211	787
122.30	1,211	799
122.35	1,211	811
122.40	1,211	823
122.45	1,211	836
122.50	1,211	848
122.55	1,211	872
122.60	1,211	896

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
122.65	1,211	920
122.70	1,211	945
122.75	1,211	969
122.80	1,211	**993**
122.85	1,211	**1,008**
122.90	1,211	1,008
122.95	1,211	1,008
123.00	1,211	1,008

WQV Storage Table WQV = 134 CF

Inv. Filter Course = 121.00

484 CF + 134 CF = 618 CF

WQV elev: = 121.55'

Stage-Discharge for Pond 104P: Porous Pavement Sidewalk #104

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
120.00	0.00	**0.00**	0.00
120.05	0.01	**0.01**	0.00
120.10	0.01	0.01	0.00
120.15	0.01	0.01	0.00
120.20	0.01	0.01	0.00
120.25	0.01	0.01	0.00
120.30	0.01	0.01	0.00
120.35	0.01	0.01	0.00
120.40	0.03	0.01	0.02
120.45	0.06	0.01	0.05
120.50	0.11	0.01	0.10
120.55	0.17	0.01	0.16
120.60	0.24	0.01	0.23
120.65	0.33	0.01	0.32
120.70	0.42	0.01	0.41
120.75	0.52	0.01	0.51
120.80	0.62	0.01	0.61
120.85	0.73	0.01	0.72
120.90	0.83	0.01	0.82
120.95	0.92	0.01	0.91
121.00	0.98	0.01	0.98
121.05	1.05	0.01	1.05
121.10	1.12	0.01	1.11
121.15	1.18	0.01	1.17
121.20	1.24	0.01	1.23
121.25	1.30	0.01	1.29
121.30	1.35	0.01	1.34
121.35	1.40	0.01	1.39
121.40	1.45	0.01	1.44
121.45	1.50	0.01	1.49
121.50	1.55	0.01	1.54
121.55	1.59	0.01	1.58
121.60	1.64	0.01	1.63
121.65	1.68	0.01	1.67
121.70	1.72	0.01	1.71
121.75	1.76	0.01	1.75
121.80	1.80	0.01	1.79
121.85	1.84	0.01	1.83
121.90	1.88	0.01	1.87
121.95	1.91	0.01	1.91
122.00	1.95	0.01	1.94
122.05	1.99	0.01	1.98
122.10	2.02	0.01	2.01
122.15	2.06	0.01	2.05
122.20	2.09	0.01	2.08
122.25	2.13	0.01	2.12
122.30	2.16	0.01	2.15
122.35	2.19	0.01	2.18
122.40	2.22	0.01	2.21
122.45	2.25	0.01	2.25
122.50	2.29	0.01	2.28
122.55	2.32	0.01	2.31
122.60	2.35	0.01	2.34
122.65	2.38	0.01	2.37
122.70	2.41	0.01	2.40
122.75	2.44	0.01	2.43
122.80	2.47	0.01	2.46
122.85	2.49	0.01	2.49
122.90	2.52	0.01	2.51
122.95	2.55	0.01	2.54
123.00	**2.58**	0.01	**2.57**

WQV elev: = 121.55'
WQV Discharge = 1.58 CFS

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Trench #201 (201P)**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

YES		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.09	ac	A = Area draining to the practice	
0.07	ac	A_I = Impervious area draining to the practice	
0.80	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.77	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.07	ac-in	WQV= 1" x Rv x A	
251	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
63	cf	25% x WQV (check calc for sediment forebay volume)	
Roof		Method of pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
1,012	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
562	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
1.8	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
123.00	feet	E_{BTM} = Elevation of the bottom of the basin	
122.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
120.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
3.0	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
4.50	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
YES	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
YES		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
124.91	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
126.72	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
127.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

ESHWT assumed based on soil map data

Summary for Pond 201P: Infiltration Trench #201

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=57)

Inflow Area = 0.090 ac, 79.90% Impervious, Inflow Depth > 4.16" for 10Yr-24Hr event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.04 cfs @ 11.70 hrs, Volume= 0.031 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.70 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 124.91' @ 12.84 hrs Surf.Area= 562 sf Storage= 430 cf
Flood Elev= 127.50' Surf.Area= 562 sf Storage= 1,012 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 72.2 min (824.7 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1	123.00'	1,012 cf	**Stone (Irregular)** Listed below (Recalc) 2,529 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	562	96.8	0	0	562
127.50	562	96.8	2,529	2,529	998

Device	Routing	Invert	Outlet Devices
#1	Discarded	123.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.70 hrs HW=123.06' (Free Discharge)
↑**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Summary for Pond 201P: Infiltration Trench #201

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=7)

Inflow Area = 0.090 ac, 79.90% Impervious, Inflow Depth > 6.60" for 50Yr-24Hr event
Inflow = 0.59 cfs @ 12.09 hrs, Volume= 0.050 af
Outflow = 0.04 cfs @ 11.35 hrs, Volume= 0.050 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.35 hrs, Volume= 0.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 126.72' @ 13.65 hrs Surf.Area= 562 sf Storage= 835 cf
Flood Elev= 127.50' Surf.Area= 562 sf Storage= 1,012 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 163.5 min (913.5 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	123.00'	1,012 cf	**Stone (Irregular)** Listed below (Recalc) 2,529 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
123.00	562	96.8	0	0	562
127.50	562	96.8	2,529	2,529	998

Device	Routing	Invert	Outlet Devices
#1	Discarded	123.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.35 hrs HW=123.05' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Stage-Area-Storage for Pond 201P: Infiltration Trench #201

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
123.00	**562**	0
123.05	562	11
123.10	562	22
123.15	562	34
123.20	562	45
123.25	562	56
123.30	562	67
123.35	562	79
123.40	562	90
123.45	562	101
123.50	562	112
123.55	562	124
123.60	562	135
123.65	562	146
123.70	562	157
123.75	562	169
123.80	562	180
123.85	562	191
123.90	562	202
123.95	562	214
124.00	562	225
124.05	562	236
124.10	562	247
124.15	562	259
124.20	562	270
124.25	562	281
124.30	562	292
124.35	562	303
124.40	562	315
124.45	562	326
124.50	562	337
124.55	562	348
124.60	562	360
124.65	562	371
124.70	562	382
124.75	562	393
124.80	562	405
124.85	562	416
124.90	562	427
124.95	562	438
125.00	562	450
125.05	562	461
125.10	562	472
125.15	562	483
125.20	562	495
125.25	562	506
125.30	562	517
125.35	562	528
125.40	562	540
125.45	562	551
125.50	562	562
125.55	562	573
125.60	562	584
125.65	562	596
125.70	562	607
125.75	562	618
125.80	562	629
125.85	562	641
125.90	562	652
125.95	562	663
126.00	562	674
126.05	562	686
126.10	562	697
126.15	562	708
126.20	562	719
126.25	562	731
126.30	562	742
126.35	562	753
126.40	562	764
126.45	562	776
126.50	562	787
126.55	562	798
126.60	562	809
126.65	562	821
126.70	562	832
126.75	562	843
126.80	562	854
126.85	562	865
126.90	562	877
126.95	562	888
127.00	562	899
127.05	562	910
127.10	562	922
127.15	562	933
127.20	562	944
127.25	562	955
127.30	562	967
127.35	562	978
127.40	562	989
127.45	562	1,000
127.50	562	**1,012**

Total Storage Provided: 1,012 CF

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Trench #202 (202P)**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

YES		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.08	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.83	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.80	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.06	ac-in	WQV= 1" x Rv x A	
220	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
55	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
860	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
506	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
1.7	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
120.00	feet	E_{BTM} = Elevation of the bottom of the basin	
117.73	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
116.90	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
2.27	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
3.1	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
4.25	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
YES	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
YES		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
121.90	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
123.58	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
124.25	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

ESHWT based on Test Pit #1

Summary for Pond 202P: Infiltration Trench #202

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=58)

Inflow Area = 0.076 ac, 83.21% Impervious, Inflow Depth > 4.39" for 10Yr-24Hr event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.04 cfs @ 11.70 hrs, Volume= 0.028 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.70 hrs, Volume= 0.028 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 121.90' @ 12.81 hrs Surf.Area= 506 sf Storage= 385 cf
Flood Elev= 124.00' Surf.Area= 506 sf Storage= 810 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 70.7 min (819.8 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	860 cf	**Stone (Irregular)** Listed below (Recalc) 2,151 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	506	91.0	0	0	506
124.00	506	91.0	2,024	2,024	870
124.25	506	91.0	127	2,151	893

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**
#2	Primary	124.00'	**26.0' long x 2.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 11.70 hrs HW=120.06' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Overflow** (Controls 0.00 cfs)

Summary for Pond 202P: Infiltration Trench #202

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=11)

Inflow Area = 0.076 ac, 83.21% Impervious, Inflow Depth > 6.87" for 50Yr-24Hr event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.04 cfs @ 11.35 hrs, Volume= 0.044 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.35 hrs, Volume= 0.044 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 123.58' @ 13.53 hrs Surf.Area= 506 sf Storage= 724 cf
Flood Elev= 124.00' Surf.Area= 506 sf Storage= 810 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 154.5 min (900.3 - 745.8)

Volume	Invert	Avail.Storage	Storage Description
#1	120.00'	860 cf	**Stone (Irregular)** Listed below (Recalc) 2,151 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
120.00	506	91.0	0	0	506
124.00	506	91.0	2,024	2,024	870
124.25	506	91.0	127	2,151	893

Device	Routing	Invert	Outlet Devices
#1	Discarded	120.00'	**3.000 in/hr Infiltration 3in/hr over Surface area**
#2	Primary	124.00'	**26.0' long x 2.0' breadth Overflow** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 11.35 hrs HW=120.05' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=120.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Overflow** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 202P: Infiltration Trench #202

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
120.00	506	0
120.05	506	10
120.10	506	20
120.15	506	30
120.20	506	40
120.25	506	51
120.30	506	61
120.35	506	71
120.40	506	81
120.45	506	91
120.50	506	101
120.55	506	111
120.60	506	121
120.65	506	132
120.70	506	142
120.75	506	152
120.80	506	162
120.85	506	172
120.90	506	182
120.95	506	192
121.00	506	202
121.05	506	213
121.10	506	223
121.15	506	233
121.20	506	243
121.25	506	253
121.30	506	263
121.35	506	273
121.40	506	283
121.45	506	293
121.50	506	304
121.55	506	314
121.60	506	324
121.65	506	334
121.70	506	344
121.75	506	354
121.80	506	364
121.85	506	374
121.90	506	385
121.95	506	395
122.00	506	405
122.05	506	415
122.10	506	425
122.15	506	435
122.20	506	445
122.25	506	455
122.30	506	466
122.35	506	476
122.40	506	486
122.45	506	496
122.50	506	506
122.55	506	516
122.60	506	526
122.65	506	536
122.70	506	546
122.75	506	557
122.80	506	567
122.85	506	577
122.90	506	587
122.95	506	597
123.00	506	607
123.05	506	617
123.10	506	627
123.15	506	638
123.20	506	648
123.25	506	658
123.30	506	668
123.35	506	678
123.40	506	688
123.45	506	698
123.50	506	708
123.55	506	719
123.60	506	729
123.65	506	739
123.70	506	749
123.75	506	759
123.80	506	769
123.85	506	779
123.90	506	789
123.95	506	799
124.00	506	810
124.05	506	820
124.10	506	830
124.15	506	840
124.20	506	850
124.25	**506**	**860**

Total Storage Provided = 860 CF

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Trench #203 (203P)**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

YES		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← **yes**
0.07	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.79	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.76	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.05	ac-in	WQV= 1" x Rv x A	
193	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
48	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ **25%WQV**
600	cf	V = Volume[1] (attach a stage-storage table)	≥ **WQV**
545	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
1.4	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ **72-hrs**
126.25	feet	E_{BTM} = Elevation of the bottom of the basin	
125.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
125.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.25	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
1.3	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ **24"**
2.75	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
YES	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←**yes**
YES		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← **yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← **yes**
N/A	:1	If a basin is proposed, pond side slopes.	≥**3:1**
127.63	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
128.87	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
129.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← **yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← **yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

SHWT data determined by Test Pit #6

Summary for Pond 203P: Infiltration Trench #203

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=74)

Inflow Area = 0.070 ac, 78.73% Impervious, Inflow Depth > 4.17" for 10Yr-24Hr event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.04 cfs @ 11.75 hrs, Volume= 0.024 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.75 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 127.63' @ 12.63 hrs Surf.Area= 545 sf Storage= 300 cf
Flood Elev= 129.00' Surf.Area= 545 sf Storage= 600 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 46.2 min (796.0 - 749.8)

Volume	Invert	Avail.Storage	Storage Description
#1	126.25'	600 cf	**Stone (Irregular)** Listed below (Recalc) 1,499 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.25	545	95.0	0	0	545
129.00	545	95.0	1,499	1,499	806

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.25'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.75 hrs HW=126.30' (Free Discharge)
↑—**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Summary for Pond 203P: Infiltration Trench #203

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=37)

Inflow Area = 0.070 ac, 78.73% Impervious, Inflow Depth > 6.55" for 50Yr-24Hr event
Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.04 cfs @ 11.50 hrs, Volume= 0.038 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.50 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 128.87' @ 13.05 hrs Surf.Area= 545 sf Storage= 572 cf
Flood Elev= 129.00' Surf.Area= 545 sf Storage= 600 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 106.1 min (853.3 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1	126.25'	600 cf	**Stone (Irregular)** Listed below (Recalc) 1,499 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.25	545	95.0	0	0	545
129.00	545	95.0	1,499	1,499	806

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.25'	**3.000 in/hr Infiltration 3in/hr over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.50 hrs HW=126.28' (Free Discharge)
↑**1=Infiltration 3in/hr** (Exfiltration Controls 0.04 cfs)

Stage-Area-Storage for Pond 203P: Infiltration Trench #203

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
126.25	**545**	0
126.30	545	11
126.35	545	22
126.40	545	33
126.45	545	44
126.50	545	55
126.55	545	65
126.60	545	76
126.65	545	87
126.70	545	98
126.75	545	109
126.80	545	120
126.85	545	131
126.90	545	142
126.95	545	153
127.00	545	164
127.05	545	174
127.10	545	185
127.15	545	196
127.20	545	207
127.25	545	218
127.30	545	229
127.35	545	240
127.40	545	251
127.45	545	262
127.50	545	273
127.55	545	283
127.60	545	294
127.65	545	305
127.70	545	316
127.75	545	327
127.80	545	338
127.85	545	349
127.90	545	360
127.95	545	371
128.00	545	382
128.05	545	392
128.10	545	403
128.15	545	414
128.20	545	425
128.25	545	436
128.30	545	447
128.35	545	458
128.40	545	469
128.45	545	480
128.50	545	491
128.55	545	501
128.60	545	512
128.65	545	523
128.70	545	534
128.75	545	545
128.80	545	556
128.85	545	567
128.90	545	578
128.95	545	589
129.00	545	**600**

Total Storage Provided = 600 CF

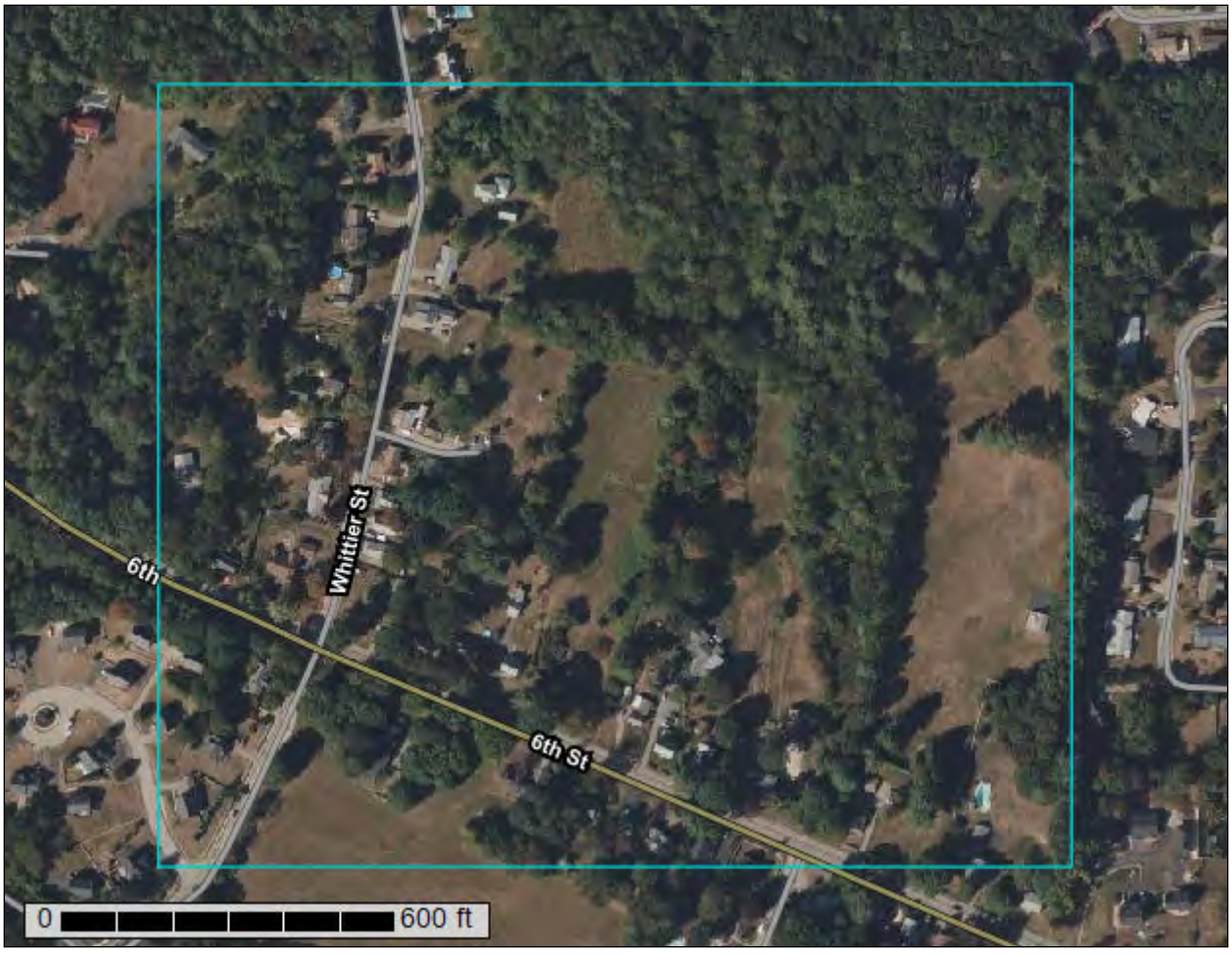
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Strafford County, New Hampshire



August 23, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 24, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	26.8	50.4%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	5.1	9.7%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	0.3	0.6%
ScB	Scantic silt loam, 3 to 8 percent slopes	6.2	11.6%
SfC	Suffield silt loam, 8 to 15 percent slopes	13.9	26.1%
WfB	Windsor loamy fine sand, clay subsoil variant, 0 to 8 percent slopes	0.9	1.7%
Totals for Area of Interest		**53.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

BzB—Buxton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d6p
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Buxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buxton

Setting

Parent material: Glaciomarine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 28 inches: silty clay loam
H3 - 28 to 43 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmwood

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

DeB—Deerfield loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xfg9
Elevation: 0 to 1,190 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Deerfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand
Bw - 9 to 25 inches: loamy fine sand
BC - 25 to 33 inches: fine sand
Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: About 15 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 11.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 7 percent
Landform: Outwash deltas, kame terraces, outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Wareham

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sudbury

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, outwash deltas, kame terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Ninigret

Percent of map unit: 1 percent
Landform: Kame terraces, outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

HaB—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash plains, eskers, moraines, kame terraces, kames, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent
Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent

Landform: Kame terraces, outwash plains, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope, base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

ScB—Scantic silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d8t
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Swanton

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Not named wet

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

SfC—Suffield silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9d8v
Elevation: 0 to 250 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Suffield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suffield

Typical profile

H1 - 0 to 19 inches: silt loam
H2 - 19 to 28 inches: silt loam
H3 - 28 to 41 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY017NH - Well Drained Lake Plain
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 9 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

WfB—Windsor loamy fine sand, clay subsoil variant, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d9b
Elevation: 0 to 280 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Windsor variant and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor Variant

Typical profile

H1 - 0 to 26 inches: loamy fine sand

H2 - 26 to 30 inches: loamy sand
H3 - 30 to 42 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 15 percent
Hydric soil rating: No

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9/21/24
Chris Berry
Berry Surveying and Engineering
335 Second Crown Point Road
Barrington NH 03825

Job # 24-040

Site Specific Soil Survey 9/20/24
Map 35 Lot 64
141 Sixth Street Dover, NH

Dear Chris,

This letter report presents the findings of a Site Specific Soil Survey conducted on the referenced property by John P. Hayes III on Serptember 20, 2024. The soil survey was conducted in accordance with the New Hampshire Supplement of the Site-Specific Soil Mapping Standard For New Hampshire and Vermont, Special Publication # 3, Version 7.0 July 2021, published by the Society of Soil Scientist of Northern New England. Soil series information was also taken from the Soil Survey of Strafford County New Hampshire issued March 1973.

The property that is the subject of the soil survey is located on the northeast side of Sixth Street, southwest of Hillcrest Drive, and southeast of Wittier Street, in Dover, NH. The lot is approximately 2.9 acres in size. The plans used for this soil map are a 40 scale plan, where 1 inch equals 40 feet, with one foot contours.

The purpose of the soil survey is to provide the client with soils information for urban and suburban or rural land planning. Soil characteristics on the property were evaluated through observation of numerous test pits, and the observation of numerous test pits, and hand auger probes, conducted throughout the property. Slope phases were determined with the use of the topography provided on the plan. The Site-specific Soil Map Units identified are taken from the New Hampshire State-Wide Numerical Soils Legend, Issue #10 January 2011, and are briefly described below. Official Series Descriptions (OSD) for each of these soil series are enclosed with this report. The soil map units comply with the Range In Characteristics described in the OSD. Any limiting inclusions on the site, do not exceed 15 percent of any of the soil map units. Dissimilar inclusions, if any, will be noted in the report. Limits of the Site Specific mapping units are highlighted on the plan. The Hydrological Soil Groups for each of the soil series was determined using SSSNNE Publication No. 5 Ksat Values for New Hampshire Soils September 2009. Limits of the Site Specific mapping units are highlighted on the plan.

Portions of the soil map with the map unit 500, contain disturbed soils that have been excavated and/or regraded, and are loamy in texture. A Disturbed Soil Mapping Unit Supplement for New Hampshire DES AoT Site Specific Soil Maps is also included. This supplement explains the additional information given about each disturbed soil map units that are present on the site.

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDRO LOGIC SOIL GROUP	DESCRIPTION
26	**Windsor**	**A B C**	**A**	The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. These soils are located in the northwest portion, central portion, and in the southeastern corner of the property, near Sixth Street. These soils are deep to bedrock. Saturated hydraulic conductivity is high or very high. A typical soil profile of these soils onsite would be: 0-6 inches 10YR 3/2 sandy loam granular, friable. 6-24 inches 10YR 5/6 loamy sand, granular friable 24-43 inches 10 Y 6/4 loamy sand, granular, friable. 43-60 inches 2.5Y 6/3 loamy fine sand and silt with redoximorphic features present massive, friable. Some inclusions of moderately well drained Elmridge soils,may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils are greater than 40 inches.
32	**Boxford (moderately well drained)**	**A B**	**C**	The Boxford series consists of very deep, moderately well drained soils that are formed in clayey marine sediments. These soils are located in the northern portion of the property.These soils are deep to moderately deep to bedrock. Saturated Hydraulic Conductivity is moderately high in the surface horizon and the upper part of the subsoil, and low to moderately low in the lower part of the subsoil and in the substratum. A typical soil profile of these soils onsite would be: 0-6 inches 10YR 3/2 silt loam, granular, friable 6-20 inches 10YR 5/4 silt loam, blocky, friable 20-56 inches 2.5Y 6/2 silt loam with redoximorphic features present, blocky, firm Some inclusions of moderately well drained Elmridge, and the somewhat poorly drained component of the Boxford soils, and may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 15 to 30 inches.
238	**Elmridge**	**B**	**C**	The Elmridge series consists of very deep, moderately well drained soils formed in loamy over clayey sediments.These soils are located in the central portion of the property. These soils are deep to bedrock. Saturated hydraulic conductivity is high

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDROLOGIC SOIL GROUP	DESCRIPTION
238	**Elmridge**	**B**	**C**	in the surface horizon, and low to moderately high in the clayey substratum. A typical soil profile of these soils onsite would be: 0-8 inches 10YR 3/2 loamy sand granular, friable. 8-22 inches 10YR 5/4 fine sandy loam granular friable 22-30 inches 2.5Y 5/4 fine sandy loam, blocky, friable 30-40 inches 2.5Y 6/2 silt loam with redoximorphic features present, blocky,firm Some inclusions of the moderately well drained, and somewhat poorly drained component of the Boxford soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 20 to 36 inches.
327	**Windsor Variant (clay subsoil)**	**B C**	**C**	The Windsor Variant (clay subsoil) soil series consists of moderately well drained soils that are sandy material, that forms over silt and clay deposits. These soils are located on the southern portion of the lot, behind the existing house and garage. These soils are deep to bedrock. Saturated Hydraulic Conductivity is high to very high in the sandy surface horizon, and low to moderately high in the clayey substratum. The Hydrologic Soil Group C was used, do to the underlying silt loam restrictive layer. A typical soil profile of these soils onsite would be: 0-8 inches 10YR 3/2 loamy sand granular, friable. 8-22 inches 10YR 5/6 loamy finer sand, granular friable 22-30 inches 2.5Y 5/4 loamy sand, granular, friable 30-40 inches 2.5Y 6/2 Silt loam with redoximorphic features present, blocky,firm Some inclusions of moderately well drained Elmridge and Boxford soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 20 to 36 inches.

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDROLOGIC SOIL GROUP	DESCRIPTION
500 (decdc)	**Udorthents (loamy)**	**A B**	**C**	Udorthents are disturbed soils that have been excavated and/or regraded, and are loamy in texture. These soils are located in the southern and eastern portions of the property, around the existing structures. These disturbed soils appear to be mostly derived from the surrounding Windsor Variant and/or Elmridge soil series. The hydrologic soil group C was used for these soils, do to the underlying silt loam restrictive layer in both of these soil series. These soils are deep to bedrock.Saturated hydraulic conductivity is high in the surface horizon, and low to moderately high in the clayey substratum. A typical soil profile of these soils A typical soil profile of these soils onsite would be: 0-10 inches 10 YR 3/2 fine sandy loam granular, friable 10-22 inches 2.5Y 4/4 loamy sand, granular, friable 30-50 inches 5Y 6/2 silt loam, with redoximorphic features present, blocky, firm. Some inclusions of excessively drained Windsor, may be present, in the disturbed area adjacent to Sixth street, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 20 to 38 inches.
953	**Boxford (somewhat poorly drained)**	**B**	**C**	The Boxford series consists of very deep, somewhat poorly drained soils that are formed in clayey marine sediments. These soils are located in the northeastern portion of the property. These soils are deep to bedrock.Saturated hydraulic conductivity is moderately high in the surface horizon and the upper part of the subsoil, and low to moderately low in the lower part of the subsoil and in the substratum. A typical soil profile of these soils onsite would be: 0-10 inches, 10 YR 3/2 silt loam, granular, friable 10-14 inches 2.5Y 5/4, silt loam, blocky, friable 14-40 2.5Y 6/2 silt loam, with redoximorphic features present, blocky, firm Some inclusions of moderately well drained Elmridge, and the moderately well drained component of the Boxford soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 10 to 15 inches.

Slope Phases

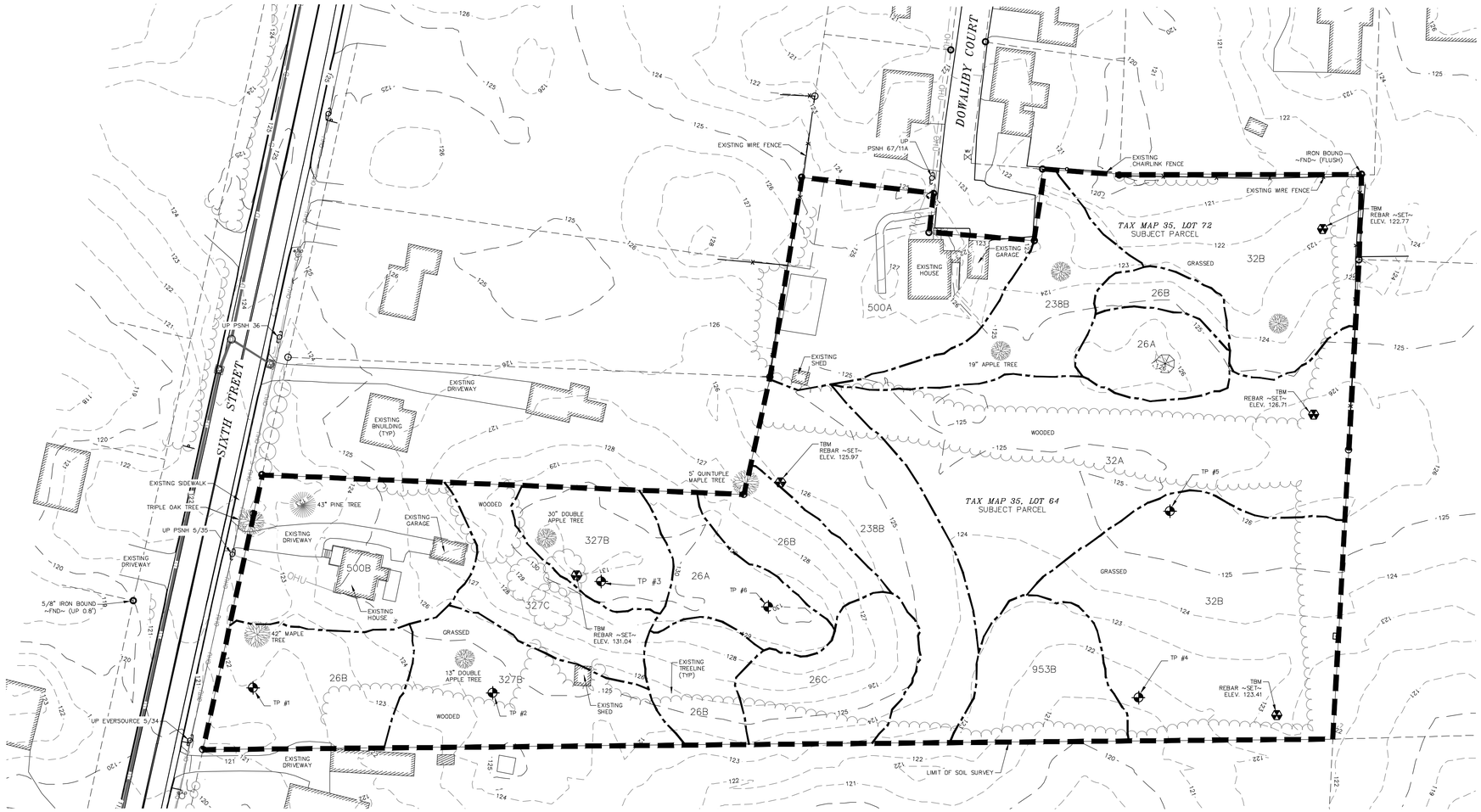
Alpha Slope Symbol	Range
A	0 – 3%
B	3 – 8%
C	8 – 15%
D	15 – 25%
E	25 – 50%
F	> 50%

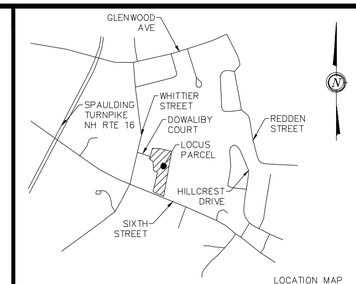
I trust that this Soil Survey and report meet your current planning needs. Please do not hesitate to contact me if you have any questions.

Sincerely:

John P. Hayes III

John P. Hayes III CSS, CWS





NOTES:

1.) OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN.
FLOOD HAZARD REF.: FEMA, COMMUNITY #330145, MAP #33017C0310E, DATED: SEPTEMBER 30, 2015.

4.) PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING, IN MAY & JUNE OF 2024 WITH AN ERROR OF CLOSURE BETTER THAN 1 IN 10,000. HORIZONTAL COORDINATES BASED ON GPS DATA COLLECTED BY CARLSON BRX7 RECEIVERS AND ON NAD83 DATUM. VERTICAL DATUM IS NAVD88.

5.) THE INTENT OF THIS PLAN IS TO SHOW THE SITE SPECIFIC SOIL BOUNDARIES OF TAX MAP 35, LOT 64.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
NO. 805
LICENSED LAND SURVEYOR
KENNETH A. BERRY
SIGNATURE

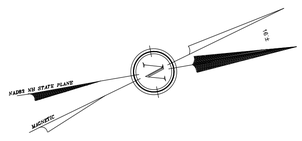
SHEET 4 OF 39

DEIDRA L. BENJAMIN
No. 295
CERTIFIED WETLAND SCIENTIST

DEIDRA BENJAMIN, CWS #295

JOHN P. HAYES
No. 087
CERTIFIED SOIL SCIENTIST

JOHN P. HAYES III, CSS #87



LEGEND:

- IRON BOUND/REBAR ~FND~
- IRON PIPE ~FND~
- CONCRETE/GRANITE BOUND ~FND~
- UTILITY POLE/GUY WIRE
- OHU — OHU — OVERHEAD UTILITIES LINE
- 129 — EXISTING CONTOUR MINOR
- 130 — EXISTING CONTOUR MAJOR
- SOIL LINE
- 448A SOIL SERIES
- TEST HOLE
- BENCHMARK
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND

WETLAND NOTE:

WETLANDS WERE DELINEATED BY DEIDRA L. BENJAMIN, CWS, IN JUNE OF 2024 USING THE FOLLOWING CRITERIA: (NO WETLANDS WERE FOUND ON SITE)

1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

SOILS LEGEND

Site Specific Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
26	A,B,C	Windsor	A
32	A,B	Boxford	C
238	B	Elmridge	C
327	B,C	Windsor Variant (Clay Subsoil)	C
500	A, B	Udorthents (Loamy)	C
953	B	Boxford (Somewhat Poorly Drained)	C

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /ED = Excessively Drained /MWD = Moderately Well Drained
/SPD = Somewhat Poorly Drained /P = Poorly Drained
/VP = Very Poorly Drained /Rk = Rocky

TEST PIT DATA:

TEST HOLES PERFORMED ON SEPTEMBER 14, 2024
TEST PIT #1
0–4" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
4–24" 10YR 5/6 FINE SANDY LOAM, GRANULAR, FRIABLE
24–43" 10YR 6/4 FINE LOAMY SAND, GRANULAR, FRIABLE
43–80" 2.5Y 6/4 VERY FINE SAND & SILT, MEDIUM BLOCKY, FRIABLE IN HAND – MEDIUM FIRM
E.S.H.W.T. @ 50"
RESTRICTIVE LAYER @ 60" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

TEST PIT #2
0–12" 10YR 2/2 FINE SANDY LOAM, GRANULAR, FRIABLE
12–25" 10YR 5/8 FINE SANDY LOAM, GRANULAR, FRIABLE
25–80" 2.5Y 6/4 SILT LOAM. BLOCKY, FIRM, REDOX @36"
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ 25" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

TEST PIT #3
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–36" 10YR 5/8 FINE SANDY LOAM, GRANULAR, FRIABLE
36"–60" 2.5Y 6/4 SILT LOAM, BLOCKY, FIRM (TIGHT ROCK IN BOTTOM OF HOLE)
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ 36" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT #4
0–12" 10YR 2/2 SILT LOAM, GRANULAR, FRIABLE
12–18" 2.5Y 6/4 SILT LOAM, GRANULAR, FRIABLE
18–60" 2.5Y 6/2 SILT LOAM, BLOCKY, FIRM
E.S.H.W.T. @ 18"
RESTRICTIVE LAYER @ 18" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT DATA (CONT.):

TEST PIT #5
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–25" 10YR 5/8 SILT LOAM, GRANULAR, FRIABLE
25–60" 2.5Y 6/4 SILT LOAM, BLOCKY, FRIABLE IN HAND–BLOCKY IN PLACE
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ 50" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT #6
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–36" 10YR 5/8 LOAMY SAND, GRANULAR, FRIABLE
36"–60" 10YR 6/4 LOAMY SAND, GRANULAR, FRIABLE
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

NOT FOR CONSTRUCTION

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4632
www.BerrySurveying.Com

Infiltration Feasibility Report

Prepared for:

The Stabile Companies.
20 Cotton Road, Suite 200
NASHUA, NH 03063

Land of

Richardson Estates of Dover LLC.
688 Calef Highway
BARRINGTON, NH 03825

141 SIXTH STREET, DOVER, NH
TAX MAP 35, LOT 64

Mohamed & Lisa K. Hamcha
5 Dowaliby Court
DOVER, *NH 03820*

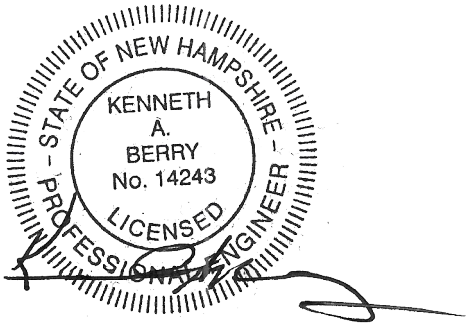
5 DOWALIBY COURT, DOVER, NH
TAX MAP 35, LOT 72

Prepared by:

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825

Project Number:
DB 2024-018

June 24, 2025



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1.0 Location of Practices:

The project proposes a porous pavement sidewalk location and three infiltration trenches for ground water recharge, treatment, and channel flow protection purposes via Porous Pavement System #103 and Infiltration Trenches #201-#203. The following is a list and description of porous asphalt pavement practices in ascending order:

Porous Pavement Sidewalk #103 (Pond #103P) – This SCM is a raised sidewalk located along the eastern side of Fawn Drive from stationing 0+13 to 6+10. Subcatchment area includes only the direct porous pavement surface (Subcatchment #43).

Infiltration Trench #201 (Pond #201P) – This SCM is located at the northwestern side of the parcel, on the northwestern side of Fawn Drive. Subcatchment area includes the adjacent crushed stone trench (Subcatchment #51) and two adjacent buildings with roof runoff from gutter systems with drainage (Subcatchment #51A and #51B (Units #15/16 & 17/18)).

Infiltration Trench #202 (Pond #202P) – This SCM is located at the southwestern side of the parcel, on the western side of Fawn Drive. Subcatchment area includes the adjacent crushed stone trench (Subcatchment #52) and two adjacent buildings with roof runoff from a gutter system with drainage (Subcatchment #52A (Units 1/2)).

Infiltration Trench #203 (Pond #203P) – This SCM is located at the northeastern side of the parcel, on the eastern side of driveway spur from stationing 2+42 to 3+81. Subcatchment area includes the adjacent crushed stone trench (Subcatchment #53) and two adjacent buildings with roof runoff from gutter systems with drainage (Subcatchment #53A and #53B (Units #5/6 & 7/8)).

2.0 Existing Topography at the Location of the Practice

Porous Pavement Sidewalk #103 (Pond #101P) – The existing topography within this practice is less than 3%. This area is currently mostly wooded.

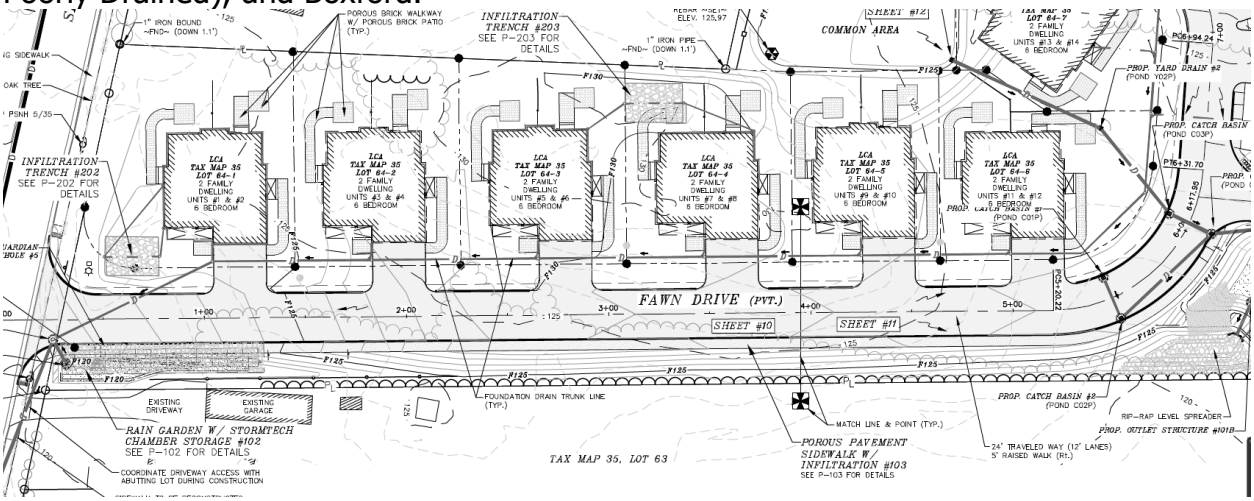
Infiltration Trench #201 (Pond #201P) – The existing topography within this practice is less than 3%. This area is currently grassed.

Infiltration Trench #202 (Pond #202P) – The existing topography within this practice is less than 3%. This area is currently grassed.

Infiltration Trench #203 (Pond #203P) – The existing topography within this practice is less than 3%. This area is currently grassed.

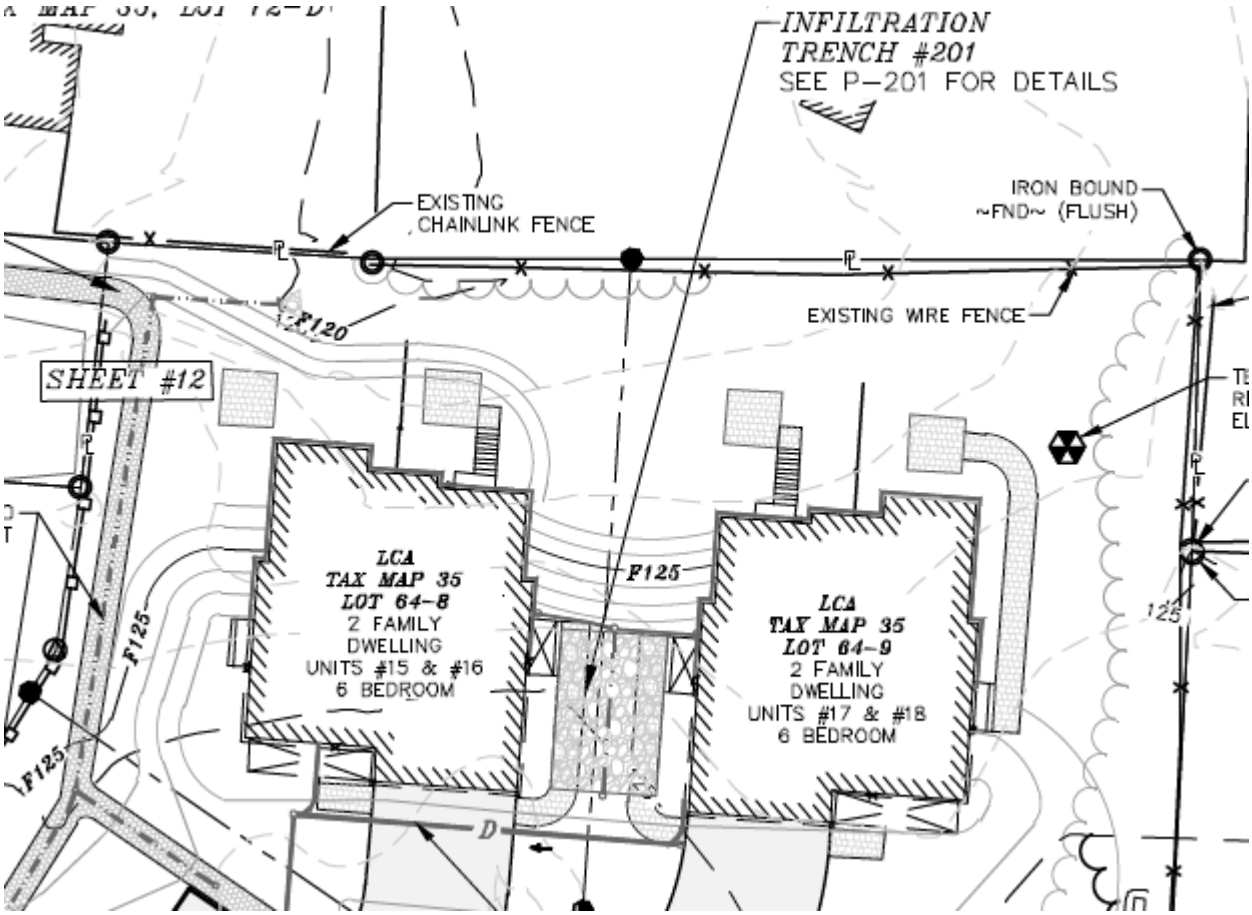
3.0 Test Hole Locations

Porous Pavement Sidewalk #103 (Pond #103P) – The practice has a surface area of 3,134 Sq. Ft.. As the practice is located in what is currently mostly wooded, the closest test hole is TH #1 & TH #2. See Site Specific Soils Map. See test hole files in following section. The soil in the vicinity of this practice changes at different sections and contains Windsor, Windsor Variant (Clay Subsoil), Elmridge, Boxford (Somewhat Poorly Drained), and Boxford.



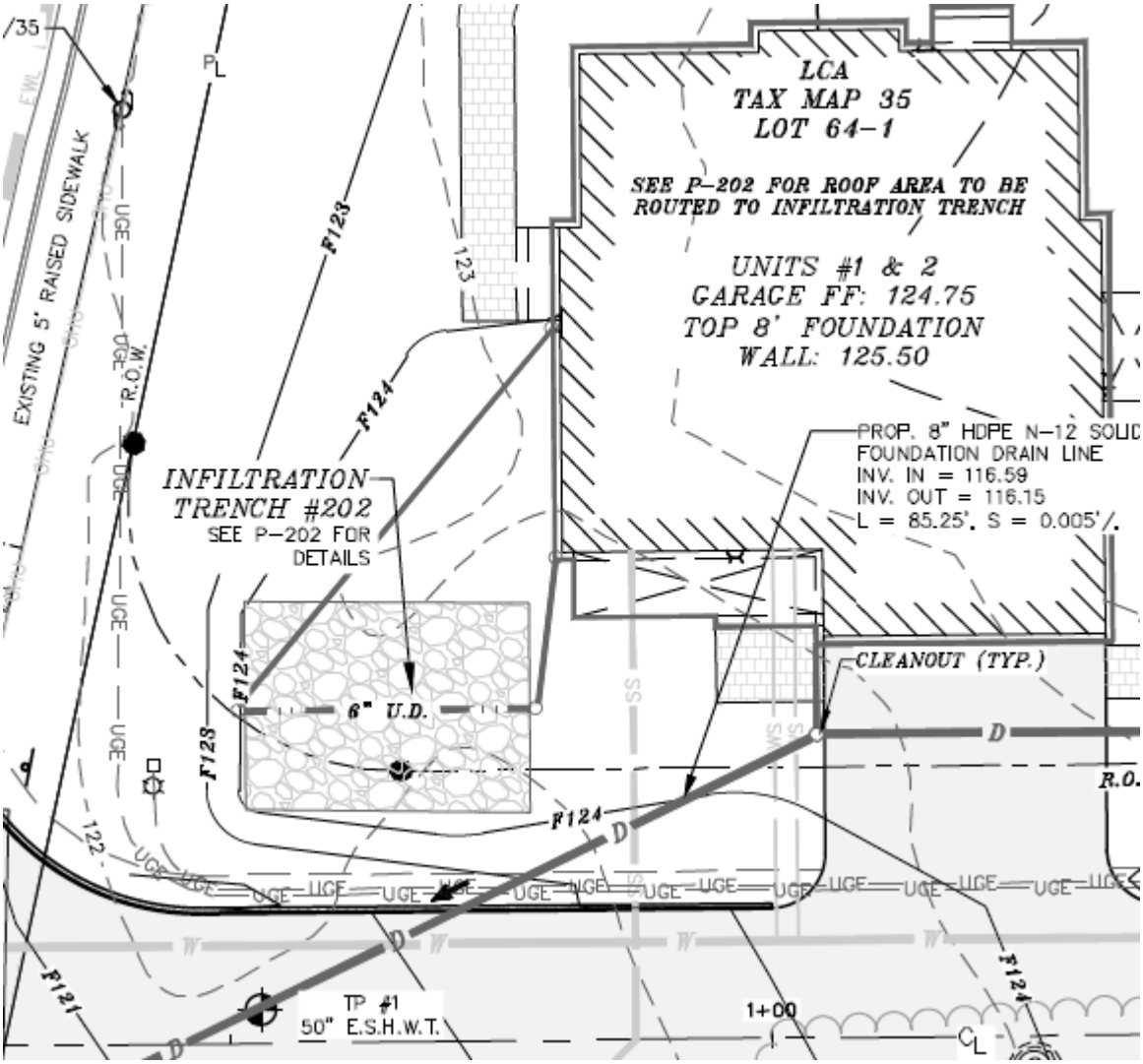
Porous Pavement Sidewalk #103 (Pond #103P) – (Reference Sheet Overview G&D)

Infiltration Trench #201 (Pond #201P) – The practice has a surface area of 562 Sq. Ft. The practice is located over soil closest in profile to test hole #6. See Site Specific Soils Map. See test hole files in following section. The soil in the vicinity of this practice is Windsor.



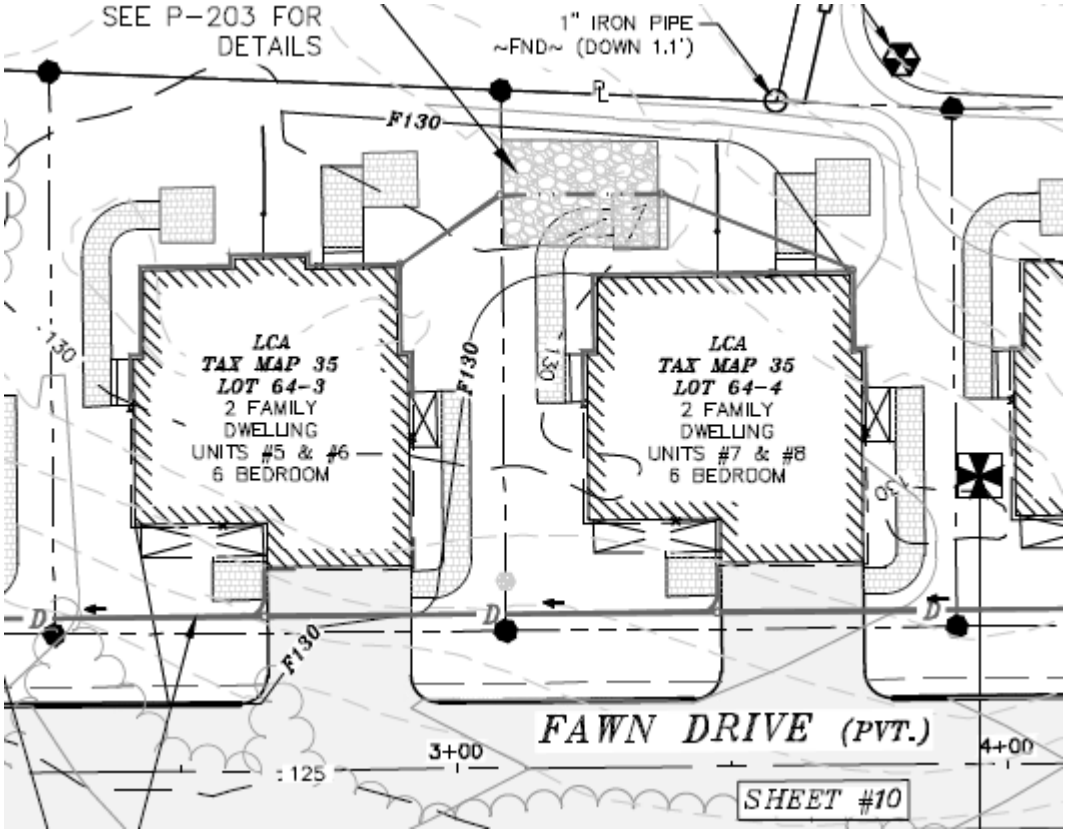
Infiltration Trench #201 (Pond #201P) – (Reference Sheet Overview G&D)

Infiltration Trench #202 (Pond #202P) – The practice has a surface area of 506 Sq. Ft.. The practice is located adjacent to TH #1. See Site Specific Soils Map. See test hole files in following section. The soil in the vicinity of this practice is Windsor.



Infiltration Trench 202 (Pond #202P) – (Reference Sheet Detail G&D)

Infiltration Trench #203 (Pond #203P) – The practice has a surface area of 506 Sq. Ft.. The practice is located closest to test hole #6. See Site Specific Soils Map. See test hole files in following section. The soil in the vicinity of this practice is Winsor.



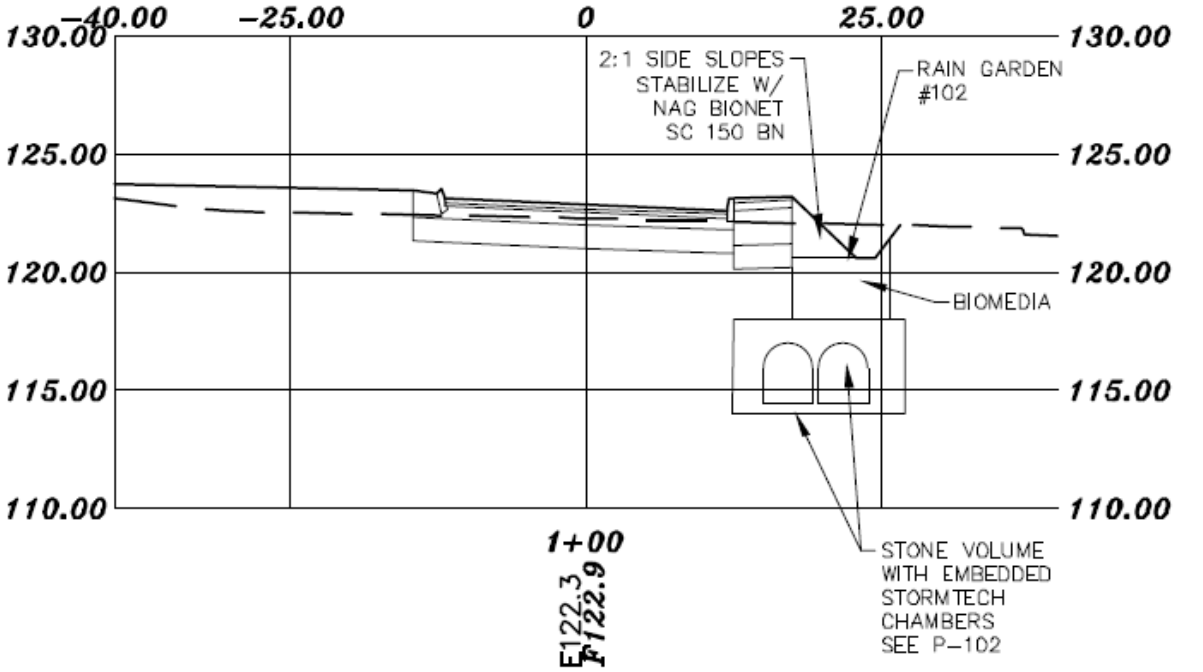
Infiltration Trench #203 (Pond #203P) – (Reference Sheet Overview G&D)

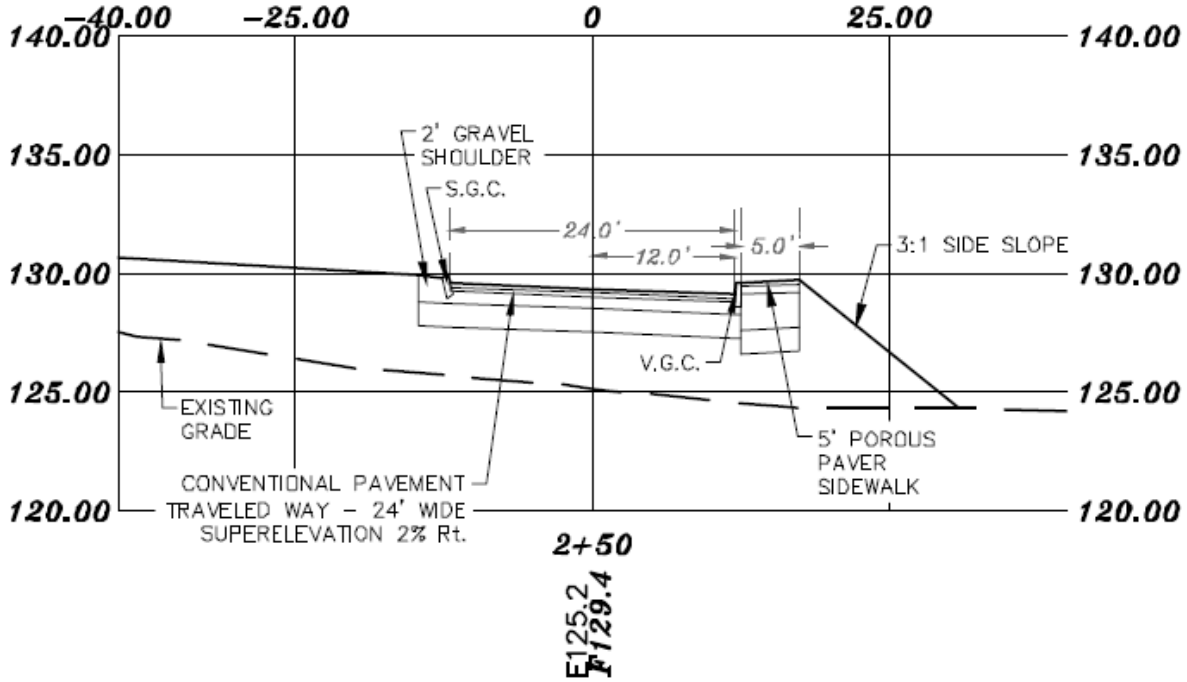
4.0 Seasonal High Water Table (SHWT) and Bedrock Elevations

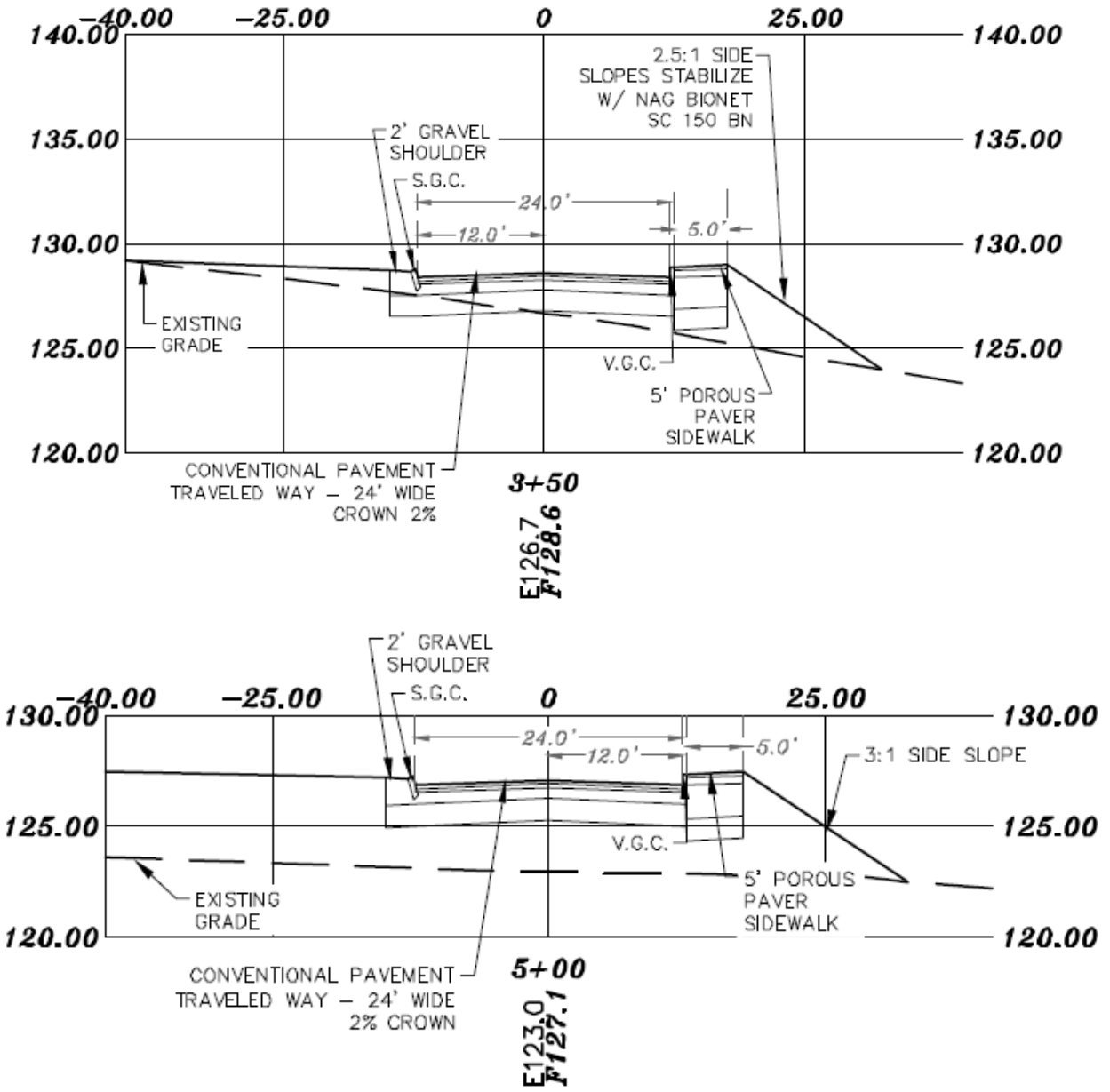
TH #1:	Existing Surface Elevation of TH =	121.90′
	Restrictive Layer = 60 Inches	116.90′
	SHWT = 50 Inches	117.73′
	Bedrock > 80 Inches	>115.23′
	Ground Water > 80 Inches	>115.23′
	Deepest Elevation of TH = 80 Inches	115.23′
TH #2:	Existing Surface Elevation of TH =	124.50′
	Restrictive Layer = 25 Inches	122.42′
	SHWT = 36 Inches	121.50′
	Bedrock > 80 Inches	>114.83′
	Ground Water > 80 Inches	>114.83′
	Deepest Elevation of TH = 80 Inches	114.83′
Porous Pavement W/ Inf. #103 (Pond #103P): Inv. Filter Media Low		118.83′

Inv. Low occurs at the low point at the entrance. See cross sections for separation from e.s.h.w.t., as a receiving fill layer is created for the sidewalk in areas of more restrictive soils.

See cross sections below.





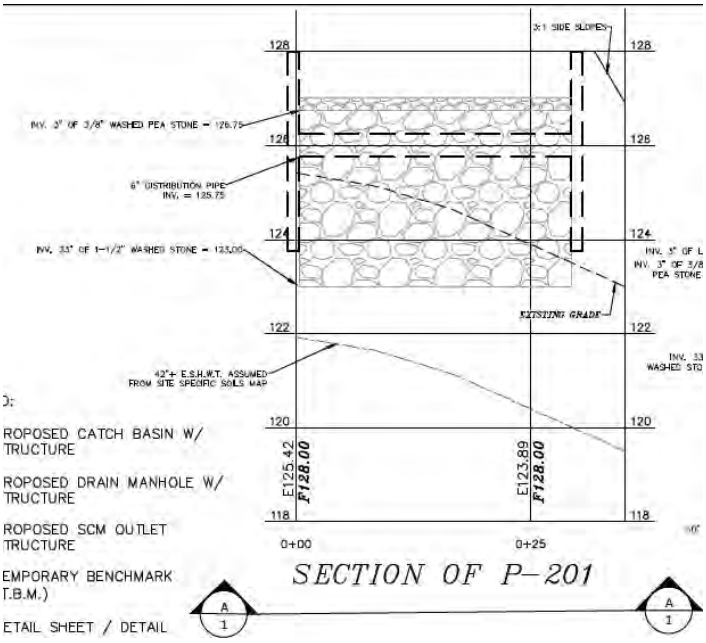


TH #6:	Existing Surface Elevation of TH =	129.90′
	Restrictive Layer = None	N/A
	SHWT > 60 Inches	124.90′
	Bedrock > 60 Inches	>124.90′
	Ground Water > 60 Inches	>124.90′
	Deepest Elevation of TH = 60 Inches	124.90′
	Existing surface elevation at high point of P201 =	125.75′

Infiltration Trench #201 (Pond #201P): Inv. Stone 123.00

Soil in location of P201 is closest to the soil profile from TH#6, where both locations are Windsor.

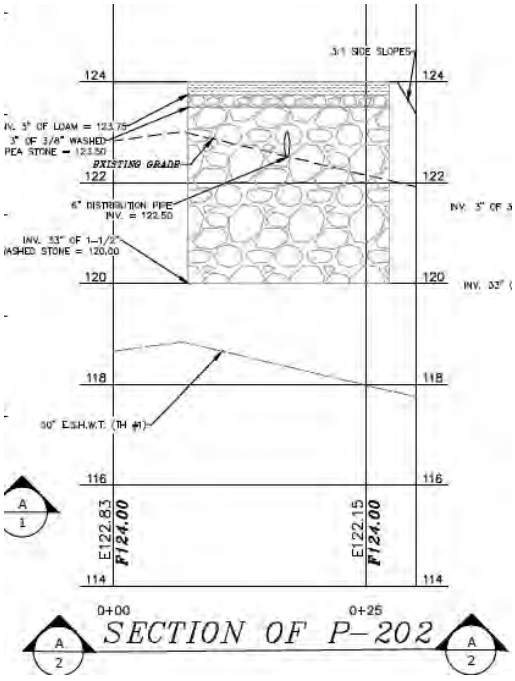
See cross section below.



TH #1:	Existing Surface Elevation of TH =	121.90′
	Restrictive Layer > 60 Inches	116.90′
	SHWT > 50 Inches	117.73′
	Bedrock > 80 Inches	>115.23′
	Ground Water > 80 Inches	>115.23′
	Deepest Elevation of TH = 80 Inches	115.23′
	Existing surface elevation at high point of P202 =	123.10′

Infiltration Trench #202 (Pond #202P): Inv. Stone 120.00′

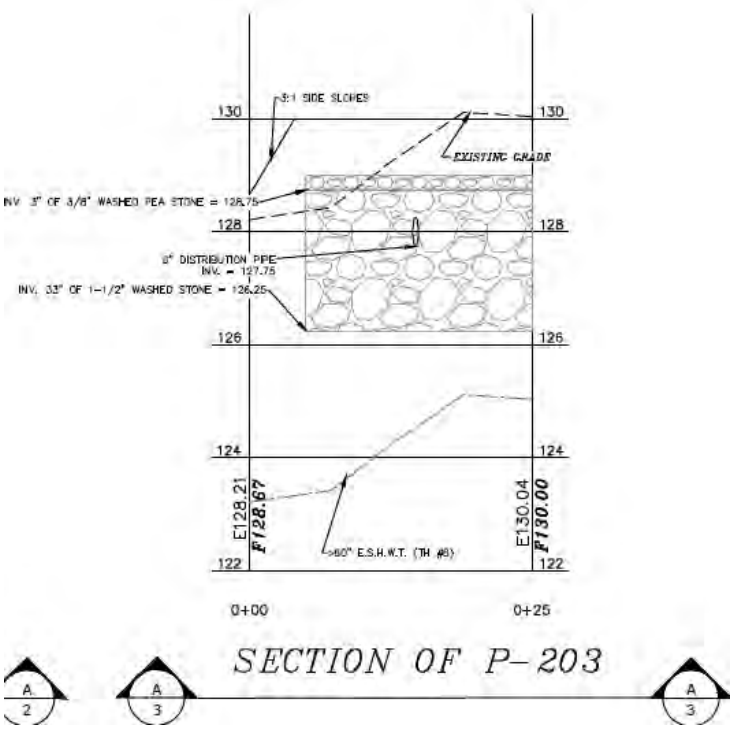
See cross section below.



TH #6:	Existing Surface Elevation of TH =	129.90′
	Restrictive Layer = None	N/A
	SHWT > 60 Inches	124.90′
	Bedrock > 60 Inches	>124.90′
	Ground Water > 60 Inches	>124.90′
	Deepest Elevation of TH = 60 Inches	124.90′
	Existing surface elevation at high point of P203 =	130.25′

Infiltration Trench #203 (Pond #203P): Inv. Stone 126.25′

See cross section below.



5.0 Profile descriptions

The following test hole data was collected, see profiles below.

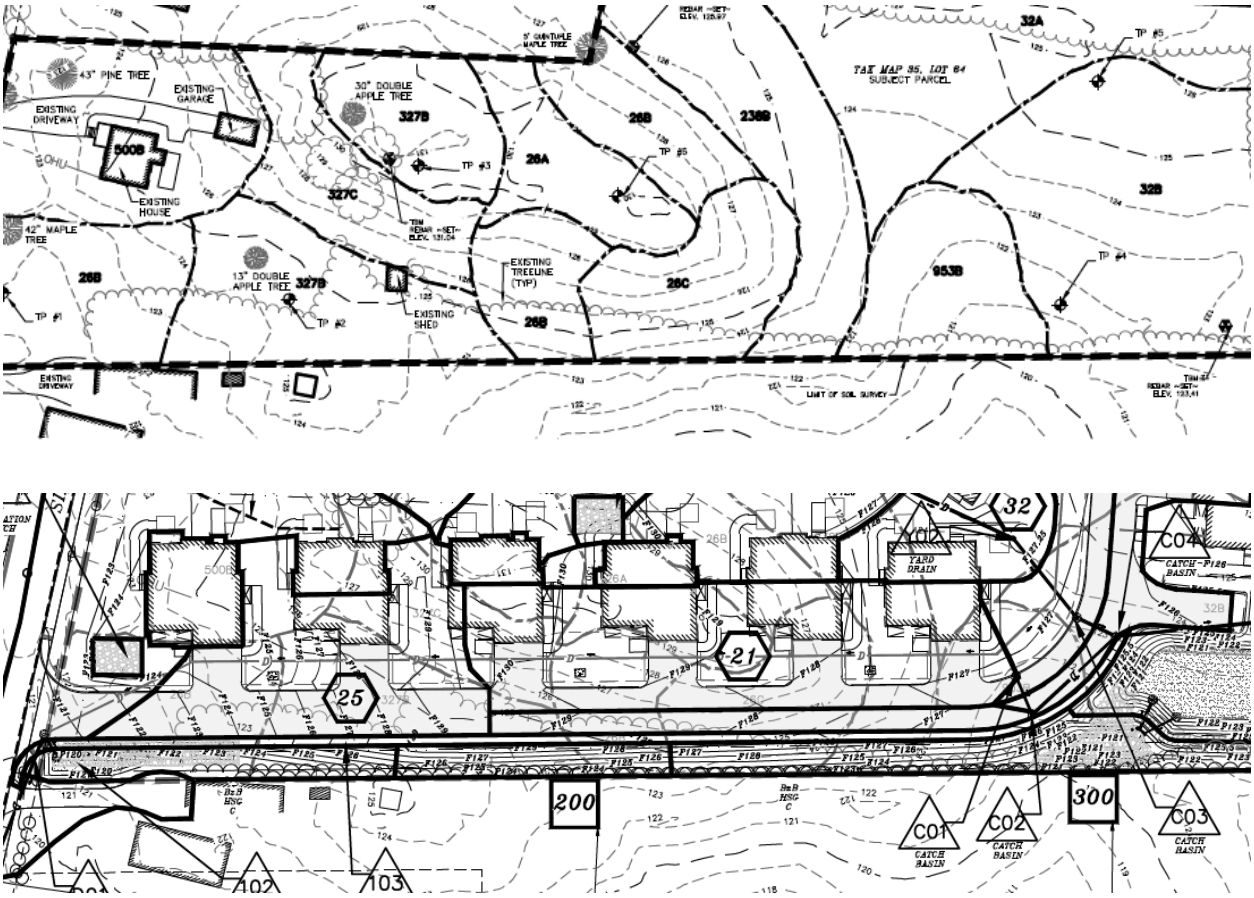
TEST PIT #1
0-4" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
4-24" 10YR 5/6 FINE SANDY LOAM, GRANULAR, FRIABLE
24-43" 10YR 6/4 FINE LOAMY SAND, GRANULAR, FRIABLE
43-80" 2.5Y 6/4 VERY FINE SAND & SILT, MEDIUM BLOCKY, FRIABLE IN HAND - MEDIUM FIRM
E.S.H.W.T. @ 50"
RESTRICTIVE LAYER @ 60" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

TEST PIT #2
0-12" 10YR 2/2 FINE SANDY LOAM, GRANULAR, FRIABLE
12-25" 10YR 5/8 FINE SANDY LOAM, GRANULAR, FRIABLE
25-80" 2.5Y 6/4 SILT LOAM. BLOCKY, FIRM, REDOX @36"
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ 25" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

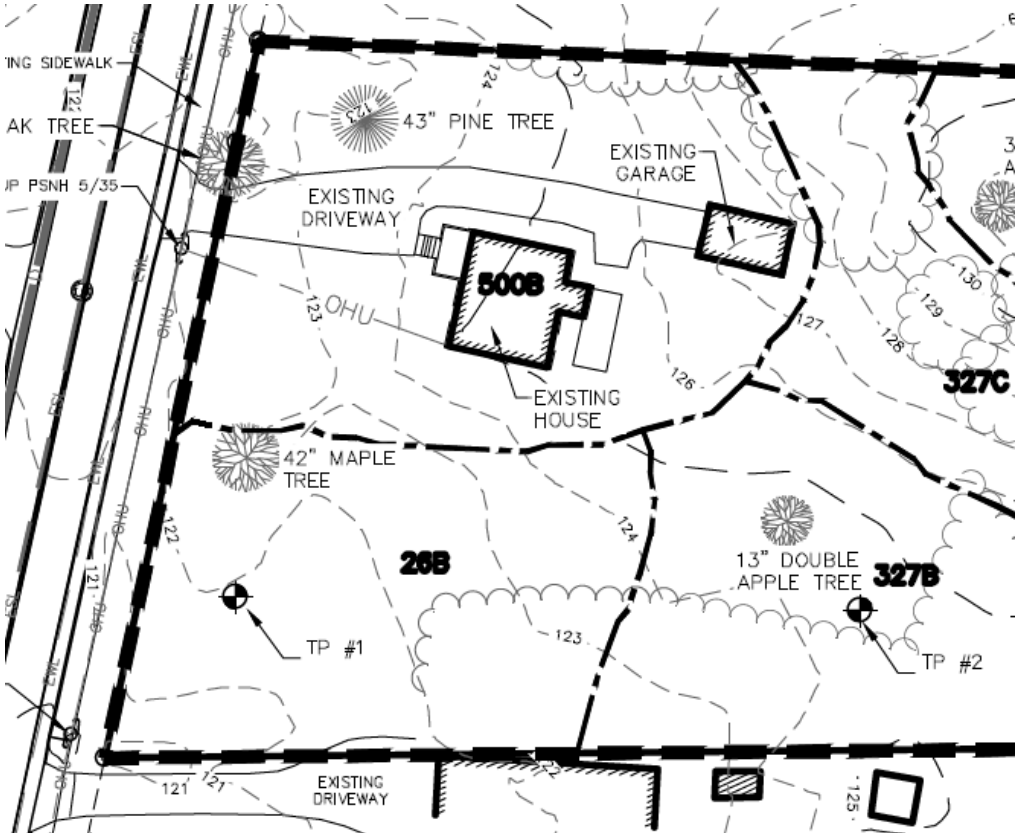
TEST PIT #6
0-6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6-36" 10YR 5/8 LOAMY SAND, GRANULAR, FRIABLE
36"-60" 10YR 6/4 LOAMY SAND, GRANULAR, FRIABLE
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

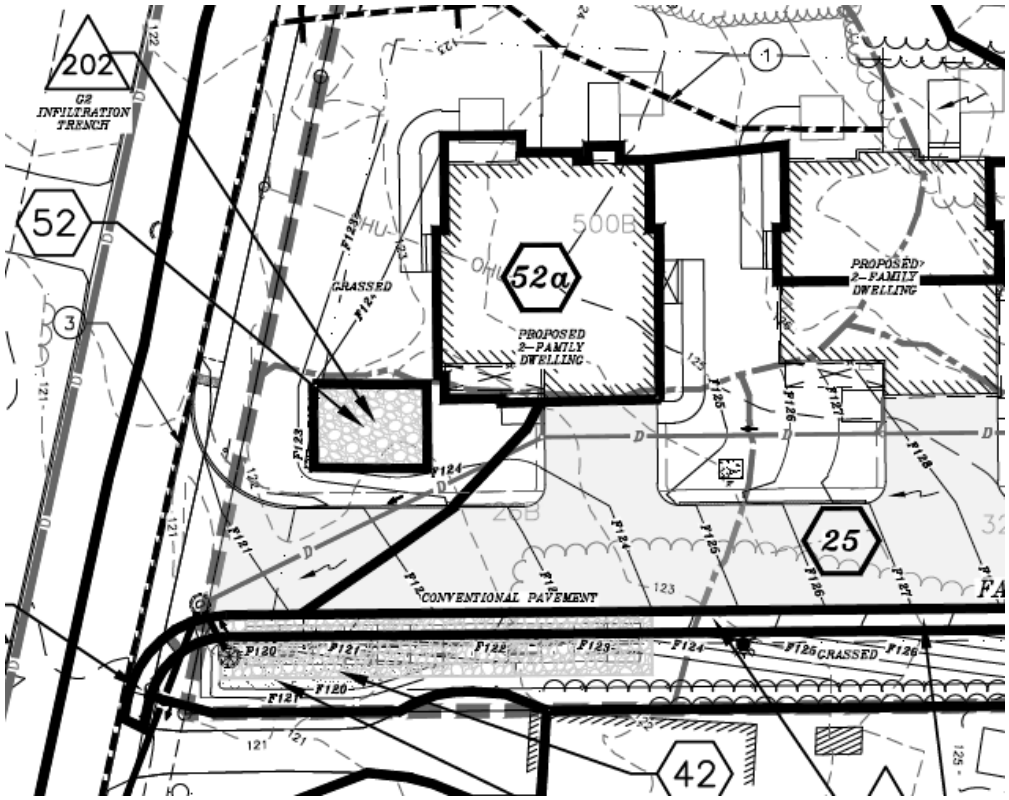
6.0 Soil Plan in the Area of the Constructed Practice

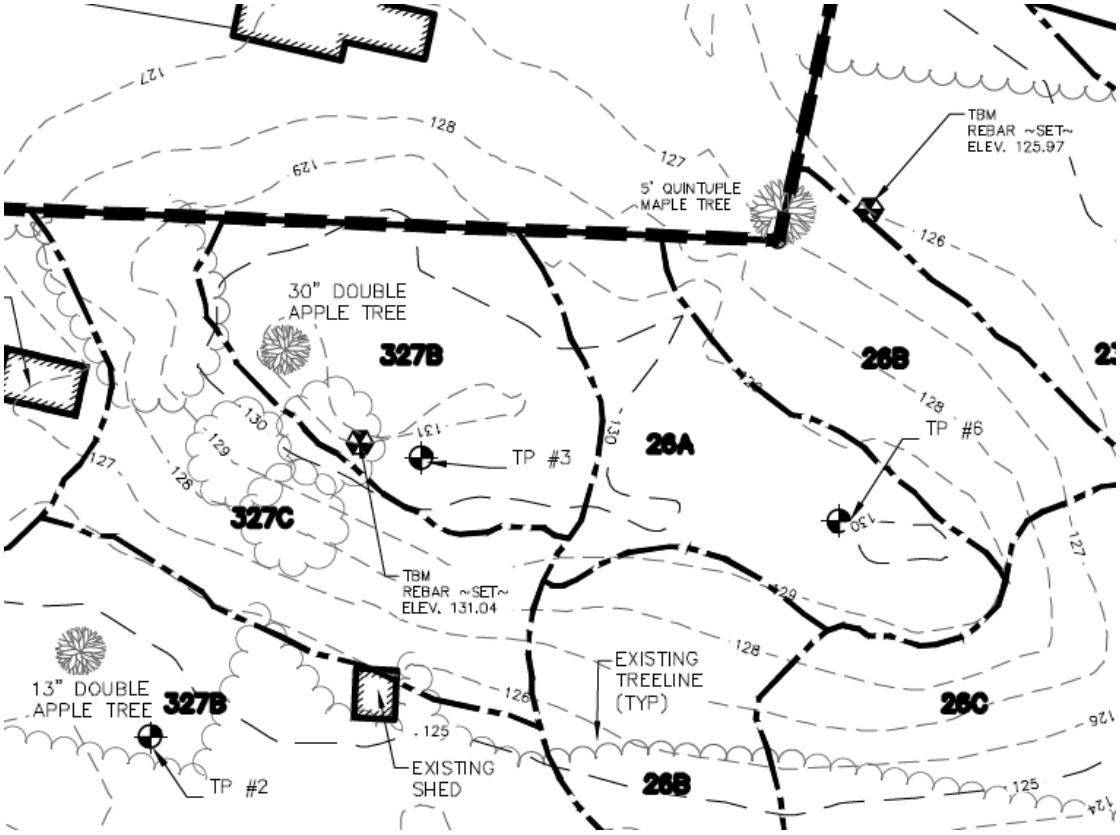
Porous Pavement Sidewalk #103 (Pond #103P) is located over Windsor (26), Windsor Variant (Clay Subsoil) (327), Elmridge (238), Boxford (Somewhat Poorly Drained) (953), and Boxford (32) soil.

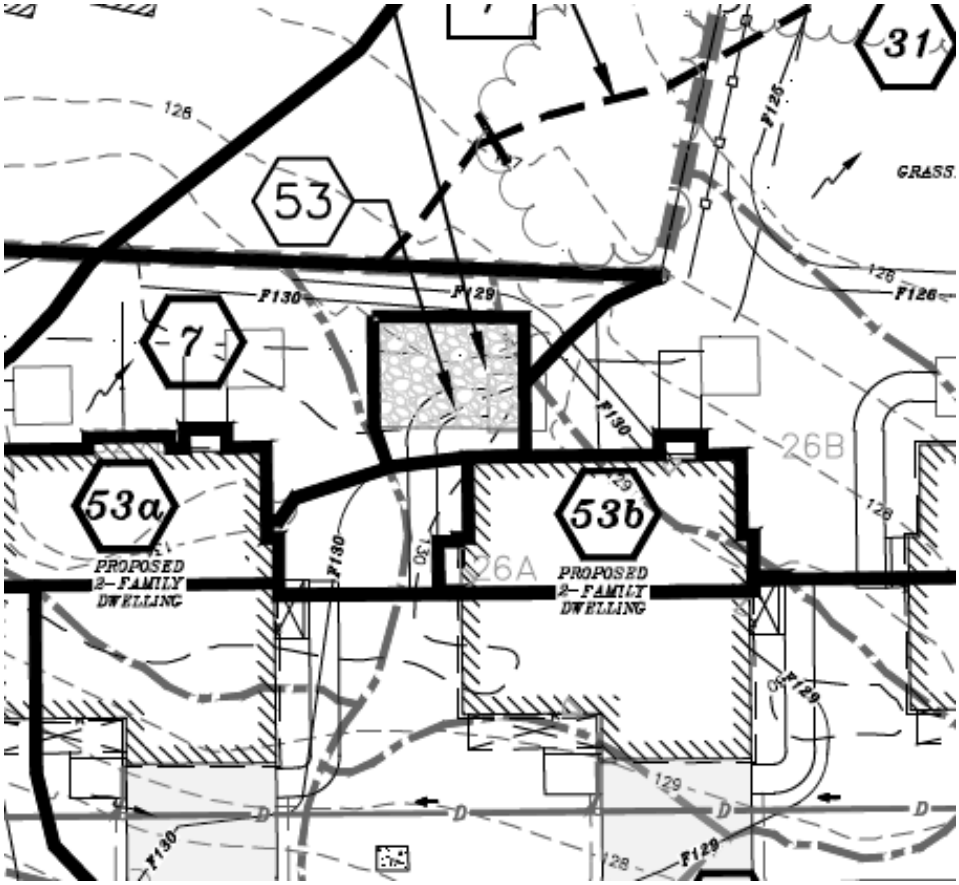


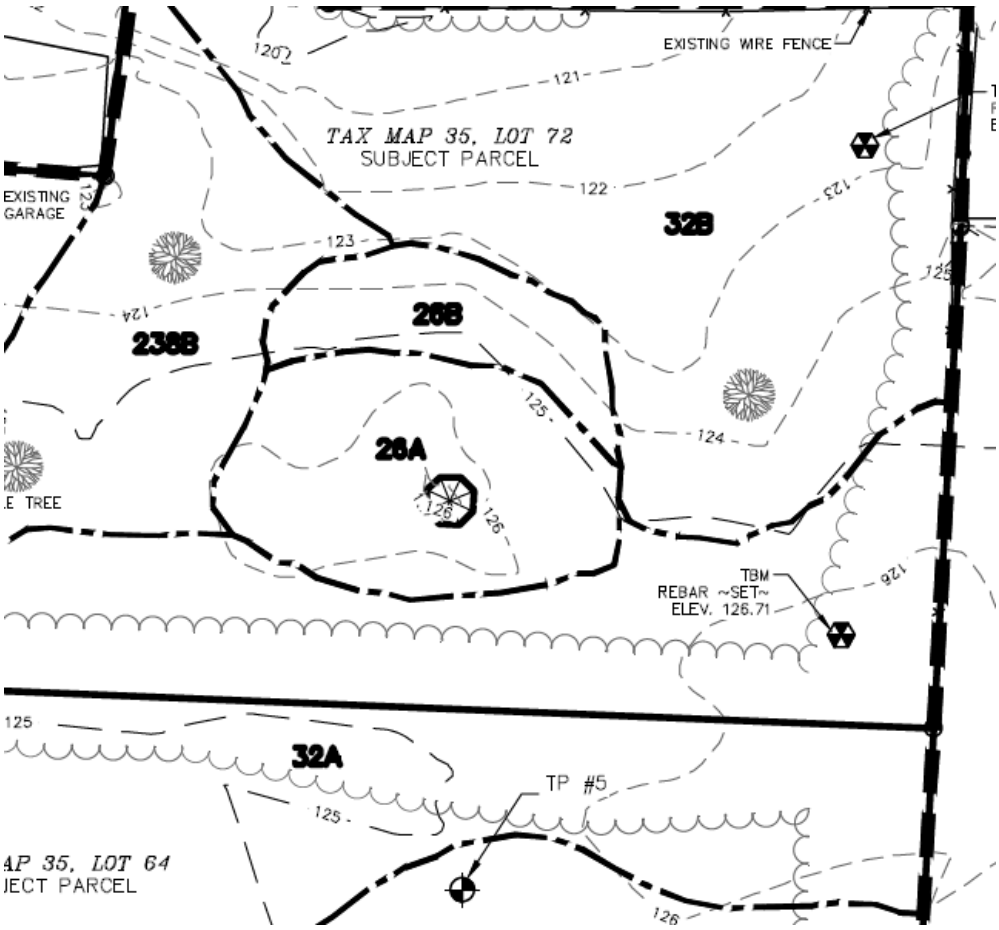
Infiltration Trench #201 (Pond #201P), Infiltration Trench #202 (Pond #202P), and Infiltration Trench #203 (Ponds #203P) are each completely within Windsor soil (26).

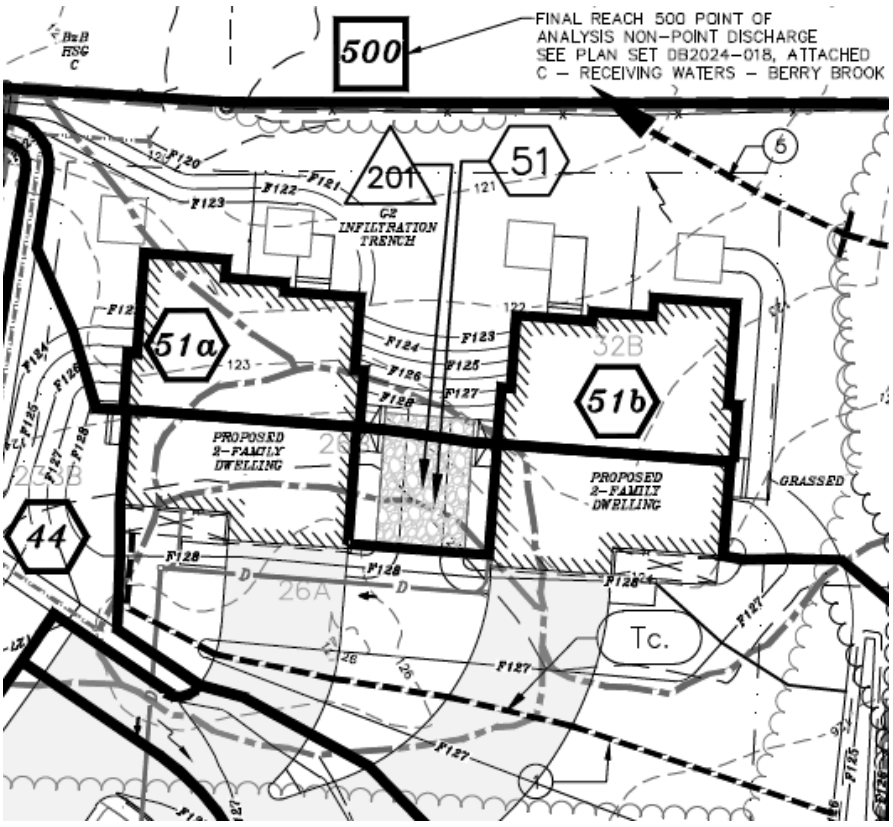

43" PINE TREE
EXISTING GARAGE
EXISTING DRIVEWAY
500B
EXISTING HOUSE
42" MAPLE TREE
26B
13" DOUBLE APPLE TREE
327B
327C
TP #1
TP #2
EXISTING DRIVEWAY


202
G2 INFILTRATION TRENCH
52
52a
PROPOSED 2-FAMILY DWELLING
PROPOSED 2-FAMILY DWELLING
GRASSED
CONVENTIONAL PAVEMENT
25
42


TBM
REBAR ~SET~
ELEV. 125.97
5" QUINTUPLE
MAPLE TREE
30" DOUBLE
APPLE TREE
327B
26B
TP #3
26A
TP #6
327C
TBM
REBAR ~SET~
ELEV. 131.04
EXISTING
TREELINE
(TYP)
13" DOUBLE
APPLE TREE
327B
26C
TP #2
EXISTING
SHED
26B


31
53
7
F130
F129
F126
F125
GRASS
53a
PROPOSED
2-FAMILY
DWELLING
53b
PROPOSED
2-FAMILY
DWELLING
26B
26A


EXISTING WIRE FENCE
TAX MAP 35, LOT 72
SUBJECT PARCEL
EXISTING GARAGE
32B
26B
23BB
26A
TBM
REBAR ~SET~
ELEV. 126.71
32A
TP #5
AP 35, LOT 64
JECT PARCEL


500
FINAL REACH 500 POINT OF ANALYSIS NON-POINT DISCHARGE SEE PLAN SET DB2024-018, ATTACHED
C – RECEIVING WATERS – BERRY BROOK
201
G2 INFILTRATION TRENCH
51
51a
51b
32B
PROPOSED 2-FAMILY DWELLING
PROPOSED 2-FAMILY DWELLING
GRASSED
44
26A
Tc.

7.0 Summary of Infiltration Rate

Porous Pavement Sidewalk #103 (Pond #103) is located over Windsor (26), Windsor (Clay Subsoil) (327), Elmridge (238), Boxford (Somewhat Poorly Drained) (953), and Boxford soil (32). These soils are considered to be a HSG C with the exception of Windsor which is considered to be a HSG A, in the soil area as mapped by Site Specific Soil Survey by John P. Hayes III, CSS. The Windsor Variant has limited recognition across the state, primarily only being in Strafford County, which is why it is not found in the KSat Values for New Hampshire Soils (Ksat NH Manual). While the Windsor Variant experiences Ksat of 6-20 in/hr in the "B" horizon according the Ksat NH, a silt loam "C" horizon exists with a significantly more restrictive Ksat.

Using the NH State-Wide Numerical Soil Legend (Key to the Soils of New Hampshire) 2011 Catena, the Windsor Variant is located within Section C, Marine or Glaciolacustrine Deposits, Soils Developed in Silt and Clay. From this section Elmridge soil contains similar textures and a restrictive "C" horizon. Using the Ksat NH Manual, Elmridge soil has a "C" horizon Ksat of 0.06-0.6 in/hr. While Boxford consists of restrictive "B" and "C" horizons of 0.1-0.2 in/hr and 0.0-0.2in/hr, respectively.

As large portions of the porous pavement sidewalk are located under Windsor (6-20in/hr & 20-100in/hr horizons) and a majority of the porous pavement sidewalk is in a fill condition, creating a receiving layer, a design exfiltration rate for the SCMs is 0.3 inches per hour.

Infiltration Trench #201 (Pond #201P), Infiltration Trench #202 (Pond #202P), and Infiltration Trench #203 (Pons #203P). considered to be HSG A, in the soil area as mapped by Site Specific Soil Survey by John P. Hayes III, CSS with a documented Ksat of 6.0 inches per hour. The design exfiltration rate for the SCMs is 3.0 inches per hour.

Amoozemeter testing was not conducted on site and the alternate method of using the USDA / NRCS published values was employed. Reference is made to Ksat Values for New Hampshire Soils (Including Hydrologic and DES Soil Lot Sizing Groups, sponsored by the Society of Soil Scientists of Northern New England, Publication #5 dated September 2009).

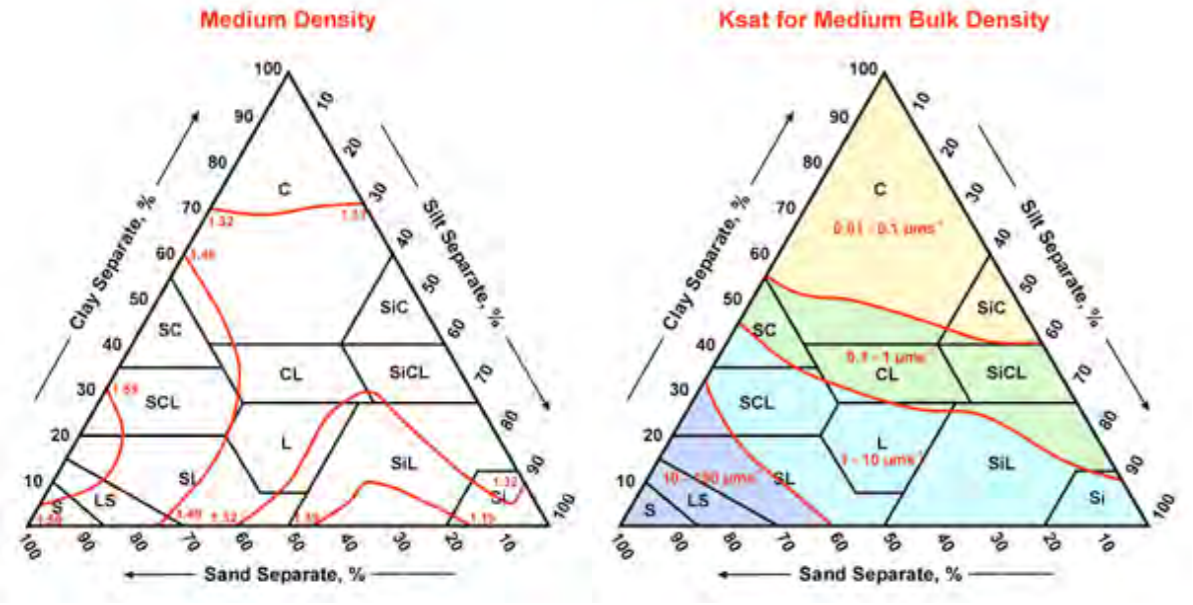
Respectfully submitted:

BERRY SURVEYING & ENGINEERING

Kevin R. Poulin, PE
Project Engineer

Kenneth A. Berry, PE, LLS
CPSWQ, CPESC, CESSWI
Principal, VP – Technical Operations

K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and DES Soil Lot Sizing Groups)



From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

Sponsored by the Society of Soil Scientists of Northern New England
SSSNNE Special Publication No. 5
September, 2009

K_{sat} VALUES FOR NEW HAMPSHIRE SOILS

ABOUT THE SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND

The Society of Soil Scientists of Northern New England (SSSNNE) is a non-profit professional organization of soil scientists, both in the private and public sectors, which is dedicated to the advancement of soil science. The Society fosters the profession of soil classification, mapping and interpretation, and encourages the dissemination of information concerning soil science. With the intent of contributing to the general human welfare, the Society seeks to educate the public on the wise use of soils and the associated natural resources.

INTRODUCTION

The publication "K_{sat} Values for New Hampshire Soils" is designed to assist soil scientists, engineers, and other professionals by assembling tables of existing data for all soil series currently on the state soil legend with regard to K_{sat} values and hydrologic groupings (Hyd.Grp.). The need for this information has become more important since the adoption by the New Hampshire Department of Environmental Services of the revised Alteration of Terrain rules for stormwater management. Additional information has been provided for each soil series with regard to landform, temperature regime (Temp.), soil textures, NHDES Soil Lot Size Groupings (Group), whether the soil is a Spodosol (Spodosol?) and other information which will be valuable to a variety of soil information users.

The data for each soil series has been sorted 3 ways for ease of searching:

Table A-Sorted by Numerical Legend
Table B-Sorted by Soil Series Name
Table C-Sorted by NHDES Soil Group for Establishing Lot Size

The report represents cumulative efforts by private soil scientists and NHDES staff with assistance from the USDA Natural Resource Conservation Service.

Comments or inquires on the information in this publication may be directed to the Board of Directors at the following address:

Society of Soil Scientists
of Northern New England
PO Box 76
Durham, NH 03824

SATURATED HYDRAULIC CONDUCTIVITY (K_{SAT})

K_{sat} refers to the ease with which pores in a saturated soil transmit water. The estimates presented here are expressed in terms of inches per hour (NRCS official data presents K_{sat} in both micrometers per second and inches per hour). K_{sat} values are based on soil characteristics observed in the field, particularly structure, consistence, porosity, and texture. (USDA NRCS, Web Soil Survey)

Saturated flow occurs when the soil water pressure is positive; that is, when the soil matric potential is zero (satiated wet condition). In most soils this situation takes place when about 95 percent of the total pore space is filled with water. The remaining 5 percent is filled with entrapped air. Saturated hydraulic conductivity cannot be used to describe water movement under unsaturated conditions. (Soil Survey Manual, 1993)

It is commonly known that soil features (and thus data) for a certain soil series name may be slightly different from one county soil survey to the next and the range in characteristics (via the Typical Pedon) may be slightly different. For example – a Marlow soil (series) in Carroll County may have a higher sand content in its B horizon as opposed to a Marlow soil (series) in Coos County; resulting in a slightly different Ksat range for the B horizon.

The K_{sat} data for this publication was obtained from the USDA-NRCS Soil Data Mart using the Typical Pedon from the county that best reflected the soil and/or had the most acres of that soil. This data is presented in B and C horizons only as it is assumed that the topsoil (A or A_p horizon) will be removed in typical construction practices.

References:

Web Soil Survey. *Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.*

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/.*

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.*

HYDROLOGIC SOIL GROUPS

Hydrologic group is a group of soils having the same runoff potential under similar storm and cover conditions.

Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning stormwater management, watershed protection, and flood-prevention projects and for planning or designing structures for the use, control, and disposal of water.

Classifications assigned to soils were based on the use of rainfall-runoff data from small watersheds and infiltrometer plots. From these data, relationships between soil properties and hydrologic groups were established. Assignment of soils to hydrologic groups is based on the relationship between soil properties and hydrologic groups. Wetness characteristics, permeability after prolonged wetting, and depth to very slowly permeable layers are properties that assist in estimating hydrologic groups. Minimum annual steady ponded infiltration rate for a bare ground surface determines the hydrologic soil groups.

Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. (The influence of ground cover is treated independently, not in hydrologic soil groups.).

The soils in the United States are placed into four groups, A, B, C, and D, and three dual classes, *A/D, B/D,* and *C/D.* In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

Group A- Saturated hydraulic conductivity is very high or in the upper half of high and internal free water occurrence is very deep. Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group A are as follows. The saturated hydraulic conductivity of all soil layers exceeds 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer are in group A if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 10 micrometers per second (1.42 inches per hour).

Group B- Saturated hydraulic conductivity is in the lower half of high or in the upper half of moderately high and free water occurrence is deep or very deep. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group B are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] ranges from 10.0 micrometers per second (1.42 inches per hour) to 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer or water table are in group B if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 4.0 micrometers per second (0.57 inches per hour) but is less than 10.0 micrometers per second (1.42 inches per hour).

Group C- Saturated hydraulic conductivity is in the lower half of moderately high or in the upper half of moderately low and internal free water occurrence is deeper than shallow. Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group C are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] is between 1.0 micrometers per second (0.14 inches per hour) and 10.0 micrometers per second (1.42 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a restriction or water table are in group C if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 0.40 micrometers per second (0.06 inches per hour) but is less than 4.0 micrometers per second (0.57 inches per hour). .

Group D- Saturated hydraulic conductivity is below the upper half of moderately low, and/or internal free water occurrence is shallow or very shallow and transitory through permanent. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained. The limits on the physical diagnostic characteristics of group D are as follows. For soils with a water impermeable layer at a depth between 50 centimeters and 100 centimeters [20 and 40 inches], the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 1.0 micrometers per second (0.14 inches per hour). For soils that are deeper than 100 centimeters [40 inches] to a restriction or water table, the saturated hydraulic

conductivity of all soil layers within 100 centimeters [40 inches] of the surface is less than or equal to 0.40 micrometers per second (0.06 inches per hour).

Dual hydrologic soil groups-Certain wet soils are placed in group D based solely on the presence of a water table within 60 centimeters [24 inches] of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups *(A/D, B/D,* and *C/D)* based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition. For the purpose of hydrologic soil group, adequately drained means that the seasonal high water table is kept at least 60 centimeters [24 inches] below the surface in a soil where it would be higher in a natural state.

References:

National Engineering Handbook, Natural Resource Conservation Service, U.S. Department of Agriculture.

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/*.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 18.*

TABLE A

NUMERICAL LEGEND

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquentic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep

no longer recognized

organic materials

TABLE B

SOIL SERIES

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquer	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

TABLE C

NHDES SOIL GROUPINGS

SSSNNE
Special Publilcation No. 5
September, 2009

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Adams	36	1	6.0	20.0	20.00	99.0	A	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Caesar	526	1	20.0	100.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	coarse sand	no	
Champlain	35	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	gravelly sand	no	
Colton	22	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Gloucester	11	1	6.0	20.0	6.00	20.0	A	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hermon	55	1	2.0	20.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hoosic	510	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Masardis	23	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Merrimac	10	1	2.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Quonset	310	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Redstone	665	1	2.0	6.0	6.00	20.0	A	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Success	154	1	2.0	6.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	cemented
Suncook	2	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Warwick	210	1	2.0	6.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Windsor	26	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	sandy	no	
Abenaki	501	2	0.6	2.0	6.00	99.0	B	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Agawam	24	2	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	2	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Bangor	572	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Berkshire	72	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bice	226	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	no	sandy loam
Canton	42	2	2.0	6.0	6.00	20.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Charlton	62	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Dutchess	366	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Fryeburg	208	2	0.6	2.0	2.00	6.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Groveton	27	2	0.6	2.0	0.60	6.0	B	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	2	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	2	0.6	2.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Houghtonville	795	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Lombard	259	2	0.6	6.0	2.00	20.0	C/D	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Monadnock	142	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Occum	1	2	0.6	2.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Salmon	630	2	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Stetson	523	2	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Unadilla	30	2	0.6	2.0	2.00	20.0	B	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Chichester	442	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Acton	146	3	2.0	20.0	2.00	20.0	B	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Becket	56	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	3	0.6	2.0	0.06	2.0	B	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bernardston	330	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Boxford	32	3	0.1	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	silty clay loam

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Buckland	237	3	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Buxton	232	3	0.1	0.6	0.00	0.2	C	Silt and Clay Deposits	frigid	fine	no	silty clay
Canterbury	166	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Chatfield Var.	289	3	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Colonel	927	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Croghan	613	3	20.0	100.0	20.00	100.0	B	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	3	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	3	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Eldridge	38	3	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elmridge	238	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116	3					C	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Gilmanton	478	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Henniker	46	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hitchcock	130	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Howland	566	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Lanesboro	228	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Lovewell	307	3	0.6	2.0	0.60	2.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Machias	520	3	2.0	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Madawaska	28	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquer	48	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Melrose	37	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Metacomet	458	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	3	6.0	100.0	6.00	100.0	B	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39	3					C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Montauk	44	3	0.6	6.0	0.06	0.6	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Mundal	610	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Newfields	444	3	0.6	2.0	0.60	2.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	3	0.6	2.0	0.60	2.0	C	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	3	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Paxton	66	3	0.6	2.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Peru	78	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	
Pittstown	334	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	3	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Poocham	230	3	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Scio	531	3	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scituate	448	3	0.6	2.0	0.06	0.2	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Sheepscot	14	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Sudbury	118	3	2.0	6.0	2.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Suffield	536	3	0.6	2.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Surplus	669	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	3	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	
Telos	123	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Waumbeck	58	3	2.0	20.0	6.00	20.0	B	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Winooski	103	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Woodbridge	29	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Winooski	9	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Canaan	663	4	2.0	20.0	2.00	20.0	C	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Cardigan	357	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Chatfield	89	4	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Elliottsville	128	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Glebe	671	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Glover	NA	4	0.6	2.0	0.60	2	D	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Hogback	91	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	4	0.6	6.0	0.60	6.0	C/D	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Kearsarge	359	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Lyman	92	4	2.0	6.0	2.00	6.0	A/D	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Macomber	252	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Millsite	251	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monson	133	4	0.6	2.0	0.60	2.0	D	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Pennichuck	460	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Rawsonville	98	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Ricker	674	4	2.0	6.0	2.00	6.0	A	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Saddleback	673	4	0.6	2.0	0.60	2.0	C/D	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Shapleigh	136	4					C/D	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Thorndike	84	4	0.6	2.0	0.60	2.0	C/D	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Tunbridge	99	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Winnecook	88	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Woodstock	93	4	2.0	6.0	2.00	6.0	C/D	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Au Gres	516	5					B	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bemis	224	5	0.6	0.2	0.00	0.2	C	Firm, platy, loamy till	cryic	loamy	no	
Binghamville	534	5	0.2	2.0	0.06	0.2	D	Terraces and glacial lake plains	mesic	silty	no	
Brayton	240	5	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Cabot	589	5	0.6	2.0	0.06	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Charles	209	5	0.6	100.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	silty	no	
Cohas	505	5	0.6	2.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Grange	433	5	0.6	2.0	0.60	2.0	C	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Kinsman	614	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Leicester	514	5	0.6	6.0	0.60	20.0	C	Loose till, loamy textures	mesic	loamy	no	
Lim	3	5	0.6	2.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	5	0.6	2.0	0.60	2.0	C	Flood Plain (Bottom Land)	mesic	silty	no	
Lyme	246	5	0.6	6.0	0.60	6.0	C	Loose till, sandy textures	frigid	loamy	no	
Mashpee	315	5	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	yes	
Monarda	569	5	0.2	2.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Moosilauke	414	5	6.0	20.0	6.00	20.0	C	Loose till, sandy textures	frigid	sandy	no	
Naumburg	214	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Pemi	633	5	0.6	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	5	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314	5					B	Outwash and Stream Terraces	mesic	sandy	yes	
Raynham	533	5	0.2	2.0	0.06	0.2	C	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	5	0.6	2.0	6.00	100.0	D	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Ridgebury	656	5	0.6	6.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	5	0.2	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	frigid	loamy	no	

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Saugatuck	16	5	0.06	0.2	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	5	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	
Scitico	33	5	0.0	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	
Shaker	439	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Squamscott	538	5	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stissing	340	5	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Swanton	438	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Walpole	546	5	2.0	6.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Biddeford	234	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	organic over clay
Bucksport	895	6					D	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	6	0.2	6.0	0.02	0.2	D	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
Catden	296	6					A/D	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Chocorua	395	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Greenwood	295	6					A/D	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Ipswich	397	6					D	Tidal Flat	mesic	hemic/sapric	no	deep organic
Matunuck	797	6			20.00	100.0	D	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	6	0.6	2.0	0.60	2.0	D	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Natchaug	496	6			0.20	2.0	D	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Ossipee	495	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497	6			20.00	100.0	D	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Peacham	549	6	0.6	2.0	0.00	0.2	D	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pondicherry	992	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Saco	6	6	0.6	2.0	6.00	20.0	D	Flood Plain (Bottom Land)	mesic	silty	no	strata
Scarboro	115	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Searsport	15	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Timakwa	393	6			6.00	100.0	D	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Vassalboro	150	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waskish	195	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Westbrook	597	6			0.00	2.0	D	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	6	0.0	0.2	0.00	0.2	D	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Wonsqueak	995	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam

no longer recognized

organic materials

denotes break betweenSoil Group

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LEGEND:

- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- CONTOUR MINOR, EXISTING
- CONTOUR MAJOR, EXISTING
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- EXISTING DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

4.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE DRAINAGE INFRASTRUCTURE THAT REQUIRES PERIODIC INSPECTION AND MAINTENANCE. IT IS TO ACCOMPANY A DOCUMENT ENTITLED "STORMWATER SYSTEM MANAGEMENT: INSPECTION AND MAINTENANCE MANUAL" PUBLISHED BY BERRY SURVEYING & ENGINEERING ON THE SAME DATE.

5.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.

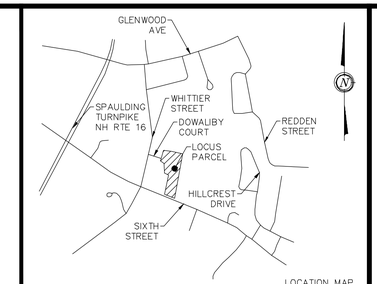
NAD83 NH STATE PLANE

MAGNETIC

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.



REVISION	DATE	DESCRIPTION

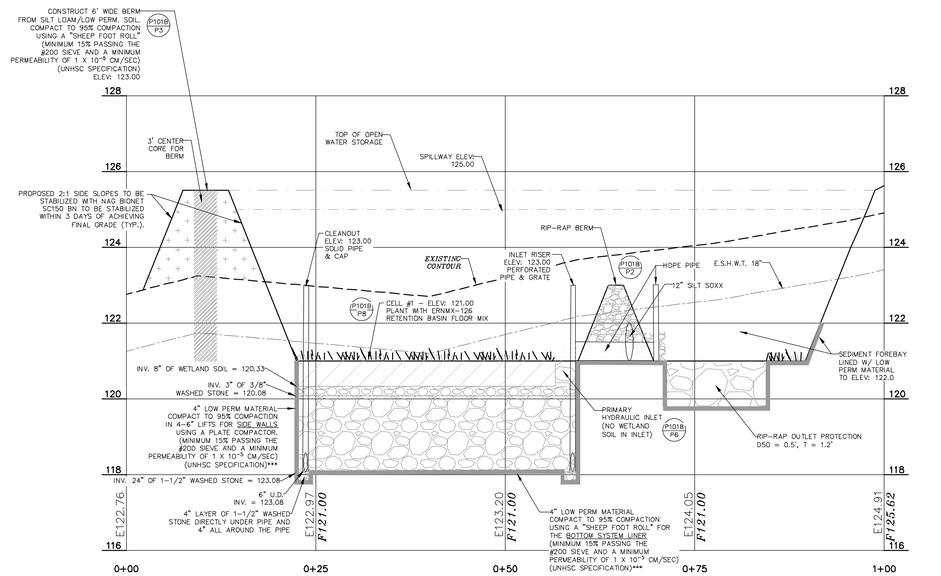
INSPECTION & MAINTENANCE PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 7626
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



SECTION OF GRAVEL WETLAND #101

A 101 — A 101

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET) *VERTICAL SCALE: 1" = 2'*

1 inch = 10 ft.

*** NOTE: THE UNDERLYING MATERIAL MAY QUALIFY AS LOW PERM MATERIAL. COORDINATE WITH DESIGN ENGINEER

CONSTRUCTION SEQUENCE NOTE:

EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E–101 FOR FULL CONSTRUCTION SEQUENCE.

WETLAND SOIL SURFACE PROTECTION NOTE:

SEE EROSION AND SEDIMENT CONTROL PLAN.
IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PROTECT THE WETLAND SOIL SURFACE FROM SEDIMENTATION CAUSED BY EROSION ON THE SIDE SLOPES.

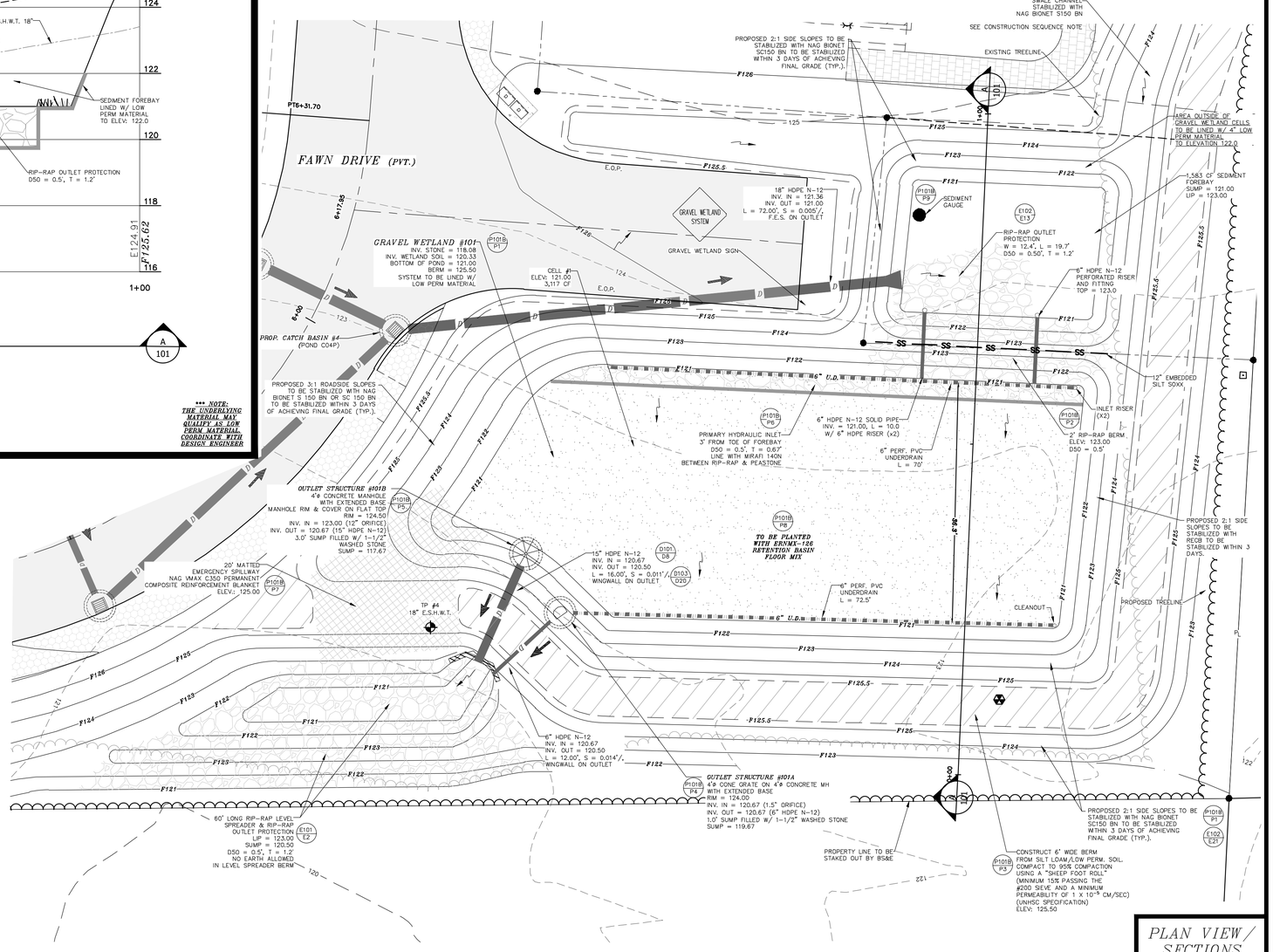
PLAN VIEW GRAVEL WETLAND #101 SEE P–101B FOR DETAILS

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES			
d50 SIZE=	0.5	FEET	6 INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE		SIZE OF STONE (INCHES) FROM	TO
100%		9	12
85%		8	11
50%		6	9
15%		2	3



LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- D D — CENTER LINE, PROPOSED DRAINAGE LINE
- U.D. U.D. — PROPOSED UNDERDRAIN
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

PLAN VIEW / SECTIONS

P–101A

REVISION	DATE	DESCRIPTION

SUBSURFACE GRAVEL WETLAND #101 PLAN VIEW & PROFILES
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14243 — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

MAINTENANCE REQUIREMENTS

ACTIVITY — CLOGGING AND SYSTEM PERFORMANCE	FREQUENCY
INSPECT INLETS AND OUTLETS TO ENSURE GOOD CONDITION AND NO EVIDENCE OF DETERIORATION. CHECK TO SEE IF HIGH-FLOW BYPASS IS FUNCTIONING. REMEDY: REPAIR OR REPLACE ANY DAMAGED STRUCTUAL PARTS, INLETS AND OUTLETS. CLEAR OR REMOVE DEBRIS OR RESTRICTIONS.	ANNUALLY, MORE FREQUENTLY IN THE FIRST YEAR OF OPERATION
CHECK FOR INTERNAL EROSION, EVIDENCE OF SHORT-CIRCUITING, AND ANIMAL BURROWS. REMEDY: SOIL EROSION FROM SHORT-CIRCUITING OR ANIMAL BOROUGHS SHOULD BE REPAIRED WHEN THEY OCCUR.	
CHECK THAT THE SYSTEM IS FULLY DRAINING WITHIN A 24-48 HOUR PERIOD AFTER RAIN EVENTS. REMEDY: REPAIR OR RESTORE HYDRAULIC INLET OR OUTLET CONFIGURATION.	

VEGETATION	
CHECK FOR ROBUST VEGETATION COVERAGE THROUGHOUT THE SYSTEM AND DEAD OR DYING PLANTS REMEDY: VEGETATION SHOULD COVER > 75% OF THE SYSTEM AND SHOULD BE RESEEDED AND CARED FOR AS NEEDED	ANNUALLY, OR AS NEEDED
CUT AND REMOVE VEGETATION FROM GRAVEL WETLAND SYSTEM AND FOREBAY IN ORDER TO MAINTAIN NITROGEN REMOVAL PERFORMANCE REMEDY: THE VEGETATION SHOULD BE CUT AND REMOVED FROM THE SYSTEM TO PREVENT NITROGEN FROM CYCLING BACK INTO THE SYSTEM	ONCE EVERY 3 YEARS

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1-1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

WETLAND SOIL

SIEVE SIZE	% PASSING BY WEIGHT
0.5	100
#10"	90 – 75
#100	40 – 50
#200	25 –50
SIEVE SIZE	% PASSING TOLERANCES
0.5	±10.0
#10	±5.0
#100	±5.0
#200	±5.0

CONSTRUCTION NOTE: THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER-DRAIN AND INTER-CHAMBER PIPES. PLEASE PROVIDE 24 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.

DESIGN REFERENCES

1 UNH STORMWATER CENTER

STABILIZATION NOTE:
SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

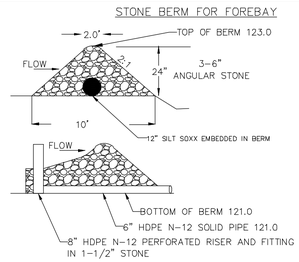
WETLAND SOIL PLANTING:
THE FLOOR OF THE SUBSURFACE GRAVEL WETLAND CELLS AT TO BE PLANTED WITH NEW ENGLAND WETLAND PLANT, INC. (N.E.W.P.) NEW ENGLAND WETMIX, OR APPROVED EQUAL. SEE DETAIL P8.

GRAVEL WETLAND CONSTRUCTION & MAINTENANCE SPECIFICATIONS

P1

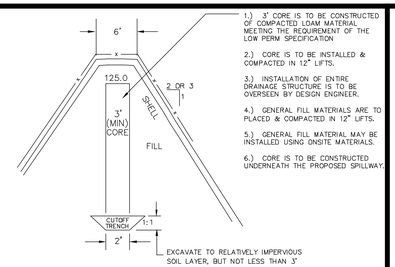
P2

STONE BERM FOR FOREBAY



GRAVEL WETLAND SEDIMENT FOREBAY
NOT TO SCALE

P3



1.) 3" CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL MEETING THE REQUIREMENT OF THE LOW PERM SPECIFICATION

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45

GRAVEL WETLAND BERM CONSTRUCTION
NOT TO SCALE

P4

TOP VIEW (OS #101A)
NOT TO SCALE

CAP WITH CONTROL ORIFICE (OS #101A)
NOT TO SCALE

GRAVEL WETLAND STRUCTURES & DETAILS
NOT TO SCALE

PERFORATED RISER DETAIL
NOT TO SCALE

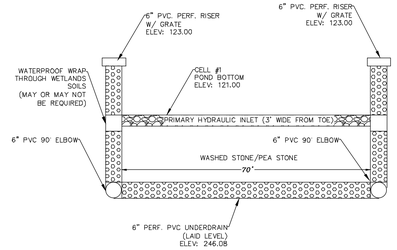
OUTLET STRUCTURE #101A (PRIMARY)
NOT TO SCALE

P5

TOP VIEW (OS #101B)
NOT TO SCALE

OUTLET STRUCTURE #101B (SECONDARY)
NOT TO SCALE

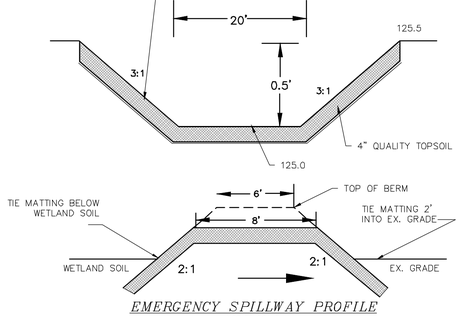
P6



GRAVEL WETLAND INLET SYSTEM
NOT TO SCALE

NOTE: THERE IS NO WETLAND SOIL IN THE GRAVEL WETLAND INLET SYSTEM

P7



EMERGENCY SPILLWAY PROFILE
NOT TO SCALE

P8

Retention Basin Floor Mix - Low Maintenance - ERNMX-126

	Botanical Name	Common Name	Price/Lb
20.00 %	*Anetum clandestinum, Tioga*	Deertongue, Tioga	22.08
20.00 %	*Panicwallis dictans, Pubs*	Alkaligrass, Pubs	4.36
18.00 %	*Elymus virginicus, Madison-NY Ecotype*	Virginia Wildrye, Madison-NY Ecotype	9.96
15.00 %	*Agrostis stolonifera, 'Pennycross'*	Creeping Bentgrass, 'Pennycross'	14.40
15.00 %	*Poa palustris*	Fowl Bluegrass	16.80
10.00 %	*Carex vulpinoidea, PA Ecotype*	Fox Sedge, PA Ecotype	28.80
1.00 %	*Carex scoparia, PA Ecotype*	Blunt Broom Sedge, PA Ecotype	81.60
1.00 %	*Juncus effusus*	Soft Rush	48.00
100.00 %		**Mix Price/Lb Bulk**	**$15.98**

Seeding Rate: 20-40 lbs per acre, or 0.5-1 lb/1,000 sq ft with a cover crop. For a cover crop use one of the following: grain rye (1 Sep to 30 Apr; 30 lbs/acre), Japenese millet (1 May to 31 Aug; 10 lbs/acre), or barnyard grass (1 May to 31 Aug; 10 lbs/acre).

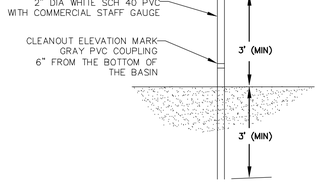
NOTE: TO BE USED FOR STORMWATER BMPS

BUTTERFLY MILK WEED IS A REQUIRED ADDITION TO ANY SEEDING DONE ON SITE.

Grasses & Grass-like Species - Herbaceous Perennial; Stormwater Management

The hardy inexpensive grass and grass-like species are ideal for retention basins that may have high salt inflows and where mowing may be required. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

P9



NOTES:
1. STAFF GAUGE TO BE TWO-INCH WHITE SCHEDULE 40 PVC PIPE DRIVEN INTO THE GROUND A MINIMUM OF 3-FEET.
2. A CLEANOUT MARK ON THE STAFF TO BE GRAY PVC COUPLING SET SIX-INCHES FROM THE BOTTOM OF THE BASIN.
3. A COMMERCIAL STAFF GAUGE WILL BE ATTACHED TO THE 2-INCH PVC PIPE WITH STAINLESS STEEL SCREWS.
4. SEDIMENT FOREBAY INSPECTION REQUIREMENTS: AT LEAST ANNUALLY OR MORE IF THE SEDIMENT LOAD EXCEEDS THE CLEANOUT MARK, CONDUCT PERIODIC MOWING OF THE SEDIMENT FOREBAY SLOPES AND EMBANKMENTS SEMI-ANNUALLY, REMOVE DEBRIS FROM THE OUTLET BERM AND DRAINS ANNUALLY, REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT BASED ON INSPECTION ACCUMULATING NO MORE THAN SIX-INCHES IN DEPTH.

DEPTH GAUGE – SEDIMENT FOREBAY
NOT TO SCALE

REVISION	DATE	DESCRIPTION

SUBSURFACE GRAVEL WETLAND #101 DETAILS

FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

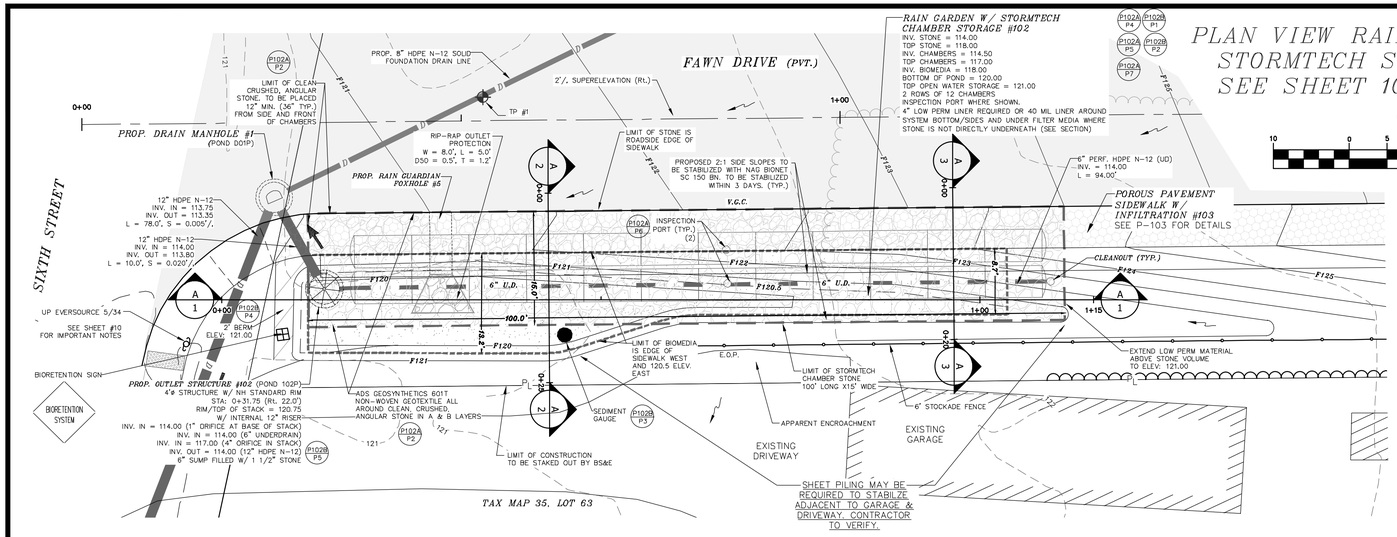
SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

DETAILS

P–102B

NOT FOR CONSTRUCTION



PLAN VIEW RAIN GARDEN #102 W/ STORMTECH SC-740 CHAMBERS
SEE SHEET 102B FOR DETAILS

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

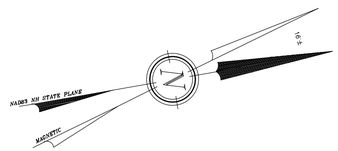


TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES		
d50 SIZE= 0.5 FEET 6 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

CONSTRUCTION SEQUENCE NOTE:
EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E-101 FOR FULL CONSTRUCTION SEQUENCE.

BIOMEDIA SURFACE PROTECTION NOTE:
SEE EROSION AND SEDIMENT CONTROL PLAN
IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PROTECT THE BIOMEDIA SURFACE FROM SEDIMENTATION CAUSED BY EROSION ON THE SIDE SLOPES.

CONSTRUCTION NOTE:
THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER-DRAIN AND CHAMBERS. PLEASE PROVIDE 24-48 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.
A LETTER CERTIFYING AS TO THE CONSTRUCTION BY THE OWNER AND DESIGN ENGINEER IS REQUIRED AS A CONDITION OF THE ALTERATION OF TERRAIN PERMIT AND THE CITY OF DOVER.

LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- LIMIT OF CRUSHED STONE
- LIMIT OF BIOMEDIA
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

REVISION	DATE	DESCRIPTION

STORMTECH SC740 CHAMBER DETENTION POND #102
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14243 — LICENSED PROFESSIONAL ENGINEER

SHEET 15 OF 39

P1

1. ALL DESIGN SPECIFICATIONS FOR STORMTECH SC-740 CHAMBERS SHALL BE IN ACCORDANCE WITH THE STORMTECH DESIGN MANUAL, ADVANCED DRAINAGE SYSTEM, INC (ADS STORMTECH)
2. THE INSTALLATION OF STORMTECH SC-740 CHAMBERS SHALL BE IN ACCORDANCE WITH THE LATEST STORMTECH INSTALLATION INSTRUCTIONS
3. THE CONTRACTOR IS ADVISED TO REVIEW AND UNDERSTAND THE INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLTION. CALL **1-888-892-2694** OR VISIT **WWW.STORMTECH.COM** TO RECIEVE A COPY OF THE LATEST STORMTECH INSTALLATION INSTRUCTIONS
4. CHAMBERS SHALL MEET THE DESIGN REQUIREMENTS AND LOAD FACTORS SPECIFIED IN SECTION 12.12 OF THE LATEST EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

SC-740 NOTES

P2

1-1/2" WASHED CRUSHED STONE * (AASHTO NO. 4)	
SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 - 100
1"	20 - 55
1/2"	0 - 15
3/8"	0 - 5

* EQUIVALENT TO STANDARD WASHED STONE - SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION¹	COMPACTION/DENSITY REQUIREMENT
D	FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISH GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THIS LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE (B² LAYER) TO 18" (457 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THIS LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES. MOST PAVEMENT SUB-BASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTION AFTER 12" (305 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (152 mm) LIFTS TO A MIN. 95% STANDARD PROCTOR DENSITY. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs [53 kN]. DYNAMIC FORCE NOT TO EXCEED 20,000 lbs [89 kN]
B	EMBEDMENT STONE SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH [19 - 51 mm]	3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH [19 - 51 mm]	3, 35, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY².

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE.

2. AS AN ALTERNATE TO PROCTOR TESTING AND FIELD DENSITY MEASUREMENTS ON OPEN GRADED STONE, STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9in [229 mm] (MAX) LIFTS USING TWO FULL COVERAGES WITH AN APPROPRIATE COMPACTOR.

STORMTECH ACCEPTABLE FILL MATERIALS

P3

INSPECTION AND MAINTENANCE:

DUE TO THE CRITICAL NATURE OF INSPECTION AND MAINTENANCE STORMTECH SYSTEM AS DETAILED IN THE DESIGN MANUAL, ADVANCED DRAINAGE SYSTEM, INC (ADS STORMTECH) THE FOLLOWING THREE FIRMS ARE RECOMMENDED FOR THIS TASK. IT IS HIGHLY RECOMMENDED THAT THE OPERATOR OF THE PROPERTY HAVE A LONG TERM INSPECTION AND MAINTENANCE CONTACT WITH A FIRM THAT CAN COMPLETE THESE VITAL SERVICES.

AS FOR ISOLATOR ROW MAINTENANCE, CB MAINTENANCE, ETC., REGIONAL ADS REPRESENTATIVES RECOMMEND USING ANY OF THE FOLLOWING CONTACTS:

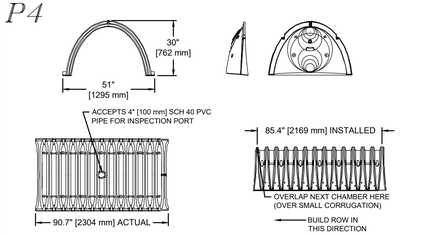
STORMWATER COMPLIANCE, LLC;
ATTN: NATHAN MARLES, 1-877-271-9055; NMARLES@LIDTECH.COM
163 THADEUS STREET, PORTLAND, ME 04106
INFO@STORMWATERCOMP.COM

TED BERRY COMPANY;
ATTN: DAVE BEAUCHAMP, 207-897-3348; DAVID.BEAUCHAMP@TEDBERRYCOMPANY.COM
521 FEDERAL ROAD, LIVERMORE, ME 04253
INFL@TEDBERRYCOMPANY.COM

BELLEMORE SEPTIC, SEWER, & DRAIN;
ATTN: RAY BELLEMORE, 603-641-6640; RAYMOND@BELLEMORE.COM
PO BOX 10369, BEDFORD, NH 03110

CONTACT AARON CHEEVER, P.E., ADVANCE DRAINAGE SYSTEMS, INC.
AARON.CHEEVER@ADS-PIPE.COM 1-978-302-0650
FOR PRODUCT AND PRICING

P4



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W x H x INSTALLED LENGTH)	51.0" x 30.0" x 85.4" [1295 mm x 762 mm x 2169 mm]
CHAMBER STORAGE	45.9 CUBIC FEET [1.30 m3]
MINIMUM INSTALLED STORAGE	74.9 CUBIC FEET [2.12 m3]
WEIGHT	75 lbs. [33.6 kg]

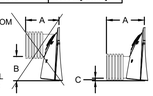
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART#	STUB	A	B	C
SC740EPE06T	6" [150 mm]	10.90" [277 mm]	18.50" [470 mm]	N/A
SC740EPE06B	6" [150 mm]	10.90" [277 mm]	N/A	0.50" [13 mm]
SC740EPE08T	8" [200 mm]	12.20" [310 mm]	16.50" [419 mm]	N/A
SC740EPE08B	8" [200 mm]	12.20" [310 mm]	N/A	0.60" [15 mm]
SC740EPE10T	10" [250 mm]	13.40" [340 mm]	14.50" [368 mm]	N/A
SC740EPE10B	10" [250 mm]	13.40" [340 mm]	N/A	0.70" [18 mm]
SC740EPE12T	12" [300 mm]	14.70" [373 mm]	12.50" [318 mm]	N/A
SC740EPE12B	12" [300 mm]	14.70" [373 mm]	N/A	1.20" [30 mm]
SC740EPE15T	12" [375 mm]	18.40" [467 mm]	9.00" [229 mm]	N/A
SC740EPE15B	12" [375 mm]	18.40" [467 mm]	N/A	1.30" [33 mm]
SC740EPE18T	18" [450 mm]	19.70" [500 mm]	5.00" [127 mm]	N/A
SC740EPE18B	18" [450 mm]	19.70" [500 mm]	N/A	1.60" [41 mm]
*SC740EPE24B	24" [600 mm]	18.50" [470 mm]	N/A	0.10" [3 mm]

NOTE: ALL DIMENSIONS ARE NOMINAL

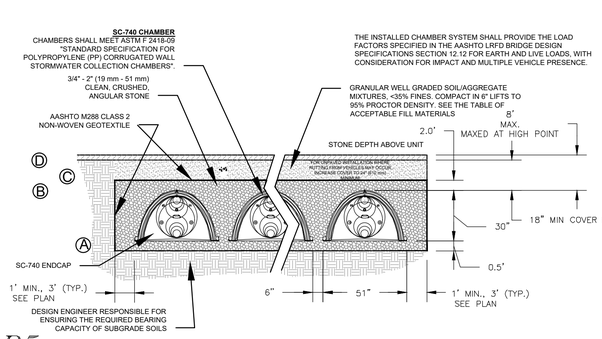
ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

*FOR THE SC740EPE24B THE 24" [600 mm] STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" [44 mm]. BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.



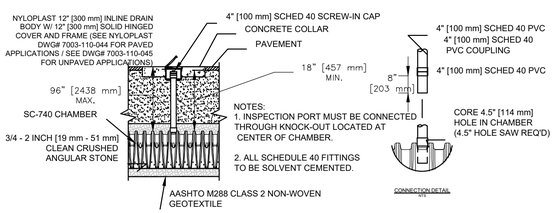
SC-740 TECHNICAL SPEC.

P5



SC-740 STANDARD CROSS SECTION

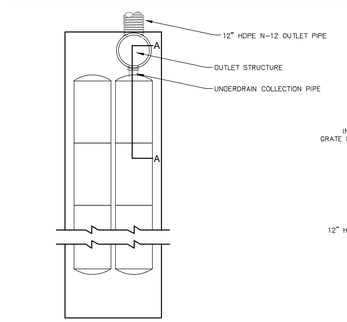
P6

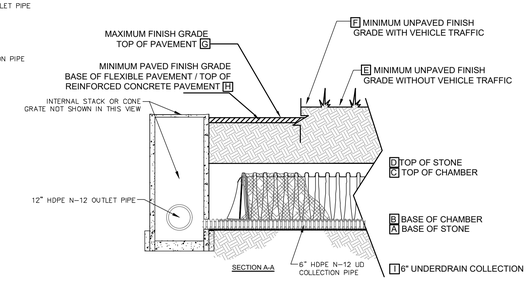


SC-740 INSPECTION PORT DETAIL

P7

	A	B	C	D	E	F	G	H	I
BED 1/ONLY	114.00	114.50	117.00	118.00	120.00	N/A	124.40	120.80	114.00





SC-740 ELEVATIONS

PLAN & STORMTECH DETAIL

P-102A

NOT FOR CONSTRUCTION

BIORETENTION FILTER MEDIA MIXTURES

Component Material	Percent of Mixture by Volume	Gradation of material	
		Sieve No.	Percent by Weight Passing Standard Sieve
Bioretention Filter Media Option A			
ASTM C-33 concrete sand	50 to 55		
Loamy sand topsoil, with fines as indicated	20 to 30	200	15 to 25
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200	< 5

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

P1

NOTES

WHEN CONTRACTOR EXCAVATES RAIN GARDEN AREA TO SUBGRADE, DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL.

1. SOIL BIORETENTION FILTER MEDIA SHALL BE AS SHOWN ABOVE. "BIO MEDIA" MEANS BIORETENTION FILTER MEDIA.
2. COMPACTION IS NOT TO OCCUR IN THE RAIN GARDEN AREAS PRIOR TO CONSTRUCTION. SCARIFICATION REQUIRED IN THE EVENT COMPACTION TAKES PLACE.
3. DO NOT PLACE THE BIORETENTION SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
4. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
5. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS

1 SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 0.25 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.

2 PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

3 AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.

4 VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING, PRUNING, REMOVAL, AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

DESIGN REFERENCES

1 UNH STORMWATER CENTER

2 NEW HAMPSHIRE STORMWATER MANAGEMENT MANUAL, FEBRUARY 2025 AS AMENDED.

CONSTRUCTION SEQUENCE NOTE:

EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E-102 FOR FULL CONSTRUCTION SEQUENCE.

P2

RAIN GARDEN MIX

THE GRASS THAT IS PLANTED WITHIN A RAIN GARDEN BIO-FILTRATION SYSTEM WITHIN THE BIO-MEDIA MUST CONSIST OF A COMBINATION OF WARM SEASON GRASS SEED AND COLD SEASON GRASS SEED IN ORDER FOR THE GRASS TO START GROWING FOR STABILIZATION AND CONTINUE GROWING IN THE SANDY WELL-DRAINED ENVIRONMENT. PLANTING SPECIFICATION WILL MEET THE REQUIREMENTS AS OUTLINED IN 'VEGETATION NEW HAMPSHIRE SAND AND GRAVEL PITS' MIX 1 (WARM SEASON GRASSES) (15 LBS/AC) AND INCLUDE ANNUAL AND PERENNIAL RYE GRASS SEED (15 LBS/AC); THE NEW ENGLAND NATIVE WARM SEASON GRASS MIX (23 LBS/AC) BY NEW ENGLAND WETLAND PLANTS, INC.; RAIN GARDEN MIX 180 (15 LBS/AC & 15 LBS/AC OF RYE) / RAIN GARDEN GRASS MIX 180-1 (20 LBS/AC & 10 LBS/AC OF RYE) BY ERNST CONSERVATION SEEDS; OR APPROVED EQUAL.

Rain Garden Grass Mix - ERNMX-180-1

	Botanical Name	Common Name	Price/Lb
40.40 %	*Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype*	Little Bluestem, Fort Indiantown Gap-PA Ecotype	14.65
20.00 %	*Carex tuckermanii, PA Ecotype*	Fox Sedge, PA Ecotype	31.20
20.00 %	*Elymus virginicus, Madison-NY Ecotype*	Virginia Wildrye, Madison-NY Ecotype	10.46
9.00 %	*Panicum clandestinum, Tioga*	Deertongue, Tioga	22.27
5.50 %	*Panicum rigidulum, PA Ecotype*	Redtop Panicgrass, PA Ecotype	72.00
4.00 %	*Chasmanthium latifolium, WI Ecotype*	River Oats, WV Ecotype	96.00
0.50 %	*Carex scoparia, PA Ecotype*	Blunt Broom Sedge, PA Ecotype	96.00
0.30 %	*Juncus effusus*	Soft Rush	48.00
0.30 %	*Juncus tenuis, PA Ecotype*	Path Rush, PA Ecotype	48.00
100.00 %		**Mix Price/Lb Bulk:**	**$24.82**

Seeding Rate: 15 lb per acre with a cover crop. For sites that drain within 24 hours of a rain event: use one of the following cover crops: Oats (1 Jan to 31 Jul; 30 lbs/acre), Japanese Millet (1 May to 31 Aug; 10 lbs/acre), or grain rye (1 Aug to 31 Dec; 30 lbs/acre).

NOTE: TO BE USED FOR STORMWATER BMPS

BUTTERFLY MILK WEED IS A REQUIRED ADDITION TO ANY SEEDING DONE ON SITE.

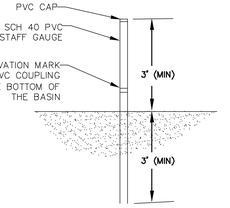
Grasses & Grass-like Species - Herbaceous Perennial; Stormwater Management

Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

STABILIZATION NOTE:

SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

P3



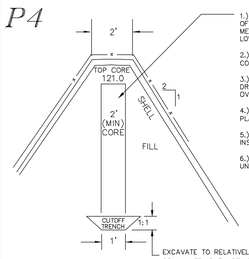
NOTES:

1. STAFF GAUGE TO BE TWO-INCH WHITE SCHEDULE 40 PVC PIPE DRIVEN INTO THE GROUND A MINIMUM OF 3-FEET.
2. A CLEANOUT MARK ON THE STAFF TO BE GRAY PVC COUPLING SET SIX-INCHES FROM THE BOTTOM OF THE BASIN.
3. A COMMERCIAL STAFF GAUGE WILL BE ATTACHED TO THE 2-INCH PVC PIPE WITH STAINLESS STEEL SCREWS.
4. SEDIMENT FOREBAY INSPECTION REQUIREMENTS: AT LEAST ANNUALLY OR MORE IF THE SEDIMENT LOAD EXCEEDS THE CLEANOUT MARK, CONDUCT PERIODIC MOWING OF THE SEDIMENT FOREBAY SLOPES AND EMBANKMENTS SEMI-ANNUALLY, REMOVE DEBRIS FROM THE OUTLET BERM AND DRAINS ANNUALLY, REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT BASED ON INSPECTION ACCUMULATING NO MORE THAN SIX-INCHES IN DEPTH.

SEDIMENT DEPTH GAUGE

NOT TO SCALE

P4



1.) 2' CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL MEETING THE REQUIREMENT OF THE LOW PERM SPECIFICATION

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

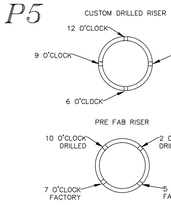
LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45

BERM & LINER CONSTRUCTION

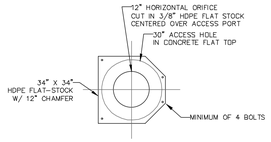
NOT TO SCALE

P5



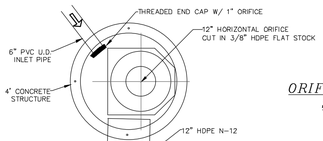
PERFORATED RISER DETAIL

NOT TO SCALE



ORIFICE SCHEMATIC #102A

NOT TO SCALE

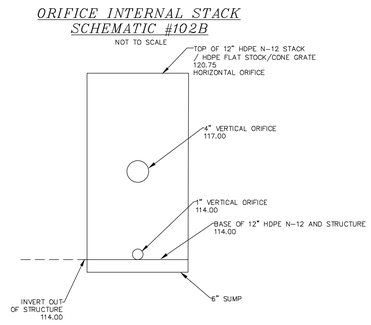


TOP VIEW

NOT TO SCALE (NO INTERNAL STACK IN THIS VIEW)

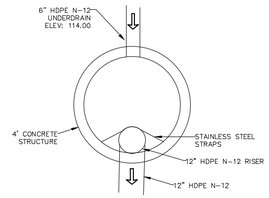
ORIFICE INTERNAL STACK SCHEMATIC #102B

NOT TO SCALE



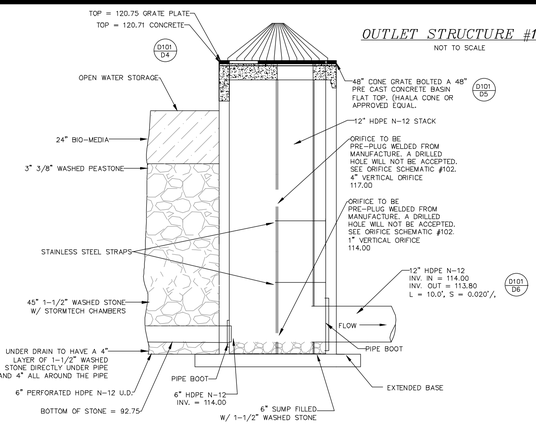
TOP VIEW

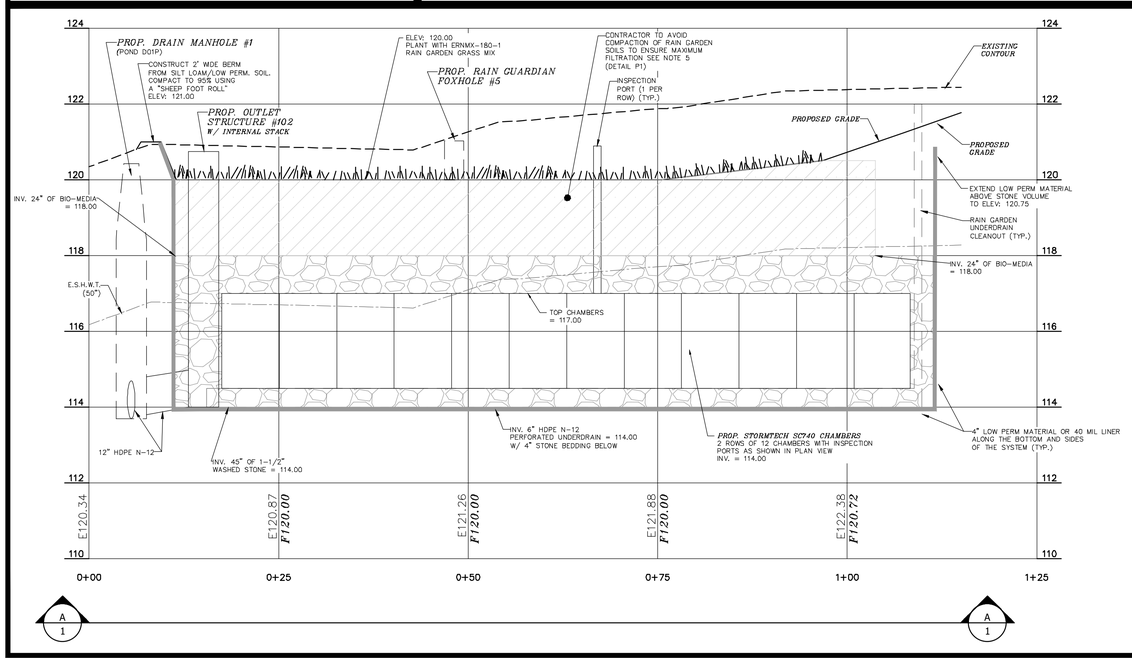
NOT TO SCALE (NO HDPE FLAT STOCK AND GRATE IN THIS VIEW)

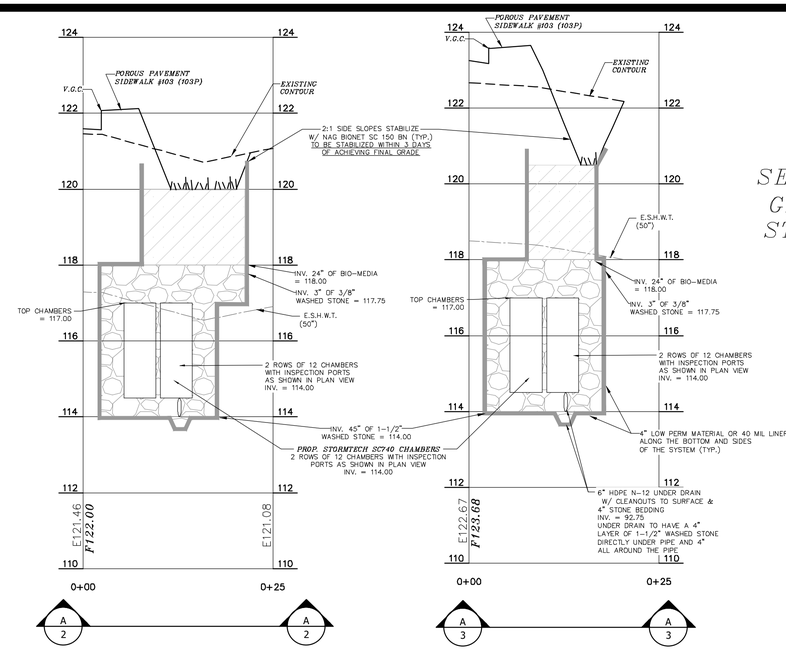


OUTLET STRUCTURE #102

NOT TO SCALE







SECTIONS OF RAIN GARDEN #102 W/ STORMTECH SC740 CHAMBERS

SECTIONS & RAIN GARDEN DETAIL

P-102B

REVISION	DATE	DESCRIPTION

RAIN GARDEN #102 W/ STORMTECH SC740
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER N.H.
TAX MAP 36, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

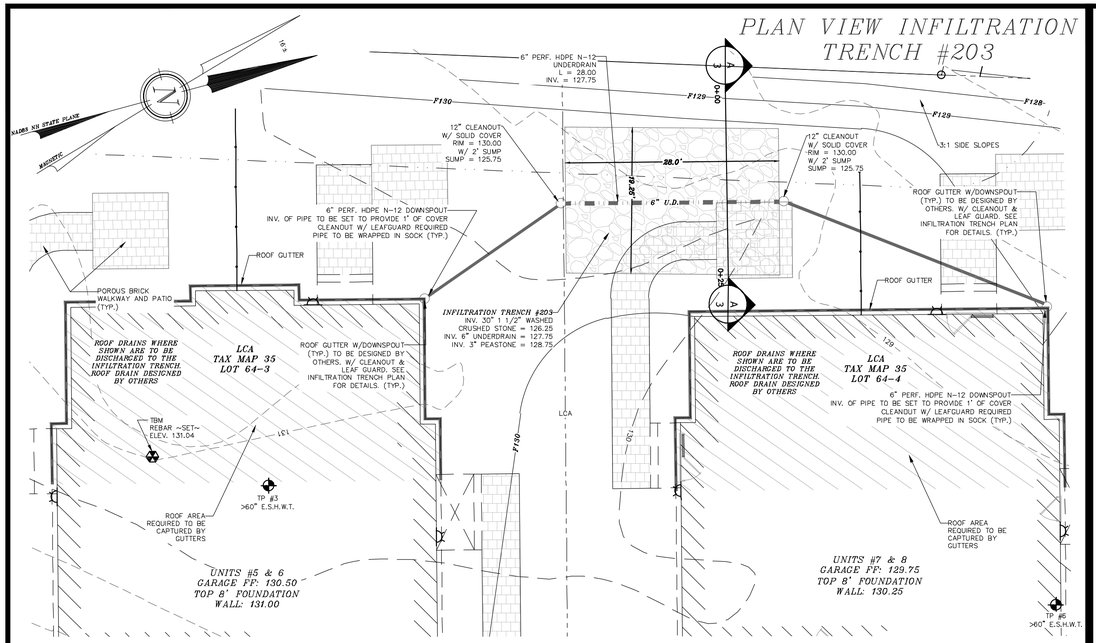
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

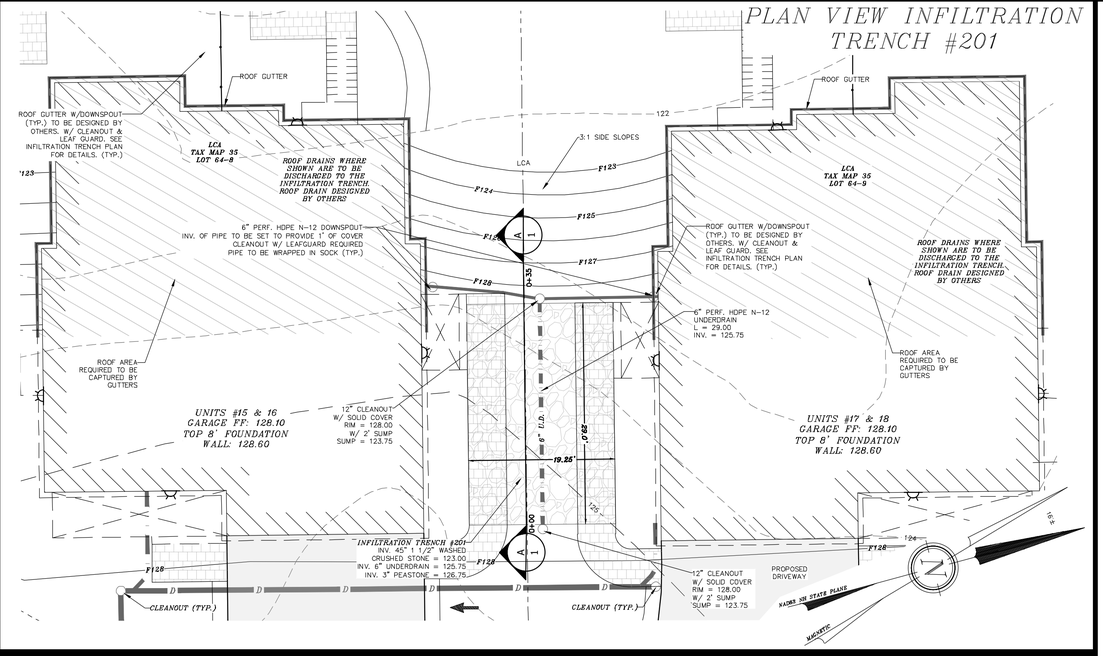
STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14243 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

PLAN VIEW INFILTRATION TRENCH #203



PLAN VIEW INFILTRATION TRENCH #201



GRAPHIC SCALE

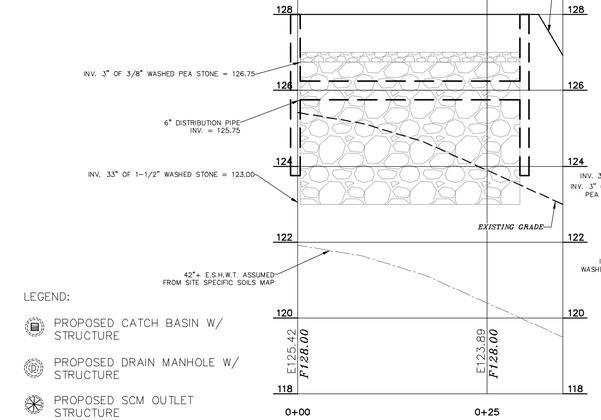
10 0 5 10 20 40

VERTICAL SCALE: 1" = 2' (IN FEET) 1 inch = 10 ft.

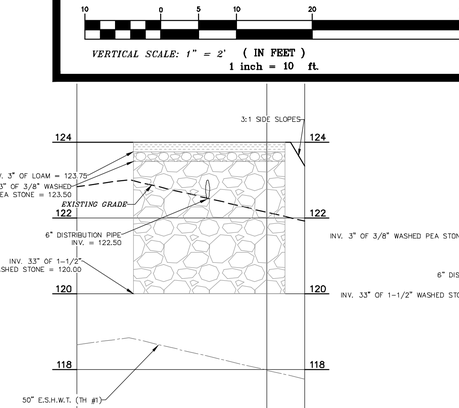
GRAPHIC SCALE

10 0 5 10 20 40

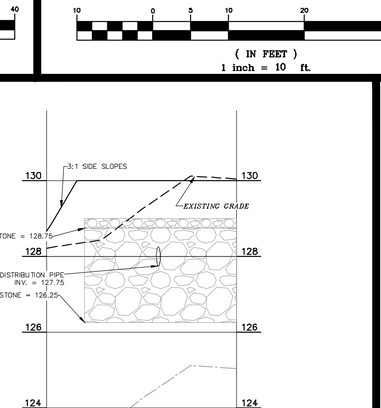
(IN FEET) 1 inch = 10 ft.



SECTION OF P-201



SECTION OF P-202



SECTION OF P-203

LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED SCM OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- D — D — PROPOSED DRAINAGE LINE
- U.D. — U.D. — PROPOSED UNDERDRAIN
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS
- ROOF AREA TO BE GUTTERED TO INFILTRATION TRENCH

NOTES

1. WHEN CONTRACTOR EXCAVATES INFILTRATION AREA TO SUBGRADE, DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL. COMPACTION IS NOT TO OCCUR IN THE INFILTRATION AREAS PRIOR TO CONSTRUCTION. SCARIFICATION REQUIRED IN THE EVENT COMPACTION TAKES PLACE.
2. DO NOT PLACE THE INFILTRATION SYSTEM SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN STABILIZED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
3. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF WATER FROM EXCAVATIONS) TO THE INFILTRATION AREA DURING ANY STAGE OF CONSTRUCTION.
4. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS

1 SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.

2 PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

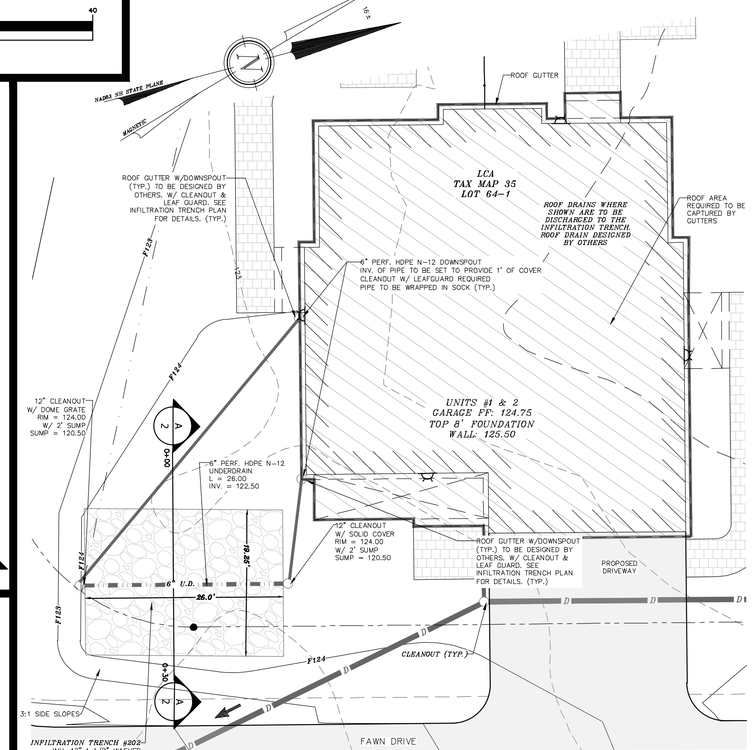
1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1-1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

NHDES AoT REQUIREMENTS

A LETTER SIGNED BY A QUALIFIED ENGINEER MUST BE PROVIDED TO DES STATING THAT THE INDIVIDUAL OBSERVED ANY UNDERGROUND DETENTION, INFILTRATION, OR FILTERING SYSTEMS PRIOR TO BACKFILLING, AND WHETHER, IN HIS OR HER PROFESSIONAL OPINION, THE SYSTEMS CONFORM TO THE APPROVED PLANS AND SPECIFICATIONS



PLAN VIEW INFILTRATION TRENCH #202

P-201 – P203

REVISION	DATE	DESCRIPTION

INFILTRATION TRENCHES #201, #202, #203
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14243 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

DESIGN NOTES:

1.) POROUS ASPHALT PAVEMENT WILL CONFORM TO UNHSC (2007b) SPECIFICATIONS AS UPDATED BY UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS (DATED: SEPTEMBER 2016).

2.) THE FILTER COURSE WILL BE INSTALLED AT A MINIMUM DEPTH OF 18 INCHES AND CONSIST OF NHDOT (2016) SAND, ITEM 304.1 PER THE NH STORMWATER MANUAL.

3.) SEE CROSS SECTIONS FOR DETAILS.

4.) SEE STORMWATER SYSTEM MANAGEMENT: INSPECTION AND MAINTENANCE MANUAL AND PLAN, DATED JUNE 24, 2024 FOR MAINTENANCE REQUIREMENTS.

REFERENCE:

1.) NH STORMWATER MANUAL (FEBRUARY 2025): APPENDIX A (A60–A64).

2.) UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS, FEBRUARY 2014, REVISED SEPTEMBER 2016, UNIVERSITY OF NEW HAMPSHIRE STORWATER CENTER, DURHAM, NH 03824–3534.

3.) POROUS ASPHALT PAVEMENT FOR STORMWATER MANAGEMENT, THE UNH STORMWATER CENTER.

POROUS PAVEMENT
TOTAL SECTION DEPTH = 36"
TOTAL SECTION REQUIRED = 31.2"
(65% OF FROST DEPTH)
FROST DEPTH = 48" (UNHSC)
18" FILTER MEDIA PROVIDED

SEE GRADING PLANS & PROFILES FOR SPOT ELEVATIONS

CHOKER COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
1 1/2"	100
1"	95 – 100
1/2"	25 – 60
# 4	0 – 10
# 8	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #57 – AASHTO

FILTER COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
6"	100
# 4	70 – 100
# 200	0 – 6**

* EQUIVALENT TO MODIFIED NHDOT 304.1 – SECTION 304 OF NHDOT NHDOT STANDARD SPECIFICATIONS

** LESS THAN 4% FINES

FILTER BLANKET COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

RESERVOIR COURSE *

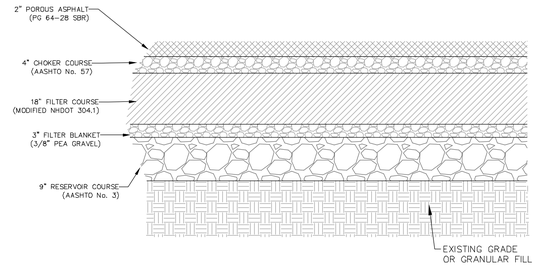
SIEVE SIZE	% PASSING BY WEIGHT
2 1/2"	100
2"	90 – 100
1 1/2"	35 – 70
1"	0 – 15
1/2"	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #3 – AASHTO

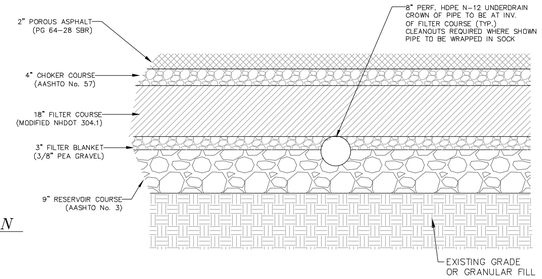
POROUS ASPHALT MIX DESIGN CRITERIA

SIEVE SIZE	% PASSING BY WEIGHT
3/4"	100
1/2"	85 – 100
3/8"	55 – 75
# 4	10 – 25
# 8	5 – 12
# 200	2 – 4
BINDER CONTENT (AASHTO T164)	5.8 – 6.5%
AIR VOID CONTENT (AASHTO D6752)	16 – 22%
DRAINDOWN (AASHTO D6390)	≤ 0.3%
RETAINED TENSILE STRENGTH (AASHTO D6390)	≥ 80%
CANTABRO ABRASION TEST (UNAGED)	≤ 20%
CANTABRO ABRASION TEST (7 DAYS)	≤ 30%

POROUS ASPHALT PAVEMENT
NOT TO SCALE

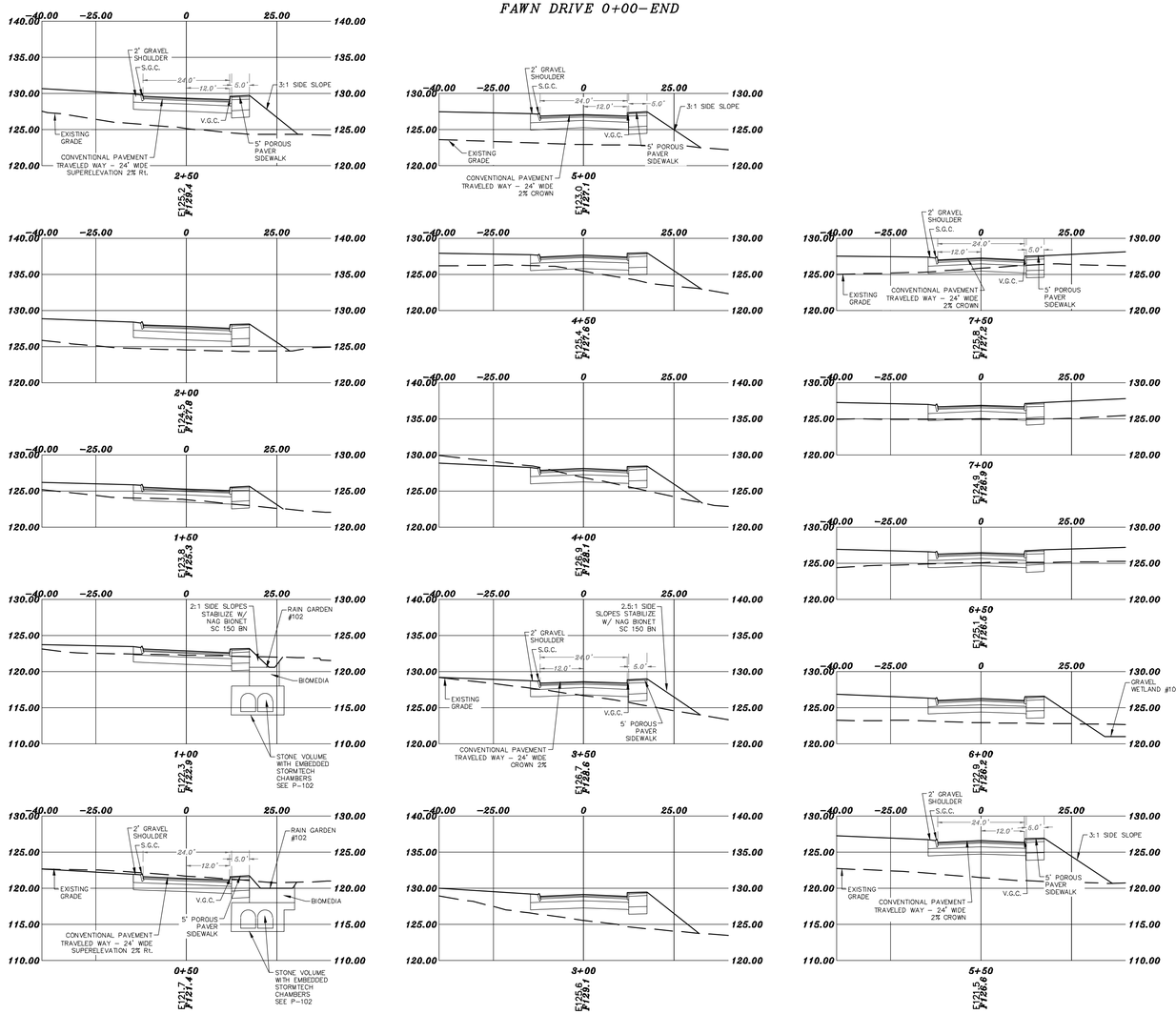


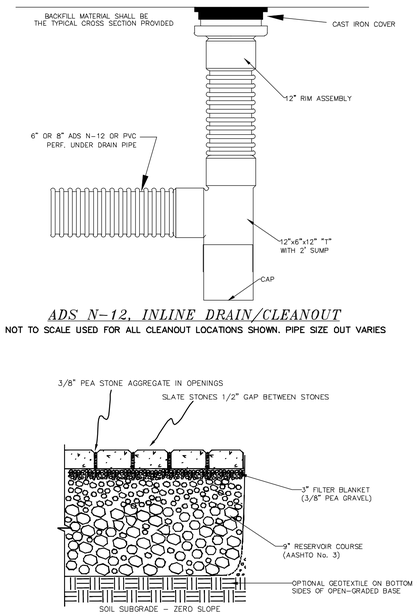
INFILTRATION POROUS ASPHALT SIDEWALK SECTION
NOT TO SCALE (P–103)



UNDERDRAINED POROUS ASPHALT SIDEWALK SECTION
NOT TO SCALE (P–104)

FAWN DRIVE 0+00–END





ADS N–12, INLINE DRAIN/CLEANOUT
NOT TO SCALE USED FOR ALL CLEANOUT LOCATIONS SHOWN. PIPE SIZE OUT VARIES

NOTES:
1.) SEE GRADING PLANS FOR LOCATIONS. POROUS PATIO AND WALKWAY PROPOSED FOR EACH UNIT.

POROUS PAVER / POROUS PATIO DETAIL
NOT TO SCALE

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.
Vertical Scale 1 INCH = 10 FT.

P–103 – P104

REVISION	DATE	DESCRIPTION

CROSS SECTIONS FAWN DRIVE 0+00 – END
& POROUS PRODUCT SPECIFICATIONS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863
SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 14243
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4623
www.BerrySurveying.Com

Stormwater System Management: Inspection and Maintenance Manual

Prepared for:

The Stabile Companies.
20 Cotton Road, Suite 200
NASHUA, NH 03063

Land of

Richardson Estates of Dover, LLC
688 Calef Highway
BARRINGTON, NH 03825

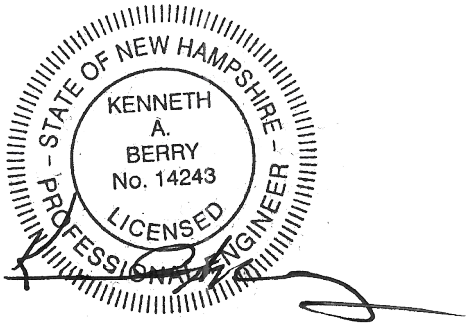
141 SIXTH STREET, DOVER, NH
TAX MAP 35, LOT 64

Mohamed & Lisa K. Hamcha
5 Dowaliby Court
DOVER, NH 03820

5 DOWALIBY COURT, DOVER, NH
TAX MAP 35, LOT 72

Prepared by:

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825



Project Number:
DB 2024-018

June 24, 2025

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Inspection & Maintenance Plan Attached – 1 Page

Stormwater Practice Design Plans Attached – 5 Pages

Control of Invasive Plants, NH Department of Agriculture Attached – 4 Pages

NHDES Green SnoPro Utilization Chart Attached – 1 Page

NHDOT Design and Maintenance of Subsurface Gravel Wetlands, 2/2015 - 43 Pages

Rain Guardian Maintenance Guide Attached – 1 Page

Introduction

The Stormwater Control Measures (SCM) described in this manual are specified in more detail within the plan set giving design details and specifications. The New Hampshire Stormwater Manual (February 2025) is included by reference to this manual. Additional details, construction specifications, and example drawings are provided within this reference. (http://des.nh.gov/organization/divisions/water/stormwater/) See also, additional references for the University of New Hampshire Stormwater Center regarding maintenance of the Subsurface Gravel Wetlands. https://www.unh.edu/unhsc/design-and-maintenance-subsurface-gravel-wetlands
https://www.unh.edu/unhsc/sites/default/files/media/unhsc_gravel_wetland_spec_6-2016.pdf

The SCMs are covered below in the general order in which the storm water flows. Each SCM has a description and maintenance consideration listed. A checklist table is provided after the narrative to summarize the maintenance responsibilities and schedule. A log form is also provided for the owner's use.

For details regarding the design of the Storm Water System see also Drainage Analysis & Sediment and Erosion Control Plan also published by Berry Surveying & Engineering originally dated June 24, 2025, as revised. See also plan set completed for The Stabile Companies originally dated June 24, 2025, as revised.

Eric L. Jackson, Managing Member, is responsible for the Stormwater System Operation and Maintenance. A significant step in this responsibility is the Inspection and Maintenance of each component of the system. Ongoing, semi-annual, and annual inspection and maintenance requirement are documented below and must be taken seriously. Failure of any component of the system can result in surface water run-off ponding and/or freezing in the roadway and parking lots, leaving the developed site untreated, and/or causing violations to issued permits. The owner must maintain, and have available, plans of the Stormwater System in order to properly inspect and maintain the system. (Reduced copies attached.) The Managing Member, Eric L. Jackson, as the owner / operator, is responsible to ensure that any subsequent owner, Homeowners Association, or subcontractor has copies of the Log Form and Annual Report records and fully understands the responsibilities of this plan. The grantor owner will ensure this document is provided to the grantee owner by duplicating the Ownership Responsibility Sheet which is found toward the back of this document, which will be maintained with the Inspection & Maintenance Logs, provided to the City of Dover, DPW, Engineering Department, with the Annual Report.

The owner of Tax Map 35, Lot 64, Richardson Estates of Dover LLC., is proposing the development of a new roadway consisting of 778 feet with 10 two-family dwelling units constructed. There will be a Rain Garden W/ Stormtech Chamber Storage, 3 Infiltration Trenches, 2 Porous Pavement Sidewalks, and a Subsurface Gravel Wetland to manage and treat the surface water runoff.

The following drainage features will all require periodic inspections and maintenance based on this manual:

Catch Basins and Yard Drains

Rain Guardian Foxhole

Conveyance Swales

Drain Manhole

Sediment Forebay

Subsurface Gravel Wetland P-101 W/ outlet structures 101A/101B, gooseneck orifice assembly, stage discharge system and emergency spillway.

Rain Garden #102 W/ Stormtech SC740 Chambers, outlet structure with internal stack and control orifice, inspection ports, underdrains, cleanouts.

Porous Sidewalk #103 W/ Infiltration

Porous Sidewalk #104 W/ Underdrain and Cleanouts

Infiltration Trenches #201-203 W/ Roof Leaders, Distribution Pipes and Inspection Ports

Outlet Protection and Level Spreader

Porous Paver Walkway and Patios

Foundation Drain Trunk Line W/ Cleanouts

Catch Basin (No Sump) / Drain Manhole / Yard Drain / Rain Guardian Foxhole

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A18-A21) (Direct Quotes)

Chapter Env-Wq 1508.06 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Catch Basins and Yard Drains are used throughout the site to capture and, along with culvert pipes and manhole, route surface water runoff to stormwater treatment and detention infrastructure. During construction the catch basins will be protected by inlet protection per the approved construction plans. The practice of street sweeping on a bi-annual basis will help reduce maintenance of these catch basins and culvert pipes.

Note: Deep sump catch basins are not allowed to be used on this proposed development due to wildlife concerns and any manufacturer sump resulting in a catch basin must be filled with washed crushed stone. Sediment should be trapped in the sediment forebays but is also a concern in earlier structures. See construction details for specifications of these conveyance practices.

Maintenance Requirements:

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other method and disposed of in conformance with applicable state and federal regulations.
- See Rain Guardian Foxhole maintenance sheet attached for additional details.

Catch Basin Cleaning

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A3-A6) (Direct Quotes)

Description:

Catch basins are chambers which allow surface stormwater runoff to enter the stormwater conveyance system. Most catch basins are built at the curb line and have a low area below the invert of the outlet pipe (i.e., sump) intended to retain coarse sediment. By trapping sediment, the catch basin minimizes solids that may clog the drain pipes and be carried to receiving waterbodies. To maintain their ability to trap sediment and prevent flooding, catch basins must be cleaned periodically. Aesthetic and water quality benefits from the removal of sediment, decaying debris, and highly polluted water from catch basins include reducing foul odors, reducing suspended solids, and reducing the load of oxygen-demanding substances that reach receiving waters (EPA, 1999). Catch basin cleaning is also a requirement of the New Hampshire MS4 General Permit. The permit requires routine inspections, cleaning, and maintenance such that no catch basin at any time will be more than 1/2 full. For unpermitted communities, this should be a target goal. Refer to the permit for additional requirements for New Hampshire MS4 catch basin operations and maintenance.

Design Guidance:

• Typically, a catch basin should be cleaned if the depth of the deposits is greater than or equal to 1/2 the depth from the basin floor to the invert of the lowest pipe or opening into or out of the basin. If a catch basin significantly exceeds the 1/2 depth standard during annual inspection, then it should be cleaned more frequently.
• Material removed from catch basins is usually disposed of in conventional landfills. However, sediment and debris removed from catch basins can potentially be classified as hazardous waste. As a result, materials removed from catch basins must be chemically analyzed to determine how they should be stored, treated, and disposed of. For more information on proper management of catch basin waste materials, see the New Hampshire Department of Environmental Services (NHDES) Management of Municipal Roadway Soils fact sheet.

Conveyance Swale

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A115-A117) (Direct Quotes)

Chapter Env-Wq 1508.20 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Conveyance swales are stabilized channels designed to convey stormwater runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance swales may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pre-treatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/ Pre-treatment Practice as described elsewhere in this Appendix.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Grassed swales should be inspected periodically (at least annually) for sediment accumulation, erosion, and condition of surface lining (vegetation or riprap). Repairs, including stone or vegetation replacement, should be made based on this inspection.
• Remove sediment, debris, and invasive species annually, or more frequently as warranted by inspection.
• Mow vegetated swales based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Sediment Forebay

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A28-A30) (Direct Quotes)

Chapter Env-Wq 1508.12 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

A sediment forebay is an impoundment, basin, or other storage structure designed to dissipate the energy of incoming stormwater runoff and allow for initial settling of coarse sediments. Forebays are used for pre-treatment of stormwater runoff prior to discharge into the primary water quality treatment SCM. Forebays are generally integrated into the design of larger stormwater management structures.

Maintenance Requirements:

• Maintenance access must be provided.
• Embankment design must be engineered to meet applicable safety standards (see description of "Detention Basin").
• Exposed earth slopes and bottom of basin should be stabilized using seed mixes appropriate for soils, mowing practices, and exposure to inundation.
• Exit velocities from the forebay should be non-erosive using a level spreader, spillway, check dam, or other appropriate dissipation techniques.
• The bottom floor may be designed with a concrete pad or hardened bottom to aid in removal of accumulated sediment during maintenance.
• As an alternative to an earthen basin, an underground structure may serve as a forebay. However, use of fully enclosed structures must consider accessibility for inspection and cleaning.
• For guidance on sizing of riprap, refer to the Federal Highway Administration's Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance- Third Edition, Volume I and II (FHWANHI-09-111 and FHWA-NHI-09-112, Hydraulic Engineering Circular 23, 2009).

Gravel Wetland

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A70-A73) (Direct Quotes)

Chapter Env-Wq 1508.05 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

The gravel wetland system consists of one or more flow-through constructed wetland cells, preceded by a pre-treatment structure. The cell(s) are filled with a gravel media, supporting an organic substrate that is planted with wetland vegetation. During low-flow storm events, the system is designed to promote subsurface horizontal flow through the gravel media, allowing contact with the root zone of the wetland vegetation. The gravel and planting media support a community of soil microorganisms. Water quality treatment occurs through microbial, chemical, and physical processes within this media. Treatment may also be enhanced by vegetative uptake and microbial activity.

To accommodate higher flows, the system is designed to permit ponding over the wetland surface, allowing the system to function similar to other constructed wetland or detention systems. Overflow from the wetland is provided by an outlet structure designed for this "extended detention" condition. Following such an event, remaining water on the surface of the wetland infiltrates through engineered inlets into the gravel media, and flows horizontally through the media as in the lowflow condition.

The wetland is designed to sustain a saturated zone, called the internal storage reservoir, that typically begins 4 inches below the treatment surface, consistent with the invert elevation of the primary system outlet. This design permits anaerobic denitrification treatment and wetland vegetation growth. The gravel media consists of either crushed rock or processed gravel. An organic soil layer is placed on top of this material, and wetland plants are rooted in the media where they directly take up pollutants.

The system can be designed to integrate some stormwater storage and extended detention but generally does not provide infiltration unless specifically designed (see "Hybrid Bioretention Systems"). With these features, the practice would not only remove pollutants, but also contribute to attenuation of peak rates through temporary storage with minimal reduction in stormwater runoff volume through evapotranspiration. For more information on gravel wetland design, see the UNHSC Subsurface Gravel Wetland Design Specifications.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Removal of debris from inlet and outlet structures.
• Inspection and removal of sediment accumulation in the gravel bed.
• Depending on sediment accumulation, bed may require periodic replacement and replanting.
• Inspection and repair of containment structure (if applicable), inlet and outlet structures, and accessories.
• Wetland vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.

• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Subsurface Gravel Wetland Systems" for an example inspection checklist.

Proposed side slopes of 2:1 will be maintained with a weedwhacker, with vegetation being removed from the SCM with each maintenance application.

Bioretention Systems

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A35-A47) (Direct Quotes)

Chapter Env-Wq 1508.08 & 1508.06 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Descriptions:

Bioretention systems collect stormwater runoff in a landscaped depression, where it ponds, filters through the engineered soil media, and infiltrates into the ground or is collected and discharged to the surface. Bioretention systems can reduce sediment, nutrients, oil and grease, and trace metals.

The major difference between bioretention systems and other filtration systems is the composition of the filter media and the use of vegetation. A typical surface sand filter is designed to be maintained with no vegetation, whereas a bioretention cell is planted with a variety of vegetation whose roots assist with pollutant uptake. The use of vegetation allows these systems to blend in with other landscaping features.

The primary types of bioretention systems are:

- **Infiltrating bioretention systems** have an elevated underdrain (or no underdrain) and are configured to infiltrate filtered stormwater runoff directly into the subsoil (preferred).
- **Filtering bioretention systems** have an underdrain that is installed in poor soils or is lined where infiltration is not desired (e.g., hot spot areas) such that limited or no infiltration is anticipated. The underdrain collects filtered stormwater runoff and conveys it to a discharge outlet.
- **Bioretention systems with internal storage reservoirs (ISR)** are designed to include a storage reservoir that remains in saturated conditions and creates an anoxic zone suitable for denitrification. Bioretention systems with ISR can be designed as infiltrating or filtering systems. Infiltrating bioretention systems with ISR are also called "hybrid" bioretention systems.

Maintenance Requirements:

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- Special attention should be given to maintenance in the first two years of operation as vegetation is established.

• Systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24- hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
• Pre-treatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
• Trash and debris should be removed at each inspection.
• At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72 hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to removal of accumulated sediments or reconstruction of the bioretention soil mixture.
• Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Bioretention Systems/ Tree Filters" for an example inspection checklist.

Proposed side slopes of 2:1 will be maintained with a weedwhacker, with vegetation being removed from the SCM with each maintenance application.

ADS StormTech Chamber: Bioretention Stone Storage Volume

Description:

The StormTech Chamber System is a trademarked product of the Advance Drainage System (ADS) company. The purchase and installation of this system will conform to ADS proprietary rights. The design engineer has specifically used the StormTech SC-740 Chambers. The system is designed as a detention practice with under drain. The system has a perforated underdrain to collect and distribute runoff to the outlet structure. The volume in the washed crushed stone and in the specified chambers will act as detention in connection with the Outlet Structure discharge stack. P-102 contains 24 chambers in 2 rows of 12 chambers. The top of the outlet structure stack is designed to pass larger storm events. Multiple inspection ports are located throughout the system.

Inspection:

Semi-annual and severe rain storm event inspections will be conducted by a trained individual with the capability to observe the condition and the extent of sediment buildup. See list of known qualified inspection / maintenance professionals below. The outlet structure must also be inspected. The inspection process requires the removal of Drain Manhole covers.

Maintenance Considerations:

Sediment collected in the Isolator Row will be removed with the JetVac process, consisting of high-pressure water scouring and suction retrieval of the captured sediment and pollutants. The orifice cover plate installed to ensure that runoff is routed to the Isolator Row must be in place and if not re-installed to the original specifications. The stack in the outlet structure must be maintained to ensure that there is no buildup that prevents the proper operation of the outlet.

The stormwater practice should be dry within 72 hours of the end of a storm event.

A copy of the ADS StormTech SC-740 Chamber manual is attached.

After the system construction and before operation of the site, it is recommended that a long-term agreement for Inspection and Maintenance be established.

As for Isolator Row inspection and maintenance, Catch Basin maintenance, the regional ADS, Inc. representatives recommend using any of the following contacts:

Stormwater Compliance, LLC;
Attn: Nathan Marles, 1-877-271-9055; nmarles@lidtech.com
163 Thadeus Street, Portland, ME 04106
Info@stormwatercomp.com

Ted Berry Company;
Attn: Dave Beauchamp, 207-897-3348; david.beauchamp@tedberrycompany.com
521 Federal Road, Livermore, ME 04253
Info@tedberrycompany.com

Bellemore Septic Sewer & Drain
Attn: Ray Bellemore, 603-641-6640
raymond@bellemore.com
PO Box 10369
Bedford, NH 03110
ADS / StormTech Contact: Aaron Cheever, PE, Advance Drainage Systems, Inc.

aaron.cheever@ads-pipe.com 1-978-302-0650

Permeable Pavement / Pavers

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A60-A64) (Direct Quotes)

Chapter Env-Wq 1508.08 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

Permeable pavement consists of a permeable/pervious surface, base, and subbase materials which allow penetration of stormwater runoff into underlying soils. The surface materials for permeable pavement can consist of paving blocks or grids, porous asphalt, or pervious concrete. These materials are installed on a base which serves as a filter and or reservoir course between the pavement surface and the underlying subbase material. The subbase material typically comprises of a layer of crushed stone that not only supports the overlying pavement structure, but also serves as a reservoir to store stormwater runoff that penetrates the pavement surface until it can percolate into the ground.

Porous asphalt is very similar to conventional asphalt except that it is mixed without particles smaller than coarse sand. Without these smaller size particles, water can pass through the surface and into a crushed stone storage area. An advantage to the use of porous asphalt is the reduced need for stormwater conveyance systems and other additional SCMs.

Pervious concrete uses carefully controlled amounts of water and cementitious materials to create a thick coating around aggregate particles, but retaining significant void space in the placement of the mixture. A pervious concrete mixture contains little or no sand, creating this void content.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Provision of signs is recommended, to indicate locations of permeable pavements and the applicability of special maintenance measures.
• No winter sanding of permeable pavements is permitted.
• Minimize application of salt for ice control.
• Never reseal or repave with impermeable materials.
• Inspect annually for pavement deterioration or concrete spalling.
• Monitor periodically to ensure that the pavement surface drains effectively after storms.
• For permeable pavements, clean periodically (one to two times per year) using a vacuum sweeper. Note, permeable surface selection will likely lead to different maintenance sensitivities and approaches.
• For vegetated paver systems, periodically reseed grass pavers to fill in bare spots.

• Major clogging may necessitate restoration or replacement of pavement surface.
• Refer to UNHSC Maintenance Guidelines and Resources, "Checklist for Inspection of Permeable Pavement" for an example inspection checklist.

Infiltration Trench

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A53-A59) (Direct Quotes)

Chapter Env-Wq 1508.07 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

An infiltration trench is a stone-filled excavation used to temporarily store stormwater runoff and allow it to infiltrate into surrounding, natural soil. Typically, stormwater runoff enters the trench as overland flow or piped inlet flow after designed pre-treatment. Installations around the perimeter of parking lots, between residential lots, and along roads are most common. Infiltration trenches can also be incorporated along the center of a vegetated swale to increase its infiltration ability. Infiltration trenches must have an observation well along the centerline for monitoring water levels and drawdown rates.

An infiltration drip edge is constructed like an infiltration trench, except that a drip edge intercepts only roof stormwater runoff, and does not require pre-treatment. Roof drip edges may be designed to act as a filtering practice or an infiltration practice as follows:

• **Filtering roof drip edges** do not infiltrate. They have an underdrain that captures and conveys stormwater runoff downstream. Filtering roof drip edges may be lined.
• **Infiltrating roof drip edges** are designed to provide infiltration.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.

• Pre-treatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
• If an infiltration system does not drain within 72 hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Permanent Outlet Protection

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A127-A131) (Direct Quotes)

Description:

Outlet protection is typically provided at stormwater discharge conduits from structural SCMs to reduce the velocity of concentrated stormwater flows to prevent scour and minimize the potential for downstream erosion. Outlet protection is also provided where conduits discharge stormwater runoff into an inground stormwater management practice (e.g., pond or swale) to prevent scour where flow enters the SCM.

Standard engineering practices allow for many different types of outlet protection which provide energy dissipation. Common outlet protection measures include:

• Riprap aprons, the design of which is covered within this section.
• Riprap lined scour holes, stilling basins or plunge pools. Design references for stilling basins are provided under 'References'.
Other outlet protection practices may be used, if documented by applicable technical literature.

Maintenance Requirements:

• Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
• Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
• Remove sediment, debris, and woody vegetation.

Stone Berm Level Spreader

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A132-A134) (Direct Quotes)

Chapter Env-Wq 1508.19 Alteration Of Terrain (RSA 485-A:17)
(As Amended September 4, 2024)

Description:

A stone berm level spreader is an outlet structure constructed at zero percent grade across a slope used to convert concentrated flow to "sheet flow." It disperses or "spreads" flow thinly over a receiving area, usually consisting of undisturbed, vegetated ground. The conversion of concentrated flow to shallow, sheet flow allows stormwater runoff to be discharged at non-erosive velocities onto natural ground. To stabilize the spreader outlet, a stone berm is provided to dissipate flow energy, and help disperse flows along the length of the spreader.

Level spreaders are not designed to remove pollutants from stormwater; however, some suspended sediment and associated phosphorus, nitrogen, metals and hydrocarbons will settle out of the stormwater runoff through settlement, filtration, infiltration, absorption, decomposition and volatilization.

Maintenance Requirements:

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel or down-slope of the spreader.
- Remove debris whenever observed during inspection.
- Remove sediment when accumulation exceeds 25 percent of spreader channel depth.
- Remove woody vegetation.
- Snow should not be stored within or down-slope of the level spreader or its approach channel.
- Repair any erosion and re-grade or replace stone berm material, as warranted by inspection.
- Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor regrading.

Leaf Litter Pickup

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A7-A8) (Direct Quotes)

Description:

Leaf litter is a significant source of nutrients (i.e., phosphorus and nitrogen) in stormwater runoff, especially during the fall season. As leaf litter decays on streets or in

the storm drain system, it releases excess phosphorus and nitrogen. Leaf litter can be carried by rain and melting snow and washed into storm drains. Once in the storm drain system, leaves may enter nearby waterbodies and harm aquatic plants and animals by smothering natural vegetation. In addition, excessive amounts of nutrients in waterbodies can lead to accelerated effects of eutrophication, contributing to excess algae and odors (USGS, 2019).

Through proper handling and disposal of leaf litter, the amount of phosphorus in stormwater runoff, and the receiving waterbodies, can be minimized.

Design Guidance:

Leaf litter pickup is a major component of street sweeping. Pollutant removal efficiency will vary seasonally with increased leaf-fall and removal during the fall (September to December).

Snow and Ice Management

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A9-A13) (Direct Quotes)

Chapter Env-Wq 2200

Description:

Rising concentrations of chloride from salt applications/deicing chemicals have been identified in New Hampshire waters, similar to other colder regions of the United States and Canada. A 120 percent increase in the number of chloride contaminated wells in New Hampshire has occurred over the past 30 years. The majority of lakes and ponds that have active sampling programs display worsening trends for chloride concentrations. To protect New Hampshire waters from chloride contamination, the New Hampshire Department of Environmental Services (NHDES), New Hampshire Department of Transportation, and the University of New Hampshire Technology Transfer Center, created the Green SnowPro Program for commercial salt applicators. This program offers snow and ice management training, proficiency testing, and certification in state-of-the-science salt reduction practices that prioritize public safety while mitigating salt usage. For additional incentive, commercial salt applicators certified by NHDES Green SnowPro under RSA 489-C, and property owners or managers who hire them, are granted limited liability protection against damages arising from

snow and ice conditions under RSA 508:22. In addition, municipalities also have the opportunity to have their public works departments and snow and ice management crews certified as Green SnowPro under RSA-489-C. Municipalities that implement a comprehensive suite of snow and ice best practices achieve higher levels of Green SnowPro certification by NHDES. For additional information regarding road salt reduction and to become Green SnowPro certified or to engage with one for winter snow and ice property management in New Hampshire, refer to the NHDES Road Salt Reduction website. NHDES also recommends the creation of a Road Salt and Deicing Minimization Plan when a development will create one acre or more of pavement, including parking lots and roadways. The plan should address the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. A component of the plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually.

Design Guidance:

• Snow disposal guidelines to minimize impact to the environment should include the following:
  - o Snow should be stored near flowing surface waters, but at least 25 feet from the high-water mark of the surface water and/or top of stream bank. Upland sites further from surface waters are acceptable, provided they do not impact water supply sources as described below. o A silt fence or equivalent barrier should be securely placed between the snow storage area and the highwater mark and/or the top of stream bank.
  - o Snow storage areas should be at least 75 feet from any private water supply wells, at least 200 feet from any community water supply wells, and at least 400 feet from any municipal wells. Snow storage is prohibited in wellhead protection areas.
  - o All debris in the snow storage area should be cleared from the site prior to snow storage.
  - o By May 15 each year, all debris from active snow storage areas should be cleared and properly disposed of.
  - o Designated snow storage areas should not be located near any SCMs to ensure the SCMs continue to function as designed during melt events and to reduce the amount of debris flowing into SCMs, which can clog and flood drainage areas.
  - o Snow storage site selection should consider the following:
    - How much snow disposal capacity is needed so an adequate number and size of sites can be selected and prepared.
    - Sites lacking mature tree growth are preferred because trees make collection of debris more difficult after the winter season.

• Municipal open space, parks, recreation fields and parking areas should be considered for potential snow disposal sites. If there are no municipal sites available, securing permissions from landowners of nonmunicipally owned sites should be considered.

• Recommended deicing application rate guidelines are provided in the table below. An example form for tracking salt and other deicer usage is also provided.

Street Sweeping

References:

New Hampshire Stormwater Manual (February 2025) (NH SWM) (A14-A16) (Direct Quotes)

Description:

Street sweeping is a pollution prevention practice that removes sediment, debris and trash that accumulates along streets and roads from winter sanding practices and everyday use. Street sweeping is often performed to improve aesthetics and to reduce the export of sand to the drainage network and receiving waters. In addition to sediment, debris and trash, other pollutants that may be minimized through street sweeping include some nutrients, oxygen-demanding substances and trace metals.

There are three types of commonly used street sweepers:

• **Mechanical sweepers** use rotating brooms to force debris from the street surface into a hopper by a conveyor system. Water is usually sprayed on the pavement surface to control dust. This type of sweeper typically removes only coarse particles and therefore is less effective at removing nutrients, oxygen-demanding materials, and toxic substances that are typically attached to fine particles.
• **Regenerative-air sweepers** combine the rotating brooms of mechanical sweepers with forced air to dislodge the remaining dirt and use a high-power vacuum to pick up the dislodged particles. This allows for greater removal of fine particles and the associated pollutants.
• **Vacuum-assisted sweepers** combine the rotating brooms of mechanical sweepers with a high-power vacuum. Some will spray water to control dust and others operate completely dry with a continuous filtration system.
Vacuum-assisted sweepers and regenerative-air sweepers are considered more effective than the mechanical sweeper at particulate pickup. However, it is understood that the overall effectiveness of street sweeping operations to remove pollutants from a given area will depend on a number of variables and may require a combination of technologies and operational efforts. Other variables include the season, the frequency and location of sweeping, the ability to sweep on heavily traveled roads, the number of passes made and the operation speed of the sweeper.

Design Guidance:

As outlined under 'Design Considerations', street sweeping programs should be developed that accommodate areas of concern based on traffic volume, land use, field observations of sediment and trash accumulation and proximity to surface waters. At a minimum, street sweeping should be performed twice annually, preferably as soon as possible after the snow melts to reduce the amount of sand, grit, debris, and associated pollutants from winter sanding from entering surface waters.

Control of Invasive Plants

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

Annual Report

Description: The owner is responsible to keep an **I & M Activity Log** that documents inspection, maintenance and repairs to the storm water management system, and a **Deicing Log** to track the amount and type of deicing material applied to the site until the Home Owners Association is established and the transfer occurs. The original owner is responsible to ensure that any subsequent owner (s) have copies of the Stormwater System Operation: Inspection & Maintenance Manual, copies of past logs and check lists. The Annual Report will be prepared and submitted to the City of Dover, Community Services, Engineering Department with copies of both logs and check lists no later than December 15th of each year and made available to NHDES upon request. Upon an ownership change, the Annual Report will include the Transfer of Ownership Responsibility Forms duplicated from the form found below.

The plans that accompany this manual include a plan sheet, "Inspection & Maintenance Plan" and copies of the Stormwater Treatment Design Sheets. The owner will also maintain a complete set of the approved original design plans.

Respectfully
BERRY SURVEYING & ENGINEERING

Kenneth A. Berry, PE, LLS
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Principal, VP – Technical Operations

Christopher R. Berry, LLS
Principal - President

Kevin R. Poulin, PE
Design Engineer

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Checklist

141 Sixth Street, Dover, NH, Tax Map 35, Lot 64
The Stabile Companies
20 Cotton Road, Suite 200, Nashua, NH 03063

☑	Date	SCM / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Pavement Sweeping	Three Times Per Year	Clean Pavement	Pavement areas will be swept and sedimentation removed so the surface is clean
		Litter/Trash Removal	Routinely	Inspect dumpsters, outdoor waste receptacles area, and yard areas.	Parcel will be free of litter/trash.
		Deicing Agents	N/A	N/A	Use salt as the primary agent for roadway safety during winter.
		Invasive Species	Two times per year.	Inspect for Invasive Species	Remove and dispose invasive species.
		Closed Drainage System:			
		Drainage Pipes	1 time per year	Check for sediment accumulation & clogging.	Less than 2" sediment depth

☑	Date	SCM / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Drain Manhole / Rain Guardian Fox Hole/ Yard Drain/ Catch Basin	2 times per year	Check for sediment accumulation & clogging.	Any accumulated Sediment or debris.
		Foundation Drain Trunk Line	2 times per year	Check for sediment accumulation & clogging.	Any accumulated Sediment or debris.
		Subsurface Gravel Wetland / Rain Garden	2 times per year	Check for sediment and debris accumulation buildup.	Remove sediment & debris when required. Remove Invasive Species. Weed whacker required for 2:1 slopes. All weed whacked vegetation to be removed
		Bioretention W/ system clean-outs.	Annually	72-Hour drawdown time evaluation and vegetation evaluation. Underdrain flushing.	Remove dead & diseased vegetation along with all debris, take corrective measures of filtration media if required. Flush underdrain clean-outs with a hose.
		Porous Pavement Sidewalk	2-4 times per year	Check for sediment and debris accumulation buildup.	Vaccuum pavement to remove debris
		Porous Pavers	Vacuum 2-4 times per year	Check for sediment and debris	If clogging occurs, remove and wash or replace peastone and fabric. Remove any vegetation

				accumulation buildup/ponding.	growing between the pavers. Refer to manufacturer's instructions for pressure washing or vacuuming.
		Rain Garden / Gravel Wetland Infiltration Trench	Annually	Drain completely within 72 hours	Evaluate the surface of the Rain Garden/Gravel Wetland for sedimentation and clogging. Remove clogging and restore the pond surface to original conditions.
		ADS StormTech Chamber Pond	Annually	72-Hour drawdown time evaluation and vegetation evaluation. Underdrain flushing.	Remove all debris, take corrective measures of filtration media if required. Flush underdrain clean-outs with a hose.
		Subsurface Gravel Wetland	See Attached NHDOT Checklist	See Attached NHDOT Checklist	See Attached NHDOT Checklist
		Riprap Outlet Protection	Annually	Check for sediment buildup and structure damage.	Remove excess sediment and repair damage.
		Winter Maintenance	Ongoing	Remove snow as directed.	Ongoing
		Post Winter Maintenance	Annually	Remove excess sand, gross solids, and repair vegetation and plantings	Parcel will be free of excess sand, litter/trash.

		Annual Report	1 time per year	Submit Annual Report to Dover Engineering Dept. and kept on file by the owner.	Report to be submitted on or before December 15th each year.

See also attached, UNHSC Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device.

Inspection Check List: Page 4

The following drainage features will all require periodic inspections and maintenance based on this manual in addition to deep sump catch basins throughout:

Catch Basins and Yard Drains

Rain Guardian Foxhole

Conveyance Swales

Drain Manhole

Sediment Forebay

Subsurface Gravel Wetland P-101 W/ outlet structures 101A/101B, gooseneck orifice assembly, and emergency spillway.

Rain Garden #102 W/ Stormtech SC740 Chambers, outlet structure with internal stack and control orifice, inspection ports, underdrains, cleanouts.

Porous Sidewalk #103 W/ Infiltration

Porous Sidewalk #104 W/ Underdrain and Cleanouts

Infiltration Trenches #201-203 W/ Roof Leaders, Distribution Pipes and Inspection Ports

Outlet Protection and Level Spreader

Porous Paver Walkway and Patios

Foundation Drain Trunk Line W/ Cleanouts

FOUNDATION DRAIN TRUNK LINE W/ CLEANOUTSFOUNDATION DRAIN TRUNK LINE W/ CLEANOUTSSTORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Log Form

141 Sixth Street, Dover, NH, Tax Map 35, Lot 64
The Stabile Companies
20 Cotton Road, Suite 200, Nashua, NH 03063

SCM / System	Date Inspected	Inspector	Cleaning/Repair (List Items & Comments)	Repair Date	Performed By:

See also attached Checklist for Inspection of Gravel Wetland

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Deicing Log Form

141 Sixth Street, Dover, NH, Tax Map 35, Lot 64
The Stabile Companies
20 Cotton Road, Suite 200, Nashua, NH 03063

Date	Amount Applied	Performed By:	Date	Amount Applied	Performed By:

STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN CERTIFICATION

Owner	Responsibility
Name: The Stabile Companies Eric L. Jackson, Managing Member Address: 20 Cotton Road, Suite 200 Nashua, NH 03063 Telephone: 1-603-889-0318 ext. 515 E-mail: sjackson@stabilecompanies.com	The owner is responsible for the conduct of all construction activities, and ultimate compliance with all the provisions of the Stormwater System Operation & Maintenance Plan and the implementation of the Inspection and Maintenance Manual.

141 Sixth Street, Dover, NH, Tax Map 35, Lot 64

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction and 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____ Date: _____

Printed Name:

Representing:

Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per 1000 sq.ft.)			
			Salt Prewetted/Pretreated with salt brine	Salt Prewetted/Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only				Not recommended
	Frz. Rain	Apply chemical				Not recommended
30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical				3.25 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical				3.25 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates & table format are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

Control of Invasive Plants

New Hampshire
Department of Agriculture,
Markets & Food
Douglas Cygan
603-271-3488
doug.cygan@agr.nh.gov

This guide lists garden plants and weeds which are already causing significant changes to natural areas in the Mid-Atlantic. **Measures for controlling each species are indicated by number, e.g., (3), in the text with a full explanation at the end of this article.** Click on the word Control: to jump to that section. Then click your "back" button to return to the text. Following each section suggested alternative plants are given. These alternatives are native plants, well adapted and needing little care, attractive to birds and butterflies, and an important part of the food web for our indigenous species.

INVASIVE TREES

NORWAY MAPLE (*Acer platanoides*) has large leaves similar to sugar maple. To easily confirm that the plant is Norway maple, break off a leaf and if it's truly Norway maple it will exude milky white sap. Fall foliage is yellow. (Exception: cultivars such as 'Crimson King,' which have red leaves in spring or summer, may have red autumn leaves.) The leaves turn color late, usually in late October after native trees have dropped their foliage. This tree suppresses growth of grass, garden plants, and forest understory beneath it, at least as far as the drip-line. Its wind-borne seeds can germinate and grow in deep shade. The presence of young Norway maples in our woodlands is increasing.

Control: (1); (7), (8), (9), or (10); (11) in mid-October to early November, before the leaves turn color.

TREE OF HEAVEN (*Ailanthus altissima*), is incredibly tough and can grow in the poorest conditions. It produces huge quantities of wind-borne seeds, grows rapidly, and secretes a toxin that kills other plants. Its long compound leaves, with 11-25 lance-shaped leaflets, smell like peanut butter or burnt coffee when crushed. Once established, this tree cannot be removed by mechanical means alone.

Control: (1) - seedlings only. Herbicide - use Garlon 3a (9) with no more than a 1" gap between cuts, or (10); plus (11) on re-growth. Or paint bottom 12" of bark with Garlon 4 Ultra (in February or March to protect surrounding plants). USE MAXIMUM STRENGTH SPECIFIED ON LABEL for all herbicide applications on Ailanthus. Glyphosate is not effective against Ailanthus.

INVASIVE SHRUBS

AUTUMN OLIVE (*Eleagnus umbellata*): Formerly recommended for erosion control and wildlife value, these have proved highly invasive and diminish the overall quality of wildlife habitat.

Control: (1) - up to 4" diameter trunks; (7) or (10) or bury stump. Do not mow.

MULTIFLORA ROSE (*Rosa multiflora*), formerly recommended for erosion control, hedges, and wildlife habitat, becomes a huge shrub that chokes out all other vegetation and is too dense for many species of birds to nest in, though a few favor it. In shade, it grows up trees like a vine. It is covered with white flowers in June. (Our native roses have fewer flowers, mostly pink.) Distinguish multiflora by its size, and by the presence of very hard, curved thorns, and a fringed edge to the leaf stalk.

Control: (1) - pull seedlings, dig out larger plants at least 6" from the crown and 6" down; (4) on extensive infestations; (10) or (11). It may remain green in winter, so herbicide may *applied when other plants are dormant. For foliar application, mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants.*

BUSH HONEYSUCKLES (*Lonicera spp.*), including Belle, Amur, Morrow's, and Tatarian honeysuckle. (In our region, assume that any honeysuckle is exotic unless it is a scarlet-flowered vine). Bush honeysuckles create denser shade than native shrubs, reducing plant diversity and eliminating nest sites for many forest interior species.
Control: (2) on ornamentals; (1); on shady sites only, brush cut in early spring and again in early fall (3); (4) during the growing season; (7); or (10) late in the growing season.

BLUNT-LEAVED PRIVET (*Ligustrum* obtusifolium). *Control:* (1); (7) or (10); or trim off all flowers. Do not cut back or mow.

BURNING BUSH, WINGED EUONYMUS (*Euonymus alatus*), identified by wide, corky wings on the branches.
Control: (1); (7) or (10); or trim off all flowers.

JAPANESE BARBERRY (*Berberis thunbergii*), and all cultivars and varieties.
Control: (1); (7) or (10); or trim off all flowers.

INVASIVE WOODY VINES

All of these vines shade out the shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle. DO NOT PLANT NEXT TO OPEN SPACE.

JAPANESE HONEYSUCKLE (*Lonicera japonica*), including Hall's honeysuckle, has gold-and-white flowers with a heavenly scent and sweet nectar in June. This is probably the familiar honeysuckle of your childhood. It is a rampant grower that spirals around trees, often strangling them.
Control: (1); (3); (10); (11) in fall or early spring when native vegetation is dormant. Plan to re-treat repeatedly.

ORIENTAL BITTERSWEET (*Celastrus orbiculatus*) has almost completely displaced American bittersweet (*C. scandens*). The Asian plant has its flowers and bright orange seed capsules in clusters all along the stem, while the native species bears them only at the branch tips.
Control: (1); keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits; to eradicate use Garlon 3a (10).

JAPANESE KNOTWEED, MEXICAN BAMBOO (*Polygonum cuspidatum*) can grow in shade. The stems have knotty joints, reminiscent of bamboo. It grows 6-10' tall and has large pointed oval or triangular leaves.
Control: Cut at least 3 times each growing season and/or treat with Rodeo (10) or (11). In gardens, heavy mulch or dense shade may kill it.

INVASIVE HERBACEOUS PLANTS

GARLIC MUSTARD (*Alliaria petiolata*, *A. officinalis*), a white-flowered biennial with rough, scalloped leaves (kidney-, heart- or arrow-shaped), recognizable by the smell of garlic and taste of mustard when its leaves are crushed. (The odor fades by fall.)
Control: Pull before it flowers in spring (1), removing crown and roots. Tamp down soil afterwards. Once it has flowered, cut (2), being careful not to scatter seed, then bag and burn or send to the landfill. (11) may be appropriate in some settings.

JAPANESE STILT GRASS (*Microstegium vimineum*) can be identified by its lime-green color and a line of silvery hairs down the middle of the 2-3" long blade. It tolerates sun or dense shade and quickly invades areas left bare or disturbed by tilling or flooding. An annual grass, it builds up a large seed bank in the soil.

Control: Easily pulled in early to mid-summer (1) - be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to landfill. Mowing weekly or when it has just begun to flower may prevent it from setting seed (3). Use glyphosate (11) or herbicidal soap (less effective) on large infestations. Follow up with (5) in spring.

MILE-A-MINUTE VINE, DEVIL'S TAIL TEARTHUMB (*Polygonum perfoliatum*), a rapidly growing annual vine with triangular leaves, barbed stems, and turquoise berries in August which are spread by birds. It quickly covers and shades out herbaceous plants.
Control: same as for stilt grass.

SPOTTED KNAPWEED (*Centaurea maculosa*), a biennial with thistle-like flowers.
Control: Do NOT pull (1) unless the plant is young and the ground is very soft - the tap root will break off and produce several new plants. Wear sturdy gloves. (2); (6); (10) or (11).

CONTROL MEASURES

(1) PULL seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs.
(2) DEADHEAD to prevent spread of seeds of invasive plants. Cut off seeds or fruits before they ripen. Bag, and burn or send to a landfill.
(3) MOW or CUTTING at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year.
(4) CONTROLLED BURNING during the spring, repeated over several years, allows native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective.
(5) Use a CORN-BASED PRE-EMERGENCE HERBICIDE on annual weeds. This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
(6) In lawns, SPOT TREAT with BROAD-LEAF WEEDKILLER. Good lawn-care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations.
(7) CUT DOWN the tree. Grind out the stump, or clip off re-growth.
(8) GIRDLE tree: cut through the bark and growing layer (cambium) all around the trunk, about 6" above the ground. Girdling is most effective in spring when the sap is rising, and from middle to late summer when the tree is sending down food to the roots. Clip off sucker sprouts.
(9) FRILL: Using a machete, hatchet or similar device, hack scars (several holes in larger trees) downward into the cambium layer, and squirt in glyphosate (or triclopyr if recommended in text above). Follow label directions for Injection and Frill Applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.
(10) CUT STEM / CUT STUMP WITH GLYPHOSATE (or triclopyr if specified above). Follow label directions for Cut Stump Application. Clip off sucker sprouts or paint with glyphosate. See Note on Herbicides.
(11) FOLIAR SPRAY WITH GLYPHOSATE herbicide (see Note on Herbicides). Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

NOTE ON HERBICIDES: It is highly recommended that small populations try to be controlled using non-chemical methods wherever feasible. However, for large infestations, and for a few plants specified above, herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some

plants; for these, triclopyr (Garlon) may be indicated. When using herbicides, read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

RAIN GUARDIAN

U.S. PATENT NOS. 8,501,016 AND 8,858,804

TURRET

FOXHOLE

BUNKER

PRETREATMENT FOR BIORETENTION

Rain Gardens • Swales • Filtration Basins • Infiltration Basins

Maintenance Guide

Rain Guardian pretreatment chambers simplify bioretention maintenance by collecting sand, leaves, grass clippings, and other debris in an easy to clean, confined location. Regularly maintaining the Rain Guardian sustains its functionality by maximizing storage and filtration capacities. Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. The general cleaning process is similar for all Rain Guardian models (i.e. Bunker, Foxhole, and Turret).

Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate. For the Foxhole, reinstall the top lid, including optional lid anchor screws if equipped.

Clear Debris from Top Grate

- Foxhole only—remove top lid, including optional lid anchor screws if equipped
- Leaf litter and garbage commonly accumulate on the top grate
- Simply remove and dispose of debris by hand or with a shovel prior to removing top grate

Remove Debris from Inside Chamber

- Remove top grate and place on paved inlet to avoid damage to nearby plants
- Remove and dispose of accumulated debris within chamber using a shovel

Clean Filter Wall

- Remove drop-in filter by lifting vertically
- Clean filter wall with a stiff bristled broom or rinse clean with pressurized water

www.RainGuardian.biz

ANOKA CONSERVATION DISTRICT
1318 McKay Dr. NE, Suite 300
Ham Lake, MN 55304
(763) 434-2030 (M-F 8:00-4:30)

Design and Maintenance of Subsurface Gravel Wetlands

February 4, 2015

The University of New Hampshire Stormwater Center conducted a design and maintenance review of subsurface gravel wetland systems for the New Hampshire Department of Transportation. The UNHSC utilized various NHDOT site and construction plans, construction photo documentation, cost and material specification sheets, and the NHDOT subsurface gravel wetland (SGW) design specification dated December 20, 2013. The UNHSC also conducted inspections of subsurface gravel wetland systems that were designed and installed by the NHDOT or its contractors in order to determine maintenance needs. The UNHSC prepared this report as a resource for SGW designers and installers to assist in the design, cost and material specification, and maintenance requirements to ensure a properly functioning SGW system.

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1.0 Introduction

The UNHSC appreciates the opportunity to provide Design and Maintenance Review services for the New Hampshire Department of Transportation. We have completed our review and site visits of NHDOT SGW installations and offer the following summary.

Information Reviewed:

- Various Site Plans prepared by NHDOT and various assisting engineering firms
- Construction Management photos provided by NHDOT
- Costs and material specifications compiled by NHDOT
- NHDOT Subsurface Gravel Wetland Design, dated December 20, 2013

2.0 Background

The subsurface gravel wetland (SGW) stormwater management system has been around for almost 20 years. It approximates the look and function of a natural wetland, effectively removing sediments and other pollutants commonly found in runoff while enhancing the visual appeal of the landscape by adding buffers or greenscape to urban areas. The SGW specification used by NHDOT represents the original specification developed by the University of New Hampshire Stormwater Center (UNHSC) and documented in the UNHSC SGW Design Specifications published in June of 2009. These specifications reflect findings from five years of study of the SGW originally designed and evaluated at UNHSC. The SGW is a horizontal-flow filtration system and should not be confused with stormwater wetlands that function more like ponds. Instead, the SGW includes a dense root mat in a wetland soil that forms a cover over crushed stone. The subsurface crushed stone is the primary flow path for stormwater and is an anaerobic microbe-rich environment for improving water quality. Like other filtration systems, it demonstrates a tremendous capacity to reduce runoff peak flows and improve water quality.

3.0 Implementation

Subsurface gravel wetlands can be used in many regions, with the exception of those that are too arid to support a wetland system. SGW systems have demonstrated exceptional stormwater quality treatment, in particular for nutrients, for a range of land uses including linear transportation environments. It should be noted that as implementation has progressed and coupled with an additional five years of research at the UNHSC, additional findings and design modifications have arisen. The initial design of the UNHSC SGW was to handle runoff from a commuter parking area, best represented by a high density commercial use. In such applications SGW systems are space intensive; however for linear transportation environments some flexibility is expected. Recommendations and comments provided herein reflect additional learning and research findings gathered since the original publication of the UNHSC 2009 SGW specification.

1.) The purpose of the NHDOT underdrain systems is to intercept and provide drainage for seasonal high ground water levels where deemed to be within 0.5' of the wetland soil surface elevation. The rationale is not well defined and requires justification. For systems that are installed within proximity to seasonal high groundwater (SHGW) it is unclear how the benefits of the flushing basins justify overall costs (average cost savings: $1,069 per system). The SGW low flow orifice not only controls the stormwater flow through the system, by this hydraulic control will also ultimately control SHGW elevation in the vicinity of the SGW in the same manner. An SGW may have a portion of the system built below the SHGW. The original SGW at the UNHSC site in Durham, NH is a case in point. A caution is noted in that groundwater flows should not be significant compared to the stormwater flows. Significant groundwater inflows could prevent the formation of the anaerobic zone in the crushed stone.

2.) Overall system sizing for NHDOT systems appears to be based on the UNHSC 2009 SGW drainage design guidance with respect to overall length to width (L:W) ratio. In some locations L:W ratio dominates design orientation. UNHSC researchers recommend that this design criterion not be considered the most critical design element. The critical design element with respect to configuration is to size the system to treat the desired design rainfall depth from the contributing drainage area (1" Water Quality Volume). Linear systems are fine (higher L:W), provided the minimum WQV: Internal Storage Reservoir (ISR) capacity ratio is 4:1 or 25% (WQV:ISR) and the minimum flow path in the crushed stone in each cell is 15 feet.

3.) Most inspected forebays appear to function as wet basins rather than the more desirable dry basin. Dry forebays promote aerobic transformations of nitrogen which is an important first step prior to the anaerobic zone. It is recommended that if forebays cannot be economically installed to operate dry then concrete inlet structures such as off-line deep sump catch basins be used for pre-treatment as opposed to a forebay structure. A deep sump catch basin or other precast inlet structure may also be easier to maintain. A very important function of any SGW forebay is that it be aerobic in order to convert most forms of nitrogen to nitrate or nitrite.

4.) Most forebay outlets lack low flow conveyance which causes them to function as wet basins as opposed to dry basins. It is important that regardless of the configuration of the pretreatment structure that the SGW system forebay contain an outlet with an invert at the same level as the wetland surface to eliminate ponding behind the forebay berm such that obligate wetland plant colonization (cattails) and the potential for anaerobic conditions do not occur. Other options are to design the forebays to convey low flows that draw the fore bay water level down between storm events.

5.) Hydraulic inlets (leaching chambers) appear to be oversized. There are many hydraulic inlet design configurations that may be able to replace existing designs with better function and maintenance capacity and diminished costs. NHDOT SGW systems observed in this study, small and large, seem to use similar hydraulic inlet configurations

with the same number of structures regardless of watershed area size or design treatment volume. UNHSC research indicates the hydraulic inlet configuration can be flexible provided it has a greater hydraulic capacity/efficiency than the primary outlet orifice control. Recent experience in UNHSC designs have used slotted hydraulic inlet pipes as a backup inlet with a primary inlet composed of woven geotextile laid on the subsurface pea stone and covered in 6”-8“ diameter stone around the outfall of the inlet pipe (see figures 1 and 2). This configuration protects the stone filter in the subsurface of the wetland system while also providing a more accessible and maintainable surface hydraulic inlet feature that will inevitably be easier and less costly to construct.

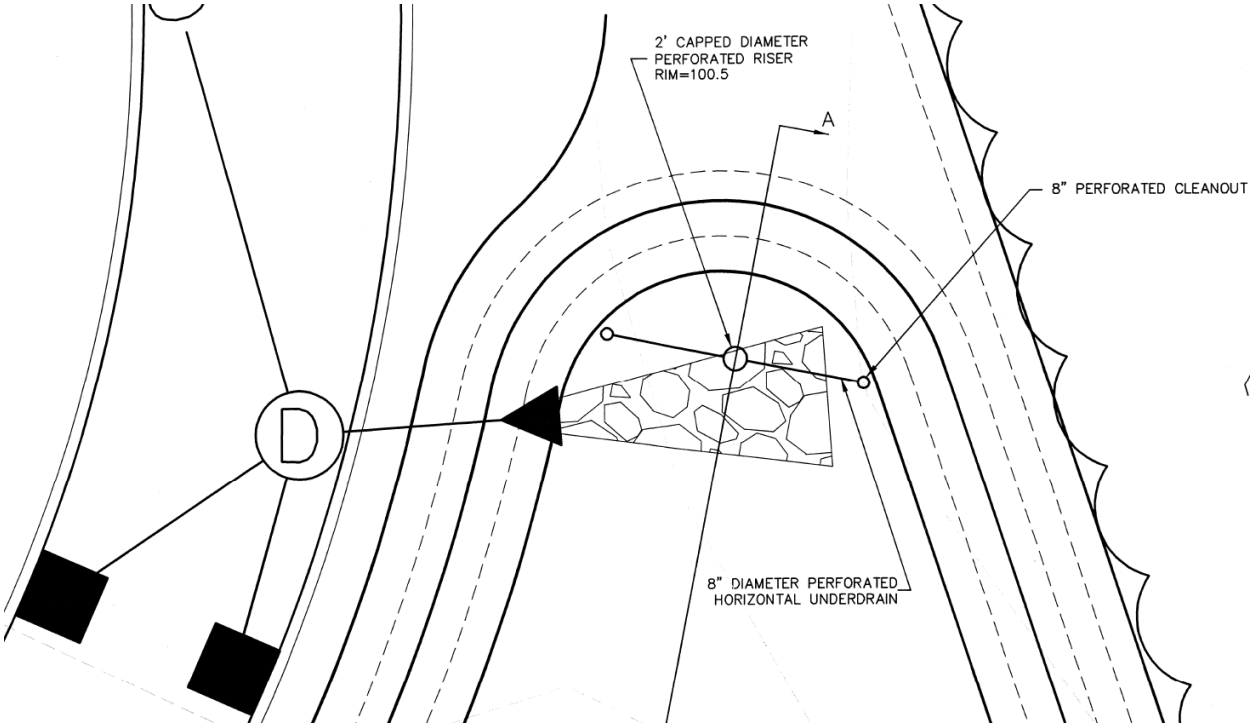

Figure 1: Typical plan view of multi-inlet configuration of a SGW system

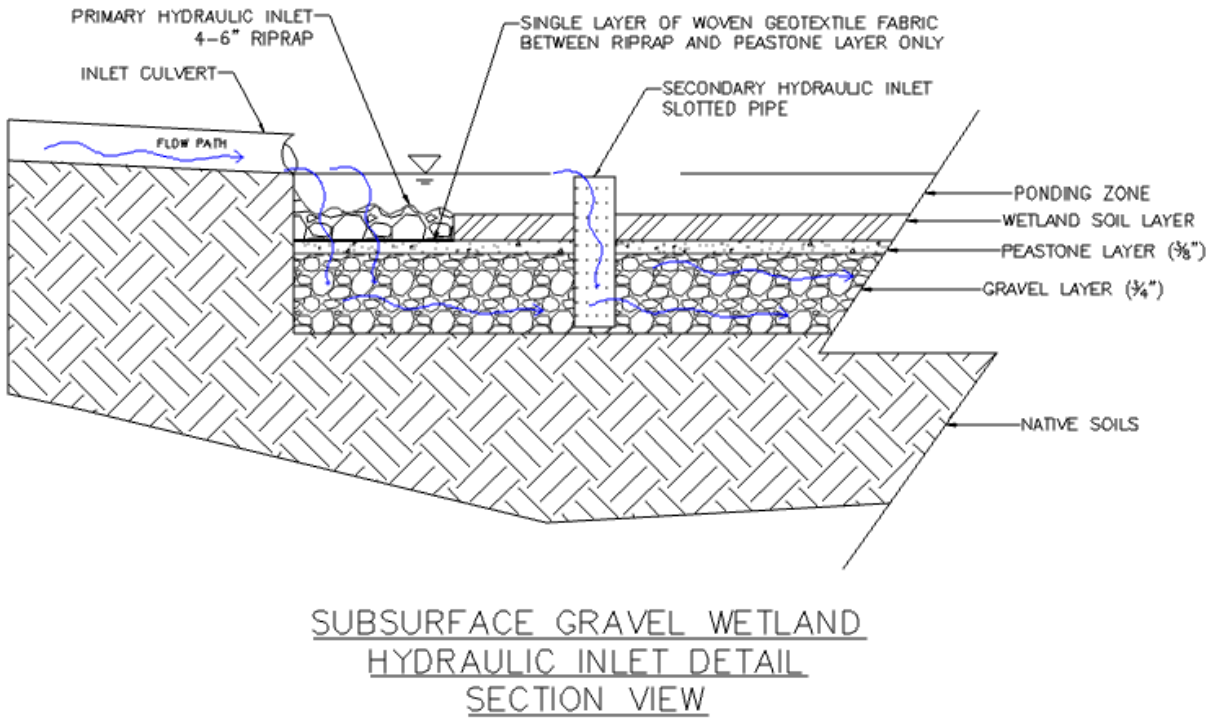

Figure 2: Typical profile view of multi-inlet configuration of a SGW system.

6.) Cleanout structures (leaching chambers) need not be as large since their primary function is for emergency access to the subsurface header pipe that directs flow either to the second wetland chamber or the outlet structure. Cleanout structures can be capped or be installed at the wetland surface grade with a manhole cover to ensure that the cleanouts are accessible, water tight, and does not short circuit system hydraulics.

7.) Some of the outlet control structures have slotted inlets (4" high by 12" wide) to allow for drainage of high flows. These slots need to be protected by covering them with 6-8" stone or some type of trash screen. This will prevent trash, leaves, or other debris from clogging the outlet orifice.

4.0 Costs

For this project NHDOT produced itemized costs associated with the bid prices for the materials and installation of thirteen SGW systems. In meetings with NHDOT personnel several items were determined to be irrelevant to this project and were thus eliminated from the spreadsheet. These items are itemized in the list below:

- 206.1 (Common Structure Excavation) and 206.2 (Rock Structure Excavation) were determined to be unique and not standard items and eliminated

- 209.1 (Granular Backfill) was determined to reflect typical stabilization for bedding material and were eliminated
- 593.331 (Geotextile, Stabilization, Class 3, Non-woven) was determined to be no longer used, and was replaced with Item 585.7 (Stone Fill, Class G) and thus eliminated
- 593.411 (Geotextile, Permeability Control, Class 1, Non-woven), 593.421 (Geotextile, Permeability Control, Class 2, Non-woven), 593.431 (Geotextile, Permeability Control, Class 3, Non-woven) were determined to be erosion control items and were eliminated
- 603.83206 (6" Plastic Pipe, Smooth Interior), 605.906 (6" Pipe Underdrain, Contractors' Option) were determined to be irrelevant to the SGW construction costs and were thus eliminated.

To compare costs, all original capital construction costs were converted to 2014 dollars using consumer price index inflation rates (USDOL, 2014). Average SGW materials and installation costs from the range of assessed projects (see attachment A for the raw costs) was $32,462 per impervious acre treated ($0.75/sf) with a maximum cost of $68,893 per impervious acre treated ($1.47/sf) and a minimum cost of $12,210 per impervious acre treated ($0.28/sf). As a comparison, for the SGW studied at the UNH field facility, costs were calculated at $28,079 per impervious acre treated ($0.64/sf). Cost details are illustrated in Table 1.

Table 1: Comparison of unit costs from all reviewed NHDOT SGW materials cost data and reference information documented by UNHSC. Note all costs are in 2014 dollars

Total Price Statistics	Contributing Impervious Area (A)	Construction Cost per Impervious Area ($/A)	Construction Cost per Impervious Area ($/sf)	UNHSC Costs ($/A)	UNHSC Costs ($/sf)
Minimum	1.90	$ 12,210	$ 0.28	-	-
Average	4.56	$ 32,462	$ 0.75	$28,079	$ 0.64
Maximum	8.40	$ 63,893	$ 1.47	-	-

Results of the cost assessment indicate room for potential savings with respect to design. In light of the detailed recommendations outlined in the Implementation section of this report, cost adjustments and justifications include:

Eliminate items 605.79 and 605.82251-24 (perimeter dewatering controls) for use if SHGW is within 0.5' of SGW surface. There is no data or clear rationale for any threat from SHGW in SGW systems. SHGW levels are often intermittent and would ultimately be controlled by the outlet orifice which is typically 0.5 to 0.67' below SGW surface. Therefore this item is redundant and further justification is necessary to validate the additional expense. Cost savings is estimated at 3.3% or $1,069 per system.

Reduce the number of item numbers 604.921 and 604.922 (alt: 604.193, 604.393, and 604.912) leaching chambers. Hydraulic inlet controls could be reduced if not eliminated in the future as linear routing through the system is adapted in future designs. Other hydraulic inlet controls such as suggested in the Implementation section of this report may be less expensive and offer

greater maintainability. There is no clear rationale for these structures at the end of each wetland cell as their only function is to provide access to the perforated header pipe in the subsurface as a potential clean out. At the end of the wetland cell these can simply be solid risers capped at the wetland surface. At the upstream end of each wetland cell, hydraulic inlets should be reduced to two if not eliminated and replaced with alternative inlet structures. Hydraulic inlet capacity need only exceed that of the outlet orifice. Cost savings is estimated at 10% or $3,201 per system.

Items 647.1 (Humus) and 647.29 (Wetland Humus) incurred high variability with respect to cost and in some systems had some of the largest percent costs (>12%) than any additional line items. There is no specification for the wetland humus in the NHDOT SGW design guidelines dated December 20, 2013 and the wetland soil specification in the UNHSC 2009 guidance is weak without sufficient detail to allow for accurate and cost effective bidding. Subsequent to this report UNHSC has worked to develop a particle size distribution for use in specifying wetland humus in future SGW systems. The proposed PSD for wetland humus is provided in Table 2 and reflects a poorly drained soil with a d50 of 0.15 mm and is a clay or silt loam in the soil textural triangle. We feel that this will allow for more cost effective bidding of appropriate soil types with the potential to even employ appropriate onsite excavated materials into select humus mixes thereby further reducing costs. We believe with these additional specifications it is not unrealistic to assume a future price of $15/CY, which represents the 25% quartile cost of the original line item. Cost savings is estimated at 0.5% or $164 per system.

Table 2: Particle size distribution and testing tolerances for wetland humus for the subsurface gravel wetland system

US Standard Sieve Size in/mm	Percent Passing	Percent Passing Testing Tolerances
0.5/12.5	100	± 10.0
#10/2.00	90 - 75	± 5.0
#100/0.15	40-50	± 5.0
#200/0.75	25-50	± 5.0

Relative cost savings are summarized in table 3.

Table 3: Comparison of unit costs from all reviewed SGW materials cost data with projected cost savings from recommended itemized design modifications. Note all costs are amortized to reflect 2014 dollars.

Total Price Statistics	Contributing Impervious Area (A)	Construction Cost per Impervious Area ($/A)	Construction Cost per Impervious Area ($/sf)	UNHSC Costs ($/A)	UNHSC Costs ($/sf)
Minimum	1.90	$ 7,895	$ 0.18	-	-
Average	4.56	$ 27,320	$ 0.63	$28,079	$0.64
Maximum	8.40	$ 53,780	$ 1.23	-	-

5.0 Maintenance

Inspection and maintenance is a critical component of the long term function and effectiveness of any stormwater control measure. Overall the UNHSC inspections of the facilities proved that the SGW systems were largely functioning properly and were well designed and constructed. The UNHSC has produced operation and maintenance guidelines as well as an inspection checklist which have been provided in attachment A of this report. Inspection is critical to assess as built functionality in addition to identifying unique maintenance tasks that may be less general in nature and more site specific. Overall the inspections conducted and provided as an attachment to this report (attachment B) indicates that routine biannual inspection (annual as a minimum) should be initiated at these facilities as a standard of practice. Post construction inspections are critical just after newly constructed SGW system is placed online. While some long-term maintenance items are due to system aging and processing of polluted runoff, some operation issues are a result of construction and installation practices not fully aligned with design specifications. These items are often quickly identifiable. In our assessment of eight NHDOT SGW systems two main issues were identified associated with installation or construction. First numerous pre-treatment forebays in observed systems held ponding water. This impacts the overall chemical function and processing of dissolved inorganic nitrogen species as these ponded forebay areas often turn into anaerobic areas of obligate wetland plants. Second on one particular system (NHDOT # 14633F BMP 19) three to five inches of standing water was observed within the entire system. The final water elevation was being controlled by an outlet pipe invert that was installed above the overall wetland soil elevation. This has resulted in sparse vegetation and likely was not part of the original design.

Beyond construction and installation issues the primary maintenance need identified through these inspections is simple maintenance of the established wetland vegetation. Numerous facilities are in need of this type of maintenance which involves cutting the existing plants down to the base and removing it from the system to prevent breakdown and rerelease of nitrogen.

Attachment A: Raw Item Costs

P. Salo 12/3/2013

SUBSURFACE GRAVEL WETLANDS (13933C/ DB 920)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	16,603	$4.75	$78,864.25
Item 203.6 - Embankment-in-Place (CY)	245	$8.95	$2,192.75
Item 203. 52 - Impervious Material (CY)	500	$14.00	$7,000.00
Item 585.3- Stone Fill, Class C (CY)	83	$18.00	$1,494.00
Item 585.5 - Stone Fill, Class E (CY)	900	$18.00	$16,200.00
Item 585.7 - Stone Fill, Class G (CY)	120	$24.00	$2,880.00
Item 593.411 - Geotextile, Perm. Control, Cl. 1, Non-woven (SY)	215	$2.10	$451.50
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	283	$33.00	$9,339.00
Item 604.91X - Outlet Control Structure (U)	2	$5,800.00	$11,600.00
Item 604.193 - Special Catch Basin (3' Dia) (U)	8	$3,300.00	$26,400.00
Item 604.393 - Specia Drain Manhole 3'x 3' (U)	3	$2,600.00	$7,800.00
Item 605.508 - 8" Perf. Corr. Poly. Pipe Underdrain (LF)	592	$22.00	$13,024.00
Item 605.79 - Underdrain Flushing Basins (EA)	10	$660.00	$6,600.00
Item 605.906 - 6" Pipe Underdrain (Contractor's Option)	506	$16.00	$8,096.00
Item 646.3 - Turf Establishment w/ Mulch & Tackifiers (A)	0.48	$1,650.00	$792.00
Item 647.1 - Humus (CY)	1,900	$15.00	$28,500.00
Item 647.29 - Wetland Humus (CY)	330	$15.00	$4,950.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$225.00	$225.00
Total			**$226,408.50**

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SUBSURFACE GRAVEL WETLANDS (13455A/ GW)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	5,776	$9.75	$56,316.00
Item 203.2 - Rock Excavation (CY)	2,241	$29.00	$64,989.00
Item 203.6 - Embankment-in-Place (CY)	317	$6.25	$1,981.25
Item 203. 53 - Low Permeability Fill (CY)	255	$8.80	$2,244.00
Item 520.1 - Concrete Class A (CY)	6	$375.00	$2,250.00
Item 585.3- Stone Fill, Class C (CY)	131	$34.50	$4,519.50
Item 585.5 - Stone Fill, Class E (CY)	370	$31.00	$11,470.00
Item 585.7 - Stone Fill, Class G (CY)	62	$34.25	$2,123.50
Item 593.421 - Geotextile, Perm. Control, Cl. 2, Non-woven (SY)	502	$2.00	$1,004.00
Item 603.80012 - 12" Plastic Pipe (LF)	31	$40.00	$1,240.00
Item 604.91X - Outlet Control Structure (U)	1	$4,850.00	$4,850.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$1,700.00	$10,200.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$1,850.00	$9,250.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	204	$19.50	$3,978.00
Item 647.1 - Humus (CY)	244	$14.00	$3,416.00
Item 647.29 - Wetland Humus (CY)	123	$16.00	$1,968.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$250.00	$250.00
Total			**$182,049.25**

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SUBSURFACE GRAVEL WETLANDS (10620L/ GW)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203. 52 - Impervious Material (CY)	1,919	$18.05	$34,637.95
Item 585.2 - Stone Fill, Class B (CY)	56	$19.15	$1,072.40
Item 585.3- Stone Fill, Class C (CY)	278	$40.25	$11,189.50
Item 585.5 - Stone Fill, Class E (CY)	46	$45.90	$2,111.40
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	200	$6.00	$1,200.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	50	$32.15	$1,607.50
Item 604.91X - Outlet Control Structure (U)	1	$2,045.00	$2,045.00
Item 604.921 - Leaching Chamber, Type 1 (U)	4	$3,080.00	$12,320.00
Item 604.922 - Leaching Chamber, Type 2 (U)	4	$2,950.00	$11,800.00
Item 605.512 - 12" Perf. Corr. Poly. Pipe Underdrain (LF)	187	$15.75	$2,945.25
Item 647.29 - Wetland Humus (CY)	93	$35.00	$3,255.00
Total			**$84,184.00**

There was no earthwork specifcally attributable to the gravel wetland. It is essentially constructed on top of the existing ground between the Rte. 16 NB slope work and the Exit 15 on ramp slope work.

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SUBSURFACE GRAVEL WETLANDS (10418G/ GW)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	5,978	$8.00	$47,824.00
Item 203.6 - Embankment-in-Place (CY)	8	$5.00	$40.00
Item 203. 52 - Impervious Material (CY)	1,415	$18.00	$25,470.00
Item 206.1 - Common Structure Excavation (CY)	1,225	$16.00	$19,600.00
Item 585.3- Stone Fill, Class C (CY)	21	$30.00	$630.00
Item 585.5 - Stone Fill, Class E (CY)	1,141	$30.00	$34,230.00
Item 593.331 - Geotextile, Stabilization, Cl. 3, Non-woven (SY)	1,711	$3.00	$5,133.00
Item 603.83206 - 6" Plastic Pipe (Smooth Interior) (LF)	55	$24.00	$1,320.00
Item 604.91X - Outlet Control Structure (U)	1	$2,400.00	$2,400.00
Item 604.921 - Leaching Chamber, Type 1 (U)	4	$3,000.00	$12,000.00
Item 604.922 - Leaching Chamber, Type 2 (U)	2	$3,000.00	$6,000.00
Item 605.906 - 6" Pipe Underdrain (Contractors Option) (LF)	602	$16.00	$9,632.00
Item 605.79 - Underdrain Flushing Basins (EA)	8	$600.00	$4,800.00
Item 647.29 - Wetland Humus (CY)	380	$25.00	$9,500.00
Total			**$178,579.00**

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SUBSURFACE GRAVEL WETLANDS (11238L/ BMP 1590)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	3,933	$4.00	$15,732.00
Item 203.6 - Embankment-in-Place (CY)	184	$2.00	$368.00
Item 203. 52 - Impervious Material (CY)	1,530	$15.00	$22,950.00
Item 206.2- Rock Structure Excavation (CY)	27	$30.00	$810.00
Item 520.1 - Concrete Class A (CY)	5	$500.00	$2,700.00
Item 585.3- Stone Fill, Class C (CY)	90	$30.00	$2,700.00
Item 585.5 - Stone Fill, Class E (CY)	182	$28.00	$5,096.00
Item 585.7 - Stone Fill, Class G (CY)	30	$40.00	$1,200.00
Item 593.411 - Geotextile, Perm. Control, Cl. 1, Non-woven (SY)	192	$2.25	$432.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	20	$32.00	$640.00
Item 604.91X - Outlet Control Structure (U)	1	$3,000.00	$3,000.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$1,250.00	$7,500.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$1,250.00	$6,250.00
Item 605.512 - 12" Perf. Corr. Poly. Pipe Underdrain (LF)	125	$25.00	$3,125.00
Item 646.31 - Turf Establishment w/ Mulch & Tackifiers (SY)	1,482	$0.35	$518.70
Item 647.1 - Humus (CY)	78	$20.00	$1,560.00
Item 647.29 - Wetland Humus (CY)	103	$35.00	$3,605.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$500.00	$500.00
Total			**$78,686.70**

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SUBSURFACE GRAVEL WETLANDS (11238L/ BMP 922)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	3,822	$4.00	$15,288.00
Item 203.6 - Embankment-in-Place (CY)	467	$2.00	$934.00
Item 206.1 - Common Structure Excavation (CY)	5	$30.00	$150.00
Item 520.1 - Concrete Class A (CY)	4	$500.00	$2,000.00
Item 585.3- Stone Fill, Class C (CY)	22	$30.00	$660.00
Item 585.5 - Stone Fill, Class E (CY)	420	$28.00	$11,760.00
Item 585.7 - Stone Fill, Class G (CY)	69	$40.00	$2,760.00
Item 593.411 - Geotextile, Perm. Control, Cl. 1, Non-woven (SY)	96	$2.25	$216.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	41	$32.00	$1,312.00
Item 604.91X - Outlet Control Structure (U)	1	$3,000.00	$3,000.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$1,250.00	$7,500.00
Item 604.922 - Leaching Chamber, Type 2 (U)	6	$1,250.00	$7,500.00
Item 605.512 - 12" Perf. Corr. Poly. Pipe Underdrain (LF)	306	$25.00	$7,650.00
Item 605.79 - Underdrain Flushing Basins (EA)	2	$500.00	$1,000.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	565	$25.00	$14,125.00
Item 646.31 - Turf Establishment w/ Mulch & Tackifiers (SY)	3,262	$0.35	$1,141.70
Item 647.1 - Humus (CY)	89	$20.00	$1,780.00
Item 647.29 - Wetland Humus (CY)	304	$35.00	$10,640.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$500.00	$500.00
Total			**$89,916.70**

SUBSURFACE GRAVEL WETLANDS (14633F/ BMP 19)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	2,396	$4.00	$9,584.00
Item 203.6 - Embankment-in-Place (CY)	468	$3.15	$1,474.20
Item 203. 52 - Impervious Material (CY)	582	$15.00	$8,730.00
Item 520.1 - Concrete Class A (CY)	10	$180.00	$1,800.00
Item 585.3- Stone Fill, Class C (CY)	108	$26.00	$2,808.00
Item 585.5 - Stone Fill, Class E (CY)	267	$25.00	$6,675.00
Item 585.7 - Stone Fill, Class G (CY)	44	$35.00	$1,540.00
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	281	$3.00	$843.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	50	$21.00	$1,050.00
Item 604.91X - Outlet Control Structure (U)	1	$4,000.00	$4,000.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$980.00	$5,880.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$960.00	$4,800.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	192	$15.00	$2,880.00
Item 605.79 - Underdrain Flushing Basins (EA)	2	$300.00	$600.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	429	$20.00	$8,580.00
Item 647.1 - Humus (CY)	233	$20.00	$4,660.00
Item 647.29 - Wetland Humus (CY)	292	$12.50	$3,650.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$110.00	$110.00
Total			**$69,664.20**

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SUBSURFACE GRAVEL WETLANDS (14633E/ BMP 17)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	7,638	$3.75	$28,642.50
Item 203.2 - Rock Excavation (CY)	1,923	$10.75	$20,672.25
Item 203.6 - Embankment-in-Place (CY)	4,211	$4.90	$20,633.90
Item 203. 52 - Impervious Material (CY)	1,746	$12.00	$20,952.00
Item 520.1 - Concrete Class A (CY)	23	$525.00	$12,075.00
Item 585.3- Stone Fill, Class C (CY)	194	$25.00	$4,850.00
Item 585.5 - Stone Fill, Class E (CY)	317	$30.00	$9,510.00
Item 585.7 - Stone Fill, Class G (CY)	52	$40.00	$2,080.00
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	580	$2.00	$1,160.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	38	$24.00	$912.00
Item 604.91X - Outlet Control Structure (U)	1	$2,900.00	$2,900.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$1,115.00	$6,690.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$1,070.00	$5,350.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	369	$10.50	$3,874.50
Item 605.79 - Underdrain Flushing Basins (EA)	6	$240.00	$1,440.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	718	$21.00	$15,078.00
Item 647.29 - Wetland Humus (CY)	289	$20.00	$5,780.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$500.00	$500.00
Total			**$163,100.15**

SUBSURFACE GRAVEL WETLANDS (14633F/ BMP 16)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	3,498	$4.00	$13,992.00
Item 203.2 - Rock Excavation (CY)	3,532	$9.00	$31,788.00
Item 203.6 - Embankment-in-Place (CY)	25	$3.15	$78.75
Item 203. 52 - Impervious Material (CY)	3,435	$15.00	$51,525.00
Item 206.2- Rock Structure Excavation (CY)	39	$17.00	$663.00
Item 209.1 - Granular Backfill (CY)	7	$28.00	$196.00
Item 520.1 - Concrete Class A (CY)	7	$180.00	$1,260.00
Item 585.2 - Stone Fill, Class B (CY)	202	$20.00	$4,040.00
Item 585.3- Stone Fill, Class C (CY)	106	$26.00	$2,756.00
Item 585.5 - Stone Fill, Class E (CY)	667	$25.00	$16,675.00
Item 585.7 - Stone Fill, Class G (CY)	111	$35.00	$3,885.00
Item 593.411 - Geotextile, Perm. Control, Cl. 1, Non-woven (SY)	222	$3.00	$666.00
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	273	$3.00	$819.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	72	$21.00	$1,512.00
Item 604.91X - Outlet Control Structure (U)	2	$4,000.00	$8,000.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$980.00	$5,880.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$960.00	$4,800.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	360	$15.00	$5,400.00
Item 605.79 - Underdrain Flushing Basins (EA)	6	$300.00	$1,800.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	1,016	$20.00	$20,320.00
Item 647.1 - Humus (CY)	434	$20.00	$8,680.00
Item 647.29 - Wetland Humus (CY)	314	$12.50	$3,925.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$110.00	$110.00
Total			**$188,770.75**

SUBSURFACE GRAVEL WETLANDS (14633E/ BMP 14)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	4,570	$3.75	$17,137.50
Item 203.2 - Rock Excavation (CY)	572	$10.75	$6,149.00
Item 203.6 - Embankment-in-Place (CY)	23	$4.90	$112.70
Item 203. 52 - Impervious Material (CY)	1,049	$12.00	$12,588.00
Item 520.1 - Concrete Class A (CY)	16	$525.00	$8,400.00
Item 585.3- Stone Fill, Class C (CY)	183	$25.00	$4,575.00
Item 585.5 - Stone Fill, Class E (CY)	210	$30.00	$6,300.00
Item 585.7 - Stone Fill, Class G (CY)	35	$40.00	$1,400.00
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	550	$2.00	$1,100.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	34	$24.00	$816.00
Item 604.91X - Outlet Control Structure (U)	1	$2,900.00	$2,900.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$1,115.00	$6,690.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$1,070.00	$5,350.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	296	$10.50	$3,108.00
Item 605.79 - Underdrain Flushing Basins (EA)	2	$240.00	$480.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	256	$21.00	$5,376.00
Item 647.29 - Wetland Humus (CY)	106	$20.00	$2,120.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$500.00	$500.00
Total			**$85,102.20**

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SUBSURFACE GRAVEL WETLANDS (14633F/ BMP 13)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	8,865	$4.00	$35,460.00
Item 203.2 - Rock Excavation (CY)	1,679	$9.00	$15,111.00
Item 203.6 - Embankment-in-Place (CY)	568	$3.15	$1,789.20
Item 203. 52 - Impervious Material (CY)	4,102	$15.00	$61,530.00
Item 206.2- Rock Structure Excavation (CY)	64	$17.00	$1,088.00
Item 209.1 - Granular Backfill (CY)	9	$28.00	$252.00
Item 520.1 - Concrete Class A (CY)	8	$180.00	$1,440.00
Item 585.3- Stone Fill, Class C (CY)	159	$26.00	$4,134.00
Item 585.5 - Stone Fill, Class E (CY)	922	$25.00	$23,050.00
Item 585.7 - Stone Fill, Class G (CY)	165	$35.00	$5,775.00
Item 593.431 - Geotextile, Perm. Control, Cl. 3, Non-woven (SY)	447	$3.00	$1,341.00
Item 603.83212 - 12" Plastic Pipe (Smooth Interior) (LF)	72	$21.00	$1,512.00
Item 604.91X - Outlet Control Structure (U)	2	$4,000.00	$8,000.00
Item 604.921 - Leaching Chamber, Type 1 (U)	6	$980.00	$5,880.00
Item 604.922 - Leaching Chamber, Type 2 (U)	5	$960.00	$4,800.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	384	$15.00	$5,760.00
Item 605.79 - Underdrain Flushing Basins (EA)	5	$300.00	$1,500.00
Item 605.82251 - 24" Agg. Und. Type 2 w/ 6" Perf. Corr. PE Pipe (LF)	994	$20.00	$19,880.00
Item 647.1 - Humus (CY)	640	$20.00	$12,800.00
Item 647.29 - Wetland Humus (CY)	467	$12.50	$5,837.50
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$110.00	$110.00
Total			**$217,049.70**

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SUBSURFACE GRAVEL WETLANDS (13742B/ GW #2)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	2,172	$5.00	$10,860.00
Item 203.6 - Embankment-in-Place (CY)	51	$5.00	$255.00
Item 203. 52 - Impervious Material (CY)	462	$14.00	$6,468.00
Item 585.3- Stone Fill, Class C (CY)	93	$27.00	$2,511.00
Item 585.5 - Stone Fill, Class E (CY)	82	$34.00	$2,788.00
Item 585.7 - Stone Fill, Class G (CY)	14	$51.00	$714.00
Item 593.421 - Geotextile, Perm. Control, Cl. 2, Non-woven (SY)	314	$2.50	$785.00
Item 603.80012 - 12" Plastic Pipe (LF)	36	$27.00	$972.00
Item 604.91X - Outlet Control Structure (U)	1	$4,000.00	$4,000.00
Item 604.921 - Leaching Chamber Type 1 (U)	6	$1,350.00	$8,100.00
Item 604.912 - Leaching Chamber Type 2 (U)	5	$1,350.00	$6,750.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	109	$15.50	$1,689.50
Item 646.3 - Turf Establishment w/ Mulch & Tackifiers (A)	0.50	$1,775.00	$887.50
Item 647.29 - Wetland Humus (CY)	256	$19.00	$4,864.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$170.00	$170.00
Total			**$51,814.00**

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SUBSURFACE GRAVEL WETLANDS (13742B/ GW #1)			
Item	**Quantity**	**Bid Price**	**Total**
Item 203.1 - Common Excavation (CY)	1,150	$5.00	$5,750.00
Item 203.6 - Embankment-in-Place (CY)	831	$5.00	$4,155.00
Item 203. 52 - Impervious Material (CY)	924	$14.00	$12,936.00
Item 585.3- Stone Fill, Class C (CY)	98	$27.00	$2,646.00
Item 585.5 - Stone Fill, Class E (CY)	178	$34.00	$6,052.00
Item 585.7 - Stone Fill, Class G (CY)	30	$51.00	$1,530.00
Item 593.421 - Geotextile, Perm. Control, Cl. 2, Non-woven (SY)	333	$2.50	$832.50
Item 603.80012 - 12" Plastic Pipe (LF)	28	$27.00	$756.00
Item 604.91X - Outlet Control Structure (U)	1	$4,000.00	$4,000.00
Item 604.921 - Leaching Chamber Type 1 (U)	6	$1,350.00	$8,100.00
Item 604.912 - Leaching Chamber Type 2 (U)	5	$1,350.00	$6,750.00
Item 605.506 - 6" Perf. Corr. Poly. Pipe Underdrain (LF)	188	$15.50	$2,914.00
Item 646.3 - Turf Establishment w/ Mulch & Tackifiers (A)	0.40	$1,775.00	$710.00
Item 647.1 - Humus (CY)	330	$18.00	$5,940.00
Item 647.29 - Wetland Humus (CY)	60	$19.00	$1,140.00
Item 670.01 - Sediment Sump Measuring Post (EA)	1	$170.00	$170.00
Total			**$64,381.50**

Attachment B: Subsurface Gravel Wetland Inspection and Maintenance Guidance

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: Inspector:

Date: Time: Site Conditions:

Date Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)			
Plants are stable, roots not exposed	**S**	**U**	
Vegetation is established and thriving	**S**	**U**	
No evidence of holes in the wetland soil causing short-circuiting	**S**	**U**	
No evidence of erosion at inlet and outlet structures	**S**	**U**	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)			
1. Standing Water			
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	**S**	**U**	
2. Short Circuiting & Erosion			
No evidence of animal burrows or other holes	**S**	**U**	
No evidence of erosion	**S**	**U**	
3. Drought Conditions (As needed)			
Water plants as needed	**S**	**U**	
Dead or dying plants	**S**	**U**	
4. Sedimentation Chamber or Forebay Inlet Inspection			
No evidence of sediment accumulation, trash, and debris.	**S**	**U**	
Good condition, no need for repair	**S**	**U**	
5. Vegetation Coverage			
50 % coverage established throughout system by first year	**S**	**U**	
Robust coverage by year 2 or later	**S**	**U**	
6. Inlet and Outlet Controls			
Flow is unobstructed in openings (grates, orifices, etc)	**S**	**U**	
Structures are operational with no evidence of deterioration	**S**	**U**	
7. Vegetation removal (once every 3 years)			
Prune dead, diseased, or decaying plants	**S**	**U**	

Corrective Action Needed	Due Date
1.	
2.	
3.	

Attachment C: Results of Subsurface Gravel Wetland Inspections

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 NB & SB Exit 5 Area DOT#: 14633F BMP 19 Inspector: Tim Puls
Date: 7/18/14 Time: 1:00PM Site Conditions: Poor
Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)			
Plants are stable, roots not exposed	**S**	U	Constructed 2013-2014
Vegetation is established and thriving	**S**	U	
No evidence of holes in the wetland soil causing short-circuiting	**S**	U	
No evidence of erosion at inlet and outlet structures	**S**	U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)			
1. Standing Water			
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	S	**U**	Standing water in fore bay & both cells, approx. 3-5”
2. Short Circuiting & Erosion			
No evidence of animal burrows or other holes	**S**	U	
No evidence of erosion	**S**	U	
3. Drought Conditions (As needed)			Too much water. Plants are thin in areas where water has been pooling.
Water plants as needed	S	**U**	
Dead or dying plants	S	**U**	
4. Sedimentation Chamber or Forebay Inlet Inspection			
No evidence of sediment accumulation, trash, and debris.	**S**	U	
Good condition, no need for repair	**S**	U	
5. Vegetation Coverage			
50 % coverage established throughout system by first year	**S**	U	NA
Robust coverage by year 2 or later	S	U	
6. Inlet and Outlet Controls:			
Flow is unobstructed in openings (grates, orifices, etc)	**S**	U	
Structures are operational with no evidence of deterioration	**S**	U	
7. Vegetation removal (once every 3 years)			
Prune dead, diseased, or decaying plants	S	U	NA

Corrective Action Needed	Due Date
1. Outlet pipe invert is above the wetland soil elevation which keeps the system flooded. Could bring the soil up another 6-8”.	ASAP
COMMENT: Area of system is smaller than other BMPs but has the same number of structures.	

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 NB, East side DOT#: 14633F BMP 18 Inspector: Tim Puls
Date: 7/18/14 Time: 1:45PM Site Conditions: Fair, Draining
Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)		
Plants are stable, roots not exposed	**S** U	Constructed 2013-2014
Vegetation is established and thriving	**S** U	
No evidence of holes in the wetland soil causing short-circuiting	**S** U	
No evidence of erosion at inlet and outlet structures	**S** U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)		
1. Standing Water		
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	S **U**	Standing water in fore bay & both cells, approx. 3-5”
2. Short Circuiting & Erosion		
No evidence of animal burrows or other holes	**S** U	
No evidence of erosion	**S** U	
3. Drought Conditions (As needed)		Too much water. Plants are thin in areas where water has been pooling.
Water plants as needed	S **U**	
Dead or dying plants	S **U**	
4. Sedimentation Chamber or Forebay Inlet Inspection		
No evidence of sediment accumulation, trash, and debris.	**S** U	
Good condition, no need for repair	**S** U	
5. Vegetation Coverage		
50 % coverage established throughout system by first year	S **U**	NA
Robust coverage by year 2 or later	S U	
6. Inlet and Outlet Controls:		A piece of trash was blocking outlet orifice. Blockage cleared and system began to drain.
Flow is unobstructed in openings (grates, orifices, etc)	S **U**	
Structures are operational with no evidence of deterioration	**S** U	
7. Vegetation removal (once every 3 years)		
Prune dead, diseased, or decaying plants	S U	NA

Corrective Action Needed	Due Date
1. Outlet control structure has slotted inlets (4” x 12”) that are unprotected. Bring rip rap up over the inlet slots to keep trash out of structure.	ASAP
COMMENT: Area of system is smaller than other BMPs but has the same number of structures.	

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 Exit 5 NB Off Ramp Area DOT#: 14633F — Inspector: Tim Puls
Date: 7/18/14 — Time: 12:30AM — Site Conditions: Very Good
Date of Last Rain Event: 7/16/14 — Two systems – BMP 13, BMP 16

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)		
Plants are stable, roots not exposed	S U	New systems – BMP 13 approx. 1.5 years old and BMP 16 is approx. 6 months. GC is Severino Construction
Vegetation is established and thriving	S U	
No evidence of holes in the wetland soil causing short-circuiting	S U	
No evidence of erosion at inlet and outlet structures	S U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)		
1. Standing Water		
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	S U	None
2. Short Circuiting & Erosion		
No evidence of animal burrows or other holes	S U	
No evidence of erosion	S U	
3. Drought Conditions (As needed)		
Water plants as needed	S U	
Dead or dying plants	S U	
4. Sedimentation Chamber or Forebay Inlet Inspection		
No evidence of sediment accumulation, trash, and debris.	S U	
Good condition, no need for repair	S U	
5. Vegetation Coverage		
50 % coverage established throughout system by first year	S U	
Robust coverage by year 2 or later	S U	
6. Inlet and Outlet Controls:		
Flow is unobstructed in openings (grates, orifices, etc)	S U	
Structures are operational with no evidence of deterioration	S U	
7. Vegetation removal (once every 3 years)		
Prune dead, diseased, or decaying plants	S U	

Corrective Action Needed	Due Date
COMMENT: Both BMPs drain to a central 48" line. Could reduce number of hydraulic inlets and cleanout structures.	

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

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ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 Exit 5 NB On Ramp DOT#: 14633E BMP 17 Inspector: Tim Puls
Date: 7/18/14 Time: 1:30PM Site Conditions: Good
Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)			
Plants are stable, roots not exposed	**S**	**U**	NA System constructed in 2008-2009
Vegetation is established and thriving	**S**	**U**	
No evidence of holes in the wetland soil causing short-circuiting	**S**	**U**	
No evidence of erosion at inlet and outlet structures	**S**	**U**	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)			
1. Standing Water			
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	**S**	**U** (circled)	Fore bay has pooled water. Full of cattails.
2. Short Circuiting & Erosion			
No evidence of animal burrows or other holes	**S** (circled)	**U**	
No evidence of erosion	**S** (circled)	**U**	
3. Drought Conditions (As needed)			
Water plants as needed	**S** (circled)	**U**	
Dead or dying plants	**S** (circled)	**U**	
4. Sedimentation Chamber or Forebay Inlet Inspection			
No evidence of sediment accumulation, trash, and debris.	**S** (circled)	**U**	
Good condition, no need for repair	**S** (circled)	**U**	
5. Vegetation Coverage			
50 % coverage established throughout system by first year	**S** (circled)	**U**	
Robust coverage by year 2 or later	**S** (circled)	**U**	
6. Inlet and Outlet Controls:			
Flow is unobstructed in openings (grates, orifices, etc)	**S** (circled)	**U**	
Structures are operational with no evidence of deterioration	**S** (circled)	**U**	
7. Vegetation removal (once every 3 years)			No maintenance has been done to date.
Prune dead, diseased, or decaying plants	**S**	**U** (circled)	

Corrective Action Needed	Due Date
1. Cut vegetation down to base and remove from system.	ASAP
COMMENT: Area of system is larger than other BMPs but has the same number of structures. 6 hydraulic inlets, 5 leach basins, 1 outlet	

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 Exit 5 SB On Ramp DOT#: 14633E BMP 14 Inspector: Tim Puls

Date: 7/18/14 Time: 1:20PM Site Conditions: Good

Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)			
Plants are stable, roots not exposed	**S**	**U**	NA System constructed in 2008-2009
Vegetation is established and thriving	**S**	**U**	
No evidence of holes in the wetland soil causing short-circuiting	**S**	**U**	
No evidence of erosion at inlet and outlet structures	**S**	**U**	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)			
1. Standing Water			
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	**S**	**U**	Fore bay is dry
2. Short Circuiting & Erosion			
No evidence of animal burrows or other holes	**S**	**U**	
No evidence of erosion	**S**	**U**	
3. Drought Conditions (As needed)			
Water plants as needed	**S**	**U**	
Dead or dying plants	**S**	**U**	
4. Sedimentation Chamber or Forebay Inlet Inspection			
No evidence of sediment accumulation, trash, and debris.	**S**	**U**	
Good condition, no need for repair	**S**	**U**	
5. Vegetation Coverage			
50 % coverage established throughout system by first year	**S**	**U**	
Robust coverage by year 2 or later	**S**	**U**	
6. Inlet and Outlet Controls:			
Flow is unobstructed in openings (grates, orifices, etc)	**S**	**U**	
Structures are operational with no evidence of deterioration	**S**	**U**	
7. Vegetation removal (once every 3 years)			No maintenance has been done to date.
Prune dead, diseased, or decaying plants	**S**	**U**	

Corrective Action Needed	Due Date
1. Cut vegetation down to base and remove from system.	ASAP
COMMENT: Area of system is smaller than other BMPs but has the same number of structures. 6 hydraulic inlets, 5 leach basins, 1 outlet	

Regular Inspection and Maintenance Guidance for Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Gravel Wetland systems. It is the responsibility of the owner to maintain the Gravel Wetland in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, overly wet or dry (I.E., drought), regional hydrologic conditions, and any changes or redevelopment in the upstream land use.

ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 Exit 1 NB Off Ramp DOT#: 13933C | Inspector: Tim Puls

Date: 7/18/14 | Time: 11:00AM | Site Conditions: Very Good

Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)		
Plants are stable, roots not exposed	S U	NA – This system was constructed in 2007
Vegetation is established and thriving	S U	
No evidence of holes in the wetland soil causing short-circuiting	S U	
No evidence of erosion at inlet and outlet structures	S U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)		
1. Standing Water		
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	(S) U	None
2. Short Circuiting & Erosion		
No evidence of animal burrows or other holes	(S) U	
No evidence of erosion	(S) U	
3. Drought Conditions (As needed)		
Water plants as needed	(S) U	
Dead or dying plants	(S) U	
4. Sedimentation Chamber or Forebay Inlet Inspection		Some trash has accumulated
No evidence of sediment accumulation, trash, and debris.	(S) U	
Good condition, no need for repair	(S) U	
5. Vegetation Coverage		Plants are in good condition. Treatment cells are densely vegetated.
50 % coverage established throughout system by first year	(S) U	
Robust coverage by year 2 or later	(S) U	
6. Inlet and Outlet Controls:		Concrete outlet structure 8' x 10'
Flow is unobstructed in openings (grates, orifices, etc)	(S) U	
Structures are operational with no evidence of deterioration	(S) U	
7. Vegetation removal (once every 3 years)		No maintenance has been done to date.
Prune dead, diseased, or decaying plants	S (U)	

Corrective Action Needed	Due Date
1. Maintain vegetation = cut down to base of plant and remove vegetation from system	
COMMENT: This is an extremely large system. RRoseen advised them to replace "E Stone" with 3/8" pea stone during construction.	

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ACTIVITIES

Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system and vegetation care is important to system productivity and health. A gravel wetland is a subsurface horizontal filtration system and does not rely upon the surface soils for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of inlet standpipes. It is important to ensure these inlets are performing properly.

1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: Rt. 16 NB Exit 5 Inspector: Jamie Houle, Tim Puls

Date: 6/20/14 Time: 10:00AM Site Conditions: Good

Date of Last Rain Event: 6/13/14 (0.75")

Inspection Items	Satisfactory (S) or Unsatisfactory (U)		Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)			
Plants are stable, roots not exposed	S	U	NA System constructed in 2010-2011
Vegetation is established and thriving	S	U	
No evidence of holes in the wetland soil causing short-circuiting	S	U	
No evidence of erosion at inlet and outlet structures	S	U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)			
1. Standing Water			
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	(S)	U	Fore bay has pooled water. Some cattails.
2. Short Circuiting & Erosion			
No evidence of animal burrows or other holes	(S)	U	
No evidence of erosion	(S)	U	
3. Drought Conditions (As needed)			
Water plants as needed	(S)	U	
Dead or dying plants	(S)	U	
4. Sedimentation Chamber or Forebay Inlet Inspection			Wet fore bay w/ evidence of anaerobic conditions, i.e. standing water, cattails, and algae.
No evidence of sediment accumulation, trash, and debris.	S	(U)	
Good condition, no need for repair	S	(U)	
5. Vegetation Coverage			
50 % coverage established throughout system by first year	(S)	U	
Robust coverage by year 2 or later	(S)	U	
6. Inlet and Outlet Controls:			Inlet is obstructed due to high elevation of fore bay control. Need low flow outlet from fore bay.
Flow is unobstructed in openings (grates, orifices, etc)	(S)	U	
Structures are operational with no evidence of deterioration	(S)	U	
7. Vegetation removal (once every 3 years)			
Prune dead, diseased, or decaying plants	(S)	U	

Corrective Action Needed	Due Date
1. Fore bay needs to be drained. 2.2ft of standing water.	ASAP
COMMENT:	

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ACTIVITIES

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1ST YEAR POST-CONSTRUCTION ACTIVITY	FREQUENCY
1. Check that plants have adequate water, are well established and healthy. **Remedy:** Water plants as necessary, remove or treat diseased vegetation as necessary and re-vegetate poorly established plants as necessary	After every major storm in the first few months, then biannually.
2. Check for erosion in the system and short circuiting (holes) in the surface wetland soils. **Remedy:** Soil piping, erosion, and holes should be filled, lightly compacted, and reseeded.	
POST-CONSTRUCTION ACTIVITY	**FREQUENCY**
3. Check inlets outlets and stand pipes for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet, outlets and standpipes if obstructed.	Quarterly initially, biannually, frequency adjusted as needed after 3 inspections
4. Check for animal burrows and short circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
5. Check that the depth of accumulated sediment in the sedimentation chamber is less than 12 inches or 10 percent of the pretreatment volume. **Remedy:** The sedimentation chamber, forebay, and treatment cells outlet devices should be cleaned when drawdown times exceed 36 hours. Remove material with rakes where possible rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.	
6. Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets.	Annually
7. Check for robust vegetation coverage throughout the system. **Remedy:** If at least 50 % vegetation coverage is not established after 2 years, reinforcement planting should be performed.	
8. Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF GRAVEL WETLAND

Location: I93 Exit 2 Park & Ride. DOT#: 10418G | Inspector: Tim Puls

Date: 7/18/14 | Time: 10:30AM | Site Conditions: Very Good

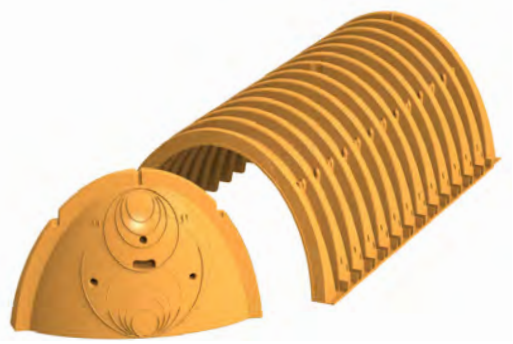
Date of Last Rain Event: 7/16/14

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1st Year Post-Construction Monitoring (After every major storm for the first three months)		
Plants are stable, roots not exposed	S U	NA – This system was constructed in 2007
Vegetation is established and thriving	S U	
No evidence of holes in the wetland soil causing short-circuiting	S U	
No evidence of erosion at inlet and outlet structures	S U	
Post-Construction Routine Monitoring (at least every 6 months thereafter as per USEPA Good House-Keeping Requirements. Inspection frequency can be reduced to annual following 2 years of monitoring indicating the rate of sediment accumulation is less than cleaning criteria listed below.)		
1. Standing Water		
Gravel wetland surface is free of standing water or other evidence of clogging, such as discolored or accumulated sediments	(S) U	Plunge pools around the 3 inlet locations
2. Short Circuiting & Erosion		
No evidence of animal burrows or other holes	(S) U	
No evidence of erosion	(S) U	
3. Drought Conditions (As needed)		
Water plants as needed	(S) U	
Dead or dying plants	(S) U	
4. Sedimentation Chamber or Forebay Inlet Inspection		Some trash has accumulated
No evidence of sediment accumulation, trash, and debris.	(S) U	
Good condition, no need for repair	(S) U	
5. Vegetation Coverage		Plants are in good condition. Forebay is >95% cattails. Treatment cells are densely vegetated.
50 % coverage established throughout system by first year	(S) U	
Robust coverage by year 2 or later	(S) U	
6. Inlet and Outlet Controls		
Flow is unobstructed in openings (grates, orifices, etc)	(S) U	
Structures are operational with no evidence of deterioration	(S) U	
7. Vegetation removal (once every 3 years)		No maintenance has been done to date.
Prune dead, diseased, or decaying plants	S (U)	

Corrective Action Needed	Due Date
1. Maintain vegetation = cut down to base of plant and remove vegetation from system	
COMMENT: Perimeter ground water drainage is a 6" PUD in 2'x3' stone trench. Flow is directed to inlets.	

StormTech® SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
85.4" x 51" x 30"
2,170 mm x 1,295 mm x 762 mm

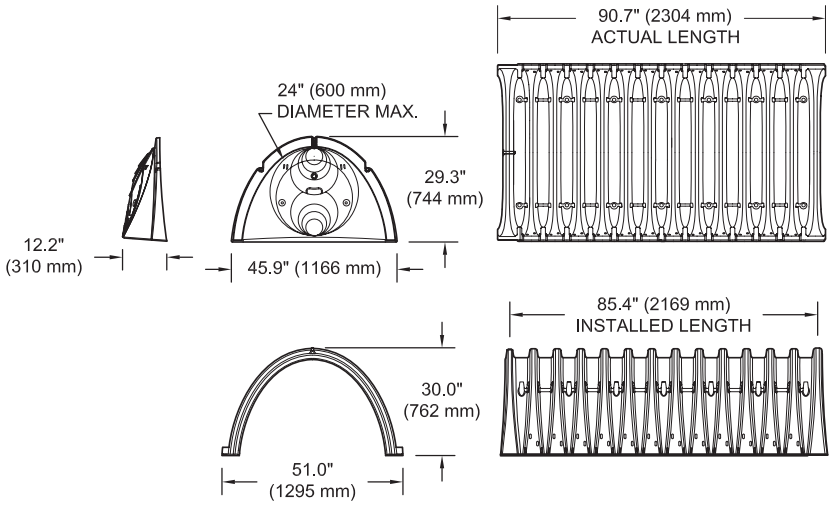
Chamber Storage
45.9 ft³ (1.30 m³)

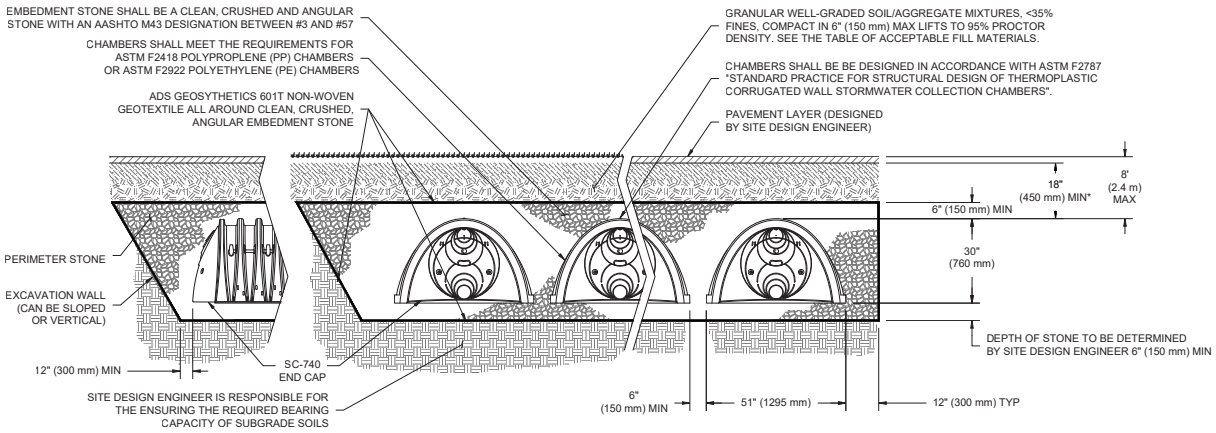
Min. Installed Storage*
74.9 ft³ (2.12 m³)

Weight
74.0 lbs (33.6 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

ADS StormTech™

StormTech SC-740 Specifications

Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6” (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)	45.90 (1.300)	74.90 (2.121)
41 (1041)	45.90 (1.300)	73.77 (2.089)
40 (1016)	45.90 (1.300)	72.64 (2.057)
39 (991)	45.90 (1.300)	71.52 (2.025)
38 (965)	45.90 (1.300)	70.39 (1.993)
37 (940)	45.90 (1.300)	69.26 (1.961)
36 (914)	45.90 (1.300)	68.14 (1.929)
35 (889)	45.85 (1.298)	66.98 (1.897)
34 (864)	45.69 (1.294)	65.75 (1.862)
33 (838)	45.41 (1.286)	64.46 (1.825)
32 (813)	44.81 (1.269)	62.97 (1.783)
31 (787)	44.01 (1.246)	61.36 (1.737)
30 (762)	43.06 (1.219)	59.66 (1.689)
29 (737)	41.98 (1.189)	57.89 (1.639)
28 (711)	40.80 (1.155)	56.05 (1.587)
27 (686)	39.54 (1.120)	54.17 (1.534)
26 (660)	38.18 (1.081)	52.23 (1.479)
25 (635)	36.74 (1.040)	50.23 (1.422)
24 (610)	35.22 (0.977)	48.19 (1.365)
23 (584)	33.64 (0.953)	46.11 (1.306)
22 (559)	31.99 (0.906)	44.00 (1.246)
21 (533)	30.29 (0.858)	1.85 (1.185)
20 (508)	28.54 (0.808)	39.67 (1.123)
19 (483)	26.74 (0.757)	37.47 (1.061)
18 (457)	24.89 (0.705)	35.23 (0.997)
17 (432)	23.00 (0.651)	32.96 (0.939)
16 (406)	21.06 (0.596)	30.68 (0.869)
15 (381)	19.09 (0.541)	28.36 (0.803)
14 (356)	17.08 (0.484)	26.03 (0.737)
13 (330)	15.04 (0.426)	23.68 (0.670)
12 (305)	12.97 (0.367)	21.31 (0.608)
11 (279)	10.87 (0.309)	18.92 (0.535)
10 (254)	8.74 (0.247)	16.51 (0.468)
9 (229)	6.58 (0.186)	14.09 (0.399)
8 (203)	4.41 (0.125)	11.66 (0.330)
7 (178)	2.21 (0.063)	9.21 (0.264)
6 (152)	0 (0)	6.76 (0.191)
5 (127)	0 (0)	5.63 (0.160)
4 (102)	0 (0)	4.51 (0.128)
3 (76)	0 (0)	3.38 (0.096)
2 (51)	0 (0)	2.25 (0.064)
1 (25)	0 (0)	1.13 (0.032)

Stone Cover

Stone Foundation

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-740 Chamber	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6” (150 mm) stone above chambers, 6” (150 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth		
	6”	12”	16”
SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
Metric Kilograms (m³)	**150 mm**	**300 mm**	**450 mm**
SC-740	3,450 (2.1)	4,170 (2.5)	4,490 (3.0)

Note: Assumes 6” (150 mm) of stone above and between chambers.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

Note: Assumes 6” (150 mm) of row separation and 18” (450 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

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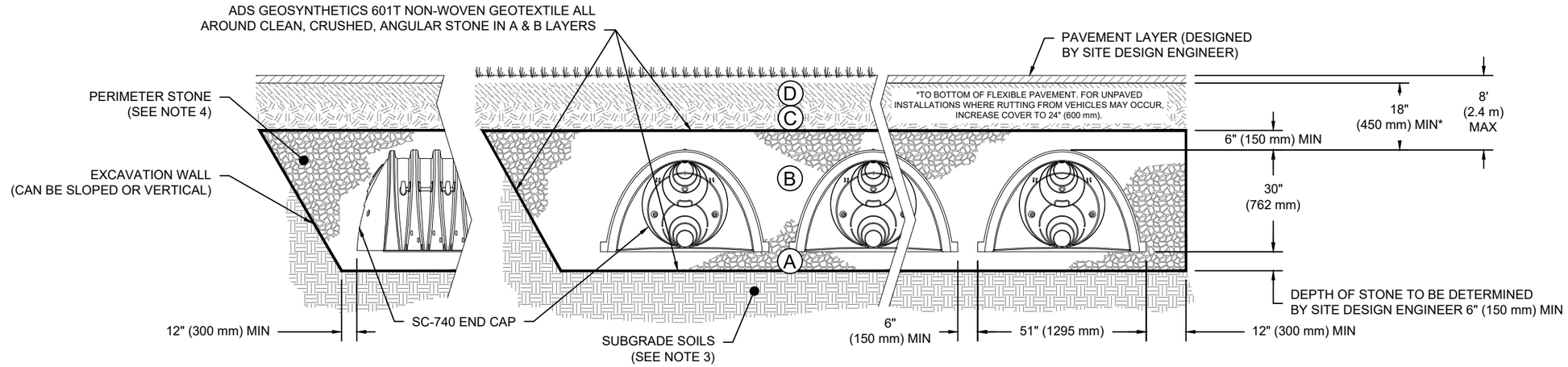
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

SC-740
STANDARD CROSS SECTION
DATE: 9/12/22
DRAWN: KLJ
PROJECT #:
CHECKED: KLJ

DATE	DRWN	CHKD	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

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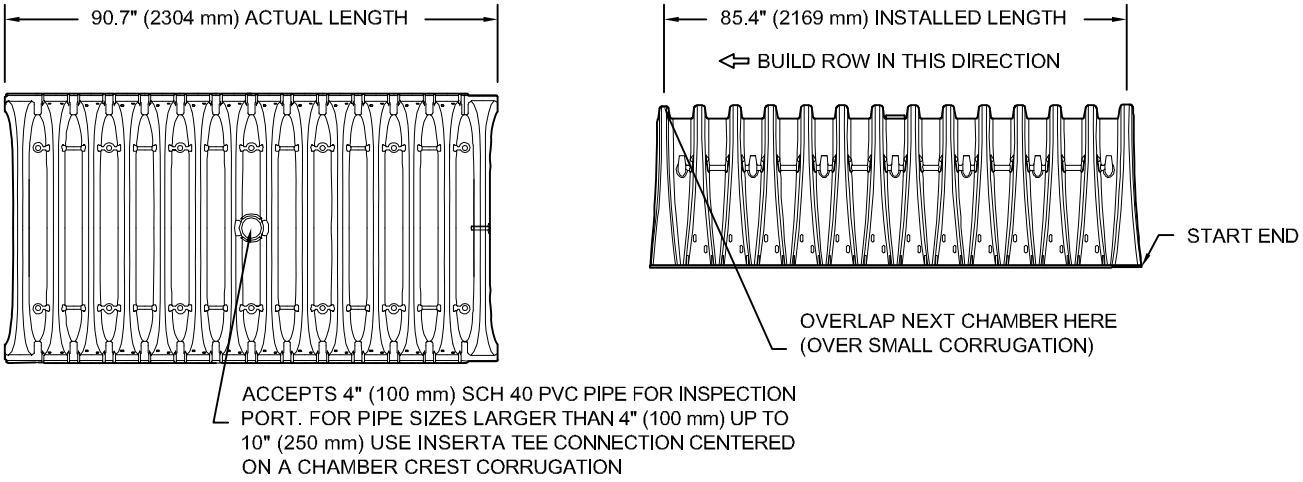
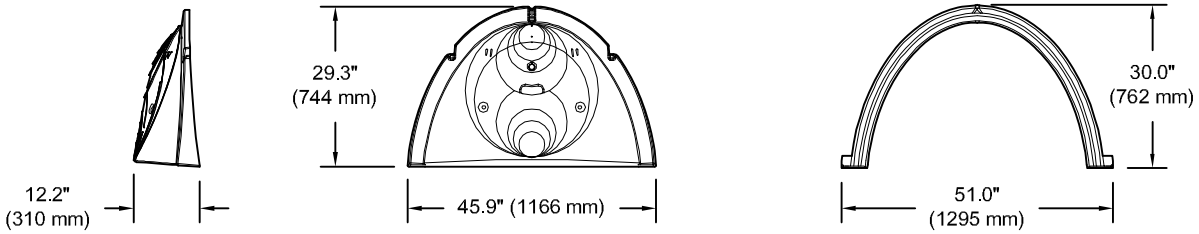
SC-740 TECHNICAL SPECIFICATION

NTS

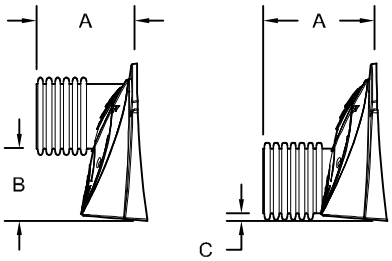




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



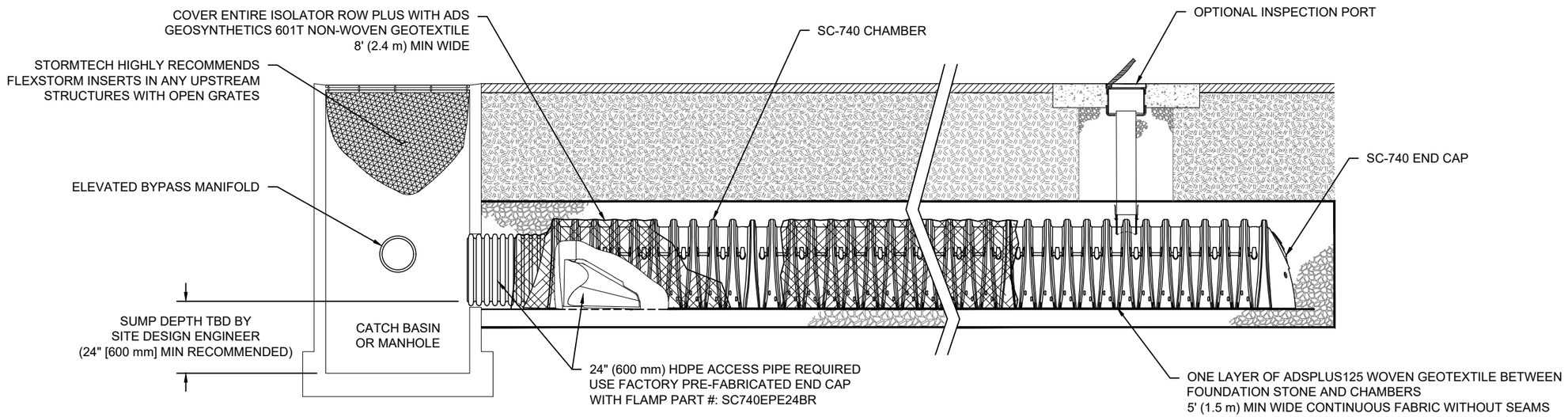
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	—
SC740EPE06B / SC740EPE06BPC			—	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	—
SC740EPE08B / SC740EPE08BPC			—	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	—
SC740EPE10B / SC740EPE10BPC			—	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	—
SC740EPE12B / SC740EPE12BPC			—	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	—
SC740EPE15B / SC740EPE15BPC			—	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	—
SC740EPE18B / SC740EPE18BPC			—	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	—	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

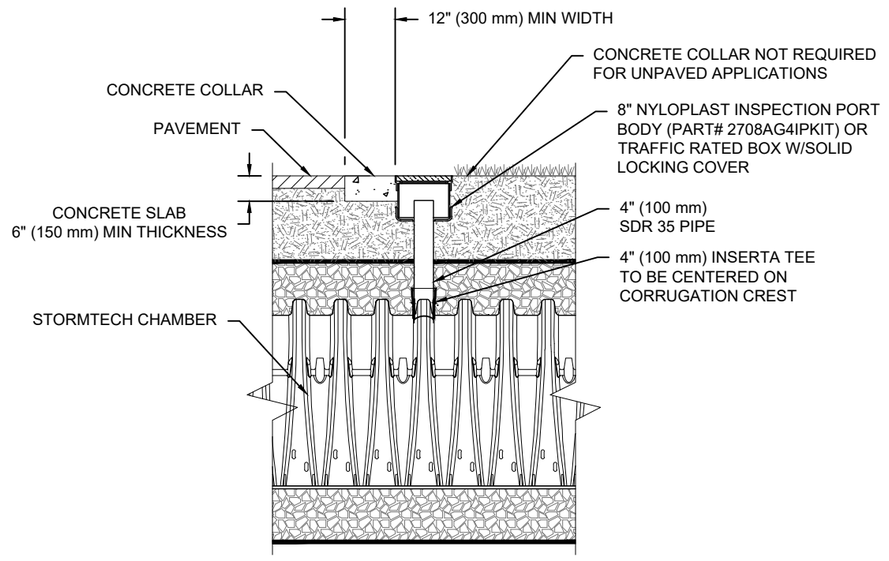
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4" PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)
NTS

SC-740
ISOLATOR ROW PLUS DETAILS

DATE: 9/12/22 | DRAWN: KLJ | PROJECT #: | CHECKED: KLJ

DATE	DRWN	CHKD	DESCRIPTION

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StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row Plus is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

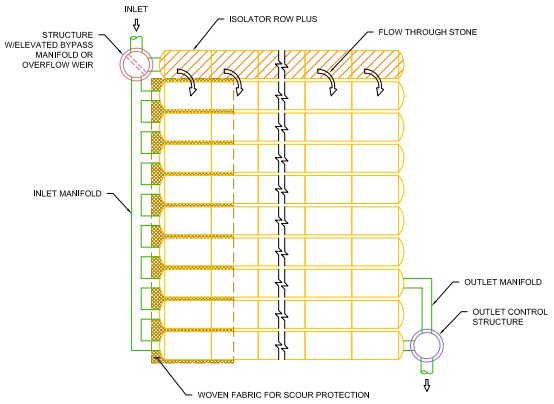
The Isolator Row FLAMP™ (patent pending) is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row PLUS from the manhole opening, ADS PLUS Fabric is shown between the chamber and stone base.

StormTech Isolator Row PLUS with Overflow Spillway (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

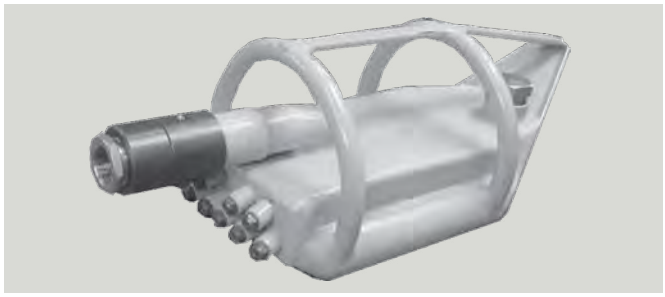
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row Plus, clean-out should be performed.

Maintenance

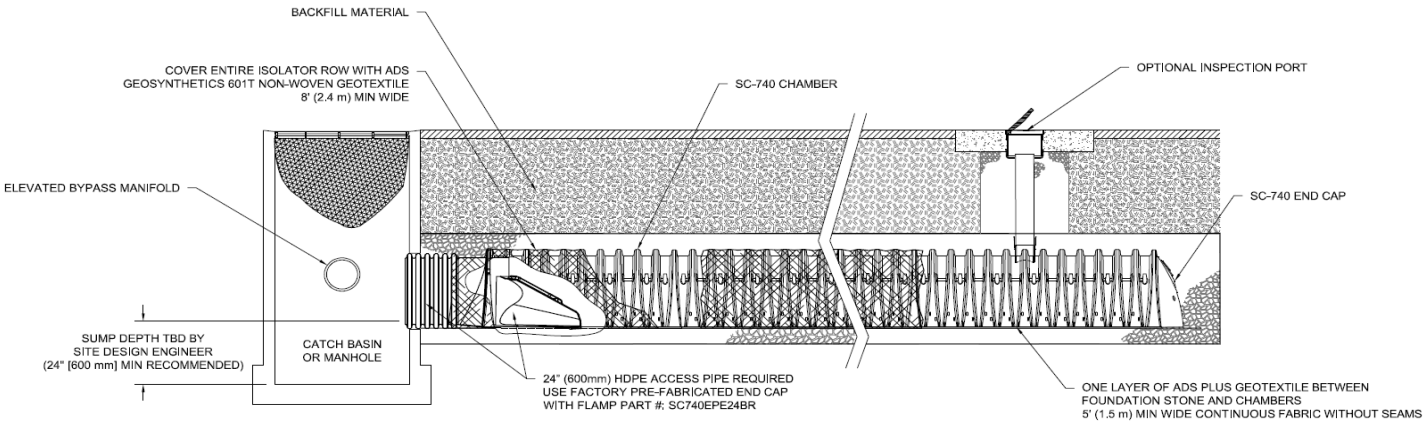
The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row PLUS (*not to scale*)

Note: *Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row PLUS.*



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

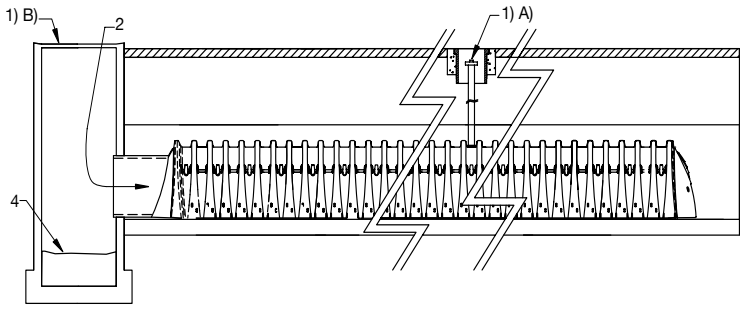
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row PLUS, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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ADS StormTech® Installation Guide

SC-310/SC-740/DC-780

StormTech Installation Video

Required Materials and Equipment List

- Acceptable fill materials per Table 1
- ADS Plus and non-woven geotextile fabrics
- StormTech solid end caps and pre-cored end caps
- StormTech chambers
- StormTech manifolds and fittings

Important Notes:

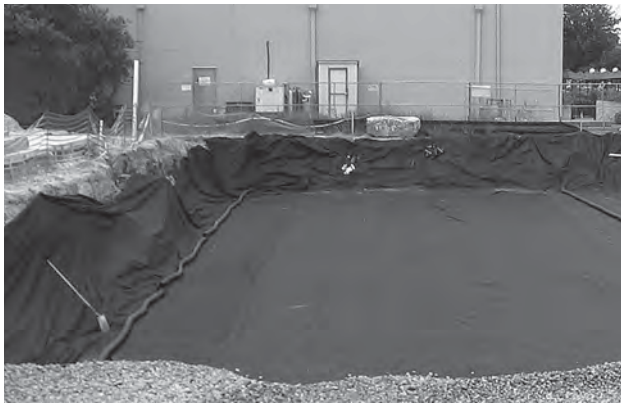
A. This installation guide provides the minimum requirements for proper installation of chambers. Non-adherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

B. Use of a dozer to push embedment stone between the rows of chambers may cause damage to chambers and is not an acceptable backfill method. Any chambers damaged by using the "dump and push" method are not covered under the StormTech standard warranty.

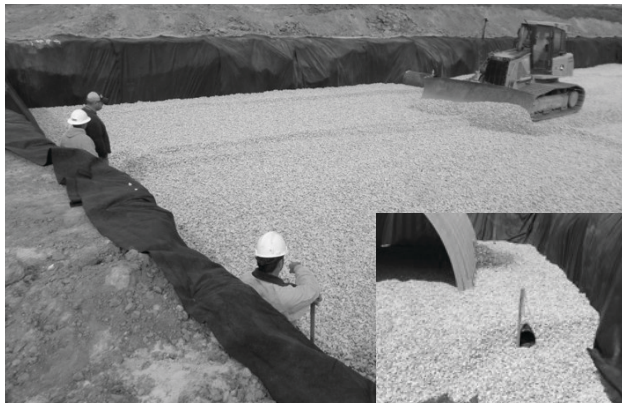
C. Care should be taken in the handling of chambers and end caps. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer's plans.



Place non-woven geotextile over prepared soils and up excavation walls. Install underdrains if required.



Place clean, crushed, angular stone foundation 6" (150 mm) min. Compact to achieve a flat surface.

Manifold, Scour Fabric and Chamber Assembly

Install manifolds and lay out ADS Plus fabric at inlet rows (min. 12.5 ft (3.8 m)) at each inlet end cap. Place a continuous piece along entire length of Isolator® Plus Row(s).

Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled "Lower Joint – Overlap Here" and "Build this direction – Upper Joint" Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 6" (150 mm) spacing between rows.

Attaching the End Caps

Lift the end of the chamber a few inches off the ground. With the curved face of the end cap facing outward, place the end cap into the chamber's end corrugation.

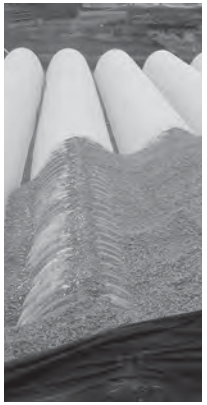
Prefabricated End Caps

24" (600 mm) inlets are the maximum size that can fit into a SC-740/DC-780 end cap and must be prefabricated with a 24" (600 mm) pipe stub. SC-310 chambers with a 12" (300 mm) inlet pipe must use a prefabricated end cap with a 12" (300 mm) pipe stub. When used on an Isolator Row Plus, these end caps will contain a welded FLAMP (flared end ramp) that will lay on top of the ADS Plus fabric (shown above)

Isolator Row Plus

Place a continuous layer of ADS Plus fabric between the foundation stone and the Isolator Row Plus chambers, making sure the fabric lays flat and extends the entire width of the chamber feet. Drape a strip of ADS non-woven geotextile over the row of chambers (not required over DC-780). This is the same type of non-woven geotextile used as a separation layer around the angular stone of the StormTech system.

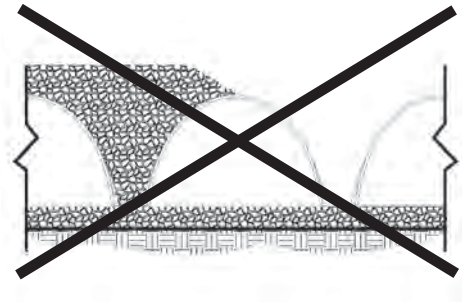
Initial Anchoring of Chambers – Embedment Stone



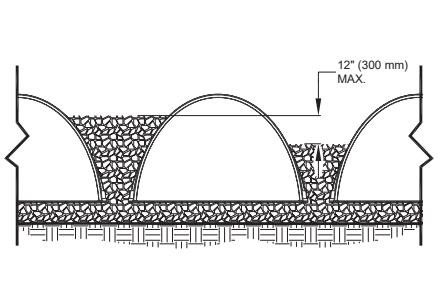
Initial embedment shall be spotted along the centerline of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

Backfill of Chambers – Embedment Stone

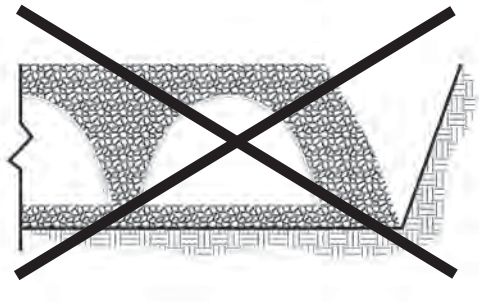


Uneven Backfill

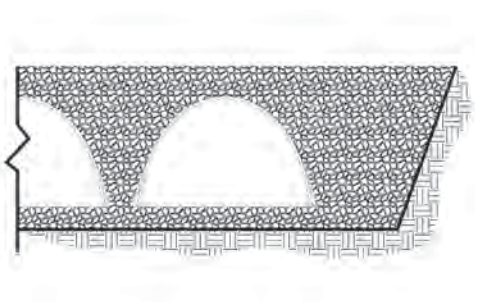


Even Backfill

Backfill chambers evenly. Stone column height should never differ by more than 12” (300 mm) between adjacent chamber rows or between chamber rows and perimeter.



Perimeter Not Backfilled



Perimeter Fully Backfilled

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill - Embedment Stone & Cover Stone

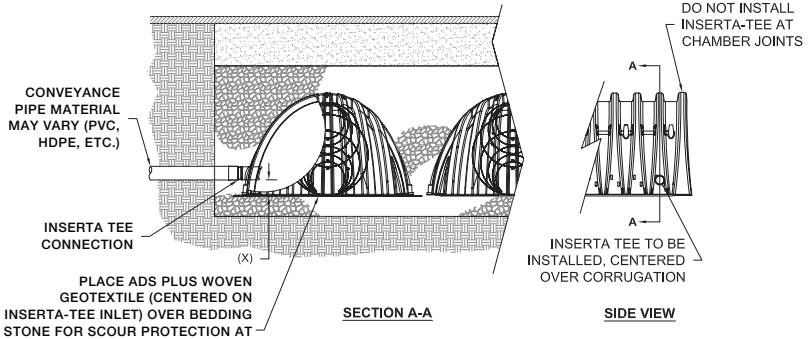
Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. **Only after chambers have been backfilled to top of chamber and with a minimum 6" (150 mm) of cover stone on top of chambers can small dozers be used over the chambers for backfilling remaining cover stone.**

Small dozers and skid loaders may be used to finish grading stone backfill in accordance with ground pressure limits in Table 2. They must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends that the contractor inspect chambers before placing final backfill. Any chambers damaged by construction shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24" (600 mm) min. where edges meet. Compact each lift of backfill as specified in the site design engineer's drawings. Roller travel parallel with rows.

Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 36, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON.		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

StormTech Isolator Row Plus Detail

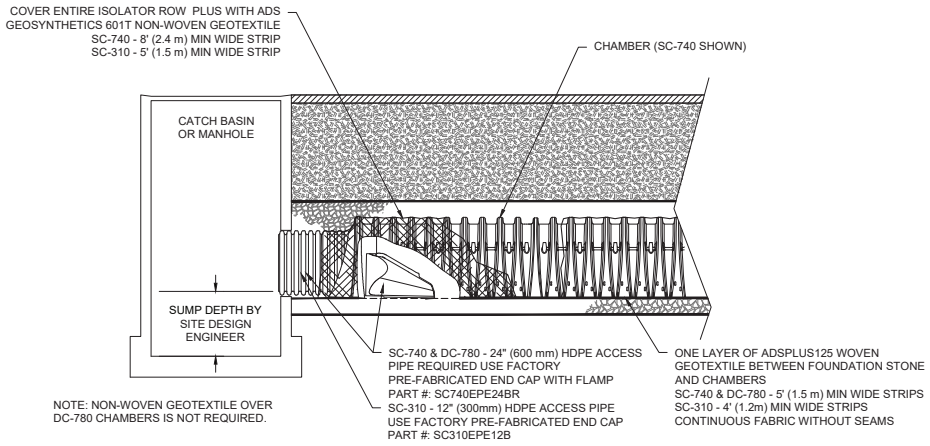


Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	Compaction/Density Requirement
(D) **Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that the pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils or per engineer's plans. Check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
(C) **Initial Fill:** Fill Material for layer 'C' starts from the top of the embedment stone ('B' layer) to 18" (450 mm) above the top of the chamber. Note that pavement subbase may be part of the 'C' layer.	Granular well-graded soil/aggregate mixtures, <35% fines or processed aggregate. Most pavement subbase materials can be used in lieu of this layer.	AASHTO M45 A-1, A-2-4, A-3 or AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compaction after min. 12" (300 mm) of material over the chambers is reached. Compact additional layers in 6" (150 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials. Roller gross vehicle weight not to exceed 12,000 lbs (53 kN). Dynamic force not to exceed 20,000 lbs (89 kN)
(B) **Embedment Stone:** Embedment Stone surrounding chambers from the foundation stone to the 'C' layer above.	Clean, crushed, angular stone	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
(A) **Foundation Stone:** Foundation Stone below the chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone,	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	Place and compact in 6" (150 mm) lifts using two full coverages with a vibratory compactor.[2,3]

Please Note:

1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular no. 4 (AASHTO M43) stone".
2. StormTech compaction requirements are met for 'A' location materials when placed and compacted in 6" (150 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be comprised by compaction, for standard installations and standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact StormTech for compaction requirements.

Figure 1- Inspection Port Detail

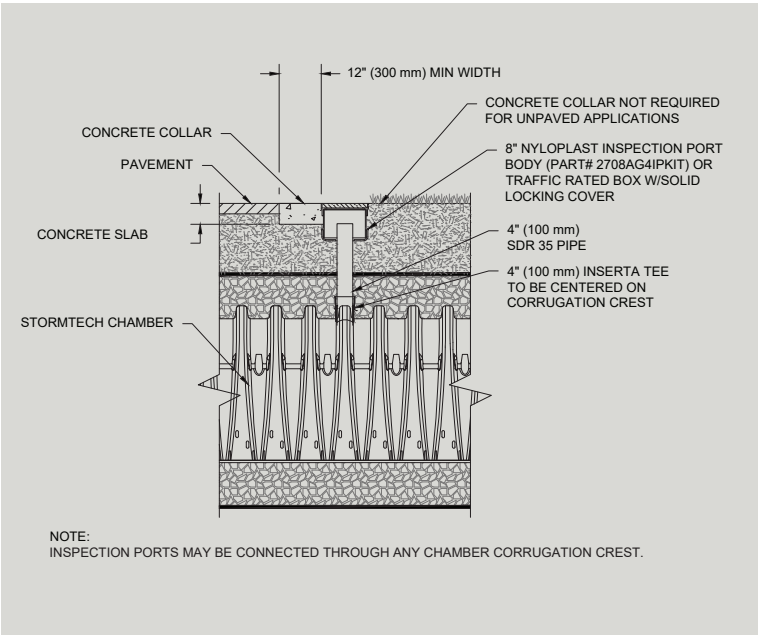
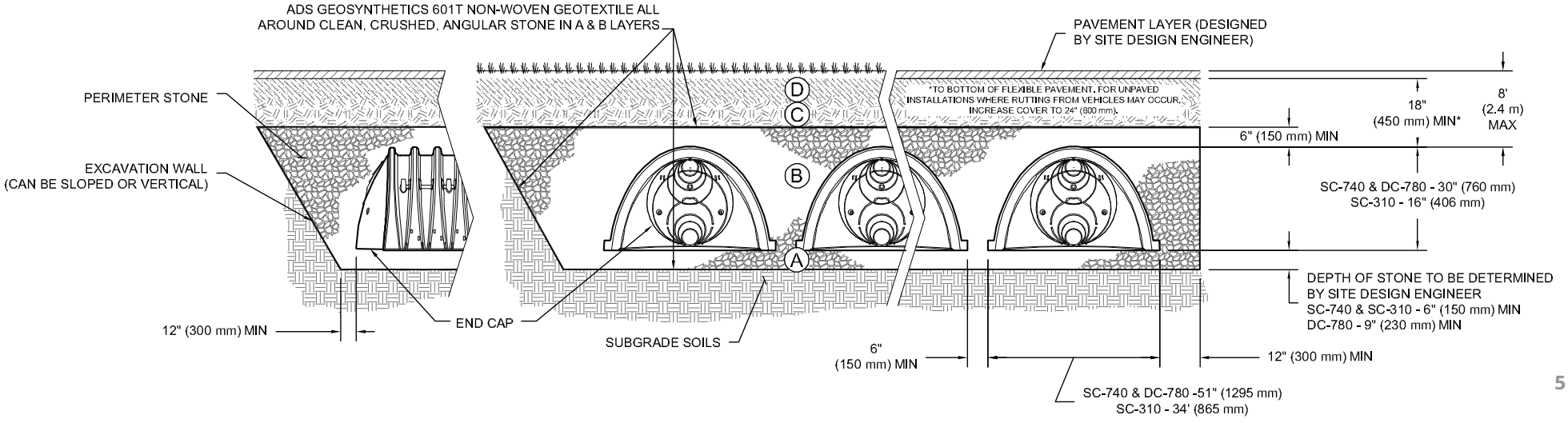


Figure 2 - Fill Material Locations



Notes:

1. 36” (900 mm) of stabilized cover materials over the chambers is recommended during the construction phase if general construction activities, such as full dump truck travel and dumping, are to occur over the bed.
2. During paving operations, dump truck axle loads on 18” (450 mm) of cover may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 18” (450 mm) of cover exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.
3. Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.
4. Mini-excavators (< 8,000lbs/3,628 kg) can be used with at least 12” (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.
5. Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.
6. Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.

Table 2 - Maximum Allowable Construction Vehicle Loads[6]

Material Location	Fill Depth over Chambers in. (mm)	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs (kN)	Max Wheel Load for Loaders lbs (kN)	Track Width in. (mm)	Max Ground Pressure psf (kPa)	Max Drum Weight or Dynamic Force lbs (kN)
Ⓓ Final Fill Material	36” (900) Compacted	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	3880 (186) 2640 (126) 2040 (97) 1690 (81) 1470 (70)	38,000 (169)
Ⓒ Initial Fill Material	24” (600) Compacted	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2690 (128) 1880 (90) 1490 (71) 1280 (61) 1150 (55)	20,000 (89)
	24” (600) Loose/ Dumped	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2390 (114) 1700 (81) 1370 (65) 1190 (57) 1080 (51)	20,000 (89) Roller gross vehicle weight not toexceed 12,000 lbs. (53 kN)
	18” (450)	32,000 (142)	16,000 (71)	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	2110 (101) 1510 (72) 1250 (59) 1100 (52) 1020 (48)	20,000 (89) Roller gross vehicle weight not to exceed 12,000 lbs. (53 kN)
Ⓑ Embedment Stone	12” (300)	16,000 (71)	NOT ALLOWED	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	1540 (74) 1190 (57) 1010 (48) 910 (43) 840 (40)	20,000 (89) Roller gross vehicle weight not to exceed 12,000 lbs. (53 kN)
	6” (150)	8,000 (35)	NOT ALLOWED	12” (305) 18” (457) 24” (610) 30” (762) 36” (914)	1070 (51) 900 (43) 800 (38) 760 (36) 720 (34)	NOT ALLOWED

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ Final Fill Material	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36” (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows until 36” (900mm) compaced cover is reached.[4]	Roller travel parallel to rows only until 36” (900 mm) compacted cover is reached.
Ⓒ Initial Fill Material	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 18” (450 mm) above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 6” (150 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 12” (300 mm) over chambers. Roller travel parallel to chamber rows only.
Ⓑ Embedment Stone	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 6” (150 mm) cover stone is in place.	No rollers allowed.
Ⓐ Foundation Stone	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			

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StormTech® Standard Limited Warranty

STANDARD LIMITED WARRANTY OF STORMTECH LLC ("STORMTECH"): PRODUCTS

(A) This Limited Warranty applies solely to the StormTech chambers and end plates manufactured by StormTech and sold to the original purchaser (the "Purchaser"). The chambers and end plates are collectively referred to as the "Products."

(B) The structural integrity of the Products, when installed strictly in accordance with StormTech's written installation instructions at the time of installation, are warranted to the Purchaser against defective materials and workmanship for one (1) year from the date of purchase. Should a defect appear in the Limited Warranty period, the Purchaser shall provide StormTech with written notice of the alleged defect at StormTech's corporate headquarters within ten (10) days of the discovery of the defect. The notice shall describe the alleged defect in reasonable detail. StormTech agrees to supply replacements for those Products determined by StormTech to be defective and covered by this Limited Warranty. The supply of replacement products is the sole remedy of the Purchaser for breaches of this Limited Warranty. StormTech's liability specifically excludes the cost of removal and/or installation of the Products.

(C) THIS LIMITED WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

(D) This Limited Warranty only applies to the Products when the Products are installed in a single layer. UNDER NO CIRCUMSTANCES, SHALL THE PRODUCTS BE INSTALLED IN A MULTI-LAYER CONFIGURATION.

(E) No representative of StormTech has the authority to change this Limited Warranty in any manner or to extend this Limited Warranty. This Limited Warranty does not apply to any person other than to the Purchaser.

(F) Under no circumstances shall StormTech be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the Products, or the cost of other goods or services related to the purchase and installation of the Products. For this Limited Warranty to apply, the Products must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and StormTech's written installation instructions.

(G) THE LIMITED WARRANTY DOES NOT EXTEND TO INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES. STORMTECH SHALL NOT BE LIABLE FOR PENALTIES OR LIQUIDATED DAMAGES, INCLUDING LOSS OF PRODUCTION AND PROFITS; LABOR AND MATERIALS; OVERHEAD COSTS; OR OTHER LOSS OR EXPENSE INCURRED BY THE PURCHASER OR ANY THIRD PARTY. SPECIFICALLY EXCLUDED FROM LIMITED WARRANTY COVERAGE ARE DAMAGE TO THE PRODUCTS ARISING FROM ORDINARY WEAR AND TEAR; ALTERATION, ACCIDENT, MISUSE, ABUSE OR NEGLECT; THE PRODUCTS BEING SUBJECTED TO VEHICLE TRAFFIC OR OTHER CONDITIONS WHICH ARE NOT PERMITTED BY STORMTECH'S WRITTEN SPECIFICATIONS OR INSTALLATION INSTRUCTIONS; FAILURE TO MAINTAIN THE MINIMUM GROUND COVERS SET FORTH IN THE INSTALLATION INSTRUCTIONS; THE PLACEMENT OF IMPROPER MATERIALS INTO THE PRODUCTS; FAILURE OF THE PRODUCTS DUE TO IMPROPER SITING OR IMPROPER SIZING; OR ANY OTHER EVENT NOT CAUSED BY STORMTECH. A PRODUCT ALSO IS EXCLUDED FROM LIMITED WARRANTY COVERAGE IF SUCH PRODUCT IS USED IN A PROJECT OR SYSTEM IN WHICH ANY GEOTEXTILE PRODUCTS OTHER THAN THOSE PROVIDED BY ADVANCED DRAINAGE SYSTEMS ARE USED. THIS LIMITED WARRANTY REPRESENTS STORMTECH'S SOLE LIABILITY TO THE PURCHASER FOR CLAIMS RELATED TO THE PRODUCTS, WHETHER THE CLAIM IS BASED UPON CONTRACT, TORT, OR OTHER LEGAL THEORY.

ADS StormTech™

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ADS 0601T/O NONWOVEN GEOTEXTILE SPECIFICATION

Scope

This specification describes ADS 0601T/O nonwoven geotextile.

Filter Fabric Requirements

ADS 0601T/O is an orange nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. ADS 0601T/O is inert to biological degradation and resists naturally encountered chemicals, alkali and acids. ADS 0601T/O conforms to the physical property values listed below:

Filter Fabric Properties

Property	Test Method	Unit	Typical Value[1] MD	Typical Value[1] CD
Grab Tensile Strength	ASTM D4632	lbs (N)	175 (779)	175 (779)
Grab Tensile Elongation	ASTM D4632	%	75	75
Trapezoid Tear Strength	ASTM D4533	lbs (N)	85 (378)	85 (378)
CBR Puncture Strength	ASTM D6241	lbs (N)	480 (2136)	480 (2136)
Permittivity	ASTM D4491	sec^{-1}	1.5	1.5
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	105 (4278)	105 (4278)
UV Resistance (at 500 hours)[1]	ASTM D4355	% strength retained	80	80

Physical Properties

Property	Test Method	Unit	Typical Value[2]
Weight	ASTM D5161	oz/yd^2 (g/m^2)	6.5 (220)
Thickness	ASTM D5199	mils (mm)	65 (1.7)
Roll Dimensions (W x L)	-	ft (m)	15 x 300 (4.5 x 91)
Roll Area	-	yd^2 (m^2)	500 (418)
Estimated Roll Weight	-	lb (kg)	220 (100)

1 Modified, Minimum Test Value
2 ASTM D4439 Standard Terminology for Geosynthetics: typical value, n-*for geosynthetics*, the mean value calculated from documented manufacturing quality control test results for a defined population obtained from one test method associated with on specific property.

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Separation

ADS 315W WOVEN GEOTEXTILE SPECIFICATION

Scope

This specification describes ADS 315W woven geotextile.

Filter Fabric Requirements

ADS 315W is manufactured using high-tenacity polypropylene yarns that are woven to form a dimensionally stable network, which allows the yarns to maintain their relative position. ADS 315W resists ultraviolet deterioration, rotting and biological degradation and is inert to commonly encountered soil chemicals. ADS 315W conforms to the physical property values listed below:

Filter Fabric Properties

Property	Test Method	Unit	M.A.R.V. (Minimum Average Roll Value)[2]
Tensile Strength (Grab)	ASTM D4632	lbs (N)	315 (1400)
Elongation	ASTM D4632	%	15
CBR Puncture	ASTM D6241	lbs (N)	900 (4005)
Puncture	ASTM D4833	lbs (N)	150 (667)
Mullen Burst	ASTM D3786	psi (kPa)	600 (4134)
Trapezoidal Tear	ASTM D4533	lbs (N)	120 (533)
UV Resistance (at 500 hours)	ASTM D4355	%	70
Apparent Opening Size (AOS)*	ASTM D4751	U.S. Sieve (mm)	40 (.425)
Permittivity	ASTM D4491	sec^{-1}	.05
Water Flow Rate	ASTM D4491	gpm/ft^2 ($l/min/m^2$)	4 (163)

* Maximum average roll value.

Packaging

Roll Dimensions (W x L) - ft. (m)	12.5 x 360/ 15 x 300 / 17.5 x 258 (3.81 x 109.8/ 4.57 x 91.5 / 5.33 x 78.6)

ADS "Terms and Conditions of Sale" can be found on the ADS website, adspipe.com.
The ADS logo is a registered trademark of Advanced Drainage Systems, Inc. #315W 10/22 MH

Welcome to New Hampshire's Watershed Report Cards built from the 2024, 305(b)/303(d)

Each Watershed Report Card covers a single 12-digit Hydrologic Unit Code (HUC12), on average a 34 square mile area. Each Watershed Report Card has three components;

1. REPORT CARD - A one page card that summarizes the overall use support for Aquatic Life Integrity, Primary Contact (i.e. Swimming), and Secondary Contact (i.e. Boating) Designated Uses on every Assessment Unit ID (AUID) within the HUC12.
2. HUC 12 MAP - A map of the watershed with abbreviated labels for each AUID within the HUC12.
3. ASSESSMENT DETAILS - Anywhere from one to forty pages with the detailed assessment information for each and every AUID in the Report Card and Map.

How are the Surface Water Quality Assessment determinations made?

All readily available data with reliable Quality Assurance/Quality Control is used in the biennial surface water quality assessments. For a full understanding of how the Surface Water Quality Standards (Env-Wq 1700) are translated into surface water quality assessments we urge the reader to review the 2024 Consolidated Assessment and Listing Methodology (CALM).

Where can I find more advanced mapping resources?

GIS files are available by assessment cycle at the NHDES FTP site.

I'd like to see the more raw water quality data?

The web mapping tool allows you to download the data used in the assessment of the primary contact and aquatic life designated uses by clicking on the "Data Access Waterbody Data (Aquatic Life and Swimming Uses)" link for any assessment unit.

How are assessments coded in the report card?

Assessment outcomes are displayed on a color scale as well as an alpha numeric scale that provides additional distinctions for the designated use and parameter level assessments as outlined in the table below.

Category	Description	Severe	Poor	Likely Bad	No Data	Likely Good	Marginal	Good
		Not Supporting, Severe	Not Supporting, Marginal	Insufficient Information – Potentially Not Supporting	No Data	Insufficient Information – Potentially Full Supporting	Full Support, Marginal	Full Support, Good
Category 2	Meets standards						2-M or 2-OBS	2-G
Category 3	Insufficient Information			3-PNS	3-ND	3-PAS		
Category 4A	Does not Meet Standards; TMDL* Completed	4A-P	4A-M or 4A-T					
Category 4B	Does not Meet Standards; Other enforceable measure will correct the issue.	4B-P	4B-M or 4B-T					
Category 4C	Does not Meet Standards; Non-pollutant (i.e. exotic weeds)	4C-P	4C-M					
Category 5	Does not Meet Standards; TMDL* Needed	5-P	5-M or 5-T					
Category 5R	Does not Meet Standards; An EPA-approved alternative plan has been completed	5R-P	5R-M					

* TMDL stands for Total Maximum Daily Load studies

Watershed 305(b) Assessment Summary Report:

Assessment Cycle: 2024

HUC 12: 010600030608

HUC 12 Name: Lower Cocheco River

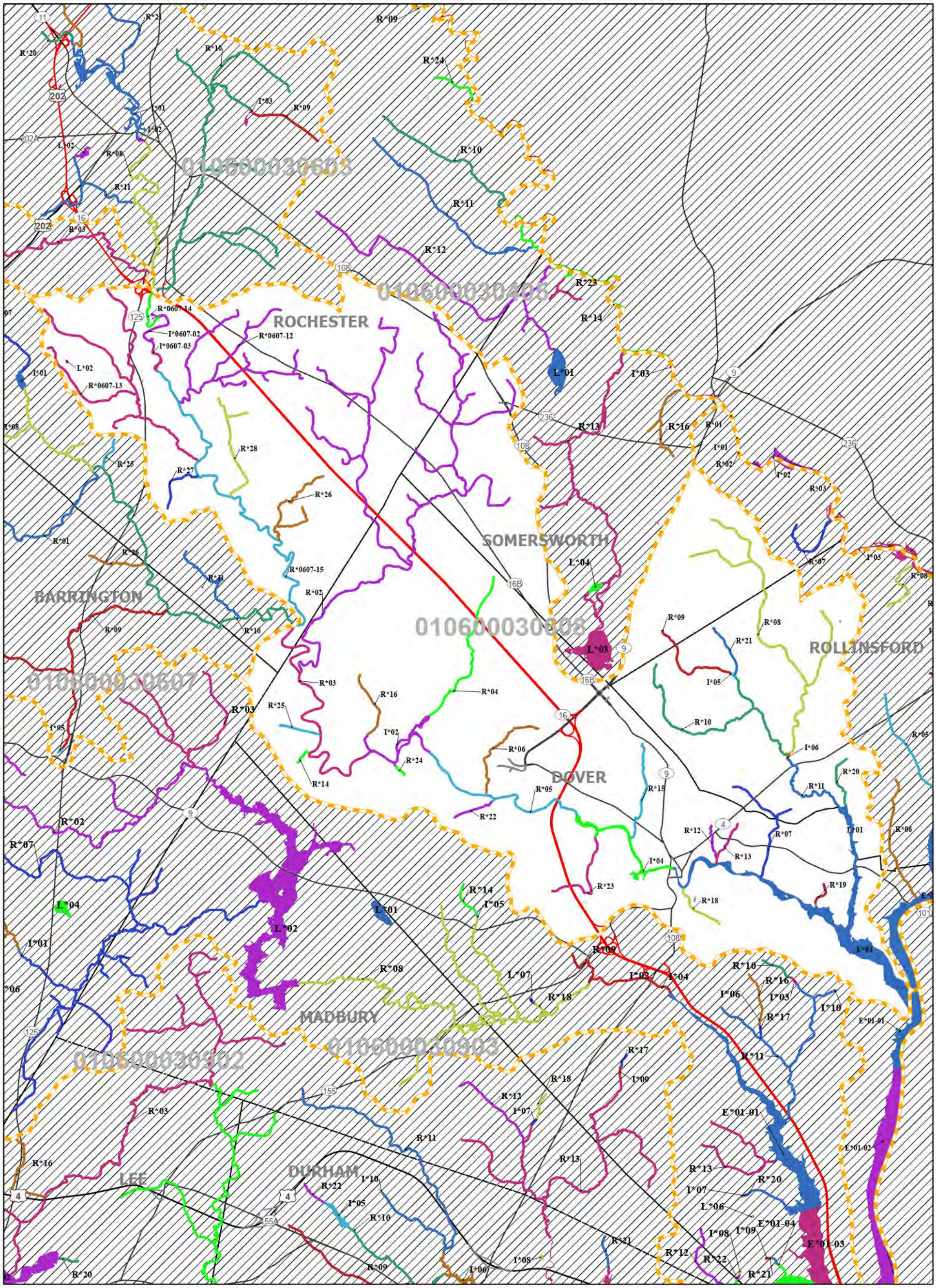
(Locator map on next page only applies to this HUC12)

Good	Meets water quality standards/thresholds by a relatively large margin.
Marginal	Meets water quality standards/thresholds but only marginally.
Likely Good	Limited data available, however, the data that is available suggests that the parameter is Potentially Attaining Standards (PAS).
No Current Data	Insufficient information to make an assessment decision.
Likely Bad	Limited data available, however, the data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.
Poor	Not meeting water quality standards/thresholds. The impairment is marginal.
Severe	Not meeting water quality standards/thresholds. The impairment is more severe and causes poor water quality.

Assessment Unit ID	Map Label	Assessment Unit Name	Aquatic Life	Fish Consump.	Swimming	Boating
NHEST600030608-01	E*01	Cocheco River		5-M	5-P	4A-M
NHIMP600030607-02	I*0607-02	Cocheco River - Gonic Dam Pond	5-M	4A-M	4A-P	2-G
NHIMP600030607-03	I*0607-03	Cocheco River - Mill Pond Dam	3-PNS	4A-M	3-ND	3-ND
NHIMP600030608-02	I*02	Cocheco River - Watson Waldron Dam	5-M	4A-M	3-ND	3-ND
NHIMP600030608-04	I*04	Cocheco River - Central Ave Dam	5-M	4A-M	3-PAS	3-ND
NHIMP600030608-05	I*05	Conservation Pond Dam	3-ND	4A-M	3-ND	3-ND
NHIMP600030608-06	I*06	Fresh Creek - Farm Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030608-01	L*01	Fresh Creek Pond	5-M	4A-M	4A-P	3-ND
NHLAK600030608-02	L*02	Unnamed Pond	3-ND	4A-M	3-ND	3-ND
NHRIV600030607-12	R*0607-12	Unnamed Tributary - To Cocheco River	3-ND	4A-M	3-ND	3-ND
NHRIV600030607-13	R*0607-13	Unnamed Brook - To Cocheco River	3-ND	4A-M	3-ND	3-ND

NHRIV600030607-14	R*0607-14	Cocheco River	3-ND	4A-M	3-ND	3-ND
NHRIV600030607-15	R*0607-15	Cocheco River	5-M	4A-M	3-ND	3-ND
NHRIV600030608-02	R*02	Blackwater Brook-Clark Brook	3-ND	4A-M	4A-P	3-ND
NHRIV600030608-03	R*03	Cocheco River - Unnamed Brook	5-M	4A-M	4A-M	3-ND
NHRIV600030608-04	R*04	Reyners Brook	3-ND	4A-M	4A-P	3-ND
NHRIV600030608-05	R*05	Cocheco River	5-M	4A-M	4A-M	3-ND
NHRIV600030608-06	R*06	Indian Brook	5-P	4A-M	4A-P	3-ND
NHRIV600030608-07	R*07	Emerson Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-08	R*08	Fresh Creek - Twombly Brook	5-P	4A-M	4A-M	3-ND
NHRIV600030608-09	R*09	Unnamed Brook - Rollins Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-10	R*10	Rollins Brook	5-P	4A-M	4A-P	3-ND
NHRIV600030608-11	R*11	Fresh Creek	3-PNS	4A-M	4A-P	4A-M
NHRIV600030608-12	R*12	Unnamed Tributary - To Cocheco River (Dover (Downstream Of Portland Ave))	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-13	R*13	Unnamed Tributary - To Cocheco River - (Dover (Upstream Of Atlantic Ave))	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-14	R*14	Unnamed Trib. To Cocheco River, Dover (From Landfill)	5-M	4A-M	3-ND	3-ND
NHRIV600030608-15	R*15	Berry Brook	5-M	4A-M	4A-P	3-ND
NHRIV600030608-16	R*16	Jackson Brook	3-ND	4A-M	4A-P	3-ND
NHRIV600030608-18	R*18	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-19	R*19	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-20	R*20	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-21	R*21	Unnamed Brook - To Rollins Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-22	R*22	Horn Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-23	R*23	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-24	R*24	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-25	R*25	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-26	R*26	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-27	R*27	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030608-28	R*28	Unnamed Brook	3-ND	4A-M	3-ND	3-ND

AUIDs For HUC12: 010600030608 - Lower Cocheco River



Assessment Unit IDs are derived from the HUC12 they reside within. The labels have been shortened on this map for presentation purposes.
Example: the Label "L*03" in HUC12 = 010700060201 represents AUID = "NHLAK700060201-03"
In rare cases where an AUID extends beyond the boundary of a single HUC12, additional portions of the end of the HUC 12 number have also been replaced.

S:\WD-Watershed\WQ_Planning\305b_303d\2024\Report_Cards\HUC12_maps

Assessment Unit ID: NHIMP600030608-04
Assessment Unit Name: Cocheco River - Central Ave Dam
Town(s) Primary Town is Listed First: Dover

Size: 20 ACRES
Assessment Unit Category: 5-M
Beach: N

2024, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	5-M	ALKALINITY, CARBONATE AS CACO3	N	1999	1999	3-ND	
		ALUMINUM	N	2007	1999	3-ND	
		AMMONIA (TOTAL)	N	2021	2000	2-G	
		ARSENIC	N	2004	N/A	3-ND	
		CADMIUM	N	1999	1999	3-ND	
		CHLORIDE	N	2021	N/A	3-PAS	
		COPPER	N	1999	1998	3-ND	
		Chlorophyll-a	N	2019	NLV	No Stnd	
		DISSOLVED OXYGEN SATURATION	N	2021	2016	3-PAS	
		IRON	N	2004	N/A	3-ND	
		LEAD	N	1999	1999	3-ND	
		OXYGEN, DISSOLVED	N	2021	2016	3-PAS	
		PH	N	2021	2019	5-M	LOW
		TURBIDITY	N	2021	2004	3-PAS	
		ZINC	N	1999	N/A	3-ND	
Fish Consumption	4A-M	ARSENIC	N	2004	2004	3-ND	

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

Fish Consumption	4A-M	COPPER	N	1999	N/A	3-ND	
		MERCURY - FISH CONSUMPTION ADVISORY	N			4A-M	
		ZINC	N	1999	N/A	3-ND	
Potential Drinking Water Supply	2-G	ARSENIC	N	2004	2004	3-ND	
		COPPER	N	1999	N/A	3-ND	
		ESCHERICHIA COLI	N	2013	2013	3-ND	
		FECAL COLIFORM	N	1993	1993	3-ND	
		IRON	N	2004	2004	3-ND	
		ZINC	N	1999	N/A	3-ND	
Primary Contact Recreation	3-PAS	CHLOROPHYLL-A	N	2019	2002	3-PAS	
		ESCHERICHIA COLI	N	2013	2011	3-ND	
Secondary Contact Recreation	3-ND	ESCHERICHIA COLI	N	2013	N/A	3-ND	
Wildlife	3-ND						

Good	**Marginal**	**Likely Good**	**No Current Data**	**Likely Bad**	**Poor**	**Severe**
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

SWPPP Cut Sheet:

Filtrexx® Inlet Protection

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Inlet protection is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for storm drain **inlet protection** of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons) on and around construction activities.

APPLICATION

Drain inlets are located in areas that receive runoff from surrounding lands, often exposed and disturbed soils, and are located at a low point, or in a sump. Inlet protection used around drain inlets (or *Drain* Inlet protection) should completely enclose the circumference of the drain and where possible should not be placed on a grade or slope. Inlet protection used around drain inlets should never be the only form of site sediment control and should be accompanied by erosion control/slope stabilization practices, such as Slope protection or rolled erosion control blankets (RECB). Inlet protection should never be placed where they divert runoff flow from the drain inlet, or on top of the inlet, which can cause flooding. Under high runoff and sediment loading conditions placement of 1-2 in (25-50 mm) diameter rock (AASHTO #2) may be placed around the outer circumference of the Inlet protection up to ½ the height of the Inlet protection. This will slow runoff velocity as it contacts the Inlet protection and will reduce sediment build-up and clogging of the Inlet protection.

Curb inlets are generally located on paved surfaces and are designed to rapidly drain storm runoff from roadways to prevent flooding that poses a hazard to vehicular traffic. Inlet protection devices should be placed in a manner which intercepts runoff prior to entering the inlet, but does not block or divert runoff from the inlet. To prevent diversion of runoff, Inlet protection used around curbs (or *Curb* Inlet protection) should be used in low points, or sumps, and minor slopes or grades. Inlet protection should never be placed in or on the curb inlet drain, or placed in a manner than obstructs vehicular traffic. Inlet protection height should be at least 1 in (25 mm) lower than top of curb inlet to allow for overflow into the drain and not over the curb. Maximum sediment removal efficiency occurs when minor ponding exists behind Inlet protection but should never lead to flooding.

Curb sediment containment systems are used to reduce the sediment and pollutant load flowing to a curb inlet. They are generally placed on paved surfaces perpendicular to runoff flow and should be lower than the height of the curb. Curb sediment containment systems should never cause flooding or placed where they are a hazard to vehicular traffic. Inlet protection used for curb sediment containment (or *Curb Sediment Containment* Inlet protection) can be placed on a grade but should never be placed directly upslope from curb inlet where it may inadvertently divert runoff from entering curb inlet.

INSTALLATION

1. Inlet protection used for inlet protection to reduce sediment and soluble pollutants entering storm drains shall meet Filtrexx® FilterSoxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be a Filtrexx® Certified™ Installer as determined by Filtrexx® International, LLC (440-926-2607 or visit web site at Filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application (current list of installers can be found at www.filtrexx.com). Look for the Filtrexx® Certified™ Installer Seal.

3. Filtrexx® Inlet protection shall be placed at locations indicated on plans as directed by the Engineer. Inlet protection should be installed in a pattern that allows complete protection of the inlet area.
4. Installation of curb Inlet protection will ensure a minimal overlap of at least 1 ft (300mm) on either side of the opening being protected. The Inlet protection will be anchored to the soil behind the curb using staples, stakes or other devices capable of holding the Inlet protection in place.
5. Standard Inlet protection for curb inlet protection and curb sediment containment will use 8 in (200mm) diameter Inlet protection, and drain inlets on soil will use 12 in (300mm) or 18 in (450mm) diameter Inlet protection. In severe flow situations, larger Inlet protection may be specified by the Engineer. During curb installation, Inlet protection shall be compacted to be slightly shorter than curb height.
6. If Inlet protection becomes clogged with debris and sediment, they shall be maintained so as to assure proper drainage and water flow into the storm drain. In severe storm events, overflow of the Inlet protection may be acceptable in order to keep the area from flooding.
7. Curb and drain Inlet protection shall be positioned so as to provide a permeable physical barrier to the drain itself, allowing sediment to collect on the outside of the Inlet protection.
8. For drains and inlets that have only curb cuts, without street grates, a spacer is required in order to keep the Inlet protection away from the drain opening. This spacer should be a hog wire screen bent to overlap the grate opening and keep the sock from falling into the opening. Use at least one spacer for every 4 ft (1.2m) of curb drain opening. The wire grid also prevents other floatable waste from passing over the Inlet protection.
9. Stakes shall be installed through the middle of the drain Inlet protection on 5 ft (1.5m) centers, using 2 in (50mm) x 2 in (50mm) x 3 ft (1m) wood stakes.
10. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Inlet protection should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Inlet protection may be required or sediment removal may be necessary. Inlet protection shall be inspected until contributing drainage area has been permanently stabilized and construction activity has ceased

1. The Contractor shall maintain the Inlet protection in a functional condition at all times and it shall be routinely inspected.
2. If the Inlet protection has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Inlet protection when accumulation has reached 1/2 of the effective height of the Inlet protection, or as directed by the Engineer. Alternatively, for drain Inlet protection a new Soxx™ may be placed on top of the original increasing the sediment storage capacity without soil disturbance.
4. Inlet protection shall be maintained until disturbed area above or around the device has been permanently stabilized and construction activity has ceased.
5. Regular maintenance includes lifting the Inlet protection and cleaning around and under them as sediment collects.
6. The FilterMedia™ will be removed from paved areas or dispersed on site soil or behind curb once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.

Table 2.4 Spacing for Curb Sediment Containment Systems.

Grade (%)	Spacing (ft)	Spacing (mm)
0.5	100	30
1.0	50	15
2.0	25	8
3.0	16	5
4.0	13	4
5.0	10	3

Source: Fifield, 2001.

Figure 2.1. Engineering Design Drawing for Curb and Drain Inlet Protection

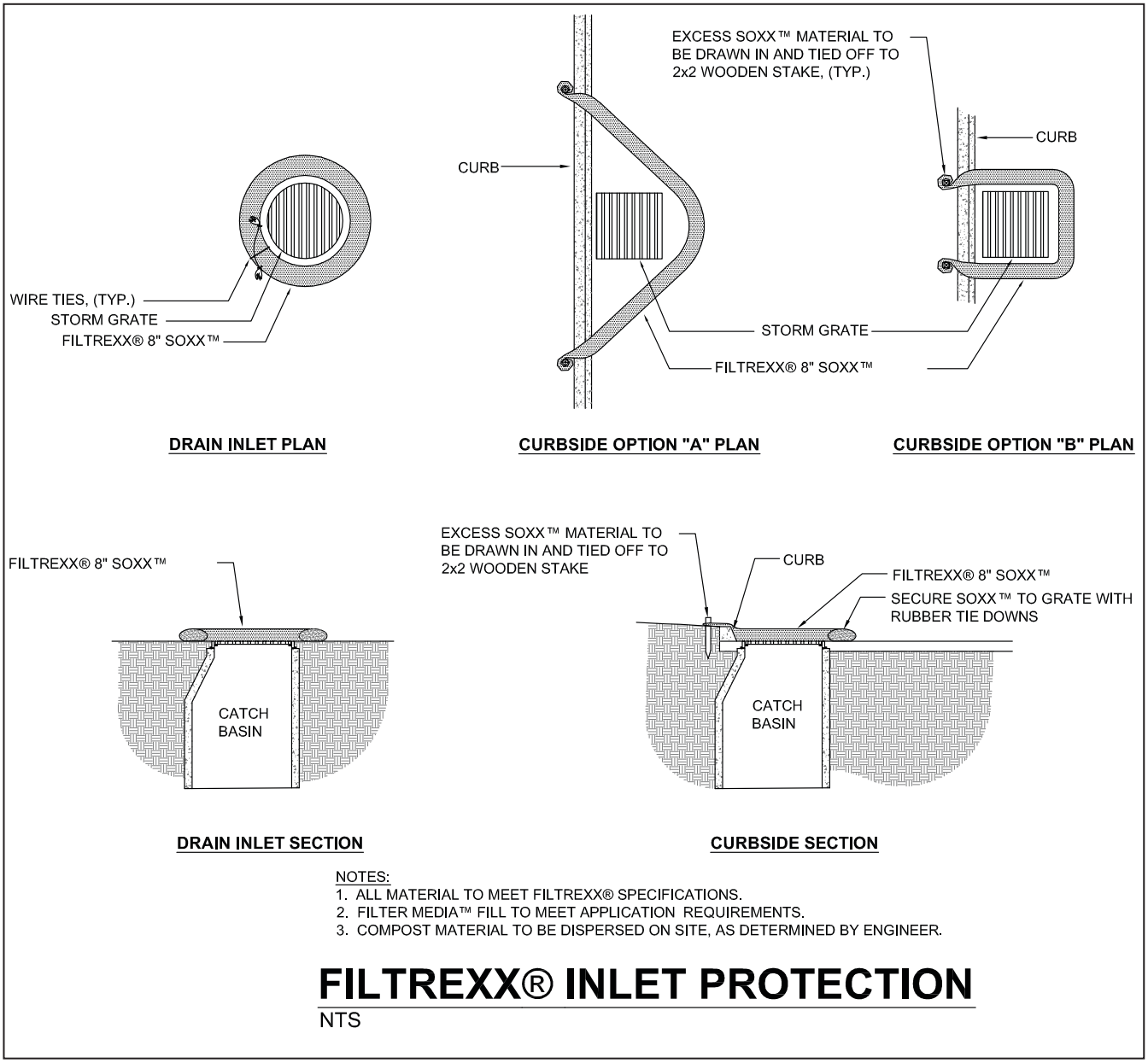
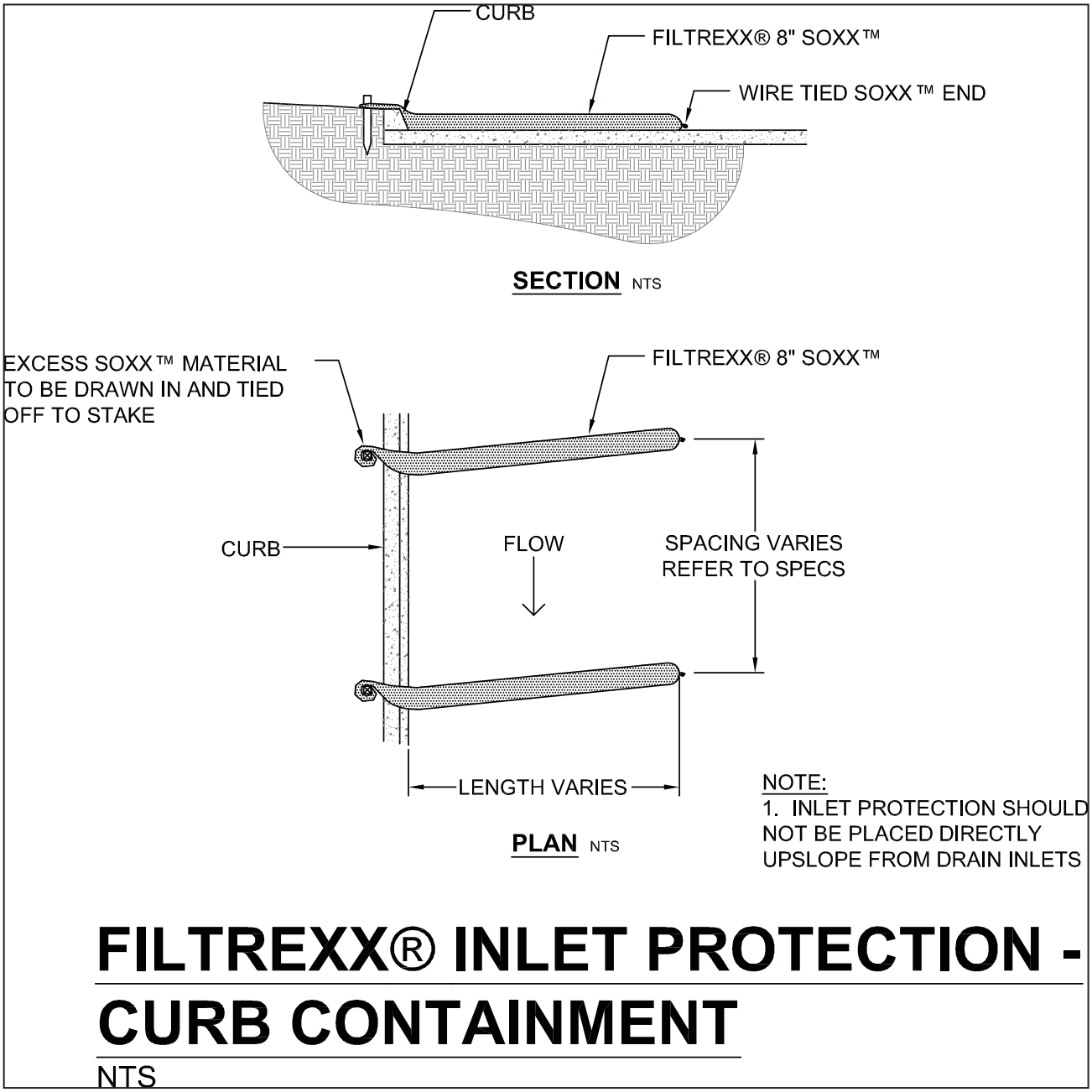


Figure 2.2. Engineering Design Drawing for Curb Sediment Containment Inlet Protection



SWPPP Cut Sheet:

Filtrexx® Sediment Control

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Sediment control is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for **perimeter control** of sediment and other soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.

APPLICATION

Filtrexx® Sediment control is to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. Sediment control is effective when installed perpendicular to sheet or low concentrated flow. Acceptable applications include:

- Site perimeters
- Above and below disturbed areas subject to sheet runoff, interrill and rill erosion
- Above and below exposed and erodable slopes
- Around area drains or inlets located in a 'sump'
- On compacted soils where trenching of silt fence is difficult or impossible
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation.
- On frozen ground where trenching of silt fence is impossible.
- On paved surfaces where trenching of silt fence is impossible.

INSTALLATION

1. Sediment control used for perimeter control of sediment and soluble pollutants in storm runoff shall meet Filtrexx® Soxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be Filtrexx® Certified™, or use pre-filled Filtrexx® Sediment control products manufactured by a Filtrexx® Certified Manufacturer™ as determined by Filtrexx® International, LLC (440-926-2607 or visit www.filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application. Look for the Filtrexx® Certified™ Seal.
3. Sediment control will be placed at locations indicated on plans as directed by the Engineer.
4. Sediment control should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second Sediment control shall be constructed at the top of the slope.
5. Effective Soxx™ height in the field should be as follows: 8" Diameter Sediment control = 6.5" high, 12" Diameter Sediment control = 9.5" high, 18" Diameter SiltSoxx™ = 14.5" high, 24" Diameter Sediment control = 19" high.
6. Stakes shall be installed through the middle of the Sediment control on 10 ft (3m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) hard wood stakes. In the event staking is not possible, i.e., when Sediment control is used on pavement, heavy concrete blocks shall be used behind the Sediment control to help stabilize during rainfall/runoff events.
7. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
8. Loose compost may be backfilled along the upslope side of the Sediment control, filling the seam between the soil surface and the device, improving filtration and sediment retention.
9. If the Sediment control is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for

establishment of permanent vegetation. The Engineer will specify seed requirements.

10. Filtrexx® Sediment control is not to be used in perennial, ephemeral, or intermittent streams.

See design drawing schematic for correct Filtrexx® Sediment control installation (Figure 1.1).

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Sediment control should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Sediment control may be required to reduce effective slope length or sediment removal may be necessary. Sediment control shall be inspected until area above has been permanently stabilized and construction activity has ceased

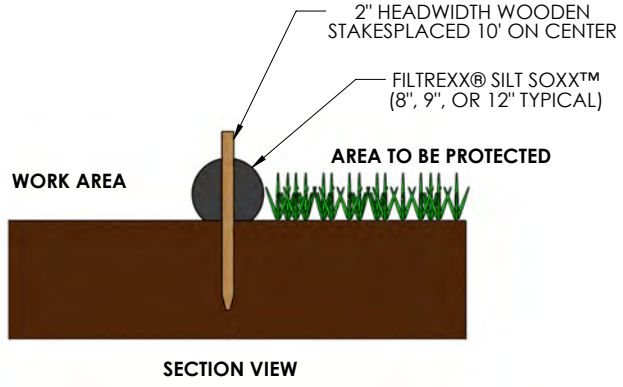
1. The Contractor shall maintain the Sediment control in a functional condition at all times and it shall be routinely inspected.
2. If the Sediment control has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Sediment control when accumulation has reached 1/2 of the effective height of the Sediment control, or as directed by the Engineer. Alternatively, a new Sediment control can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.
4. Sediment control shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
5. The FilterMedia™ will be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
6. For long-term sediment and pollution control applications, Sediment control can be seeded at the time of installation to create a vegetative filtering system for prolonged and increased filtration of sediment and soluble pollutants (contained vegetative filter strip). The appropriate seed mix shall be determined by the Engineer.

Slope Percent	Maximum Slope Length Above Sediment Control in Feet (meters)*				
	8 in (200 mm) Sediment control	12 in (300 mm) Sediment control	18 in (450 mm) Sediment control	24 in (600mm) Sediment control	32 in (800mm) Sediment control
	6.5 in (160 mm)**	9.5 in (240 mm) **	14.5 in (360 mm) **	19 in (480 mm) **	26 in (650 mm) **
2 (or less)	600 (180)	750 (225)	1000 (300)	1300 (400)	1650 (500)
5	400 (120)	500 (150)	550 (165)	650 (200)	750 (225)
10	200 (60)	250 (75)	300 (90)	400 (120)	500 (150)
15	140 (40)	170 (50)	200 (60)	325 (100)	450 (140)
20	100 (30)	125 (38)	140 (42)	260 (80)	400 (120)
25	80 (24)	100 (30)	110 (33)	200 (60)	275 (85)
30	60 (18)	75 (23)	90 (27)	130 (40)	200 (60)
35	60 (18)	75 (23)	80 (24)	115 (35)	150 (45)
40	60 (18)	75 (23)	80 (24)	100 (30)	125 (38)
45	40 (12)	50 (15)	60 (18)	80 (24)	100 (30)
50	40 (12)	50 (15)	55 (17)	65 (20)	75 (23)

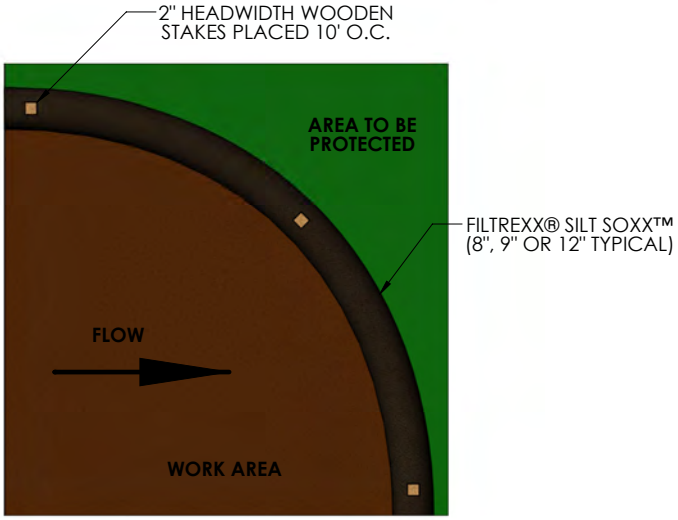
* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event.

** Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

FILTREXX® SILT SOXX™

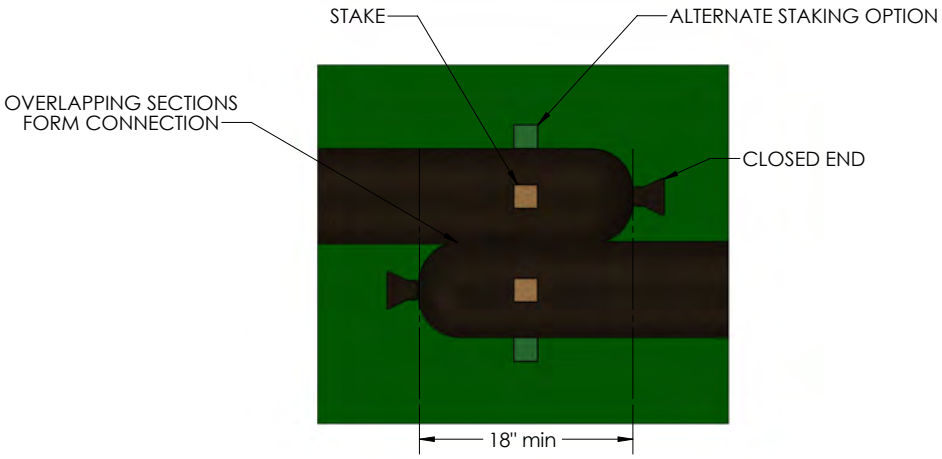


SECTION VIEW

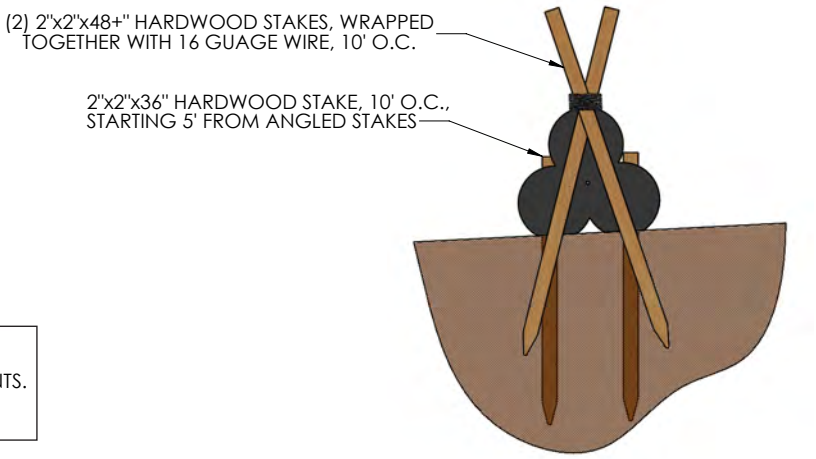


TOP VIEW

COMPOST SOCK CONNECTION/ATTACHMENT DETAIL



FILTREXX® PYRAMID STAKING DETAIL



NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) COMBINED LOT AREA PARCEL #1 & #2: 163,417 Sq. Ft., 3.75 Ac

4.) THE INTENT OF THIS PLAN IS SHOW THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES.

EROSION & EROSION CONTROL NOTES:

1.) CONTRACTOR IS TO INSTALL A CONSTRUCTION ENTRANCE PRIOR TO EARTH DISTURBING ACTIVITIES, UTILIZING 3" ANGULAR STONE UNDERLAID WITH ENGINEER FABRIC.

2.) CONTRACTOR IS RESPONSIBLE FOR SWEEPING THE PARKING LOT, SIDEWALKS AND ROADWAY, TO ENSURE THAT NO SEDIMENT IS BEING TRACKED ONTO SIXTH STREET OR THE SURROUNDING ROADWAYS.

3.) CONTRACTOR IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE INLET PROTECTION ONCE INSTALLED.

4.) FUGITIVE DUST IS TO BE CONTROLLED THROUGHOUT THE CONSTRUCTION PROCESS IN ACCORDANCE WITH ENV-A 1000. CALCIUM CHLORIDE SHALL NOT BE USED FOR DUST CONTROL AS THIS IS IN THE SECONDARY GROUNDWATER PROTECTION ZONE,

5.) CONTRACTOR IS TO MEET THE REQUIREMENTS SPECIFIED IN RSA 430:51-57 AND AGR 3800, RELATING TO INVASIVE SPECIES.

6.) CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE WATER QUALITY FROM ANY RUN OFF DURING THE CONSTRUCTION PROCESS, IN ACCORDANCE WITH ENV-WQ 1507, IN ORDER TO PREVENT VIOLATIONS OF THE STORM WATER QUALITY STANDARDS.

7.) CONTRACTOR MAY USE SILT FENCE, SILT SOXX OR MULCH BERM FOR PERIMETER CONTROL. SPECIFIC PRACTICES MAY BE SPECIFIED, SEE PLAN. THE CONTRACTOR IS NOT THE EXPAND CONSTRUCTION BEYOND THE STAKED OUT LIMITS.

8.) ALL STORAGE FACILITIES FOR FUEL, CHEMICALS, CHEMICAL OR INDUSTRIAL WASTES, AND BIODEGRADABLE RAW MATERIALS SHALL MEET THE REGULATIONS OF THE NHDES, INCLUDING BUT NOT LIMITED TO THOSE INVOLVING UNDERGROUND STORAGE TANKS, ABOVE GROUND STORAGE TANKS, HAZARDOUS WASTE AND BEST MANAGEMENT PRACTICES FOR GROUND WATER PROTECTION (PART ENV-WQ 401).

9.) ALL DEVELOPMENT MUST COMPLY WITH THE EPA PHASE II STORMWATER RULES AND THE CITY'S MS4 PERMIT, AS AMENDED.

10.) CITY OF DOVER: IN ACCORDANCE WITH SITE PLAN REVIEW REGULATIONS (153-14) THE FOLLOWING STORMWATER MEASURES ARE REQUIRED.

A.) ALL PROPOSED SCMs WILL CONFORM TO THE NH STORMWATER MANUAL (FEBRUARY 2025).

B.) EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SOIL LAND DISTURBANCE AND MUST BE REVIEWED AND APPROVED BY COMMUNITY SERVICE.

C.) TEMPORARY STABILIZATION MEASURES SHOULD BE IN PLACE WITHIN SEVEN CALENDAR DAYS FOR EXPOSED SOILS AREAS THAT ARE WITHIN ONE HUNDRED FEET OF A SURFACE WATER BODY OR A WETLAND AND NO MORE THAN 14 CALENDAR DAYS FOR ALL OTHER AREAS. PERMANENT STABILIZATION SHOULD BE IN PLACE WITHIN THREE CALENDAR DAYS FOLLOWING COMPLETION OF FINAL GRADING OF EXPOSED SOIL AREAS.

D.) ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED IN FUNCTIONING CONDITION UNTIL FINAL STABILIZATION IS ACCOMPLISHED. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. TRAPPED SEDIMENT AND OTHER DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN 30 CALENDAR DAYS UNLESS CONDITIONS DICTATE OTHERWISE.

E.) COMMUNITY SERVICES DEPARTMENT OR THEIR DESIGNATED AGENT SHALL HAVE ACCESS TO THE SITE TO COMPLETE ROUTINE INSPECTIONS AND SHALL BE NOTIFIED 24-HOURS PRIOR TO INSTALLATION OF A STORMWATER BMP IN ORDER TO SCHEDULE AN INSPECTION, DURING NORMAL WORKING HOURS.

F.) THE PLANNING BOARD OR COMMUNITY SERVICES MAY REQUIRE THE DESIGN ENGINEER AND/OR AN INDEPENDENT, THIRD-PARTY INSPECTION AND OVERSIGHT OF THE CONSTRUCTION OF STORMWATER MANAGEMENT FACILITIES AND EROSION AND SEDIMENT CONTROL AT THEIR DISCRETION. THE OWNER / APPLICANT IS RESPONSIBLE FOR ALL FEES ASSOCIATED WITH INSPECTIONS.

G.) ALL SWPPP/SWMP INSPECTIONS MUST BE CONDUCTED BY A QUALIFIED PROFESSIONAL SUCH AS A PROFESSIONAL ENGINEER (PE), A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), A CERTIFIED EROSION SEDIMENT AND STORMWATER INSPECTOR (CESSW), OR A CERTIFIED PROFESSIONAL IN STORMWATER QUALITY (CPSWQ). INSPECTION REPORTS WILL BE SUBMITTED TO THE COMMUNITY SERVICES DEPARTMENT.

H.) THE OWNER IS ULTIMATELY RESPONSIBLE FOR THE INSTALLATION, CONSTRUCTION, INSPECTION, AND DISPOSITION OF ALL STORMWATER MANAGEMENT AND EROSION CONTROL MEASURES REQUIRED BY THE PROVISIONS OF THESE REGULATIONS.

I.) STORMWATER MANAGEMENT PLAN (SWMP) SUBMITTAL REQUIREMENTS. AT THE DISCRETION OF THE PLANNING BOARD OR COMMUNITY SERVICES DEPARTMENT, A TECHNICAL REVIEW BY AN INDEPENDENT THIRD PARTY MAY BE REQUIRED OF ANY SWMP PREPARED UNDER THESE REGULATIONS. SUCH A REVIEW SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL CONSULTANT AND THE EXPENSE OF WHICH SHALL BE THE FULL RESPONSIBILITY OF THE OWNER/APPLICANT.

SOILS & DEWATERING:

26	*WINDSOR*	*FINE SANDY LOAM*	*K= 0.17*
32	*BOXFORD*	*SILT LOAM*	*K= 0.49*
238	*ELMRIDGE*	*FINE SANDY LOAM*	*K= 0.48*
327	*WINDSOR (CLAY SUBSOIL)*	*LOAMY SAND*	*K= 0.48*
S00	*UDORTHENTS (LOAMY)*	*SANDY LOAM*	*K= 0.48*
953	*BOXFORD (SOMEWHAT POORLY DRAINED)*	*SILT LOAM*	*K= 0.49*

SEE SITE SPECIFIC SOILS MAP (SSSM)
SEE WEBSOIL USDA-NRCS
ERODIBILITY FACTOR – K, CPESC MANUAL, ENVIROCERT INTERNATIONAL INC. &
ROCKINGHAM COUNTTY SOIL SURVEY, ROCKWEB SOIL ATTRIBUTES.

CONTRACTOR TO BE AWARE OF THE SOIL PROFILES AND ENSURE THAT PROPER EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE TAKEN AT ALL TIMES. ANY DEWATERING REQUIREMENTS IN NEW HAMPSHIRE REQUIRE SPECIAL PROVISIONS IN ACCORDANCE WITH THE "CLARIFICATION OF SECTION 9.1.2 (STATE OF NEW HAMPSHIRE CONDITIONS) AND OTHER NH SPECIFIC INFORMATION FOR THE U.S. EPA 2022 NPDES CONSTRUCTION GENERAL PERMIT (CGP)" DATED FEBRUARY 17, 2022 INCLUDED IN THE SWPPP.

COVER MANAGEMENT DURING CONSTRUCTION FOR EXPOSED SOIL WILL INCLUDE HAY / STRAW APPLIED AT A RATE OF 2.0 TONS PER ACRE, TEMPORARY SEEDING OF ANNUAL RYE GRASS, AND PERMANENT SEEDING AT THE EARLIES OPPORTUNITY. SEE ADDITIONAL REQUIREMENT FOR STABILIZATION ON THE EROSION AND SEDIMENT CONTROL DETAIL SHEETS, E-101 AND E-102.

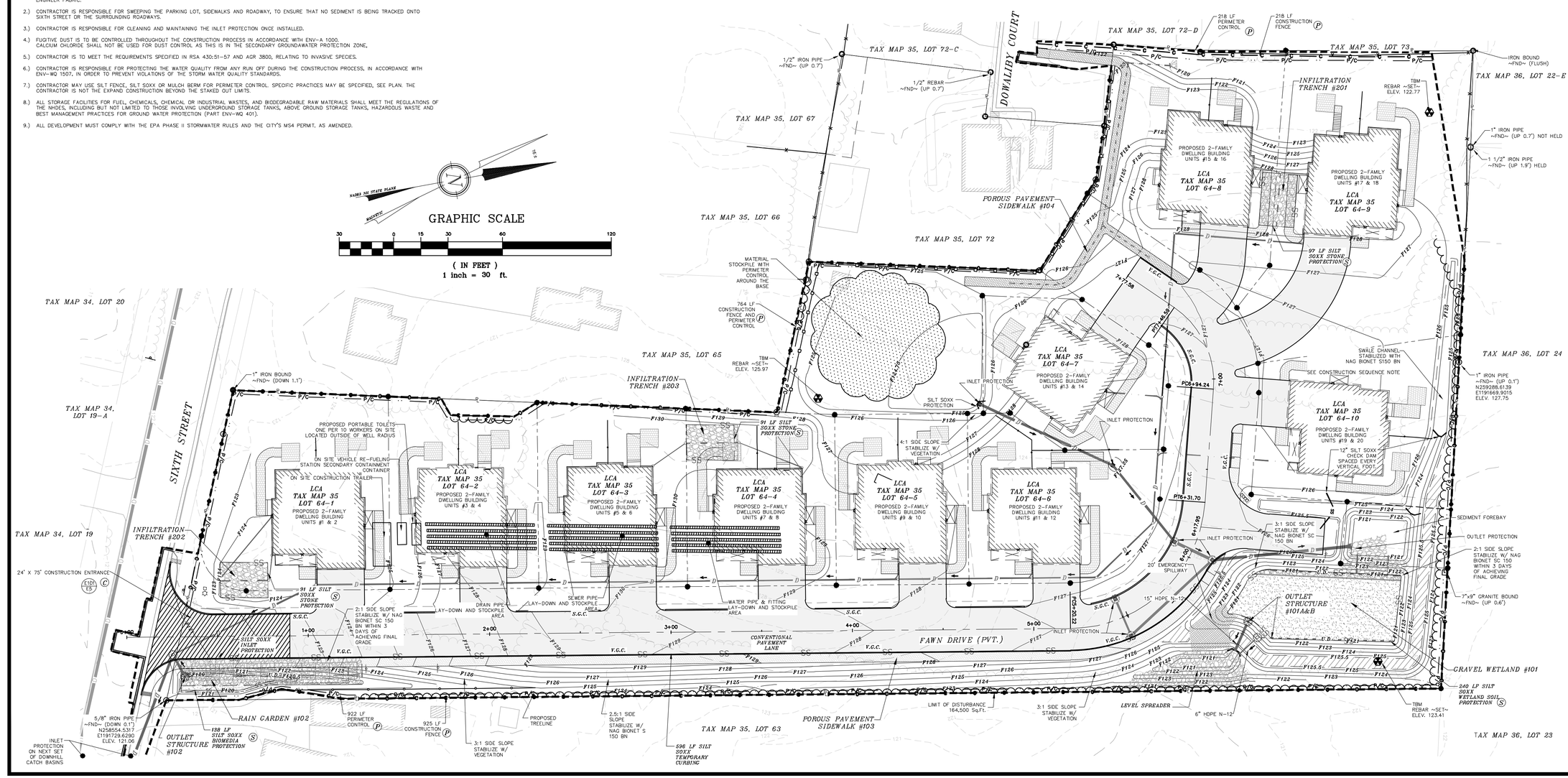
THE CONSTRUCTION SCHEDULE WILL BE MANAGED SO THAT ALL STORMWATER STRUCTURES WILL BE BUILT AND STABILIZED PRIOR TO RECEIVING SURFACE WATER RUNOFF. CONTRACTOR TO BE RESPONSIBLE FOR ALL DIVERSIONS DURING CONSTRUCTION AND FOR INTERIM SEDIMENT AND EROSION CONTROL MEASURES. SEE E&SC NOTES SHEET E-102

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- EXISTING/PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- DETAIL SHEET / DETAIL (E101 / E6)

LEGEND (CONTINUED):

- CONTOUR MINOR, EXISTING
- CONTOUR MAJOR, EXISTING
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- LIMIT OF PROJECT DISTURBANCE (164,500 Sq. Ft.)
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- SILT FENCE / EROSION MIX BERM
- FILTREXX 8" – 12" SILT SOXX AS SPECIFIED
- ORANGE CONSTRUCTION PERIMETER FENCE
- PERIMETER CONTROL
- (S) SCM PROTECTION
- (P) PERIMETER CONTROL
- (C) RESIDENTIAL/ROADWAY CONSTRUCTION



REVISION	DATE	DESCRIPTION

EROSION AND SEDIMENT CONTROL PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

SHEET 18 OF 39

NOT FOR CONSTRUCTION

20 UNIT, 2-FAMILY DWELLING
TRANSFER OF DEVELOPMENT RIGHTS (TDR) SITE PLAN
FOR
THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER, LLC
141 SIXTH STREET &
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, N.H.
TAX MAP 35, LOT 64 & 72

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SHEET 2 ~ PROJECT NOTES
SHEET 3 ~ EXISTING CONDITIONS PLAN
SHEET 4 ~ SITE SPECIFIC SOILS MAP
SHEET 5 ~ 20 UNIT, 2-FAMILY DWELLING TDR CONDOMINIUM PLAN*
SHEET 6 ~ OVERVIEW SITE PLAN
SHEETS 7&8 ~ DETAIL SITE PLANS
SHEET 9 ~ OVERVIEW GRADING & DRAINAGE PLAN
SHEETS 10-12 ~ GRADING PLAN & PROFILE SHEETS
SHEET 13 ~ P-101A GRAVEL WETLAND #101 PLAN
SHEET 14 ~ P-101B GRAVEL WETLAND #101 DETAILS
SHEET 15 ~ P-102A RAIN GARDEN W/ STORMTECH STORAGE #102 PLAN
SHEET 16 ~ P-102B RAIN GARDEN W/ STORMTECH STORAGE #102 DETAILS
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SHEET 19 ~ CROSS SECTIONS FAWN DRIVE 0+00-END & POROUS PRODUCT SPECIFICATIONS (P-103 & P-104)
SHEET 20 ~ OVERVIEW UTILITY PLAN
SHEETS 21&22 ~ FAWN DRIVE UTILITY PLAN & PROFILE SHEETS
SHEET 23 ~ LANDSCAPING PLAN
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SHEET 36 ~ L101-LANDSCAPING DETAILS
SHEET 37 ~ W101-WILDLIFE IDENTIFICATION PLAN
SHEET 38 ~ DOVER FIRE TRUCK ENTRANCE & EXIT MOVEMENTS
SHEET 39 ~ DOVER FIRE TRUCK TURNAROUND MOVEMENT

*DENOTES A PLAN IS TO BE RECORDED AT THE S.C.R.D.

OWNER: *"A"* RICHARDSON ESTATES OF DOVER, LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

"B" MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

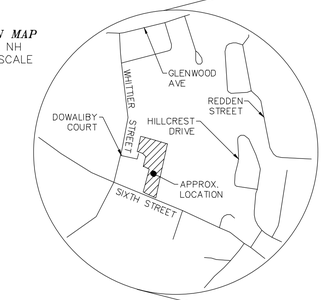
SURVEYOR OF RECORD: KENNETH A. BERRY, PE, LLS
CPSWQ, CPESC, CESSWI
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825
(603) 332-2863

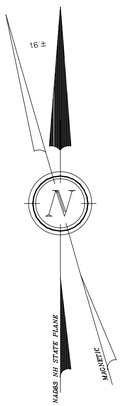
ENGINEER OF RECORD: KENNETH A. BERRY, PE, LLS
CPSWQ, CPESC, CESSWI
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825
(603) 332-2863

SOIL SCIENTIST: JOHN P. HAYES, III, CSS, CWS
7 LIMESTONE WAY
NORTH HAMPTON, NH 03862

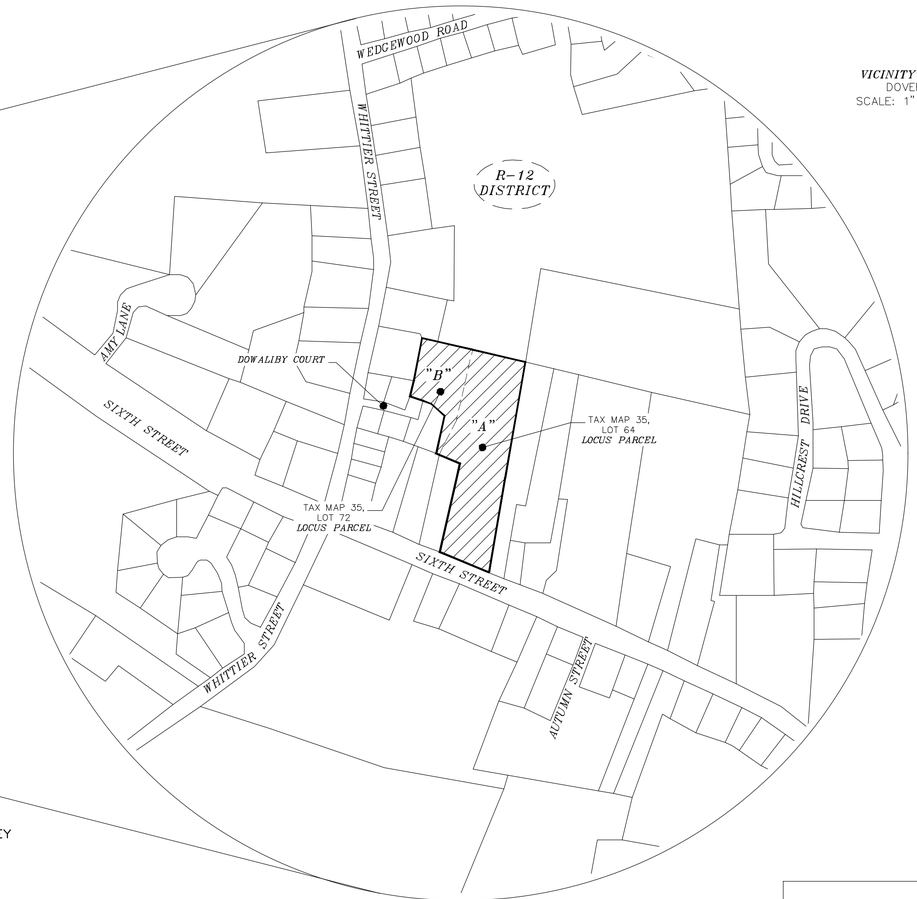
WETLAND SCIENTIST: DEIDRA L. BENJAMIN, CWS
100 LEAVITT ROAD
PITTSFIELD, NH 03263

LOCATION MAP
DOVER, NH
NOT TO SCALE





VICINITY SKETCH
DOVER, NH
SCALE: 1" = 250' ±



REQUIRED PERMITS:

~ NHDES SEWER DISCHARGE PERMIT	(PENDING)
~ NHDES ALTERATION OF TERRAIN PERMIT	(PENDING)
~ US EPA NOI & SWPPP	(PENDING)
~ NATURAL HERITAGE BUREAU	NHB25-1040
~ NH DIVISION OF HISTORICAL RESOURCES	DHR #10630

WILDLIFE PROTECTION NOTES (ENV-WQ 1504.17(a)):

1.) ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV, EMAIL SUBJECT LINE: NHB24-0747, 141 SIXTH STREET, WILDLIFE SPECIES OBSERVATION.

2.) PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHF&G IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION AS FEASIBLE.

3.) IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHF&G AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHF&G, IF ANY, TO ASSURE THE PROJECT DOES NOT APPRECIABLY JEOPARDIZE THE CONTINUED EXISTENCE OF THREATENED AND ENDANGERED SPECIES AS DEFINED IN FIS 1002.04

4.) THE NHF&G, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.

GENERAL PLAN SET NOTES:

1.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.

2.) ALL PLANS ARE CONSIDERED TO BE NOT FOR CONSTRUCTION UNLESS THEY CONTAIN THE APPROVAL STAMP OF THE CITY OF DOVER.

NOTE:

BERRY SURVEYING & ENGINEERING HAS PREPARED AN INSPECTION & MAINTENANCE MANUAL, DRAINAGE NARRATIVE, AND EROSION AND SEDIMENT CONTROL PLAN AS PART OF THIS PROJECTS DOCUMENTATION. THE DRAINAGE NARRATIVE AND SEDIMENT CONTROL PLAN PROVIDES NEW HAMPSHIRE STORMWATER MANUAL INFORMATION AND REQUIREMENTS FOR MEASURES TO BE INSTALLED ON SITE.

ALL USERS ARE BOUND TO THESE DOCUMENT AS PART OF THE APPROVAL OF THE PLANNING BOARD. COPIES OF THE YEARLY INSPECTIONS ARE TO BE DELIVERED TO THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT.

WHETHER OR NOT OTHERWISE EXPRESSLY RECITED ON THIS SITE PLAN, THE SITE PLAN APPROVAL GRANTED IS CONDITIONED ON FAITHFUL AND DILIGENT ADHERENCE BY THE OWNER/SUBDIVIDER/DEVELOPER OF ALL TERMS, CONDITIONS, PROVISIONS AND SPECIFICATIONS OF THE CITY OF DOVER LAND SITE PLAN REGULATIONS AS AMENDED OR AS MAY LATER BE AMENDED, IN EFFECT ON THE DATE OF APPROVAL, UNLESS OR EXCEPT INSOFAR AS EXPRESSLY WAIVED, IN ANY PARTICULAR, BELOW. NON - ADHERENCE MAY RESULT IN A REVOCATION OF APPROVAL. ANY VARIATION FROM THE APPROVED PLAN WILL REQUIRE A RESUBMISSION FOR SITE PLAN APPROVAL.

APPROVED DOVER

REVISION	DATE	DESCRIPTION

TRANSFER OF DEVELOPMENT RIGHTS SITE PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
JOHN P. HAYES III
No. 087
CERTIFIED SOIL SCIENTIST

STATE OF NEW HAMPSHIRE
DEIDRA L BENJAMIN
No. 295
CERTIFIED WETLAND SCIENTIST

STATE OF NEW HAMPSHIRE
No. 805
KENNETH A. BERRY
LICENSED LAND SURVEYOR
SIGNATURE

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

ABBREVIATION LEGEND:

E.O.P.	EDGE OF PAVEMENT
V.G.C.	VERTICAL GRANITE CURB
S.G.C.	SLOPED GRANITE CURB
BITUM.	BITUMINOUS
E.S.H.W.T.	ESTIMATED SEASONAL HIGH WATER TABLE
TYP.	TYPICAL
U.G.E	UNDER GROUND ELECTRIC / UTILITY
CLDI	CONCRETE LINED DUCTILE IRON
DI	DUCTILE IRON
U.D.	UNDER DRAIN
C.O.	CLEAN OUT
INV.	INVERT
ELEV.	ELEVATION
HDPE	HIGH DENSITY POLYETHYLENE
RCP	REINFORCED CONCRETE PIPE
RECB	ROLLED EROSION CONTROL BLANKET
F.P.	FINISHED GRADE
E.G.	EXISTING GRADE
E.T.W.	EDGE OF TRAVELED WAY
T.B.R.	TO BE REMOVED
PL	PROPERTY LINE
EL	EASEMENT LINE
CL	CENTER LINE
CF	CUBIC FEET
P.C.	POINT OF CURVATURE
P.T.	POINT OF TANGENCY
P.V.C.	POINT OF VERTICAL CURVE
P.V.I.	POINT OF VERTICAL INTERSECTION
P.V.T.	POINT OF VERTICAL TANGENCY
EX.	EXISTING
PROP.	PROPOSED
STA.	STATION
BMP	BEST MANAGEMENT PRACTICE
'/,	FEET / FEET
TP	TEST PIT
LCA	LIMITED COMMON AREA

{ } SSL ( ) ~ {SIZE} SINGLE SOLID LINE (COLOR W=WHITE, Y=YELLOW)
{ } DSL ( ) ~ {SIZE} DOUBLE SOLID LINE (COLOR W=WHITE, Y=YELLOW)
{ } SSB ( ) ~ {SIZE} SINGLE SOLID W/ BROKEN LINE (COLOR W=WHITE, Y=YELLOW)
{ } SBL ( ) ~ {SIZE} SINGLE BROKEN LINE (COLOR W=WHITE, Y=YELLOW)
{ } DBL ( ) ~ {SIZE} DOUBLE BROKEN LINE (COLOR W=WHITE, Y=YELLOW)

EXISTING LEGEND:

- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- TEMPORARY BENCHMARK (TBM)
- TEST PIT
- CURB STOP
- GATE VALVE
- FIRE HYDRANT
- CATCH BASIN
- DRAIN MANHOLE
- SEWER MANHOLE
- BzB NRCS SOIL LABEL
- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING DRAIN LINE
- OVERHEAD UTILITIES
- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- EXISTING TREELINE
- FND FOUND
- TYP TYPICAL
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- E175.31 EXISTING SPOT GRADE

LANDSCAPE LEGEND:

TREES:
- AR – 'OCTOBER GLORY' MAPLE
- PE – EXCLAMATION PLANETREE
- PM – DOUGLAS FIR

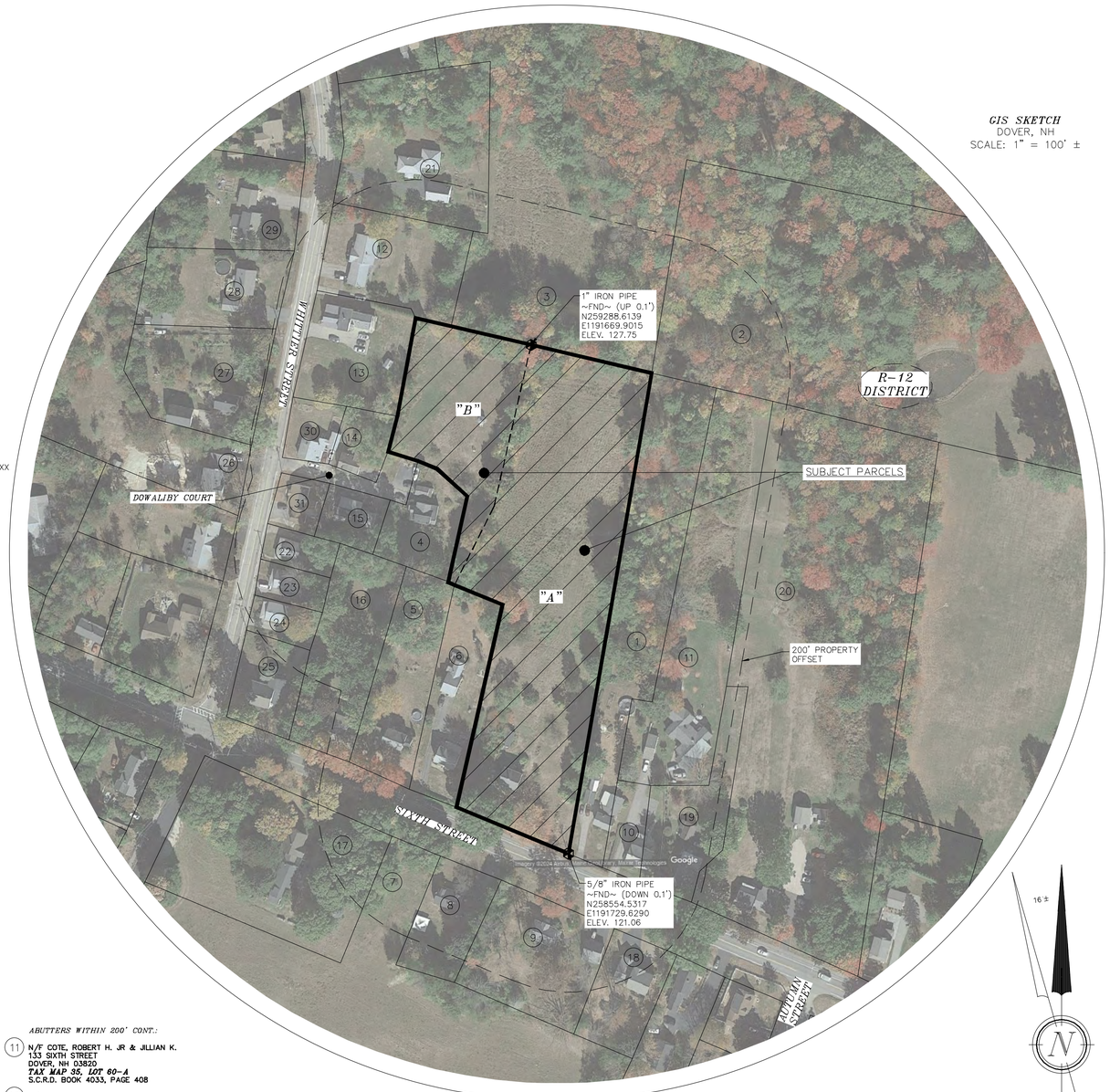
BUSHES:
- BW – BOXWOOD

PLANTS:
- HM – HYDRANGERA

GRASS:
- KF – FEATHER REED GRASS

PROPOSED LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- SEWER MANHOLE W/ STRUCTURE
- DRAIN MANHOLE W/ STRUCTURE
- CATCH BASIN W/ STRUCTURE
- E101 / E6 DETAIL SHEET / DETAIL
- GATE VALVE
- CURB STOP
- FIRE HYDRANT
- THRUST BLOCKS
- LIGHT TYPE "A" MOUNTED ON POLE
- LIGHT TYPE "B" MOUNTED ON POLE
- F175.31 PROPOSED SPOT GRADE
- FLOW ARROW
- PY76 CONTOUR MINOR, PROPOSED
- PY75 CONTOUR MAJOR, PROPOSED
- CENTER LINE
- GRAVEL SHOULDER
- PROPOSED LCA LINE
- PROPOSED EASEMENT
- PROPOSED TREELINE
- STOCKADE FENCE
- SPLIT RAIL FENCE
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED SEWER SERVICE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- PROPOSED UNDERGROUND UTILITY
- SOIL LINE
- LIMIT OF SOIL SURVEY
- 448A SOIL SERIES
- LIMIT OF PROJECT DISTURBANCE
- SILT FENCE / EROSION MIX BERM
- FILTREXX 8" – 12" SILT SOXX AS SPECIFIED
- ORANGE CONSTRUCTION PERIMETER FENCE
- PERIMETER CONTROL – MULCH BERM & SILT SOXX
- SCM PROTECTION / PERIMETER CONTROL / RESIDENTIAL/ROADWAY CONSTRUCTION
- SNOW STORAGE
- TRANSFORMER/CONCRETE PAD
- STORMWATER CONTROL MEASURE (SCM)
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT SIDEWALK
- STORMTECH CHAMBERS
- SCM OUTLET STRUCTURE
- RIP RAP
- BERM



ABUTTERS WITHIN 200':

1. N/F RUEL FAMILY REV. TRUST
RUEL, GEORGE A. & JACQUELINE L. TRUSTEES
137 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 63
S.C.R.D. BOOK 2545, PAGE 750

2. N/F SNIPER HOLDINGS, LLC
35 BROADWAY
DOVER, NH 03820
TAX MAP 36, LOT 23
S.C.R.D. BOOK 4903, PAGE 386

3. N/F SNIPER HOLDINGS, LLC
35 BROADWAY
DOVER, NH 03820
TAX MAP 36, LOT 24
S.C.R.D. BOOK 4903, PAGE 386

4. N/F HAMCHA, MOHAMED & LISA K.
5 DOWALIBY CT.
DOVER, NH 03820
TAX MAP 35, LOT 72
S.C.R.D. BOOK 2717, PAGE 789

5. N/F FORD, DAVID & STRACUZZI, NENA
143 SIXTH ST
DOVER, NH 03820
TAX MAP 35, LOT 66
S.C.R.D. BOOK, 3058, PAGE 253

6. N/F TOMFORDE, CHAD G. & COLBY, CARRIE L.
141 1/2 SIXTH STREET
DOVER, NH 03820-2644
TAX MAP 35, LOT 65
S.C.R.D. BOOK 3783, PAGE 165

7. N/F LALIBERTE, JOAN M. TRUSTEE & EGAN, CORNELIA, EGAN, MICHAEL
150 SIXTH STREET
DOVER, NH 03820
TAX MAP 34, LOT 20
S.C.R.D. BOOK 4787, PAGE 683

8. N/F ROY, ADAM T. & KELSEY R.
142 SIXTH STREET
DOVER, NH 03820
TAX MAP 34, LOT 19-A
S.C.R.D. BOOK 4693, PAGE 263

9. N/F RINEHART, JACKSON
138 SIXTH STREET
DOVER, NH 03820
TAX MAP 34, LOT 19
S.C.R.D. BOOK, 5106, PAGE 997

10. N/F COTE, ROBERT H. JR & JILLIAN K.
133 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 62
S.C.R.D. BOOK 4817, PAGE 905

ABUTTERS WITHIN 200' CONT.:

11. N/F COTE, ROBERT H. JR & JILLIAN K.
133 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 60-A
S.C.R.D. BOOK 4033, PAGE 408

12. N/F BRENNAN, BERNARD C.
18 WHITTIER STREET
DOVER, NH 03820
TAX MAP 36, LOT 22-E
S.C.R.D. BOOK 5126, PAGE 25

13. N/F FIELD, KEIRSTAN & ENTRIKAN, ANDREW
20 WHITTIER STREET
DOVER, NH 03820
TAX MAP 35, LOT 73
S.C.R.D. BOOK 5123, PAGE 723

14. N/F NAWISH, SEAN & CHRISTIN
4 DOWALIBY CT.
DOVER, NH 03820
TAX MAP 35, LOT 72-D
S.C.R.D. BOOK 4603, PAGE 752

15. N/F GAULIN, ROBERT MARK TRUSTEE
THE ROBERT MARK GAULIN REV LIV TRUST
3 DOWALIBY CT.
DOVER, NH 03820
TAX MAP 35, LOT 72-C
S.C.R.D. BOOK 5079, PAGE 858

16. N/F WONG, ANDREW & GOLIA, JENNIFER A.
143 1/2 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 67
S.C.R.D. BOOK 4799, PAGE 625

ABUTTERS WITHIN 200' CONT.:

17. N/F EGAN, CORNELIA M. TRUSTEE
EGAN FAMILY REVOCABLE TRUST
150 SIXTH STREET
DOVER, NH 03820
TAX MAP 34, LOT 20-A
S.C.R.D. BOOK 4853, PAGE 610

18. N/F O'CONNOR, JEFFERY M. & RENEA A.
132 SIXTH STREET
DOVER, NH 03820
TAX MAP 34, LOT 19-1
S.C.R.D. BOOK 3648, PAGE 558

19. N/F LAROCHELLE, SHARON
131 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 60
S.C.R.D. BOOK 1157, PAGE 720

20. N/F GRAY, PAMELA & WALLACE
129 SIXTH STREET
DOVER, NH 03820
TAX MAP 35, LOT 61
S.C.R.D. BOOK 1058, PAGE 743

ABUTTERS WITHIN 200' CONT.:

21. N/F LEWIS, DOROTHY TRUSTEE
LEWIS, ROBERT & DOROTHY REV. LIV. TRUST
16 WHITTIER STREET
DOVER, NH 03820
TAX MAP 36, LOT 22
S.C.R.D. BOOK 3374, PAGE 979

22. N/F DANOWSKI, JOHN D.
14243 N 25TH AVE.
PHOENIX, AZ 85023-5908
TAX MAP E, LOT 71
S.C.R.D. BOOK 2220, PAGE 27

23. N/F FRYE, SHANNA
30 WHITTIER STREET
DOVER, NH 03820
TAX MAP 35, LOT 70
S.C.R.D. BOOK 4552, PAGE 621

24. N/F COLGAN, CAROL M.
32 WHITTIER STREET
DOVER, NH 03820
TAX MAP 35, LOT 69
S.C.R.D. BOOK 3833, PAGE 874

ABUTTERS WITHIN 200' CONT.:

25. N/F GOLICK, ALAN L. & THOMPSON, LISA K.
136 OLDFIELDS ROAD
SOUTH BERWICK, ME 03908
TAX MAP 35, LOT 68
S.C.R.D. BOOK 2007, PAGE 43

26. N/F ST. PETER, SARAH & JONES, RUSSELL
23 WHITTIER STREET
DOVER, NH 03820
TAX MAP E, LOT 72-1
S.C.R.D. BOOK 4744, PAGE 779

27. N/F WARNOCK, RUSSELL D. & AMY E.
21 WHITTIER STREET
DOVER, NH 03820
TAX MAP E, LOT 72
S.C.R.D. BOOK 4846, PAGE 659

28. N/F COUTURE, NANCY C. & ALAN P.
19 WHITTIER STREET
DOVER, NH 03820
TAX MAP E, LOT 72-C
S.C.R.D. BOOK 1808, PAGE 395

ABUTTERS WITHIN 200' CONT.:

29. N/F HASTINGS, NATHANIEL M. & JENNIFER K.
17 WHITTIER STREET
DOVER, NH 03820
TAX MAP E, LOT 72-A
S.C.R.D. BOOK 4152, PAGE 933

30. N/F HIBSCHWEILER RITA A TRUSTEE
HIBSCHWEILER RITA A REV. LIVING TRUST
24 WHITTIER STREET
DOVER, NH 03820
TAX MAP 35, LOT 72-A
S.C.R.D. BOOK 4618, PAGE 567

31. N/F MA, AMY & ALLEN, GAHEIN & MA, HENRY GAHGATE
26 WHITTIER STREET
DOVER, NH 03820
TAX MAP 35, LOT 72-B
S.C.R.D. BOOK 4444, PAGE 52

SIGN ID NUMBER	SIGN SIZE (WIDTH x HEIGHT)	SIGN	TEXT DIMENSIONS	NO. OF SIGNS	BACKGROUND	LEGEND	BORDER	POST SIZE & QUANTITY
R1-1	30"x30"	STOP	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	1	RED	WHITE	WHITE	SQUARE (1)
W14-2	12"X6"	NO OUTLET	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	1	YELLOW	BLACK	BLACK	U-CHANNEL (0)
R8-31	12"x18"	NO PARKING FIRE LANE	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	1	WHITE	RED	RED	SQUARE (1)
R2-1	24"x30"	SPEED LIMIT 25	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	1	WHITE	GREEN	GREEN	U-CHANNEL (1)
R7-3	12"x18"	NO PARKING THIS SIDE OF STREET	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	2	WHITE	RED	RED	U-CHANNEL (2)
	24"x12"	FAWN DRIVE PVT.	SEE STANDARD HIGHWAY SIGNS 2004 EDITION PUBLISHED BY USDOT – FHWA	1	GREEN	WHITE	WHITE	U-CHANNEL (0)

REVISION	DATE	DESCRIPTION

NEIGHBORHOOD PLAN
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED LAND SURVEYOR
SIGNATURE

STATE OF NEW HAMPSHIRE
No. 805
KENNETH A. BERRY
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825
DEWAYNE WATSON, MANAGING MEMBER

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820
MOHAMED HAMCHA
LISA K. HAMCHA

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABLE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063
ERIC L. JACKSON, MANAGING MEMBER

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12)
WITH MUNICIPAL WATER AND SEWER
SETBACKS:
SECONDARY GROUNDWATER RECHARGE OVERLAY (SGRO)
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MIN. LOT COVERAGE: 30% (20% MAX. COVERAGE DUE TO SGRO)

ZONING: TRANSFER OF DEVELOPMENT RIGHTS (TDR)
LOT SIZE: N/A Sq. Ft.
MIN. LOT COVERAGE: N/A

MINIMUM FRONTAGE: 40'	174.81' PROVIDED
ABUT A STREET SETBACK: 20'	24' PROVIDED
ABUT A SIDE LOT LINE: 10'	10' PROVIDED
ABUT A REAR LOT LINE: 30'	30' PROVIDED

4.) THE INTENT OF THIS PLAN IS TO SHOW A TRANSFER OF DEVELOPMENT RIGHTS (TDR) SITE PLAN ON TAX MAP 35, LOT 64 AND TAX MAP 35, LOT 72 LOCATED IN DOVER, N.H.

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS PROPERTY DOES NOT FALL WITHIN THE FLOOD PLAIN.
FLOOD HAZARD REF: FEMA, COMMUNITY #330145,
MAP #33017C0310E, DATED: SEPTEMBER 30, 2015.

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL DATUM BASED ON NAD83 STATE PLANE COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

7.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN AUGUST, 2024 WITH AN ERROR OF CLOSURE BETTER THAN 1 PART IN 10,000.

8.) ON-SITE TOPOGRAPHY PROVIDED IS DEMARCATED AT 1' INTERVALS, AND IS THE RESULT OF A FIELD SURVEY PERFORMED IN MAY AND JUNE, 2024. OFF-SITE TOPOGRAPHY IS SHOWN USING NH COASTAL 2019 DEM.

9.) THIS SITE IS SERVICED BY MUNICIPAL SEWER AND WATER.

10.) WETLANDS WERE DELINEATED BY DIEDRA BENJAMIN, CERTIFIED WETLANDS SCIENTIST, IN ACCORDANCE WITH CHAPTER 170-27.1 OF THE ZONING ORDINANCE, IN JUNE, 2024.
NO WETLANDS WERE FOUND ON SITE.

11.) AS-BUILT PLANS OF THE SUBDIVISION SHALL BE SUBMITTED ON PAPER AND IN DIGITAL FORMAT AUTOCAD DWG, AUTOCAD DXF OR ESRI FORMAT TO THE CITY OF DOVER ENGINEER'S OFFICE UPON COMPLETION OF PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E. DIGITAL FILES SHALL BE GEO-REFERENCED TO NEW HAMPSHIRE STATE PLANE COORDINATES NAD83 AND SHALL BE EXPRESSED IN FEET.

12.) THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE PROPOSED.

13.) ALL CONSTRUCTION SHALL CONFORM WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 2016" AND WITH THE CITY OF DOVER COMMUNITY SERVICES REGULATIONS AND STANDARD SPECIFICATION FOR CONSTRUCTION. THE MORE STRINGENT SPECIFICATION SHALL APPLY.

14.) ALL EROSION CONTROL NOTES SHALL INCLUDE PROVISIONS FOR CONSTRUCTION SEQUENCING, TEMPORARY EROSION CONTROL MEASURES, AND PERMANENT STANDARDS SUCH AS LOAM SPREAD RATE FOR DISTURBED AREAS, RATES OF LIME, TYPE AND RATES FOR FERTILIZER, AND SEED AND MULCH MIXTURE WITH RATES OF APPLICATION.

15.) THE LIMITS OF CONSTRUCTION DISTURBANCE THAT ARE LOCATED IN OR WITHIN THE 50 FT. OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR ANY EARTH DISTURBING ACTIVITY OCCURS: NO 50' BUFFERS ON SITE SO NOT APPLICABLE FOR THIS PROJECT.

16.) ALL TREATMENT SWALES TO BE CONSTRUCTED SHALL HAVE SOD BOTTOMS. (NOT APPLICABLE)

17.) A LETTER OF CREDIT FOR THE COST OF RE-VEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED, AND THE APPROVED CONSTRUCTION SIGN INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS. THE PROPOSED PROJECT WILL CONSIST OF ONE PHASE AND WILL DISTURB 164,500 Sq. Ft., 3.78 Ac. (SEE NOTE #40)

18.) A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND THE CITY ENGINEER SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.

19.) THE SITE CONSTRUCTION HOURS SHALL BE LIMITED TO SATURDAY 8AM-4PM, NO MONDAY-FRIDAY & NO SUNDAY, OR FEDERAL HOLIDAY HOURS. HOURS OF CONSTRUCTION SHALL BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. THE PROJECT SIGN SHALL INDICATE THE ROAD IS PROPOSED TO BE PRIVATE AND SHALL RECEIVE NO CITY SERVICES.

20.) BUILDING ADDRESSES SHALL BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.

21.) THE PROPOSED USE FOR THIS SITE WILL CONSIST OF THE CONSTRUCTION OF TEN (10) NEW 2-FAMILY DWELLINGS. THERE IS A TOTAL OF 60 BEDROOMS PROPOSED FOR THIS DEVELOPMENT.

22.) THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:

NHDES SEWER DISCHARGE PERMIT:	(PENDING)
US EPA NOTICE OF INTENT/SWPPP (NOI):	(PENDING)
NATURAL HERITAGE BUREAU:	(NHB25-1040)
NH DIVISION OF HISTORICAL RESOURCES:	(DHR #10830)

23.) COMMERCIAL VEHICLE ROUTE DURING CONSTRUCTION SHALL CONFORM TO DOVER CITY CODE OR BE COORDINATED WITH THE COMMUNITY SERVICES DIRECTOR.

24.) ANY RETAINING WALL TALLER THAN FOUR FEET (4') REQUIRES ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.

25.) ANY FENCE TALLER THAN SEVEN FEET (7') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.

26.) THE OWNER OF RECORD SHALL RECORD AT THE REGISTRY OF DEEDS DOCUMENTATION SUFFICIENT TO PROVIDE NOTICE TO ALL PERSONS/ENTITIES THAT MAY ACQUIRE ANY PROPERTY SUBJECT TO THE REQUIREMENTS AND RESPONSIBILITIES DESCRIBED IN THE APPROVED STORMWATER MANAGEMENT PLAN. THE NOTICE SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR RECORDING CONTAINED IN RSA 477 AND 478. THE NOTICE NEED NOT SET FORTH THE REQUIREMENTS AT LENGTH, SO LONG AS IT IS SUFFICIENT TO PROVIDE NOTICE TO PROSPECTIVE PURCHASERS TO THE REQUIREMENTS FOR MAINTENANCE AND REPORTING.

27.) FIRE DEPARTMENT ACCESS ROADS SHALL BE INSTALLED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRE APPARATUS IN ALL WEATHER CONDITIONS AT ALL TIMES.

28.) EXTERIOR LIGHTING SHALL BE CUT-OFF TYPE FIXTURES PER CHAPTER 153-14-E AND SHALL PROVIDE LIGHTING DIRECTED ON-SITE ONLY.

29.) APPROVED BACKFLOW PREVENTERS SHALL BE PROVIDED FOR DOMESTIC WATER LINES.

30.) SITE IS TO COMPLY WITH NFPA 1 CHAPTER 18 "AS APPLIABLE".

31.) FAWN DRIVE IS PROPOSED TO BE PRIVATE. REFER TO THE DEVELOPMENT AGREEMENT FOR ROAD & DRAINAGE RESPONSIBILITIES. FAWN DRIVE PROPOSES POROUS PAVEMENT SIDEWALKS. FAWN DRIVE WILL ALWAYS BE PRIVATE AND WILL NEVER BE ACCEPTED BY THE CITY OF DOVER.

32.) APPLICANT SHALL COMPLETE LAND USE DEVELOPMENT TRACKING FORM, MOST RECENTLY REVISED VERSION, UTILIZING THE ONLINE POLLUTION TRACKING AND ACCOUNTING PILOT PROJECT (PTAPP) PORTAL. HTTPS://WWW.UNH.EDU/UNHSC/PTAPP

33.) THE STRUCTURES SHALL BE SERVED BY A SPRINKLER SYSTEM AS APPLICABLE TO DOVER CHAPTER 81-30 AND THE NH BUILDING AND FIRE CODES (NOT APPLICABLE).

NOTES CONTINUED:

34.) SPRINKLER CONNECTIONS MUST BE FLUSHED IN ACCORDANCE WITH NFPA 24 AND A CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM MUST BE COMPLETED AND APPROVED BY INSPECTION SERVICES PRIOR TO CONNECTION OF THE BACKFLOW DEVICE, NOT APPLICABLE

35.) FIRE DEPARTMENT CONNECTION(S), IF REQUIRED BY THE SPECIFIC SYSTEM, SHALL BE LOCATED ON THE STREET SIDE OF THE BUILDING PER NFPA 13. ACCESS TO THE FDC SHALL MAINTAIN A CLEAR AND UNOBSTRUCTED PATH AT ALL TIMES. NOT APPLICABLE

36.) THE SITE LAYOUT IS DESIGNED IN COMPLIANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. THE PROPOSED STRUCTURE WILL ALSO BE DESIGNED IN ACCORDANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS (I.E. IBC, ANSI-117.1) AND NH RSA 155-A:5.

37.) PRIVATE TRASH PICKUP WILL BE DONE THROUGH TOTERS STORED IN GARAGES AND WILL BE COLLECTED THROUGH A PRIVATE WASTE PICK UP COMPANY.

38.) THE BUILDINGS ARE DESIGNED AS FULL FOUNDATION WITH 8' WALLS. A FOUNDATION DRAIN TRUNK LINE IS PROPOSED FOR THE DEVELOPMENT.

39.) PROJECT DISTURBANCE: TOTAL 164,500 Sq. Ft., (3.78 Ac.) NOTE THAT THE PROJECT IS SUBJECT TO THE EPA NPDES PHASE II. THE NOTICE OF INTENT (NOI) MUST BE FILED ALONG WITH A STORMWATER POLLUTION PREVENTION PLAN (SWPPP). EROSION AND SEDIMENT CONTROL INSPECTIONS TO BE CONDUCTED ONCE PER EVERY SEVEN DAYS AND AT AN INCREASED FREQUENCY INCLUDING WITHIN 24-HOURS OF A 0.25 INCH RAIN EVENT. INSPECTIONS TO BE CONDUCTED BY A "QUALIFIED PERSON" AS DEFINED BY EPA CGP 4.1.1 AND INSPECTION REPORTS SUBMITTED TO THE CITY OF DOVER, NH, ENGINEERING DEPARTMENT WITHIN 24 HOURS IN ACCORDANCE WITH CGP 4.1.7 AND MAINTAINED BY THE OWNER FOR A PERIOD OF THREE YEARS AFTER THE PROJECT IS COMPLETED. SEE ALSO CITY OF DOVER ADDITIONAL INSPECTION REQUIREMENTS BELOW.

40.) THE OWNERS AND THEIR SUCCESSORS ARE RESPONSIBLE FOR THE LIFETIME MAINTENANCE OF ALL BUFFERING AND INTERNAL LANDSCAPING THROUGH THE HOA.

41.) THE PERIMETER BOUNDARY WILL BE STAKED OUT BY BERRY SURVEYING & ENGINEERING PRIOR TO THE START OF CONSTRUCTION.

42.) THE APPLICANT IS TO PROVIDE SURETY WITHIN THE CONFINES OF NH RSA 674:36.

43.) DURING PERIODS OF HEAVY SNOW AND WHEN TEMPORARY PILES ARE USED ON SITE, SNOW IS TO BE LOADED INTO TRUCKS AND REMOVED FROM THE SITE. SNOW IS TO BE DISPOSED OF ON AN APPROVED SNOW DUMP.

POROUS PAVEMENT SHALL BE MAINTAINED IN ACCORDANCE WITH THE SITE'S APPROVED O&M MANUAL IN PERPETUITY. FAILURE TO DO SO COULD RESULT IN A FAILURE TO COMPLY WITH THE PLANNING BOARD APPROVALS.

GRADING NOTES:

1.) THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH NHDOT STANDARD SPECIFICATIONS DATED 2016. CURRENT STANDARD PLANS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE PROPOSAL.

2.) CONTRACTOR SHALL TAKE SPECIAL CARE IN NOT DISTURBING EXISTING MONUMENTS BOUNDS, AND OR BENCHMARKS WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION

3.) THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE EXACTLY AND TO PRESERVE ANY AND ALL UNDERGROUND UTILITIES CALL "DIG-SAFE" 1-888-DIGSAFE (344-7233) AT LEAST 72 HOURS BEFORE COMMENCING CONSTRUCTION

4.) WHERE AN EXISTING UNDERGROUND UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

5.) THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

6.) AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. LIMIT OF GRADING SHOULD NOT BE EXPANDED WITHOUT CONSULTING THE DESIGN ENGINEER. SEE ALSO E&SC PLAN.

7.) THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS, OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R & R).

8.) ALL SYMBOLS, WORDS, TRANSVERSE MARKINGS (STOP BARS, CROSSWALK LINES, AND RAILROAD SYMBOLS), LANE LINES, AND ALL OTHER MARKINGS NOTED WITH [T] SHALL BE THERMOPLASTIC.

9.) ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM PLACED AND SEEDED. THE LOAM SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

10.) ALL ELEVATIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE DESIGN ENGINEER IS TO BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. TEMPORARY BENCHMARKS (T.B.M.) ARE TO BE PROVIDED BY THE DESIGN ENGINEER.

11.) WRITTEN DIMENSION ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR IS TO CONFIRM ALL ELEVATIONS. CONFLICTS WILL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO CONSTRUCTION.

12.) SEE DETAILS CONCERNING SITE LAYOUT, DRAINAGE, UTILITY, AND SEDIMENT AND EROSION CONTROLS.

13.) DESIGN ENGINEER OF RECORD SHALL PROVIDE SIGNED LETTER TO CITY ENGINEER CERTIFYING THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH APPROVED PLANS. DESIGN ENGINEER OR DESIGN ENGINEERS REPRESENTATIVE IS TO BE PERIODICALLY ON SITE AND INSPECT DURING CONSTRUCTION PROCESS. CONTRACTOR IS TO PROVIDE 24-48 HOURS NOTICES PRIOR TO INSPECTION REQUESTS.

14.) UPON FINAL COMPLETION AND 85% STABILIZATION THE DRAINAGE SYSTEM IS TO BE CLEANED OF ALL DEBRIS TO INCLUDE THE PUMPING OF THE BASINS. SEE SHEET E102, DETAIL E18 FOR DEFINITION OF STABLE. ALSO TO BE DONE ONCE A YEAR DURING THE CONSTRUCTION PROCESS.

15.) ALL DRAINAGE PIPE IS TO BE HDPE N-12. INDIVIDUAL PIPE SIZES ARE SPECIFIED, RECYCLED PIPE IS APPROVED FOR PROJECT SITE. RECYCLED HDPE PIPE "GREEN PIPE" IS ACCEPTABLE FOR THIS PROJECT SITE.

16.) BASINS ARE TO HAVE NH STANDARD FRAMES AND GRATES MADE IN NORTH AMERICA. GRATES ARE TO BE INSTALLED BINDER FLUSH PRIOR TO BASE PAVE. UPON PROJECT COMPLETION FRAMES AND GRATES ARE TO BE CUT AND RIM RAISED TO FINAL PAVEMENT SURFACE. THIS IS TO ENSURE STORMWATER ENTERS THE SYSTEM AS DESIGN DURING THE INTERIM CONSTRUCTION PERIOD. CATCH BASINS AREA TO BE WITH OUT SUMPS. MANUFACTURERS BASES ARE TO BE FILLED WITH WASHED CRUSHED STONE ON SITE AS NEEDED.

EROSION & EROSION CONTROL NOTES:

1.) CONTRACTOR IS TO INSTALL A CONSTRUCTION ENTRANCE PRIOR TO EARTH DISTURBING ACTIVITIES, UTILIZING 3" ANGULAR STONE UNDERLAID WITH ENGINEER FABRIC.

2.) CONTRACTOR IS RESPONSIBLE FOR SWEEPING THE PARKING LOT, SIDEWALKS AND ROADWAY, TO ENSURE THAT NO SEDIMENT IS BEING TRACKED ONTO SIXTH STREET OR THE SURROUNDING ROADWAYS.

3.) CONTRACTOR IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE INLET PROTECTION ONCE INSTALLED.

4.) FUGITIVE DUST IS TO BE CONTROLLED THROUGHOUT THE CONSTRUCTION PROCESS IN ACCORDANCE WITH ENV-A 1000. CALCIUM CHLORIDE SHALL NOT BE USED FOR DUST CONTROL AS THIS IS IN THE SECONDARY GROUNDAWATER PROTECTION ZONE,

5.) CONTRACTOR IS TO MEET THE REQUIREMENTS SPECIFIED IN RSA 430:51-57 AND AGR 3800, RELATING TO INVASIVE SPECIES.

6.) CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE WATER QUALITY FROM ANY RUN OFF DURING THE CONSTRUCTION PROCESS, IN ACCORDANCE WITH ENV-WQ 1507, IN ORDER TO PREVENT VIOLATIONS OF THE STORM WATER QUALITY STANDARDS.

7.) CONTRACTOR MAY USE SILT FENCE, SILT SOXX OR MULCH BERM FOR PERIMETER CONTROL. SPECIFIC PRACTICES MAY BE SPECIFIED, SEE PLAN. THE CONTRACTOR IS NOT THE EXPAND CONSTRUCTION BEYOND THE STAKED OUT LIMITS.

8.) ALL STORAGE FACILITIES FOR FUEL, CHEMICALS, CHEMICAL OR INDUSTRIAL WASTES, AND BIODEGRADABLE RAW MATERIALS SHALL MEET THE REGULATIONS OF THE NHDES, INCLUDING BUT NOT LIMITED TO THOSE INVOLVING UNDERGROUND STORAGE TANKS, ABOVE GROUND STORAGE TANKS, HAZARDOUS WASTE AND BEST MANAGEMENT PRACTICES FOR GROUND WATER PROTECTION (PART ENV-WQ 401).

9.) ALL DEVELOPMENT MUST COMPLY WITH THE EPA PHASE II STORMWATER RULES AND THE CITY'S MS4 PERMIT, AS AMENDED.

10.) CITY OF DOVER: IN ACCORDANCE WITH SITE PLAN REVIEW REGULATIONS (153-14) THE FOLLOWING STORMWATER MEASURES ARE REQUIRED.

A.) ALL PROPOSED SCMs WILL CONFORM TO THE NH STORMWATER MANUAL (FEBRUARY 2025).

B.) EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SOIL LAND DISTURBANCE AND MUST BE REVIEWED AND APPROVED BY COMMUNITY SERVICE.

C.) TEMPORARY STABILIZATION MEASURES SHOULD BE IN PLACE WITHIN SEVEN CALENDAR DAYS FOR EXPOSED SOILS AREAS THAT ARE WITHIN ONE HUNDRED FEET OF A SURFACE WATER BODY OR A WETLAND AND NO MORE THAN 14 CALENDAR DAYS FOR ALL OTHER AREAS. PERMANENT STABILIZATION SHOULD BE IN PLACE WITHIN THREE CALENDAR DAYS FOLLOWING COMPLETION OF FINAL GRADING OF EXPOSED SOIL AREAS.

D.) ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED IN FUNCTIONING CONDITION UNTIL FINAL STABILIZATION IS ACCOMPLISHED. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. TRAPPED SEDIMENT AND OTHER DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN 30 CALENDAR DAYS UNLESS CONDITIONS DICTATE OTHERWISE.

E.) COMMUNITY SERVICES DEPARTMENT OR THEIR DESIGNATED AGENT SHALL HAVE ACCESS TO THE SITE TO COMPLETE ROUTINE INSPECTIONS AND SHALL BE NOTIFIED 24-HOURS PRIOR TO INSTALLATION OF A STORMWATER BMP IN ORDER TO SCHEDULE AN INSPECTION, DURING NORMAL WORKING HOURS.

F.) THE PLANNING BOARD OR COMMUNITY SERVICES MAY REQUIRE THE DESIGN ENGINEER AND/OR AN INDEPENDENT, THIRD-PARTY INSPECTION AND OVERSIGHT OF THE CONSTRUCTION OF STORMWATER MANAGEMENT FACILITIES AND EROSION AND SEDIMENT CONTROL AT THEIR DISCRETION. THE OWNER / APPLICANT IS RESPONSIBLE FOR ALL FEES ASSOCIATED WITH INSPECTIONS.

G.) ALL SWPPP/SWMP INSPECTIONS MUST BE CONDUCTED BY A QUALIFIED PROFESSIONAL SUCH AS A PROFESSIONAL ENGINEER (PE), A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), A CERTIFIED EROSION SEDIMENT AND STORMWATER INSPECTOR (CESSWI), OR A CERTIFIED PROFESSIONAL IN STORMWATER QUALITY (CPSWQ). INSPECTION REPORTS WILL BE SUBMITTED TO THE COMMUNITY SERVICES DEPARTMENT.

H.) THE OWNER IS ULTIMATELY RESPONSIBLE FOR THE INSTALLATION, CONSTRUCTION, INSPECTION, AND DISPOSITION OF ALL STORMWATER MANAGEMENT AND EROSION CONTROL MEASURES REQUIRED BY THE PROVISIONS OF THESE REGULATIONS.

I.) STORMWATER MANAGEMENT PLAN (SWMP) SUBMITTAL REQUIREMENTS. AT THE DISCRETION OF THE PLANNING BOARD OR COMMUNITY SERVICES DEPARTMENT, A TECHNICAL REVIEW BY AN INDEPENDENT THIRD PARTY MAY BE REQUIRED OF ANY SWMP PREPARED UNDER THESE REGULATIONS. SUCH A REVIEW SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL CONSULTANT AND THE EXPENSE OF WHICH SHALL BE THE FULL RESPONSIBILITY OF THE OWNER/APPLICANT.

UTILITY NOTES:

1.) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.

2.) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

3.) PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES, TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL MEETING THE ENGINEERS SPECIFIC RECOMMENDED CRITERIA.

4.) IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER (NOT ALLOWED IN CITY R.O.W.), EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATION. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.

5.) PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION. VOIDS BETWEEN STONES AND CLUMPS OF MATERIAL SHALL BE FILLED WITH FINE MATERIALS.

6.) FINAL UTILITY LOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE DOVER DPW.

7.) CONTRACTOR TO CONTACT DOVER DPW A MINIMUM OF TWO WEEKS PRIOR TO ANY CONSTRUCTION TO COORDINATE ALL WORK CONCERNING INSTALLATION OF ANY PROPOSED WATER LINE IMPROVEMENTS.

8.) ALL WATER MAIN AND SERVICE INSTALLATIONS SHALL CONFORM TO CITY OF DOVER STANDARDS. ALL HIGHWAY CONSTRUCTION WILL MEET THE CITY OF DOVER STANDARDS.

9.) CONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATIONS WITH EVERSOURCE AT (800) 662-7764. ALL ELECTRIC CONDUIT INSTALLATION SHALL BE INSPECTED BY EVERSOURCE PRIOR TO BACKFILL. A 48-HOUR MINIMUM NOTICE IS REQUIRED.

10.) CONTRACTOR SHALL COORDINATE ALL TELECOMMUNICATIONS INSTALLATIONS WITH FAIRPOINT COMMUNICATIONS AT (603) 427-5525.

11.) CONTRACTOR SHALL COORDINATE ALL CABLE INSTALLATIONS WITH COMCAST.

12.) ALL SEWER MANHOLE RIMS & COVERS ARE TO BE LIFTMATE R-1743-LM.

13.) ALL WATER SERVICES ARE TO BE WITNESSED WITH A 2"X4" PAINTED BLUE. ALL SEWER SERVICES ARE TO BE WITNESSED WITH A 2"X4" PAINTED YELLOW, IS STUBBED PRIOR TO BUILDING CONSTRUCTION. DETECTABLE METALLIC UNDERGROUND TAPE SHALL BE LABELED APPROPRIATELY.

14.) CURB BOXES SHOULD BE PLACED IN THE LAWN AREA, OR IF PLACED IN PAVEMENT, A ROAD BOX IS REQUIRED.

15.) SEE EXISTING CONDTIONS PLAN FOR DATUM. VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL DATUM BASED ON NAD83 STATE PLANE COORDINATES GATHERED USING TOPCON CARLSON BRX7 SURVEY GRADE GPS.

16.) MINIMUM SLOPE FOR ALL SEWER SERVICE CONNECTIONS IS TO BE NO LESS THAN 0.02 FT/FT. MINIMUM SLOPE FOR ALL 6" SEWER SERVICES IS TO BE NO LESS THAN 0.01 FT/FT.

17.) ALL SEWER INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF NHDES & DOVER DPW SEWER DIVISION STANDARDS. ALL PVC SEWER PIPE IS TO CONFORM WITH ENV-WQ 704.05 (C)-(E) FOR SDR 35 GRAVITY SEWER PIPE,

18.) CONTRACTOR TO TRANSFER TEMPORARY BENCHMARK TO A SUITABLE BENCHMARK TO CONTROL CONSTRUCTION. ANY ELEVATION DISCREPANCIES ARE TO BE REPORTED TO THE THE DESIGN ENGINEER IMMEDIATELY.

19.) ALL SEWER AND WATER CROSSINGS ARE TO MAINTAIN A 1.5' OF SEPARATION.

20.) C900 WATERLINE MAY BE SUBSTITUTED FOR C.L.D.I. WATERLINE WITH THE APPROVAL OF THE CITY ENGINEER.

21.) THE PROPOSED 2 FAMILY DWELLINGS WILL CONSIST OF 10 STRUCTURES PROVIDING 20 UNITS, EACH WITH 3 BEDROOMS PER UNIT. THERE AREA A TOTAL OF 60 BEDROOMS PROPOSED. TOTAL DESIGN FLOW : 9,000 GPD

LOT & IMPERVIOUS COVEREAGE:

EXISTING:
HOUSE, COVERED PORCH & OVERHANGS: 877 Sq.Ft.
STEPS: 28 Sq.Ft.
DECK: 150 Sq.Ft.
SHED: 125 Sq.Ft.
TOTAL: 1,180 Sq.Ft. (0.72%)

DRIVEWAY: 1,537 Sq.Ft.
TOTAL: 1,537 Sq.Ft. (0.94%)
TOTAL IMPERVIOUS: 2,717 Sq.Ft. (1.66%)

PROPOSED:
INCLUDES BUILDING, OVERHANG, PORCH, DECK & STEPS
UNITS #1 & #2, #3 & #4, #5 & #6, #9 & #10, #19 & #20 = 2,847 Sq.Ft. EACH
TOTAL: 14,253 Sq.Ft.
UNIT #15 & #16, #17 & #18 = 3,000 Sq.Ft. EACH
TOTAL: 6,000 Sq.Ft.
UNITS #7 & #8, #11 & #12, #13 & #14 = 2,723 Sq.Ft. EACH
TOTAL: 8,169 Sq.Ft.
TOTAL: 28,422 Sq.Ft. (17.39%)

PAVEMENT: 28,314 Sq.Ft.
CURB: 551 Sq.Ft.
CONCRETE PADS: 115 Sq.Ft.
TOTAL: 28,980 Sq.Ft. (17.73%)
TOTAL PROPOSED IMPERVIOUS COVERAGE: 57,402 Sq.Ft. (35.13%)

CONDITIONAL USE PERMITS:

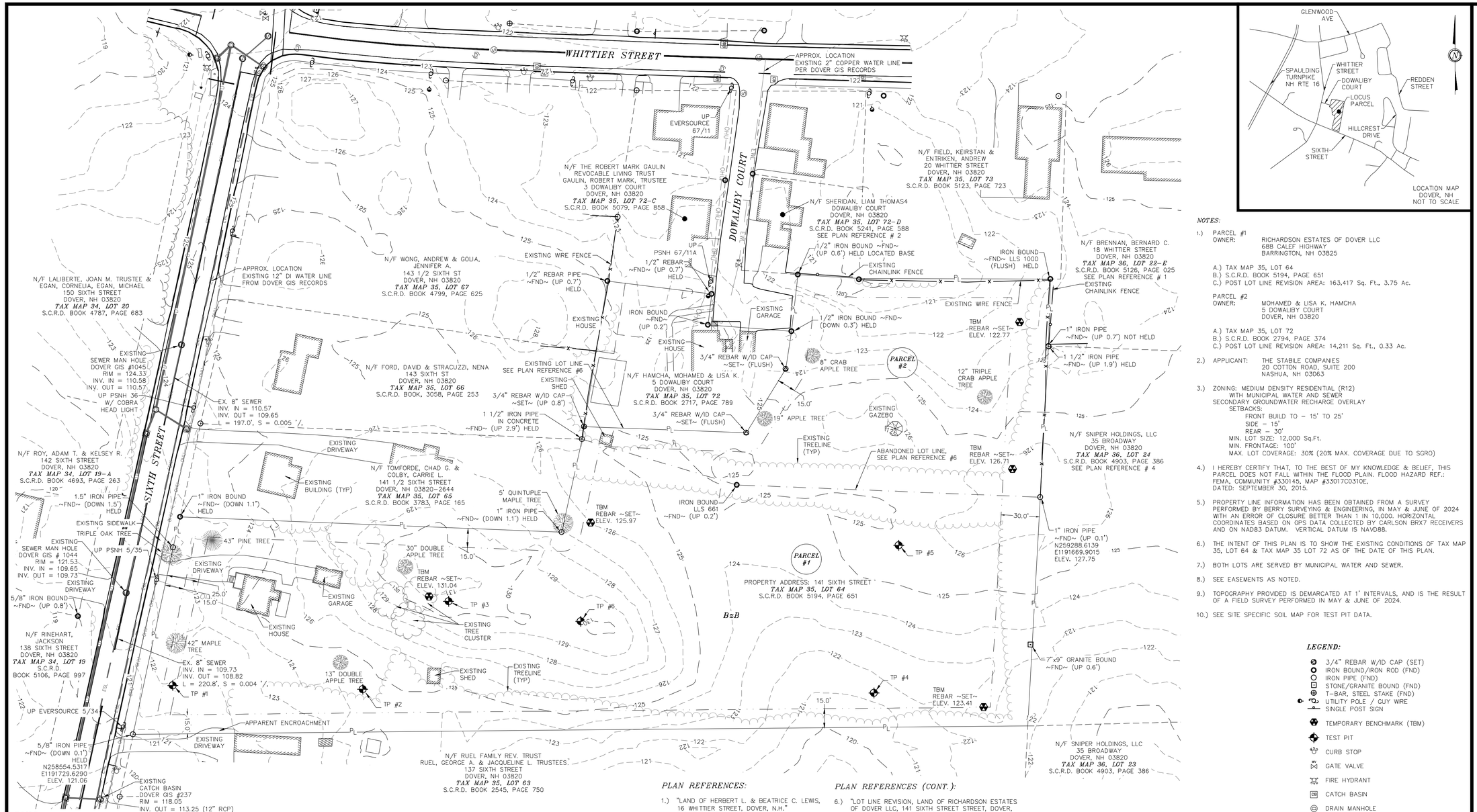
170-33 GROUNDWATER PROTECTION: GREATER THAN 20% IMPERVIOUS IN THE SECONDARY GROUNDWATER RECHARGE ZONE.

WAIVER REQUESTS:

STORMWATER RUNOFF VOLUME (153-14-(3)(B)(4)): PENDING

SNOW STORAGE CALCULATION:

- STORAGE CALCULATION (6:1 RATIO USED)
  - •• PLOWABLE AREA = 35,916 Sq.Ft. / 6 = 5,986 Sq.Ft.
  - •• >6,721 Sq.Ft. PROVIDED
  - ••• SNOW SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF IN



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12)
WITH MUNICIPAL WATER AND SEWER
SECONDARY GROUNDWATER RECHARGE OVERLAY
SETBACKS:
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MAX. LOT COVERAGE: 30% (20% MAX. COVERAGE DUE TO SGRO)

4.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN. FLOOD HAZARD REF.: FEMA, COMMUNITY #330145, MAP #33017C0310E, DATED: SEPTEMBER 30, 2015.

5.) PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING, IN MAY & JUNE OF 2024 WITH AN ERROR OF CLOSURE BETTER THAN 1 IN 10,000. HORIZONTAL COORDINATES BASED ON GPS DATA COLLECTED BY CARLSON BRX7 RECEIVERS AND ON NAD83 DATUM. VERTICAL DATUM IS NAVD88.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS OF TAX MAP 35, LOT 64 & TAX MAP 35 LOT 72 AS OF THE DATE OF THIS PLAN.

7.) BOTH LOTS ARE SERVED BY MUNICIPAL WATER AND SEWER.

8.) SEE EASEMENTS AS NOTED.

9.) TOPOGRAPHY PROVIDED IS DEMARCATED AT 1' INTERVALS, AND IS THE RESULT OF A FIELD SURVEY PERFORMED IN MAY & JUNE OF 2024.

10.) SEE SITE SPECIFIC SOIL MAP FOR TEST PIT DATA.

LEGEND:

- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- TEMPORARY BENCHMARK (TBM)
- TEST PIT
- CURB STOP
- GATE VALVE
- FIRE HYDRANT
- CB CATCH BASIN
- DRAIN MANHOLE
- S SEWER MANHOLE
- BzB NRCS SOIL LABEL
- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- EWL EXISTING WATER LINE
- ESL EXISTING SEWER LINE
- EXISTING DRAIN LINE
- OHU OVERHEAD UTILITIES
- 116 EXISTING CONTOUR MINOR
- 115 EXISTING CONTOUR MAJOR
- EXISTING TREELINE
- FND FOUND
- TYP TYPICAL
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

KENNETH A. BERRY L.L.S. 805 DATE

SOILS:

BzB – BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES

SEE: USDA/NRCS WEBSOIL

WETLAND NOTE:

WETLANDS WERE DELINEATED BY DEIDRA L. BENJAMIN, CWS, IN JUNE OF 2024 USING THE FOLLOWING CRITERIA: (NO WETLANDS WERE FOUND ON SITE)

1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

DEIDRA BENJAMIN, CWS #295

STATE OF NEW HAMPSHIRE DEIDRA BENJAMIN No. 295 CERTIFIED WETLAND SCIENTIST

LOT & IMPERVIOUS COVEREAGE:

EXISTING:
HOUSE, COVERED PORCH & OVERHANGS: 877 Sq.Ft.
STEPS: 28 Sq.Ft.
DECK: 150 Sq.Ft.
SHED: 125 Sq.Ft.
TOTAL: 1,180 Sq.Ft. (0.72%)

DRIVEWAY: 1,537 Sq.Ft.
TOTAL: 1,537 Sq.Ft. (0.94%)
TOTAL IMPERVIOUS: 2,717 Sq.Ft. (1.66%)

UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR NOR THE ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE.

PLAN REFERENCES:

1.) "LAND OF HERBERT L. & BEATRICE C. LEWIS, 16 WHITTIER STREET, DOVER, N.H." BY: THE BERRY CONST. CO., INC. DATED: DECEMBER 16, 1963 NOT RECORDED, ON FILE AT THIS OFFICE

2.) "DOWALIBY COURT SUBDIVISION" BY: NORMAN G. LECLERC APPROVED: JUNE 18, 1974 S.C.R.D. PLAN #51, POCKET #9, FOLDER #1

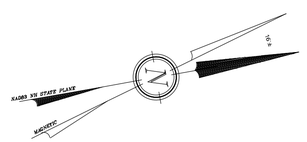
3.) "ROW PLAN" BY: NHDOT DATED: JUNE 1998 SIXTH STREET & WHITTIER STREET S.C.R.D. PLAN #55-70

4.) "LOT LINE ADJUSTMENT PLAN PREPARED FOR ROBERT AND RUTH MURRAY WEDGEWOOD ROAD & BARTLETT STREET" BY: KEVIN M. MCENEANEY DATED: NOVEMBER 30, 2004 S.C.R.D. PLAN #78-22

5.) "LOT LINE ADJUSTMENT PLAN PREPARED FOR PATRICK MURRAY TAX MAP 35 LOT NO'S 59 & 59A 125 SIXTH STREET" BY: KEVIN M. MCENEANEY DATED: OCTOBER 24, 2013 S.C.R.D. PLAN #106-81

PLAN REFERENCES (CONT.):

6.) "LOT LINE REVISION, LAND OF RICHARDSON ESTATES OF DOVER LLC, 141 SIXTH STREET STREET, DOVER, N.H. TAX MAP 35, LOT 64 AND MOHAMED & LISA K. HAMCHA, 5 DOWALIBY COURT, DOVER, N.H., TAX MAP 35 LOT 72" BY: BERRY SURVEYING & ENGINEERING DATED: SEPTEMBER 3, 2024 S.C.R.D. PLAN # 13394



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

EXISTING CONDITIONS PLAN
FOR: THE STABILE COMPANIES
OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

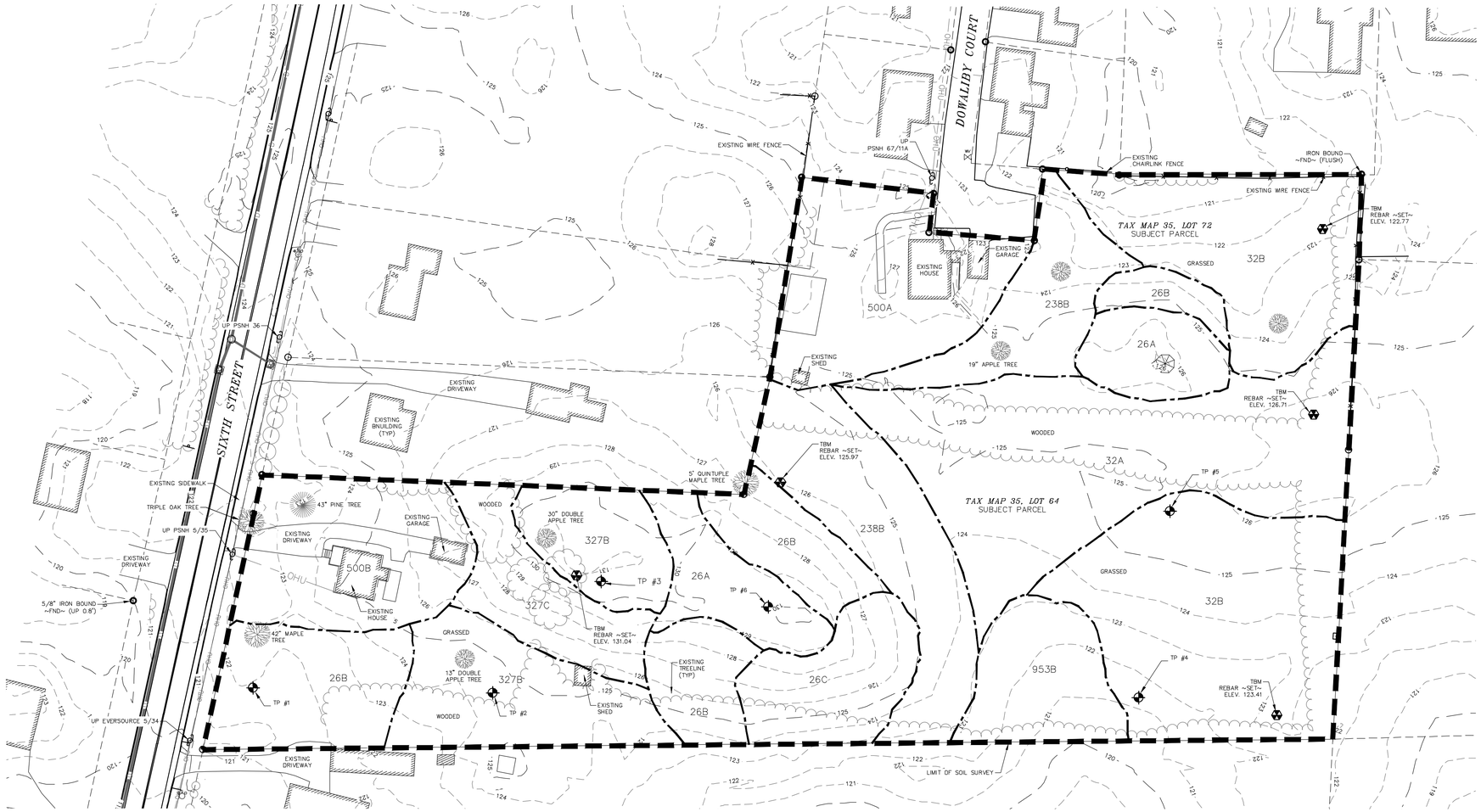
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

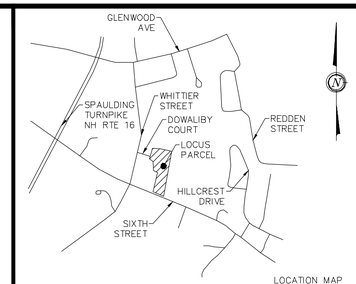
SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE NO. 805 LICENSED LAND SURVEYOR KENNETH A. BERRY SIGNATURE

SHEET 3 OF 39

NOT FOR CONSTRUCTION





LOCATION MAP
DOVER, NH
NOT TO SCALE

NOTES:

1.) OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN.
FLOOD HAZARD REF.: FEMA, COMMUNITY #330145, MAP #33017C0310E, DATED: SEPTEMBER 30, 2015.

4.) PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING, IN MAY & JUNE OF 2024 WITH AN ERROR OF CLOSURE BETTER THAN 1 IN 10,000. HORIZONTAL COORDINATES BASED ON GPS DATA COLLECTED BY CARLSON BRX7 RECEIVERS AND ON NAD83 DATUM. VERTICAL DATUM IS NAVD88.

5.) THE INTENT OF THIS PLAN IS TO SHOW THE SITE SPECIFIC SOIL BOUNDARIES OF TAX MAP 35, LOT 64.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
LICENSED LAND SURVEYOR
NO. 805
KENNETH A. BERRY
SIGNATURE

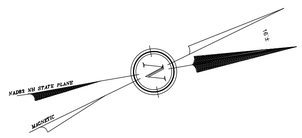
SHEET 4 OF 39

STATE OF NEW HAMPSHIRE
DEIDRA L. BENJAMIN
No. 295
CERTIFIED WETLAND SCIENTIST

DEIDRA BENJAMIN, CWS #295

STATE OF NEW HAMPSHIRE
JOHN P. HAYES III
No. 087
CERTIFIED SOIL SCIENTIST

JOHN P. HAYES III, CSS #87



LEGEND:

- IRON BOUND/REBAR ~FND~
- IRON PIPE ~FND~
- CONCRETE/GRANITE BOUND ~FND~
- UTILITY POLE/GUY WIRE
- OHU — OHU — OVERHEAD UTILITIES LINE
- 129 — EXISTING CONTOUR MINOR
- 130 — EXISTING CONTOUR MAJOR
- SOIL LINE
- 448A SOIL SERIES
- TEST HOLE
- BENCHMARK
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND

WETLAND NOTE:

WETLANDS WERE DELINEATED BY DEIDRA L. BENJAMIN, CWS, IN JUNE OF 2024 USING THE FOLLOWING CRITERIA: (NO WETLANDS WERE FOUND ON SITE)

1. USACE. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. VERSION 2.0. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER. 2012. VICKSBURG, MS.

2. USACE. CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. ENVIRONMENTAL LABORATORY. 1987. VICKSBURG, MS.

3. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.

4. NEW ENGLAND HYDRIC SOIL TECHNICAL COMMITTEE. FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 4. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. 2019. LOWELL, MA.

5. U.S. ARMY CORPS OF ENGINEERS 2019. NATIONAL WETLAND PLANT LIST, VERSION 3.3. HTTP://WETLAND-PLANTS.USACE.ARMY.MIL/

SOILS LEGEND

Site Specific Soils

Symbol	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
26	A,B,C	Windsor	A
32	A,B	Boxford	C
238	B	Elmridge	C
327	B,C	Windsor Variant (Clay Subsoil)	C
500	A, B	Udorthents (Loamy)	C
953	B	Boxford (Somewhat Poorly Drained)	C

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /ED = Excessively Drained /MWD = Moderately Well Drained
/SPD = Somewhat Poorly Drained /P = Poorly Drained
/VP = Very Poorly Drained /Rk = Rocky

TEST PIT DATA:

TEST HOLES PERFORMED ON SEPTEMBER 14, 2024

TEST PIT #1
0–4" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
4–24" 10YR 5/6 FINE SANDY LOAM, GRANULAR, FRIABLE
24–43" 10YR 6/4 FINE LOAMY SAND, GRANULAR, FRIABLE
43–80" 2.5Y 6/4 VERY FINE SAND & SILT, MEDIUM BLOCKY, FRIABLE IN HAND – MEDIUM FIRM
E.S.H.W.T. @ 50"
RESTRICTIVE LAYER @ 60" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

TEST PIT #2
0–12" 10YR 2/2 FINE SANDY LOAM, GRANULAR, FRIABLE
12–25" 10YR 5/8 FINE SANDY LOAM, GRANULAR, FRIABLE
25–80" 2.5Y 6/4 SILT LOAM. BLOCKY, FIRM, REDOX @36"
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ 25" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 80"
REFUSAL @ N/A

TEST PIT #3
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–36" 10YR 5/8 FINE SANDY LOAM, GRANULAR, FRIABLE
36"–60" 2.5Y 6/4 SILT LOAM, BLOCKY, FIRM (TIGHT ROCK IN BOTTOM OF HOLE)
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ 36" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

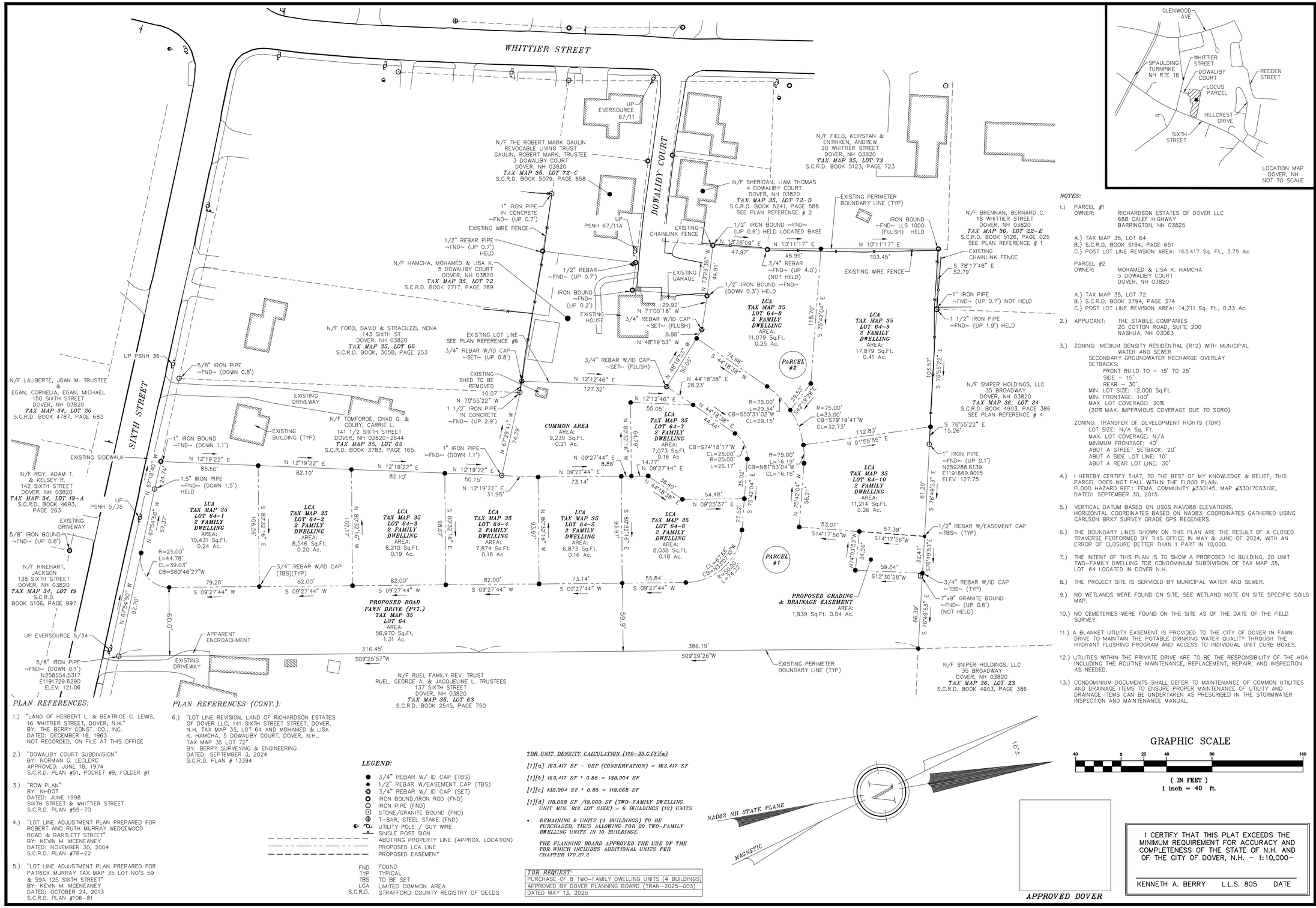
TEST PIT #4
0–12" 10YR 2/2 SILT LOAM, GRANULAR, FRIABLE
12–18" 2.5Y 6/4 SILT LOAM, GRANULAR, FRIABLE
18–60" 2.5Y 6/2 SILT LOAM, BLOCKY, FIRM
E.S.H.W.T. @ 18"
RESTRICTIVE LAYER @ 18" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT DATA (CONT.):

TEST PIT #5
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–25" 10YR 5/8 SILT LOAM, GRANULAR, FRIABLE
25–60" 2.5Y 6/4 SILT LOAM, BLOCKY, FRIABLE IN HAND–BLOCKY IN PLACE
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ 50" (FIRM)
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT #6
0–6" 10YR 3/2 FINE SANDY LOAM, GRANULAR, FRIABLE
6–36" 10YR 5/8 LOAMY SAND, GRANULAR, FRIABLE
36"–60" 10YR 6/4 LOAMY SAND, GRANULAR, FRIABLE
E.S.H.W.T. @ N/A
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

NOT FOR CONSTRUCTION



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12) WITH MUNICIPAL WATER AND SEWER
SECONDARY GROUNDWATER RECHARGE OVERLAY
SETBACKS:
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MAX. LOT COVERAGE: 30%
(20% MAX. IMPERVIOUS COVERAGE DUE TO SGRO)

ZONING: TRANSFER OF DEVELOPMENT RIGHTS (TDR)
LOT SIZE: N/A Sq. Ft.
MAX. LOT COVERAGE: N/A
MINIMUM FRONTAGE: 40'
ABUT A STREET SETBACK: 20'
ABUT A SIDE LOT LINE: 10'
ABUT A REAR LOT LINE: 30'

4.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN. FLOOD HAZARD REF.: FEMA, COMMUNITY #330145, MAP #33017C0310E, DATED: SEPTEMBER 30, 2015.

5.) VERTICAL DATUM BASED ON USGS NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN MAY & JUNE OF 2024, WITH AN ERROR OF CLOSURE BETTER THAN 1 PART IN 10,000.

7.) THE INTENT OF THIS PLAN IS TO SHOW A PROPOSED 10 BUILDING, 20 UNIT TWO-FAMILY DWELLING TDR CONDOMINIUM SUBDIVISION OF TAX MAP 35, LOT 64 LOCATED IN DOVER N.H.

8.) THE PROJECT SITE IS SERVICED BY MUNICIPAL WATER AND SEWER.

9.) NO WETLANDS WERE FOUND ON SITE, SEE WETLAND NOTE ON SITE SPECIFIC SOILS MAP.

10.) NO CEMETERIES WERE FOUND ON THE SITE AS OF THE DATE OF THE FIELD SURVEY.

11.) A BLANKET UTILITY EASEMENT IS PROVIDED TO THE CITY OF DOVER IN FAWN DRIVE TO MAINTAIN THE POTABLE DRINKING WATER QUALITY THROUGH THE HYDRANT FLUSHING PROGRAM AND ACCESS TO INDIVIDUAL UNIT CURB BOXES.

12.) UTILITIES WITHIN THE PRIVATE DRIVE ARE TO BE THE RESPONSIBILITY OF THE HOA INCLUDING THE ROUTINE MAINTENANCE, REPLACEMENT, REPAIR, AND INSPECTION AS NEEDED.

13.) CONDOMINIUM DOCUMENTS SHALL DEFER TO MAINTENANCE OF COMMON UTILITIES AND DRAINAGE ITEMS TO ENSURE PROPER MAINTENANCE OF UTILITY AND DRAINAGE ITEMS CAN BE UNDERTAKEN AS PRESCRIBED IN THE STORMWATER INSPECTION AND MAINTENANCE MANUAL.

PLAN REFERENCES:

1.) "LAND OF HERBERT L. & BEATRICE C. LEWIS, 16 WHITTIER STREET, DOVER, N.H." BY: THE BERRY CONST. CO., INC. DATED: DECEMBER 16, 1963 NOT RECORDED, ON FILE AT THIS OFFICE

2.) "DOWALIBY COURT SUBDIVISION" BY: NORMAN G. LECLERC APPROVED: JUNE 18, 1974 S.C.R.D. PLAN #51, POCKET #9, FOLDER #1

3.) "ROW PLAN" BY: NHDOT DATED: JUNE 1998 SIXTH STREET & WHITTIER STREET S.C.R.D. PLAN #55-70

4.) "LOT LINE ADJUSTMENT PLAN PREPARED FOR ROBERT AND RUTH MURRAY WEDGEWOOD ROAD & BARTLETT STREET" BY: KEVIN M. MCENEANEY DATED: NOVEMBER 30, 2004 S.C.R.D. PLAN #78-22

5.) "LOT LINE ADJUSTMENT PLAN PREPARED FOR PATRICK MURRAY TAX MAP 35 LOT NO'S 59 & 59A 125 SIXTH STREET" BY: KEVIN M. MCENEANEY DATED: OCTOBER 24, 2013 S.C.R.D. PLAN #106-81

PLAN REFERENCES (CONT.):

6.) "LOT LINE REVISION, LAND OF RICHARDSON ESTATES OF DOVER LLC, 141 SIXTH STREET STREET, DOVER, N.H. TAX MAP 35, LOT 64 AND MOHAMED & LISA K. HAMCHA, 5 DOWALIBY COURT, DOVER, N.H., TAX MAP 35 LOT 72" BY: BERRY SURVEYING & ENGINEERING DATED: SEPTEMBER 3, 2024 S.C.R.D. PLAN # 13394

LEGEND:

- ● 3/4" REBAR W/ ID CAP (TBS)
- ● 1/2" REBAR W/EASEMENT CAP (TBS)
- ⊗ 3/4" REBAR W/ ID CAP (SET)
- ⊙ IRON BOUND/IRON ROD (FND)
- ○ IRON PIPE (FND)
- ⊡ STONE/GRANITE BOUND (FND)
- ⊕ T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- ABUTTING PROPERTY LINE (APPROX. LOCATION)
- PROPOSED LCA LINE
- PROPOSED EASEMENT

FND FOUND
TYP TYPICAL
TBS TO BE SET
LCA LIMITED COMMON AREA
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS

TDR UNIT DENSITY CALCULATION (170-28.C.(3)(a)

[1][a] 163,417 SF – 0SF (CONSERVATION) = 163,417 SF

*[1][b] 163,417 SF * 0.85 = 138,904 SF*

*[1][c] 138,904 SF * 0.85 = 118,068 SF*

[1][d] 118,068 SF /18,000 SF (TWO-FAMILY DWELLING UNIT MIN. R12 LOT SIZE) = 6 BUILDINGS (12) UNITS

- *REMAINING 8 UNITS (4 BUILDINGS) TO BE PURCHASED, THUS ALLOWING FOR 20 TWO-FAMILY DWELLING UNITS IN 10 BUILDINGS.*

THE PLANNING BOARD APPROVED THE USE OF THE TDR WHICH INCLUDES ADDITIONAL UNITS PER CHAPTER 170.27.2

TDR REQUEST:
PURCHASE OF 8 TWO-FAMILY DWELLING UNITS (4 BUILDINGS)
APPROVED BY DOVER PLANNING BOARD (TRAN-2025-003)
DATED MAY 13, 2025

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

I CERTIFY THAT THIS PLAT EXCEEDS THE MINIMUM REQUIREMENT FOR ACCURACY AND COMPLETENESS OF THE STATE OF N.H. AND OF THE CITY OF DOVER, N.H. – 1:10,000–

KENNETH A. BERRY L.L.S. 805 DATE

REVISION	DATE	DESCRIPTION

20 UNIT, 2-FAMILY DWELLING TDR CONDOMINIUM PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

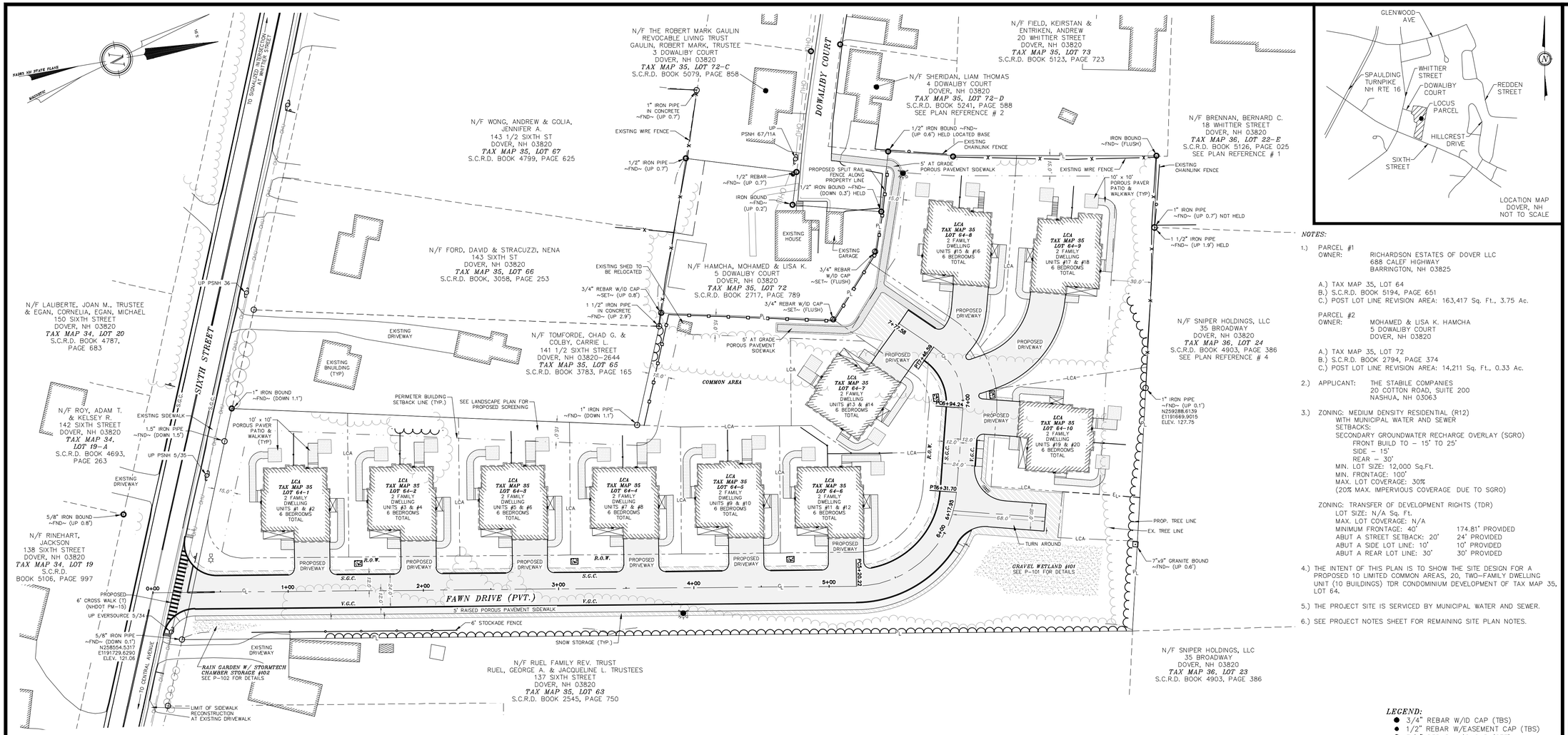
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE NO. 805 LICENSED LAND SURVEYOR KENNETH A. BERRY
SIGNATURE

SHEET 5 OF 39

NOT FOR CONSTRUCTION



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12)
WITH MUNICIPAL WATER AND SEWER
SETBACKS:
SECONDARY GROUNDWATER RECHARGE OVERLAY (SGRO)
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MAX. LOT COVERAGE: 30%
(20% MAX. IMPERVIOUS COVERAGE DUE TO SGRO)

ZONING: TRANSFER OF DEVELOPMENT RIGHTS (TDR)
LOT SIZE: N/A Sq. Ft.
MAX. LOT COVERAGE: N/A
MINIMUM FRONTAGE: 40' 174.81' PROVIDED
ABUT A STREET SETBACK: 20' 24' PROVIDED
ABUT A SIDE LOT LINE: 10' 10' PROVIDED
ABUT A REAR LOT LINE: 30' 30' PROVIDED

4.) THE INTENT OF THIS PLAN IS TO SHOW THE SITE DESIGN FOR A PROPOSED 10 LIMITED COMMON AREAS, 20, TWO–FAMILY DWELLING UNIT (10 BUILDINGS) TDR CONDOMINIUM DEVELOPMENT OF TAX MAP 35, LOT 64.

5.) THE PROJECT SITE IS SERVICED BY MUNICIPAL WATER AND SEWER.

6.) SEE PROJECT NOTES SHEET FOR REMAINING SITE PLAN NOTES.

SNOW STORAGE CALCULATION:

- STORAGE CALCULATION (6:1 RATIO USED)
  - PLOWABLE AREA = 35,916 Sq.Ft. / 6 = 5,986 Sq.Ft.
  - >6,721 Sq.Ft. PROVIDED
  - SNOW SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS ONCE IDENTIFIED AREAS ARE FULL.

LOT & IMPERVIOUS COVEREAGE:

EXISTING:
HOUSE, COVERED PORCH & OVERHANGS: 877 Sq.Ft.
STEPS: 28 Sq.Ft.
DECK: 150 Sq.Ft.
SHED: 125 Sq.Ft.
TOTAL: 1,180 Sq.Ft. (0.72%)

DRIVEWAY: 1,537 Sq.Ft.
TOTAL: 1,537 Sq.Ft. (0.94%)
TOTAL IMPERVIOUS: 2,717 Sq.Ft. (1.66%)

PROPOSED:
INCLUDES BUILDING, OVERHANG, PORCH, DECK & STEPS
UNITS #1 & #2, #3 & #4, #5 & #6, #9 & #10, #19 & #20 = 2,847 Sq.Ft. EACH
TOTAL: 14,253 Sq.Ft.
UNIT #15 & #16, #17 & #18 = 3,000 Sq.Ft. EACH
TOTAL: 6,000 Sq.Ft.
UNITS #7 & #8, #11 & #12, #13 & #14 = 2,723 Sq.Ft. EACH
TOTAL: 8,169 Sq.Ft.
TOTAL: 28,422 Sq.Ft. (17.39%)

PAVEMENT: 28,314 Sq.Ft.
CURB: 551 Sq.Ft.
CONCRETE PADS: 115 Sq.Ft.
TOTAL: 28,980 Sq.Ft. (17.73%)
TOTAL PROPOSED IMPERVIOUS COVERAGE: 57,402 Sq.Ft. (35.13%)
(CUP REQUIRED)

CONDITIONAL USE PERMITS:

170–33 GROUNDWATER PROTECTION: GREATER THAN 20% IMPERVIOUS IN THE SECONDARY GROUNDWATER RECHARGE ZONE.

WAIVER REQUESTS:
STORMWATER RUNOFF VOLUME (153–14–(3)(B)(4)): PENDING

TDR UNIT DENSITY CALCULATION (170–29.G.(3)(a)

[1][a] 163,417 SF – 0SF (CONSERVATION) = 163,417 SF

*[1][b] 163,417 SF * 0.85 = 138,904 SF*

*[1][c] 138,904 SF * 0.85 = 118,068 SF*

[1][d] 118,068 SF /18,000 SF (TWO–FAMILY DWELLING UNIT MIN. R12 LOT SIZE) = 6 BUILDINGS (12) UNITS

- *REMAINING 8 UNITS (4 BUILDINGS) TO BE PURCHASED, THUS ALLOWING FOR 20 TWO–FAMILY DWELLING UNITS IN 10 BUILDINGS.*

THE PLANNING BOARD APPROVED THE USE OF THE TDR WHICH INCLUDES ADDITIONAL UNITS PER CHAPTER 170.27.2

TDR REQUEST:
PURCHASE OF 8 TWO–FAMILY DWELLING UNITS (4 BUILDINGS)
APPROVED BY DOVER PLANNING BOARD (TRAN–2025–003)
DATED MAY 13, 2025

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T–BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OVERHEAD UTILITIES
- PROPOSED LCA LINE
- CENTER LINE
- TREE LINE (EX. OR PROP.)
- SPLIT RAIL FENCE
- STOCKADE FENCE
- PROPOSED EASEMENT
- FND FOUND
- TYP TYPICAL
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- E.O.P. EDGE OF PAVEMENT
- V.G.C. VERTICAL GRANITE CURB
- S.G.C. SLOPED GRANITE CURB
- LCA LIMITED COMMON AREA
- P_L PROPERTY LINE
- E_L EASEMENT LINE
- LIGHT TYPE "A" POLE MOUNTED
- LIGHT TYPE "B" BUILDING MOUNTED
- FIRE HYDRANT
- SNOW STORAGE
- TRANSFORMER/CONCRETE PAD
- STORMWATER SCM
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT SIDEWALK

REVISION	DATE	DESCRIPTION

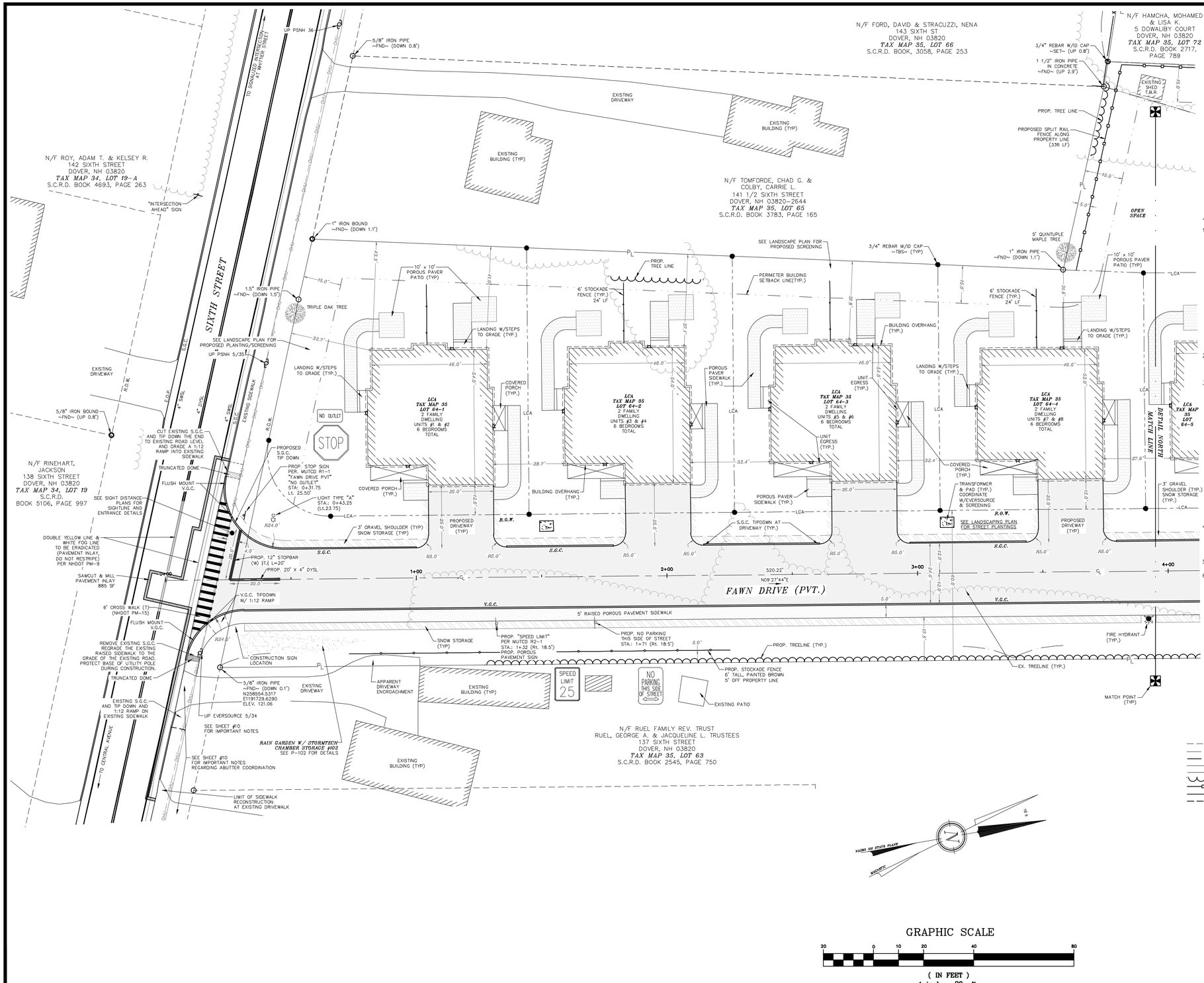
OVERVIEW SITE PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
AND OF: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

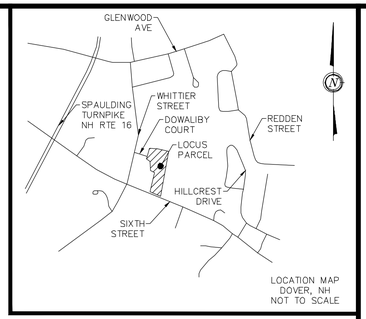
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION





NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12)
WITH MUNICIPAL WATER AND SEWER
SECONDARY GROUNDWATER RECHARGE OVERLAY
SETBACKS:
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MAX. LOT COVERAGE: 30%
(20% MAX. IMPERVIOUS COVERAGE DUE TO SGRO)

ZONING: TRANSFER OF DEVELOPMENT RIGHTS (TDR)

LOT SIZE: N/A Sq. Ft.	
MAX. LOT COVERAGE: N/A	
MINIMUM FRONTAGE: 40'	174.81' PROVIDED
ABUT A STREET SETBACK: 20'	24' PROVIDED
ABUT A SIDE LOT LINE: 10'	10' PROVIDED
ABUT A REAR LOT LINE: 30'	30' PROVIDED

4.) THE INTENT OF THIS PLAN IS TO SHOW A DETAIL VIEW OF THE SITE DESIGN FOR A PROPOSED 10 LIMITED COMMON AREAS, 20 TWO-FAMILY DWELLING UNIT (10 BUILDINGS) TDR CONDOMINIUM DEVELOPMENT OF TAX MAP 35, LOT 64.

5.) THE PROJECT SITE IS SERVICED BY MUNICIPAL WATER AND SEWER.

6.) SEE PROJECT NOTES SHEET FOR REMAINING SITE PLAN NOTES.

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN

- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OVERHEAD UTILITIES
- PROPOSED LCA LINE
- CENTER LINE
- TREE LINE (EX. OR PROP.)
- SPLIT RAIL FENCE
- STOCKADE FENCE
- PROPOSED EASEMENT

FND FOUND
TYP TYPICAL
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
E.O.P. EDGE OF PAVEMENT
V.G.C. VERTICAL GRANITE CURB
S.G.C. SLOPED GRANITE CURB
LCA LIMITED COMMON AREA
P_L PROPERTY LINE
E_L EASEMENT LINE

- LIGHT TYPE "A" POLE MOUNTED
- LIGHT TYPE "B" BUILDING MOUNTED
- FIRE HYDRANT

- SNOW STORAGE
- TRANSFORMER/CONCRETE PAD
- STORMWATER SCM
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT SIDEWALK

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

REVISION	DATE	DESCRIPTION

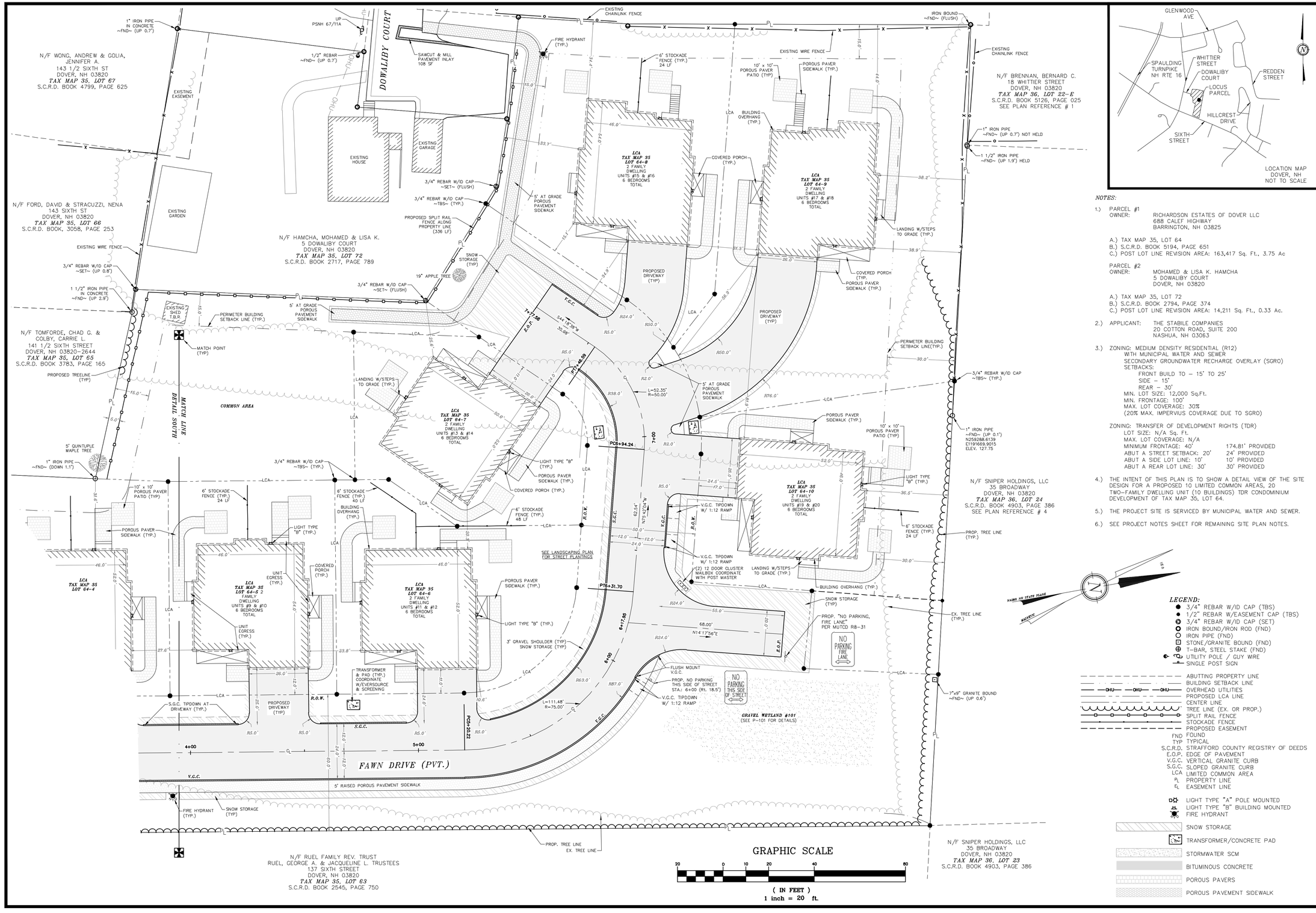
SITE PLAN – DETAIL SOUTH
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14241 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) ZONING: MEDIUM DENSITY RESIDENTIAL (R12)
WITH MUNICIPAL WATER AND SEWER
SECONDARY GROUNDWATER RECHARGE OVERLAY (SGRO)
SETBACKS:
FRONT BUILD TO – 15' TO 25'
SIDE – 15'
REAR – 30'
MIN. LOT SIZE: 12,000 Sq.Ft.
MIN. FRONTAGE: 100'
MAX. LOT COVERAGE: 30%
(20% MAX. IMPERVIUS COVERAGE DUE TO SGRO)

ZONING: TRANSFER OF DEVELOPMENT RIGHTS (TDR)

LOT SIZE: N/A Sq. Ft.		
MAX. LOT COVERAGE: N/A		
MINIMUM FRONTAGE:	40'	174.81' PROVIDED
ABUT A STREET SETBACK:	20'	24' PROVIDED
ABUT A SIDE LOT LINE:	10'	10' PROVIDED
ABUT A REAR LOT LINE:	30'	30' PROVIDED

4.) THE INTENT OF THIS PLAN IS TO SHOW A DETAIL VIEW OF THE SITE DESIGN FOR A PROPOSED 10 LIMITED COMMON AREAS, 20 TWO-FAMILY DWELLING UNIT (10 BUILDINGS) TDR CONDOMINIUM DEVELOPMENT OF TAX MAP 35, LOT 64.

5.) THE PROJECT SITE IS SERVICED BY MUNICIPAL WATER AND SEWER.

6.) SEE PROJECT NOTES SHEET FOR REMAINING SITE PLAN NOTES.

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN

- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OHU OHU OHU OVERHEAD UTILITIES
- PROPOSED LCA LINE
- CENTER LINE
- TREE LINE (EX. OR PROP.)
- SPLIT RAIL FENCE
- STOCKADE FENCE
- PROPOSED EASEMENT

FND FOUND
TYP TYPICAL
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
E.O.P. EDGE OF PAVEMENT
V.G.C. VERTICAL GRANITE CURB
S.G.C. SLOPED GRANITE CURB
LCA LIMITED COMMON AREA
P_L PROPERTY LINE
E_L EASEMENT LINE

- LIGHT TYPE "A" POLE MOUNTED
- LIGHT TYPE "B" BUILDING MOUNTED
- FIRE HYDRANT
- SNOW STORAGE
- TRANSFORMER/CONCRETE PAD
- STORMWATER SCM
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT SIDEWALK

REVISION	DATE	DESCRIPTION

SITE PLAN – DETAIL NORTH
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H. *LOT 64*
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H. *LOT 72*
TAX MAP 35, LOT 72

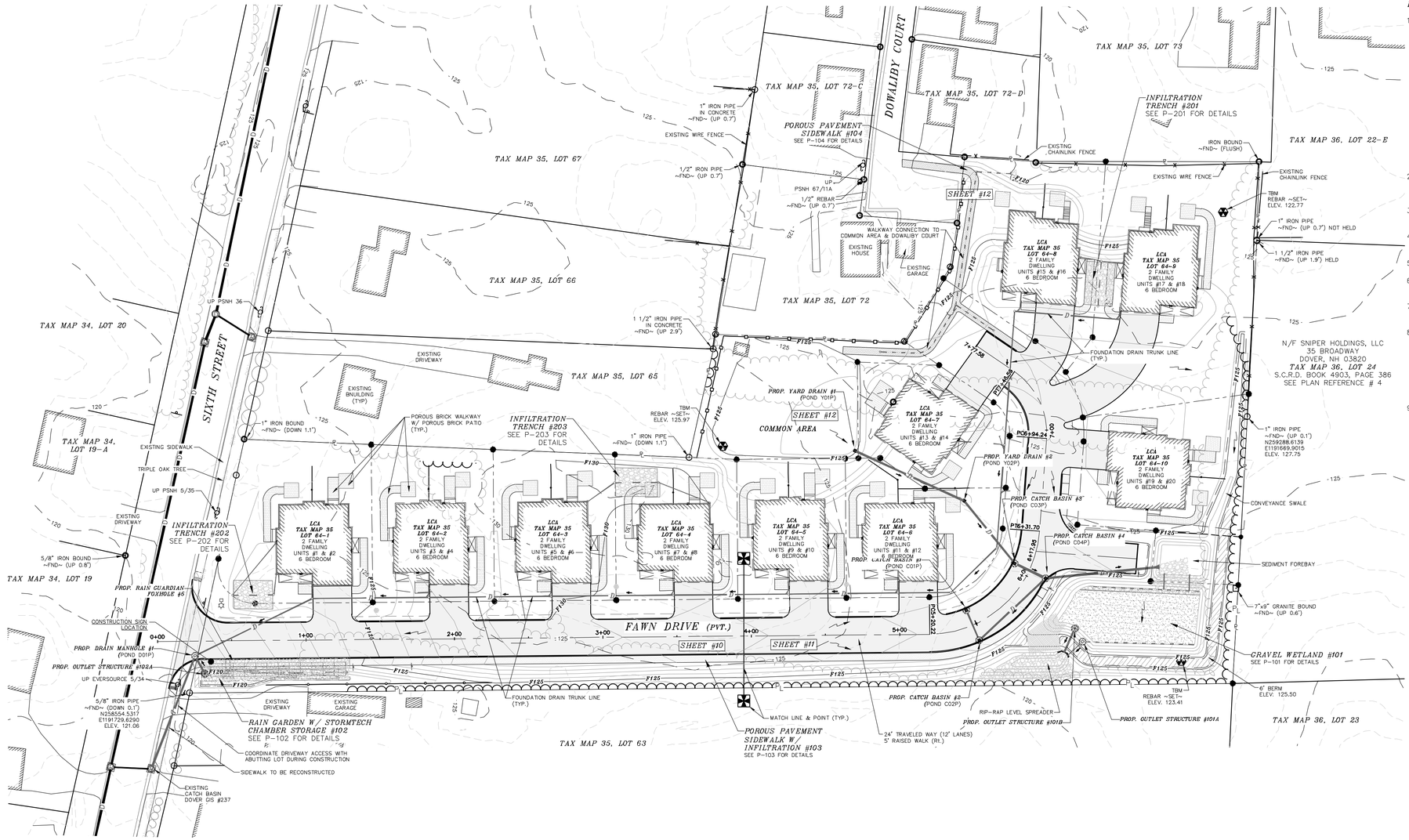
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED PROFESSIONAL ENGINEER

SHEET 8 OF 39

NOT FOR CONSTRUCTION



PROJECT NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE AN OVERVIEW OF GRADING & ENGINEERING DETAILS FOR THE PROPOSED SITE PLAN.

4.) SEE EROSION & SEDIMENT CONTROL PLANS FOR DETAILS ON PERIMETER CONTROL (MULCH BERM / FENCE / SILT SOXX).

5.) BS&E IS TO PROVIDE ADDITIONAL BENCHMARKS PRIOR TO CONSTRUCTION.

6.) EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

7.) SEE PROJECT NOTES SHEET FOR REMAINING GRADING NOTES. SEE EROSION & SEDIMENT CONTROL PLAN FOR LIMIT OF PROJECT DISTURBANCE.

8.) BASINS ARE TO HAVE NH STANDARD FRAMES AND GRATES MADE IN NORTH AMERICA. GRATES ARE TO BE INSTALLED BINDER FLUSH PRIOR TO BASE PAVE. UPON PROJECT COMPLETION FRAMES AND GRATES ARE TO BE CUT AND RIM RAISED TO FINAL PAVEMENT SURFACE. THIS IS TO ENSURE STORMWATER ENTERS THE SYSTEM AS DESIGN DURING THE INTERIM CONSTRUCTION PERIOD. CATCH BASINS AREA TO BE WITH OUT SUMPS. MANUFACTURERS BASES ARE TO BE FILLED WITH WASHED CRUSHED STONE ON SITE AS NEEDED.

9.) SEE P201-203 FOR THE ROOF AREAS THAT ARE REQUIRED TO BE GUTTERED AND ROUTED TO THE THREE INFILTRATION TRENCH LOCATIONS FOR GROUNDWATER RECHARGE.

LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- BUILDING SETBACK LINE
- CONTOUR MINOR, EXISTING
- CONTOUR MAJOR, EXISTING
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- UNDERGROUND UTILITY
- E175.31 — EXISTING SPOT GRADE
- F175.31 — PROPOSED SPOT GRADE
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

GRADING PLANS TABLE OF CONTENTS:

SHEET #9: OVERVIEW GRADING & DRAINAGE PLAN
SHEET #10: P&P FAWN DRIVE 0+00-4+00
SHEET #11: P&P FAWN DRIVE 4+00-END
SHEET #12: COMMON AREA AND PIPE PROFILES
SHEETS #13-#17: STORMWATER BMPs #101-#102, #201-203
SHEET #18: EROSION & SEDIMENT CONTROL PLAN
SHEET #19: CROSS SECTIONS FAWN DRIVE 0+00 - END & POROUS PRODUCT SPECIFICATIONS (P-103 & P-104)
SHEETS #27-#28: EROSION & SEDIMENT CONTROL DETAILS E-101-E102
SHEETS #29-#31: CONSTRUCTION DETAILS C-101-C103
SHEETS #32-#33: DRAINAGE CONSTRUCTION DETAILS D-101-D102

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

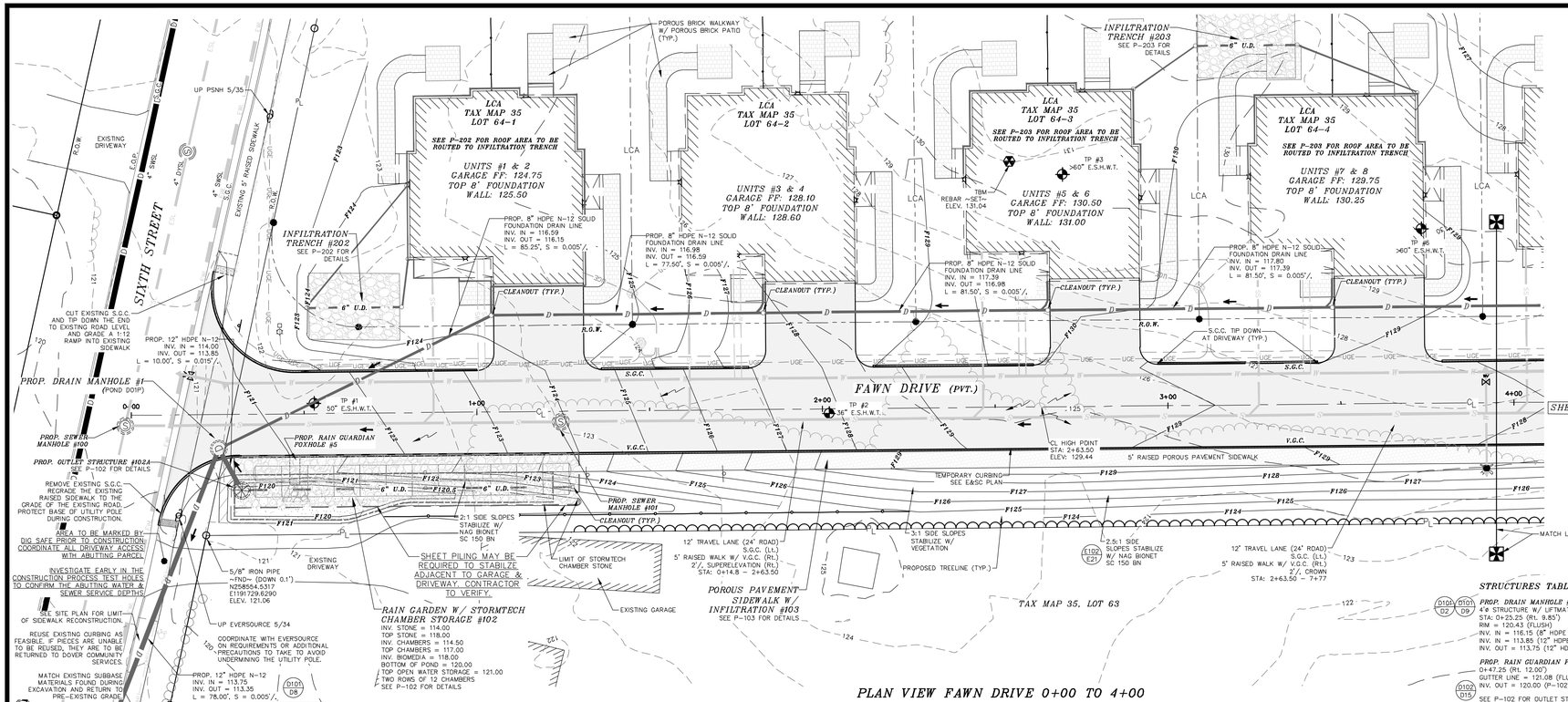
OVERVIEW GRADING & DRAINAGE PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

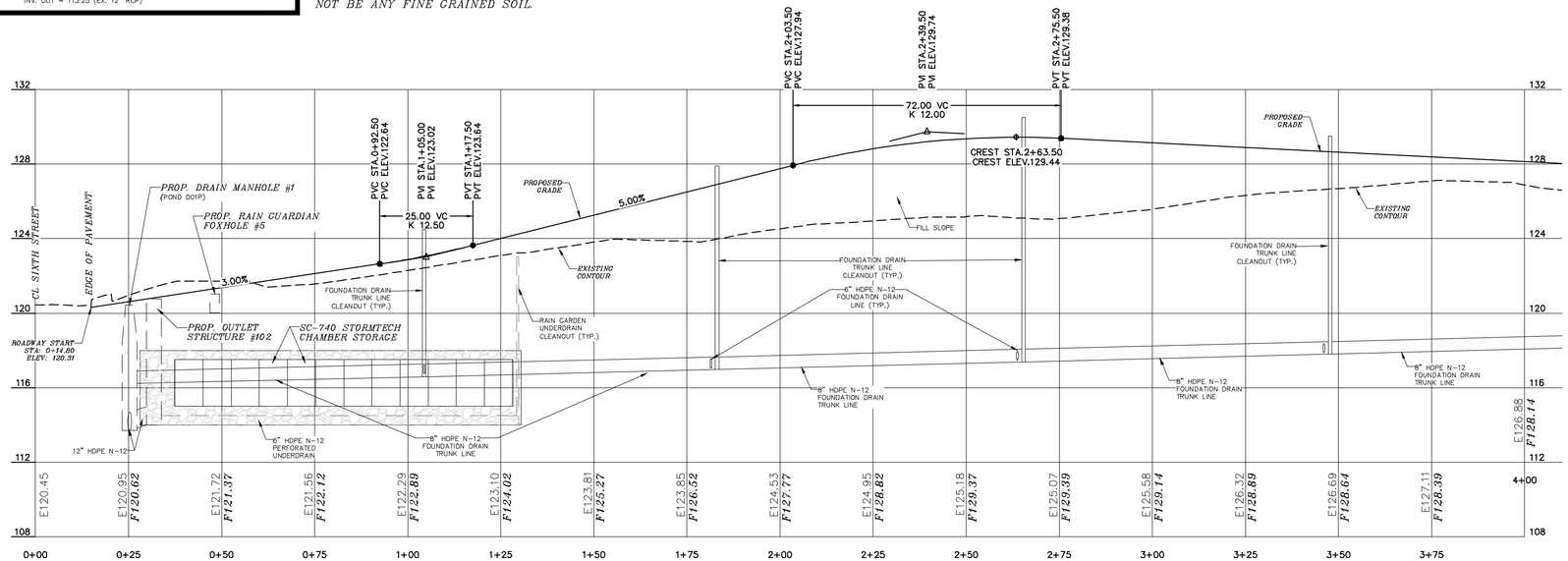


PLAN VIEW FAWN DRIVE 0+00 TO 4+00

ROAD NOTE:

GRANULAR FILL REQUIRED WITHIN 12" OF SELECT MATERIALS. COMPACT ALL ROAD FILL MATERIALS IN 6" LIFTS. UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM, THE GRANULAR FILL BE GRAVELLY OR SANDY SOIL AND WILL NOT BE ANY FINE GRAINED SOIL.

PROFILE VIEW FAWN DRIVE 0+00 TO 4+00



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- BUILDING SETBACK LINE
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- UNDERGROUND UTILITY
- E175.31 — EXISTING SPOT GRADE
- F175.31 — PROPOSED SPOT GRADE
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

PROJECT NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE GRADING & ENGINEERING DETAILS FOR THE PROPOSED SITE PLAN.

4.) SEE EROSION & SEDIMENT CONTROL PLANS FOR DETAILS ON PERIMETER CONTROL (MULCH BERM / FENCE / SILT SOXX).

5.) BS&E IS TO PROVIDE ADDITIONAL BENCHMARKS PRIOR TO CONSTRUCTION.

6.) EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

7.) SEE PROJECT NOTES SHEET FOR REMAINING GRADING NOTES. SEE EROSION & SEDIMENT CONTROL PLAN FOR LIMIT OF PROJECT DISTURBANCE.

8.)BASINS ARE TO HAVE NH STANDARD FRAMES AND GRATES MADE IN NORTH AMERICA. GRATES ARE TO BE INSTALLED BINDER FLUSH PRIOR TO BASE PAVE. UPON PROJECT COMPLETION FRAMES AND GRATES ARE TO BE CUT AND RIM RAISED TO FINAL PAVEMENT SURFACE. THIS IS TO ENSURE STORMWATER ENTERS THE SYSTEM AS DESIGN DURING THE INTERIM CONSTRUCTION PERIOD. CATCH BASINS AREA TO BE WITH OUT SUMPS. MANUFACTURERS BASES ARE TO BE FILLED WITH WASHED CRUSHED STONE ON SITE AS NEEDED.

9.) SEE P201–203 FOR THE ROOF AREAS THAT ARE REQUIRED TO BE GUTTERED AND ROUTED TO THE THREE INFILTRATION TRENCH LOCATIONS FOR GROUNDWATER RECHARGE.

REVISION	DATE	DESCRIPTION

PLAN & PROFILE FAWN DRIVE 0+00 TO 4+00
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14343 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

STRUCTURES TABLE:

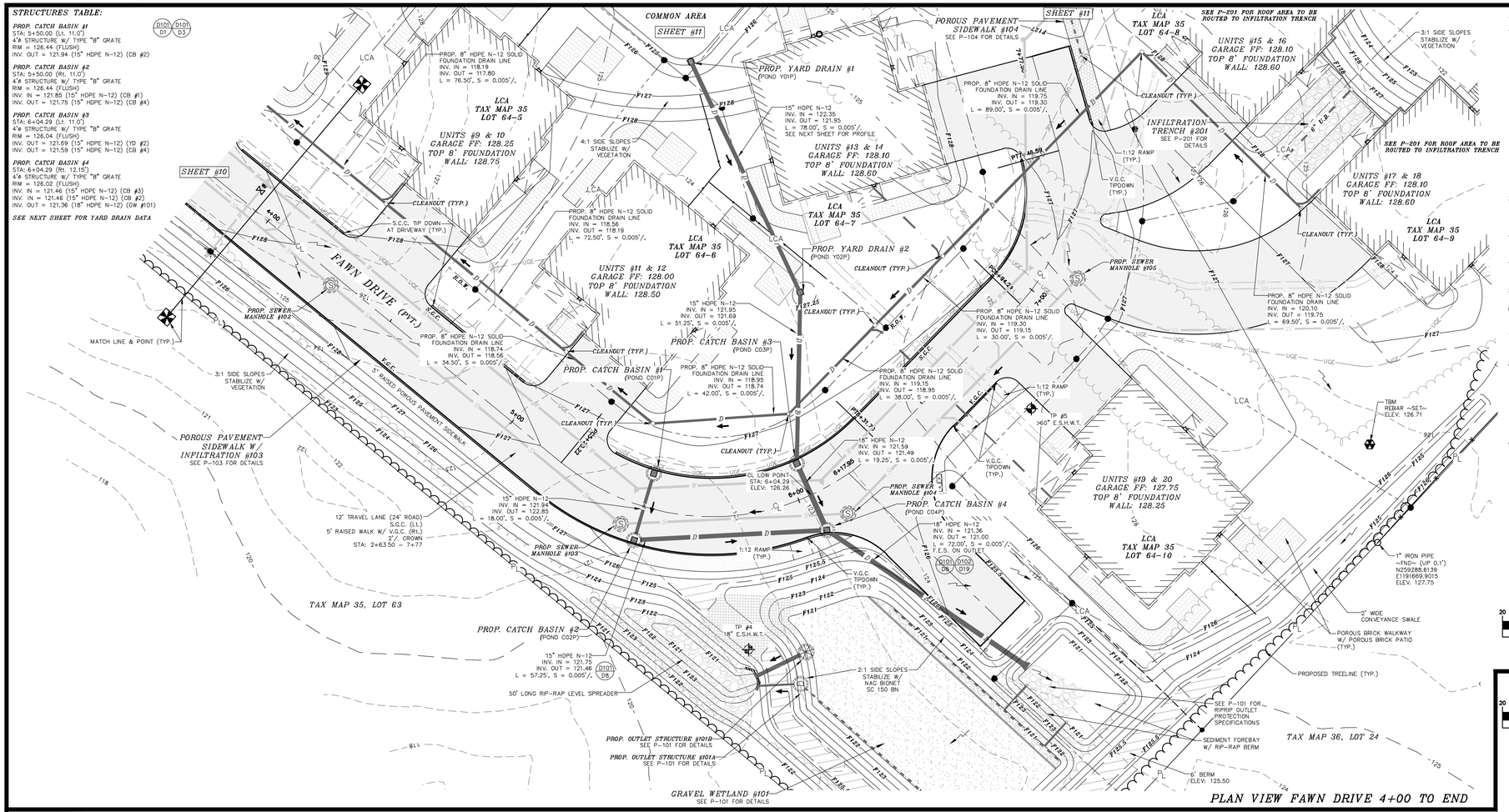
PROP. CATCH BASIN #1
STA: 5+50.00 (Lt. 11.0')
4'ø STRUCTURE W/ TYPE "B" GRATE
RIM = 126.44 (FLUSH)
INV. OUT = 121.94 (15" HDPE N-12) (CB #2)

PROP. CATCH BASIN #2
STA: 5+50.00 (Rt. 11.0')
4'ø STRUCTURE W/ TYPE "B" GRATE
RIM = 126.44 (FLUSH)
INV. IN = 121.85 (15" HDPE N-12) (CB #1)
INV. OUT = 121.75 (15" HDPE N-12) (CB #4)

PROP. CATCH BASIN #3
STA: 6+04.29 (Lt. 11.0')
4'ø STRUCTURE W/ TYPE "B" GRATE
RIM = 126.04 (FLUSH)
INV. OUT = 121.69 (15" HDPE N-12) (YD #2)
INV. OUT = 121.59 (15" HDPE N-12) (CB #4)

PROP. CATCH BASIN #4
STA: 6+04.29 (Rt. 12.15')
4'ø STRUCTURE W/ TYPE "B" GRATE
RIM = 126.02 (FLUSH)
INV. IN = 121.46 (15" HDPE N-12) (CB #3)
INV. IN = 121.46 (15" HDPE N-12) (CB #2)
INV. OUT = 121.36 (18" HDPE N-12) (GW #101)

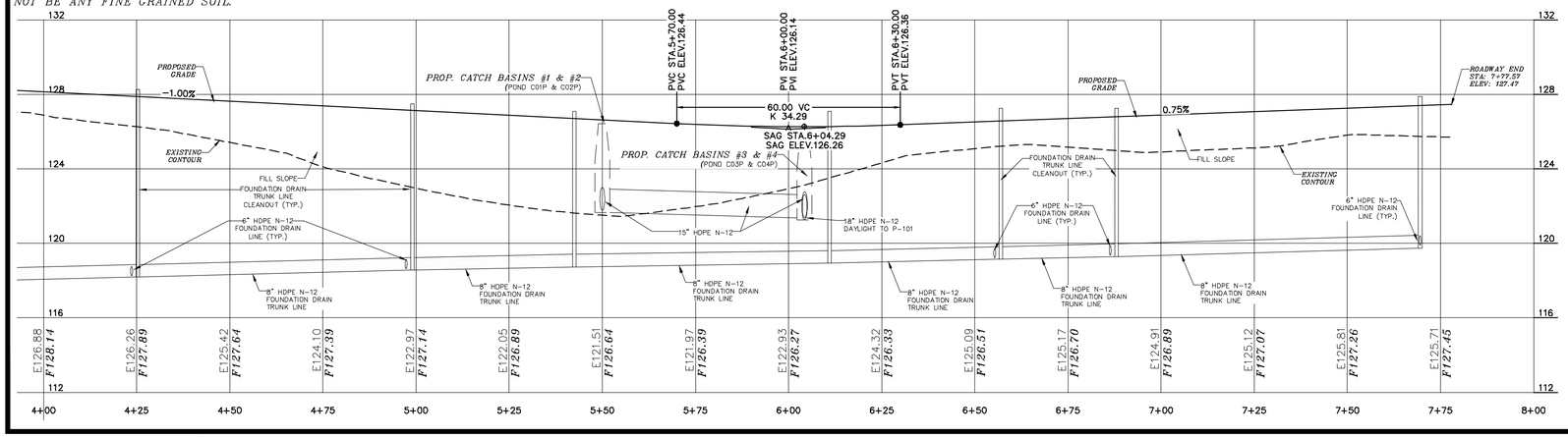
SEE NEXT SHEET FOR YARD DRAIN DATA



PLAN VIEW FAWN DRIVE 4+00 TO END

ROAD NOTE:

GRANULAR FILL REQUIRED WITHIN 12" OF SELECT MATERIALS. COMPACT ALL ROAD FILL MATERIALS IN 6" LIFTS. UNDER THE UNIFIED SOIL CLASSIFICATION SYSTEM, THE GRANULAR FILL BE GRAVELLY OR SANDY SOIL AND WILL NOT BE ANY FINE GRAINED SOIL.



PROFILE VIEW FAWN DRIVE 4+00 TO END

PROJECT NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE GRADING & ENGINEERING DETAILS FOR THE PROPOSED SITE PLAN.

4.) SEE EROSION & SEDIMENT CONTROL PLANS FOR DETAILS ON PERIMETER CONTROL (MULCH BERM / FENCE / SILT SOXX).

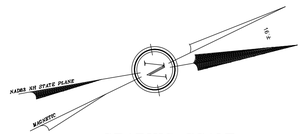
5.) BS&E IS TO PROVIDE ADDITIONAL BENCHMARKS PRIOR TO CONSTRUCTION.

6.) EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

7.) SEE PROJECT NOTES SHEET FOR REMAINING GRADING NOTES. SEE EROSION & SEDIMENT CONTROL PLAN FOR LIMIT OF PROJECT DISTURBANCE.

8.)BASINS ARE TO HAVE NH STANDARD FRAMES AND GRATES MADE IN NORTH AMERICA. GRATES ARE TO BE INSTALLED BINDER FLUSH PRIOR TO BASE PAVE. UPON PROJECT COMPLETION FRAMES AND GRATES ARE TO BE CUT AND RIM RAISED TO FINAL PAVEMENT SURFACE. THIS IS TO ENSURE STORMWATER ENTERS THE SYSTEM AS DESIGN DURING THE INTERIM CONSTRUCTION PERIOD. CATCH BASINS AREA TO BE WITH OUT SUMPS. MANUFACTURERS BASES ARE TO BE FILLED WITH WASHED CRUSHED STONE ON SITE AS NEEDED.

9.) SEE P201-203 FOR THE ROOF AREAS THAT ARE REQUIRED TO BE GUTTERED AND ROUTED TO THE THREE INFILTRATION TRENCH LOCATIONS FOR GROUNDWATER RECHARGE.



GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

LEGEND:

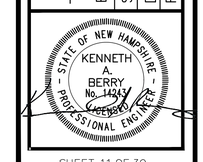
- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- BUILDING SETBACK LINE
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- UNDERGROUND UTILITY
- E175.31 — EXISTING SPOT GRADE
- F175.31 — PROPOSED SPOT GRADE
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

REVISION	DATE	DESCRIPTION

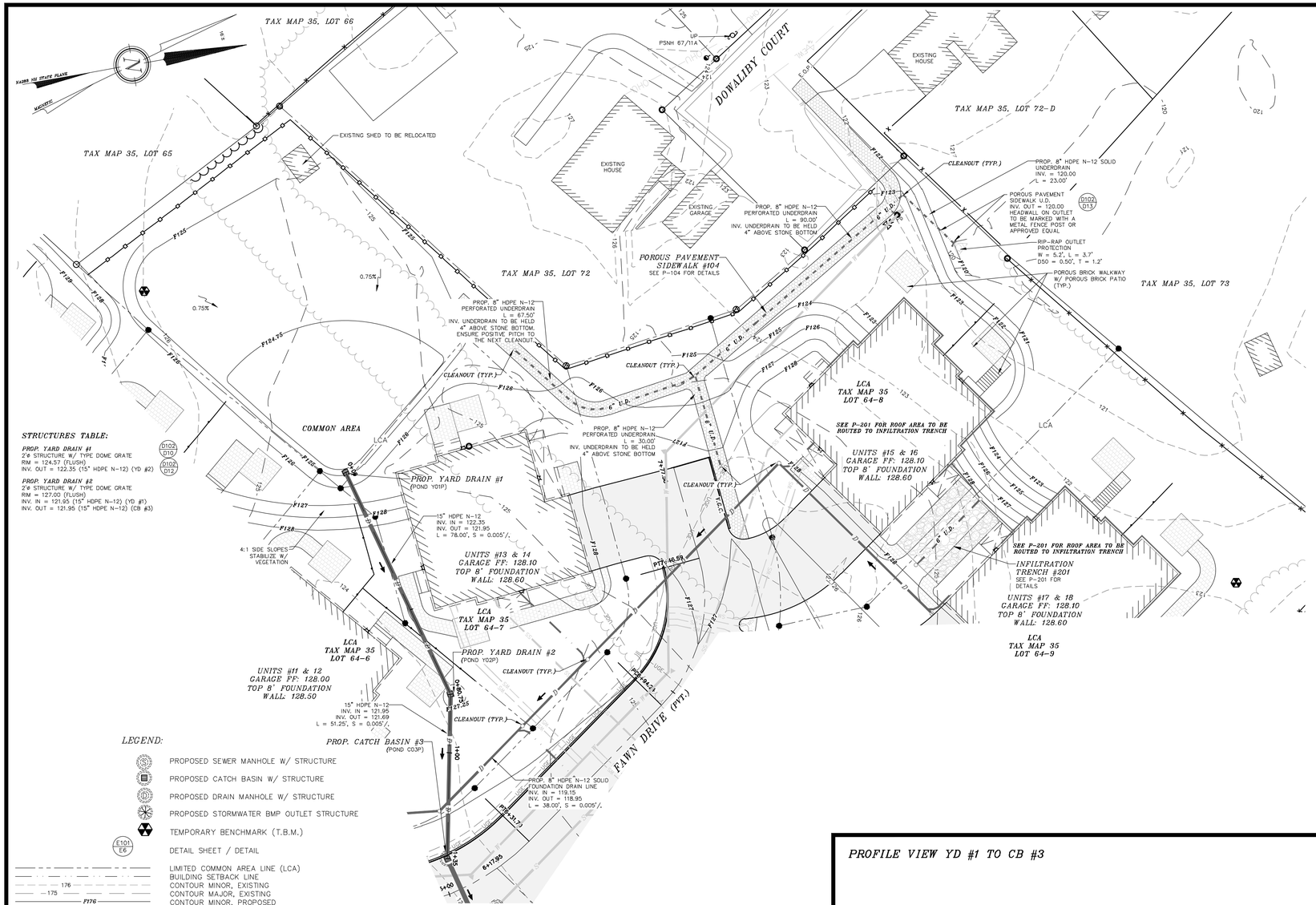
PLAN & PROFILE FAWN DRIVE 4+00 TO END
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018



NOT FOR CONSTRUCTION



STRUCTURES TABLE:

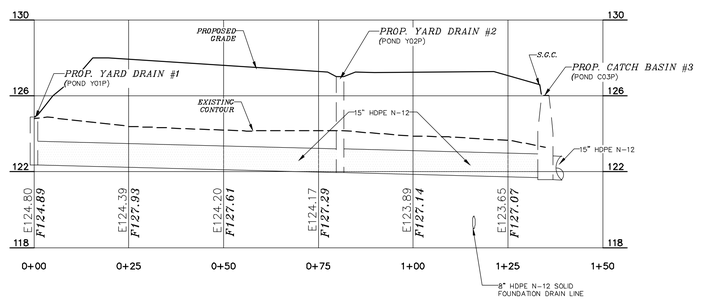
PROP. YARD DRAIN #1
2'ø STRUCTURE W/ TYPE DOME GRATE
RIM = 124.57 (FLUSH)
INV. OUT = 122.35 (15" HDPE N-12) (YD #2)

PROP. YARD DRAIN #2
2'ø STRUCTURE W/ TYPE DOME GRATE
RIM = 127.00 (FLUSH)
INV. IN = 121.95 (15" HDPE N-12) (YD #1)
INV. OUT = 121.95 (15" HDPE N-12) (CB #3)

LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- BUILDING SETBACK LINE
- CONTOUR MINOR, EXISTING
- CONTOUR MAJOR, EXISTING
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDERDRAIN
- UNDERGROUND UTILITY
- E175.31 — EXISTING SPOT GRADE
- F175.31 — PROPOSED SPOT GRADE
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

PROFILE VIEW YD #1 TO CB #3



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

PROJECT NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE GRADING & ENGINEERING DETAILS FOR THE PROPOSED SITE PLAN.

4.) SEE EROSION & SEDIMENT CONTROL PLANS FOR DETAILS ON PERIMETER CONTROL (MULCH BERM / FENCE / SILT SOXX).

5.) BS&E IS TO PROVIDE ADDITIONAL BENCHMARKS PRIOR TO CONSTRUCTION.

6.) EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

7.) SEE PROJECT NOTES SHEET FOR REMAINING GRADING NOTES. SEE EROSION & SEDIMENT CONTROL PLAN FOR LIMIT OF PROJECT DISTURBANCE.

8.)BASINS ARE TO HAVE NH STANDARD FRAMES AND GRATES MADE IN NORTH AMERICA. GRATES ARE TO BE INSTALLED BINDER FLUSH PRIOR TO BASE PAVE. UPON PROJECT COMPLETION FRAMES AND GRATES ARE TO BE CUT AND RIM RAISED TO FINAL PAVEMENT SURFACE. THIS IS TO ENSURE STORMWATER ENTERS THE SYSTEM AS DESIGN DURING THE INTERIM CONSTRUCTION PERIOD. CATCH BASINS AREA TO BE WITH OUT SUMPS. MANUFACTURERS BASES ARE TO BE FILLED WITH WASHED CRUSHED STONE ON SITE AS NEEDED.

9.) SEE P201-203 FOR THE ROOF AREAS THAT ARE REQUIRED TO BE GUTTERED AND ROUTED TO THE THREE INFILTRATION TRENCH LOCATIONS FOR GROUNDWATER RECHARGE.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISION	DATE	DESCRIPTION

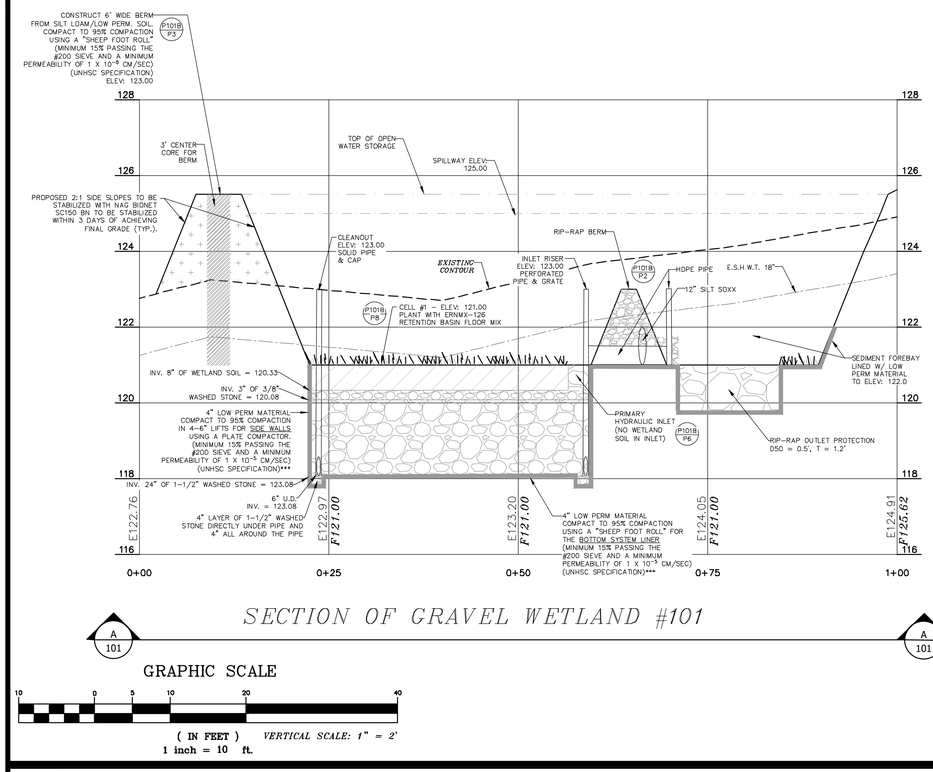
COMMON AREA AND PIPE PROFILE
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



SECTION OF GRAVEL WETLAND #101

A 101 — A 101

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET) VERTICAL SCALE: 1" = 2'
1 inch = 10 ft.

*** NOTE: THE UNDERLYING MATERIAL MAY QUALIFY AS LOW PERM. MATERIAL. COORDINATE WITH DESIGN ENGINEER

CONSTRUCTION SEQUENCE NOTE:
EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E-101 FOR FULL CONSTRUCTION SEQUENCE.

WETLAND SOIL SURFACE PROTECTION NOTE:
SEE EROSION AND SEDIMENT CONTROL PLAN
IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PROTECT THE WETLAND SOIL SURFACE FROM SEDIMENTATION CAUSED BY EROSION ON THE SIDE SLOPES.

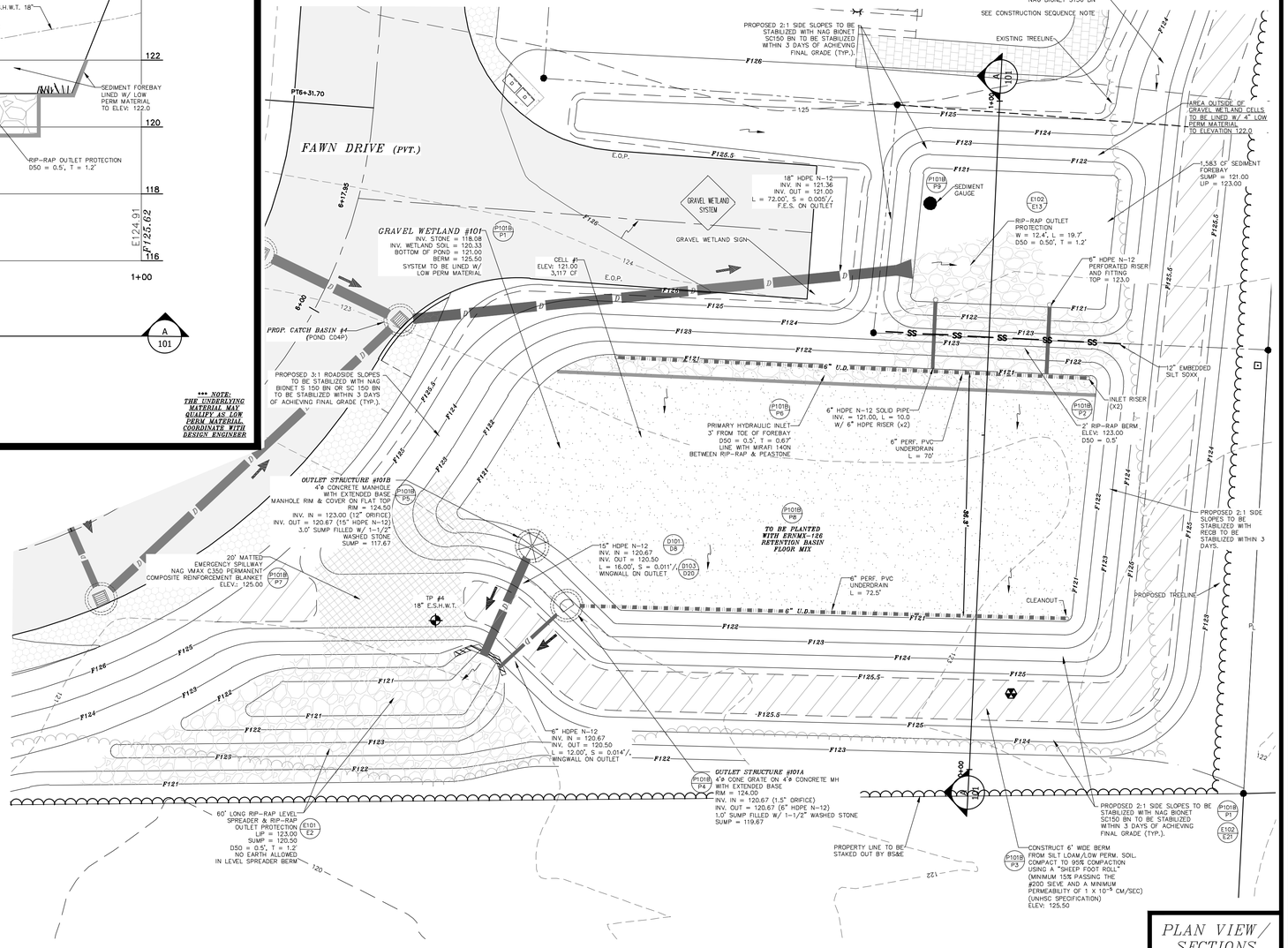
PLAN VIEW GRAVEL WETLAND #101 SEE P-101B FOR DETAILS

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES			
d50 SIZE=	0.5	FEET	6 INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE		SIZE OF STONE (INCHES) FROM	TO
100%		9	12
85%		8	11
50%		6	9
15%		2	3



LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E8 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- D — D — PROPOSED DRAINAGE LINE
- U.D. — U.D. — PROPOSED UNDERDRAIN
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

PLAN VIEW / SECTIONS

P-101A

REVISION	DATE	DESCRIPTION

SUBSURFACE GRAVEL WETLAND #101 PLAN VIEW & PROFILES
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14247 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

MAINTENANCE REQUIREMENTS

ACTIVITY	CLOGGING AND SYSTEM PERFORMANCE	FREQUENCY
INSPECT INLETS AND OUTLETS TO ENSURE GOOD CONDITION AND NO EVIDENCE OF DETERIORATION. CHECK TO SEE IF HIGH-FLOW BYPASS IS FUNCTIONING.	REMEDY: REPAIR OR REPLACE ANY DAMAGED STRUCTUAL PARTS, INLETS AND OUTLETS. CLEAR OR REMOVE DEBRIS OR RESTRICTIONS.	ANNUALLY, MORE FREQUENTLY IN THE FIRST YEAR OF OPERATION
CHECK FOR INTERNAL EROSION, EVIDENCE OF SHORT-CIRCUITING, AND ANIMAL BURROWS.	REMEDY: SOIL EROSION FROM SHORT-CIRCUITING OR ANIMAL BOROUGHS SHOULD BE REPAIRED WHEN THEY OCCUR.	
CHECK THAT THE SYSTEM IS FULLY DRAINING WITHIN A 24-48 HOUR PERIOD AFTER RAIN EVENTS.	REMEDY: REPAIR OR RESTORE HYDRAULIC INLET OR OUTLET CONFIGURATION.	

VEGETATION

CHECK FOR ROBUST VEGETATION COVERAGE THROUGHOUT THE SYSTEM AND DEAD OR DYING PLANTS REMEDY: VEGETATION SHOULD COVER > 75% OF THE SYSTEM AND SHOULD BE RESEEDED AND CARED FOR AS NEEDED	ANNUALLY, OR AS NEEDED
CUT AND REMOVE VEGETATION FROM GRAVEL WETLAND SYSTEM AND FOREBAY IN ORDER TO MAINTAIN NITROGEN REMOVAL PERFORMANCE REMEDY: THE VEGETATION SHOULD BE CUT AND REMOVED FROM THE SYSTEM TO PREVENT NITROGEN FROM CYCLING BACK INTO THE SYSTEM	ONCE EVERY 3 YEARS

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1-1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

WETLAND SOIL

SIEVE SIZE	% PASSING BY WEIGHT
0.5	100
#10"	90 – 75
#100	40 – 50
#200	25 –50
SIEVE SIZE	% PASSING TOLERANCES
0.5	±10.0
#10	±5.0
#100	±5.0
#200	±5.0

CONSTRUCTION NOTE: THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER-DRAIN AND INTER-CHAMBER PIPES. PLEASE PROVIDE 24 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.

DESIGN REFERENCES

1 UNH STORMWATER CENTER

STABILIZATION NOTE:
SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

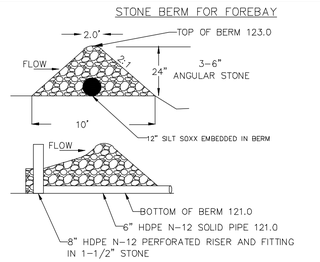
WETLAND SOIL PLANTING:
THE FLOOR OF THE SUBSURFACE GRAVEL WETLAND CELLS AT TO BE PLANTED WITH NEW ENGLAND WETLAND PLANT, INC. (N.E.W.P.) NEW ENGLAND WETMIX, OR APPROVED EQUAL. SEE DETAIL P8.

GRAVEL WETLAND CONSTRUCTION & MAINTENANCE SPECIFICATIONS

P1

P2

STONE BERM FOR FOREBAY

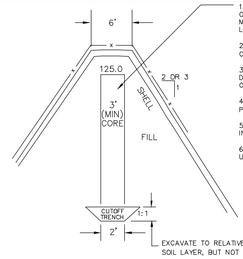


GRAVEL WETLAND SEDIMENT FOREBAY
NOT TO SCALE

P3

LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45



1.) 3" CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL MEETING THE REQUIREMENT OF THE LOW PERM SPECIFICATION

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

GRAVEL WETLAND BERM CONSTRUCTION
NOT TO SCALE

P4

TOP VIEW (OS #101A)
NOT TO SCALE

CAP WITH CONTROL ORIFICE (OS #101A)
NOT TO SCALE

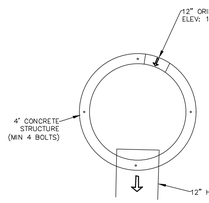
GRAVEL WETLAND STRUCTURES & DETAILS
NOT TO SCALE

PERFORATED RISER DETAIL
NOT TO SCALE

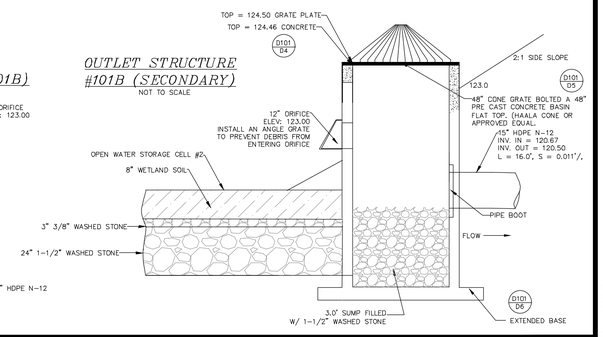
OUTLET STRUCTURE #101A (PRIMARY)
NOT TO SCALE

P5

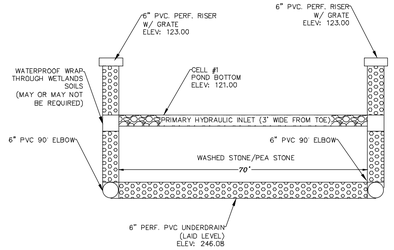
TOP VIEW (OS #101B)
NOT TO SCALE



OUTLET STRUCTURE #101B (SECONDARY)
NOT TO SCALE



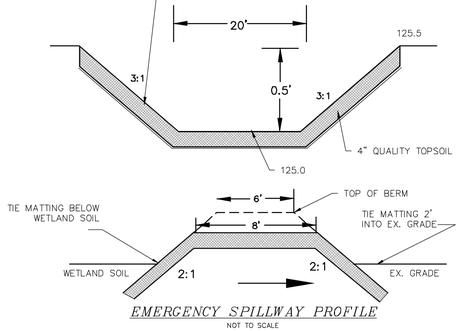
P6



GRAVEL WETLAND INLET SYSTEM
NOT TO SCALE

NOTE: THERE IS NO WETLAND SOIL IN THE GRAVEL WETLAND INLET SYSTEM

P7



EMERGENCY SPILLWAY PROFILE
NOT TO SCALE

P8

Retention Basin Floor Mix - Low Maintenance - ERNMX-126

	Botanical Name	Common Name	Price/Lb
20.00 %	*Panicum clandestinum, Tioga*	Deertongue, Tioga	22.08
20.00 %	*Poa wolfii, Rutz*	Alkaligrass, Rutz	4.36
18.00 %	*Elymus virginicus, Madison-NY Ecotype*	Virginia Wildrye, Madison-NY Ecotype	9.96
15.00 %	*Agrostis stolonifera, 'Pennacross'*	Creeping Bentgrass, 'Pennacross'	14.40
15.00 %	*Poa palustris*	Fowl Bluegrass	16.80
10.00 %	*Carex vulpinoidea, PA Ecotype*	Fox Sedge, PA Ecotype	28.80
1.00 %	*Carex scoparia, PA Ecotype*	Blunt Broom Sedge, PA Ecotype	81.60
1.00 %	*Juncus effusus*	Soft Rush	48.00
100.00 %		**Mix Price/Lb Bulk**	**$15.98**

Seeding Rate: 20-40 lbs per acre, or 0.5-1 lb/1,000 sq ft with a cover crop. For a cover crop use one of the following: grain rye (1 Sep to 30 Apr; 30 lbs/acre), Japenese millet (1 May to 31 Aug; 10 lbs/acre), or barnyard grass (1 May to 31 Aug; 10 lbs/acre).

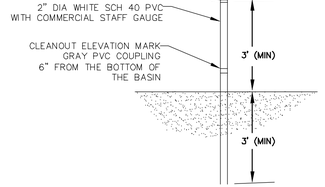
NOTE: TO BE USED FOR STORMWATER BMPS

BUTTERFLY MILK WEED IS A REQUIRED ADDITION TO ANY SEEDING DONE ON SITE.

Grasses & Grass-like Species - Herbaceous Perennial; Stormwater Management

The hardy inexpensive grass and grass-like species are ideal for retention basins that may have high salt inflows and where mowing may be required. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

P9



NOTES:
1. STAFF GAUGE TO BE TWO-INCH WHITE SCHEDULE 40 PVC PIPE DRIVEN INTO THE GROUND A MINIMUM OF 3-FEET.
2. A CLEANOUT MARK ON THE STAFF TO BE GRAY PVC COUPLING SET SIX-INCHES FROM THE BOTTOM OF THE BASIN.
3. A COMMERCIAL STAFF GAUGE WILL BE ATTACHED TO THE 2-INCH PVC PIPE WITH STAINLESS STEEL SCREWS.
4. SEDIMENT FOREBAY INSPECTION REQUIREMENTS: AT LEAST ANNUALLY OR MORE IF THE SEDIMENT LOAD EXCEEDS THE CLEANOUT MARK, CONDUCT PERIODIC MOWING OF THE SEDIMENT FOREBAY SLOPES AND EMBANKMENTS SEMI-ANNUALLY, REMOVE DEBRIS FROM THE OUTLET BERM AND DRAINS ANNUALLY, REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT BASED ON INSPECTION ACCUMULATING NO MORE THAN SIX-INCHES IN DEPTH.

DEPTH GAUGE – SEDIMENT FOREBAY
NOT TO SCALE

REVISION	DATE	DESCRIPTION

SUBSURFACE GRAVEL WETLAND #101 DETAILS

FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

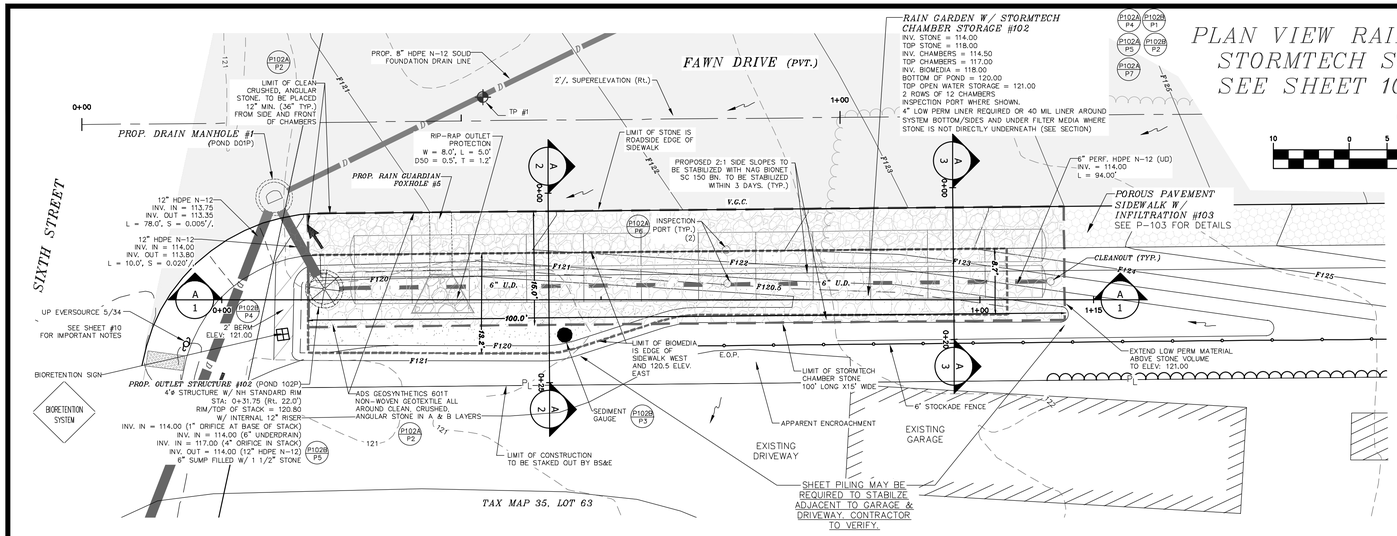
SCALE : NONE
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

DETAILS

P–102B

NOT FOR CONSTRUCTION



PLAN VIEW RAIN GARDEN #102 W/ STORMTECH SC-740 CHAMBERS SEE SHEET 102B FOR DETAILS

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

NAD83 NH STATE PLANE

MAGNETIC

CONSTRUCTION SEQUENCE NOTE:
EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E-101 FOR FULL CONSTRUCTION SEQUENCE.

BIOMEDIA SURFACE PROTECTION NOTE:
SEE EROSION AND SEDIMENT CONTROL PLAN
IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PROTECT THE BIOMEDIA SURFACE FROM SEDIMENTATION CAUSED BY EROSION ON THE SIDE SLOPES.

CONSTRUCTION NOTE:
THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER-DRAIN AND CHAMBERS. PLEASE PROVIDE 24-48 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.
A LETTER CERTIFYING AS TO THE CONSTRUCTION BY THE OWNER AND DESIGN ENGINEER IS REQUIRED AS A CONDITION OF THE ALTERATION OF TERRAIN PERMIT AND THE CITY OF DOVER.

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES		
d50 SIZE= 0.5 FEET 6 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 CONTOUR MINOR, EXISTING
- 175 CONTOUR MAJOR, EXISTING
- F176 CONTOUR MINOR, PROPOSED
- F175 CONTOUR MAJOR, PROPOSED
- CENTER LINE
- D PROPOSED DRAINAGE LINE
- 42"D.& 18"U.D. PROPOSED UNDERDRAIN
- LIMIT OF CRUSHED STONE
- LIMIT OF BIOMEDIA
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

REVISION	DATE	DESCRIPTION

STORMTECH SC740 CHAMBER DETENTION POND #102
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 14547 LICENSED PROFESSIONAL ENGINEER

SHEET 15 OF 39

P1

1. ALL DESIGN SPECIFICATIONS FOR STORMTECH SC-740 CHAMBERS SHALL BE IN ACCORDANCE WITH THE STORMTECH DESIGN MANUAL, ADVANCED DRAINAGE SYSTEM, INC (ADS STORMTECH)
2. THE INSTALLATION OF STORMTECH SC-740 CHAMBERS SHALL BE IN ACCORDANCE WITH THE LATEST STORMTECH INSTALLATION INSTRUCTIONS
3. THE CONTRACTOR IS ADVISED TO REVIEW AND UNDERSTAND THE INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLTION. CALL **1-888-892-2694** OR VISIT **WWW.STORMTECH.COM** TO RECIEVE A COPY OF THE LATEST STORMTECH INSTALLATION INSTRUCTIONS
4. CHAMBERS SHALL MEET THE DESIGN REQUIREMENTS AND LOAD FACTORS SPECIFIED IN SECTION 12.12 OF THE LATEST EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

SC-740 NOTES

P2

1-1/2" WASHED CRUSHED STONE * (AASHTO NO. 4)	
SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 - 100
1"	20 - 55
1/2"	0 - 15
3/8"	0 - 5

* EQUIVALENT TO STANDARD WASHED STONE - SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION[1]	COMPACTION/DENSITY REQUIREMENT
D	FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISH GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THIS LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE (B' LAYER) TO 18" (457 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THIS LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES. MOST PAVEMENT SUB-BASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTION AFTER 12" (305 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (152 mm) LIFTS TO A MIN. 95% STANDARD PROCTOR DENSITY. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs [53 kN]. DYNAMIC FORCE NOT TO EXCEED 20,000 lbs [89 kN]
B	EMBEDMENT STONE SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH [19 - 51 mm]	3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH [19 - 51 mm]	3, 35, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY[2].

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE.

2. AS AN ALTERNATE TO PROCTOR TESTING AND FIELD DENSITY MEASUREMENTS ON OPEN GRADED STONE, STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9in [229 mm] (MAX) LIFTS USING TWO FULL COVERAGES WITH AN APPROPRIATE COMPACTOR.

STORMTECH ACCEPTABLE FILL MATERIALS

P3

INSPECTION AND MAINTENANCE:

DUE TO THE CRITICAL NATURE OF INSPECTION AND MAINTENANCE STORMTECH SYSTEM AS DETAILED IN THE DESIGN MANUAL, ADVANCED DRAINAGE SYSTEM, INC (ADS STORMTECH) THE FOLLOWING THREE FIRMS ARE RECOMMENDED FOR THIS TASK. IT IS HIGHLY RECOMMENDED THAT THE OPERATOR OF THE PROPERTY HAVE A LONG TERM INSPECTION AND MAINTENANCE CONTACT WITH A FIRM THAT CAN COMPLETE THESE VITAL SERVICES.

AS FOR ISOLATOR ROW MAINTENANCE, CB MAINTENANCE, ETC., REGIONAL ADS REPRESENTATIVES RECOMMEND USING ANY OF THE FOLLOWING CONTACTS:

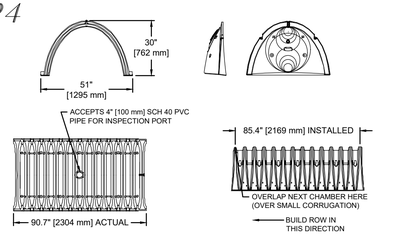
STORMWATER COMPLIANCE, LLC;
ATTN: NATHAN MARLES, 1-877-271-9055; NMARLES@LIDTECH.COM
163 THADEUS STREET, PORTLAND, ME 04106
INFO@STORMWATERCOMP.COM

TED BERRY COMPANY;
ATTN: DAVE BEAUCHAMP, 207-897-3348; DAVID.BEAUCHAMP@TEDBERRYCOMPANY.COM
521 FEDERAL ROAD, LIVERMORE, ME 04253
INFL@TEDBERRYCOMPANY.COM

BELLEMORE SEPTIC, SEWER, & DRAIN;
ATTN: RAY BELLEMORE, 603-641-6640; RAYMOND@BELLEMORE.COM
PO BOX 10369, BEDFORD, NH 03110

CONTACT AARON CHEEVER, P.E., ADVANCE DRAINAGE SYSTEMS, INC.
AARON.CHEEVER@ADS-PIPE.COM 1-978-302-0650
FOR PRODUCT AND PRICING

P4



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W x H x INSTALLED LENGTH)	51.0" x 30.0" x 85.4" [1295 mm x 762 mm x 2169 mm]
CHAMBER STORAGE	45.9 CUBIC FEET [1.30 m3]
MINIMUM INSTALLED STORAGE	74.9 CUBIC FEET [2.12 m3]
WEIGHT	75 lbs. [33.6 kg]

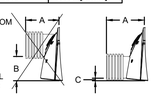
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART#	STUB	A	B	C
SC740EPE06T	6" [150 mm]	10.90" [277 mm]	18.50" [470 mm]	N/A
SC740EPE06B	6" [150 mm]	10.90" [277 mm]	N/A	0.50" [13 mm]
SC740EPE08T	8" [200 mm]	12.20" [310 mm]	16.50" [419 mm]	N/A
SC740EPE08B	8" [200 mm]	12.20" [310 mm]	N/A	0.60" [15 mm]
SC740EPE10T	10" [250 mm]	13.40" [340 mm]	14.50" [368 mm]	N/A
SC740EPE10B	10" [250 mm]	13.40" [340 mm]	N/A	0.70" [18 mm]
SC740EPE12T	12" [300 mm]	14.70" [373 mm]	12.50" [318 mm]	N/A
SC740EPE12B	12" [300 mm]	14.70" [373 mm]	N/A	1.20" [30 mm]
SC740EPE15T	12" [375 mm]	18.40" [467 mm]	9.00" [229 mm]	N/A
SC740EPE15B	12" [375 mm]	18.40" [467 mm]	N/A	1.30" [33 mm]
SC740EPE18T	18" [450 mm]	19.70" [500 mm]	5.00" [127 mm]	N/A
SC740EPE18B	18" [450 mm]	19.70" [500 mm]	N/A	1.60" [41 mm]
*SC740EPE24B	24" [600 mm]	18.50" [470 mm]	N/A	0.10" [3 mm]

NOTE: ALL DIMENSIONS ARE NOMINAL

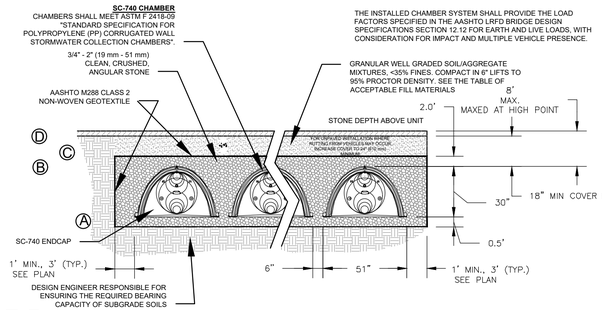
ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

*FOR THE SC740EPE24B THE 24" [600 mm] STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" [44 mm]. BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.



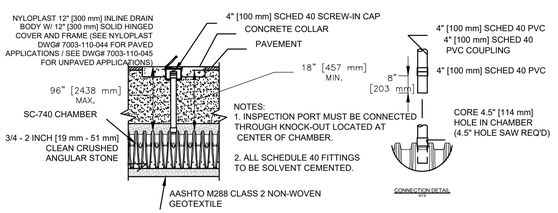
SC-740 TECHNICAL SPEC.

P5



SC-740 STANDARD CROSS SECTION

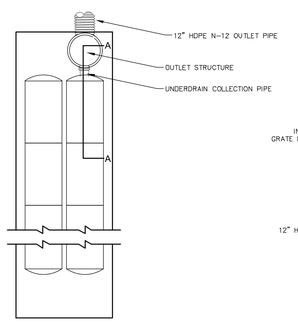
P6

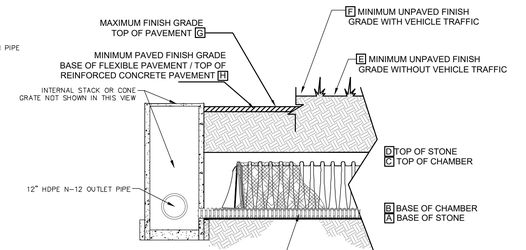


SC-740 INSPECTION PORT DETAIL

P7

	A	B	C	D	E	F	G	H	I
BED 1/ONLY	114.00	114.50	117.00	118.00	120.00	N/A	124.40	120.80	114.00





SC-740 ELEVATIONS

PLAN & STORMTECH DETAIL

P-102A

NOT FOR CONSTRUCTION

P1

BIORETENTION FILTER MEDIA MIXTURES			
Component Material	Percent of Mixture by Volume	Gradation of material	
		Sieve No.	Percent by Weight Passing Standard Sieve
Bioretention Filter Media Option A			
ASTM C-33 concrete sand	50 to 55		
Loamy sand topsoil, with fines as indicated	20 to 30	200	15 to 25
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200	< 5

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

NOTES

WHEN CONTRACTOR EXCAVATES RAIN GARDEN AREA TO SUBGRADE, DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL.

1. SOIL BIORETENTION FILTER MEDIA SHALL BE AS SHOWN ABOVE. "BIO MEDIA" MEANS BIORETENTION FILTER MEDIA.
2. COMPACTION IS NOT TO OCCUR IN THE RAIN GARDEN AREAS PRIOR TO CONSTRUCTION. SCARIFICATION REQUIRED IN THE EVENT COMPACTION TAKES PLACE.
3. DO NOT PLACE THE BIORETENTION SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
4. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF WATER FROM EXCAVATIONS) TO THE BIORETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
5. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS

1 SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 0.25 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.

2 PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

3 AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.

4 VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING, PRUNING, REMOVAL, AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

DESIGN REFERENCES

1 UNH STORMWATER CENTER

2 NEW HAMPSHIRE STORMWATER MANAGEMENT MANUAL, FEBRUARY 2025 AS AMENDED.

CONSTRUCTION SEQUENCE NOTE:

EROSION, SEDIMENT AND DETENTION CONTROL FACILITIES SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPs ARE STABILIZED. SWALES CONVEYING RUNOFF TO STORMWATER BMPs WILL BE CONSTRUCTED AND PUT INTO SERVICE ONCE THE RECEIVING STORMWATER BMP IS STABILIZED. SEE DETAIL E17, SHEET E-102 FOR FULL CONSTRUCTION SEQUENCE.

P2

RAIN GARDEN MIX

THE GRASS THAT IS PLANTED WITHIN A RAIN GARDEN BIO-FILTRATION SYSTEM WITHIN THE BIO-MEDIA MUST CONSIST OF A COMBINATION OF WARM SEASON GRASS SEED AND COLD SEASON GRASS SEED IN ORDER FOR THE GRASS TO START GROWING FOR STABILIZATION AND CONTINUE GROWING IN THE SANDY WELL-DRAINED ENVIRONMENT. PLANTING SPECIFICATION WILL MEET THE REQUIREMENTS AS OUTLINED IN 'VEGETATION NEW HAMPSHIRE SAND AND GRAVEL PITS' MIX 1 (WARM SEASON GRASSES) (15 LBS/AC) AND INCLUDE ANNUAL AND PERENNIAL RYE GRASS SEED (15 LBS/AC); THE NEW ENGLAND NATIVE WARM SEASON GRASS MIX (23 LBS/AC) BY NEW ENGLAND WETLAND PLANTS, INC.; RAIN GARDEN MIX 180 (15 LBS/AC & 15 LBS/AC OF RYE) / RAIN GARDEN GRASS MIX 180-1 (20 LBS/AC & 10 LBS/AC OF RYE) BY ERNST CONSERVATION SEEDS; OR APPROVED EQUAL.

Rain Garden Grass Mix - ERNMX-180-1

	Botanical Name	Common Name	Price/Lb
40.40 %	*Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype*	Little Bluestem, Fort Indiantown Gap-PA Ecotype	14.65
20.00 %	*Carex vulpinoidea, PA Ecotype*	Fox Sedge, PA Ecotype	31.20
20.00 %	*Elymus virginicus, Madison-NY Ecotype*	Virginia Wildrye, Madison-NY Ecotype	10.46
9.00 %	*Panicum clandestinum, Tioga*	Deertongue, Tioga	22.27
5.50 %	*Panicum rigidulum, PA Ecotype*	Redtop Panicgrass, PA Ecotype	72.00
4.00 %	*Chasmanthium latifolium, WI Ecotype*	River Oats, WI Ecotype	96.00
0.50 %	*Carex scoparia, PA Ecotype*	Blunt Broom Sedge, PA Ecotype	95.00
0.30 %	*Juncus effusus*	Soft Rush	48.00
0.30 %	*Juncus tenuis; PA Ecotype*	Path Rush, PA Ecotype	48.00
100.00 %		**Mix Price/Lb Bulk:**	**$24.82**

Seeding Rate: 15 lb per acre with a cover crop. For sites that drain within 24 hours of a rain event: use one of the following cover crops: Oats (1 Jan to 31 Jul; 30 lbs/acre), Japanese Millet (1 May to 31 Aug; 10 lbs/acre), or grain rye (1 Aug to 31 Dec; 30 lbs/acre).

NOTE: TO BE USED FOR STORMWATER BMPS

BUTTERFLY MILK WEED IS A REQUIRED ADDITION TO ANY SEEDING DONE ON SITE.

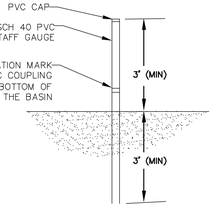
Grasses & Grass-like Species - Herbaceous Perennial; Stormwater Management

Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

STABILIZATION NOTE:

SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

P3



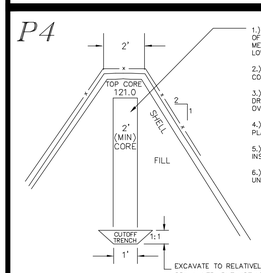
NOTES:

1. STAFF GAUGE TO BE TWO-INCH WHITE SCHEDULE 40 PVC PIPE DRIVEN INTO THE GROUND A MINIMUM OF 3-FEET.
2. A CLEANOUT MARK ON THE STAFF TO BE GRAY PVC COUPLING SET SIX-INCHES FROM THE BOTTOM OF THE BASIN.
3. A COMMERCIAL STAFF GAUGE WILL BE ATTACHED TO THE 2-INCH PVC PIPE WITH STAINLESS STEEL SCREWS.
4. SEDIMENT FOREBAY INSPECTION REQUIREMENTS: AT LEAST ANNUALLY OR MORE IF THE SEDIMENT LOAD EXCEEDS THE CLEANOUT MARK, CONDUCT PERIODIC MOWING OF THE SEDIMENT FOREBAY SLOPES AND EMBANKMENTS SEMI-ANNUALLY, REMOVE DEBRIS FROM THE OUTLET BERM AND DRAINS ANNUALLY, REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT BASED ON INSPECTION ACCUMULATING NO MORE THAN SIX-INCHES IN DEPTH.

SEDIMENT DEPTH GAUGE

NOT TO SCALE

P4



1.) 2' CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL MEETING THE REQUIREMENT OF THE LOW PERM SPECIFICATION

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

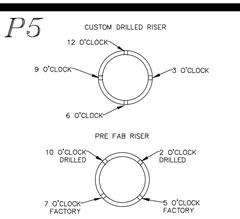
LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45

BERM & LINER CONSTRUCTION

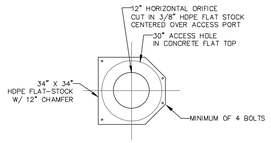
NOT TO SCALE

P5



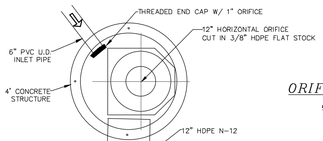
PERFORATED RISER DETAIL

NOT TO SCALE



ORIFICE SCHEMATIC #102A

NOT TO SCALE

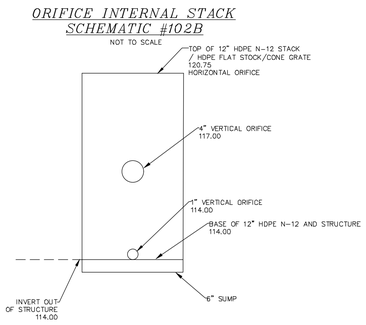


TOP VIEW

NOT TO SCALE (NO INTERNAL STACK IN THIS VIEW)

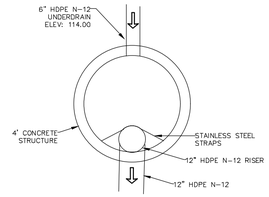
ORIFICE INTERNAL STACK SCHEMATIC #102B

NOT TO SCALE



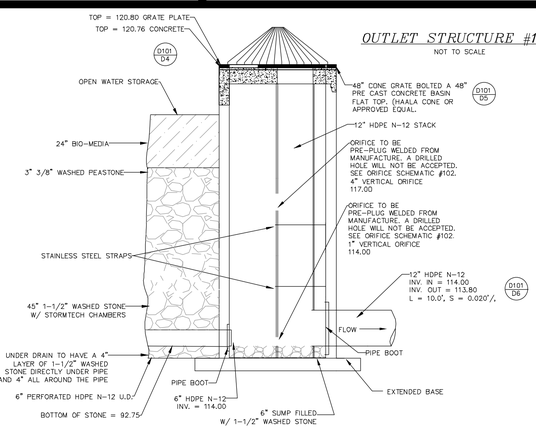
TOP VIEW

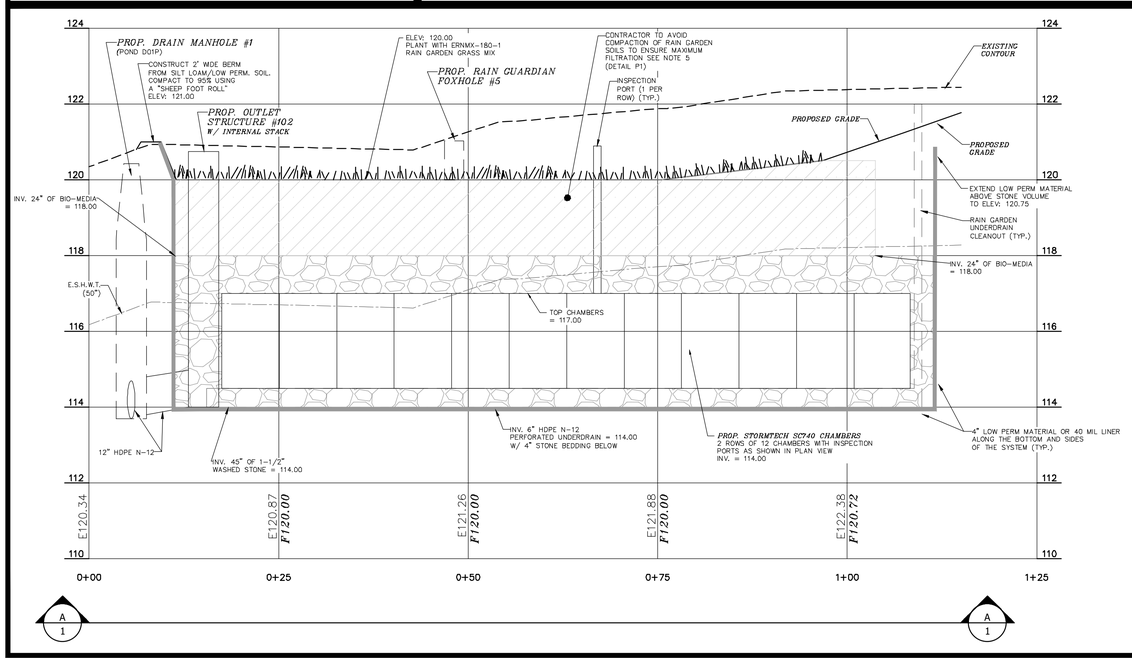
NOT TO SCALE (NO HDPE FLAT STOCK AND GRATE IN THIS VIEW)

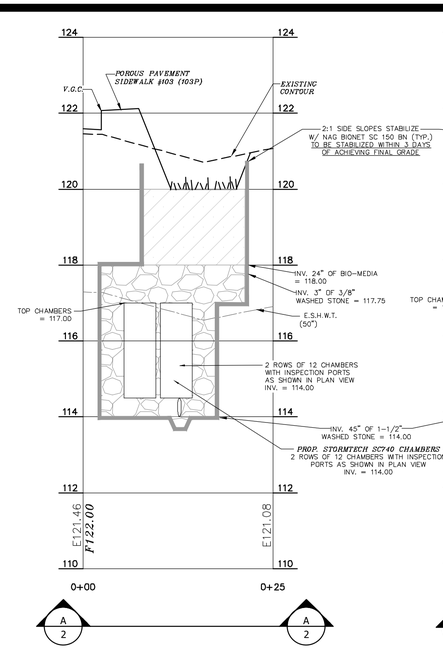


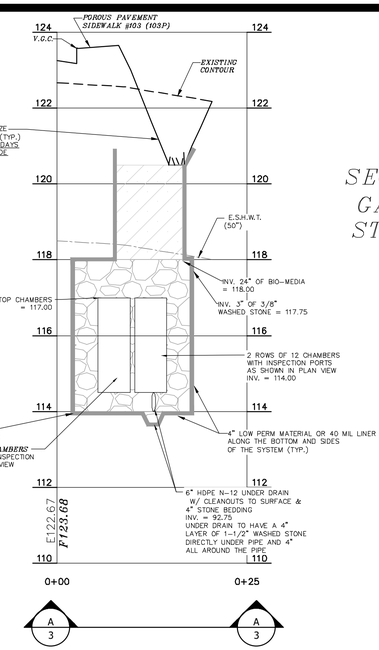
OUTLET STRUCTURE #102

NOT TO SCALE









SECTIONS OF RAIN GARDEN #102 W/ STORMTECH SC740 CHAMBERS

SECTIONS & RAIN GARDEN DETAIL

P-102B

REVISION	DATE	DESCRIPTION

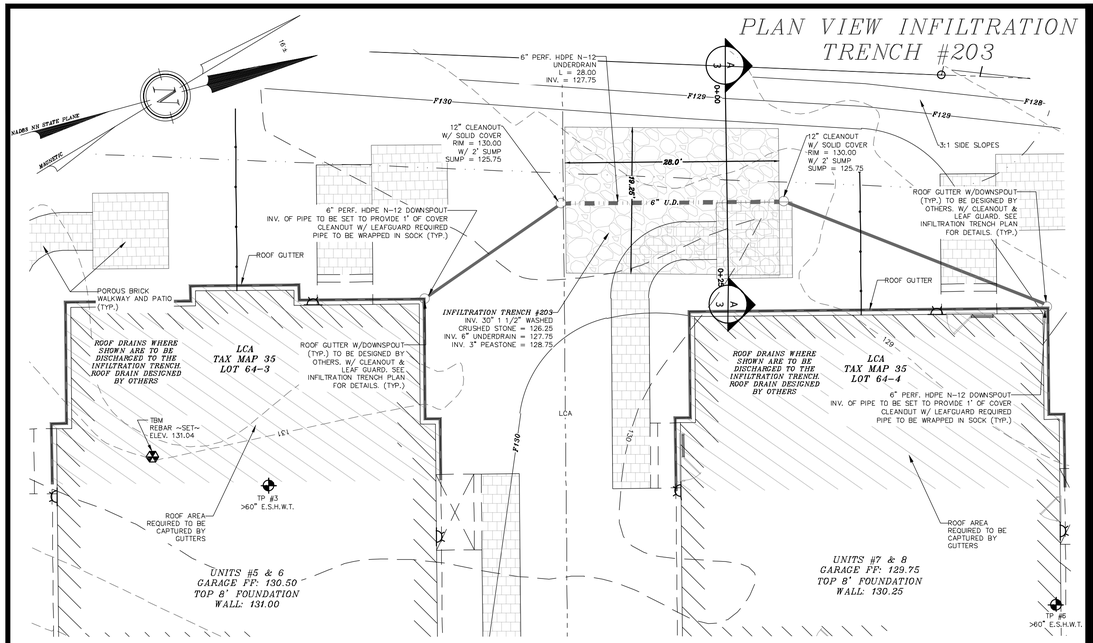
RAIN GARDEN #102 W/ STORMTECH SC740
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

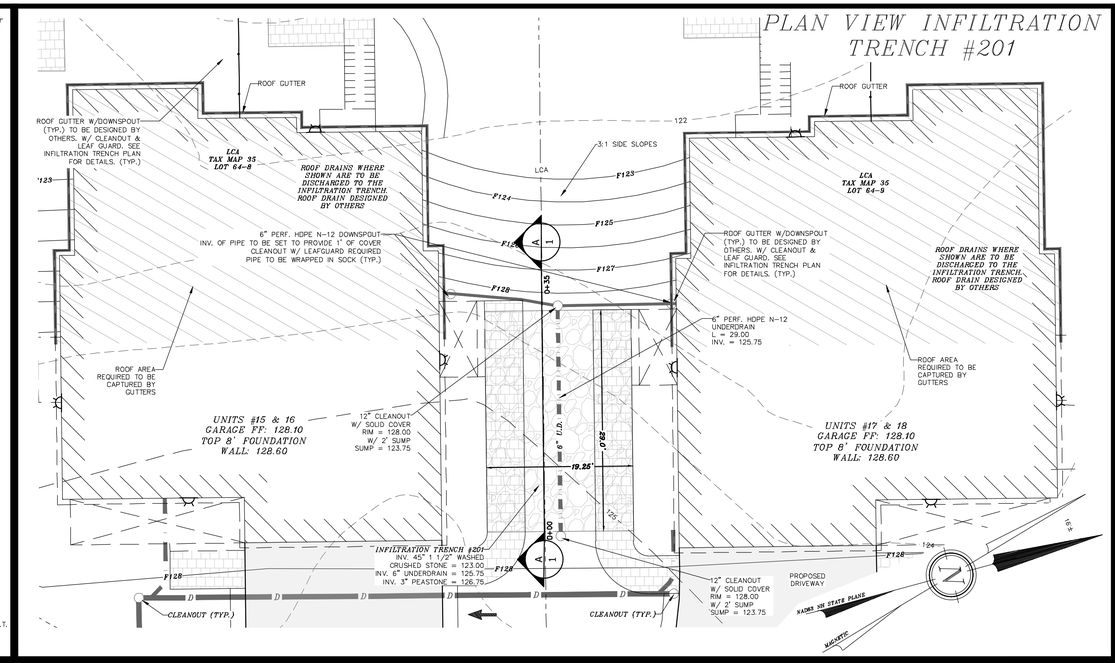
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 14847
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION





GRAPHIC SCALE

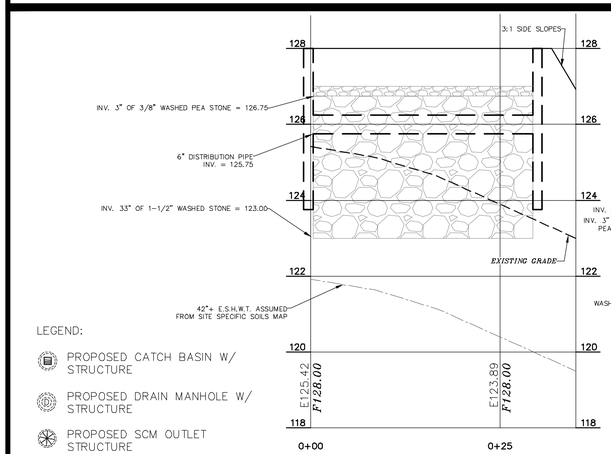
10 0 5 10 20 40

VERTICAL SCALE: 1" = 2' (IN FEET) 1 inch = 10 ft.

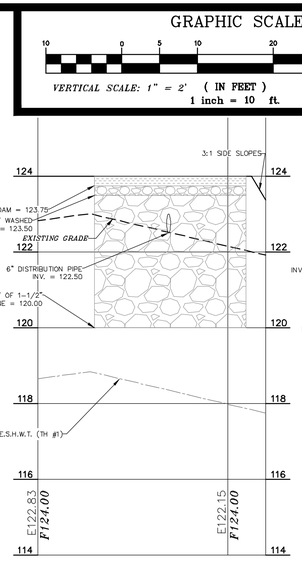
GRAPHIC SCALE

10 0 5 10 20 40

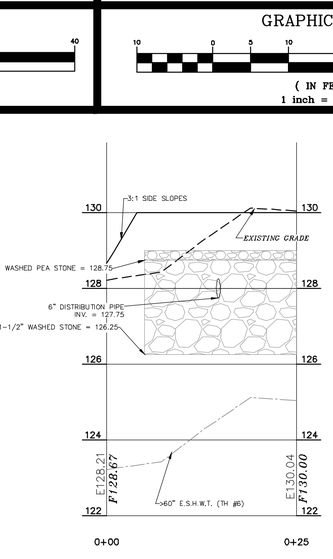
(IN FEET) 1 inch = 10 ft.



SECTION OF P-201



SECTION OF P-202



SECTION OF P-203

LEGEND:

- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED SCM OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- FI176 — CONTOUR MINOR, PROPOSED
- FI175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- D — D — PROPOSED DRAINAGE LINE
- U.D. — U.D. — PROPOSED UNDERDRAIN
- FLOW ARROW
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS
- ROOF AREA TO BE GUTTERED TO INFILTRATION TRENCH

NOTES

1. WHEN CONTRACTOR EXCAVATES INFILTRATION AREA TO SUBGRADE, DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL. COMPACTION IS NOT TO OCCUR IN THE INFILTRATION AREAS PRIOR TO CONSTRUCTION. SCARIFICATION REQUIRED IN THE EVENT COMPACTION TAKES PLACE.
2. DO NOT PLACE THE INFILTRATION SYSTEM SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN STABILIZED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
3. DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF WATER FROM EXCAVATIONS) TO THE INFILTRATION AREA DURING ANY STAGE OF CONSTRUCTION.
4. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

MAINTENANCE REQUIREMENTS

1 SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.

2 PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

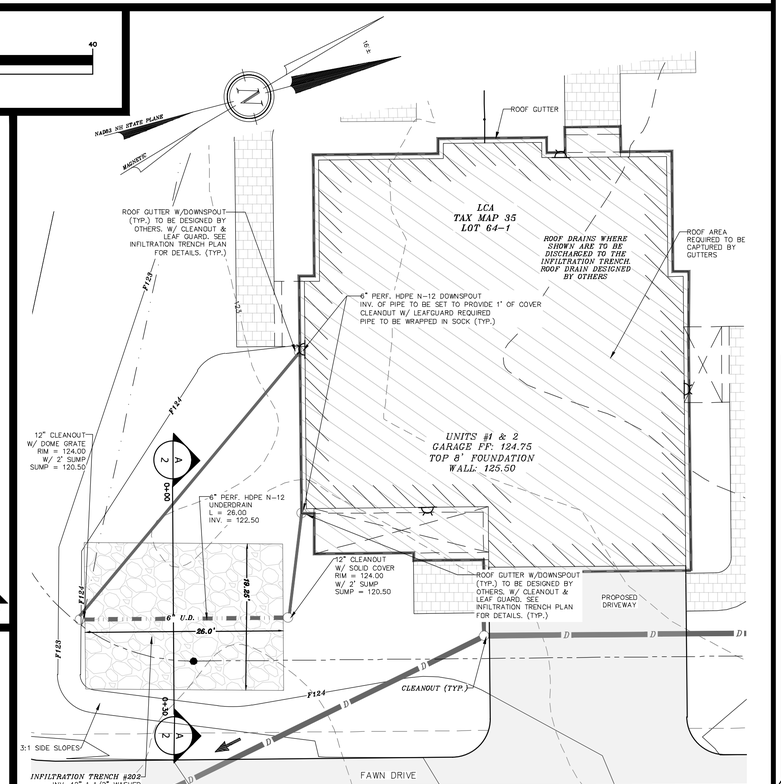
1-1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1-1/2"	90 – 100
1"	20 – 55
1-1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

NHDES AoT REQUIREMENTS

A LETTER SIGNED BY A QUALIFIED ENGINEER MUST BE PROVIDED TO DES STATING THAT THE INDIVIDUAL OBSERVED ANY UNDERGROUND DETENTION, INFILTRATION, OR FILTERING SYSTEMS PRIOR TO BACKFILLING, AND WHETHER, IN HIS OR HER PROFESSIONAL OPINION, THE SYSTEMS CONFORM TO THE APPROVED PLANS AND SPECIFICATIONS



PLAN VIEW INFILTRATION TRENCH #202

P-201 – P203

REVISION	DATE	DESCRIPTION

INFILTRATION TRENCHES #201, #202, #203
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14241 — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS SHOW THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES.

10.) CITY OF DOVER: IN ACCORDANCE WITH SITE PLAN REVIEW REGULATIONS (153-14) THE FOLLOWING STORMWATER MEASURES ARE REQUIRED.

A.) ALL PROPOSED SCMs WILL CONFORM TO THE NH STORMWATER MANUAL (FEBRUARY 2025).

B.) EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SOIL LAND DISTURBANCE AND MUST BE REVIEWED AND APPROVED BY COMMUNITY SERVICE.

C.) TEMPORARY STABILIZATION MEASURES SHOULD BE IN PLACE WITHIN SEVEN CALENDAR DAYS FOR EXPOSED SOILS AREAS THAT ARE WITHIN ONE HUNDRED FEET OF A SURFACE WATER BODY OR A WETLAND AND NO MORE THAN 14 CALENDAR DAYS FOR ALL OTHER AREAS. PERMANENT STABILIZATION SHOULD BE IN PLACE WITHIN THREE CALENDAR DAYS FOLLOWING COMPLETION OF FINAL GRADING OF EXPOSED SOIL AREAS.

D.) ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED IN FUNCTIONING CONDITION UNTIL FINAL STABILIZATION IS ACCOMPLISHED. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED AFTER FINAL SITE STABILIZATION. TRAPPED SEDIMENT AND OTHER DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED WITHIN 30 CALENDAR DAYS UNLESS CONDITIONS DICTATE OTHERWISE.

E.) COMMUNITY SERVICES DEPARTMENT OR THEIR DESIGNATED AGENT SHALL HAVE ACCESS TO THE SITE TO COMPLETE ROUTINE INSPECTIONS AND SHALL BE NOTIFIED 24-HOURS PRIOR TO INSTALLATION OF A STORMWATER BMP IN ORDER TO SCHEDULE AN INSPECTION, DURING NORMAL WORKING HOURS.

F.) THE PLANNING BOARD OR COMMUNITY SERVICES MAY REQUIRE THE DESIGN ENGINEER AND/OR AN INDEPENDENT, THIRD-PARTY INSPECTION AND OVERSIGHT OF THE CONSTRUCTION OF STORMWATER MANAGEMENT FACILITIES AND EROSION AND SEDIMENT CONTROL AT THEIR DISCRETION. THE OWNER / APPLICANT IS RESPONSIBLE FOR ALL FEES ASSOCIATED WITH INSPECTIONS.

G.) ALL SWPPP/SWMP INSPECTIONS MUST BE CONDUCTED BY A QUALIFIED PROFESSIONAL SUCH AS A PROFESSIONAL ENGINEER (PE), A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), A CERTIFIED EROSION SEDIMENT AND STORMWATER INSPECTOR (CESSW), OR A CERTIFIED PROFESSIONAL IN STORMWATER QUALITY (CPSWQ). INSPECTION REPORTS WILL BE SUBMITTED TO THE COMMUNITY SERVICES DEPARTMENT.

H.) THE OWNER IS ULTIMATELY RESPONSIBLE FOR THE INSTALLATION, CONSTRUCTION, INSPECTION, AND DISPOSITION OF ALL STORMWATER MANAGEMENT AND EROSION CONTROL MEASURES REQUIRED BY THE PROVISIONS OF THESE REGULATIONS.

I.) STORMWATER MANAGEMENT PLAN (SWMP) SUBMITTAL REQUIREMENTS. AT THE DISCRETION OF THE PLANNING BOARD OR COMMUNITY SERVICES DEPARTMENT, A TECHNICAL REVIEW BY AN INDEPENDENT THIRD PARTY MAY BE REQUIRED OF ANY SWMP PREPARED UNDER THESE REGULATIONS. SUCH A REVIEW SHALL BE PERFORMED BY A QUALIFIED PROFESSIONAL CONSULTANT AND THE EXPENSE OF WHICH SHALL BE THE FULL RESPONSIBILITY OF THE OWNER/APPLICANT.

SOILS & DEWATERING:

26	*WINDSOR*	*FINE SANDY LOAM*	*K= 0.17*
32	*BOXFORD*	*SILT LOAM*	*K= 0.49*
238	*ELMRIDGE*	*FINE SANDY LOAM*	*K= 0.48*
327	*WINDSOR (CLAY SUBSOIL)*	*LOAMY SAND*	*K= 0.48*
S00	*UDORTHENTS (LOAMY)*	*SANDY LOAM*	*K= 0.48*
953	*BOXFORD (SOMEWHAT POORLY DRAINED)*	*SILT LOAM*	*K= 0.49*

SEE SITE SPECIFIC SOILS MAP (SSSM)
SEE WEBSOIL USDA-NRCS
ERODIBILITY FACTOR – K, CPESC MANUAL, ENVIROCERT INTERNATIONAL INC. &
ROCKINGHAM COUNTTY SOIL SURVEY, ROCKWEB SOIL ATTRIBUTES.

CONTRACTOR TO BE AWARE OF THE SOIL PROFILES AND ENSURE THAT PROPER EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE TAKEN AT ALL TIMES. ANY DEWATERING REQUIREMENTS IN NEW HAMPSHIRE REQUIRE SPECIAL PROVISIONS IN ACCORDANCE WITH THE "CLARIFICATION OF SECTION 9.1.2 (STATE OF NEW HAMPSHIRE CONDITIONS) AND OTHER NH SPECIFIC INFORMATION FOR THE U.S. EPA 2022 NPDES CONSTRUCTION GENERAL PERMIT (CGP)" DATED FEBRUARY 17, 2022 INCLUDED IN THE SWPPP.

COVER MANAGEMENT DURING CONSTRUCTION FOR EXPOSED SOIL WILL INCLUDE HAY / STRAW APPLIED AT A RATE OF 2.0 TONS PER ACRE, TEMPORARY SEEDING OF ANNUAL RYE GRASS, AND PERMANENT SEEDING AT THE EARLIES OPPORTUNITY. SEE ADDITIONAL REQUIREMENT FOR STABILIZATION ON THE EROSION AND SEDIMENT CONTROL DETAIL SHEETS, E-101 AND E-102.

THE CONSTRUCTION SCHEDULE WILL BE MANAGED SO THAT ALL STORMWATER STRUCTURES WILL BE BUILT AND STABILIZED PRIOR TO RECEIVING SURFACE WATER RUNOFF. CONTRACTOR TO BE RESPONSIBLE FOR ALL DIVERSIONS DURING CONSTRUCTION AND FOR INTERIM SEDIMENT AND EROSION CONTROL MEASURES. SEE E&SC NOTES SHEET E-102

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- EXISTING/PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 DETAIL SHEET / DETAIL

LEGEND (CONTINUED):

- CONTOUR MINOR, EXISTING
- CONTOUR MAJOR, EXISTING
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- LIMIT OF PROJECT DISTURBANCE (164,500 Sq. Ft.)
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- SILT FENCE / EROSION MIX BERM
- FILTREXX 8" – 12" SILT SOXX AS SPECIFIED
- ORANGE CONSTRUCTION PERIMETER FENCE
- PERIMETER CONTROL
- (S) SCM PROTECTION
- (P) PERIMETER CONTROL
- (C) RESIDENTIAL/ROADWAY CONSTRUCTION

EROSION & EROSION CONTROL NOTES:

1.) CONTRACTOR IS TO INSTALL A CONSTRUCTION ENTRANCE PRIOR TO EARTH DISTURBING ACTIVITIES, UTILIZING 3" ANGULAR STONE UNDERLAID WITH ENGINEER FABRIC.

2.) CONTRACTOR IS RESPONSIBLE FOR SWEEPING THE PARKING LOT, SIDEWALKS AND ROADWAY, TO ENSURE THAT NO SEDIMENT IS BEING TRACKED ONTO SIXTH STREET OR THE SURROUNDING ROADWAYS.

3.) CONTRACTOR IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE INLET PROTECTION ONCE INSTALLED.

4.) FUGITIVE DUST IS TO BE CONTROLLED THROUGHOUT THE CONSTRUCTION PROCESS IN ACCORDANCE WITH ENV-A 1000. CALCIUM CHLORIDE SHALL NOT BE USED FOR DUST CONTROL AS THIS IS IN THE SECONDARY GROUNDWATER PROTECTION ZONE,

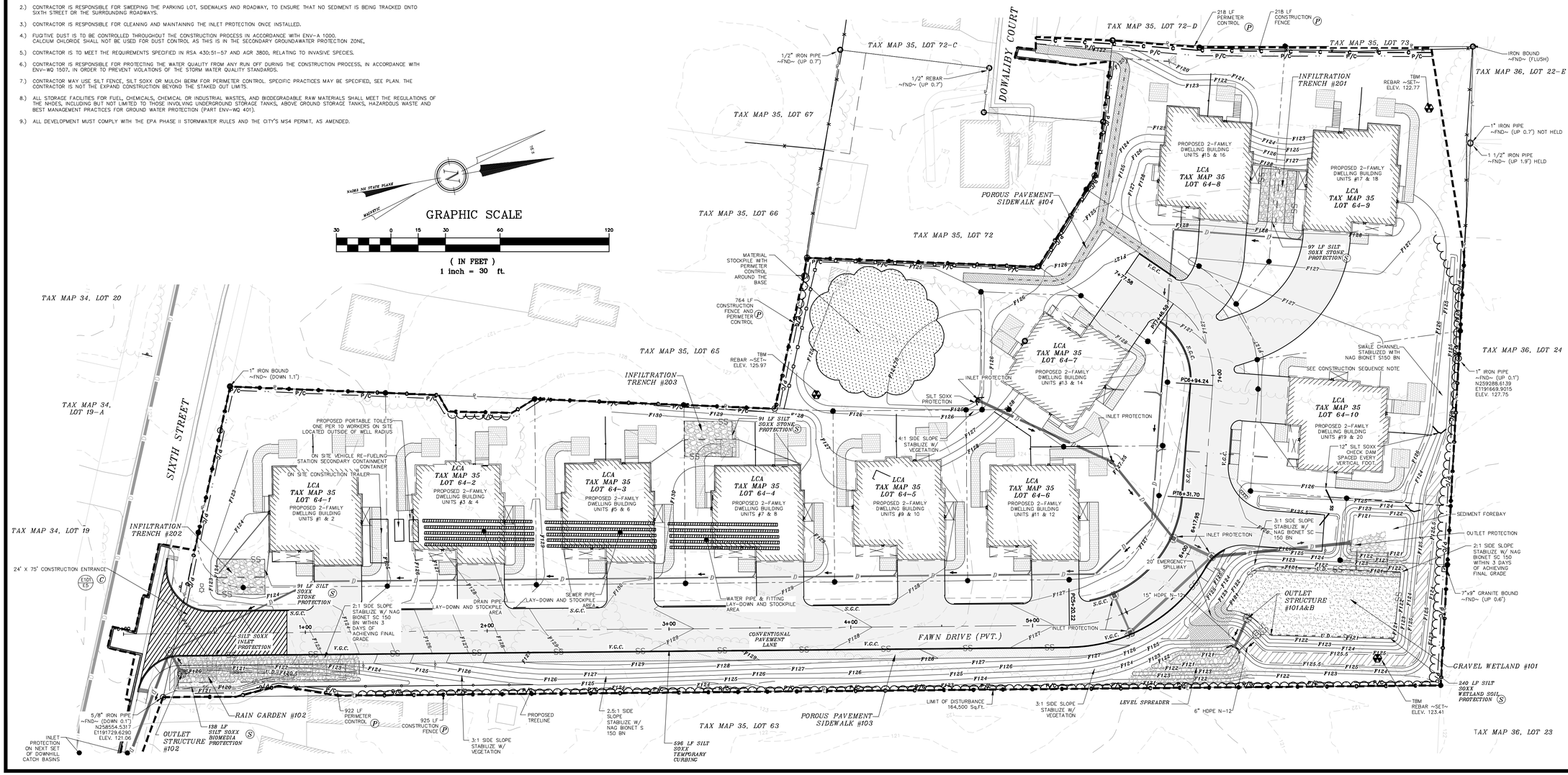
5.) CONTRACTOR IS TO MEET THE REQUIREMENTS SPECIFIED IN RSA 430:51-57 AND AGR 3800, RELATING TO INVASIVE SPECIES.

6.) CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE WATER QUALITY FROM ANY RUN OFF DURING THE CONSTRUCTION PROCESS, IN ACCORDANCE WITH ENV-WQ 1507, IN ORDER TO PREVENT VIOLATIONS OF THE STORM WATER QUALITY STANDARDS.

7.) CONTRACTOR MAY USE SILT FENCE, SILT SOXX OR MULCH BERM FOR PERIMETER CONTROL. SPECIFIC PRACTICES MAY BE SPECIFIED, SEE PLAN. THE CONTRACTOR IS NOT THE EXPAND CONSTRUCTION BEYOND THE STAKED OUT LIMITS.

8.) ALL STORAGE FACILITIES FOR FUEL, CHEMICALS, CHEMICAL OR INDUSTRIAL WASTES, AND BIODEGRADABLE RAW MATERIALS SHALL MEET THE REGULATIONS OF THE NHDES, INCLUDING BUT NOT LIMITED TO THOSE INVOLVING UNDERGROUND STORAGE TANKS, ABOVE GROUND STORAGE TANKS, HAZARDOUS WASTE AND BEST MANAGEMENT PRACTICES FOR GROUND WATER PROTECTION (PART ENV-WQ 401).

9.) ALL DEVELOPMENT MUST COMPLY WITH THE EPA PHASE II STORMWATER RULES AND THE CITY'S MS4 PERMIT, AS AMENDED.



REVISION	DATE	DESCRIPTION

EROSION AND SEDIMENT CONTROL PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

SHEET 18 OF 39

NOT FOR CONSTRUCTION

DESIGN NOTES:

1.) POROUS ASPHALT PAVEMENT WILL CONFORM TO UNHSC (2007b) SPECIFICATIONS AS UPDATED BY UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS (DATED: SEPTEMBER 2016).

2.) THE FILTER COURSE WILL BE INSTALLED AT A MINIMUM DEPTH OF 18 INCHES AND CONSIST OF NHDOT (2016) SAND, ITEM 304.1 PER THE NH STORMWATER MANUAL.

3.) SEE CROSS SECTIONS FOR DETAILS.

4.) SEE STORMWATER SYSTEM MANAGEMENT: INSPECTION AND MAINTENANCE MANUAL AND PLAN, DATED JUNE 24, 2024 FOR MAINTENANCE REQUIREMENTS.

REFERENCE:

1.) NH STORMWATER MANUAL (FEBRUARY 2025): APPENDIX A (A60–A64).

2.) UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS, FEBRUARY 2014, REVISED SEPTEMBER 2016, UNIVERSITY OF NEW HAMPSHIRE STORWATER CENTER, DURHAM, NH 03824–3534.

3.) POROUS ASPHALT PAVEMENT FOR STORMWATER MANAGEMENT, THE UNH STORMWATER CENTER.

POROUS PAVEMENT
TOTAL SECTION DEPTH = 36"
TOTAL SECTION REQUIRED = 31.2"
(65% OF FROST DEPTH)
FROST DEPTH = 48" (UNHSC)
18" FILTER MEDIA PROVIDED

SEE GRADING PLANS & PROFILES FOR SPOT ELEVATIONS

CHOKER COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
1 1/2"	100
1"	95 – 100
1/2"	25 – 60
# 4	0 – 10
# 8	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #57 – AASHTO

FILTER COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
6"	100
# 4	70 – 100
# 200	0 – 6**

* EQUIVALENT TO MODIFIED NHDOT 304.1 – SECTION 304 OF NHDOT NHDOT STANDARD SPECIFICATIONS

** LESS THAN 4% FINES

FILTER BLANKET COURSE *

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

RESERVOIR COURSE *

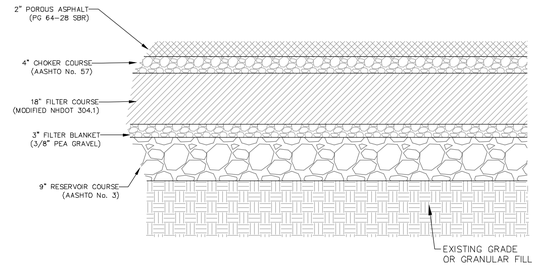
SIEVE SIZE	% PASSING BY WEIGHT
2 1/2"	100
2"	90 – 100
1 1/2"	35 – 70
1"	0 – 15
1/2"	0 – 5

* EQUIVALENT TO STANDARD STONE SIZE #3 – AASHTO

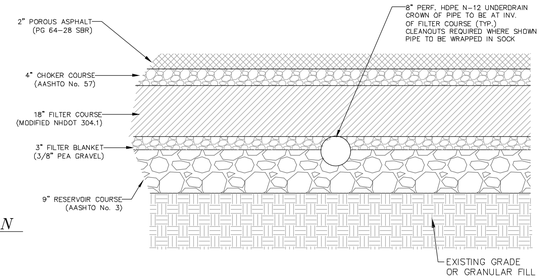
POROUS ASPHALT MIX DESIGN CRITERIA

SIEVE SIZE	% PASSING BY WEIGHT
3/4"	100
1/2"	85 – 100
3/8"	55 – 75
# 4	10 – 25
# 8	5 – 12
# 200	2 – 4
BINDER CONTENT (AASHTO T164)	5.8 – 6.5%
AIR VOID CONTENT (AASHTO D6752)	16 – 22%
DRAINDOWN (AASHTO D6390)	≤ 0.3%
RETAINED TENSILE STRENGTH (AASHTO D6390)	≥ 80%
CANTABRO ABRASION TEST (UNAGED)	≤ 20%
CANTABRO ABRASION TEST (7 DAYS)	≤ 30%

POROUS ASPHALT PAVEMENT
NOT TO SCALE

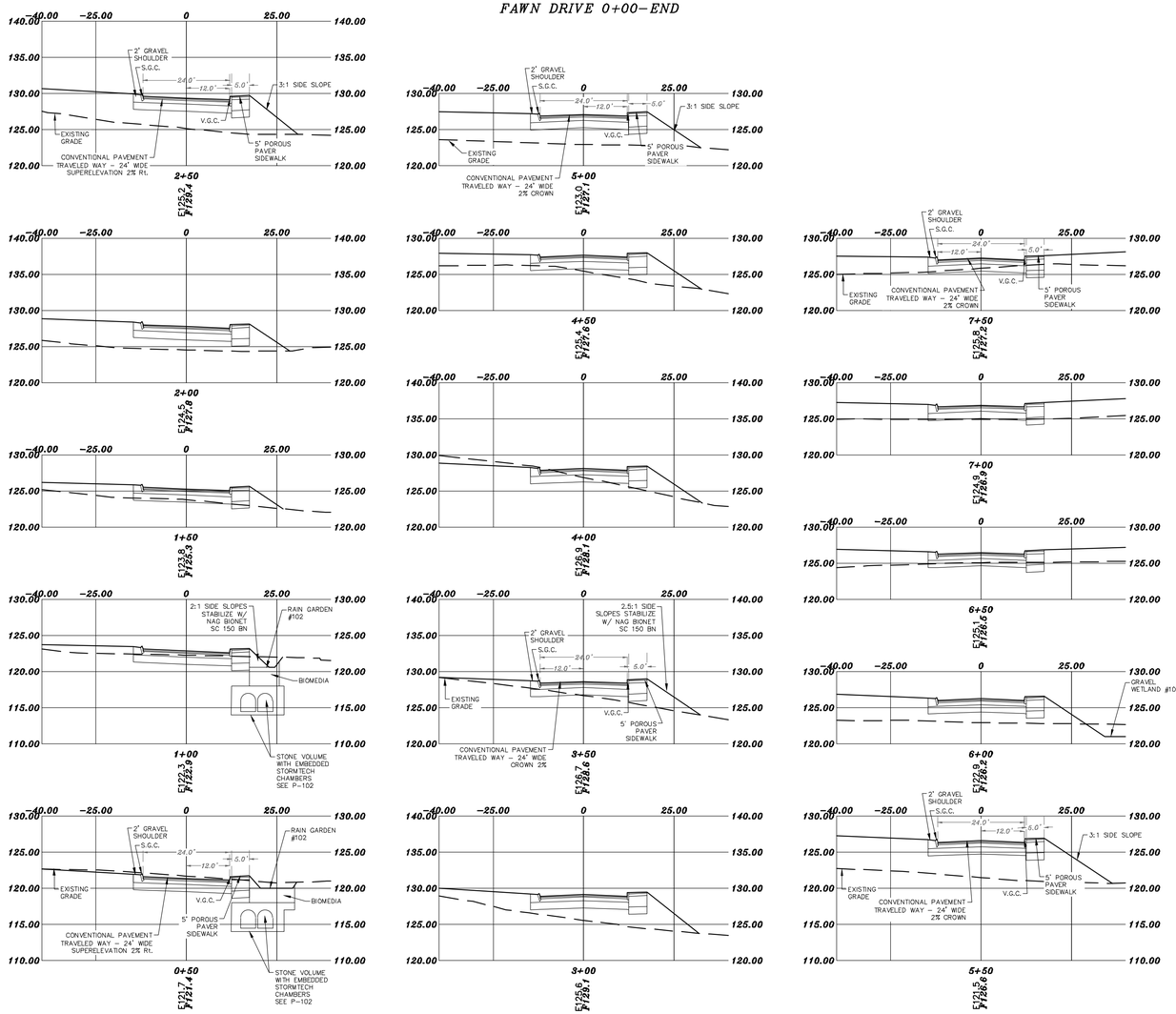


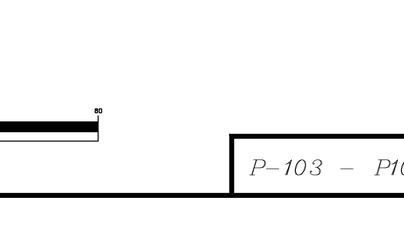
INFILTRATION POROUS ASPHALT SIDEWALK SECTION
NOT TO SCALE (P–103)



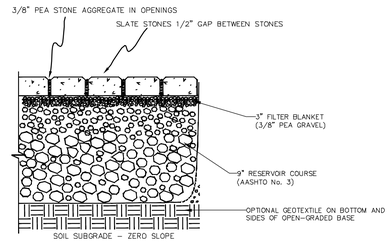
UNDERDRAINED POROUS ASPHALT SIDEWALK SECTION
NOT TO SCALE (P–104)

FAWN DRIVE 0+00–END





ADS N–12, INLINE DRAIN/CLEANOUT
NOT TO SCALE USED FOR ALL CLEANOUT LOCATIONS SHOWN. PIPE SIZE OUT VARIES



NOTES:
1.) SEE GRADING PLANS FOR LOCATIONS. POROUS PATIO AND WALKWAY PROPOSED FOR EACH UNIT.

POROUS PAVER / POROUS PATIO DETAIL
NOT TO SCALE

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.
Vertical Scale 1 INCH = 10 FT.

REVISION	DATE	DESCRIPTION

CROSS SECTIONS FAWN DRIVE 0+00 – END
& POROUS PRODUCT SPECIFICATIONS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

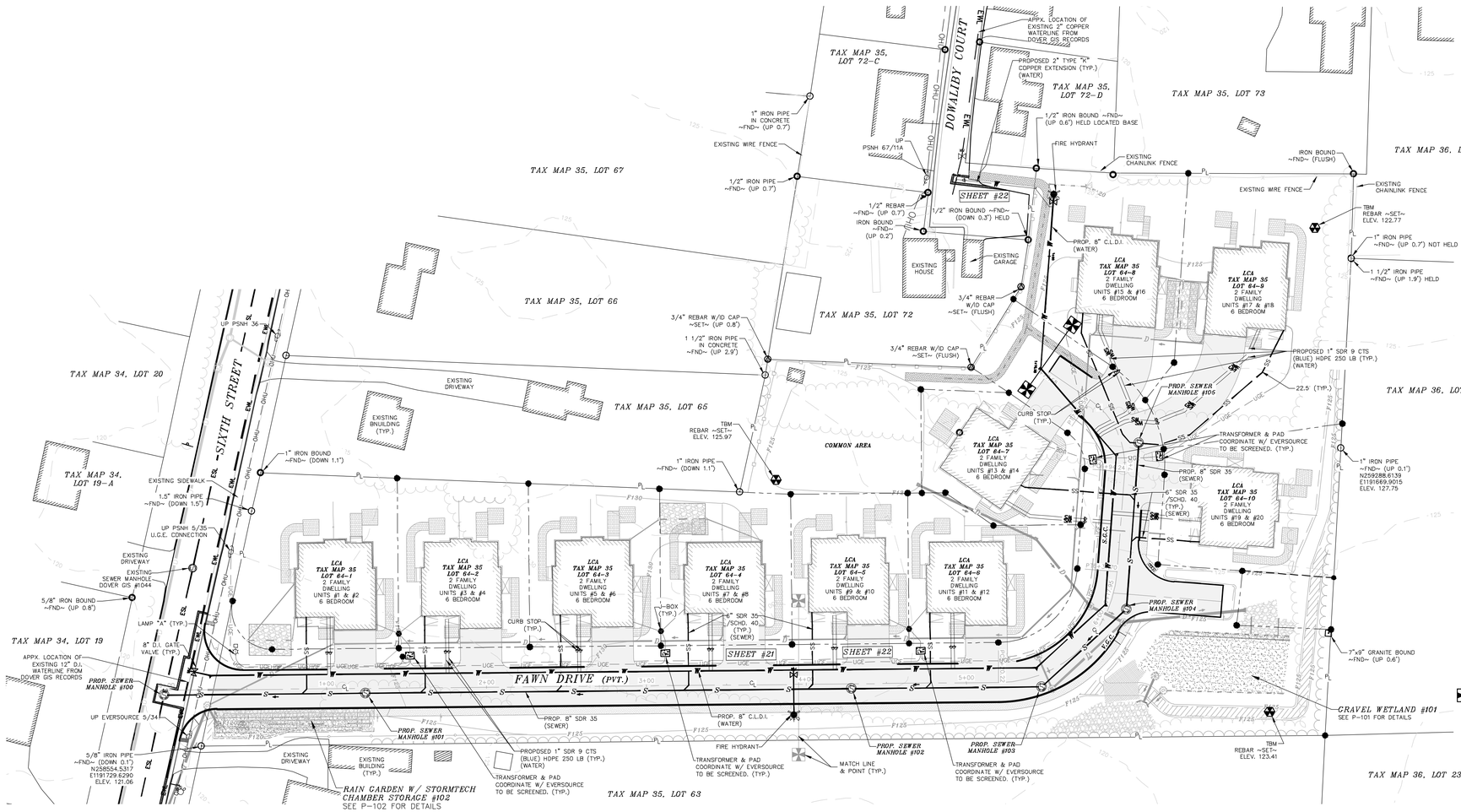
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14243 – LICENSED PROFESSIONAL ENGINEER

P–103 – P104

NOT FOR CONSTRUCTION



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE AN OVERVIEW OF UTILITY & ENGINEERING OF FAWN DRIVE AND TAX MAP 35, LOT 64.

4.) BS&E IS TO PROVIDE ADDITIONAL BENCHMARKS PRIOR TO CONSTRUCTION.

5.) EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

6.) 22.5° OR 45° ELBOWS FOR SEWER CLEAN OUTS NOT ALLOWED IN DOVER

LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- P176 — CONTOUR MINOR, PROPOSED
- P175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
- PROPOSED SEWER SERVICE
- PROPOSED DRAINAGE LINE
- PROPOSED UNDER GROUND UTILITY
- PROPOSED UNDERDRAIN
- MATCH LINE / MATCH POINT
- TRANSFORMER / J.BOX
- GATE VALVE
- CURB STOP
- FIRE HYDRANT
- THRUST BLOCKS
- LIGHT TYPE "A" MOUNTED ON POLE
- LIGHT TYPE "B" MOUNTED ON BUILDING
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

UTILITY NOTES:

1.) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVE AND BELOW GROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ANY UTILITY CONFLICTS SHOULD BE REPORTED IMMEDIATELY TO THE DESIGN ENGINEER.

2.) THE CONTRACTOR SHALL CALL AND COORDINATE WITH DIGSAFE 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

3.) PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES, TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL MEETING THE ENGINEERS SPECIFIC RECOMMENDED CRITERIA.

4.) IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER (NOT ALLOWED IN CITY R.O.W.), EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATION. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.

5.) PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG-TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION. VOIDS BETWEEN STONES AND CLUMPS OF MATERIAL SHALL BE FILLED WITH FINE MATERIALS.

6.) FINAL UTILITY LOCATIONS TO BE COORDINATED BETWEEN THE CONTRACTOR, ALL APPROPRIATE UTILITY COMPANIES AND THE DOVER DPW.

7.) CONTRACTOR TO CONTACT DOVER DPW A MINIMUM OF TWO WEEKS PRIOR TO ANY CONSTRUCTION TO COORDINATE ALL WORK CONCERNING INSTALLATION OF ANY PROPOSED WATER LINE IMPROVEMENTS.

8.) ALL WATER MAIN AND SERVICE INSTALLATIONS SHALL CONFORM TO CITY OF DOVER STANDARDS. ALL HIGHWAY CONSTRUCTION WILL MEET THE CITY OF DOVER STANDARDS.

9.) CONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATIONS WITH EVERSOURCE AT (800) 662-7764. ALL ELECTRIC CONDUIT INSTALLATION SHALL BE INSPECTED BY EVERSOURCE PRIOR TO BACKFILL. A 48-HOUR MINIMUM NOTICE IS REQUIRED.

10.) CONTRACTOR SHALL COORDINATE ALL TELECOMMUNICATIONS INSTALLATIONS WITH CONSOLIDATED COMMUNICATIONS AT (603) 222-4500.

11.) CONTRACTOR SHALL COORDINATE ALL CABLE INSTALLATIONS WITH COMCAST.

12.) ALL SEWER MANHOLE RIMS & COVERS ARE TO BE LIFTMATE R-1743-LM.

13.) ALL WATER SERVICES ARE TO BE WITNESSED WITH A 2"X4" PAINTED BLUE. ALL SEWER SERVICES ARE TO BE WITNESSED WITH A 2"X4" PAINTED YELLOW, IS STUBBED PRIOR TO BUILDING CONSTRUCTION. DETECTABLE METALLIC UNDERGROUND TAPE SHALL BE LABELED APPROPRIATELY.

14.) CURB BOXES SHOULD BE PLACED IN THE LAWN AREA, OR IF PLACED IN PAVEMENT, A ROAD BOX IS REQUIRED.

15.) SEE EXISTING CONDTIONS PLAN FOR DATUM. VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL DATUM BASED ON NAD83 STATE PLANE COORDINATES GATHERED USING TOPCON CARLSON BRX7 SURVEY GRADE GPS.

16.) MINIMUM SLOPE FOR ALL 6" SEWER SERVICES IS TO BE NO LESS THAN 0.01 FT/FT.

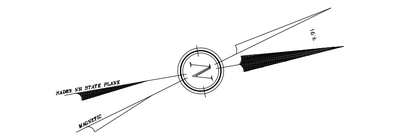
17.) ALL SEWER INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF NHDES & DOVER DPW SEWER DIVISION STANDARDS. ALL PVC SEWER PIPE IS TO CONFORM WITH ENV-WQ 704.05 (c)-(e) FOR SDR 35 GRAVITY SEWER PIPE.

18.) CONTRACTOR TO TRANSFER TEMPORARY BENCHMARK TO A SUITABLE BENCHMARK TO CONTROL CONSTRUCTION. ANY ELEVATION DISCREPANCIES ARE TO BE REPORTED TO THE THE DESIGN ENGINEER IMMEDIATELY.

19.) ALL SEWER AND WATER CROSSINGS ARE TO MAINTAIN A 1.5' OF SEPARATION.

20.) C900 WATERLINE MAY BE SUBSTITUTED FOR C.L.D.I. WATERLINE WITH THE APPROVAL OF THE CITY ENGINEER.

21.) THE PROPOSED 2 FAMILY DWELLINGS WILL CONSIST OF 10 STRUCTURES PROVIDING 20 UNITS, EACH WITH 3 BEDROOMS PER UNIT. THERE AREA A TOTAL OF 60 BEDROOMS PROPOSED. TOTAL DESIGN FLOW: 9,000 GPD



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

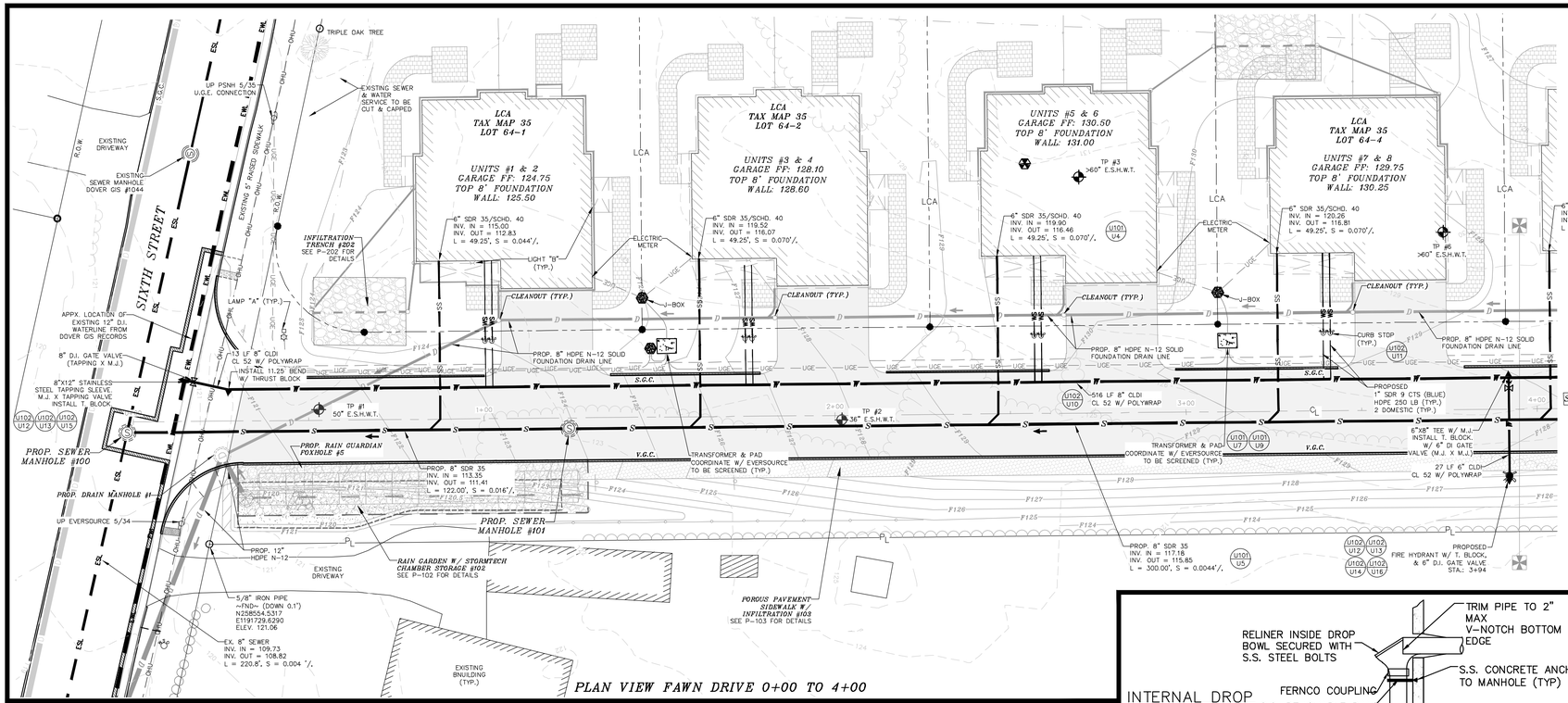
OVER-VIEW UTILITY PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE - KENNETH A. BERRY No. 14241 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



PLAN VIEW FAWN DRIVE 0+00 TO 4+00

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

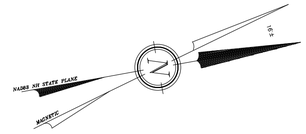
PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE A DETAIL VIEW OF UTILITY & ENGINEERING OF FAWN DRIVE AND TAX MAP 35, LOT 64.

4.) 22.5° OR 45° ELBOWS FOR SEWER CLEAN OUTS NOT ALLOWED IN DOVER



STRUCTURES TABLE:

U1/U1A, U1/U1B, U1/U2, U1/U3

PROP. SEWER MANHOLE #100
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: -0+01.75 (Rt. 3.50')
RIM = 120.39 (FLUSH)
INV. IN = 111.41 (PROP. 8" SDR 35) (INTERNAL DROP)
INV. IN = 109.41 (EX. 8" SEWER)
INV. OUT = 109.39 (EX. 8" SEWER)

PROP. SEWER MANHOLE #101
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: 1+24.25 (Rt. 3.00')
RIM = 123.92 (FLUSH)
INV. IN = 115.85 (8" SDR 35) (INTERNAL DROP)
INV. OUT = 113.35 (8" SDR 35)

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
- TEMPORARY BENCHMARK (T.B.M.)
- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EXISTING WATER MAIN
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- EXISTING OVERHEAD UTILITY
- PROPOSED WATER MAIN
- PROPOSED WATER SERVICE
- PROPOSED SEWER LINE
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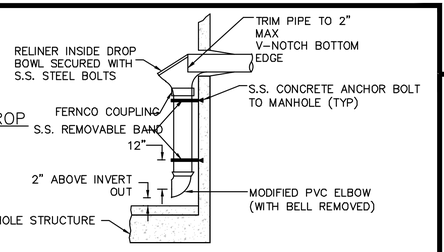
- PROPOSED DRAINAGE LINE
- PROPOSED UNDER GROUND UTILITY
- PROPOSED UNDERDRAIN
- MATCH LINE / MATCH POINT
- TRANSFORMER / J.BOX
- GATE VALVE
- CURB STOP
- FIRE HYDRANT
- THRUST BLOCKS
- LIGHT TYPE "A" MOUNTED ON POLE
- LIGHT TYPE "B" MOUNTED ON BUILDING
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS



NOTES:
1. INTERNAL DROPS ARE PROHIBITED UNLESS APPROVED BY THE CITY ENGINEER.
2. IF DROP IS FOR AN EXISTING MANHOLE, REWORK SHELF TO FORM NEW CHANNEL FOR NEW DROP CONNECTIONS.
3. BRICK INVERT NOT SHOWN ON DETAIL.

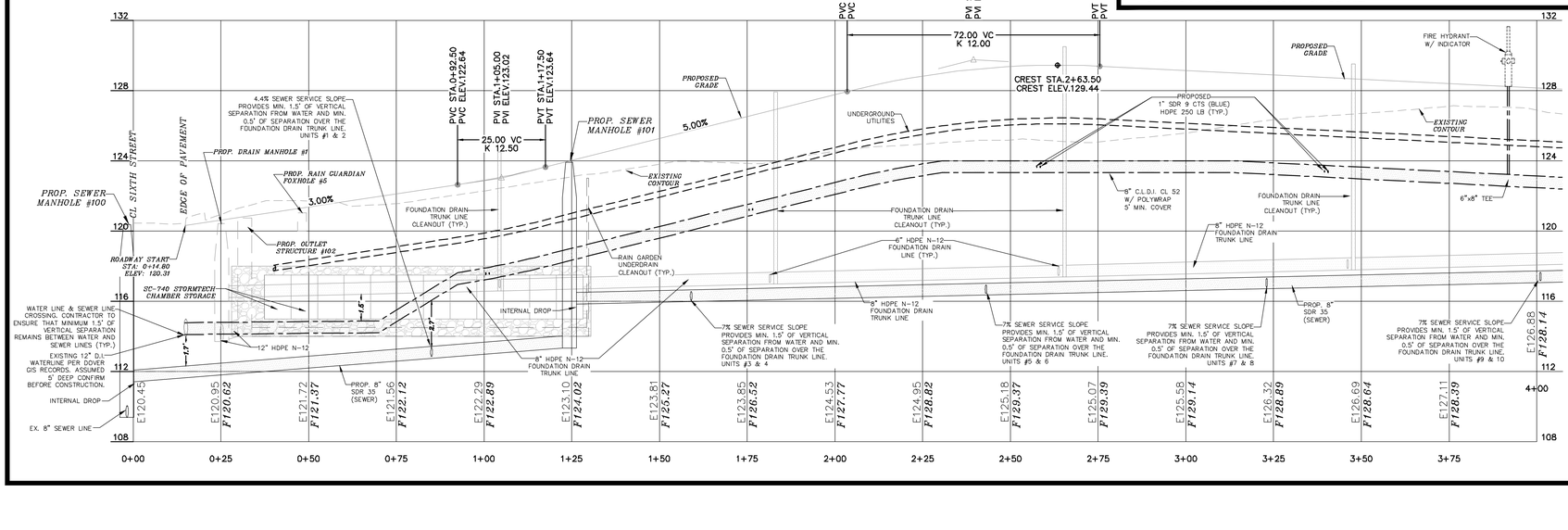
UTILITY NOTE:

CONTRACTOR IS TO PROVIDE A MINIMUM OF 1.5' OF VERTICAL SEPARATION BETWEEN WATER, SEWER, AND DRAIN UTILITIES.

A MINIMUM OF 10' HORIZONTAL IS REQUIRED FOR SEPARATION OF WATER & SEWER LINES.

WATERLINE CONSTRUCTION INTENT:
WATERLINE ELEVATION SET AS TO AVOID ABRUPT CREST AND SAGS WITHIN THE PROFILE

PROFILE VIEW FAWN DRIVE 0+00 TO 4+00



REVISION	DATE	DESCRIPTION

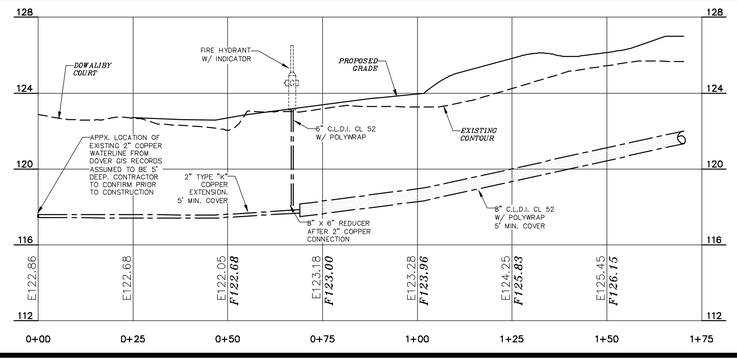
UTILITY PLAN & PROFILE FAWN DRIVE 0+00 TO 4+00
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

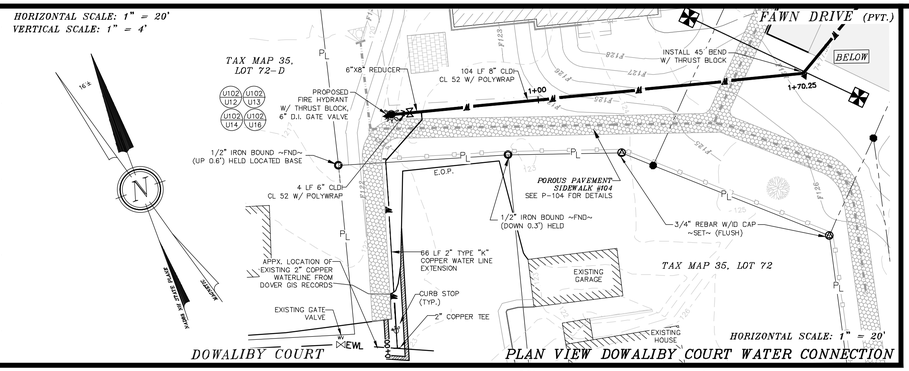
SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14343
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'



HORIZONTAL SCALE: 1" = 20'

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO PROVIDE A DETAIL VIEW OF UTILITY & ENGINEERING OF FAWN DRIVE AND TAX MAP 35, LOT 64.

4.) 22.5° OR 45° ELBOWS FOR SEWER CLEAN OUTS NOT ALLOWED IN DOVER

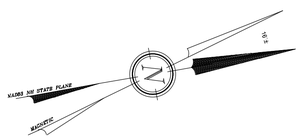
STRUCTURES TABLE:

PROP. SEWER MANHOLE #102
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: 4+28.25 (Rt. 3.00')
RIM = 127.78 (FLUSH)
INV. IN = 117.28 (8" SDR 35)
INV. OUT = 117.18 (8" SDR 35)

PROP. SEWER MANHOLE #103
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: 5+45.10 (Rt. 7.50')
RIM = 126.55 (FLUSH)
INV. IN = 117.90 (8" SDR 35)
INV. OUT = 117.80 (8" SDR 35)

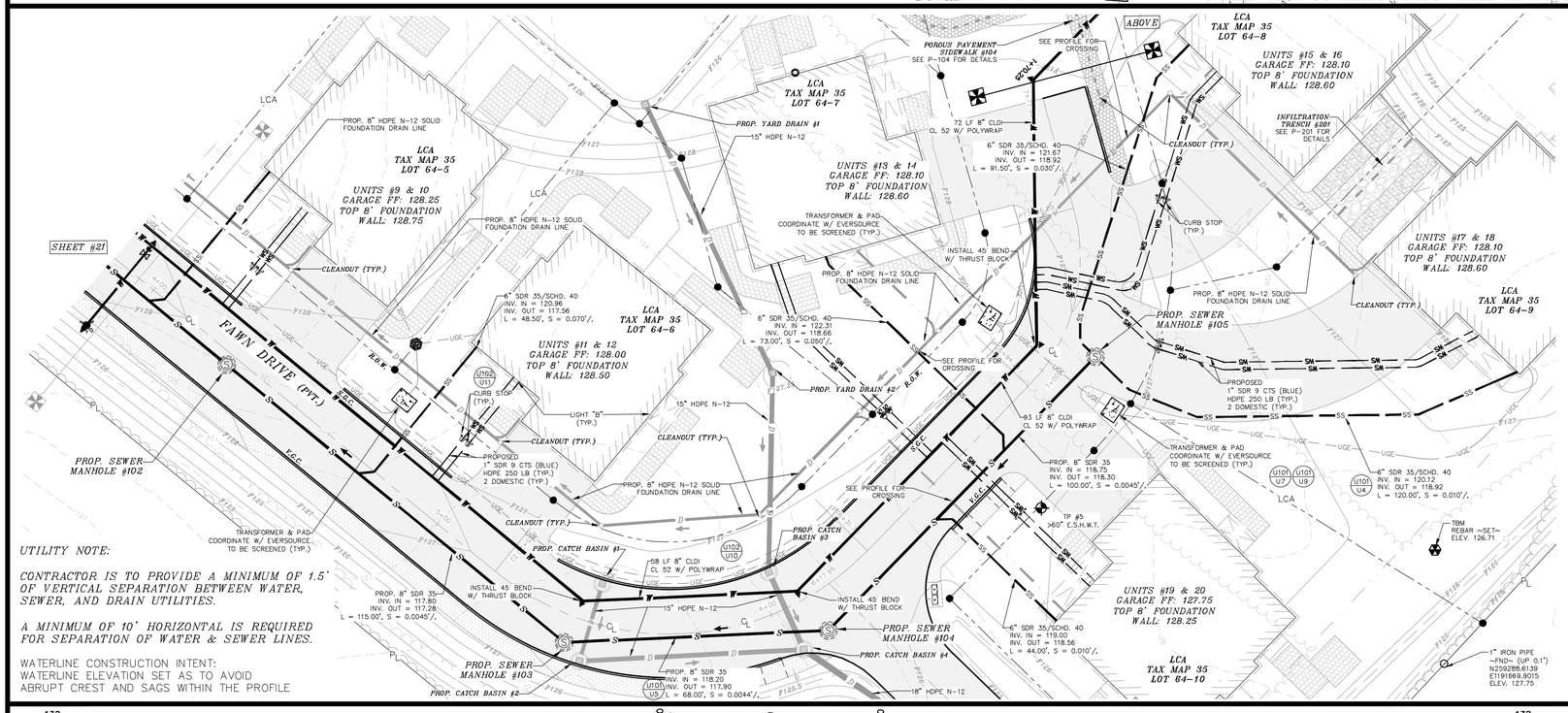
PROP. SEWER MANHOLE #104
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: 6+11.35 (Rt. 10.60')
RIM = 126.05 (FLUSH)
INV. IN = 118.30 (8" SDR 35)
INV. OUT = 118.20 (8" SDR 35)

PROP. SEWER MANHOLE #105
4'ø STRUCTURE W/ LIFTMATE R-1743-LM RIM
STA.: 7+09.85 (Rt. 10.40')
RIM = 126.75 (FLUSH)
INV. IN = 118.92 (6" SDR 35) (2)
INV. OUT = 118.75 (8" SDR 35)



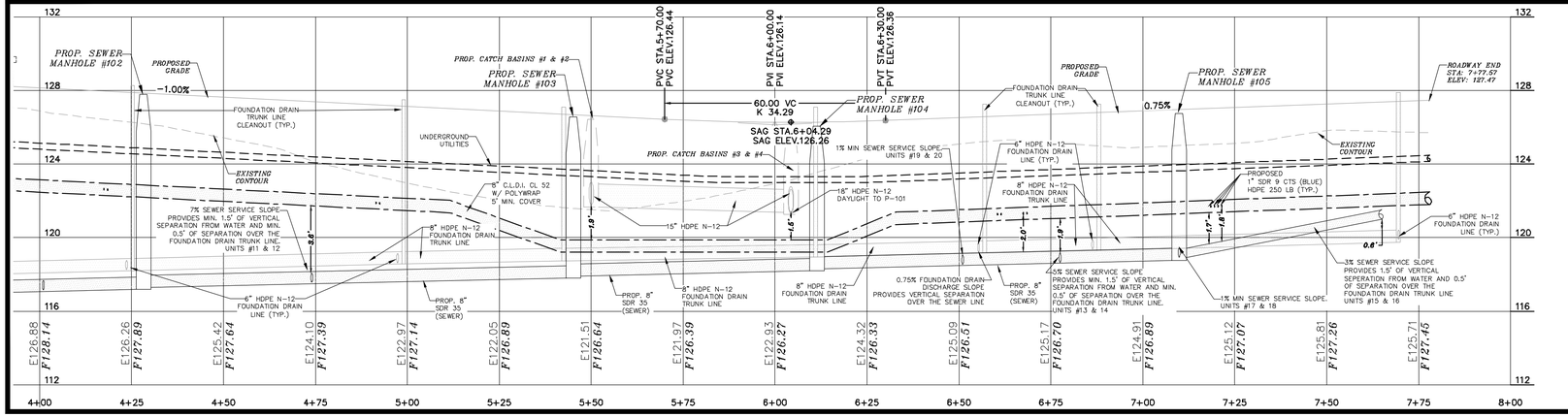
GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PLAN VIEW FAWN DRIVE 4+00 TO END



PROFILE VIEW FAWN DRIVE 4+00 TO END

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'



LEGEND:

- PROPOSED SEWER MANHOLE W/ STRUCTURE
- PROPOSED CATCH BASIN W/ STRUCTURE
- PROPOSED DRAIN MANHOLE W/ STRUCTURE
- PROPOSED STORMWATER BMP OUTLET STRUCTURE
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- E101 / E6 — DETAIL SHEET / DETAIL
- LIMITED COMMON AREA LINE (LCA)
- 176 — CONTOUR MINOR, EXISTING
- 175 — CONTOUR MAJOR, EXISTING
- F176 — CONTOUR MINOR, PROPOSED
- F175 — CONTOUR MAJOR, PROPOSED
- CENTER LINE
- EWL — EXISTING WATER MAIN
- ESL — EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- OHU — EXISTING OVERHEAD UTILITY
- W — PROPOSED WATER MAIN
- WS — PROPOSED WATER SERVICE
- S — PROPOSED SEWER LINE
- SS — PROPOSED SEWER SERVICE
- PROPOSED DRAINAGE LINE
- UGE — PROPOSED UNDER GROUND UTILITY
- U.D. — PROPOSED UNDERDRAIN
- MATCH LINE / MATCH POINT
- TRANSFORMER / J.BOX
- GATE VALVE
- CURB STOP
- FIRE HYDRANT
- THRUST BLOCKS
- LIGHT TYPE "A" MOUNTED ON POLE
- LIGHT TYPE "B" MOUNTED ON BUILDING
- RIP RAP
- STORMWATER CONTROL MEASURE (SCM)
- BERM
- TEST PIT
- PROPOSED BITUMINOUS CONCRETE
- PROPOSED POROUS PAVERS
- PROPOSED POROUS PAVEMENT
- PROPOSED STORMTECH CHAMBERS

REVISION	DATE	DESCRIPTION

UTILITY PLAN & PROFILE FAWN DRIVE 4+00 TO END
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14241
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTES:

1. CALL DIG SAFE PRIOR TO BEGINNING WORK. (1–888–344–7233). THE LANDSCAPE CONTRACTOR IS ADVISED OF THE PRESENCE OF UNDERGROUND UTILITIES AND SHALL VERIFY THE EXISTENCE AND LOCATION OF THE SAME BEFORE COMMENCING AND DIGGING OPERATIONS. THE LANDSCAPE CONTRACTOR SHALL REPLACE OR REPAIR UTILITIES, PAVING, WALKS, CURBING, ETC DAMAGED IN PERFORMANCE OF THIS JOB AT NO ADDITIONAL COST TO THE OWNER OR GENERAL CONTRACTOR.
2. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL SITE CONDITIONS PRIOR TO CONSTRUCTION BIDDING.
3. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS. VARIATIONS IN QUANTITIES ARE TO BE APPROVED BY THE DESIGN ENGINEER.
4. PROVIDED SMOOTH TRANSITION WHERE NEW WORK MEETS EXISTING CONDITIONS.
5. ALL PLANT MATERIAL INSTALLED SHALL MEET THE SPECIFICATIONS OF "AMERICAN STANDARD FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN
6. ALL PLANT MATERIALS SHALL BE FREE FROM INSECTS AND DISEASE.
7. ALL PLANTINGS SHALL BE DONE IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICES. THIS IS TO INCLUDE PROPER PLANTING MIX, PLANT BED AND TREE PIT PREPARATION, PRUNING STAKING OR GUYING, WRAPPING, SPRAYING, FERTILIZATION, PLANTING AND ADEQUATE MAINTENANCE UNTIL ACCEPTANCE FROM OWNER.
8. ALL GRASS, OTHER VEGETATION AND DEBRIS SHALL BE REMOVED FROM ALL PLANTING AREAS PRIOR TO PLANTING.
9. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EXISTING AND NEWLY PLANTED TREES AND SHRUBS DURING THE CONSTRUCTION PROCESS. WHERE REQUIRED, THE CONTRACTOR SHALL INSTALL TEMPORARY FENCING (SNOW OR EQUAL) AROUND EXISTING TREES AND SHRUBS THAT COULD BE IMPACTED BY THE CONSTRUCTION PROCESS. STORAGE OF CONSTRUCTION EQUIPMENT, CONSTRUCTION MATERIALS, SNOW STORAGE AND OR VEHICLE PARKING SHALL NOT BE PERMITTED WITHIN THE DRIP LINE OF TREES OR TWENTY FEET WHICH EVER IS GREATER.
10. NEW PLANTINGS SHALL BE INSTALLED PER PROJECT DRAWINGS AND SPECIFICATION THAT INCLUDE FERTILIZATION AND MULCHING AS REQUIRED.
11. ALL SHRUB BEDS AND TREE PITS SHALL BE MULCHED WITH 3" CLEAN SHREDDED BLACK MULCH
12. WHERE INDICATED ON PLAN, PLANTING SOIL MIXTURE FOR GROUND COVER AND PERENNIAL BED AREAS SHALL CONSIST OF FOUR PARTS TOPSOIL, TWO PARTS SPHAGNUM PEAT MOSS, AND ONE PART HORTICULTURAL PERLITE BY VOLUME. PEAT MOSS MAY BE SUBSTITUTED WITH WELL–ROTTED OR DEHYDRATED MANURE OR COMPOST. ROTOTILL BEDS TO A DEPTH OF 8 INCHES.
13. MAINTENANCE OF NEW PLANTINGS AND LAWNS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND OR LANDSCAPE SUBCONTRACTOR UNTIL ACCEPTANCE BY THE OWNER. RESPONSIBILITIES SHALL INCLUDE WATERING WEEDING AND MOWING AS NECESSARY. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE, REPLACEMENT MATERIAL SHALL BE GUARANTEED FOR AND ADDITIONAL YEAR FROM TIME OF INSTALLATION.
14. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY EROSION CONTROL MEASURES DURING THE CONSTRUCTION PHASE AND UNTIL ALL AREAS HAVE BEEN STABILIZED AND ACCEPTED BY THE OWNER. THE GENERAL CONTRACTOR SHALL PROVIDE WEEKLY INSPECTIONS OF EROSION MEASURE AND IMMEDIATELY AFTER STORM EVENTS AND REPAIR AS NECESSARY.
15. THE GENERAL CONTRACTOR AND OR THE LANDSCAPE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL THREE GUYING MATERIAL ONCE PLANT MATERIAL HAS BEEN ESTABLISHED. (MINIMUM OF ONE GROWING SEASON). ALL TEMPORARY EROSION CONTROL MEASURE SHALL BE REMOVED ONCE STABILIZATION OF DISTURBANCE HAS BEEN ACCEPTED BY OWNER.
16. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR A MINIMUM OF TWO MOWINGS FOR ALL TURF AREAS OR UNTIL ACCEPTANCE BY THE OWNER. A MINIMUM UNIFORM 75% CATCH OF TURF IS REQUIRED FOR ACCEPTANCE.
17. ALL PLANTINGS SHALL BE WATERED REGULARLY DURING THEIR FIRST YEAR AND MAINTAINED PERMANENTLY IN GOOD GROWING CONDITION AS AN EFFECTIVE VISUAL SCREEN.
18. SHRUBS OR TREES WHICH DIE SHALL BE REPLACED WITHIN ONE GROWING SEASON WITH NEW SHRUBS OR TREES TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE LANDSCAPING REQUIREMENTS.
19. ALL REQUIRED LANDSCAPING SHALL BE INSTALLED BEFORE OCCUPANCY, OR WITHIN SIX MONTHS IF OCCUPANCY OCCURS DURING WINTER CONDITIONS.
20. TREES ARE TO BE 6' TALL AT PLANTING.
21. ALL PLANT STOCK SHALL CONFORM TO ANSI Z260.1 – NURSERY STOCK, LATEST EDITIONS (AMERICAN ASSOCIATION OF NURSERYMEN, INC.)
22. 4" AGED PINEBARK MULCH AND A WEED BARRIER (TY–PAR FABRIC OR APPROVED EQUAL) SHALL BE APPLIED TO ALL SHRUB AND GROUND COVER BEDS. INSTALL WEED BARRIER AS PER MANUFACTURERS RECOMMENDATIONS.
23. PLANT–PIT BACK–FILL SHALL BE MIXED AT A RATE OF 7 PARTS OF TOPSOIL TO 2 PARTS OF DEHYDRATED COW MANURE. SLOW RELEASE FERTILIZER SHALL BE APPLIED AS PER MANUFACTURERS RECOMMENDATIONS. USE EXISTING ON–SITE TOPSOIL AS PART OF BACK FILL WHEN AVAILABLE.
24. ALL LANDSCAPED AREAS NOT PLANTED WITH TREES, SHRUBS OR GROUNDCOVER SHALL BE RESTORED WITH SEED OR SOD AS INDICATED ON PLANS.
25. TOPSOIL WILL BE TESTED FOR FERTILIZATION REQUIREMENTS, AND SLOW RELEASE ENVIRONMENTALLY FRIENDLY FERTILIZER WILL BE APPLIED AT THE RECOMMENDED RATES.
26. ALL DISTURBED WETLAND BUFFER AREAS, EXCEPT FOR AREAS THAT ARE PART OF THE DRAINAGE SYSTEM, ARE TO BE RESEEDED WITH A CONSERVATION SEED MIX AND ONLY MOWED TWICE PER YEAR.
27. ALL PLANT SUBSTITUTIONS MUST BE APPROVED BY THE ENGINEER.
28. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ONGOING TO CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
29. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT–BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT MAY BE DEEMED UNACCEPTABLE.
30. ALL PLANTS SHALL BE GUARANTEED BY THE CONTRACTOR FOR NO LESS THAN ONE FULL YEAR FROM THE TIME OF INSTALLATION. DURING THIS TIME, THE OWNER SHALL MAINTAIN ALL PLANT MATERIALS IN THE ABOVE MANNER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE PLANTS TO ENSURE PROPER CARE. IF THE CONTRACTOR IS DISSATISFIED WITH THE CARE GIVEN, HE SHALL IMMEDIATELY, AND IN SUFFICIENT TIME TO PERMIT THE CONDITION TO BE RECTIFIED, NOTIFY THE OWNER IN WRITING OR OTHERWISE FORFEIT HIS CLAIM.
31. BY THE END OF THE GUARANTEE PERIOD, THE CONTRACTOR SHALL HAVE REPLACED ANY PLANT MATERIAL THAT IS MISSING, NOT TRUE TO SIZE AS SPECIFIED, THAT HAS DIED, THAT HAS LOST NATURAL SHAPE DUE TO DEAD BRANCHES, EXCESS PRUNING OR INADEQUATE OR IMPROPER CARE, OR IS, IN THE OPINION OF THE OWNER, IN UNHEALTHY OR UNSIGHTLY CONDITION.
32. THE CONTRACTOR IS TO USE TEMPORARY MEASURES FOR WATERING PLANTS DURING THE ESTABLISHMENT PERIOD. INCLUDING CONNECTING TEMPORARY HOSES TO THE STRUCTURE WATER SUPPLY LINE AND UTILIZING SPRINKLERS UNTIL 85% GROWTH OCCURS.

PLANTING NOTES

1. CONTRACTOR SHALL OBTAIN APPROVAL FROM L.A. PRIOR TO PURCHASING &/OR INSTALLING SUBSTITUTE PLANT MATERIAL PRIOR TO PURCHASE OF ANY SUBSTITUTE MATERIALS.
2. CONSTRUCTION ACCESS WILL BE AS DIRECTED BY L.A. CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ACCESS ROUTE AND ALL AREAS DISTURBED BY PLANTING OPERATIONS UPON COMPLETION OF CONSTRUCTION OPERATIONS, AT NO ADDITIONAL COST TO THE OWNER.
3. LAYOUT OF ALL PLANTING BEDS AND LOCATION OF PLANTS TO BE APPROVED BY L.A. ON SITE PRIOR TO CONSTRUCTION AND INSTALLATION.
4. CONTRACTOR TO REMOVE ALL DEBRIS GENERATED BY PLANT INSTALLATION. DEBRIS TO BE DISPOSED OF IN A LEGAL MANNER.
5. ALL PLANT MATERIAL SHALL BE GUARANTEED TO BE IN GOOD, HEALTHY & FLOURISHING CONDITION FOR ONE YEAR FROM THE DATE OF FINAL INSTALLATION APPROVAL BY L.A. CONTRACTOR SHALL REPLACE, WITHOUT COST TO OWNER, AND AS SOON AS WEATHER CONDITIONS PERMIT, ALL DEAD AND NON–FLOURISHING PLANTS AS DETERMINED BY THE L.A. REPLACEMENT PLANTS SHALL BE BE GUARANTEED IDENTICALLY TO ORIGINAL PLANTS, TIME PERIOD COMMENCING FROM DATE OF REPLACEMENT PLANTING APPROVAL BY L.A.
6. ALL BEDS TO BE MULCHED WITH 3" DEPTH SHREDDED BARK MULCH UNLESS NOTED OTHERWISE.
7. CONTRACTOR TO PROVIDE NECESSARY TEMPORARY IRRIGATION IF NEEDED BASED ON TIME OF YEAR THE PROJECT IS IMPLEMENTED.
8. ALL PLANT MATERIAL TO COMPLY WITH THE CITY OF DOVER'S SITE REVIEW REGULATIONS, 149–14(G), SUCH THAT THERE SHALL BE DECIDUOUS SHADE TREES PLANTED 40 FEET O.C. ALONG THE PERIMTERE OF THE PARKING LOTS AND SHRUBS PLANTED 5 FEET O.C. WITHIN THE PERIMETER BUFFER. SEE PLANT LIST FOR SPECIES AND SIZE OF PLANTS.

TEMPORARY WATERING NOTES

1. CONTRACTOR IS RESPONSIBLE FOR MAKING SURE ALL PLANT MATERIAL HAS ADEQUATE WATER DURING THE ESTABLISHMENT PERIOD.
2. THE USE OF GATOR BAGS, SOAKER HOSE, HAND WATERING AND OTHER TECHNIQUES SHOULD BE USED TO ASSURE PROPER HYDRATION OF THE PLANTINGS IS MAINTAINED.
3. TEMPORARY IRRIGATION SYSTEMS CAN BE SET UP TO ASSIST IN WATERING ACTIVITIES.

PLANTING SCHEDULE
2024-018 Fawn Drive

Botanical Name/ Common Name	Size	Qty	Label
Trees			
Acer rubrum / Red Maple	4" Cal.	13	AR
Platanus x acerifolia / London Planetree	4" Cal.	10	PA
Picea glauca / White Spruce	6' tall	22	WS
Shrubs			
Buxus / Boxwood	3 Gal.	111	BW
Syringa pubescens patula 'Miss Kim' / Miss Kim Lilac	3 Gal.	25	MK
Perennials			
Hydrangea macrophylla / Hydranges	#1	121	HM
Grasses			
Calamagrostis acutifolia 'Karl Foerster' / Feather Reed Grass	#2	32	KF

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General Plant Maintenance Guide

General Plant Bed Maintenance:

- All plant maintenance should be performed by a qualified horticulturalist or licensed arborist. Cleaning the dead material out of the planting bed in the fall helps keep litter from building up around the plants and in some cases killing the plants. Watering the first year during dry periods will help get the plants established. Mulching every year is not necessary. Raking the old mulch and turning it over is all that is needed. When necessary only install one inch of mulch and do not place the mulch closer than 3" to the trunks or stems of woody plants.

Trees

- The first year watering during dry periods will be necessary.
- 3" inches of mulch maybe used. The mulch should be kept 3 inches from the trunk.
- Fertilizing is not necessary for the first year. Fertilizing in subsequent years only when and if the foliage is looking weak.
- Fertilization should occur prior to Mat 31st or after trees have dropped their leaves for the year.
- Prune dead wood once a year.
- Depending on the amount of compaction the bed area receives, deep root aeration may be needed over time

Woody Shrubs

- The first year watering during dry periods will be necessary.
- 3" inches of mulch maybe used. The mulch should be kept 3 inches from the stems.
- Fertilizing is not necessary for the first year. Fertilizing in subsequent years only when and if the foliage is looking weak.
- Fertilization should occur prior to Mat 31st or after shrubs have dropped their leaves or gone dormant for the year.
- Prune dead wood once a year.

Grasses

- Grasses only need to be clipped back at the end of the growing season and all the clippings removed from the area.
- Do not over mulch. Too much mulch will prohibit the grass from developing into a strong clump.

Perennials

- All perennials need to be pruned back after the first or second hard frost. A two-step method; first dead head all the flower heads and let drop to the ground for re-seeding. Second cut the stems back to 3" above the ground and remove the stem and leaf litter and place in compost. Do not over mulch. Too much mulch will prohibit the growth and development
- Fertilizing perennials once in the spring with a low phosphate fertilizer will help the plants to get started in the spring.

www.terrainplanning.com 311 kast hill road hopkinton nh 03229 T:603-491-2322

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311 kast hill road
hopkinton, nh 03229
603. 491. 2322
terrainplanning.com

141 SIXTH STREET

Site Location:
141 Sixth Street
Dover, NH
Tax Map 35, Lot 64

Prepared For:
Berry Surveying & Engineering
335 Second Crown Point Rd
Barrington, NH 03825

LANDSCAPING PLAN

DATE: June 24, 2025

SCALE: 1" = 40'

PROJECT #: DB 2024-018

Drawn By: JDB

Checked By: ERB

REVISIONS: DATE:
Issued for Client Review

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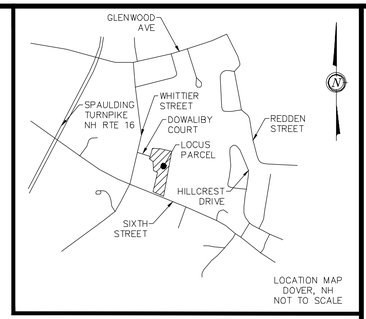
L - 01

LICENSED LANDSCAPE ARCHITECT
ERIC R. BUCK
078
STATE OF NEW HAMPSHIRE

NOT FOR CONSTRUCTION



NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO SHOW THE LIGHTING FOR THE SITE DESIGN FOR A PROPOSED 10 LIMITED COMMON AREAS, 20, TWO-FAMILY DWELLING UNIT (10 BUILDINGS) TDR CONDOMINIUM DEVELOPMENT OF TAX MAP 35, LOT 64.

Schedule									
Symbol	Label	QTY	Manufacturer	Catalog	Description	Number Lamps	Lamp Output	LLF	Input Power
A	A	1	Lithonia Lighting	DSX0 LED P1 30K 70CRI BLC3	D-Series Size 0 Area Luminaire P1 Performance Package 3000K CCT 70 CRI Type 3 Extreme Backlight Control	1	3344	1	33.21
B	B	40	Lithonia Lighting	ODSL10 SRC	CRAFTSTON WALL MOUNTED SMALL DECORATIVE LANTERN, ONE LAMP 13W SPIRAL COMPACT FLUORESCENT, WHITE GLASS DIFFUSER 4.25" DIA. X 6.65" HIGH, ELECTRONIC BALLAST	1	900	1	12.6

LEGEND:

- 3/4" REBAR W/ID CAP (TBS)
- 1/2" REBAR W/EASEMENT CAP (TBS)
- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- ABUTTING PROPERTY LINE
- BUILDING SETBACK LINE
- OHU — OHU — OHU — OVERHEAD UTILITIES
- PROPOSED LCA LINE
- CENTER LINE
- TREE LINE (EX. OR PROP.)
- SPLIT RAIL FENCE
- PROPOSED EASEMENT
- FND FOUND
- TYP TYPICAL
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- E.O.P. EDGE OF PAVEMENT
- V.G.C. VERTICAL GRANITE CURB
- S.G.C. SLOPED GRANITE CURB
- LIGHT TYPE "A" POLE MOUNTED
- LIGHT TYPE "B" BUILDING MOUNTED
- FIRE HYDRANT
- TRANSFORMER/CONCRETE PAD
- STORMWATER SCM
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

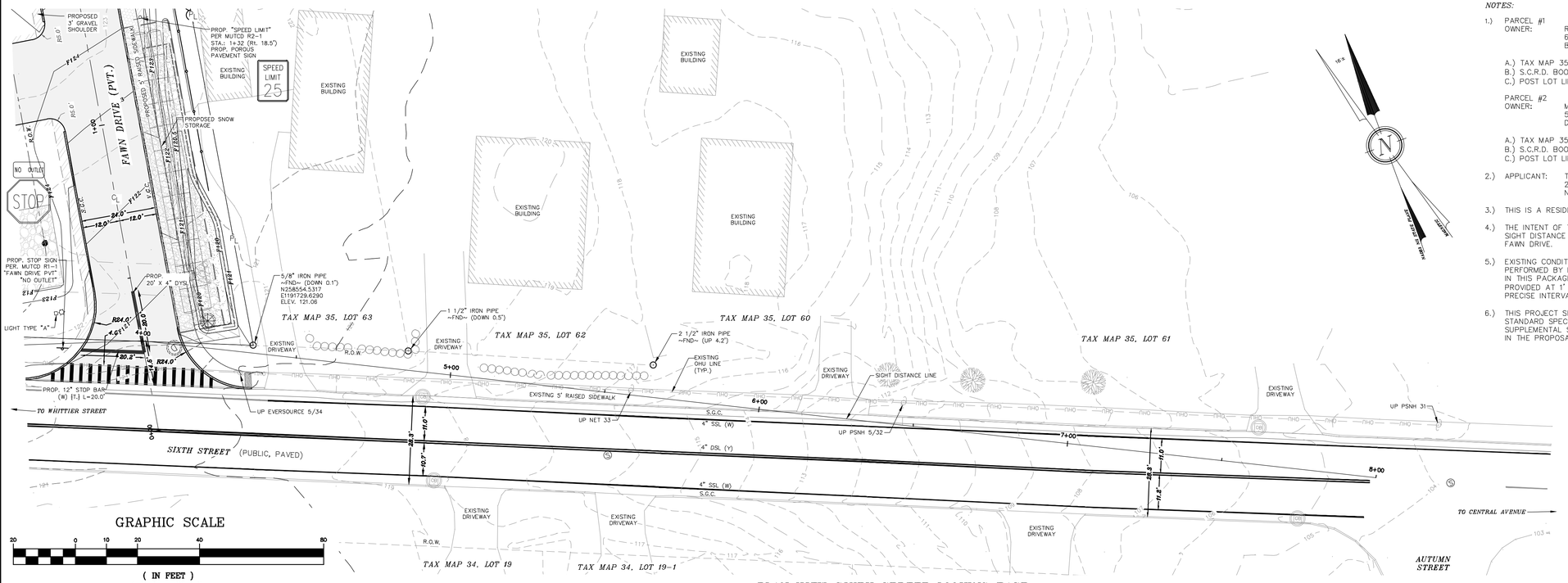
LIGHTING PLAN
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & USA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

PLAN VIEW SIXTH STREET LOOKING EAST

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

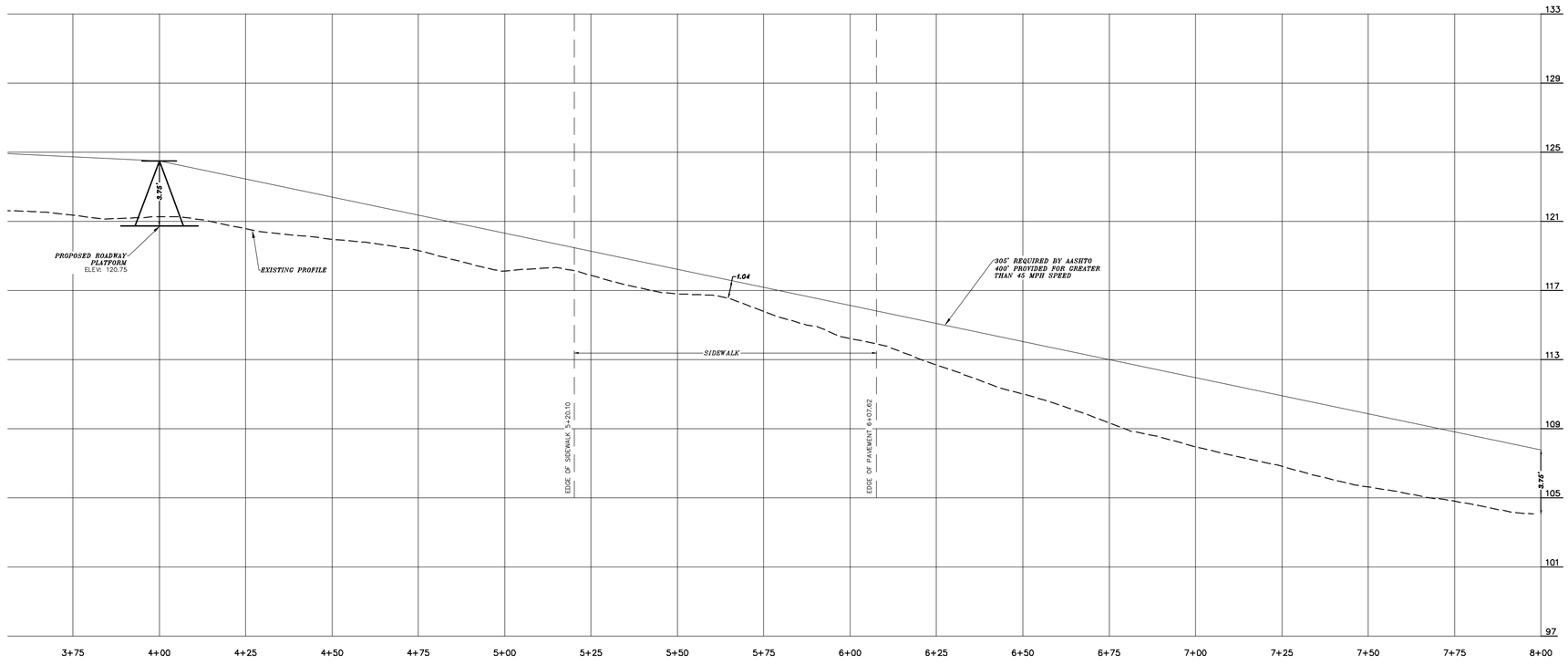
3.) THIS IS A RESIDENTIAL SITE PLAN.

4.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE AVAILABLE SIGHT DISTANCE FROM THE PROPOSED ROADWAY TO BE KNOWN AS FAWN DRIVE.

5.) EXISTING CONDITIONS INFORMATION IS BASED ON A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING AND IS ENCLOSED IN THIS PACKAGE. EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

6.) THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH NHDOT STANDARD SPECIFICATIONS DATED 2016. CURRENT STANDARD PLANS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE PROPOSAL.

PROFILE VIEW SIGHT LINE



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

SIGHT DISTANCE CALCULATION:

DESIGN SPEED: 30 MPH / 85TH ASSUMED 40 MPH

305' REQUIRED AT 40 MPH AASHTO, 85TH PERCENTILE ASSUMED
400' PROVIDED

LEGEND:

- DRILL HOLE ~FND~
- IRON PIPE ~FND~
- IRON BOUND/REBAR ~FND~
- T-BAR STEEL STAKE ~FND~
- GRANITE/STONE BOUND ~FND~
- SIGNAGE
- UTILITY POLE
- GUY WIRE
- OVERHEAD UTILITIES LINE
- SHOULDER
- BUILDING SETBACK LINE
- CENTER LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND
- PL PROPERTY LINE
- CL CENTER LINE
- R.O.W. RIGHT OF WAY
- E.O.P. EDGE OF PAVEMENT
- S.G.C. SLOPED GRANITE CURB
- SSL (W/Y) SINGLE SOLID LINE (WHITE/YELLOW)
- DSL (Y) DOUBLE SOLID LINE (YELLOW)
- EXISTING TREE
- BITUMINOUS CONCRETE
- POROUS PAVERS
- POROUS PAVEMENT SIDEWALK

SD-2

REVISION	DATE	DESCRIPTION

SIGHT DISTANCE PLAN FAWN DRIVE EASTBOUND
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

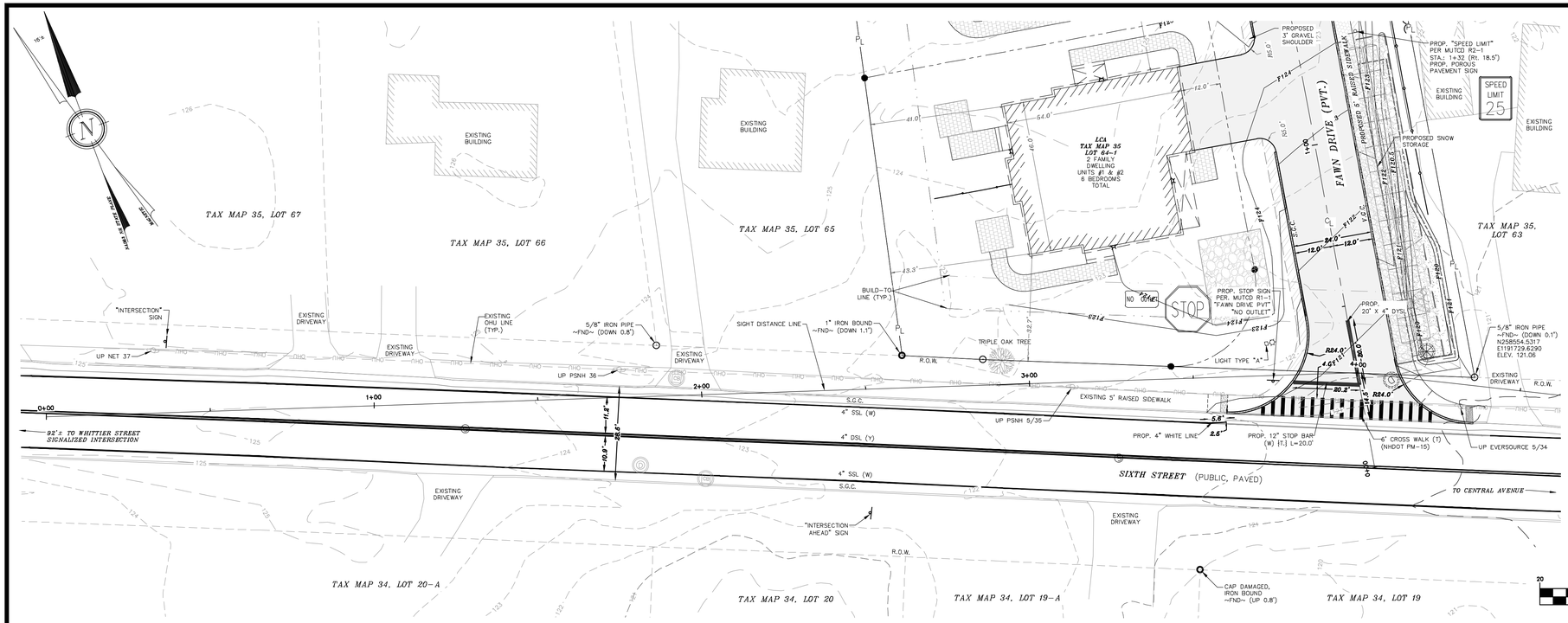
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE - KENNETH A. BERRY No. 14242 LICENSED PROFESSIONAL ENGINEER

SHEET 25 OF 39

NOT FOR CONSTRUCTION



PLAN VIEW SIXTH STREET LOOKING WEST

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) COMBINED LOT AREA: 163,417 Sq. Ft., 3.75 Ac

4.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE AVAILABLE SIGHT DISTANCE FROM THE PROPOSED ROADWAY TO BE KNOWN AS FAWN DRIVE.

5.) EXISTING CONDITIONS INFORMATION IS BASED ON A SURVEY PERFORMED BY BERRY SURVEYING & ENGINEERING AND IS ENCLOSED IN THIS PACKAGE. EXISTING AND PROPOSED CONTOURS ARE PROVIDED AT 1' INTERVALS WITH DRAINAGE FEATURES AT MORE PRECISE INTERVALS.

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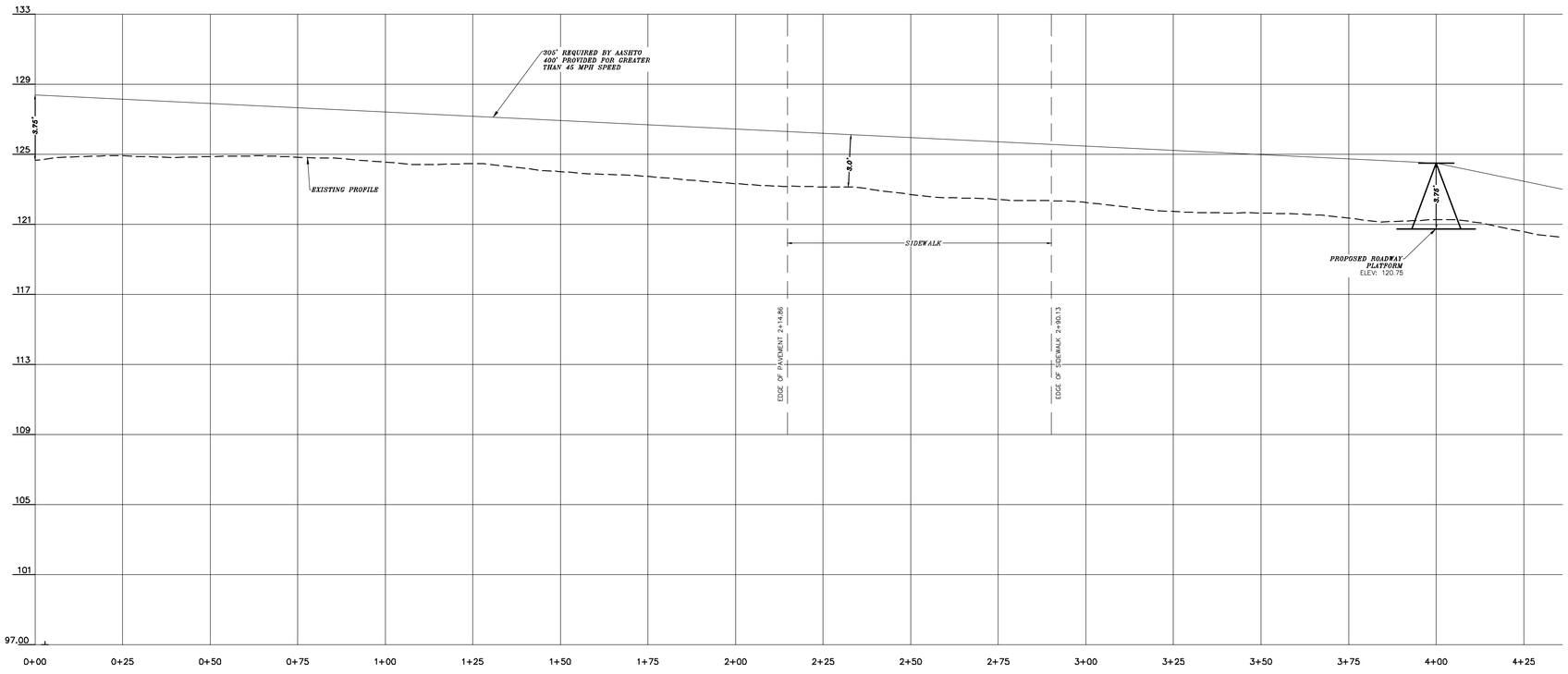
PROFILE VIEW SIGHT LINE



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.
VERTICAL SCALE: 1" = 4'

NOTES CONT.:

7.) THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE EXACTLY AND TO PRESERVE ANY AND ALL UNDERGROUND UTILITIES CALL "DIG-SAFE" 1-888-DIGSAFE (344-7233) AT LEAST 72 HOURS BEFORE COMMENCING CONSTRUCTION

8.) WHERE AN EXISTING UNDERGROUND UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

9.) THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.

10.) AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

11.) THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS, OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE & RESET" (R & R).

12.) ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.

13.) ALL SYMBOLS, WORDS, TRANSVERSE MARKINGS (STOP BARS, CROSSWALK LINES, AND RAILROAD SYMBOLS), LANE LINES, AND ALL OTHER MARKINGS NOTED WITH (T) SHALL BE THERMOPLASTIC.

14.) ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED SHALL HAVE LOAM PLACED AND SEEDED. THE LOAM SHALL HAVE A MINIMUM DEPTH OF 4 INCHES AND SHALL BE PLACED FLUSH WITH THE TOP OF THE ADJACENT CURB, EDGING, BERM OR PAVEMENT SURFACE.

15.) ALL PAVEMENT MARKINGS TO BE PAINTED TO NHDOT STANDARD NO. PM-9.

16.) THE SPEED LIMIT ON SIXTH STREET IS 30 MPH.

PM-9 GENERAL NOTES

1.) EDGELINE DETAILS ARE SHOWN FOR MAINLINE ROADWAYS WITHOUT TURN LANE. THE PRESENCE OF TURN LANES MAY REQUIRE DIFFERENT EDGELINE TREATMENTS,

2.) EDGELINES ON THE SIDE ROADS, WHEN CALLED FOR, SHALL FOLLOW THE ABOVE MAINLINE TYPICALS. EDGELINES SHALL NOT BE CONTINUOUS AROUND THE MAINLINE/SIDE ROAD RADIUS. EDGELINES SHALL END AT STOP BARS.

3.) CENTERLINE AND EDGELINE SHALL BE CONTINUOUS PAST RESIDENTIAL DRIVEWAYS. CENTERLINE AND EDGELINE SHALL BREAK FOR COMMERCIAL DRIVES W/TRAFFIC CONTROLS, MINOR SIDE ROADS, OR PRIVATE INTERSECTIONS.

4.) LOCATION OF THE STOP LINE MAY VARY DUE TO INTERSECTION SIGHT DISTANCE AND VEHICLE TURNING RADIUS AND MAY NOT ALWAYS COINCIDE WITH THE LOCATION OF THE STOP SIGN.

5.) IF THERE IS NO EDGELINE, END STOP BAR 12" FROM EDGE OF PAVEMENT.

6.) STOP BARS, WORDS, LANE LINES, SYMBOLS AND ARROWS SHALL BE THERMOPLASTIC (T).

SD-1

REVISION	DATE	DESCRIPTION

SIGHT DISTANCE PLAN, FAWN DRIVE WESTBOUND
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

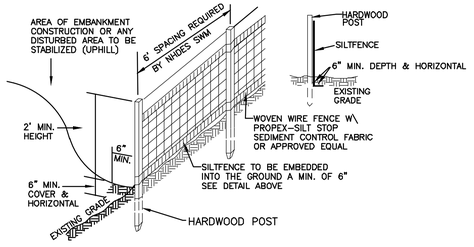
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14247
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

E1



SILT FENCE CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES AND FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP MID AND BOTTOM SECTIONS AND BE EMBEDDED INTO GROUND A MINIMUM OF 8" THE FENCE POSTS SHALL BE A MINIMUM 48" LONG, SPACED A MAXIMUM 6' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THE ENDS OF THE FABRIC SHALL BE OVERLAPPED BY SIX INCHES, FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BY-PASSING.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE AND PROPERLY DISPOSED OF. SEE MAINTENANCE NOTE BELOW, REMOVAL OF SEDIMENT REQUIRED AT A DEPTH OF 6-INCHES.
4. PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE FOR SEDIMENT STORAGE.
5. SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER.
6. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND RE-VEGETATED.
7. TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, SILT FENCE, PAGE 90.

SILT FENCE MAINTENANCE

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH SIX-INCHES IN DEPTH.
4. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

SILT FENCE DETAIL
NOT TO SCALE

E2

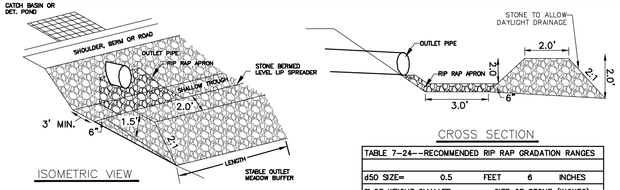


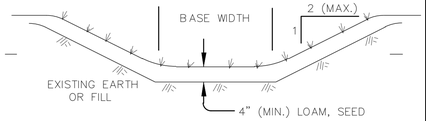
TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES

d50 SIZE=	0.5	FEET	6	INCHES
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE		SIZE OF STONE (INCHES) FROM		TO
100%		9		12
85%		8		11
50%		6		9
15%		2		3

1. CONSTRUCT THE LEVEL SPREADER LIP ON A 0% GRADE TO INSURE UNIFORM SPREADING OF RUNOFF.
2. LEVEL SPREADER SHALL BE CONSTRUCTED ON UNDISTURBED SOIL AND NOT ON FILL.
3. THE ENTIRE LEVEL LIP AREA SHALL BE PROTECTED BY PLACING EXCELSIOR ENFORCER MATTING BENEATH THE STONE. EACH STRIP SHALL OVERLAP BY AT LEAST SIX INCHES.
4. THE FLOW FROM THE LEVEL SPREADER SHALL OUTLET ONTO STABILIZED AREAS. WATER SHOULD NOT RE-CONCENTRATE IMMEDIATELY BELOW THE SPREADER.
5. MAINTENANCE: THE LEVEL SPREADER SHOULD BE CHECKED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE IF THE LIP HAS BEEN DAMAGED AND THE DESIGN CONDITIONS HAVE NOT CHANGED. ANY DETRIMENTAL SEDIMENT ACCUMULATION SHOULD BE REMOVED. IF STONE REMOVAL HAS TAKEN PLACE ON THE LIP, THEN THE DAMAGE SHOULD BE REPAIRED.
6 REFERENCE IS MADE TO NHDES SWM VOL. 2, 4-6, STONE BERM LEVEL SPREADERS, PAGE 162

STONE BERM LEVEL SPREADER
NOT TO SCALE

E3



GRASS SWALE
NOT TO SCALE

INSPECT ANNUALLY FOR EROSION, SEDIMENT ACCUMULATIONS, VEGETATION LOSS, & INVASIVE SPECIES. REPAIR AS NECESSARY.

MOW GRASS ANNUALLY TO A DEPTH OF 4".

INSTALL STABILIZATION MATTING DURING CONSTRUCATION

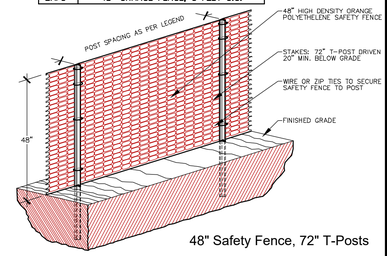
TO BE CONSTRUCTED IAW NH SWM #2 CHAPTER 4, #5 TREATMENT SWALES, PAGE 123.

E4 *CONSTRUCTION SAFETY FENCE*

NOT TO SCALE

LEGEND

SAF12	48" ORANGE FENCE, 12 FEET O.C.
SAF11	48" ORANGE FENCE, 11 FEET O.C.
SAF10	48" ORANGE FENCE, 10 FEET O.C.
SAF9	48" ORANGE FENCE, 9 FEET O.C.
SAF8	48" ORANGE FENCE, 8 FEET O.C..
SAF7	48" ORANGE FENCE, 7 FEET O.C.
SAF6	48" ORANGE FENCE, 6 FEET O.C.

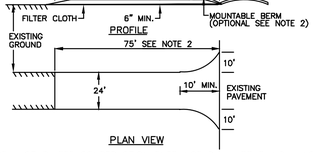


48" Safety Fence, 72" T-Posts

1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
2. ALL TREES IN THE CONSTRUCTION AREA NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PRESERVED AND PROTECTED WITH HIGH VISIBILITY FENCE AS PER PLAN.
3. WHEN PRACTICABLE, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

E5 *STABILIZED CONSTRUCTION ENTRANCE*

NOT TO SCALE

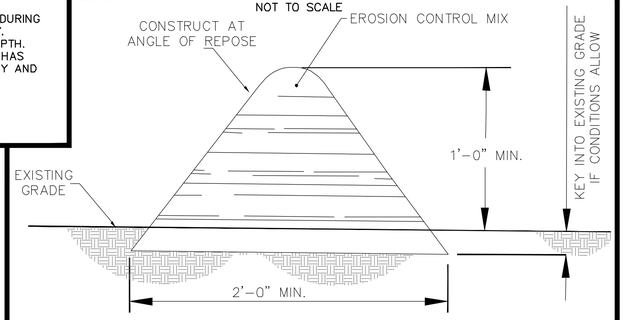


PLAN VIEW

1. STONE FOR A STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH ANGULAR STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT WITH ENGINEERED FABRIC.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 75 FEET, EXCEPT THAT THE MINIMUM LENGTH MAY BE REDUCED TO 50 FEET IF A 3-INCH TO 6-INCH BERM IS INSTALLED AT THE ENTRANCE OF THE PROJECT SITE.
3. THE THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS OR 10 FEET, WHICH EVER IS GREATER.
5. GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.
8. TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, TEMPORARY CONSTRUCTION EXIT, PAGE 124.

E6 *EROSION CONTROL MIX BERM*

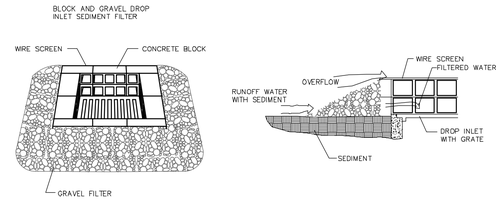
NOT TO SCALE



EROSION CONTROL MIX BERMS SHALL BE USED ONLY AS FOLLOWS:

1. BERMS SHALL BE USED IN AREAS WHERE EROSION WILL OCCUR ONLY IN THE FORM OF SHEET EROSION AND THERE IS NO CONCENTRATION OF WATER IN A CHANNEL OR DRAINAGE WAY ABOVE THE BERM.
2. THE BERMS SHALL BE INSTALLED FOLLOWING THE CONTOUR OF THE LAND AS CLOSELY AS POSSIBLE.
3. THE BERMS SHALL BE INSTALLED ON SLOPES LESS THAN 5%
4. SUBJECT TO (E), BELOW, THE MIX SHALL HAVE AN ORGANIC PORTION BETWEEN 80 AND 100%, DRY WEIGHT BASIS, AND BE FIBROUS AND ELONGATED SUCH AS FROM SHREDDED BARK, STUMP GRINDINGS, COMPOSED BARK, OR EQUIVALENT MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS, OR REPROCESSED WOOD PRODUCTS SHALL NOT BE USED AS ORGANIC MATERIAL.
5. THE MIX SHALL NOT CONTAIN SILTS, CLAY, OR FINE SANDS.
6. THE MIX SHALL HAVE A PARTICLE SIZE BY WEIGHT OF 70 TO 85% PASSING A 6-INCH SCREEN AND A MAXIMUM OF 85% PASSING THE 0.75-INCH SCREEN.
7. THE MIX PH SHALL BE BETWEEN 5.0 AND 8.0.
8. THE BERM SHALL BE AT LEAST 12 INCHES HIGH AND AT LEAST 2 FEET WIDE.
9. TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, EROSION CONTROL MIX BERMS, PAGE 106.

E7



MAINTENANCE

ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAIN STORM AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED OF IN A SUITABLE AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

BLOCK & GRAVEL DROP INLET SEDIMENT FILTER
NOT TO SCALE

TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, TEMPORARY STORM DRAIN INLET PROTECTION, PAGE 118.

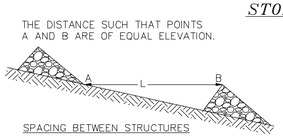
TO BE USED IN ALL AREAS WHERE THERE WILL BE NO TRAFFIC.

E8 *TEMPORARY EROSION CONTROL MEASURES*

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS SHALL BE RETURNED TO ORIGINAL GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 4" OF LOAM AND SEEDED WITH NOT LESS THAN ONE POUND OF SEED PER 50 SQUARE YARDS OF AREA. (SEE SEED SPECIFICATIONS THIS SHEET)
4. ALL DISTURBED AREAS WILL BE RESTABILIZED WITHIN 45 DAYS. AT ANY ONE TIME, NO MORE THAN 5 ACRES, (217,800 Sq. Ft.) WILL BE DISTURBED.
5. SILT FENCES AND PERIMETER BARRIERS SHALL BE INSPECTED PERIODICALLY AND AFTER EVERY RAIN DURING THE LIFE OF THE PROJECT. ALL DAMAGED AREAS SHALL BE REPAIRED, SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
6. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
7. PER THE EPA CGP REQUIREMENTS THERE WILL BE REPORTS OF THE EROSION CONTROL INSPECTIONS IAW SWPPP PREPARED BY BS&E. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND WITHIN 24 HOURS AFTER 0.25" OR GREATER RAIN EVENT.
8. DITCHES, SWALES, AND BASINS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
9. DO NOT TRAFFIC EXPOSED SOIL SURFACES WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION SYSTEM.
10. DRIVEWAYS AND CUT AND FILL SPLOPES MUST BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINAL GRADE.
11. STABILIZATION MEANS:
    - 11.1. A MINIMUM OF 85% OF VEGETATIVE COVER HAS BEEN ESTABLISHED.
    - 11.2. A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP RAP HAS BEEN INSTALLED, OR
    - 11.3. EROSION CONTROL BLANKETS HAVE BEEN INSTALLED.
12. THIS PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.
13. THE NHDES STORMWATER MANUAL, IN THREE VOLUMES, DATED DECEMBER 2008, IS A PART OF THIS PLAN SET AND THE MORE RESTRICTIVE WILL GOVERN. (NH SWM)

E9 *STONE CHECK DAM*

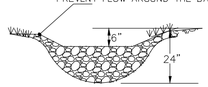
NOT TO SCALE

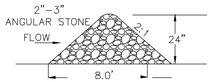


SPACING BETWEEN STRUCTURES

1.) CHECK DAMS SHOULD BE INSTALLED BEFORE RUNOFF IS DIRECTED TO THE SWALE OR DRAINAGE DITCH.
2.) THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE DAM SHOULD BE LESS THEN ONE ACRE.
3.) THE MAXIMUM HEIGHT OF THE DAM SHOULD BE TWO FEET.
4.) THE CENTER OF THE DAM SHOULD BE AT LEAST SIX INCHES LOWER THAN THE OUTER EDGES.
5.) THE MAXIMUM SPACING IS AS SHOWN ON THE PROJECT SITE PLANS.
6.) CHECK DAMS WILL NOT BE USED IN A FLOWING STREAM.
7.) TEMPORARY CHECK DAMS WILL BE REMOVED ONCE THE SWALE OR DITCH IS DETERMINED STABLE.
8.) TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, TEMPORARY CHECK DAMS, PAGE 114.

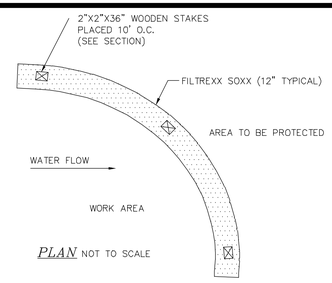
NOTE: KEY STONE INTO CHANNEL BANKS AND EXTEND IT BEYOND THE ABUTMENTS A MINIUM OF 18" TO PREVENT FLOW AROUND THE DAM.





STONE GRADE STABILIZATION STRUCTURE

E10

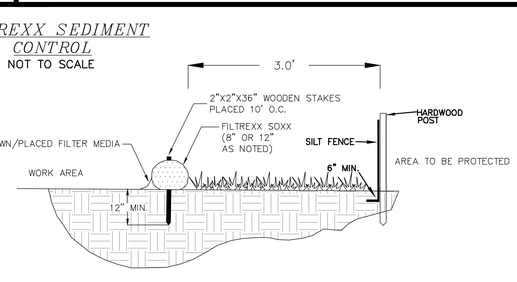


PLAN NOT TO SCALE

NOTES

1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. FILTER MEDIA FILL TO MEET APPLICATION REQUIRMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
4. SILTSOXX MAY BE USED IN PLACE OF SILT FENCE OR OTHER SEDIMENT BARRIERS.
5. SILTSOXX COMPOST/SOIL/ROCK/SEED FILL MATERIAL SHALL BE ADJUSTED AS NECESSARY TO MEET THE REQUIRMENTS OF THE SPECIFIC APPLICATION.
6 FILTREXX SOXX IS A REGISTERED TRADEMARK OF FILTREXXIN TERNATIONAL, LLC.
7. SILT FENCE IS NOT A SUBSTITUTION FOR SILT SOXX AND ANY EQUAL SUBSTITUTION TO BE APPROVED.
8. TO BE CONSTRUCTED IAW FILTREXX, SECTION 1:EROSION & SEDIMENT CONTROL (PAGE 323) – CONSTRUCTION ACTIVITIES, SWPPP CUT SHEET: FILTREXX SEDIMENT CONTROL

FILTREXX SEDIMENT CONTROL
NOT TO SCALE



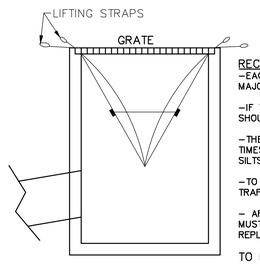
Filtrexx International, LLC
35481 Grafton Eastern Rd | Grafton, Oh 44044
440-926-2607 | fax 440-926-4021
WWW.FILTREXX.COM
OR APPROVED EQUAL

NOTE: FOR AREAS REQUIRING DOUBLE PERIMETER CONTROL WITHIN 50' OF JURISDICTIONAL WETLANDS AND NOT FOR ALL SILT SOXX APPLICATIONS.

DOUBLE PERIMETER PROTECTION CAN BE ANY COMBINATION OF THE PRACTICES OF SILT FENCE, SILT SOXX, OR EROSION CONTROL MULCH BERM.

SECTION NOT TO SCALE

E11



RECOMMENDED MAINTENANCE SCHEDULE

-EACH SILTSACK SHOULD BE INSPECTED AFTER EVERY MAJOR RAIN EVENT, AND MUST BE MAINTAINED.

-IF THERE HAVE BEEN NO MAJOR EVENTS, SILTSACK SHOULD BE INSPECTED EVERY 2-3 WEEKS.

-THE RESTRAINT CORD SHOULD BE VISIBLE AT ALL TIMES. IF CORD IS COVERED WITH SEDIMENT, THE SILTSACK SHOULD BE EMPTIED.

-TO BE USED IN ALL AREAS WHERE THERE WILL BE TRAFFIC.

- ARE SUBJECT TO DAMAGE BY SNOW PLOWS, AND MUST BE INSPECTED AFTER ANY SNOW EVENT AND REPLACED AS REQUIRED.

TO BE CONSTRUCTED IAW NH SWM #3 4-2 SEDIMENT CONTROL PRACTICES, TEMPORARY STORM DRAIN INLET PROTECTION, PAGE 118.

SILTSACK DETAIL
NOT TO SCALE

REVISION	DATE	DESCRIPTION

EROSION & SEDIMENT CONTROL DETAILS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 36, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

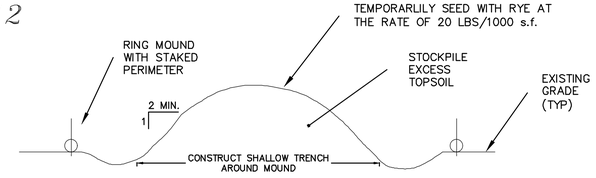
SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

KENNETH A. BERRY No. 14243 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

E-101

NOT FOR CONSTRUCTION

E12



TO BE CONSTRUCTED IAW NH SWM #3 4–1 EROSION CONTROL PRACTICES, SOIL STOCKPILE PRACTICES, PAGE 46.

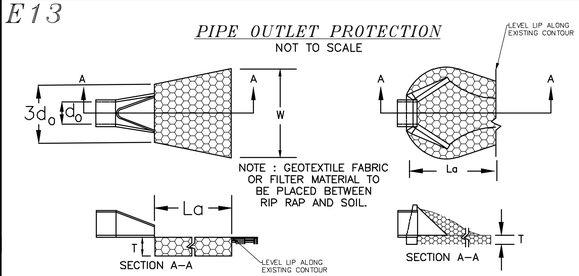
TOPSOIL STOCKPILE MOUND

NOT TO SCALE

E13

PIPE OUTLET PROTECTION

NOT TO SCALE



PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

PIPE OUTLET TO WELL–DEFINED CHANNEL

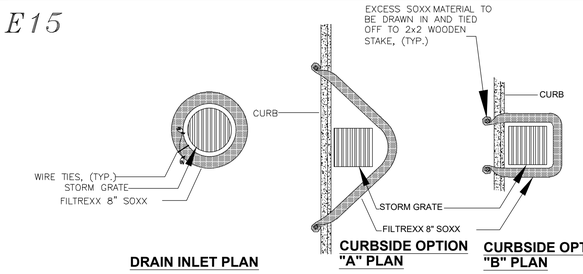
PIPE OUTLET PROTECTION CONSTRUCTION SPECIFICATIONS

1. THE SUB GRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS. SPECIFIED GRADATION.
2. THE ROCK OR GRAVEL USED FOR FILTER OF RIP RAP SHALL CONFORM TO NHDOT SECTION 583.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP RAP DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.
5. TO BE CONSTRUCTED IAW NH SWM #2 4–6 CONVEYANCE PRACTICES, 6. OUTLET PROTECTION, PAGE 172.

E14

TABLE 7–24––RECOMMENDED RIP RAP GRADATION RANGES		
d50 SIZE= 0.5 FEET	6 INCHES	
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

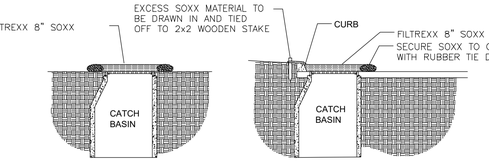
E15



DRAIN INLET PLAN

CURBSIDE OPTION "A" PLAN

CURBSIDE OPTION "B" PLAN



DRAIN INLET SECTION

CURBSIDE SECTION

NOTES:
1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. FILTER MEDIA FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

FILTREXX INLET PROTECTION

NOT TO SCALE

E16

NOTE: THIS PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

NOTE: Temporary seed mix for stabilization of turf shall be winter rye or oats at a rate of 2.5 lbs. per 1000 s.f. and shall be placed prior to OCT. 15, if permanent seeding not yet complete.

SEEDING GUIDE

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	EXCELLENT	FAIR
	C	POOR	GOOD	GOOD	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	EXCELLENT
	E	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
	D	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	GOOD	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
	D	FAIR	GOOD	GOOD	EXCELLENT
PLAY AREAS AND athletic FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	F	FAIR	EXCELLENT	EXCELLENT	2/
	G	FAIR	EXCELLENT	EXCELLENT	2/

GRAVEL PIT, SEE NH–PM–24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.

1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE 7–36.
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.

SEEDING SPECIFICATIONS

1. GRADING AND SHAPING
   A. SLOPES SHALL NOT BE STEEPER THAN 2:1;3:1 SLOPES OR FLATTER ARE PREFERRED.
   WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. SEEDBED PREPARATION
   A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
   B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEED BED AND MIX FERTILIZER AND LIME INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. ESTABLISHING A STAND
   A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING
   AND INCORPORATED INTO THE SOIL KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE,
   THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
   AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100LBS. PER 1,000 SQ.FT.
   NITROGEN(N), 50LBS. PER ACRE OR 1.1LBS. PER 1,000 SQ.FT.
   PHOSPHATE(P2O5), 100LBS. PER ACRE OR 2.2LBS. PER 1,000 SQ.FT.
   POTASH(K2O), 100LBS. PER ACRE OR 2.2LBS. PER 1,000 SQ.FT.
   (NOTE: THIS IS THE EQUIVALENT OF 500LBS. PER ACRE OF 10–20–20 FERTILIZER OR 1,000LBS. PER ACRE OF 5–10–10.)
   B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
   C. REFER TO TABLE(G–E1 THIS SHEET) FOR APPROPRIATE SEED MIXTURES AND TABLE(H–E1 THIS SHEET) FOR RATES OF SEEDING. ALL LEGUMES (CROWNVETCH, BIRDSFOOT TREFOIL, AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT.
   D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 10 TO SEPTEMBER 1.
4. MULCH
   A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
   B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90LBS PER 1000 S.F.
5. MAINTENANCE TO ESTABLISH A STAND
   A. PLANTED AREA SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
   B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIAL STAKE 2 TO 3 YEARS TO BECOME ESTABLISHED.
   C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, OCCASIONAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.
6. TO BE CONSTRUCTED IAW NH SWM #3 4–1 EROSION CONTROL PRACTICES, PERMANENT VEGETATION, PAGE 60.

SEEDING RATES

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
RED TOP	2	0.05
TOTAL	42	0.95
B. TALL FESCUE	15	0.35
CREEPING RED FESCUE	10	0.25
CROWN VETCH	15	0.35
OR	30	0.75
FLAT PEA	30	0.75
TOTAL	40 OR 55	0.95 OR 1.35
C. TALL FESCUE	24	0.55
CREEPING RED FESCUE	24	0.55
BIRDS FOOT TREFOIL	REMOVED	REMOVED
TOTAL	48	1.10
D. TALL FESCUE	20	0.45
FLAT PEA	30	0.75
TOTAL	50	1.20
E. CREEPING RED FESCUE 1/	50	1.15
KENTUCKY BLUEGRASS 1/	50	1.15
TOTAL	100	2.30
F. TALL FESCUE 1	150	3.60

CONSERVATION MIX TO BE PROVIDED BY NEW ENGLAND WETLAND PLANTS, INC. OR APPROVED EQUAL

New England Conservation/Wildlife Mix

Botanical Name	Common Name	Indicator
Elymus virginicus	Virgina Wild Rye	FACW-
Schizachyrium scoparium	Little Bluestem	FACU
Andropogon gerardii	Big Bluestem	FAC
Festuca rubra	Red Fescue	FACU
Sorghastrum nutans	Indian Grass	UPL
Panicum virgatum	Switch Grass	FAC
Chamaecrista fasciculata	Partridge Pea	FACU
Desmodium canadense	Shown Tick Trefoil	FAC
Asclepias tuberosa	Butterfly Milkweed	NI
Bidens frondosa	Beggas Ticks	FACW
Eupatorium purpureum (Eutrochium maculatum)	Purple Joe Pye Weed	FAC
Redbeckia hirta	Black Eyed Susan	FACU-
Aster pilosus (Symphyotrichum pilosum)	Heath (or Hairy) Aster	UPL
Solidago juncea	Early Goldenrod	

E17 *CONSTRUCTION SEQUENCE:*

1.) CUT AND REMOVE TREES IN CONSTRUCTION AREA ONLY AS REQUIRED, RELOCATE ANY PROJECT T.B.M.

2.) CONSTRUCT AND/OR INSTALL TEMPORARY AND PERMANENT SEDIMENT EROSION AND DETENTION CONTROL FACILITIES AS SPECIFIED. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SOIL LAND DISTURBANCE AND MUST BE REVIEWED AND APPROVED BY THE COMMUNITY SERVICES DEPARTMENT.

3.) EROSION, SEDIMENT AND DETENTION CONTROL FACILITY SHALL BE INSTALLED & STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM. TEMPORARY DIVERSIONS MAY BE REQUIRED. POST CONSTRUCTION STORM WATER MANAGEMENT PRACTICES MUST BE INITIATED AND STABILIZED EARLY IN THE PROCESS.

4.) CLEAR, CUT AND DISPOSE OF DEBRIS IN APPROVED FACILITY

5.) CONSTRUCT TEMPORARY CULVERTS AS REQUIRED, OR DIRECTED

6.) CONSTRUCT ROADWAYS FOR ACCESS TO DESIRED CONSTRUCTION AREAS. ALL ROADS SHALL BE STABILIZED IMMEDIATELY. CONSTRUCT STORMWATER CONTROL MEASURES.

7.) START BUILDING CONSTRUCTION AND INSTALL PERIMETER FENCE WHERE SHOWN.

8.) INSTALL PIPE AND CONSTRUCTION ASSOCIATED APPURTENANCES AS REQUIRED OR DIRECTED. ALL DISTURBED AREAS SHALL STABILIZED IMMEDIATELY AFTER GRADING.

9.) BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES AND DISTURBED AREAS SHALL BE SEEDED OR MULCHED AS REQUIRED, OR DIRECTED. NO AREA IS ALLOWED TO BE DISTURBED FOR A LENGTH OF TIME THAT EXCEEDS 45 DAYS BEFORE BEING STABILIZED, DAILY, OR AS REQUIRED. ALL ROADWAYS AND PARKING AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADES. ALL CUT AND FILL SLOPES SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADES.

10.) CONSTRUCT TEMPORARY BERMS, DRAINS DITCHES, SILT FENCES, SEDIMENT TRAPS, ETC. MULCH AND SEED AS REQUIRED.

11.) INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION. ALL SWPPP INSPECTIONS MUST BE CONDUCTED BY A QUALIFIED PROFESSIONAL SUCH AS A PROFESSIONAL ENGINEER (PE), A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), A CERTIFIED EROSION SEDIMENT AND STORM WATER INSPECTOR (CESSWI), OR A CERTIFIED PROFESSIONAL IN STORM WATER QUALITY (CPSWQ). INSPECTION REPORTS SHALL BE SUBMITTED TO THE COMMUNITY SERVICES DEPARTMENT.

12.) COMPLETE PERMANENT SEEDING AND LANDSCAPING.

13.) REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE ESTABLISHED THEMSELVES AND SITE IMPROVEMENTS ARE COMPLETE.

14.) SMOOTH AND REVEGETATE ALL DISTURBED AREAS.

15.) FINISH PAVING ALL ROADWAYS.

E18 *DEFINITION OF STABLE:*

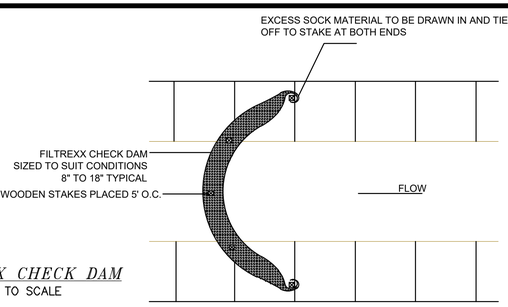
PER ENV–WQ 1500 ALTERATION OF TERRAIN

1. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED.
2. A MINIMUM OF 85 PERCENT VEGETATED GROWTH HAS BEEN ESTABLISHED..
3. A MINIMUM OF 3 INCHES OF NON–EROSIVE MATERIAL SUCH AS STONE OR RIP–RAP HAS BEEN INSTALLED.
4. OR, EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.

ADDITION STABILIZATION NOTES:

5. HAY MULCH OR OTHER APPROVED METHODS SHALL BE USED TO CONTROL EROSION OF NEWLY GRADED AREAS. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS AFTER THEIR CONSTRUCTION.
6. DISTURBED SOIL AREAS SHALL BE EITHER TEMPORARILY OR PERMANENTLY STABILIZED. IN AREAS WHERE FINAL GRADING HAS NOT OCCURRED, TEMPORARY STABILIZATION MEASURES SHOULD BE IN PLACE WITHIN SEVEN (7) CALENDAR DAYS FOR EXPOSED SOIL AREAS THAT ARE WITHIN ONE HUNDRED (100) FEET OF A SURFACE WATER BODY OR A WETLAND AND NO MORE THAN 14 CALENDAR DAYS FOR ALL OTHER AREAS. PERMANENT STABILIZATION SHOULD BE IN PLACE WITHIN THREE (3) CALENDAR DAYS FOLLOWING COMPLETION OF FINAL GRADING OF EXPOSED SOIL AREAS.

E19

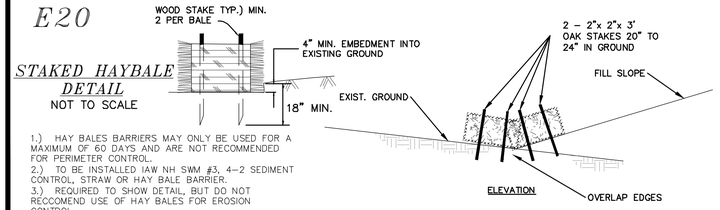


FILTREXX CHECK DAM

NOT TO SCALE

NOTES:
1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. CHECK DAM SHOULD BE USED IN AREAS THAT DRAIN 1 ACRE OR LESS.
3. SEDIMENT SHOULD BE REMOVED FROM BEHIND CHECK DAM ONCE THE ACCUMULATED HEIGHT HAS REACHED ½ THE HEIGHT OF THE CHECK DAM.
4. CHECK DAM CAN BE DIRECT SEEDED AT THE TIME OF INSTALLATION.
5. CONTRACTOR IS REQUIRED TO BE A FILTREXX CERTIFIED INSTALLER.

E20

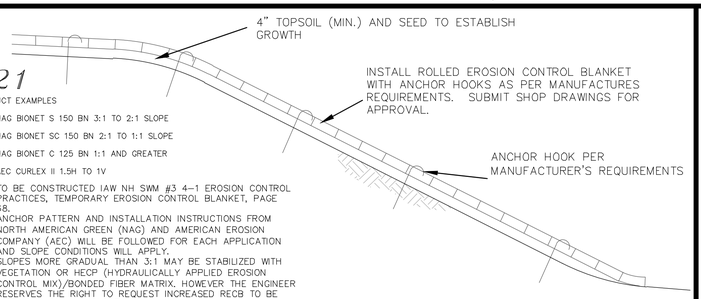


STAKED HAYBALE DETAIL

NOT TO SCALE

1.) HAY BALES BARRIERS MAY ONLY BE USED FOR A MAXIMUM OF 60 DAYS AND ARE NOT RECOMMENDED FOR PERIMETER CONTROL.
2.) TO BE INSTALLED IAW NH SWM #3, 4–2 SEDIMENT CONTROL, STRAW OR HAY BALE BARRIER.
3.) REQUIRED TO SHOW DETAIL, BUT DO NOT RECCOMEND USE OF HAY BALES FOR EROSION CONTROL.

E21



PRODUCT EXAMPLES

1.) NAG BIONET S 150 BN 3:1 TO 2:1 SLOPE
2.) NAG BIONET SC 150 BN 2:1 TO 1:1 SLOPE
3.) NAG BIONET C 125 BN 1:1 AND GREATER
4.) AEC CURLEX II 1.5H TO 1V

1. TO BE CONSTRUCTED IAW NH SWM #3 4–1 EROSION CONTROL PRACTICES, TEMPORARY EROSION CONTROL BLANKET, PAGE 68.
2. ANCHOR PATTERN AND INSTALLATION INSTRUCTIONS FROM NORTH AMERICAN GREEN (NAG) AND AMERICAN EROSION COMPANY (AEC) WILL BE FOLLOWED FOR EACH APPLICATION AND SLOPE CONDITIONS WILL APPLY.
3. SLOPES MORE GRADUAL THAN 3:1 MAY BE STABILIZED WITH VEGETATION OR HECP (HYDRAULICALLY APPLIED EROSION CONTROL MIX)/BONDED FIBER MATRIX. HOWEVER THE ENGINEER RESERVES THE RIGHT TO REQUEST INCREASED RECB TO BE INSTALLED ON ANY SLOPE.
4. UNDER SOME CONDITIONS, E.G. WINTER CONSTRUCTION OR RAIN EVENT SATURATION, AREA INTENDED FOR VEGETATION STABILIZATION MAY REQUIRE HAY MULCH OR R.E.C.B. STABILIZATION

ROLLED EROSION CONTROL BLANKET (RECB) SLOPE STABILIZATION DETAIL

NOT TO SCALE

E22 *WINTER STABILIZATION NOTES*

1. ALL DISTURBED AREAS THAT DO NOT HAVE AT LEAST 85% VEGETATIVE COVERAGE PRIOR TO OCTOBER 15TH SHALL BE STABILIZED BY APPLYING MULCH AT A RATE OF 3–4 TONS PER ACRE. ALL SIDE SLOPES, STEEPER THAN 4:1, THAT ARE NOT DIRECTED TO SWALES OR DETENTION BASINS, SHALL BE LINED WITH BIODEGRADABLE/PHOTODEGRADABLE "JUTE MATTING" (EXCELSIOR'S CURLEX II OR EQUAL). ALL OTHER SLOPES SHALL BE MULCHED AND TACKED AT A RATE OF 3–4 TONS PER ACRE. THE APPLICATION OF MULCH AND/OR JUTE MATTING SHALL NOT OCCUR OVER EXISTING SNOW COVER. IF THE SITE IS ACTIVE AFTER OCTOBER 15TH, ANY SNOW THAT ACCUMULATES ON DISTURBED AREAS SHALL BE REMOVED. PRIOR TO SPRING THAW ALL AREAS WILL BE STABILIZED, AS DIRECTED ABOVE.

2. ALL SWALES THAT DO NOT HAVE FULLY ESTABLISHED VEGETATION SHALL BE EITHER LINED WITH TEMPORARY JUTE MATTING OR TEMPORARY STONE CHECK DAMS (APPROPRIATELY SPACED). STONE CHECK DAMS WILL BE MAINTAINED THROUGHOUT THE WINTER MONTHS. IF THE SWALES ARE TO BE MATTED WITH PERMANENT LINERS OR RIPRAP WITH ENGINEERING FABRIC, THIS SHALL BE COMPLETED PRIOR TO WINTER SHUTDOWN OR AS SOON AS THEY ARE PROPERLY GRADED AND SHAPED.

3. PRIOR TO OCT. 1st ALL ROADWAY AND PARKING AREAS SHALL BE BROUGHT UP TO AND THROUGH THE BANK RUN GRAVEL APPLICATION. IF THESE AREAS' ELEVATIONS ARE PROPOSED TO REMAIN BELOW THE PROPOSED SUBGRADE ELEVATION, THE SUBGRADE MATERIAL SHALL BE ROUGHLY CROWNED AND A 3" LAYER OF CRUSHED GRAVEL SHALL BE PLACED AND COMPACTED. THIS WILL ALLOW THE SUBGRADE TO SHED RUNOFF AND WILL REDUCE ROADWAY EROSION. THIS CRUSHED GRAVEL DOES NOT HAVE TO CONFORM TO NH DOT 304.3, BUT SHALL HAVE BETWEEN 15–25% PASSING THE #200 SIEVE AND THE LARGEST STONE SIZE SHALL BE 2". IF THE SITE IS ACTIVE AFTER OCTOBER 1st, ANY ACCUMULATED SNOW SHALL BE REMOVED FROM ALL ROADWAY AND PARKING AREAS.

4. AFTER OCTOBER 1st, THE END OF NEW HAMPSHIRE'S AVERAGE GROWING SEASON, NO ADDITIONAL LOAM SHALL BE SPREAD ON SIDE SLOPES AND SWALES. THE STOCKPILES THAT WILL BE LEFT UNDISTURBED UNTIL SPRING SHALL BE SEEDED BY THIS DATE. AFTER OCTOBER 15TH, ANY NEW OR DISTURBED PILES SHALL BE MULCHED AT A RATE OF 3–4 TONS PER ACRE. ALL STOCKPILES THAT WILL REMAIN THROUGHOUT THE WINTER SHALL BE SURROUNDED WITH SILT FENCING.

REVISION	DATE	DESCRIPTION

EROSION & SEDIMENT CONTROL DETAILS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY & SURVEYING ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

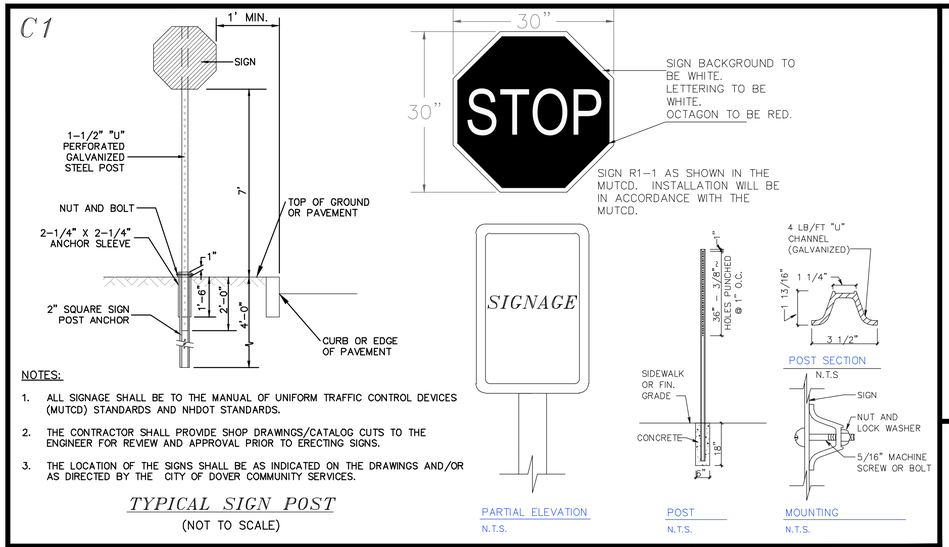
SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE — KENNETH A. BERRY No. 14243 — LICENSED PROFESSIONAL ENGINEER

E–102

NOT FOR CONSTRUCTION

C1

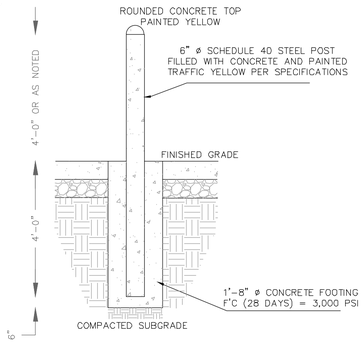


NOTES:

1. ALL SIGNAGE SHALL BE TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS AND NHDOT STANDARDS.
2. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS/CATALOG CUTS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ERECTING SIGNS.
3. THE LOCATION OF THE SIGNS SHALL BE AS INDICATED ON THE DRAWINGS AND/OR AS DIRECTED BY THE CITY OF DOVER COMMUNITY SERVICES.

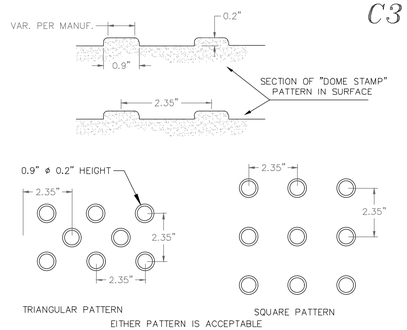
TYPICAL SIGN POST
(NOT TO SCALE)

C2



BOLLARD DETAIL
NOT TO SCALE

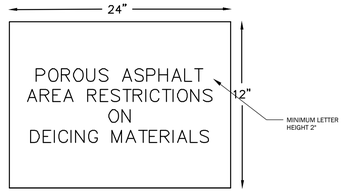
C3



DETECTABLE WARNING SURFACE
NOT TO SCALE

C4

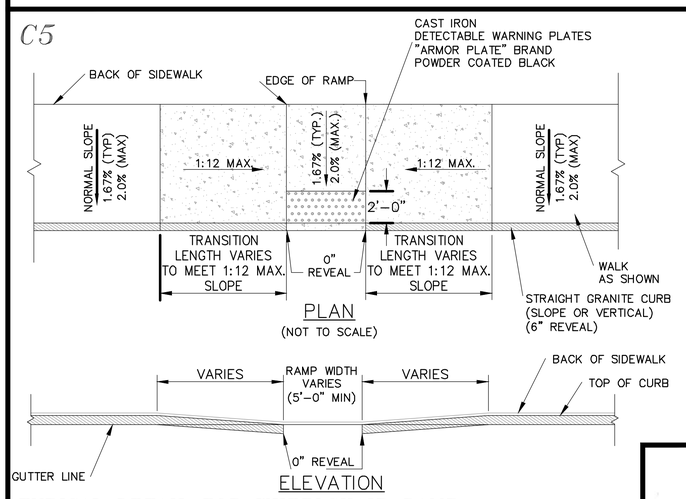
POROUS PAVEMENT SIGN
NOT TO SCALE



NOTES:

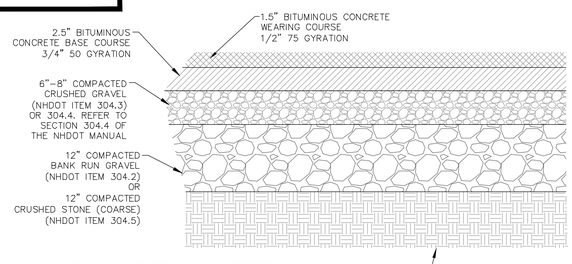
1. SIGN SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND
2. SIGN SHALL BE WEATHER RESISTANT AND SECURED TO THE GROUND
3. TO BE MOUNTED AT A HEIGHT OF 3'

C5



TYPICAL DETAIL FOR WHEELCHAIR RAMP
NOT TO SCALE

C6



NOTES:

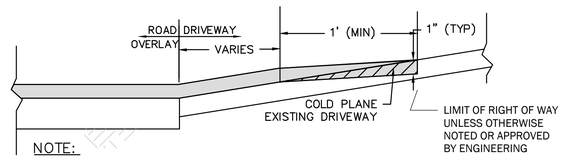
1.) BITUMINOUS MATERIALS SHALL CONFORM TO NHDOT SPECIFICATION SUBSECTION 401.3.6.

2.) PAVEMENT BASE COURSE AGGEGATE SHALL CONFORM TO NHDOT SPECIFICATION SECTION 304, ITEM 304.3 AND COMPACTED TO A MINIMUM OF 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY.

3.) PAVEMENT SUBBASE COURSE AGGREGATE AND AGGREGATE FOR SUBGRADE REPAIR AREAS SHALL BE SUITABLE FOR USE AS STRUCTURAL FILL AND BE PROOFROLLED AND COMPABED TO 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY. FOR NEW CONSTRUCTION AREAS ONLY. IN EXISTING PAVEMENT AREAS THE CONTRACTOR IS TO ENSURE THE BASE MATERIAL IS SUITABLE TO THE OWNER FOR RE-PAVING

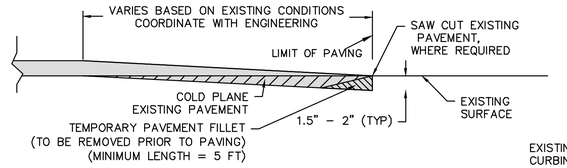
BITUMINOUS CONCRETE PAVEMENT SECTION (NON-POROUS)
NOT TO SCALE

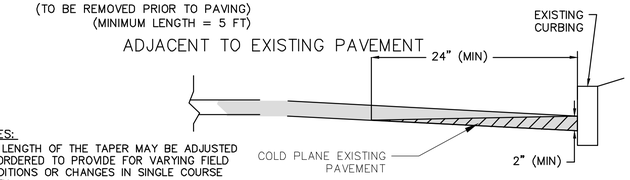
C7



NOTE:
CONTRACTOR MAY SAWCUT DRIVEWAY TRANSITION AT HIS OPTION. PAVEMENT SHALL BE REMOVED AND REPLACED TO MATCH EXISTING.

ADJACENT TO EXISTING DRIVEWAY



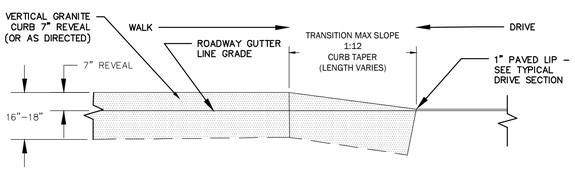


NOTES:

1. THE LENGTH OF THE TAPER MAY BE ADJUSTED AS ORDERED TO PROVIDE FOR VARYING FIELD CONDITIONS OR CHANGES IN SINGLE COURSE DEPTH.

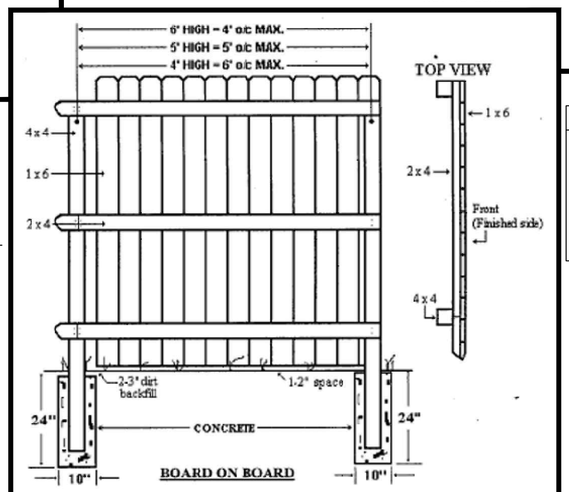
PAVEMENT OVERLAY
NOT TO SCALE

C8



GRANITE CURB TRANSITION AT TIP DOWN DETAIL
NOT TO SCALE
TO BE USED FOR TRANSITION FROM GRANITE CURB TO EDGE OF PAVEMENT

C9



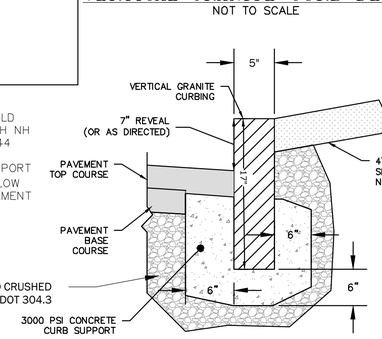
STOCKADE FENCE DETAIL
NOT TO SCALE

C10A

RADIUS	MAX LENGTH
< 21'	USE CURVED CURB
12'	3'
22' - 28'	4'
29' - 35'	5'
36' - 42'	6'
43' - 49'	7'
50' - 56'	8'
57' - 60'	9'
OVER 60'	10'

NOTES:
1.LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
2. CONCRETE CURB SUPPORT SHOULD BE SET ½" BELOW THE TOP OF THE PAVEMENT BASE COURSE.

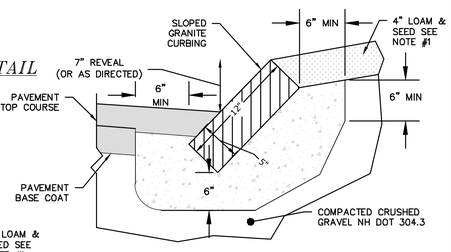
VERTICAL GRANITE CURB DETAIL
NOT TO SCALE



NOTES:
1.LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
2. CONCRETE CURB SUPPORT SHOULD BE SET ½" BELOW THE TOP OF THE PAVEMENT BASE COURSE.

SLOPE GRANITE CURBDETAIL
NOT TO SCALE

C10B



C-101

REVISION	DATE	DESCRIPTION

CONSTRUCTION DETAILS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

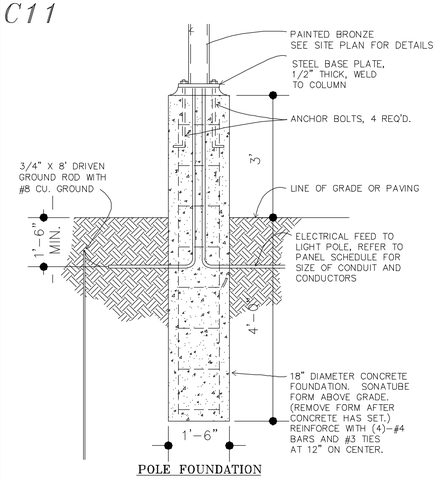
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

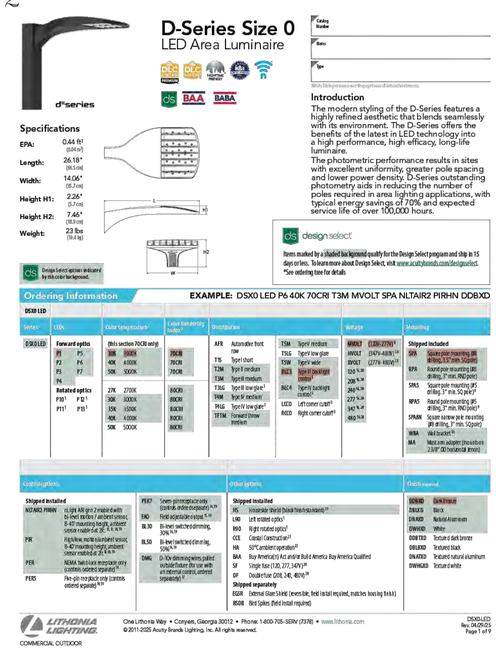
NOT FOR CONSTRUCTION

C11



LIGHT BASE DETAIL
NOT TO SCALE

C12

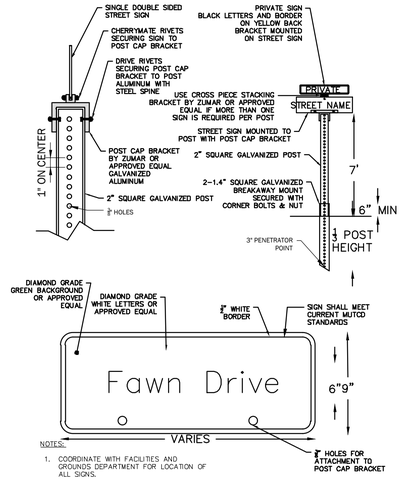


TYPICAL POLE LAMP "A"
MOUNTED AT 16.0' AS SHOWN
NOT TO SCALE

C13

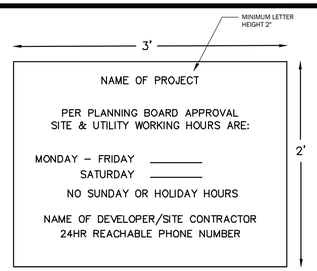
TYPICAL RESIDENTIAL LAMP "B"
MOUNTED AT 8' +/- AS SHOWN
NOT TO SCALE

C14



STREET SIGN
NOT TO SCALE

C15



NOTES:
1. SIGN SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND
2. SIGN SHALL BE WEATHER RESISTANT AND SECURED TO THE GROUND
3. HOURS ON THE SIGN SHALL COMPLY WITH ALL PLANNING BOARD CONDITIONS OF APPROVAL.
4. TO BE PLACED AT THE INTERSECTION OF OLD ROCHESTER ROAD/MILLWRIGHT DRIVE.

REQUIRED PROJECT INFORMATION SIGN
NOT TO SCALE

REVISION	DATE	DESCRIPTION

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BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

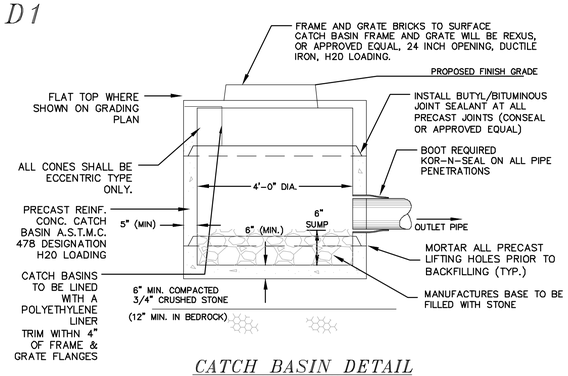
SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14041
PROFESSIONAL ENGINEER

C-102

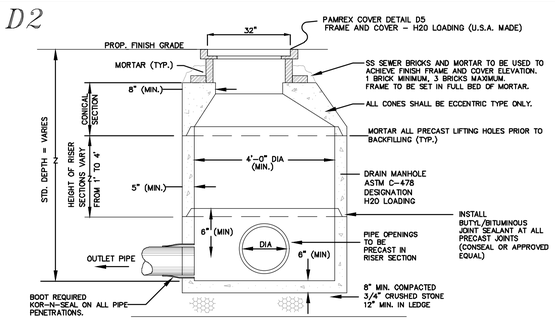
NOT FOR CONSTRUCTION

D1



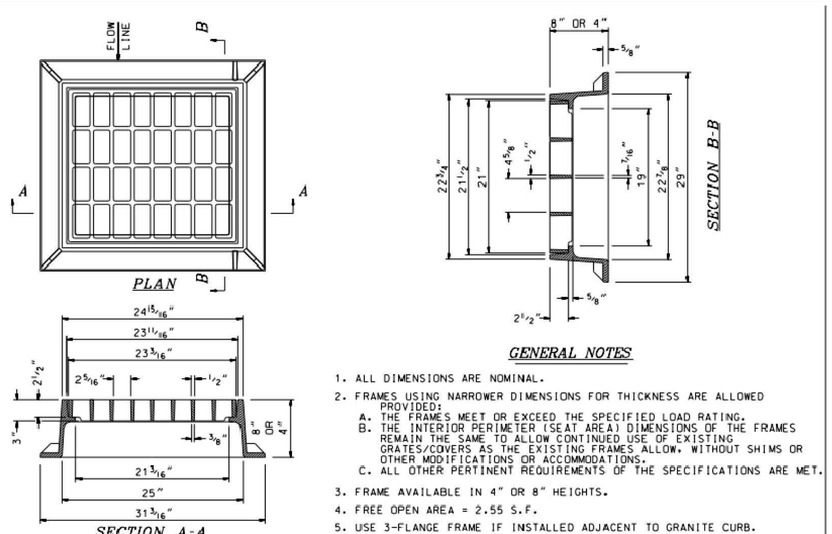
CATCH BASIN DETAIL
NOT TO SCALE

D2



PRECAST DRAIN MANHOLE DETAIL
NOT TO SCALE

D3



GENERAL NOTES

1. ALL DIMENSIONS ARE NOMINAL.
2. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
   A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
   B. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW. WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
   C. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
3. FRAME AVAILABLE IN 4" OR 8" HEIGHTS.
4. FREE OPEN AREA = 2.55 S.F.
5. USE 3-FLANGE FRAME IF INSTALLED ADJACENT TO GRANITE CURB.

NHDOT STANDARD PLANS	REV. DATE	PLATE
TYPE "B" GRATE & FRAME	06-16-2010	2
	08-14-2015	STANDARD
		DR-1

CATCH BASIN GRATE (TYPE "B")
NOT TO SCALE

D4

CONE GRATE
NOT TO SCALE

NOTE:
MUST BE HAALA INDUSTRIES INC. OR EQUAL.

Cone Grates Top Mount

CG12TM
Part No. CG12TM

Save Trees

Top Mount Cone Grates are designed to mount on the top of round manhole inlet or outlet structures to keep debris from entering the storm water system. Top mount cone grates are easy to install and allow for at grade manhole installations but can be used in a variety of applications. Grates 96" and larger are made as a two piece, bolt together design.

- Plate and bar hybrid design is both clean and cost effective
- Made from 1/2" plate with 3/4" or 1" round bars depending on grate size
- Anti vortex plate can be added upon request
- Hinged and lockable access doors can be added upon request
- Galvanized steel construction. Can be made from aluminum or stainless steel.

D5

ANGLE GRATE
NOT TO SCALE

MUST BE HAALA INDUSTRIES INC. OR EQUAL.

Angle Grates For Manholes

AG0808-58
Part No. AG0808-58

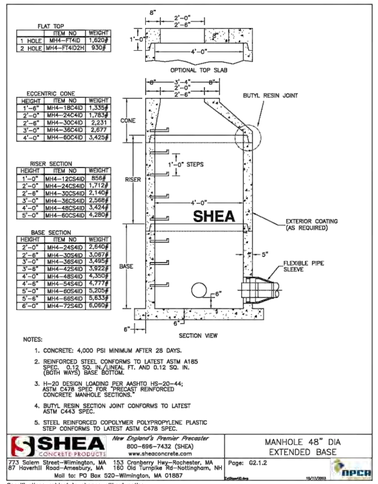
Save Trees

Angle Grates are designed to cover inlet orifices and prevent small to medium debris from passing through. The top angled design helps to minimize the amount of debris that settles on top after the water receeds. All grates are made from plate for a clean and smooth contact surface.

- Plate design for a clean appearance
- Standard 2" openings (other sizes can be made)
- Angled top/front plate to maximize debris deflection
- Mounting flanges on 3 sides allows grate to be mounted at floor level inverts
- Galvanized steel construction. Can be made from aluminum or stainless steel.

D6

48" MANHOLE ROUND EXTENDED BASE
NOT TO SCALE



D7

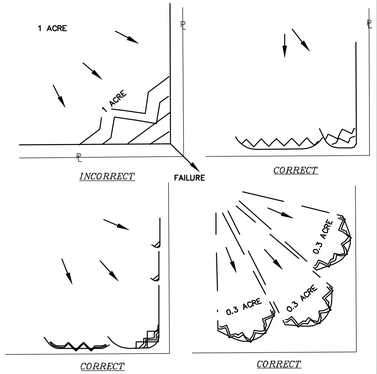
PERIMETER CONTROL
NOT TO SCALE

DESIGN CONSITERATIONS:

1. THE MAXIMUM LENGTH OF SLOPE ABOVE PERIMETER CONTROL IS 100 FEET.
2. SILT FENCE OR SILT SOXX REQUIRED WHEN UPGRADIENT DISTURBED SOIL IS GREATER THAN 5% (50% SLOPE MAX). MULCH BERM CAN BE USED WHEN THE UPGRADIENT DISTURBED SOIL IS 5% OR LESS.
3. THE MAXIMUM CONTRIBUTING DRAINAGE AREA OF ONE-QUARTER ACRE PER 100-FEET OF PRACTICE LENGTH.
4. PERIMETER CONTROL IS TO BE INSTALLED PRIOR TO EARTH MOVING ACTIVITIES, INCLUDING GRUBBING AND CLEARING.

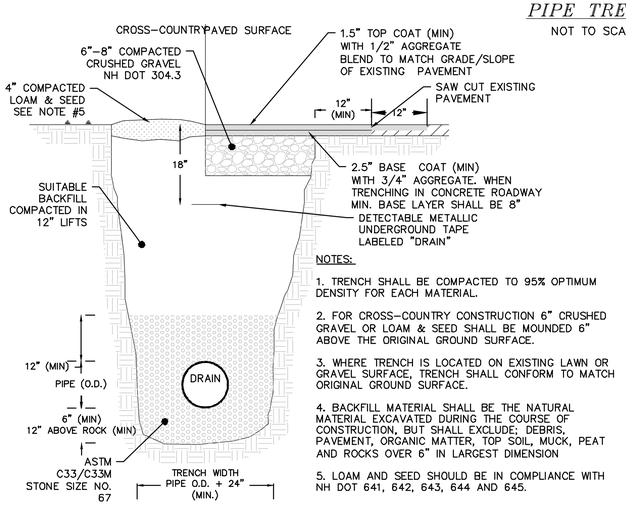
NOTES:

1. DO NOT LAYOUT PERIMETER CONTROL ALONG SLOPING PROPERTY PERIMETER WITHOUT INSTALLING "J HOOKS" AT HIGH CONCENTRATION AREAS. RUNOFF WILL CONCENTRATE AND CAUSE FAILURES ALONG THE PERIMETER.
2. "J HOOKS" CAN BE USED TO HELP LIMIT THE CONCENTRATION OF RUNOFF AND PROVIDE MORE STABILITY TO THE PERIMETER.
3. SILT FENCE AND EROSION CONTROL MULCH BERM MAY BE USED INTERCHANGEABLY. IN SPECIFIED AREA, SILT FENCE MAY NOT BE SUBSTITUTED FOR FILTREXX SILT SOXX OR APPROVED ALTERNATIVE.
4. SEE HAMPSHIRE STORM WATER MANUAL: VOLUME 3, PAGE 99 FOR FURTHER DETAILS AND SPECIFICATIONS



D8

TYPICAL DRAIN PIPE TRENCH
NOT TO SCALE



NOTES:

1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT AND ROCKS OVER 6" IN LARGEST DIMENSION
5. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

D9

DRAIN MANHOLE COVER DETAIL
NOT TO SCALE

DRAIN MANHOLE FRAME AND GRATE WILL BE LIFTMATE R-1743-LM, OR APPROVED EQUAL, 32 INCH OPENING, CAST IRON, H20 LOADING.

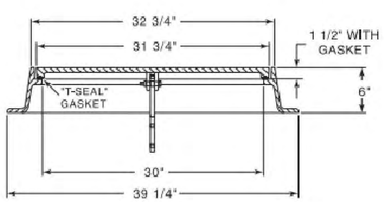
R-1743-LM
LiftMate Frame, Solid Gasketed Lid

Heavy Duty

Furnished with four 1" anchor holes on 36-7/8" diameter bolt circle.

Hinge plug available for self-seal application.

See p. 13 for LiftMate information.



REFERENCE IS MADE TO A LONG TERM MAINTENANCE MANUAL PREPARED BY BERRY SURVEYING & ENGINEERING, WHICH IS ON FILE AT THE CITY OF DOVER PLANNING DEPARTMENT, AND CAN BE FOUND AT THE OFFICE OF BERRY SURVEYING & ENGINEERING. (603) 332-2863

D-101

REVISION	DATE	DESCRIPTION

DRAINAGE CONSTRUCTION DETAILS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 36, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 36, LOT 72

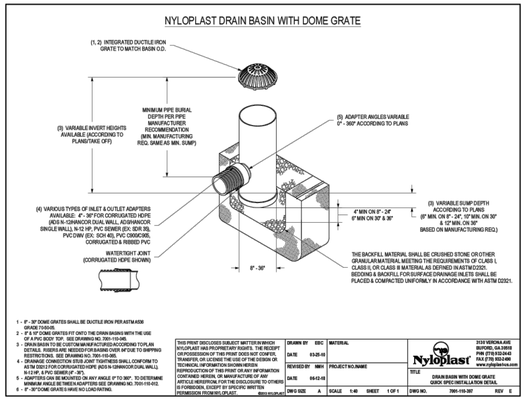
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14947
PROFESSIONAL ENGINEER

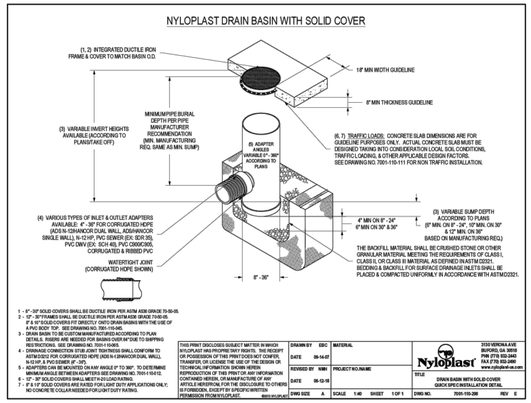
NOT FOR CONSTRUCTION

D10



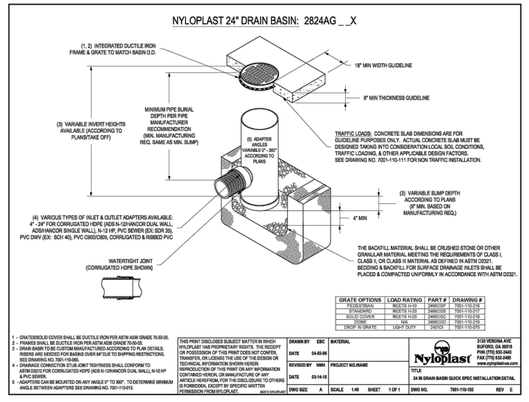
NYLOPLAST DOME GRATE
NOT TO SCALE

D11



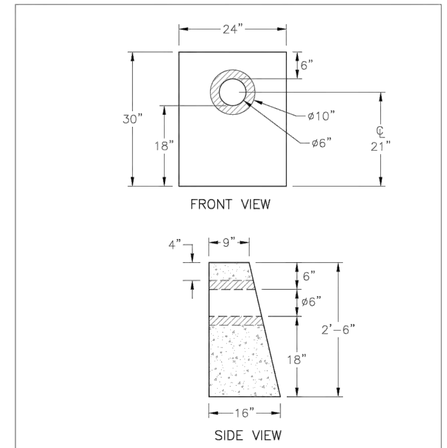
NYLOPLAST SOLID COVER
NOT TO SCALE

D12



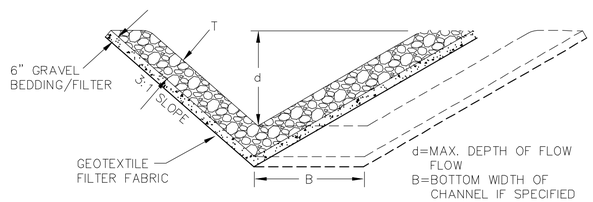
24" NYLOPLAST DRAIN BASIN
NOT TO SCALE

D13



UNDERDRAIN HEADWALL
NOT TO SCALE

D14

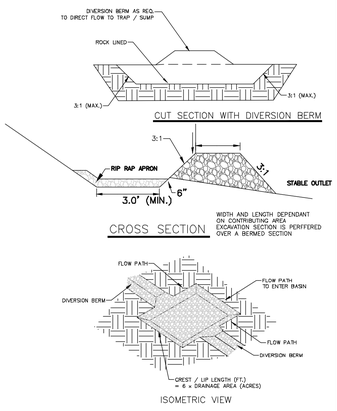


TYPICAL SECTION FOR A RIPRAP LINED CHANNEL
NOT TO SCALE

D16

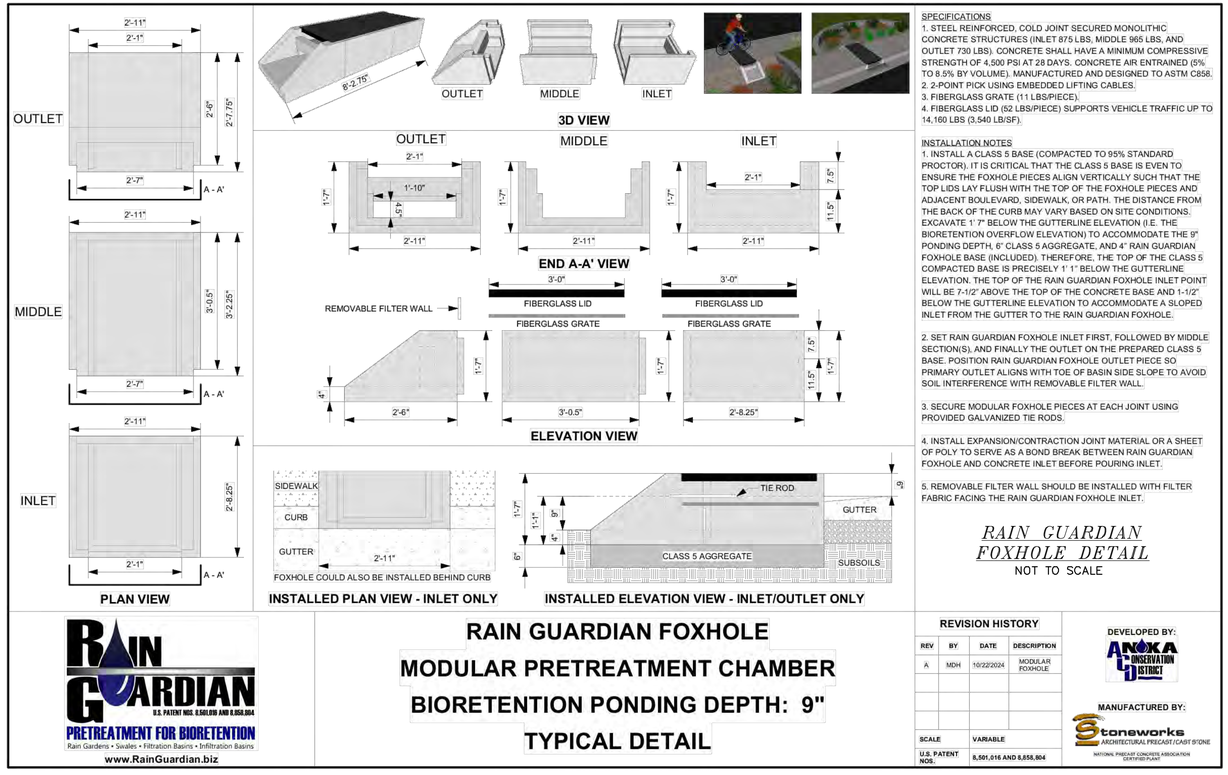
1. TRAP TO BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. THE SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER AND SHALL BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
5. THE OUTLET OF THE TRAP SHALL BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
6. THE TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. THE MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

SIEVE DESIGNATION	SIZE OF STONE (INCHES)
100%	12
84–100%	6
68–83%	3
42–55%	1
8–12%	NO. 4



STONE LINED SEDIMENT TRAP
NOT TO SCALE

D15



SPECIFICATIONS
1. STEEL REINFORCED, COLD JOINT SECURED MONOLITHIC CONCRETE STRUCTURES (INLET 875 LBS, MIDDLE 965 LBS, AND OUTLET 730 LBS). CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,500 PSI AT 28 DAYS. CONCRETE AIR ENTRAINED (5% TO 8.5% BY VOLUME). MANUFACTURED AND DESIGNED TO ASTM C858.
2. 2-POINT PICK USING EMBEDDED LIFTING CABLES.
3. FIBERGLASS GRATE (11 LBS/PIECE).
4. FIBERGLASS LID (52 LBS/PIECE) SUPPORTS VEHICLE TRAFFIC UP TO 14,160 LBS (3,540 LB/SF).

INSTALLATION NOTES
1. INSTALL A CLASS 5 BASE (COMPACTED TO 95% STANDARD PROCTOR). IT IS CRITICAL THAT THE CLASS 5 BASE IS EVEN TO ENSURE THE FOXHOLE PIECES ALIGN VERTICALLY SUCH THAT THE TOP LIDS LAY FLUSH WITH THE TOP OF THE FOXHOLE PIECES AND ADJACENT BOULEVARD, SIDEWALK, OR PATH. THE DISTANCE FROM THE BACK OF THE CURB MAY VARY BASED ON SITE CONDITIONS. EXCAVATE 1' 7" BELOW THE GUTTERLINE ELEVATION (I.E. THE BIORETENTION OVERFLOW ELEVATION) TO ACCOMMODATE THE 9" PONDING DEPTH, 6" CLASS 5 AGGREGATE, AND 4" RAIN GUARDIAN FOXHOLE BASE (INCLUDED). THEREFORE, THE TOP OF THE CLASS 5 COMPACTED BASE IS PRECISELY 1' 1" BELOW THE GUTTERLINE ELEVATION. THE TOP OF THE RAIN GUARDIAN FOXHOLE INLET POINT WILL BE 7-1/2" ABOVE THE TOP OF THE CONCRETE BASE AND 1-1/2" BELOW THE GUTTERLINE ELEVATION TO ACCOMMODATE A SLOPED INLET FROM THE GUTTER TO THE RAIN GUARDIAN FOXHOLE.
2. SET RAIN GUARDIAN FOXHOLE INLET FIRST, FOLLOWED BY MIDDLE SECTION(S), AND FINALLY THE OUTLET ON THE PREPARED CLASS 5 BASE. POSITION RAIN GUARDIAN FOXHOLE OUTLET PIECE SO PRIMARY OUTLET ALIGNS WITH TOE OF BASIN SIDE SLOPE TO AVOID SOIL INTERFERENCE WITH REMOVABLE FILTER WALL.
3. SECURE MODULAR FOXHOLE PIECES AT EACH JOINT USING PROVIDED GALVANIZED TIE RODS.
4. INSTALL EXPANSION/CONTRACTION JOINT MATERIAL OR A SHEET OF POLY TO SERVE AS A BOND BREAK BETWEEN RAIN GUARDIAN FOXHOLE AND CONCRETE INLET BEFORE POURING INLET.
5. REMOVABLE FILTER WALL SHOULD BE INSTALLED WITH FILTER FABRIC FACING THE RAIN GUARDIAN FOXHOLE INLET.

RAIN GUARDIAN FOXHOLE DETAIL
NOT TO SCALE

RAIN GUARDIAN
U.S. PATENT NOS. 8,501,016 AND 8,858,804
PRETREATMENT FOR BIORETENTION
Rain Gardens • Swales • Filtration Basins • Infiltration Basins
www.RainGuardian.biz

RAIN GUARDIAN FOXHOLE
MODULAR PRETREATMENT CHAMBER
BIORETENTION PONDING DEPTH: 9"
TYPICAL DETAIL

REVISION HISTORY

REV	BY	DATE	DESCRIPTION
A	MDH	10/22/2024	MODULAR FOXHOLE
SCALE		VARIABLE	
U.S. PATENT NOS.		8,501,016 AND 8,858,804	

DEVELOPED BY: ANOKA CONSERVATION DISTRICT
MANUFACTURED BY: Stoneworks ARCHITECTURAL PRECAST/CAST STONE
NATIONAL PRECAST CONCRETE ASSOCIATION CERTIFIED PLANT

REVISION | DATE | DESCRIPTION

DRAINAGE CONSTRUCTION DETAILS
FOR: THE STABILE COMPANIES
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TAX MAP 36, LOT 64
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BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863
SCALE : AS SHOWN
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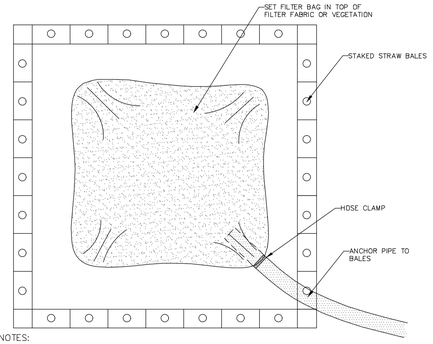
STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14247 – PROFESSIONAL ENGINEER

D–102

SHEET 32 OF 39

NOT FOR CONSTRUCTION

D17



NOTES:

1.) ENSURE DISCHARGE POINT IS STABILIZED WITH VEGETATION OR PROPER EROSION AND SEDIMENT CONTROL PRACTICES.

2.) USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.

3.) TO BE PLACED AT AN UPLAND LOCATION THAT WILL ALLOW WATER TO DRAIN INTO THE GROUND.

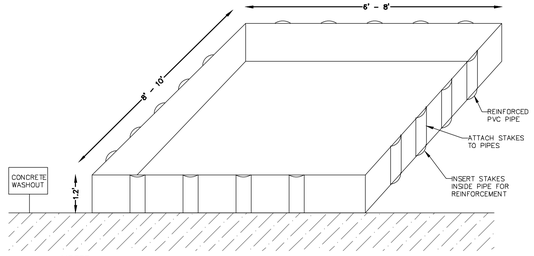
4.) SIZE OF DE-WATERING AREA TO BE 10' X 10', ADJUST SIZE DEPENDING ON VOLUME AND USE.

5.) ADDITIONAL BALES MAY BE USED TO INCREASE RETENTION AND FILTERING.

DE-WATERING BASIN

NOT TO SCALE

D18



NOTES:

1.) CONCRETE WASHOUT SHALL BE INSTALLED PRIOR TO ANY CONCRETE POURS.

2.) SIGNS SHALL BE INSTILLED TO CLEARLY INDICATE WHERE THE LOCATION OF THE WASHOUT AREA IS.

3.) CONTRACTOR IS RESPONSIBLE TO MAINTAIN AND REPLACE WASHOUT AREA AS NEEDED.

4.) RESIDUE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.

5.) DO NOT WASH CONCRETE TRUCKS OUT INTO DRAINAGE AREAS, SWALES, STREETS OR UNDISTURBED AREAS.

6.) WASHOUT AREA SHALL BE PLACED AWAY FROM DRAINAGE FEATURES AND OUTSIDE AND WETLAND BUFFERS.

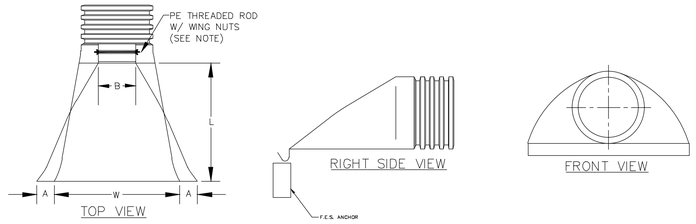
CONCRETE WASHOUT

NOT TO SCALE

D19

PART No.	PIPE SIZE	A	B(MAX)	H	L	W
1510-NP	15" 375 mm	6.5" 165 mm	10" 254 mm	6.5" 165 mm	25" 635 mm	29" 735 mm
1810-NP	18" 450 mm	7.5" 190 mm	15" 380 mm	6.5" 165 mm	32" 812 mm	35" 890 mm
2410-NP	24" 600 mm	7.5" 190 mm	18" 450 mm	6.5" 165 mm	36" 900 mm	45" 1140 mm
3010-NP	30" 750 mm	10.5" 266 mm	N/A	7.0" 178 mm	53" 1345 mm	68" 1725 mm
3610-NP	36" 900 mm	10.5" 266 mm	N/A	7.0" 178 mm	53" 1345 mm	68" 1725 mm

NOTE: PE THREADED ROD W/ WING NUTS PROVIDED FOR END SECTIONS 15"-24". 30" & 36" END SECTIONS TO BE WELDED PER MANUFACTURER'S RECOMMENDATIONS.



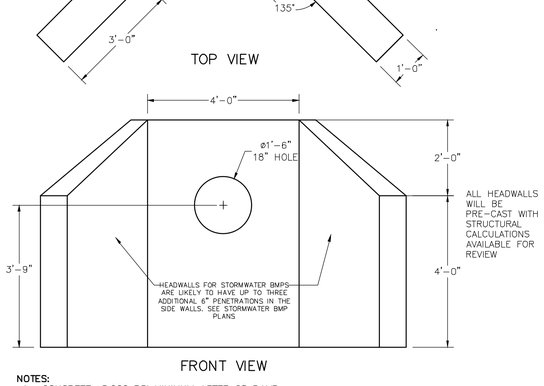
ADS N-12 FLARED END SECTIONS

NOT TO SCALE (ALL DIMENSIONS ARE NOMINAL)

D20

HEADWALL (CONCRETE)

NOT TO SCALE



NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.

REVISION	DATE	DESCRIPTION

DRAINAGE CONSTRUCTION DETAILS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

REFERENCE IS MADE TO AN INSPECTION & MAINTENANCE MANUAL PREPARED BY BERRY SURVEYING & ENGINEERING, WHICH IS ON FILE AT THE CITY OF DOVER PLANNING DEPARTMENT, AND CAN BE FOUND AT THE OFFICE OF BERRY SURVEYING & ENGINEERING. (603) 332-2863

STATE OF NEW HAMPSHIRE - KENNETH A. BERRY No. 14042 - LICENSED PROFESSIONAL ENGINEER

D-103

NOT FOR CONSTRUCTION

NOTES ON MANHOLE AND SEWER CONSTRUCTION:

1) IT IS THE INTENTION THAT THE MANHOLE, INCLUDING ALL COMPONENT PARTS, HAVE ADEQUATE SPACE, STRENGTH AND LEAKPROOF QUALITIES CONSIDERED NECESSARY FOR THE INTENDED SERVICE. SPACE REQUIREMENTS AND CONFIGURATIONS, SHALL BE AS SHOWN ON THE DRAWING. MANHOLES SHALL BE AN ASSEMBLY OF PRECAST SECTIONS, WITH STEEL REINFORCEMENT AND ADEQUATE JOINTING. THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND HS-20-44 LOADING, INCLUDING THE COVER. ALL SMH CONSTRUCTION AND MATERIALS WILL BE IAW ENV.-WQ 704.13 ADOPTED OCTOBER 15, 2014

2) BARRELS AND CONE SECTIONS SHALL BE PRECAST REINFORCED CONCRETE. (IAW ENV.-WQ 704.12 (d))

3) SEWER MANHOLE DIAMETER SHALL BE AS INDICATED ON THE PLANS.

4) PRECAST CONCRETE BARREL SECTIONS, CONES AND BASES SHALL CONFORM TO ASTM C478.

5) GRAVITY SEWER PIPE TESTING WILL BE IN ACCORDANCE WITH ENV.-WQ 704.06 AND MAN HOLE TESTING IAW ENV.-WQ 704.17 DATED OCTOBER 15, 2014.

6) INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF THE PIPE AND FLOW. INVERT BRICKS SHALL BE LAID ON EDGE AND THE BASE SECTION SHALL BE FULL. AT CHANGES IN DIRECTIONS, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. CARE SHALL BE TAKEN TO ENSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TOWARD THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY. (IAW ENV.-WQ 704.13 (a) (9)), MORTAR SHALL CONFORM WITH REQUIREMENTS OF IAW ENV.-WQ 704.13 (c). SEE ALSO DETAIL U6 SPECIFICATIONS AND TESTING.

FRAMES AND COVERS: MANHOLES FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. 3-INCH (MINIMUM HEIGHT) LETTERS WITH THE WORD "SEWER" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH MANHOLE COVER. (IAW ENV.-WQ 704.13 (a) (4-6)) SEWER MAN HOLE COVERS ARE TO BE LIFTMATE R-1743-LM.

7) PER ENV-WQ 704.12(M), MANHOLES MUST BE CAPABLE OF SUPPORTING HS-20 LOADS.

8) HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF A TYPE APPROVED BY THE DOVER DPW, WHICH TYPE SHALL IN GENERAL DEPEND FOR WATERTIGHTNESS UPON A DOUBLE ROW OF AN OVERLAPPING TYPE ELASTOMERIC OR MASTIC-LIKE GASKET. APPROVED ELASTOMERIC SEALANTS ARE: RAM-NEK, KENT SEAL NO. 2, EZ, OR EQUAL.

9) IN CROSS COUNTRY AREAS OUTSIDE OF THE PAVED ROADWAY SURFACE, THE MANHOLE FRAME ELEVATION SHALL BE A MINIMUM OF 6" ABOVE FINISHED GRADE. GRADE TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE MANHOLE. SEE TYPICAL TRENCH DETAIL ON U10S.

11.) ALL FRAMES AND GRATES ARE TO BE U.S.A. MADE. MANHOLE STEPS ARE REQUIRED IN THIS MUNICIPALITY AND MUST CONFORM TO THE REQUIREMENTS OF ENV-WQ 704.14. STEPS ARE TO BE PLASTIC.

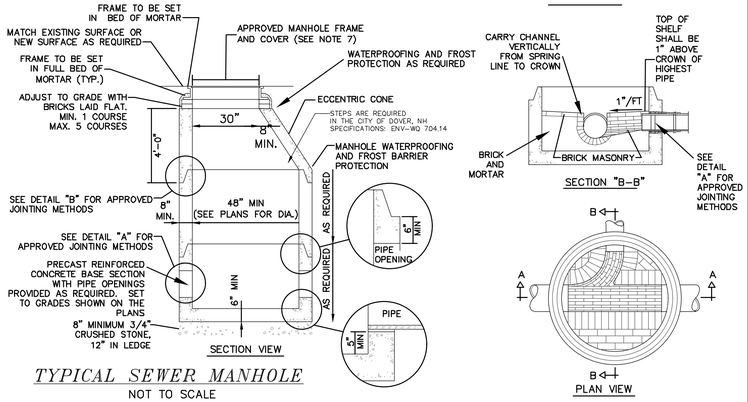
12.) THE CONTRACTOR TO WORK WITH CITY OF DOVER REVIEW ENGINEER AND SEWER DEPARTMENT ON THE MEANS AND METHODS USED TO INSTALL ALL SEWER STRUCTURES.

13.) ANY WORK INVOLVING THE CUTTING INTO THE EXISTING A.C. PIPE SHALL MEET THE REQUIREMENTS OF ENV-A 1800.

14.) THE "CITY OF DOVER, NEW HAMPSHIRE, DEPARTMENT OF COMMUNITY SERVICES, CONSTRUCTION GUIDELINES, PERMITS, RULES, AND REGULATIONS" (DATED MARCH 13, 2018) ARE A PART OF THE CONSTRUCTION DETAILS AND TO BE FOLLOWED.

15.) MANHOLES SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST IN ACCORDANCE WITH THE ASTM C1244 STANDARD AND ENV-WQ 704.17. SEE ALSO DETAIL U6 SPECIFICATIONS AND TESTING.

U1a

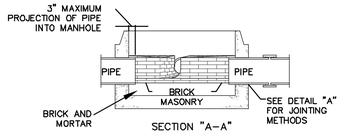


TYPICAL SEWER MANHOLE

NOT TO SCALE

BRICK MAXONRY SHELF DETAIL U1b

NOT TO SCALE



U2

R-1743-LM

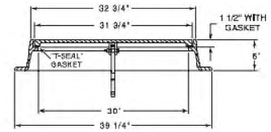
LiftMate Frame, Solid Gasketed Lid

Heavy Duty

Furnished with four 1" anchor holes on 36-7/8" diameter bolt circle.

Hinge plug available for self-seal application.

See p. 13 for LiftMate information.

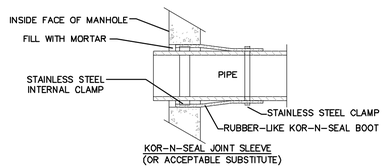


SEWER MANHOLE FRAME AND GRATE WILL BE LIFTMATE R-1743-LM, OR APPROVED EQUAL, 32 INCH OPENING, CAST IRON, H20 LOADING.

SEWER MANHOLE COVER DETAIL

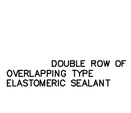
NOT TO SCALE

U3



DETAIL "A" - PIPE TO MANHOLE JOINTS

NOT TO SCALE

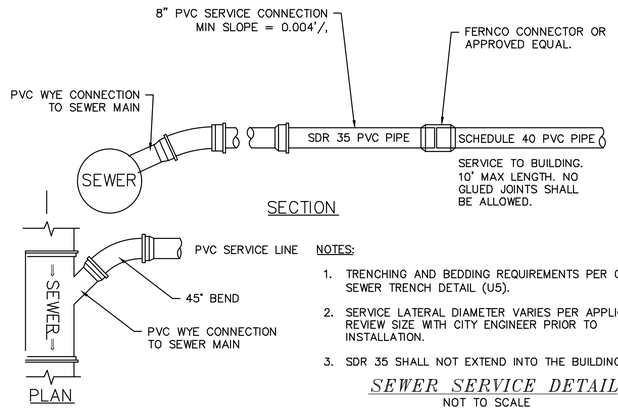


NOTE:
ALL GASKETS AND SEALANTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

DETAIL "B" HORIZONTAL JOINTS

NOT TO SCALE

U4



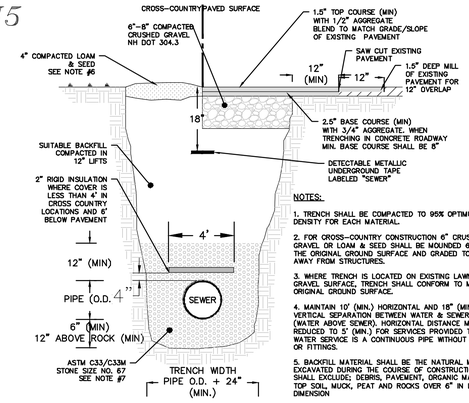
NOTES:

1. TRENCHING AND BEDDING REQUIREMENTS PER CITY SEWER TRENCH DETAIL (U5).
2. SERVICE LATERAL DIAMETER VARIES PER APPLICATION. REVIEW SIZE WITH CITY ENGINEER PRIOR TO INSTALLATION.
3. SDR 35 SHALL NOT EXTEND INTO THE BUILDING

SEWER SERVICE DETAIL

NOT TO SCALE

U5



NOTES:

1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE AND GRADED TO DRAIN AWAY FROM STRUCTURES.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT AND ROCKS OVER 6" IN LARGEST DIMENSION
6. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
7. SEWER TRENCH CONSTRUCTION SHALL CONFORM WITH ENV-WQ 704.11. THE PIPE SAND SAND BLANKET MATERIAL SHALL BE GRADED SAND FREE FROM ORGANIC MATERIALS, GRADED SUCH THAT 100 PERCENT PASSES A 1/2-INCH SIEVE AND MAXIMUM OF 15 PERCENT PASSES A #200 SIEVE.

TYPICAL SEWER PIPE TRENCH

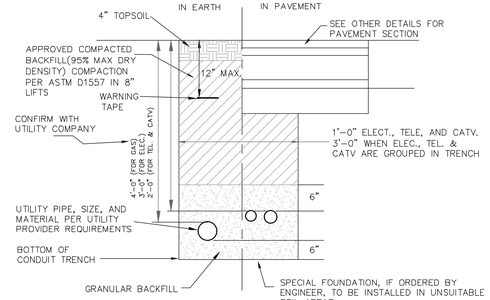
NOT TO SCALE

U6

NOTES:

1. BRICK SHELF CONSTRUCTION DETAIL.
   BRICK MASONRY FOR SHELF, INVERT, AND GRADE ADJUSTMENTS SHALL BE CERTIFIED BY ITS MANUFACTURER AS COMPLYING WITH THE ASTM C32 STANDARD IN EFFECT AT THE TIME THE BRICK IS MANUFACTURED FOR GRADE SS HARD BRICK.
2. MANHOLE DETAIL:
   A. BASE SECTIONS SHALL BE MONOLITHIC CONSTRUCTION TO A POINT AT LEAST 6 INCHES ABOVE THE CROWN OF THE INCOMING PIPE.
   B. ALL PRECAST SECTIONS AND BASES SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING PER ENV-WQ 704.12(J).
3. GRAVITY SEWER PIPE MATERIAL SPECIFICATIONS:
   A. PLASTIC GRAVITY SEWER PIPE AND FITTINGS SHALL BE CERTIFIED BY THE MANUFACTURER AS COMPLYING WITH ASTM D3034 FOR 8-INCH THROUGH 15-INCH SDR 35 PVC PIPE. PLASTIC SEWER PIPE SHALL HAVE A PIPE STIFFNESS RATING OF AT LEAST 46 POUNDS PER SQUARE INCH AT 5 PERCENT PIPE DIAMETER DEFLECTION, AS MEASURED BY THE MANUFACTURER IN ACCORDANCE WITH THE ASTM D2412 STANDARD IN EFFECT WHEN PIPE WAS MANUFACTURED. JOINT SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL AND CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE ASTM D3212 STANDARD IN EFFECT WHEN THE JOINT SEALS WERE MANUFACTURED, AND SHALL BE PUSH-ON, BELL-AND-SPIGOT TYPE.
4. GRAVITY SEWER PIPE TESTING REQUIREMENTS PER ENV WQ 704.06:
   A. ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.
   B. LOW-PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING TESTING STANDARDS IN EFFECT AT THE TIME THE TEST IS CONDUCTED:
      ASTM F1417 'STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR'; AVAILABLE AS NOTED IN APPENDIX D; OR
      UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, 'LOW-PRESSURE AIR TESTING OF INSTALLED SEWER PIPE', AVAILABLE AS NOTED IN APPENDIX D.
   C. ALL NEW GRAVITY SEWERS SHALL BE:
      CLEANED AND VISUALLY INSPECTED USING A LAMP TEST AND BY INTRODUCING WATER TO DETERMINE THAT THERE IS NO STANDING WATER IN THE SEWER; AND
      TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE.
   D. ALL PLASTIC SEWER PIPE SHALL BE VISUALLY INSPECTED, AND DEFLECTION TESTED NOT LESS THAN 30 DAYS NOR MORE THAN 90 DAYS FOLLOWING INSTALLATION.
   E. THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% PERCENT OF AVERAGE INSIDE DIAMETER. A ROD BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.
5. MANHOLE TESTING REQUIREMENTS PER ENV-WQ 704.17:
   A. MANHOLES SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST IN ACCORDANCE WITH ASTM C1244. THE MANHOLE VACUUM TEST SHALL CONFORM TO THE FOLLOWING:
      THE INITIAL VACUUM GAUGE TEST PRESSURE SHALL BE 10 INCHES HG; AND
      THE MINIMUM ACCEPTABLE TEST HOLD TIME FOR A 1-INCH HG PRESSURE DROP TO 9 INCHES HG SHALL BE:
      NOT LESS THAN 2 MINUTES FOR MANHOLES LESS THAN 10 FEET DEEP IN DEPTH;
      NOT LESS THAN 2.5 MINUTES FOR MANHOLES 10 TO 15 FEET DEEP; AND
      NOT LESS THAN 3 MINUTES FOR MANHOLES MORE THAN 15 FEET DEEP;
   B. THE MANHOLE SHALL BE REPAIRED AND RETESTED IF THE TEST HOLD TIMES FAIL TO ACHIEVE THE ACCEPTANCE LIMITS SPECIFIED.

U7



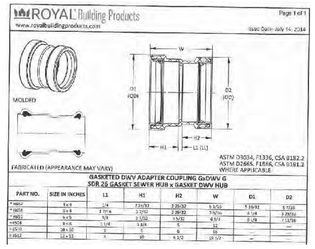
CONTRACTOR IS REQUIRED TO INSTALL ALL CONDUIT PER THE UTILITY COMPANY SPECIFICATIONS INCLUDING METAL SWEEPS, SERVICES AND BLANKS

CONTRACTOR TO COORDINATE WITH UTILITY COMPANY AND PROVIDE EXCAVATION AND BACKFILL FOR PIPE INSTALLATION

ELECTRICAL, TELEPHONE, CATV & GAS TRENCH

NOT TO SCALE

U8

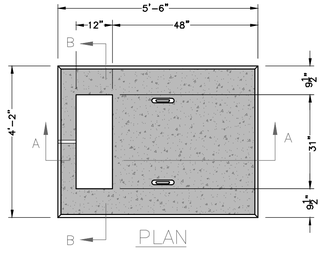


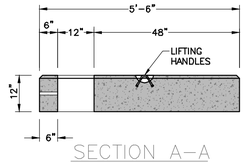
PART NO.	SIZE IN INCHES	L1	H1	H2	W	D1	D2
* 4PDCV	4 x 4	3/4	1.13750	2.00750	3.13750	4.1/4	3.75750
* 6PDCV	6 x 6	3 7/16	2.13750	2.99750	3.75750	6.1/4	5.62750
* 8PDCV	8 x 8	N/A	3.13750	3.93750	4.3/4	8.1/4	7.50750
* 10PDCV	10 x 10	1 1/4	4.14375	5	5	10	9.50
* 12PDCV	12 x 12	1	5	5.93	5.93	12	11.50
* 15PDCV	15 x 15	1	6	6.93	6.93	15	14.50

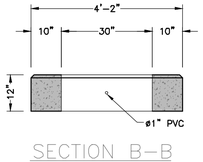
COUPLING DETAIL

NOT TO SCALE

U9







NOTES:

1. CONCRETE MINIMUM STRENGTH 4,000 PSI AFTER 28 DAYS
2. REINFORCEMENT STEEL CONFORMS TO ASTM A615 GRADE 60 #6 REBAR.
3. MEETS OR EXCEEDS EVERSOURCE SPECIFICATIONS.
4. MUST BE A SHEA CONCRETE PRODUCT OR EQUAL.

TRANSFORMER AND PAD DETAIL

NOT TO SCALE

U-101

REVISION	DATE	DESCRIPTION

UTILITY CONSTRUCTION DETAILS

FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

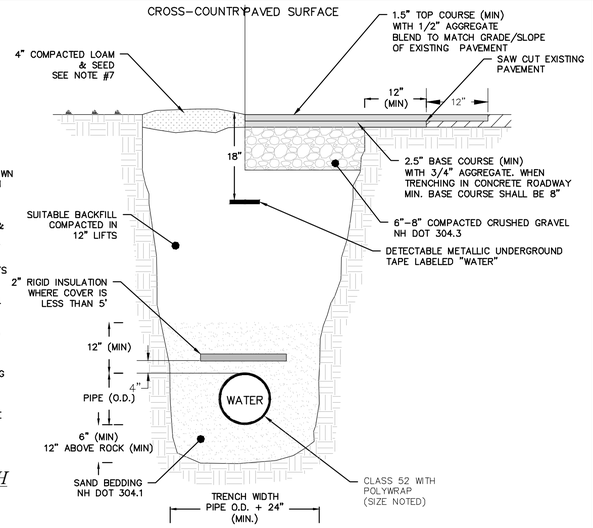
KENNETH A. BERRY No. 14241 - STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

U10

NOTES:

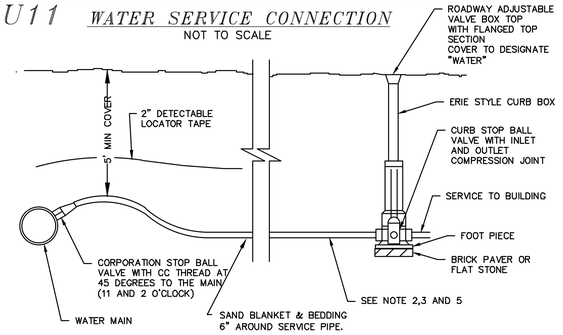
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE AND GRADED TO DRAIN AWAY FROM STRUCTURES.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT, AND ROCKS OVER 6" IN LARGEST DIMENSION
6. PROVIDE MINIMUM 5' OF COVER. ENGINEERING APPROVAL REQUIRED FOR LESS THAN 5' OF COVER.
7. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.



WATER PIPE TRENCH
NOT TO SCALE

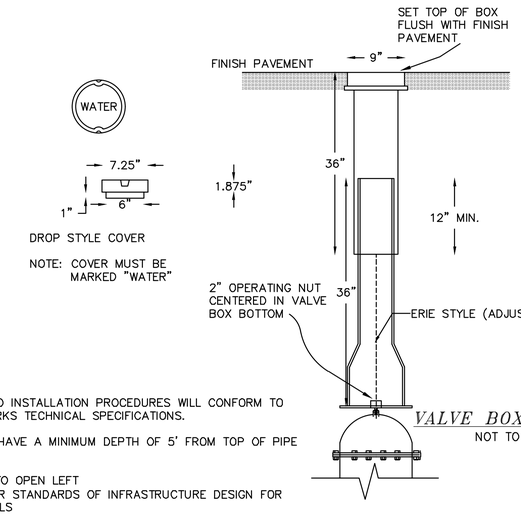
U11 WATER SERVICE CONNECTION

NOT TO SCALE



NOTES:
1. ALL WATER LINES 4" OR GREATER SHALL BE DUCTILE IRON WITH A ZINC COATED 8 MIL POLYETHYLENE WRAP, INCLUDING TEE AND OTHER CONNECTIONS.
2. WATER SERVICE LINES SHALL BE COPPER TUBING (TYPE K) BETWEEN MAIN AND CURB STOP.
3. SERVICE BETWEEN CURB STOP AND BUILDING MAY BE (BLUE OR BLACK) CTS SDR 9 PLASTIC POLYETHYLENE RATED FOR 250 psi.
4. CAM-LOCK REQUIRED FOR CTS OR IPS, MJ ADAPTER REQUIRED FOR HDPE
5. ALL SERVICES SHALL BE 1". PROVIDE 1" TO 3/4" REDUCER COUPLING WHERE EXISTING SERVICES ARE 3/4". SUBSIDIARY.
6. APPROVED WATER SERVICE MATERIALS INCLUDE:
   1"- COPPER, CTS
   2"- CTS, HDPE, IPS
7. ALL SADDLES USED AS SPECIFIED SHALL HAVE DOUBLE STAINLESS STEEL STRAPS.
8. TAPS TO BE MADE AT APPROX. 2:00 AND 10:00.

U12

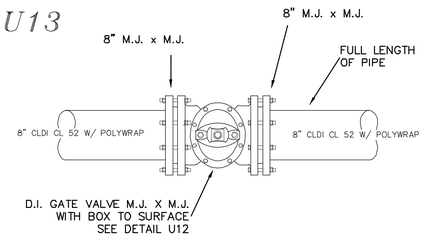


VALVE BOX DETAIL
NOT TO SCALE

NOTES:

1.) ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO LOCAL WATER WORKS TECHNICAL SPECIFICATIONS.
2.) ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3.) ALL VALVES ARE TO OPEN LEFT
4.) SEE CITY OF DOVER STANDARDS OF INFRASTRUCTURE DESIGN FOR POTABLE WATER DETAILS

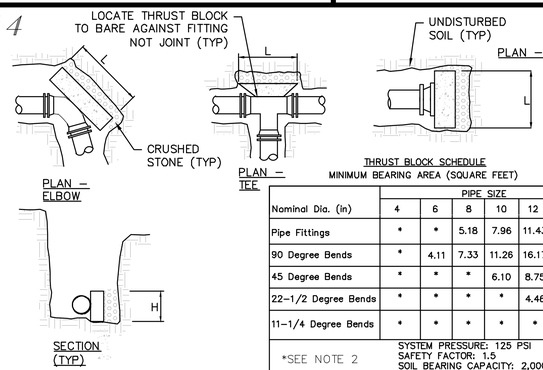
U13



SHUTOFF VALVE DETAIL
NOT TO SCALE

1.) ALL VALVES ARE TO OPEN LEFT
2.) SEE CITY OF DOVER STANDARDS OF INFRASTRUCTURE DESIGN FOR POTABLE WATER DETAILS

U14



THRUST BLOCK SCHEDULE
MINIMUM BEARING AREA (SQUARE FEET)

Nominal Dia. (in)	PIPE SIZE 4	6	8	10	12	16
Pipe Fittings	*	*	5.18	7.96	11.43	20.29
90 Degree Bends	*	4.11	7.33	11.26	16.17	28.69
45 Degree Bends	*	*	*	6.10	8.75	15.53
22-1/2 Degree Bends	*	*	*	*	4.46	7.92
11-1/4 Degree Bends	*	*	*	*	*	*

*SEE NOTE 2

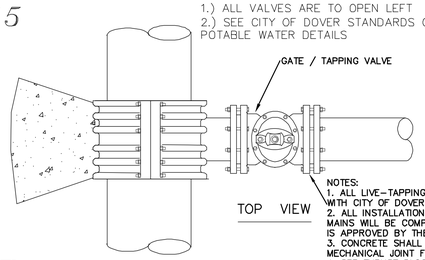
SYSTEM PRESSURE: 125 PSI
SAFETY FACTOR: 1.5
SOIL BEARING CAPACITY: 2,000 PSF

NOTES:
1. ALL THRUST BLOCKS SHALL BE PRE-CAST CONCRETE UNLESS APPROVED BY THE CITY ENGINEER.
2. 2'X2'X2' MINIMUM THRUST BLOCK REQUIRED, ANY BEARING AREA OVER 4SF REQUIRES THRUST BLOCKS, RESTRAINED JOINTS AND CALCULATIONS ASSOCIATED WITH THE JOINT.
3. THE MINIMUM BEARING AREAS SHOWN IN THE THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 125 PSI. IF THE SYSTEM PRESSURE IS ABOVE 125 PSI, INCREASE THE NOTED AREAS PROPORTIONALLY TO THE ACTUAL SYSTEM PRESSURE.
4. FOR MINIMUM BEARING AREAS OVER 4 SF, THE LENGTH (L) OF THE BLOCK IS APPROXIMATELY TWICE AS LONG AS THE HEIGHT (H).
5. PLACE CRUSHED STONE BEHIND THRUST BLOCK AGAINST UNDISTURBED SOIL.
6. PLACE THRUST BLOCK ALONG MAXIMUM LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
7. CONCRETE COMPRESSIVE STRENGTH: 2,000 PSI MINIMUM.
8. USE OF THRUST BLOCKS DOES NOT ELIMINATE THE REQUIREMENT OF OTHER RESTRAINTS OR VICE VERSA.

THRUST BLOCKS

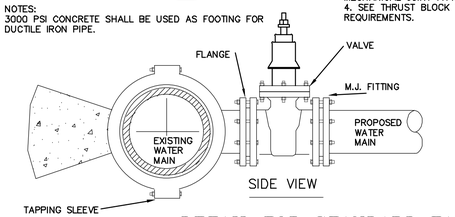
U15

1.) ALL VALVES ARE TO OPEN LEFT
2.) SEE CITY OF DOVER STANDARDS OF INFRASTRUCTURE DESIGN FOR POTABLE WATER DETAILS



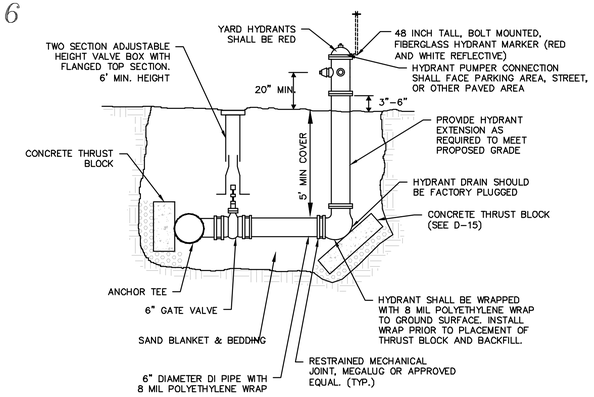
NOTES:
1. ALL LIVE-TAPPING WILL BE COMPLETED IN ACCORDANCE WITH CITY OF DOVER WATER DEPARTMENT REGULATIONS.
2. ALL INSTALLATION AND TAPPING OF EXISTING WATER MAINS WILL BE COMPLETED BY AN INDIVIDUAL OR FIRM THAT IS APPROVED BY THE CITY OF DOVER ENGINEERING
3. CONCRETE SHALL NOT CONTACT BOLTS OR END OF MECHANICAL JOINT FITTINGS.
4. SEE THRUST BLOCK TABLES FOR AREA OF CONCRETE REQUIREMENTS.

NOTES:
3000 PSI CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.



DETAIL FOR STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY
NOT TO SCALE

U16



NOTES:
1. FIRE HYDRANTS SHALL BE FACTORY SEALED EDDY STYLE 2641.
2. HYDRANT SHALL BE PAINTED RED WITH EPOXY PAINT AS RECOMMENDED BY THE HYDRANT MANUFACTURER.
3. HYDRANT SHALL OPEN LEFT.
4. HYDRANT MARKER TO BE 3/8" FIBERGLASS RODS BY E-ZGUIDE PRODUCTS OR APPROVED EQUAL.
5. PIPE BEDDING AND BLANKET SHALL MEET THE STANDARD WATER TRENCH DETAIL D-4.

FIRE HYDRANT
NOT TO SCALE

REVISION	DATE	DESCRIPTION

FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

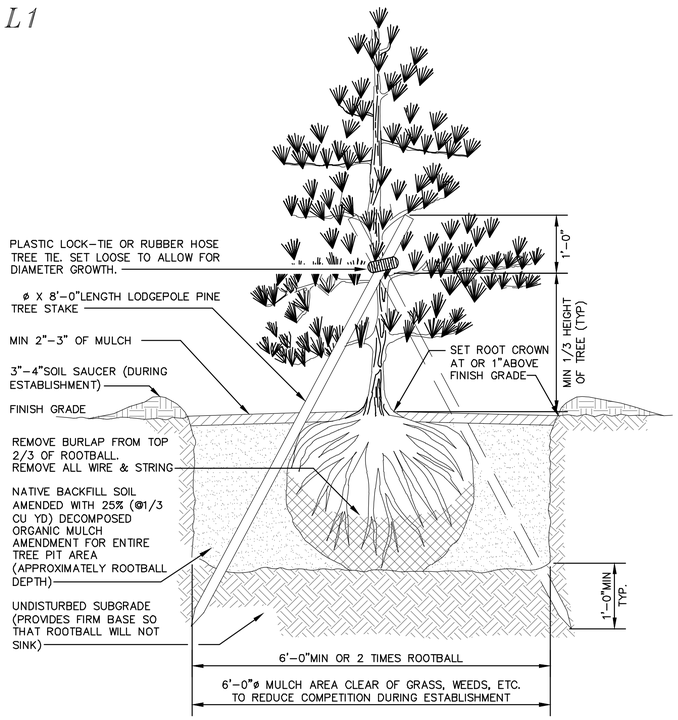
SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE - KENNETH A. BERRY No. 14047 - PROFESSIONAL ENGINEER

U-102

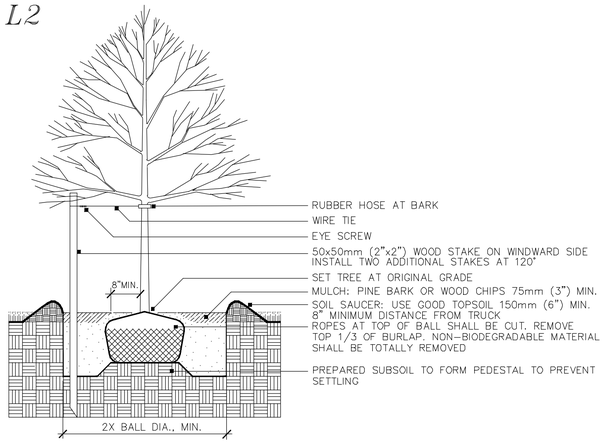
NOT FOR CONSTRUCTION

L1



CONIFEROUS TREE PLANTING

L2



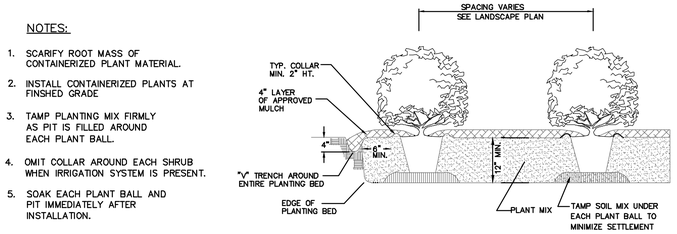
DECIDUOUS TREE PLANTING

NOTE: STAKING TO BE USED IN PARKING ISLANDS AND OTHER CONFINED AREAS AS NECESSARY TO AVOID CONFLICTS WITH PEDESTRIANS

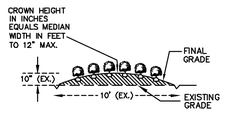
L3

NOTES:

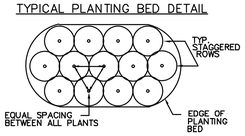
1. SCARIFY ROOT MASS OF CONTAINERIZED PLANT MATERIAL.
2. INSTALL CONTAINERIZED PLANTS AT FINSHED GRADE
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
5. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.



TYPICAL PLANTING BED DETAIL



TYPICAL BED CROWNING

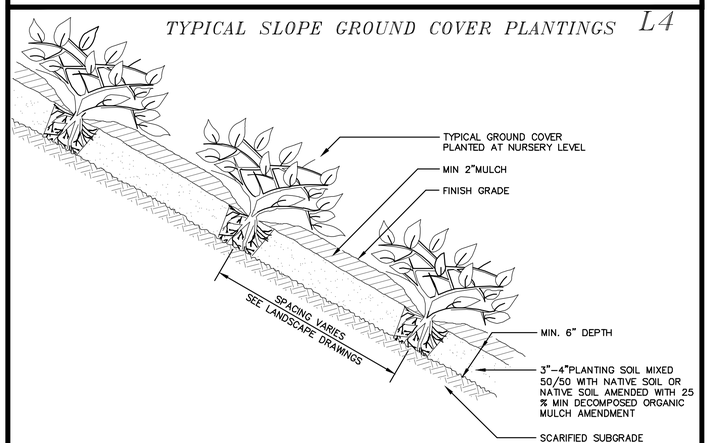


TYPICAL PLANTING BED PLAN

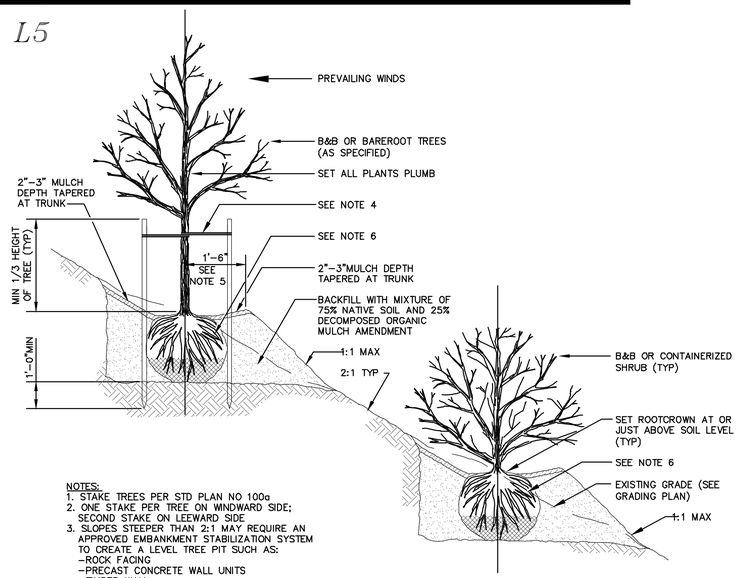
SHRUB & HEDGE PLANTING

L4

TYPICAL SLOPE GROUND COVER PLANTINGS



L5



NOTES:
1. STAKE TREES PER STD PLAN NO 100a
2. ONE STAKE PER TREE ON WINDWARD SIDE; SECOND STAKE ON LEEWARD SIDE
3. SLOPES STEEPER THAN 2:1 MAY REQUIRE AN APPROVED EMBANKMENT STABILIZATION SYSTEM TO CREATE A LEVEL TREE PIT SUCH AS:
   - -ROCK FACING
   - -PRECAST CONCRETE WALL UNITS
   - -TIMBER WALL
   - -MANUFACTURED SLOPE RETENTION UNITS
4. CHAINLOCK TREE TIE. LOOP EACH TIE AROUND TREE LOOSELY TO PROVIDE 1" SLACK FOR DIAMETER GROWTH.
5. SHAPE SOIL TO PROVIDE 3' DIAMETER OR ROOTBALL DIAMETER, WHICHEVER IS GREATER, WATERING RING.
6. REMOVE ALL WIRE AND STRING. REMOVE TOP 2/3 OF BURLAP.

TREE PLANTING ON SLOPES

L6

NOTES:

1.) CALL DIG SAFE PRIOR TO BEGINNING WORK. (1-888-344-7233). THE LANDSCAPE CONTRACTOR IS ADVISED OF THE PRESENCE OF UNDERGROUND UTILITIES AND SHALL VERIFY THE EXISTENCE AND LOCATION OF THE SAME BEFORE COMMENCING AND DIGGING OPERATIONS. THE LANDSCAPE CONTRACTOR SHALL REPLACE OR REPAIR UTILITIES, PAVING, WALKS, CURBING, ETC DAMAGED IN PERFORMANCE OF THIS JOB AT NO ADDITIONAL COST TO THE OWNER OR GENERAL CONTRACTOR.

2.) CONTRACTOR SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL SITE CONDITIONS PRIOR TO CONSTRUCTION BIDDING.

3.) PROVIDED SMOOTH TRANSITION WHERE NEW WORK MEETS EXISTING CONDITIONS.

4.) ALL PLANT MATERIAL INSTALLED SHALL MEET THE SPECIFICATIONS OF "AMERICAN STANDARD FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN.

5.) ALL PLANT MATERIALS SHALL BE FREE FROM INSECTS AND DISEASE.

6.) ALL PLANTINGS SHALL BE DONE IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICES. THIS IS TO INCLUDE PROPER PLANTING MIX, PLANT BED AND TREE PIT PREPARATION, PRUNING STAKING OR GUYING, WRAPPING, SPRAYING, FERTILIZATION, PLANTING AND ADEQUATE MAINTENANCE UNTIL ACCEPTANCE FROM OWNER.

7.) ALL GRASS, OTHER VEGETATION AND DEBRIS SHALL BE REMOVED FROM ALL PLANTING AREAS PRIOR TO PLANTING.

8.) THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EXISTING AND NEWLY PLANTED TREES AND SHRUBS DURING THE CONSTRUCTION PROCESS. WHERE REQUIRED, THE CONTRACTOR SHALL INSTALL TEMPORARY FENCING (SNOW OR EQUAL) AROUND EXISTING TREES AND SHRUBS THAT COULD BE IMPACTED BY THE CONSTRUCTION PROCESS. STORAGE OF CONSTRUCTION EQUIPMENT, CONSTRUCTION MATERIALS, SNOW STORAGE AND OR VEHICLE PARKING SHALL NOT BE PERMITTED WITHIN THE DRIP LINE OF TREES OR TWENTY FEET WHICH EVER IS GREATER.

9.) NEW PLANTINGS SHALL BE INSTALLED PER PROJECT DRAWINGS AND SPECIFICATION THAT INCLUDE FERTILIZATION AND MULCHING AS REQUIRED.

10.) ALL SHRUB BEDS AND TREE PITS SHALL BE MULCHED WITH 3" CLEAN SHREDDED BLACK MULCH.

11.) WHERE INDICATED ON PLAN, PLANTING SOIL MIXTURE FOR GROUND COVER AND PERENNIAL BED AREAS SHALL CONSIST OF FOUR PARTS TOPSOIL, TWO PARTS SPHAGNUM PEAT MOSS, AND ONE PART HORTICULTURAL PERLITE BY VOLUME. PEAT MOSS MAY BE SUBSTITUTED WITH WELL-ROTTED OR DEHYDRATED MANURE OR COMPOST. ROTOTILL BEDS TO A DEPTH OF 8 INCHES.

12.) MAINTENANCE OF NEW PLANTINGS AND LAWNS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND OR LANDSCAPE SUBCONTRACTOR UNTIL ACCEPTANCE BY THE OWNER. RESPONSIBILITIES SHALL INCLUDE WATERING WEEDING AND MOWNG AS NECESSARY. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE, REPLACEMENT MATERIAL SHALL BE GUARANTEED FOR AND ADDITIONAL YEAR FROM TIME OF INSTALLATION.

13.) THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY EROSION CONTROL MEASURES DURING THE CONSTRUCTION PHASE AND UNTIL ALL AREAS HAVE BEEN STABILIZED AND ACCEPTED BY THE OWNER. THE GENERAL CONTRACTOR SHALL PROVIDE WEEKLY INSPECTIONS OF EROSION MEASURE AND IMMEDIATELY AFTER STORM EVENTS AND REPAIR AS NECESSARY.

14.) THE GENERAL CONTRACTOR AND OR THE LANDSCAPE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL THREE GUYING MATERIAL ONCE PLANT MATERIAL HAS BEEN ESTABLISHED. (MINIMUM OF ONE GROWNG SEASON). ALL TEMPORARY EROSION CONTROL MEASURE SHALL BE REMOVED ONCE STABILIZATION OF DISTURBANCE HAS BEEN ACCEPTED BY OWNER.

15.) THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR A MINIMUM OF TWO MOWINGS FOR ALL TURF AREAS OR UNTIL ACCEPTANCE BY THE OWNER. A MINIMUM UNIFORM 75% CATCH OF TURF IS REQUIRED FOR ACCEPTANCE.

16.) ALL PLANTINGS SHALL BE WATERED REGULARLY DURING THEIR FIRST YEAR AND MAINTAINED PERMANENTLY IN GOOD GROWING CONDITION AS AN EFFECTIVE VISUAL SCREEN.

17.) SHRUBS OR TREES WHICH DIE SHALL BE REPLACED WITHIN ONE GROWING SEASON WITH NEW SHRUBS OR TREES TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE LANDSCAPING REQUIREMENTS.

18.) ALL REQUIRED LANDSCAPING SHALL BE INSTALLED BEFORE OCCUPANCY, OR WITHIN SIX MONTHS IF OCCUPANCY OCCURS DURING WINTER CONDITIONS.

19.) TREES ARE TO BE 3.5" CALIPER 6" OFF THE ROOT BALL.

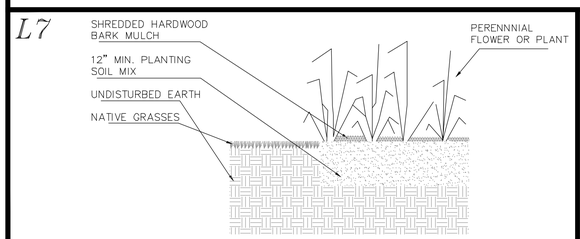
20.) ALL PLANT STOCK SHALL CONFORM TO ANSI Z260.1 – NURSERY STOCK, LATEST EDITIONS (AMERICAN ASSOCIATION OF NURSERYMEN, INC.)

21.) 4" AGED PINEBARK MULCH AND A WEED BARRIER (TY-PAR FABRIC OR APPROVED EQUAL) SHALL BE APPLIED TO ALL SHRUB AND GROUND COVER BEDS. INSTALL WEED BARRIER AS PER MANUFACTURERS RECOMMENDATIONS.

22.) PLANT-PIT BACK-FILL SHALL BE MIXED AT A RATE OF 7 PARTS OF TOPSOIL TO 2 PARTS OF DEHYDRATED COW MANURE. SLOW RELEASE FERTILIZER SHALL BE APPLIED AS PER MANUFACTURERS RECOMMENDATIONS. USE EXISTING ON-SITE TOPSOIL AS PART OF BACK FILL WHEN AVAILABLE.

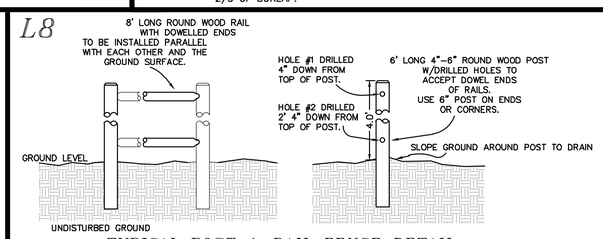
23.) ALL LANDSCAPED AREAS NOT PLANTED WITH TREES, SHRUBS OR GROUNDCOVER SHALL BE RESTORED WITH SEED OR SOD AS INDICATED ON PLANS.

L7



PERENNIAL PLANTING DETAIL

L8



TYPICAL POST & RAIL FENCE DETAIL

NOT TO SCALE

REVISION	DATE	DESCRIPTION

LANDSCAPING CONSTRUCTION DETAILS

FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

L-101

NOT FOR CONSTRUCTION

AMERICAN BUMBLE BEE

IDENTIFICATION/DESCRIPTION:

BOMBUS PENSYLVANICUS IS A LARGE BUMBLE BEE WITH THE QUEEN MEASURING 1 IN, THE WORKER FROM 0.5 IN, AND THE MALE FROM 0.75 IN IN LENGTH. THE QUEEN IS MOSTLY BLACK, INCLUDING THE LEGS, SPURS AND TEGULAE (BASE OF WING). TERGITE 1, OR THE MOST ANTERIOR BACK PORTION OF THE QUEEN IS OFTEN YELLOW ESPECIALLY IN THE MIDDLE. WORKER BEES' MIDDLE TERGITES ARE YELLOW, THE TAIL BLACK, AND FACE LONG. THEIR CHEEKS ARE SLIGHTLY LONGER THAN BROAD, AND THE CLYPEUS (NOSE) HAS LARGE PUNCTURES EXCEPT ON THE MID LINE. THE HAIR ON THE TOP OF THE HEAD IS BLACK, SHORT AND EVEN. MALES HAVE A YELLOW ABDOMEN WITH A BLACK HEAD AND BLACK STRIPING IN THE LOWER THORAX.

NORTHERN LONG-EARED BAT

IDENTIFICATION/DESCRIPTION:

THE NORTHERN LONG-EARED BAT IS A MEDIUM-SIZED BAT WITH A BODY LENGTH OF 3 TO 3.7 INCHES BUT A WINGSPAN OF 9 TO 10 INCHES. THEIR FUR COLOR CAN BE MEDIUM TO DARK BROWN ON THE BACK AND TAWNY TO PALE-BROWN ON THE UNDERSIDE. AS ITS NAME SUGGESTS, THIS BAT IS DISTINGUISHED BY ITS LONG EARS, PARTICULARLY AS COMPARED TO OTHER BATS IN ITS GENUS, MYOTIS

NORTHERN BLACK RACER

IDENTIFICATION/DESCRIPTION:

A SLENDER BLACK SNAKE MEASURING 36-60 INCHES. BLACK RACERS ARE GLOSSY BLACK ON THE TOP AND BOTTOM WITH A WHITE THROAT AND CHIN. YOUNG RACERS ARE PATTERNED WITH BROWN OR REDDISH PATCHES ON A LIGHTER BASE OF GRAY.

SMOOTH GREEN SNAKE

IDENTIFICATION/DESCRIPTION:

A THIN, SLENDER BRIGHT-GREEN SNAKE MEASURING 10-20 INCHES. THE UNDERSIDE IS WHITE OR A PALE YELLOW.

LITTLE BROWN BAT

IDENTIFICATION/DESCRIPTION:

THE LITTLE BROWN BAT IS A SMALL MAMMAL WITH A BODY LENGTH OF 2 1/2 – 4" AND WEIGHING APPROXIMATELY 1/8 TO 1/2 AN OUNCE. THE WINGSPAN OF LITTLE BROWN BATS RANGE FROM 9 – 11". BATS ARE THE ONLY MAMMALS THAT ENGAGE IN TRULY ACTIVE FLIGHT. AS THEIR NAME SUGGESTS THEY ARE GLOSSY BROWN ABOVE WITH A LIGHTER GRAY COLOR BELOW. THESE BATS CAN LIVE 20 TO 30 YEARS.

TRI-COLORED BAT

IDENTIFICATION/DESCRIPTION:

THE TRICOLORED BAT, FORMERLY KNOWN AS THE EASTERN PIPISTRELLE (PIPISTRELLUS SUBFLAVUS), IS A SMALL BAT WEIGHING 0.2 TO 0.3 OUNCES (5 TO 8 GR) AND HAS A WINGSPAN OF 8 TO 10 INCHES. THE TERM "TRICOLORED" REFERS TO THE BAT'S YELLOWISHBROWN COAT THAT IS DARK AT THE BASE, YELLOWISH-BROWN IN THE MIDDLE, AND DARK AT THE TIPS. THE WING MEMBRANES ARE BLACKISH, BUT THE FACE AND EARS HAVE A PINKISH COLOR. AN OBVIOUS IDENTIFYING CHARACTERISTIC OF THIS SPECIES IS THE PINK COLOR OF THE SKIN ON THE RADIUS BONE. THE FEET ARE ALSO RELATIVELY LARGE COMPARED TO ITS BODY SIZE.

EASTERN SMALL-FOOTED BAT

IDENTIFICATION/DESCRIPTION:

THE EASTERN SMALL-FOOTED BAT HAS BROWNISH FUR, OFTEN WITH A GOLDEN SHEEN, THAT CONTRASTS WITH ITS BLACKISH FACE AND EARS, AND BLACKISH-BROWN WINGS AND TAIL MEMBRANE. IT CAN BE DISTINGUISHED FROM OTHER MYOTIS SPECIES BY ITS BLACK MASK AND SMALL SIZE. THE BODY IS LITTLE MORE THAN 3½ INCHES LONG, INCLUDING A 1½-INCH TAIL. ITS SMALL FEET, WHICH PROVIDE THE COMMON NAME, ARE LESS THAN A HALF-INCH AND ITS WINGSPAN RANGES FROM 8¼ TO 9¾INCHES. THIS SPECIES FLIES SLOWLY AND ERRATICALLY, USUALLY ABOUT ONE TO THREE YARDS ABOVE THE GROUND.

SILVER HAIRED BAT

IDENTIFICATION/DESCRIPTION:

THE SILVER-HAIRED BAT IS A MEDIUM-SIZED BAT WITH VERY DARK FUR TIPPED WITH SILVER OR WHITE. THE WINGS AND TAIL MEMBRANE ARE BLACK. EARS ARE SHORT AND ROUND WITH A SHORT, BLUNT-TIPPED TRAGUS. THE DORSAL SURFACE OF THE TAIL MEMBRANE IS PARTIALLY FURRED AND THE CALCAR LACKS A KEEL

Wood Turtle

New Hampshire State Species of Special Concern

Contact NHFG Wildlife Biologists (grout text preferred) if observed within your project site:
Melissa Winters 603-479-1129 and Josh Megyesy 978-578-0802

- Turtles may be attracted to disturbed ground during nesting season (May 15th – June 30th)
- Turtles are most active from April 15th - October 15th

Identifying traits

- Neck and forelimbs are orange.
- Characterized by its highly sculpted shell with each large scute taking on an irregular pyramidal shape.
- Adults can be 5-8 inches long.

Habitat Use

- wooded areas near streams
- uplands surrounding streams

NOTE: It is illegal to remove a wood turtle from the wild.

Immediately report nesting turtles, suspected nesting turtles or suspected nest sites to NHFG Wildlife Biologists.

All other observations of this species shall be reported to NH Fish & Game via email at NHFGReview@wildlife.nh.gov. Include in the email subject line: NHBxx-xxxx, Project name, Wildlife Observation". *Photo documentation, location and date/time of observation is helpful.*

State laws pertaining to this species RSA 207:1, FIS 804.02, Fis 1401.03 (a)

WATCH FOR RARE TURTLES

NHFG Wildlife Biologist Contacts:

Melissa Winters 603-479-1129 and Josh Megyesy 978-578-0802

- Turtles may be attracted to disturbed ground during nesting season (May 15th – June 30th).
- Turtles are most active from April 15th - October 15th.

Blanding's turtle (State Endangered)

Large, dark/black domed shell with lighter speckles.

Distinct yellow throat/chin.

Semi-aquatic- uses both wetland and terrestrial habitats.

Spotted turtle (State Threatened)

Small, mostly aquatic with black or dark brown with yellow spots.

Fairly flat shell compared to Blanding's turtle.

Spots vary in color and number.

Semi-aquatic - uses both wetland and terrestrial habitats.

Blanding's and spotted turtles are protected by state laws. It is illegal to capture, harass or harm these species, including their nests. Handle ONLY if necessary to move out of harms way. Move to the nearest location in the direction they were moving and contact NHFG. Do not disturb nests.

Report sightings in accordance with NHFG permit conditions. Contact NHFG Wildlife Biologist Melissa Winters 603-479-1129 (cell) and Josh Megyesy 978-578-0802 (group text preferred) if a turtle is observed nesting or a nest site is suspected within the project area. Please report promptly, noting specific location, project site and date – Photographs strongly encouraged to be included with report.

W-101

REVISION	DATE	DESCRIPTION

ROCHESTER CH. 218 STORMWATER REQUIREMENTS & NOTES

FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

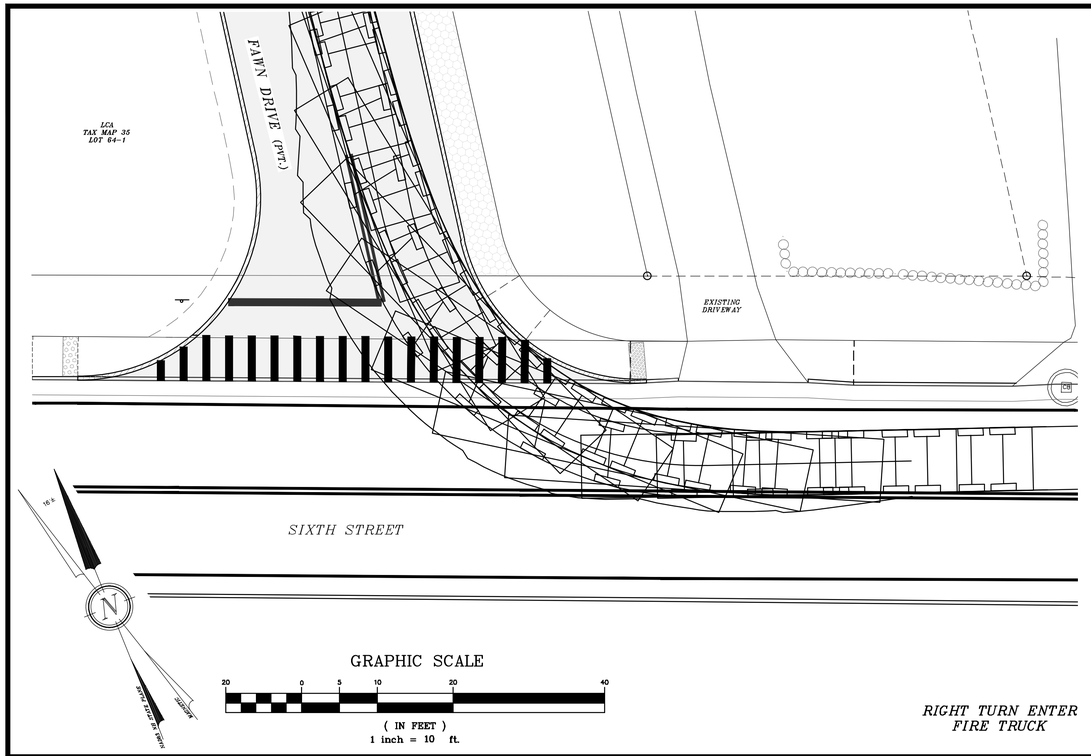
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : NONE
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

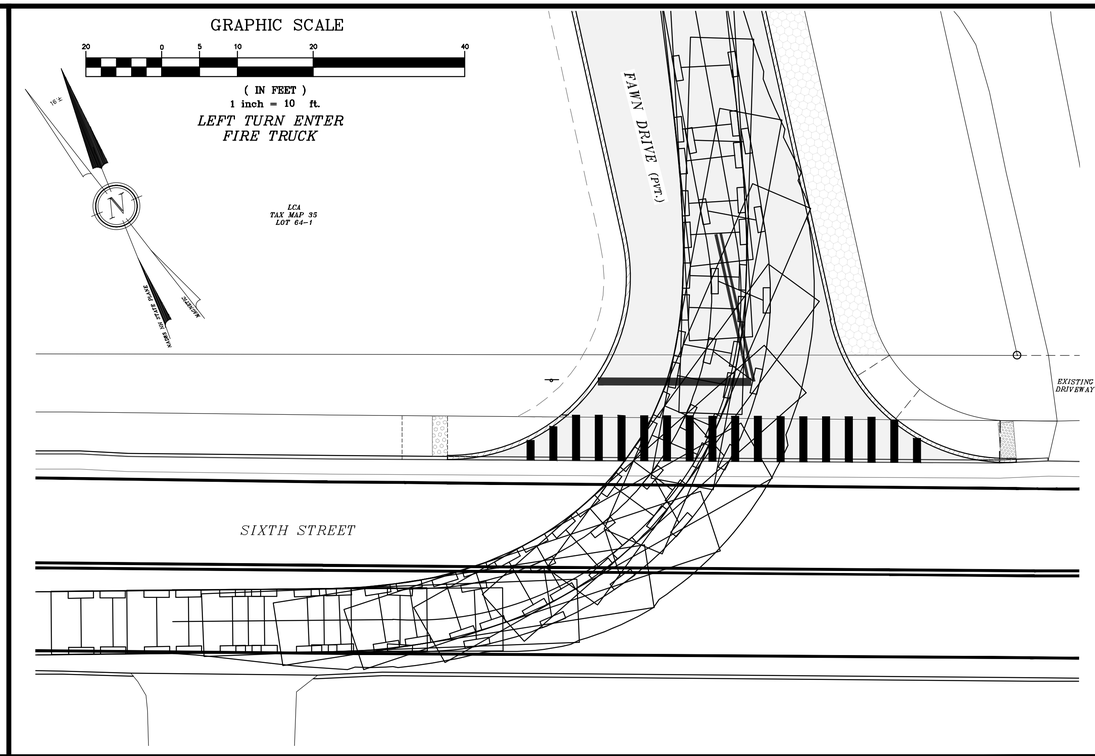
STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14947
PROFESSIONAL ENGINEER

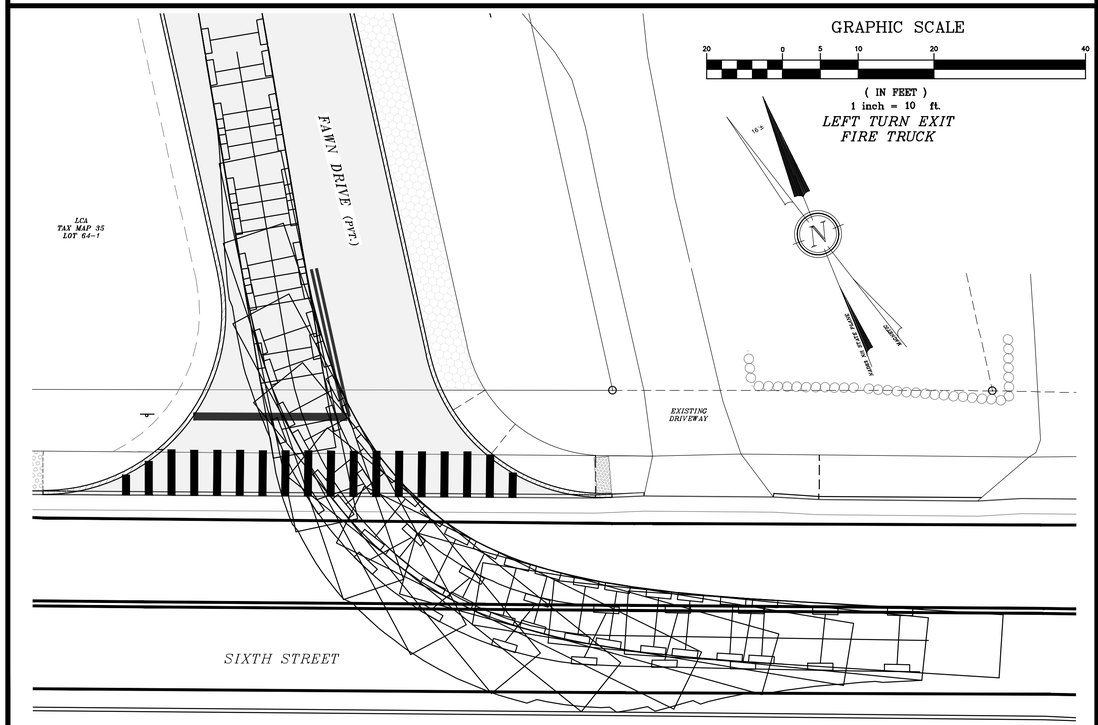
SHEET 37 OF 39

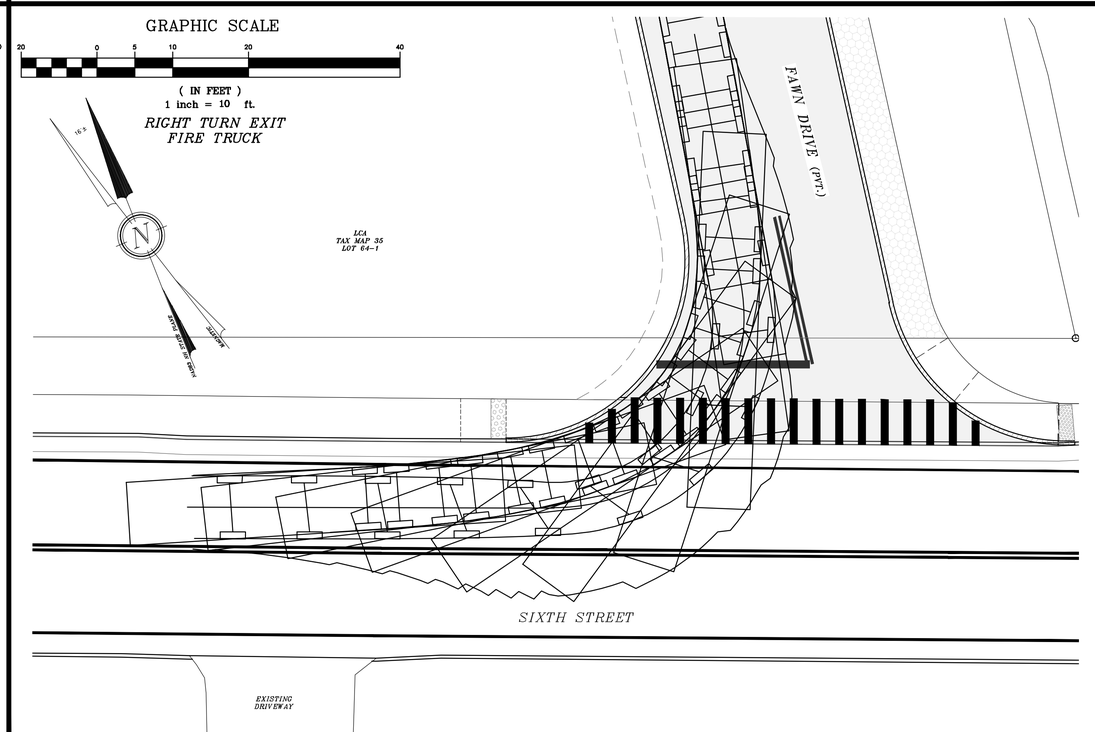
NOT FOR CONSTRUCTION



RIGHT TURN ENTER
FIRE TRUCK







REVISION	DATE	DESCRIPTION

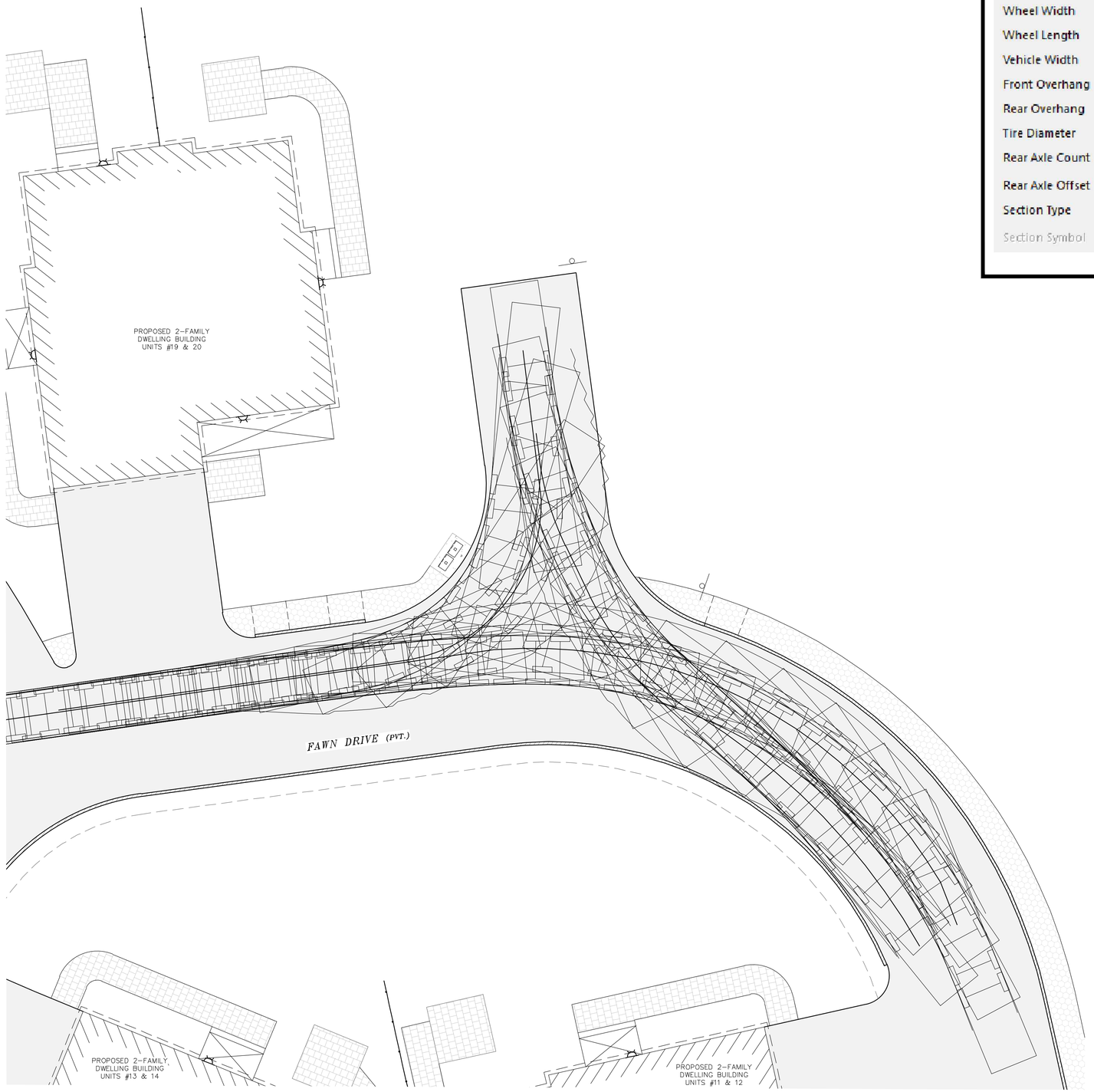
DOVER FIRE TRUCK ENTRANCE & EXIT MOVEMENTS
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

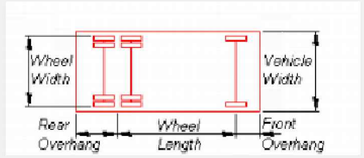
SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 – 018

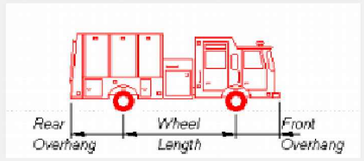
STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14049
LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



Description	Dover Fire Engine
Wheel Width	8.330
Wheel Length	20.000
Vehicle Width	8.330
Front Overhang	13.580
Rear Overhang	16.000
Tire Diameter	3.330
Rear Axle Count	2
Rear Axle Offset	4.200
Section Type	Fire Truck
Section Symbol	Set





REVISION	DATE	DESCRIPTION

DOVER FIRE TRUCK TURNAROUND MOVEMENT
FOR: THE STABLE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

SHEET 39 OF 39

NOT FOR CONSTRUCTION

JAD DESIGN GROUP INC.

custom home designers
jaddesigngroup.com
603.554.1199

The Stabile Companies

Builders and Developers

DUPLEX - MODEL B

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

A 1.0

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DUPLEX - MODEL B

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

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DUPLEX - MODEL B

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

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Front Elevation

DUPLEX - B

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 3/27/2025
Rev : 6/2/25

The Stabile Companies
Builders and Developers

Duplex - Model B
Sixth Street
Dover, NH

Front Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.1

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Right Side Elevation

DUPLEX - B

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JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model B
Sixth Street

Right Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.2

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Rear Elevation

DUPLEX - B

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JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model B
Sixth Street

Rear Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.3

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Left Side Elevation

DUPLEX - B

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Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model B
Sixth Street

Left Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.4

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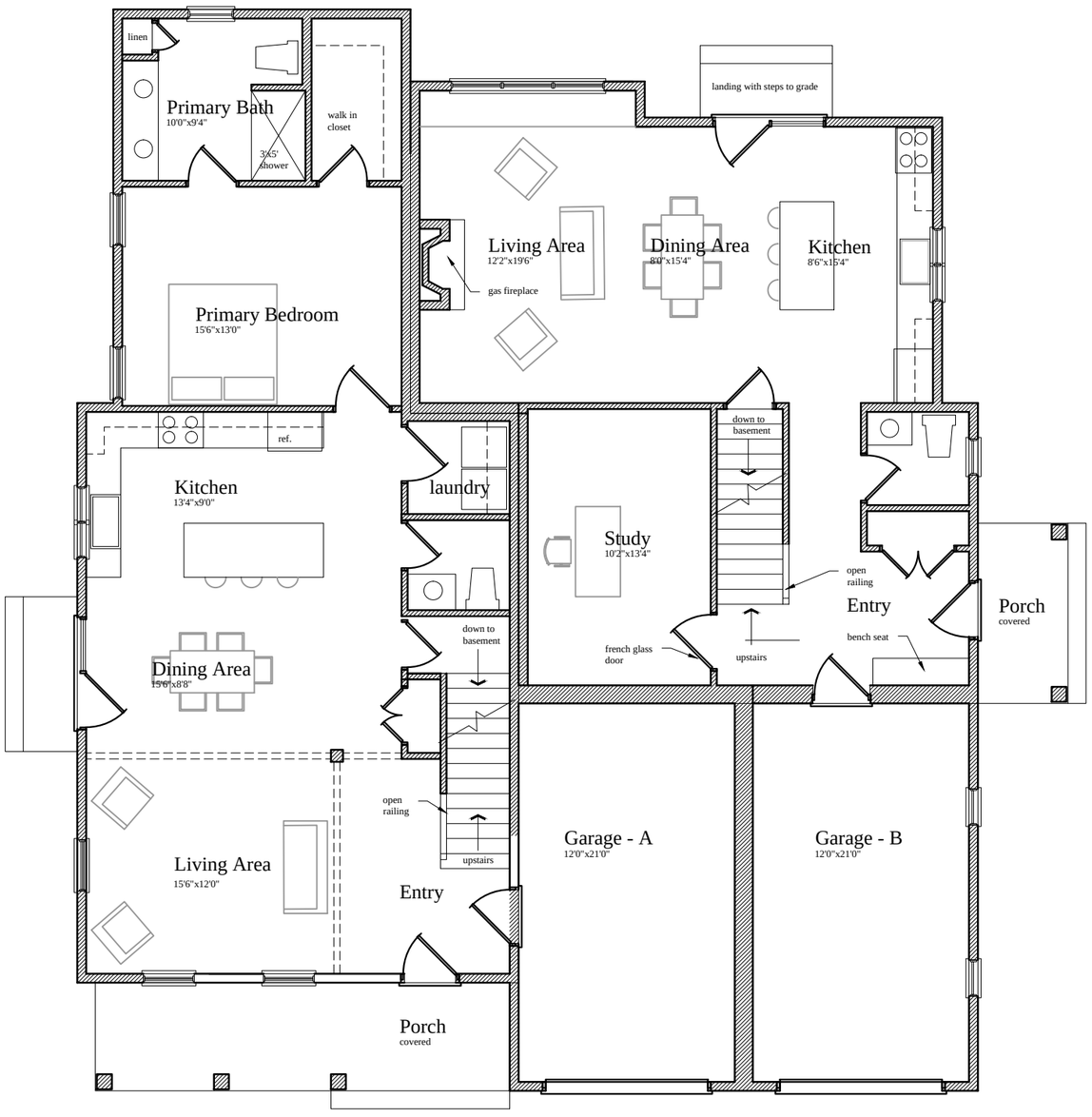

MAIN FLOOR PLAN

UNIT A :	UNIT B :
MAIN: 1144 SF	MAIN: 921 SF
UPPER: 788 SF	UPPER: 1003 SF
TOTAL: 1992 SF	TOTAL: 1924 SF

DUPLEX - B

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model B
Sixth Street

Main Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-3.1

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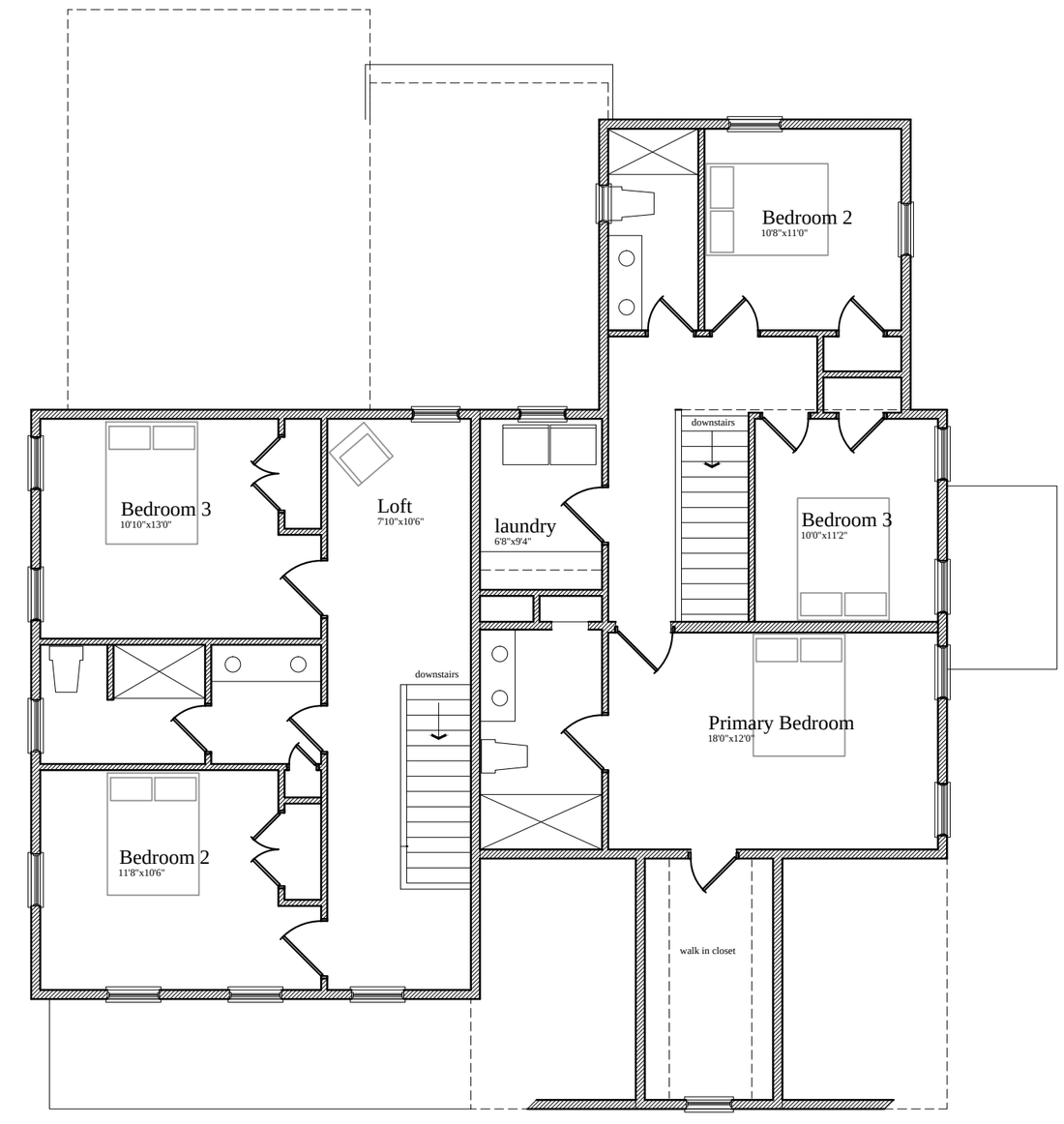

UPPER FLOOR PLAN

DUPLEX - B

CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model B
Sixth Street

Upper Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-4.1

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The Stabile Companies

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Builders and Developers

DUPLEX - MODEL C

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

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Builders and Developers

DUPLEX - MODEL C

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

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The Stabile Companies

Builders and Developers

DUPLEX - MODEL C

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

A 1.0

Front Elevation

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

The Stabile Companies
Builders and Developers

Duplex - Model C
Sixth Street
Dover, NH

Front Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.1

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Right Side Elevation

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

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Job : 2782
Ref :
Date : 6/18/2025
Rev :

The Stabile Companies
Builders and Developers

Duplex - Model C
Sixth Street

Right Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.2

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Rear Elevation

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

The Stabile Companies
Builders and Developers

Duplex - Model C
Sixth Street

Rear Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.3

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Left Side Elevation

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

The Stabile Companies
Builders and Developers

Duplex - Model C
Sixth Street

Left Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.4

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MAIN FLOOR PLAN

UNIT A :	UNIT B :
MAIN: 950 SF	MAIN: 849 SF
UPPER: 967 SF	UPPER: 969 SF
TOTAL: 1917 SF	TOTAL: 1818 SF

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND SPECIFICATIONS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

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Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model C
Sixth Street

Main Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-3.1

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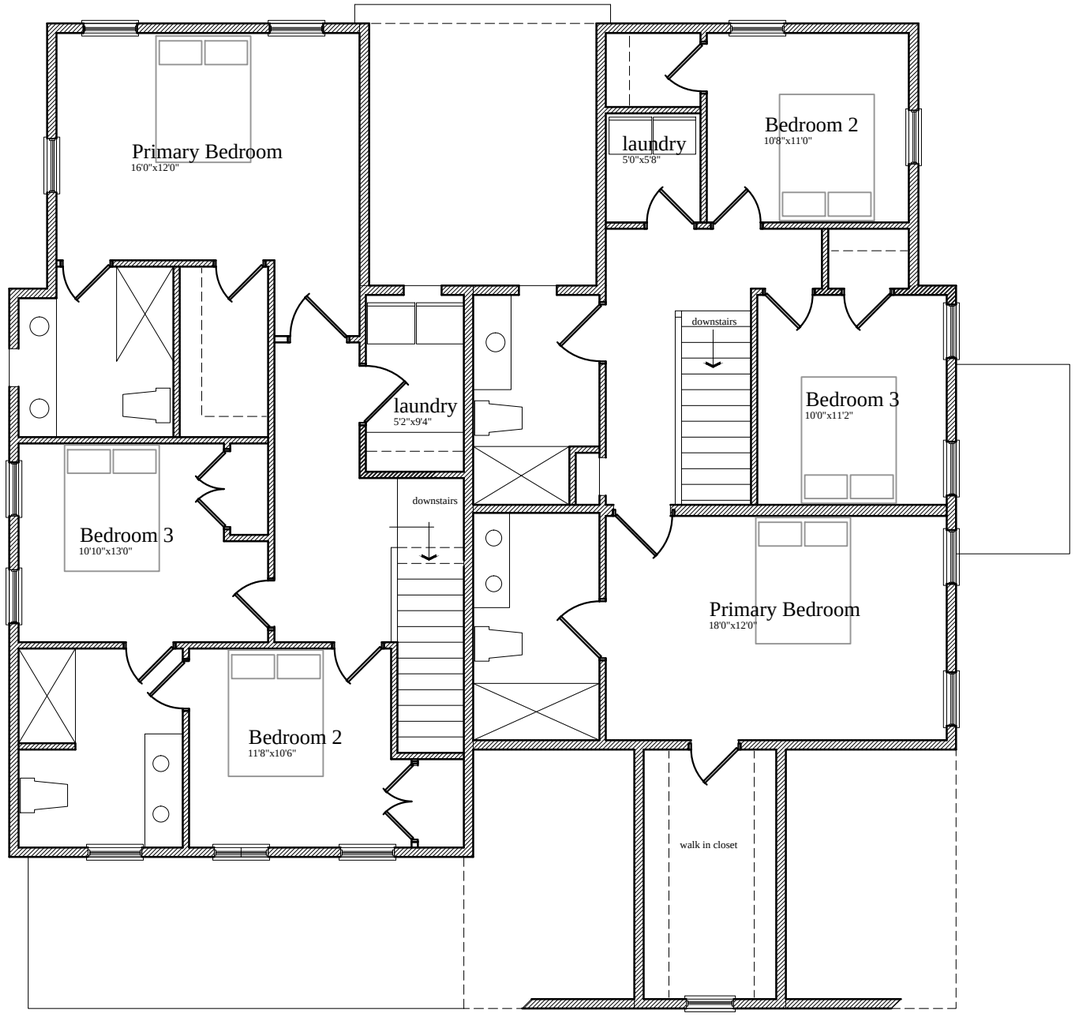

UPPER FLOOR PLAN

DUPLEX - C

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model C
Sixth Street

Upper Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-4.1

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The Stabile Companies

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Builders and Developers

DUPLEX - MODEL A

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

A 1.0

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Builders and Developers

DUPLEX - MODEL A

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

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Builders and Developers

DUPLEX - MODEL A

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

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DUPLEX - MODEL A

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

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The Stabile Companies

Builders and Developers

DUPLEX - MODEL A

Sixth Street, Dover, New Hampshire

PRELIMINARY DESIGN DRAWINGS

7/2/25

A 1.0

Front Elevation

DUPLEX - A

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

The Stabile Companies
Builders and Developers

Duplex - Model A
Sixth Street
Dover, NH

Front Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.1

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Right Side Elevation

DUPLEX - A

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JAD DESIGN GROUP INC.
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Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model A
Sixth Street

Right Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.2

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Rear Elevation

DUPLEX - A

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model A
Sixth Street

Rear Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.3

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Left Side Elevation

DUPLEX - A

CONTRACTOR TO VERIFY ALL DIMENSIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 6/18/2025
Rev :

Stabile Homes
Manchester, NH

Duplex - Model A
Sixth Street

Left Side Elevation
Scale : 1/8" = 1'-0"

SHEET
A-2.4

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MAIN FLOOR PLAN

UNIT A :	UNIT B :
MAIN: 983 SF	MAIN: 934 SF
UPPER: 1007 SF	UPPER: 1003 SF
TOTAL: 1990 SF	TOTAL: 1937 SF

DUPLEX - A

CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS AND STRUCTURAL MEMBERS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL SITE SPECIFIC AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model A
Sixth Street

Main Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-3.1

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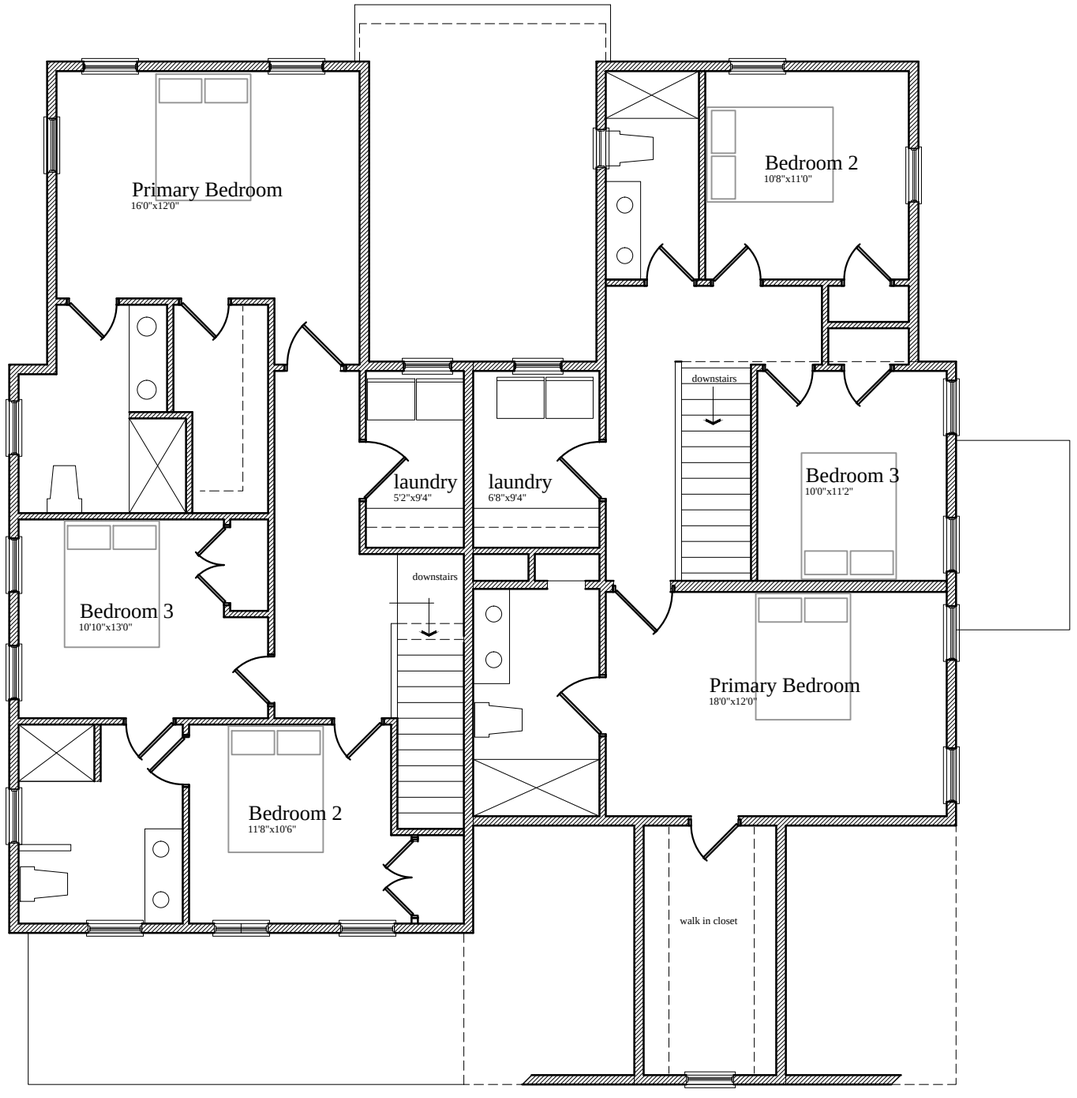

UPPER FLOOR PLAN

DUPLEX - A

CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO STARTING CONSTRUCTION. BUILDING IS TO MEET OR EXCEED ALL STATE AND LOCAL BUILDING CODES.

JAD DESIGN GROUP INC.
jaddesigngroup.com phone 603.554.1199

Job : 2782
Ref :
Date : 6/5/25
Rev :

Stabile Homes
Manchester, NH

Duplex - Model A
Sixth Street

Upper Floor Plan
Scale : 1/8" = 1'-0"
square feet

SHEET
A-4.1

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LEGEND:

- 3/4" REBAR W/ID CAP (SET)
- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE/GRANITE BOUND (FND)
- T-BAR, STEEL STAKE (FND)
- UTILITY POLE
- SIGNAGE
- PROPERTY LINE
- BUILDING SETBACK LINE
- APPROXIMATE ABUTTING PROPERTY LINE
- GRASS AREA
- WOODED AREA
- CONVENTIONAL PAVEMENT / BITUMINOUS CONCRETE AREA
- PROPOSED BUILDING
- PROPOSED BUILDING OVERHANG
- POROUS PAVEMENT SIDEWALK
- POROUS PAVER SIDEWALK
- INFILTRATION SUMPS
- VARIOUS TREES
- VARIOUS SHRUBS AND PLANTS

LOT & IMPERVIOUS COVEREAGE:

EXISTING:
HOUSE, COVERED PORCH & OVERHANGS: 877 Sq.Ft.
STEPS: 28 Sq.Ft.
DECK: 150 Sq.Ft.
SHED: 125 Sq.Ft.
TOTAL: 1,180 Sq.Ft. (0.72%)

DRIVEWAY: 1,537 Sq.Ft.
TOTAL: 1,537 Sq.Ft. (0.94%)
TOTAL IMPERVIOUS: 2,717 Sq.Ft. (1.66%)

PROPOSED:
INCLUDES BUILDING, OVERHANG, PORCH, DECK & STEPS
UNITS #1 & #2, #3 & #4, #5 & #6, #9 & #10, #19 & #20 = 2,847 Sq.Ft. EACH
TOTAL: 14,253 Sq.Ft.
UNIT #15 & #16, #17 & #18 = 3,000 Sq.Ft. EACH
TOTAL: 6,000 Sq.Ft.
UNITS #7 & #8, #11 & #12, #13 & #14 = 2,723 Sq.Ft. EACH
TOTAL: 8,169 Sq.Ft.
TOTAL: 28,422 Sq.Ft. (17.39%)

PAVEMENT: 28,314 Sq.Ft.
CURB: 551 Sq.Ft.
CONCRETE PADS: 115 Sq.Ft.
TOTAL: 28,980 Sq.Ft. (17.73%)
TOTAL PROPOSED IMPERVIOUS COVERAGE: 57,402 Sq.Ft. (35.13%)

TDR UNIT DENSITY CALCULATION (170-29.G.(3)(a)

[1][a] 163,417 SF - 0SF (CONSERVATION) = 163,417 SF

*[1][b] 163,417 SF * 0.85 = 138,904 SF*

*[1][c] 138,904 SF * 0.85 = 118,068 SF*

[1][d] 118,068 SF /18,000 SF (TWO-FAMILY DWELLING UNIT MIN. R12 LOT SIZE) = 6 BUILDINGS (12) UNITS

- *REMAINING 8 UNITS (4 BUILDINGS) TO BE PURCHASED. THUS ALLOWING FOR 20 TWO-FAMILY DWELLING UNITS IN 10 BUILDINGS.*

THE PLANNING BOARD APPROVED THE USE OF THE TDR WHICH INCLUDES ADDITIONAL UNITS PER CHAPTER 170.27.2

TDR REQUEST:
PURCHASE OF 8 TWO-FAMILY DWELLING UNITS (4 BUILDINGS)
APPROVED BY DOVER PLANNING BOARD (TRAN-2025-003)
DATED MAY 13, 2025

CONDITIONAL USE PERMITS:

170-33 GROUNDWATER PROTECTION: GREATER THAN 20% IMPERVIOUS IN THE SECONDARY GROUNDWATER RECHARGE ZONE.

WAIVER REQUESTS:
STORMWATER RUNOFF VOLUME (153-14-(3)(B)(4)): PENDING

SNOW STORAGE CALCULATION:

- STORAGE CALCULATION (6:1 RATIO USED)
  - PLOWABLE AREA = 35,916 Sq.Ft. / 6 = 5,986 Sq.Ft.
  - >6,721 Sq.Ft. PROVIDED
  - SNOW SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS ONCE IDENTIFIED AREAS ARE FULL.

NAD83 NH STATE PLANE

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

NOTES:

1.) PARCEL #1
OWNER: RICHARDSON ESTATES OF DOVER LLC
688 CALEF HIGHWAY
BARRINGTON, NH 03825

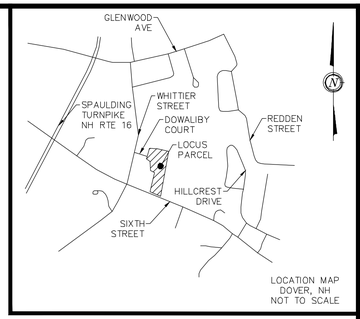
A.) TAX MAP 35, LOT 64
B.) S.C.R.D. BOOK 5194, PAGE 651
C.) POST LOT LINE REVISION AREA: 163,417 Sq. Ft., 3.75 Ac.

PARCEL #2
OWNER: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT
DOVER, NH 03820

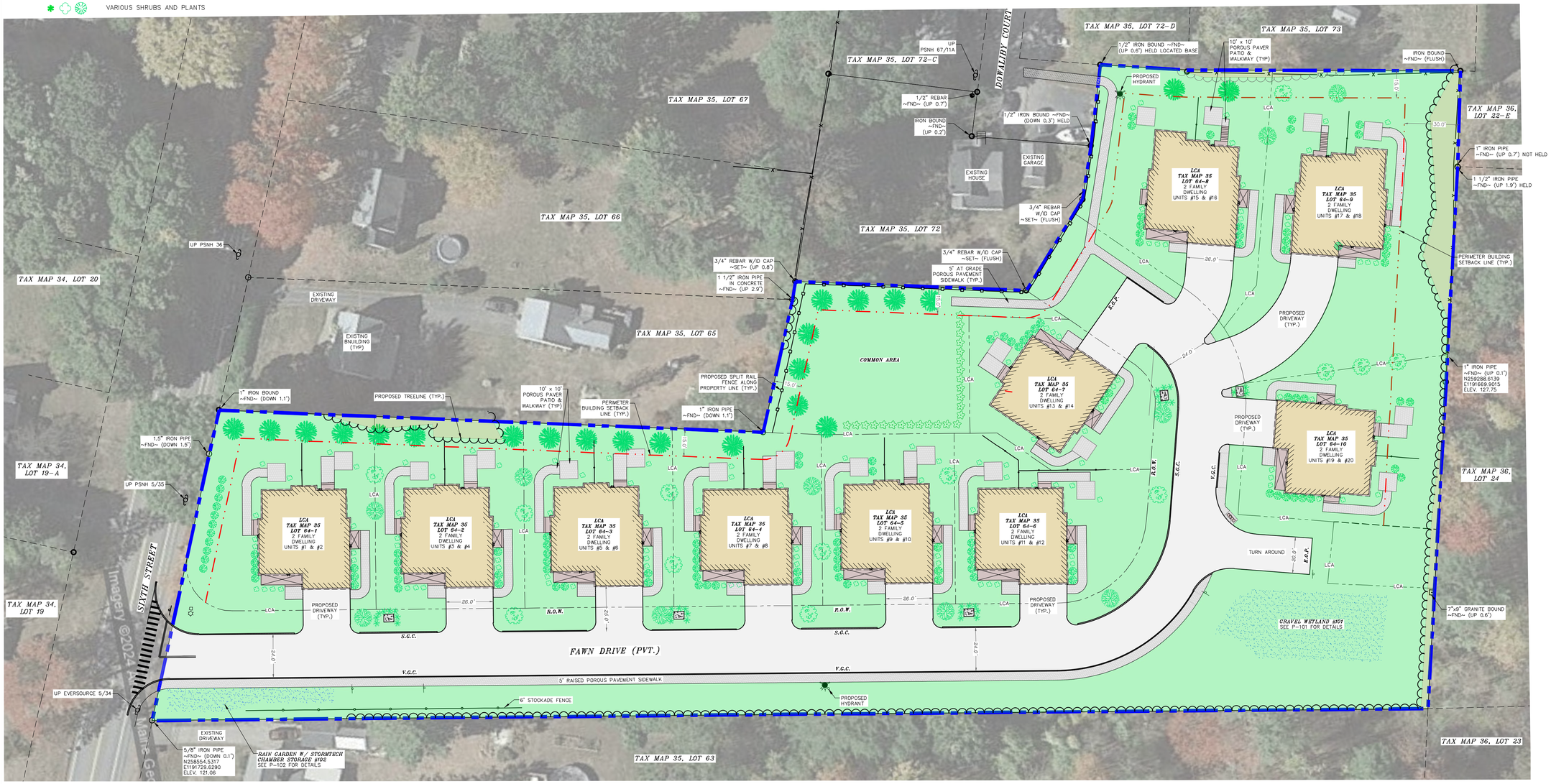
A.) TAX MAP 35, LOT 72
B.) S.C.R.D. BOOK 2794, PAGE 374
C.) POST LOT LINE REVISION AREA: 14,211 Sq. Ft., 0.33 Ac.

2.) APPLICANT: THE STABILE COMPANIES
20 COTTON ROAD, SUITE 200
NASHUA, NH 03063

3.) THE INTENT OF THIS PLAN IS TO SHOW A COLOR RENDERING OF THE SITE DESIGN FOR A PROPOSED 10 LIMITED COMMON AREAS, 20, TWO-FAMILY DWELLING UNIT (10 BUILDINGS) TDR CONDOMINIUM DEVELOPMENT OF TAX MAP 35, LOT 64.



LOCATION MAP
DOVER, NH
NOT TO SCALE



	REVISION	DATE
		DESCRIPTION

COLOR RENDERING
FOR: THE STABILE COMPANIES
LAND OF: RICHARDSON ESTATES OF DOVER LLC
141 SIXTH STREET, DOVER, N.H.
TAX MAP 35, LOT 64
LAND OF: MOHAMED & LISA K. HAMCHA
5 DOWALIBY COURT, DOVER, N.H.
TAX MAP 35, LOT 72

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 30 FT.
DATE : JUNE 24, 2025
FILE NO. : DB 2024 - 018

NOT FOR CONSTRUCTION