

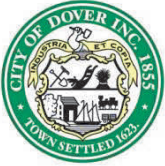
**CITY OF DOVER**

## PLANNING TECHNICAL REVIEW COMMITTEE –AGENDA

**REVISED**

Meeting Type: Regular Meeting  
Meeting Location: Council Conference Room, City Hall, 288 Central Ave, Dover NH 03820  
Meeting Date: **Thursday, March 16, 2023**  
Meeting Time: **10:30 AM**

1. 10:30 AM - 11:15 AM: Open Space Subdivision for Chinburg Development, LLC, Assessor's Map N, Lot 13-1, zoned R-40, located at Oak Street & Gulf Road. (11 new lots.) (SUBD-2023-0001).



# City of Dover, New Hampshire SUBDIVISION APPLICATION

[Revision Date: July 1, 2021]

Office Use Only

Project #: \_\_\_\_\_

Date Received: \_\_\_\_\_

Amount Paid: \_\_\_\_\_

Time Received: \_\_\_\_\_

## APPLICANT AND OWNER INFORMATION

Name of Applicant: Chinburg Development, LLC Telephone # 603-868-5995

Address of Applicant: 3 Penstock Way Newmarket, NH 03857

Name of Property Owner (if different from applicant): SAME Telephone # \_\_\_\_\_

Address of Property Owner: \_\_\_\_\_

E-Mail Address: massia@chinburg.com

## PROPERTY INFORMATION

Address of Property: Oak Street (& Gulf Road)

Assessor's Map # N Lot(s) # 13-1

Zoning District(s) R-40 Overlay District(s) \_\_\_\_\_

Size of Parcel: 34.53 ac Property Deed: Book 5037 Page: 903

Existing Use of Property: VACANT

## SUBDIVISION INFORMATION

Subdivision Type: Conventional: \_\_\_\_\_ Open Space: ☒ TDR: \_\_\_\_\_

Existing Number of Lots: 1 Proposed Number of Lots: 11

**TDR Relief sought (Check All That Apply):** ☐ Lot Size ☐ Frontage ☐ Setback ☐ 30' Buffer ☐ Purchase \_\_\_\_\_ units

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

Circle one for each category:

Water: ☒ City ☐ Well (circle one) How far is city water from the property? at street(s)

Sewer: City ☒ Septic (circle one) How far is city sewer from the property? N/A

Highway Access: ☒ City Street ☐ State Highway (circle one) | Roadway Public or ☒ Private Road (circle one)

Refuse removal: Public ☒ Private (circle one) | Estimated Length of Proposed Road: 387± feet

Estimated value of construction: \$400,000 New impervious area (in s.f.): 27,717 s.f.

**WAIVER REQUESTS**Subdivision Regulations section(s) to be waived: No new waivers are requested.Justification for waiver request(s) (*attach additional sheets as needed*): Previously obtained waivers, see attached NOD.**SURVEYOR INFORMATION**Name of Surveyor and Company (Licensed in N.H.) Kevin McEneaney, LLS - McEneaney Survey AssociatesAddress 24 Chestnut Street Dover, NH 03820 Telephone #: 603-742-0911Professional License #: Kevin McEneaney, LLS 661 E-mail address: kevin@surveynh.com**ENGINEER INFORMATION**Name of Engineer and Company (Licensed in N.H.) Stephen J. Haight, PE - Civilworks New EnglandAddress P.O. Box 1166 Dover, NH 03821 Telephone #: 603-749-0443Professional License #: Stephen J. Haight, PE #7978 E-mail address: shaight@civilworksne.com**LANDSCAPE ARCHITECT INFORMATION**Name of Landscape Architect and Company (Licensed in N.H.) N/A

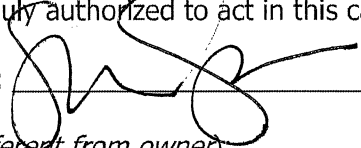
Address \_\_\_\_\_ Telephone #: \_\_\_\_\_

Professional License #: \_\_\_\_\_ E-mail address: \_\_\_\_\_

**SOIL SCIENTIST INFORMATION**Name of Soil Scientist and Company (Licensed in N.H.) Damon E. Burt, CWS - Fraggie Rock Environmental, Inc.Address 38 Garland Road Strafford, NH 03884 Telephone #: 603-969-5574Professional License #: Damon E. Burt, CWS #163 E-mail address: frenvironmental@gmail.com**CONSERVATION EASEMENT HOLDER**Name of Easement Holder: N/A Telephone # \_\_\_\_\_Address Easement Holder: \_\_\_\_\_**SIGNATURES**shaight@civilworksne.com

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.

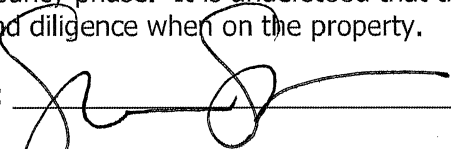
Signature of Property Owner:  Date: 22 FEB 2023

Signature of Applicant (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Agent: \_\_\_\_\_ Date: \_\_\_\_\_

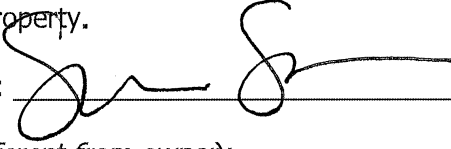
#### AUTHORIZATION TO ENTER SUBJECT PROPERTY

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: 22 FEB 2023

#### AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

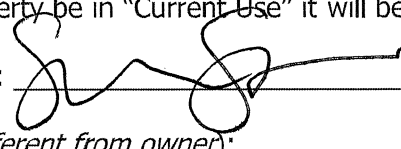
I, and my successors, hereby authorize the City of Dover and its assigns to enter my property for the purpose of completing the site work as required by the approved plan should the letter or credit or other surety be called. It is understood that these individuals must use all reasonable care, courtesy,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

Signature of Property Owner:  Date: 22 FEB 2023

Signature of Applicant (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_

#### CERTIFICATION OF FEES

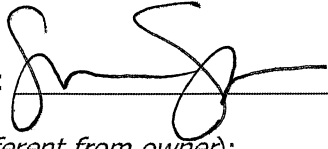
I, and my successors, hereby certify that I understand that the City of Dover collects impact fees, utility investment fees and inspection fees for projects developed in Dover. Said fees must be paid before a Certificate of Occupancy can be obtained for a structure, unless a different payment schedule 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: 22 FEB 2023

Signature of Applicant (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_

#### CERTIFICATION OF PUBLIC ROADWAY ACCEPTANCE

I, and my successors, hereby certify that I understand that the acceptance of a roadway as a public road is an action of the City Council in its sole and complete discretion. In order for the City Council to consider accepting a road as public, it must be free of encumbrances. No roadway with private utility easements shall be accepted as a public road by the City unless the easements are expunged prior to the transfer of land to the City. License agreements for any and all private utilities within the right of way may be granted by the City upon acceptance of the unencumbered roadway consistent with applicable state law.

Signature of Property Owner:  Date: 22 FEB 2023

Signature of Applicant (if different from owner): \_\_\_\_\_ 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:

Chinburg Development, LLC

Signature(s) of Property Owner(s):

Date: 2023-02-21

Signature of Applicant:

*if different from owner*

Date:

### 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:

Chinburg Development, LLC

Signature(s) of Property Owner(s):

Date: 2023-02-21

Signature of Applicant:

*if different from owner*

Date:

### 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



## City of Dover, New Hampshire SUBDIVISION SUBMISSION CHECKLIST

[Revision Date: May 18, 2019]

This review checklist is intended to assist the applicant in the planning process of preparing a Subdivision 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 subdivision requirements. Please refer to the Subdivision Regulations for full details.*

APPLICANT: Chinburg Development, LLC File Number: P23-

PROJECT TITLE: Emerson Ridge - An Open Space Subdivision

PROPERTY LOCATION: Oak Street & Gulf Road Tax Map: N Lot: 13-1

|                                                                                                                                                                  | Where/How Provided                              | Reviewed |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------|
| 1. Completed and signed Application form                                                                                                                         | SEE ATTACHED                                    |          |
| 2. Plan Review Fees are provided                                                                                                                                 | SEE ATTACHED                                    |          |
| 3. Electronic copy of the surveyed plat layout                                                                                                                   | EMAILED & UPLOADED TO CITY PORTAL               |          |
| 4. Electronic copy of supplementary materials and application                                                                                                    | EMAILED & UPLOADED TO CITY PORTAL               |          |
| 5. Traffic Impact Assessment and Analysis (Standard or Advanced)                                                                                                 | SEE ATTACHED, EMAILED & UPLOADED TO CITY PORTAL |          |
| 6. Waiver requests to the Subdivision Regulations, with written justification                                                                                    | PREVIOUSLY OBTAINED, SEE ATTACHED NOD           |          |
| 7. Conditional Use Permit applications                                                                                                                           | SEE ATTACHED                                    |          |
| 8. Narrative describing yield plan and cost analysis                                                                                                             | SEE ATTACHED                                    |          |
| 9. Folded copies of subdivision plan w/scale of not less than 1"=50' or 1"=100' for larger subdivisions. Plans shall contain the following items as appropriate: | SEE ATTACHED , 8 FULL SIZE SETS (TRC)           |          |
| Location map at appropriate scale                                                                                                                                | SHOWN ON PLANS                                  |          |
| Proposed subdivision name and title and Planning File #                                                                                                          | SHOWN ON PLANS                                  |          |
| Date, north arrow and scale                                                                                                                                      | SHOWN ON PLANS                                  |          |
| Names of all abutting property owners                                                                                                                            | SHOWN ON PLANS                                  |          |
| Name and address of owners and/or applicants                                                                                                                     | SHOWN ON PLANS                                  |          |
| Signature & stamp of NH licensed land surveyor and/or engineer                                                                                                   | SHOWN ON PLANS                                  |          |
| Zoning District boundaries, including any special or overlay districts                                                                                           | N/A                                             |          |
| Location of Conservation District areas                                                                                                                          | SHOWN ON PLANS                                  |          |
| Location, names and widths of existing and proposed streets, including pavement widths, grades, curbs and crosswalks                                             | SHOWN ON PLANS                                  |          |
| Location and widths of existing & proposed easements & right of ways                                                                                             | SHOWN ON PLANS                                  |          |
| Location and widths of existing and proposed sidewalks                                                                                                           | N/A                                             |          |
| Existing and proposed property lines with dimensions and bearings tied into Dover's Geographic Information System coordinate system                              | SHOWN ON PLANS                                  |          |
| Existing and proposed lot areas in square feet                                                                                                                   | SHOWN ON PLANS                                  |          |
| Existing and proposed topographic information at two foot intervals                                                                                              | SHOWN ON PLANS                                  |          |
| Minimum building setbacks or build to lines on all lots                                                                                                          | SHOWN ON PLANS                                  |          |

|                                                                                                                                                 | Explain How Provided | Reviewed |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------|
| Existing and proposed buildings and structure locations                                                                                         | N/A                  |          |
| Location and size of existing and proposed electric, telephone, gas cable and other underground utilities                                       | SHOWN ON PLANS       |          |
| Existing and proposed water lines and fire hydrants, including materials and capacity needed                                                    | SHOWN ON PLANS       |          |
| Location and materials of sanitary sewage facilities within project site and projected additional peak hour sewer load                          | N/A                  |          |
| Existing and proposed septic system, including test pit locations and results and NHDES subdivision permit number                               | SHOWN ON PLANS       |          |
| Existing and proposed stormwater lines and facilities                                                                                           | SHOWN ON PLANS       |          |
| Existing and proposed streetlights                                                                                                              | SHOWN ON PLANS       |          |
| Location of Flood Hazard Zone                                                                                                                   | SHOWN ON PLANS       |          |
| Location of all bodies of water and watercourses                                                                                                | SHOWN ON PLANS       |          |
| Location of wetlands and buffers                                                                                                                | SHOWN ON PLANS       |          |
| Neighborhood plan with aerial underlay showing how project relates to abutting uses                                                             | SHOWN ON PLANS       |          |
| Existing natural features and/or significant vegetation on property                                                                             | SHOWN ON PLANS       |          |
| Depict existing contours up to 100 ft. beyond project limits                                                                                    | SHOWN ON PLANS       |          |
| Soil types                                                                                                                                      | SHOWN ON PLANS       |          |
| Map and lot numbers for existing and proposed lots as assigned by Tax Assessor                                                                  | SHOWN ON PLANS       |          |
| Location of all land offered for dedication for public use or land to be held in common by property owners of the subdivision                   | SHOWN ON PLANS       |          |
| Location of all land offered for dedication for public use or land to be held in common by property owners of the subdivision                   | SHOWN ON PLANS       |          |
| Location, material and size of existing and proposed permanent monuments                                                                        | SHOWN ON PLANS       |          |
| Existing railroad lines                                                                                                                         | N/A                  |          |
| Note regarding solid waste disposal                                                                                                             | SEE PLAN NOTES       |          |
| All applicable Dover Common Subdivision notes                                                                                                   | SEE PLAN NOTES       |          |
| <b>10. Construction Detail Sheets shall contain the following:</b>                                                                              |                      |          |
| Profiles showing existing & proposed elevations along the center lines of proposed streets & within 100' of intersections with existing streets | SEE DETAIL SHEETS    |          |
| Profiles showing the locations & a typical cross-section detail of streets                                                                      | SEE DETAIL SHEETS    |          |
| Location of street trees, street lighting poles and street signs                                                                                | SHOWN ON PLANS       |          |
| Location, size and invert elevations of existing and proposed sanitary sewers, stormwater drains and fire hydrants                              |                      |          |
| Location and size of all water, gas and other underground utilities                                                                             | SHOWN ON PLANS       |          |
| <b>11. Additional Information if appropriate</b>                                                                                                |                      |          |
| Stormwater Management Plan depicting the existing and proposed storm drainage system and engineered drainage analysis                           | SEE ATTACHED         |          |
| Stormwater Management System Operation and Maintenance Plan                                                                                     | SEE ATTACHED         |          |
| Letter to Serve from Public and Private Utilities                                                                                               | SEE ATTACHED         |          |
| Erosion and Sedimentation Control Plan                                                                                                          | SEE ATTACHED         |          |
| Perimeter Landscaping Plan                                                                                                                      | PENDING              |          |
| Proposed restrictive covenants or homeowners association documents                                                                              | PENDING              |          |
| Dates and permit numbers of all required state and federal permits                                                                              | PENDING              |          |
| If wetland buffer, indicate placards locations, as applicable                                                                                   | PENDING              |          |
| Hydrogeologic study if located in Groundwater Protection Zone                                                                                   | N/A                  |          |
| Provide additional exhibits/technical data determined appropriate by the Planning Board or its staff as required                                | TBD                  |          |

REVIEWED BY: \_\_\_\_\_ DATE \_\_\_\_\_ TRC DATE \_\_\_\_\_



# 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: Chinburg Development, LLC Telephone # 603-868-5995

Address of Applicant: 3 Penstock Way Newmarket, NH 03857

E-Mail Address: massia@chinburg.com

Name of Property Owner (if different from applicant): SAME AS APPLICANT Telephone # \_\_\_\_\_

Address of Property Owner: \_\_\_\_\_

### PROPERTY INFORMATION

Assessor's Map # N Lot(s) # 13-1

Address of Property: Oak Street & Gulf Road

Zoning District(s) R-40 Overlay District(s) Conservation District

Existing Use of Property: Residential - Vacant

### CONDITIONAL USE PERMIT INFORMATION

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

- |                                                                 |                                                         |                                                        |
|-----------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|
| <input checked="" type="checkbox"/> Conservation District       | <input type="checkbox"/> RCM Use Overlay District       | <input type="checkbox"/> Gateway District              |
| <input type="checkbox"/> Groundwater Protection                 | <input type="checkbox"/> Off-Street Parking and Loading | <input type="checkbox"/> Alternative Treatment Center  |
| <input checked="" type="checkbox"/> Wetland Protection District | <input type="checkbox"/> Central Business District      | <input type="checkbox"/> Heritage Residential District |

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

Impacts will be made to the 50' Wetland Buffers and also the 20% Steep Slope Areas to allow  
disturbances for road construction and associated grading and drainage design. Total impacts  
to wetland buffers will be 32,089 s.f. and total impact to steep slope areas will be 88,70 s.f.

There will be no direct impacts to wetlands.

List Any Associated State or Federal Permits That Have Been or Will Be Applied For and Indicate Their Status: \_\_\_\_\_

NH DES Subdivision Approval - Pending

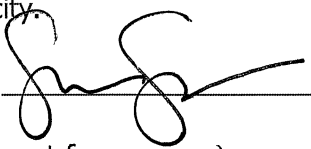
Name of Professional That Prepared Plans: Stephen J. Haight, PE - Civilworks New England

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-749-0443

Professional License #: NH PE # 7978 E-mail address: shaight@civilworksne.com

### **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.

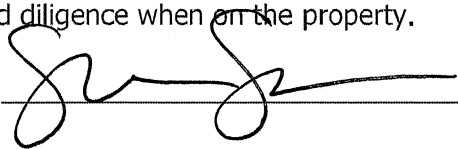
Signature of Property Owner:  Date: 22 FEB 2023

Signature of Applicant (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Agent: \_\_\_\_\_ Date: \_\_\_\_\_

### **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: 22 FEB 2023

## 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                    |
|---------|-------|---------------------------|------------------------------------|
| N       | 13-1  | Chinburg Development, LLC | 3 Penstock Way Newmarket, NH 03857 |

**Applicant (if different from owner):**

| APPLICANT NAME | APPLICANT COMPANY | MAILING ADDRESS |
|----------------|-------------------|-----------------|
|                |                   |                 |

**Surveyor and/or Engineer/Professional Agent:**

| NAME                  | COMPANY                          | MAILING ADDRESS                     |
|-----------------------|----------------------------------|-------------------------------------|
| Stephen J. Haight, PE | Civilworks New England           | P.O. Box 1166 Dover, NH 03821       |
| Kevin McEneaney, LLS  | McEneaney Survey Associates      | 24 Chestnut Street Dover, NH 03820  |
| Damon Burt, CWS       | Fraggle Rock Environmental, Inc. | 38 Garland Road Strafford, NH 03884 |

**Conservation Easement Holder:**

| TAX MAP | LOT # | NAME OF EASEMENT HOLDER | MAILING ADDRESS |
|---------|-------|-------------------------|-----------------|
|         |       |                         |                 |

# PROJECT NARRATIVE

for  
EMERSON RIDGE  
Open Space Subdivision  
Oak Street & Gulf Road, Dover, NH  
Tax Map N, Lot 13-1

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## PROJECT OVERVIEW

The proposed project is for the development of a 34.5 acre parcel on Oak Street consisting of eleven (11) single family detached homes. Improvements will include widening and paving of "Old Oak Street" to provide access to seven (7) of these homes, while three (3) lots will have frontage directly on Oak Street, and one (1) lot will have access from Country Club Estates Drive. Proposed site improvements consist of installation of underground utilities, tie into existing city water service located in Oak Street, and stormwater mitigation with associated site grading. All lots will be serviced by individual septic systems. Mail will be delivered to a mail kiosk installed at the entrance of Old Oak Street.

Along with Subdivision approval from the Planning Board this project will include a Conditional Use Permit for impacts to wetland buffers and steep slopes (Dover Conservation District). These proposed impacts are limited to road and driveway construction and the installation of grading and drainage structures. There are no wetland impacts from the proposed development.

On April 26, 2022, the Dover Planning Board approved a yield plan allowing a waiver for a road length of less than 500' (P22-21), (See attached Notice of Decision)

This project consists of the following outline of general construction:

- Select clearing and grubbing of land area required to construct the proposed roadway and private driveway while maintaining as much natural buffer as is practical;
- Installation of storm water management features, roads, and underground utilities and associated grading;
- Installation of site landscaping and stabilization, as needed, of the remaining areas with loam and seed.

## PROJECT LOCATION AND SITE CHARACTERISTICS

The project site has frontage along Oak Street (west), Old Oak Street and Fresh Creek Road (North), Country Club Estates Drive (east), and Gulf Road (south). The parcel is within the Rural Residential (R-40) District. The parcel of land contains +/- 34.5 acres, and is currently undeveloped, as shown on Tax Map N, Lot 13-1.

# **PROJECT NARRATIVE**

**for  
EMERSON RIDGE  
Open Space Subdivision  
Oak Street & Gulf Road, Dover, NH  
Tax Map N, Lot 13-1**

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## **WETLAND BUFFER AND 20% STEEP SLOPE IMPACTS**

There are no wetland impacts for this project. The project proposes wetland buffer and steep slope impacts limited to road and driveway construction and the installation of drainage structures and systems with associated grading. The proposed site design consists of 32,089 s.f. of impact to the wetland buffer and 8,870 s.f. of impacts to the 20% steep slopes.

## **DRAINAGE**

The project has been designed to treat and mitigate stormwater on site. All site drainage will flow overland or be captured by a closed drainage system which will direct runoff to 1 of 2 bio-retention basins. The drainage mitigation systems have been designed to reduce post development flows to abutting properties to less than the existing conditions and to provide mitigation of both stormwater quantity and quality. A Stormwater Inspection and Maintenance Plan has been developed as part of this project.

## **TRAFFIC**

A traffic study was completed by Civilworks New England on February 15, 2023, and is included as an attachment to this application. In summary, the analysis concluded that the development will result in little impact to the existing traffic stream on Oak Street and the surrounding road network.

## **UTILITIES**

The proposed house lots will connect to existing City water located within the Oak Street right of way and will have on-site septic systems. Electric service will be provided by the existing power poles owned by Eversource also located in the Oak Street right-of-way.

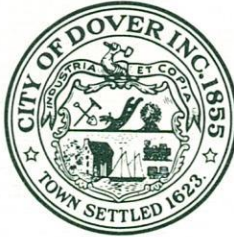
## **SOLID WASTE**

Solid waste will be managed on site by the Homeowners Association by contracting with a private waste removal company.

## **POSTAL SERVICES**

Postal delivery services will be provided for this development at a postal kiosk to be installed on the in-bound side of the project entrance road.

DONNA P. BENTON, AICP  
Director of Planning and  
Community Development  
d.benton@dover.nh.gov



288 Central Avenue  
Dover, New Hampshire 03820-4169  
(603) 516-6008  
Fax: (603) 516-6049  
www.dover.nh.gov

## City of Dover, New Hampshire

### DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT

#### NOTICE OF DECISION

April 28, 2022

Chinburg Properties  
3 Penstock Way  
Newmarket, NH 03857

Re: Review of a proposed yield plan requiring a road length waiver for Chinburg Properties, (Owners: Dahn H. & Norma M. Tibbett and Jahn H. & Susan G. Janetos), Assessor's Map N, Lot 13-1, zoned R-40, located at Oak Street. (12 new lots) (P22-21)

Dear Chinburg Properties:

Please be advised that on Tuesday, April 26, 2022, the Dover Planning Board approved the waiver to allow a yield plan with a cul-de-sac less than 500'. A full TRC and Planning Board review of the major subdivision is still required.

If you have any questions, please do not hesitate to contact my office.

Sincerely,

Donna P. Benton, AICP  
Director of Planning & Community Development

EC: Building Inspection Office  
Engineering Office  
Assessing Office  
McEneaney Survey Associates  
Civilworks, NE  
Dahn H. & Norma M. Tibbett  
Jahn H. & Susan G. Janetos

# **CIVILWORKS NEW ENGLAND**

181 WATSON ROAD - P.O. BOX 1166  
DOVER, NEW HAMPSHIRE 03821-1166

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PHONE: 603.749.0443      FAX: 603.749.7348

## **STANDARD TRAFFIC IMPACT ASSESSMENT AND ANALYSIS**

prepared for

### **EMERSON RIDGE SUBDIVISION**

Tax Map N, Lot 13-1

Oak Street, Gulf Road, Country Club Estates Drive

Dover, New Hampshire

February 15, 2023

### **1. Description of Site**

The proposed project calls for construction of eleven (11) single family detached homes on a 34.5 acre parcel of land located and accessed primarily along Oak Street with secondary frontages on Gulf Road as well as Country Club Estates Drive. The parcel is shown as Lot 3-1 on Tax Map N and is located along the easterly side of Oak Street in the Residential (R-40) District. The opposite side of Oak Street, or westerly side, consists of commercial uses located in the Gateway (G) District as well as a residential neighborhood consisting of about 25 homes accessed via Elmwood and Fairview Avenues and located in the Medium Density Residential (R-12) District.

### **2. Description of Roadways**

#### **A. Oak Street**

Oak Street serves as a connector roadway running between Central Avenue at the westerly terminus and Atlantic Avenue / Gulf Road at the easterly terminus. The segment of interest in this analysis lies between NH Route 4 (a.k.a. Portland Avenue) and the easterly terminus at Atlantic Avenue/Gulf Road.

The segment adjacent to the project is comprised of two (2) travel lanes with a total pavement width of 24 ft. Pavement markings include a double-yellow centerline. There are no fog lines. There is no curbing and shoulder widths are variable. The posted speed limit is 30 miles per hour. There is presently only one (1) minor driveway (primarily agricultural use) accessing Oak Street to the south of the project limit on the easterly side. In addition, there are three (3) curb cuts on the opposite, or westerly side, of Oak Street for commercial uses including two (2) for the former armory building and one (1) for a small sign company. There are no pedestrian amenities within this roadway segment.

#### **B. Country Club Estates Drive**

This city street provides two-way access to an existing subdivision that includes 18 single-family homes. The pavement width of the street at the proposed Lot 11 access drive is 32 feet and there is bituminous concrete curbing on both sides. Speed limit does not appear to be posted but is assumed to be 30 miles per hour (NH RSA 265:60). There are no pedestrian amenities within this roadway segment and there are no lane markings. The nearest driveway on the westerly side of the street is located approximately 125 feet to the north of the proposed driveway to Lot 11.

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DOVER, NEW HAMPSHIRE 03821-1166

PHONE: 603.749.0443 FAX: 603.749.7348

### **3. Sight Distance**

The following presentation of available sight distance at each proposed access drive to Oak Street and Country Club Estates Drive is based on measurements obtained on February 13, 2023. Methodology was based on the requirements of Section 157-60, Definitions, for All-Season Sight Distance. Driver's "eye" was set back 14 ft. from the edge of pavement.

Stopping Sight Distance standards were obtained from "A Policy on Geometric Design of Highways and Streets", prepared by AASHTO. The observed travel speed for traffic on the subject segment of Oak Street on February 13, 2023 was approximately 35 miles per hour. For this analysis, the travel speed on Country Club Estates Drive is assumed to be 30 miles per hour, especially given that the terminus of this street at its intersection with Gulf Road is approximately 350 feet south of the proposed driveway for Lot 11.

**TABLE 1**  
**Sight Distance Analysis**

| <u>Lot Number(s)</u> | <u>Accessed Via</u>        | <u>Stopping Sight Distance (ft.)</u> |                               |
|----------------------|----------------------------|--------------------------------------|-------------------------------|
|                      |                            | <u>AASHTO Recommended</u>            | <u>Available</u>              |
| 1-7                  | Oak Street                 | 225 – 250                            | 400 LT, 400 RT <sup>(1)</sup> |
| 8                    | Oak Street                 | 225 – 250                            | 400 LT, 400 RT                |
| 9                    | Oak Street                 | 225 – 250                            | 400 LT, 400 RT                |
| 10                   | Oak Street                 | 225 – 250                            | 275 LT, 400 RT                |
| 11                   | Country Club Estates Drive | 200                                  | 350 LT, 350 RT <sup>(2)</sup> |

Note:

(1) Sight distance to left (LT) reflects proposed grading and vegetation removal as shown on plans.

(2) Sight distance extends to the terminus of Country Club Estates Drive at Gulf Road.

Currently, under Section 157-50, Driveways, of the Dover Code, specifically subsection C(1), the language refers to an "all-season sight distance of 400 feet in both directions" as a requirement for permitting of more than one access to a single parcel. This language appears to be an application of the requirements for a driveway permit for access to a State (NHDOT jurisdiction) highway under NH RSA 236:13. It should be noted that NH RSA 236:13 applies to access to Class I or Class III highways, which are part of the primary state highway system (i.e. typically number routes) or recreational roads within state reservations, as well as Class II highways or highways in the secondary state highway system (unless within compact sections of cities or towns per NH RSA 229:5, V).

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It should be noted that the NHDOT driveway permit guidelines contained in NH RSA 236:13 specify a sight distance of 400 feet based on AASHTO stopping sight distance calculations for vehicle speeds of 45 to 50 miles per hour. Oak Street is not a Class I, II or III highway, as mentioned above, but rather a Class V highway maintained by the City of Dover with a posted speed limit of 30 miles per hour. Accordingly, application of AASHTO stopping sight distance calculations is a more reasonable standard for the subject points of access to Oak Street and Country Club Estate Drive.

In summary, all proposed access points meet or exceed AASHTO design recommendations based on observed travel speeds.

#### **4. Trip Generation**

The estimated trip generation for the proposed 11-lot subdivision is presented in Table 2 below. The trip generation rate data was derived from the ITE Trip Generation Manual, 11<sup>th</sup> edition and copies of the data sheets are included in Attachment A.

The cluster of lot 1 through 7, which will be served by the "Old Oak Street" cul-de-sac is broken out separately from the remaining individual lots, 8 through 11, which will be served by individual driveways accessing either Oak Street (Lots 8, 9, 10) or Country Club Estates Drive (Lot 11). Data presented includes average weekday vehicle trip ends as well as A.M. and P.M. peak hour of adjacent street and average Saturday vehicle trip ends.

**TABLE 2**  
**Estimated Average Vehicle Trip Ends <sup>(1)</sup>**

| <u>Lot</u><br><u>Number(s)</u> | <u>Average</u><br><u>Weekday</u> | <u>AM Peak Hour</u><br><u>Adjacent Street</u> | <u>PM Peak Hour</u><br><u>Adjacent Street</u> | <u>Average</u><br><u>Saturday</u> |
|--------------------------------|----------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------|
| 1 – 7                          | 66<br>(33 in / 33 out)           | 4.9<br>(1.3 in / 3.6 out)                     | 6.6<br>(4.2 in / 2.4 out)                     | 66.4<br>(33.2 in / 33.2 out)      |
| 8                              | 9.4<br>(4.7 in / 4.7 out)        | 0.7<br>(0.2 in / 0.5 out)                     | 0.9<br>(0.6 in / 0.3 out)                     | 9.5<br>(4.75 in / 4.75 out)       |
| 9                              | 9.4<br>(4.7 in / 4.7 out)        | 0.7<br>(0.2 in / 0.5 out)                     | 0.9<br>(0.6 in / 0.3 out)                     | 9.5<br>(4.75 in / 4.75 out)       |
| 10                             | 9.4<br>(4.7 in / 4.7 out)        | 0.7<br>(0.2 in / 0.5 out)                     | 0.9<br>(0.6 in / 0.3 out)                     | 9.5<br>(4.75 in / 4.75 out)       |
| 11                             | 9.4<br>(4.7 in / 4.7 out)        | 0.7<br>(0.2 in / 0.5 out)                     | 0.9<br>(0.6 in / 0.3 out)                     | 9.5<br>(4.75 in / 4.75 out)       |
| PROJECT<br>TOTALS              | 103.6<br>(51.8 in / 51.8 out)    | 7.7<br>(2.1 in / 5.6 out)                     | 10.2<br>(6.6 in / 3.6 out)                    | 104.4<br>(52.2 in / 52.2 out)     |

<sup>(1)</sup> A trip end is a single or one-direction vehicle movement either entering or entering a study site.

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### **5. Trip Distribution**

Based on the availability of services and attractions, including shopping, restaurants, recreational activities, schools, and health care, it is assumed that 85 percent of the trip ends are directed to or from Oak Street / NH Route 4 / Portland Avenue intersection and points to the north or west of the project site. The remaining 15 percent of trip ends are assumed to be directed away from Dover, towards Maine and points east, via Gulf Road.

Using the total estimated trip generation figures in Table 2, the trip ends are approximately distributed as follows:

**TABLE 3**  
**Estimated Total Trip End Distribution**

|                                        | <u>Weekday</u> | <u>AM Peak Hour</u> | <u>PM Peak Hour</u> | <u>Saturday</u> |
|----------------------------------------|----------------|---------------------|---------------------|-----------------|
| To/From<br>NH Route 4<br>or Dover      | 88             | 7                   | 9                   | 89              |
| To/From<br>Gulf Road or<br>Points East | 16             | 1                   | 1                   | 16              |

### **6. Public Transit**

The closest available public transit is provided by COAST. Route 33, according to the schedule/map published on the COAST website, appears to provide service to the Dover Arena / Outdoor pool complex on Saturdays only with stops at Shaw's Supermarket and the Dover Transport Center via downtown Dover.

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## **ATTACHMENT A**

ITE Trip Generation Manual, 11<sup>th</sup> edition  
Data Sheets

Land Use Code 210  
Single-Family Detached Housing

# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 174

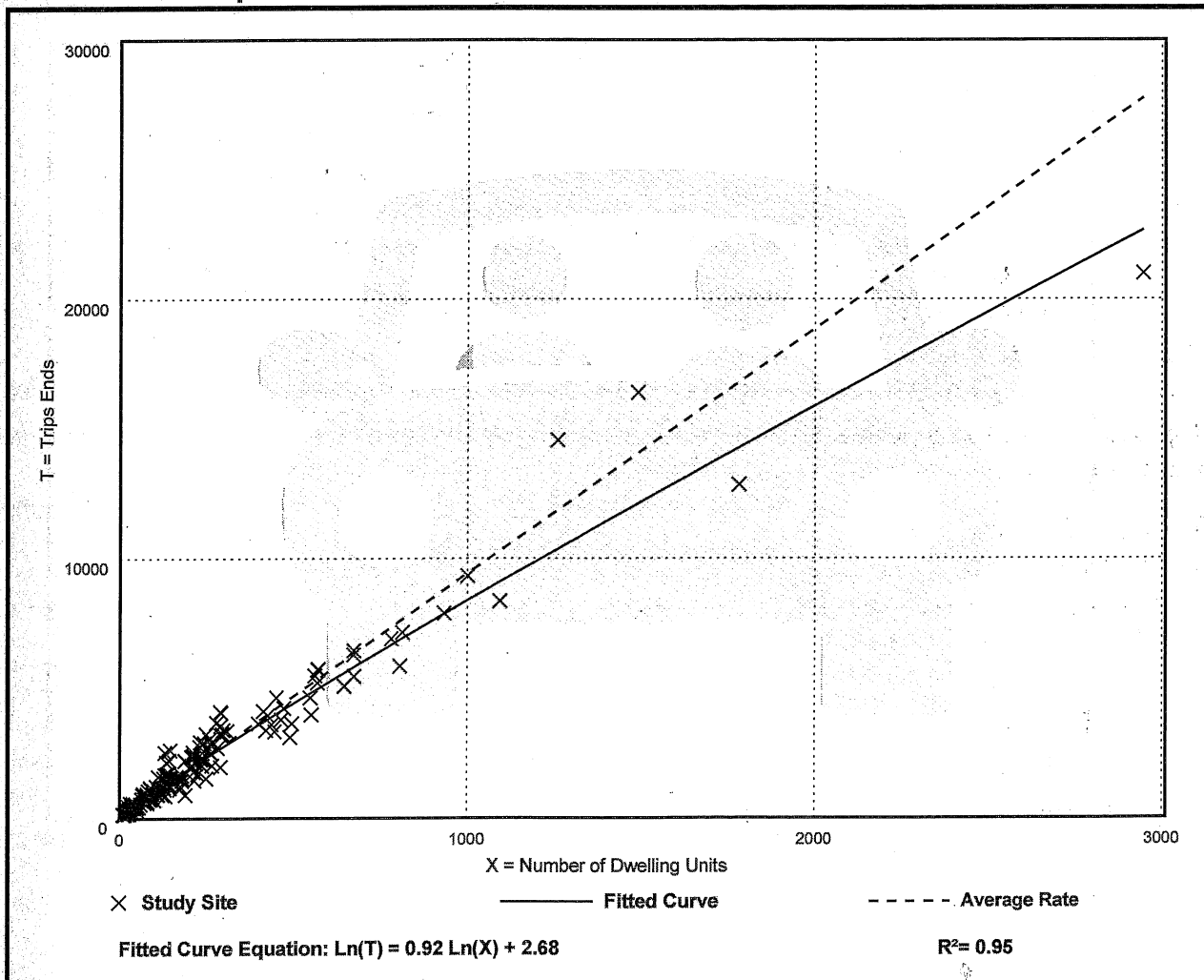
Avg. Num. of Dwelling Units: 246

Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 9.43         | 4.45 - 22.61   | 2.13               |

## Data Plot and Equation



# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 192

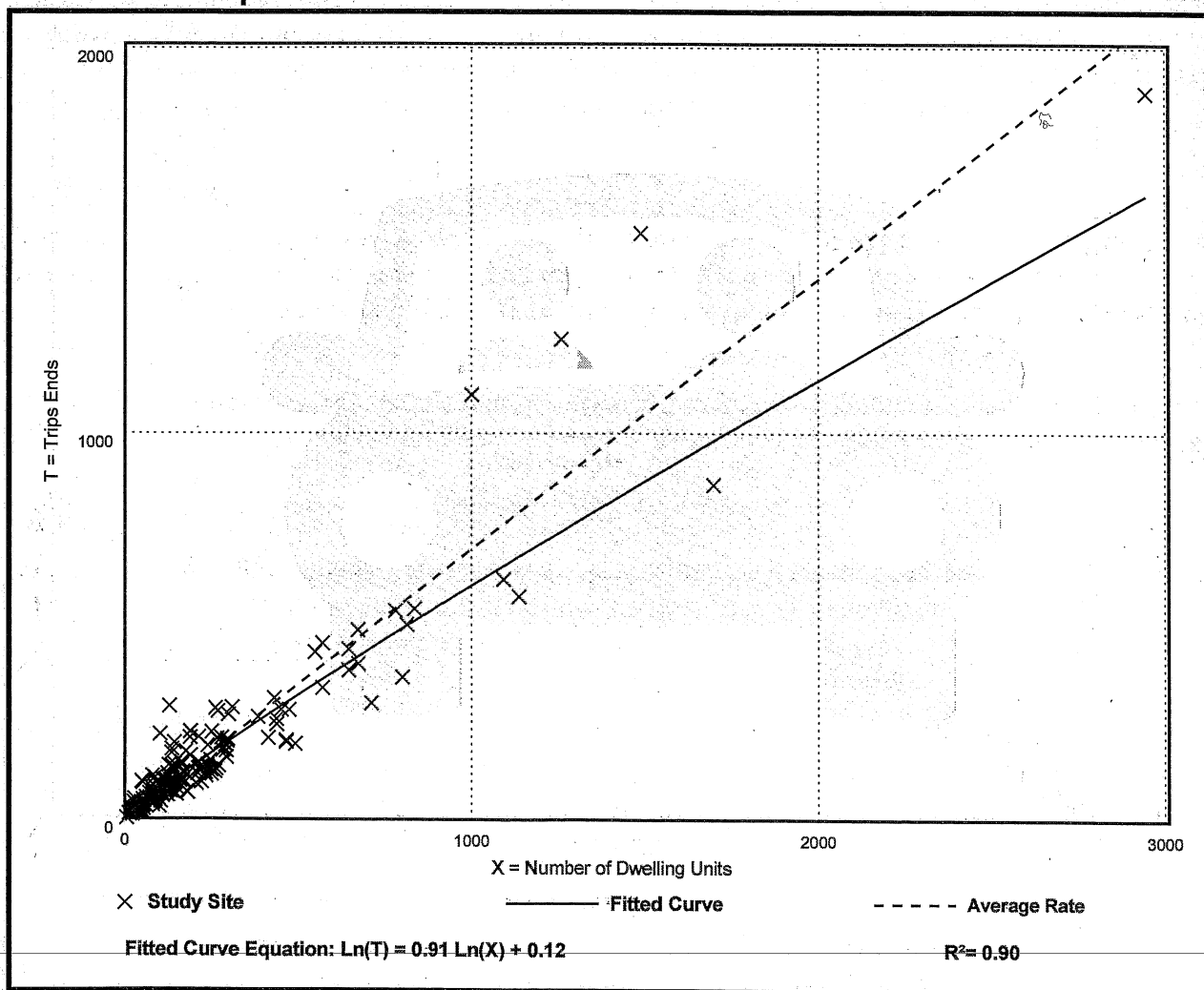
Avg. Num. of Dwelling Units: 226

Directional Distribution: 26% entering, 74% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 0.70         | 0.27 - 2.27    | 0.24               |

## Data Plot and Equation



# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 208

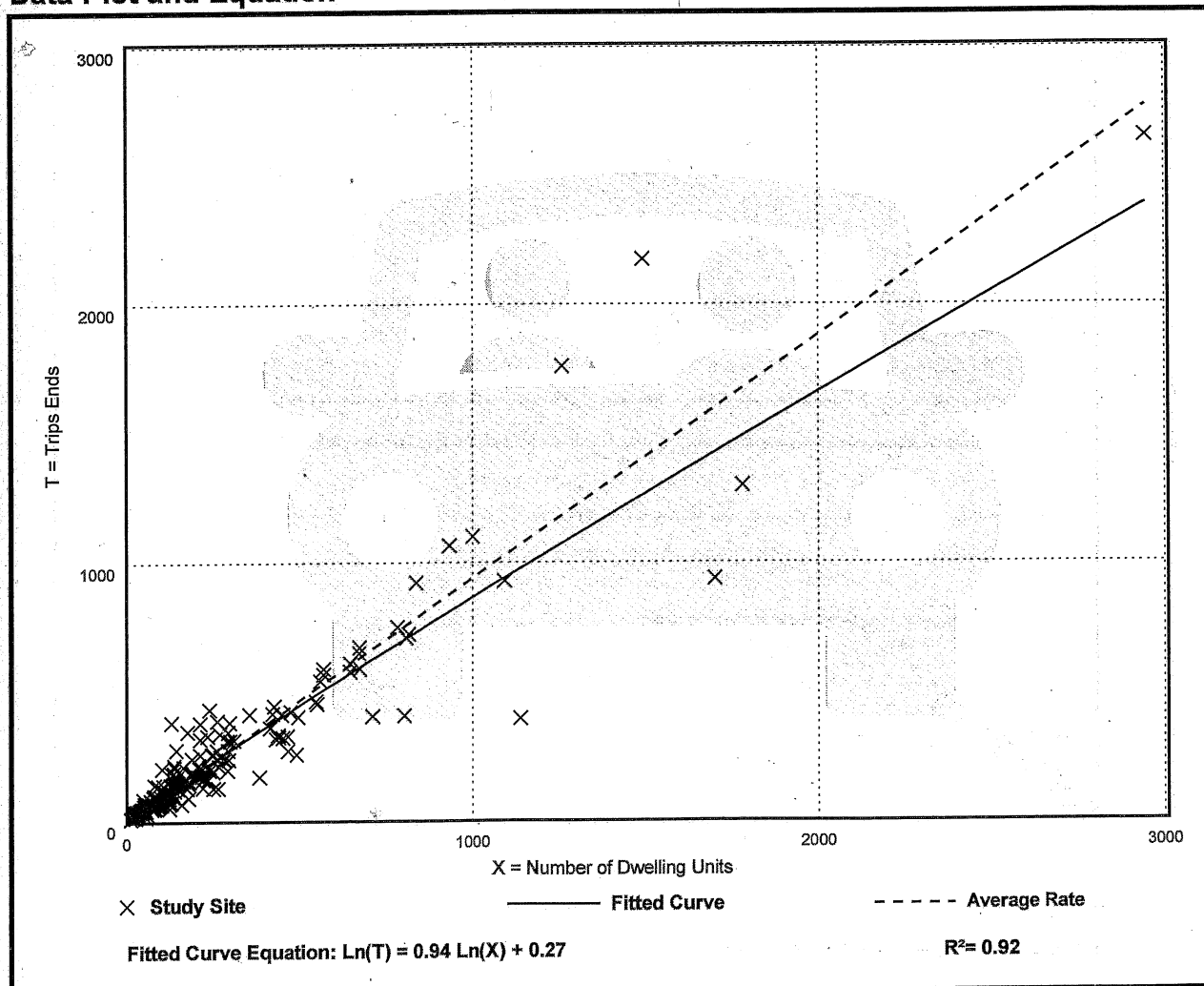
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 0.94         | 0.35 - 2.98    | 0.31               |

## Data Plot and Equation



# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday

Setting/Location: General Urban/Suburban

Number of Studies: 63

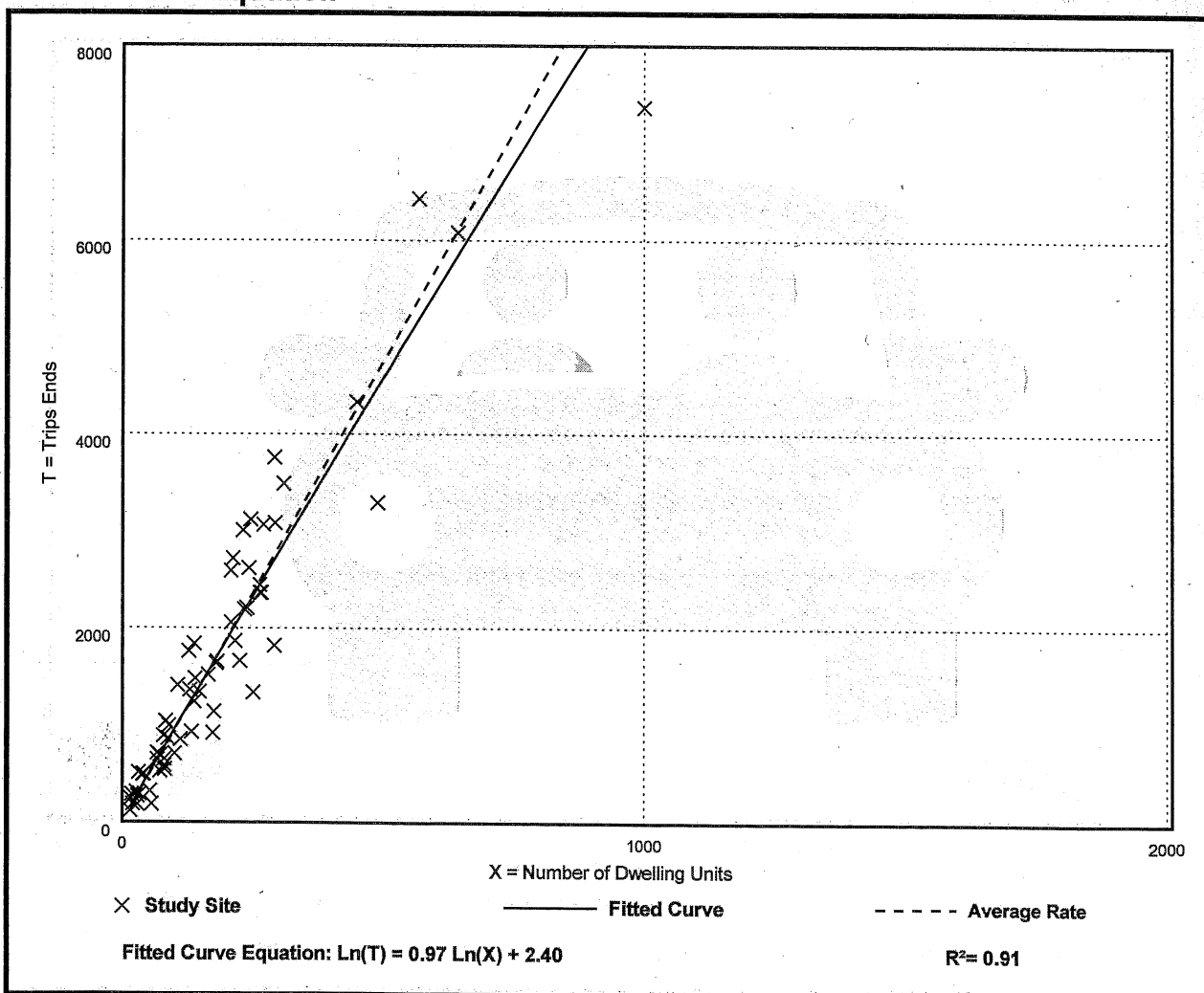
Avg. Num. of Dwelling Units: 179

Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 9.48         | 3.36 - 16.52   | 2.26               |

## Data Plot and Equation



# **DRAINAGE ANALYSIS**

**EMERSON RIDGE  
TAX MAP N, LOT 13-1**

**Oak Street  
Dover, New Hampshire  
Strafford County**

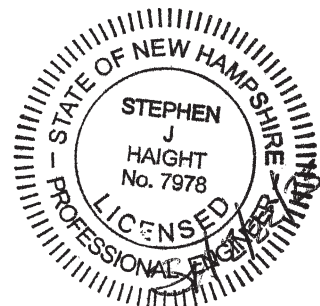
**February 2023**

**Prepared For:**

**Chinburg Development, LLC  
3 Penstock Way  
Newmarket, NH 03857**

**Prepared By:**

**Civilworks NE  
PO Box 1166  
181 Watson Road  
Dover, NH 03820**



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## 1.0 INTRODUCTION

This is a hydrologic analysis of the subject parcel located on Oak Street in Dover, NH. The 34.53± acre lot is identified as Tax Map N, Lot 13-1. This hydrologic analysis only includes the development area (28.630 ac.). The analysis ends at the large wetlands located on-site and on the abutting property. The site is undeveloped, and the groundcover primarily consists of grassed fields and wooded vegetation. Emerson Brook flows through the southeast section of the parcel, approximately 600' from the proposed development. A majority of the parcel drains to the south/southeast while a small portion of the site along Oak Street drains to the north. All drainage from the site discharges to a large inter-connected wetlands that ultimately drains to Emerson Brook. The site is bounded by the Fresh Creek Road and Old Oak Street right-of-way to the north, developed and undeveloped residential lots to the east, developed residential lots and Gulf Road to the south, and Oak Street to the west.

To effectively analyze the pre development conditions, the 34.53± acre parcel has been subdivided into three (3) watersheds. The three watersheds are identified as discharge points A, B, and C. Watersheds A, B, and C drain from a localized high point located on-site. Watershed A drains to the north westerly corner of the site adjacent to Oak Street. Watershed B drains south and south westerly towards the interconnected wetlands. Watershed C drains south and south easterly towards the interconnected wetlands which ultimately drains to Emerson Brook.

The project proposes ±850 LF of roadway for the construction of seven (7) single family house lots, on-site mail kiosks, drainage improvements and utility construction. The proposed drainage system incorporates two (2) bio-retention basins, and one (1) detention pond. Closed and open drainage systems consisting of pipes, catch basins, swales, and existing drainage swales, are utilized for the conveyance of post condition stormwater. The proposed development incorporates outlet protection at all outlets of drainage structures to mitigate flow velocities. The proposed stormwater drainage structures (catch basins, pipes, basins, outlet structures, energy dissipation, etc.) will be maintained by the project proponent as outlined within the Stormwater Management System Inspection & Maintenance Manual (Stormwater I&M Manual) in Appendix C.

Post development analyzes runoff to the same three (3) discharge points as the pre-development model (Watersheds A, B, and C). Watershed C is further divided into eight (8) subcatchments to model the proposed stormwater drainage system. This provides a direct comparison to the pre-development model. This analysis indicates that the proposed stormwater measures and stormwater management plan will treat and mitigate runoff in accordance with ENV-Wq 1500 of the New Hampshire Code of Administrative Rules and the City of Dover's Subdivision Regulations. The proposed development of the site in conjunction with the implementation of the Stormwater I&M Manual will have minimal impact on the watersheds.

## 2.0 DRAINAGE ANALYSIS

A comprehensive hydrologic study of this site has been performed utilizing nationally recognized runoff estimating techniques developed by the USDA, Soil Conservation Services (SCS). The technique and runoff models are described in various SCS publications and references as follows:

“Stormwater Management and Erosion Sediment Control Handbook for Urban and Developing Areas in New Hampshire”

“New Hampshire Stormwater Manual Volume 2 - Post-Construction Best Management Practices Selection & Design”

“Civil Engineering Reference Manual, Fifth Edition”

“Open-Channel Hydraulics” Chow.

“Stormwater Modeling System” HydroCAD Ver. 10.10

## 2.1 DRAINAGE DESIGN PARAMETERS

A brief review of the procedures and parameters used in the drainage study follows:

### 2.1.1 Watersheds

The watersheds and sub-catchment areas were delineated using wetland data provided by Damon E. Burt, Wetland Scientist (CWS) #163 on August 28, 2021, and field located by McEneaney Survey Associates of New England.

### 2.1.2 Soils

Soil types were determined utilizing the NRCS Web Soil Survey (WSS) mapping tool at <http://websoilsurvey.nrcs.usda.gov>.

#### Hydrologic Drainage Class A:

| Map Unit Symbol | Slopes          | Map Unit Name           |
|-----------------|-----------------|-------------------------|
| WfC             | 8 to 15 percent | Windsor Loamy Fine Sand |

#### Hydrologic Drainage Class C:

| Map Unit Symbol | Slopes         | Map Unit Name    |
|-----------------|----------------|------------------|
| BzB             | 3 to 8 percent | Buxton Silt Loam |

ScA

0 to 3 percent

Scantic Silt Loam

#### Hydrologic Drainage Class D:

| Map Unit Symbol | Slopes          | Map Unit Name                               |
|-----------------|-----------------|---------------------------------------------|
| HcB             | 3 to 8 percent  | Hollis-Charlton Fine Sandy Loams            |
| HcC             | 8 to 15 percent | Hollis-Charlton Fine Sandy Loams            |
| HdB             | 3 to 8 percent  | Hollis-Charlton Very Rocky Fine Sandy Loams |
| HdC             | 8 to 15 percent | Hollis-Charlton Very Rocky Fine Sandy Loams |
| HdD             | 8 to 15 percent | Hollis-Charlton Very Rocky Fine Sandy Loams |

#### 2.1.3 Rainfall Data

Extreme precipitation estimate values from the Northeast Regional Climate Center were utilized in this analysis. The analysis has been performed for the 2-year, 10-year, 25-year, and 50-year storm events with 3.16", 4.76", 6.02", and 7.19" rainfall depths respectively.

#### 2.1.4 Runoff Curve Numbers

The SCS runoff curve numbers were used and are summarized within each sub-catchment drainage summary in Appendix A.

## 2.2 EXISTING CONDITIONS

For purposes of this analysis, the subject parcel was analyzed with three (3) discharge points (Watershed A, B, and C).

#### 2.2.1 Table A – Existing Conditions (2, 10, 25, and 50-year storm events)

| Watershed       | Pre-Development Volume (af) | Pre Development Peak Flows (cfs) |              |              |              |
|-----------------|-----------------------------|----------------------------------|--------------|--------------|--------------|
| Discharge Point | <u>2-yr</u>                 | <u>2-yr</u>                      | <u>10-yr</u> | <u>25-yr</u> | <u>50-yr</u> |
| A               | 0.06                        | 0.5                              | 1.0          | 1.3          | 1.6          |
| B               | 0.52                        | 6.1                              | 12.4         | 17.7         | 22.2         |
| C               | 2.12                        | 11.8                             | 22.9         | 31.9         | 39.8         |

## 2.3 DEVELOPED CONDITIONS

The post development analyzes runoff to the same three (3) discharge points as the pre-development model (Watershed A, B, and C).

2.3.1 Table B – Developed Conditions (2, 10, 25, and 50-year storm events)

| <b>Watershed</b> | <b>Post-Development Volume (af)</b> | <b>Post Development Peak Flows (cfs)</b> |                     |                     |                     |
|------------------|-------------------------------------|------------------------------------------|---------------------|---------------------|---------------------|
| Discharge Point  | <u><b>2-yr</b></u>                  | <u><b>2-yr</b></u>                       | <u><b>10-yr</b></u> | <u><b>25-yr</b></u> | <u><b>50-yr</b></u> |
| A                | 0.01                                | 0.1                                      | 0.1                 | 0.2                 | 0.2                 |
| B                | 0.52                                | 6.0                                      | 12.3                | 17.5                | 22.0                |
| C                | 2.32                                | 11.0                                     | 22.4                | 31.4                | 39.0                |

## 2.4 HYDROLOGIC COMPARISON

The analysis indicates that the proposed project will have negligible impact on the watershed.

2.4.1 Table C – Pre/Post Development Comparison (2, 10, 25, and 50-year storm events)

| <b>Watershed</b> | <b>Pre/Post-Development Volume (af)</b> | <b>Pre/Post Development Peak Flows (cfs)</b> |                     |                     |                     |
|------------------|-----------------------------------------|----------------------------------------------|---------------------|---------------------|---------------------|
| Discharge Point  | <u><b>2-yr</b></u>                      | <u><b>2-yr</b></u>                           | <u><b>10-yr</b></u> | <u><b>25-yr</b></u> | <u><b>50-yr</b></u> |
| A                | 0.06/ <b>0.01</b>                       | 0.5/ <b>0.1</b>                              | 1.0/ <b>0.1</b>     | 1.3/ <b>0.2</b>     | 1.6/ <b>0.2</b>     |
| B                | 0.52/ <b>0.52</b>                       | 6.1/ <b>6.0</b>                              | 12.4/ <b>12.3</b>   | 17.7/ <b>17.5</b>   | 22.2/ <b>22.0</b>   |
| C                | 2.12/ <b>2.32</b>                       | 11.8/ <b>11.0</b>                            | 22.9/ <b>22.4</b>   | 31.9/ <b>39.4</b>   | 39.8/ <b>39.0</b>   |

## 2.5 STORMWATER DESIGN

The project incorporates best management practices to mitigate runoff as well as treat and convey stormwater.

### 2.5.1 Stormwater Best Management Practices

The project incorporates two bio-retention basins to mitigate flow and water quality from the proposed development. Pre-treatment for the bio-retention basins includes a sediment forebay and a grassed pre-treatment swale.

#### 2.5.2 Pollutant Removal

The site stormwater design captures 100% of the proposed onsite impervious area and directs it to the best management practices that provide pollutant removal. The project incorporates the following practices and associated pollutant removal efficacies as identified in the New Hampshire Stormwater Management Manual Volume 1, Appendix E:

|                      | TSS | TN  | TP  |
|----------------------|-----|-----|-----|
| Bio-Retention Basin: | 90% | 65% | 65% |

The pollutant removal meets or exceeds The City of Dover's, Site Review Regulations.

#### 2.5.3 Outlet Protection

BMP's, conveyance structures, and outlet protection have been sized to convey the 25-year, 24 hour storm event. All proposed rip-rap applications shall consist of min. d50 = 6" stone with a stone layer thickness of 12" (min) on a filter fabric layer over a 6" thick (min) gravel base. See the plan set for rip-rap locations and the drainage details for additional information.

# APPENDIX A

## HYDROLOGIC CALCULATIONS

Select Product ?

Extreme Precipitation  
Tables - HTML ?

Extreme Precipitation  
Tables - Text/CSV ?

Partial Duration Series -  
by Point ?

Partial Duration Series -  
by Station ?

Distribution Curves -  
Graphical ?

Distribution Curves -  
Text/TBL ?

Intensity Frequency  
Duration Graphs ?

Precipitation Frequency  
Duration Graphs ?

GIS Data Files ?

Regional/State Maps ?

Select Location ? Double-click the map to place a marker, or enter address or latitude/longitude.

Locate by Address ?

Locate by Lat/Lon ?

Locate by State/County ?

Select Options ?

Smoothing ?

Delivery ?

Submit ?

# Extreme Precipitation Tables

## Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

|                  |                                 |
|------------------|---------------------------------|
| <b>Smoothing</b> | No                              |
| <b>State</b>     | New Hampshire                   |
| <b>Location</b>  |                                 |
| <b>Longitude</b> | 70.857 degrees West             |
| <b>Latitude</b>  | 43.203 degrees North            |
| <b>Elevation</b> | 0 feet                          |
| <b>Date/Time</b> | Tue, 26 Jul 2022 12:02:42 -0400 |

## Extreme Precipitation Estimates

|              | 5min | 10min | 15min | 30min | 60min | 120min |              | 1hr  | 2hr  | 3hr  | 6hr  | 12hr | 24hr  | 48hr  |              | 1day  | 2day  | 4day  | 7day  | 10day |              |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|------|-------|-------|--------------|-------|-------|-------|-------|-------|--------------|
| <b>1yr</b>   | 0.26 | 0.40  | 0.49  | 0.66  | 0.81  | 1.00   | <b>1yr</b>   | 0.70 | 0.98 | 1.13 | 1.58 | 2.02 | 2.61  | 2.88  | <b>1yr</b>   | 2.31  | 2.77  | 3.17  | 3.90  | 4.46  | <b>1yr</b>   |
| <b>2yr</b>   | 0.32 | 0.49  | 0.61  | 0.82  | 1.02  | 1.20   | <b>2yr</b>   | 0.88 | 1.17 | 1.39 | 1.86 | 2.41 | 3.16  | 3.53  | <b>2yr</b>   | 2.80  | 3.39  | 3.88  | 4.62  | 5.26  | <b>2yr</b>   |
| <b>5yr</b>   | 0.37 | 0.57  | 0.70  | 0.97  | 1.23  | 1.48   | <b>5yr</b>   | 1.06 | 1.45 | 1.72 | 2.32 | 2.96 | 3.99  | 4.52  | <b>5yr</b>   | 3.53  | 4.34  | 4.97  | 5.83  | 6.59  | <b>5yr</b>   |
| <b>10yr</b>  | 0.41 | 0.64  | 0.79  | 1.10  | 1.42  | 1.74   | <b>10yr</b>  | 1.23 | 1.70 | 2.02 | 2.73 | 3.47 | 4.76  | 5.45  | <b>10yr</b>  | 4.22  | 5.24  | 5.99  | 6.96  | 7.82  | <b>10yr</b>  |
| <b>25yr</b>  | 0.49 | 0.74  | 0.92  | 1.32  | 1.73  | 2.15   | <b>25yr</b>  | 1.49 | 2.10 | 2.51 | 3.39 | 4.28 | 6.02  | 6.99  | <b>25yr</b>  | 5.33  | 6.72  | 7.68  | 8.80  | 9.82  | <b>25yr</b>  |
| <b>50yr</b>  | 0.55 | 0.83  | 1.04  | 1.49  | 2.01  | 2.52   | <b>50yr</b>  | 1.74 | 2.47 | 2.95 | 3.99 | 5.01 | 7.19  | 8.44  | <b>50yr</b>  | 6.36  | 8.12  | 9.26  | 10.51 | 11.67 | <b>50yr</b>  |
| <b>100yr</b> | 0.62 | 0.94  | 1.18  | 1.71  | 2.34  | 2.97   | <b>100yr</b> | 2.02 | 2.90 | 3.48 | 4.71 | 5.88 | 8.59  | 10.20 | <b>100yr</b> | 7.60  | 9.81  | 11.18 | 12.56 | 13.87 | <b>100yr</b> |
| <b>200yr</b> | 0.71 | 1.06  | 1.35  | 1.95  | 2.72  | 3.49   | <b>200yr</b> | 2.35 | 3.42 | 4.10 | 5.56 | 6.89 | 10.26 | 12.33 | <b>200yr</b> | 9.08  | 11.85 | 13.50 | 15.02 | 16.49 | <b>200yr</b> |
| <b>500yr</b> | 0.84 | 1.25  | 1.61  | 2.34  | 3.33  | 4.34   | <b>500yr</b> | 2.88 | 4.24 | 5.09 | 6.93 | 8.52 | 12.99 | 15.84 | <b>500yr</b> | 11.50 | 15.23 | 17.32 | 19.03 | 20.75 | <b>500yr</b> |

## Lower Confidence Limits

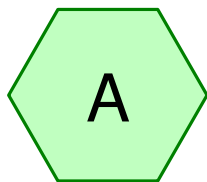
|              | 5min | 10min | 15min | 30min | 60min | 120min |              | 1hr  | 2hr  | 3hr  | 6hr  | 12hr | 24hr | 48hr  |              | 1day | 2day  | 4day  | 7day  | 10day |              |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|------|------|-------|--------------|------|-------|-------|-------|-------|--------------|
| <b>1yr</b>   | 0.24 | 0.37  | 0.45  | 0.60  | 0.74  | 0.89   | <b>1yr</b>   | 0.64 | 0.87 | 0.92 | 1.26 | 1.58 | 2.18 | 2.44  | <b>1yr</b>   | 1.93 | 2.35  | 2.86  | 3.37  | 4.02  | <b>1yr</b>   |
| <b>2yr</b>   | 0.31 | 0.49  | 0.60  | 0.81  | 1.00  | 1.18   | <b>2yr</b>   | 0.86 | 1.16 | 1.36 | 1.83 | 2.35 | 3.05 | 3.41  | <b>2yr</b>   | 2.70 | 3.28  | 3.76  | 4.48  | 5.05  | <b>2yr</b>   |
| <b>5yr</b>   | 0.35 | 0.54  | 0.67  | 0.91  | 1.16  | 1.40   | <b>5yr</b>   | 1.00 | 1.37 | 1.61 | 2.14 | 2.77 | 3.72 | 4.13  | <b>5yr</b>   | 3.29 | 3.97  | 4.64  | 5.42  | 6.12  | <b>5yr</b>   |
| <b>10yr</b>  | 0.38 | 0.59  | 0.73  | 1.02  | 1.31  | 1.60   | <b>10yr</b>  | 1.13 | 1.57 | 1.81 | 2.43 | 3.12 | 4.27 | 4.79  | <b>10yr</b>  | 3.78 | 4.60  | 5.33  | 6.24  | 7.01  | <b>10yr</b>  |
| <b>25yr</b>  | 0.44 | 0.66  | 0.83  | 1.18  | 1.55  | 1.91   | <b>25yr</b>  | 1.34 | 1.87 | 2.11 | 2.83 | 3.63 | 4.88 | 5.78  | <b>25yr</b>  | 4.32 | 5.56  | 6.49  | 7.53  | 8.40  | <b>25yr</b>  |
| <b>50yr</b>  | 0.48 | 0.73  | 0.91  | 1.31  | 1.76  | 2.19   | <b>50yr</b>  | 1.52 | 2.14 | 2.35 | 3.17 | 4.07 | 5.55 | 6.65  | <b>50yr</b>  | 4.91 | 6.40  | 7.53  | 8.67  | 9.63  | <b>50yr</b>  |
| <b>100yr</b> | 0.54 | 0.81  | 1.01  | 1.47  | 2.01  | 2.51   | <b>100yr</b> | 1.73 | 2.45 | 2.63 | 3.55 | 4.54 | 6.30 | 7.65  | <b>100yr</b> | 5.57 | 7.36  | 8.73  | 9.99  | 11.02 | <b>100yr</b> |
| <b>200yr</b> | 0.59 | 0.89  | 1.13  | 1.64  | 2.29  | 2.87   | <b>200yr</b> | 1.97 | 2.81 | 2.93 | 3.97 | 5.06 | 7.13 | 8.80  | <b>200yr</b> | 6.31 | 8.47  | 10.10 | 11.52 | 12.63 | <b>200yr</b> |
| <b>500yr</b> | 0.69 | 1.03  | 1.32  | 1.92  | 2.73  | 3.45   | <b>500yr</b> | 2.36 | 3.38 | 3.39 | 4.58 | 5.85 | 8.39 | 10.58 | <b>500yr</b> | 7.43 | 10.17 | 12.24 | 13.92 | 15.08 | <b>500yr</b> |

## Upper Confidence Limits

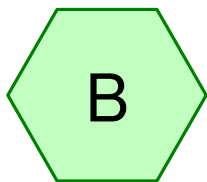
|              | 5min | 10min | 15min | 30min | 60min | 120min |              | 1hr  | 2hr  | 3hr  | 6hr  | 12hr  | 24hr  | 48hr  |              | 1day  | 2day  | 4day  | 7day  | 10day |              |
|--------------|------|-------|-------|-------|-------|--------|--------------|------|------|------|------|-------|-------|-------|--------------|-------|-------|-------|-------|-------|--------------|
| <b>1yr</b>   | 0.28 | 0.43  | 0.53  | 0.71  | 0.87  | 1.08   | <b>1yr</b>   | 0.75 | 1.05 | 1.24 | 1.74 | 2.21  | 2.90  | 3.11  | <b>1yr</b>   | 2.57  | 2.99  | 3.47  | 4.26  | 4.85  | <b>1yr</b>   |
| <b>2yr</b>   | 0.33 | 0.51  | 0.63  | 0.85  | 1.04  | 1.25   | <b>2yr</b>   | 0.90 | 1.22 | 1.48 | 1.96 | 2.51  | 3.32  | 3.66  | <b>2yr</b>   | 2.94  | 3.52  | 4.03  | 4.78  | 5.49  | <b>2yr</b>   |
| <b>5yr</b>   | 0.39 | 0.61  | 0.75  | 1.03  | 1.31  | 1.59   | <b>5yr</b>   | 1.13 | 1.55 | 1.86 | 2.50 | 3.21  | 4.26  | 4.90  | <b>5yr</b>   | 3.77  | 4.71  | 5.31  | 6.28  | 7.04  | <b>5yr</b>   |
| <b>10yr</b>  | 0.46 | 0.70  | 0.87  | 1.22  | 1.58  | 1.93   | <b>10yr</b>  | 1.36 | 1.88 | 2.24 | 3.05 | 3.87  | 5.23  | 6.13  | <b>10yr</b>  | 4.63  | 5.89  | 6.75  | 7.71  | 8.59  | <b>10yr</b>  |
| <b>25yr</b>  | 0.56 | 0.85  | 1.06  | 1.51  | 1.99  | 2.49   | <b>25yr</b>  | 1.71 | 2.43 | 2.89 | 3.97 | 4.98  | 7.15  | 8.25  | <b>25yr</b>  | 6.33  | 7.93  | 9.07  | 10.16 | 11.20 | <b>25yr</b>  |
| <b>50yr</b>  | 0.65 | 0.98  | 1.22  | 1.76  | 2.37  | 3.01   | <b>50yr</b>  | 2.05 | 2.94 | 3.51 | 4.84 | 6.06  | 8.84  | 10.35 | <b>50yr</b>  | 7.82  | 9.95  | 11.37 | 12.50 | 13.70 | <b>50yr</b>  |
| <b>100yr</b> | 0.75 | 1.14  | 1.43  | 2.06  | 2.83  | 3.64   | <b>100yr</b> | 2.44 | 3.56 | 4.26 | 5.93 | 7.38  | 10.93 | 12.99 | <b>100yr</b> | 9.67  | 12.49 | 14.24 | 15.41 | 16.76 | <b>100yr</b> |
| <b>200yr</b> | 0.88 | 1.32  | 1.67  | 2.42  | 3.37  | 4.42   | <b>200yr</b> | 2.91 | 4.32 | 5.18 | 7.26 | 8.97  | 13.55 | 16.31 | <b>200yr</b> | 11.99 | 15.69 | 17.87 | 18.99 | 20.53 | <b>200yr</b> |
| <b>500yr</b> | 1.07 | 1.60  | 2.06  | 2.99  | 4.25  | 5.68   | <b>500yr</b> | 3.67 | 5.55 | 6.70 | 9.50 | 11.66 | 18.01 | 22.06 | <b>500yr</b> | 15.94 | 21.22 | 24.13 | 25.05 | 26.87 | <b>500yr</b> |

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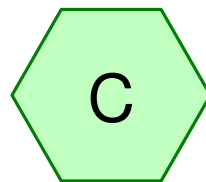
## EXISTING WATERSHEDS



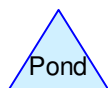
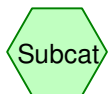
A



B



C



**Routing Diagram for 21074 - Pre**

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## 21074 - Pre

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Page 2

### Area Listing (all nodes)

| Area<br>(acres) | CN        | Description<br>(subcatchment-numbers)   |
|-----------------|-----------|-----------------------------------------|
| 1.656           | 39        | >75% Grass cover, Good, HSG A (B, C)    |
| 3.559           | 74        | >75% Grass cover, Good, HSG C (B, C)    |
| 14.155          | 80        | >75% Grass cover, Good, HSG D (A, B, C) |
| 0.015           | 96        | Gravel surface, HSG D (A)               |
| 0.373           | 98        | Paved parking, HSG D (A, B, C)          |
| 0.005           | 30        | Woods, Good, HSG A (B)                  |
| 0.685           | 70        | Woods, Good, HSG C (C)                  |
| 8.182           | 77        | Woods, Good, HSG D (A, B, C)            |
| <b>28.630</b>   | <b>76</b> | <b>TOTAL AREA</b>                       |

## 21074 - Pre

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Page 3

### Soil Listing (all nodes)

| Area<br>(acres) | Soil<br>Group | Subcatchment<br>Numbers |
|-----------------|---------------|-------------------------|
| 1.661           | HSG A         | B, C                    |
| 0.000           | HSG B         |                         |
| 4.244           | HSG C         | B, C                    |
| 22.725          | HSG D         | A, B, C                 |
| 0.000           | Other         |                         |
| <b>28.630</b>   |               | <b>TOTAL AREA</b>       |

A - 1

NODE LISTING - 2-YR

**21074 - Pre****21074 24-hr S1 2-yr Rainfall=3.16"**

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Page 1

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 A: A**

Runoff Area=23,582 sf 12.14% Impervious Runoff Depth=1.37"

Flow Length=388' Tc=16.0 min CN=80 Runoff=0.5 cfs 0.06 af

**Subcatchment B: B**

Runoff Area=286,514 sf 3.29% Impervious Runoff Depth=0.96"

Flow Length=629' Tc=7.5 min CN=73 Runoff=6.1 cfs 0.52 af

**Subcatchment C: C**

Runoff Area=937,040 sf 0.42% Impervious Runoff Depth=1.18"

Flow Length=1,646' Tc=37.5 min CN=77 Runoff=11.8 cfs 2.12 af

**Total Runoff Area = 28.630 ac Runoff Volume = 2.71 af Average Runoff Depth = 1.13"****98.70% Pervious = 28.258 ac 1.30% Impervious = 0.373 ac**

A - 1

NODE LISTING - 10-YR

**21074 - Pre****21074 24-hr S1 10-yr Rainfall=4.76"**

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Page 2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 A: A**

Runoff Area=23,582 sf 12.14% Impervious Runoff Depth=2.68"  
Flow Length=388' Tc=16.0 min CN=80 Runoff=1.0 cfs 0.12 af

**Subcatchment B: B**

Runoff Area=286,514 sf 3.29% Impervious Runoff Depth=2.09"  
Flow Length=629' Tc=7.5 min CN=73 Runoff=12.4 cfs 1.15 af

**Subcatchment C: C**

Runoff Area=937,040 sf 0.42% Impervious Runoff Depth=2.42"  
Flow Length=1,646' Tc=37.5 min CN=77 Runoff=22.9 cfs 4.34 af

**Total Runoff Area = 28.630 ac Runoff Volume = 5.61 af Average Runoff Depth = 2.35"**  
**98.70% Pervious = 28.258 ac 1.30% Impervious = 0.373 ac**

A - 1

## 10-YR STORM SUMMARY

**Summary for Subcatchment A: A**

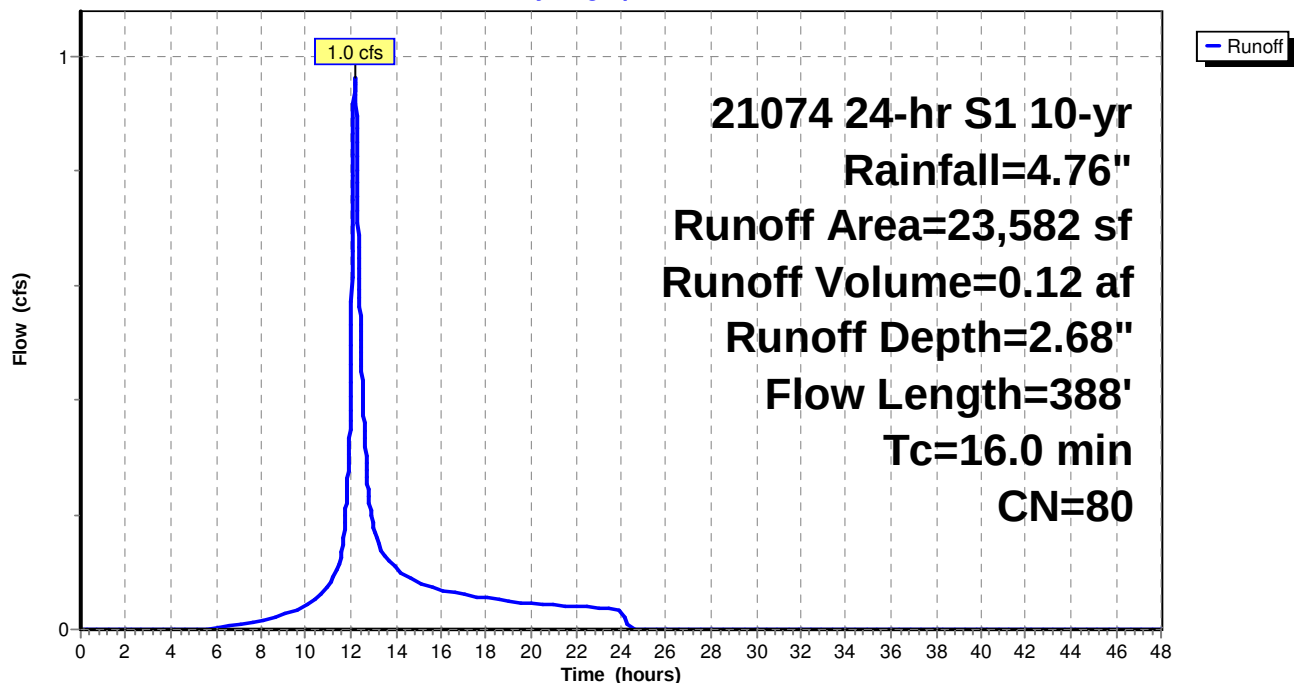
Runoff = 1.0 cfs @ 12.18 hrs, Volume= 0.12 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 18,969    | 77 | Woods, Good, HSG D            |
| 1,115     | 80 | >75% Grass cover, Good, HSG D |
| 634       | 96 | Gravel surface, HSG D         |
| 2,864     | 98 | Paved parking, HSG D          |
| 23,582    | 80 | Weighted Average              |
| 20,718    |    | 87.86% Pervious Area          |
| 2,864     |    | 12.14% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                               |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------|
| 8.0      | 60            | 0.0330        | 0.12              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"     |
| 0.6      | 94            | 0.2340        | 2.42              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 7.4      | 234           | 0.0110        | 0.52              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps |
| 16.0     | 388           | Total         |                   |                |                                                           |

**Subcatchment A: A****Hydrograph**

**Summary for Subcatchment B: B**

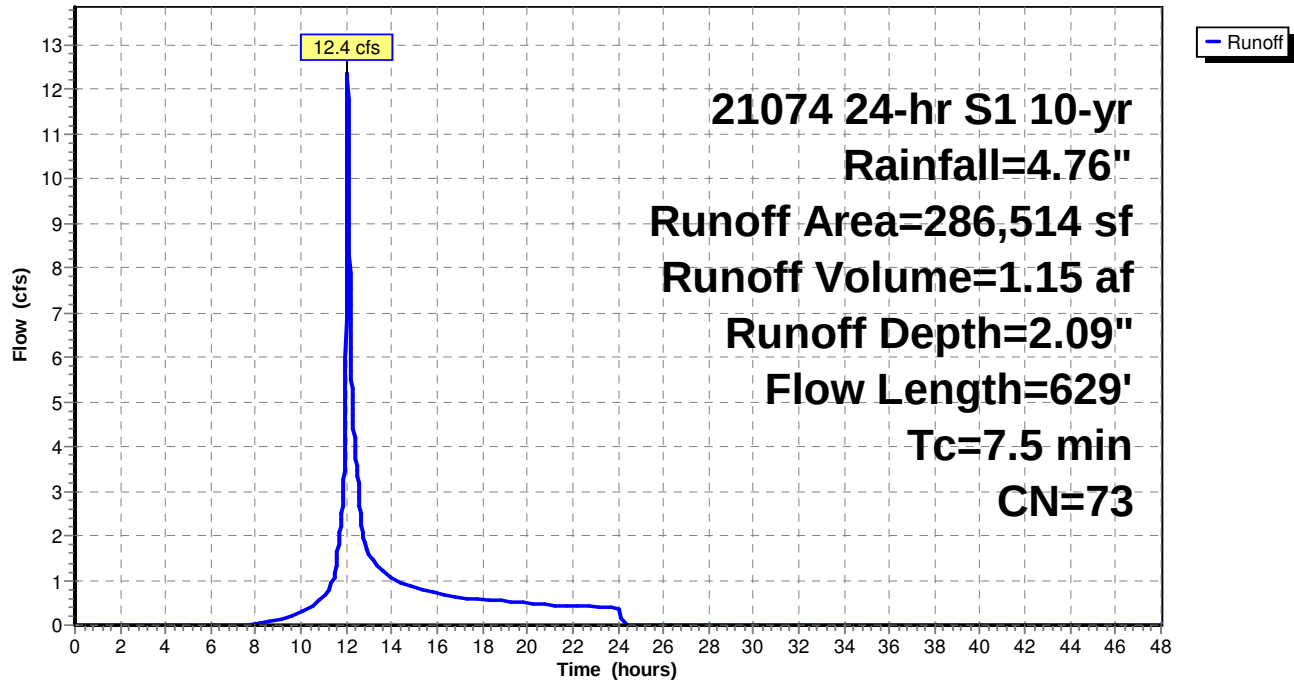
Runoff = 12.4 cfs @ 12.06 hrs, Volume= 1.15 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 233       | 30 | Woods, Good, HSG A            |
| 47,498    | 39 | >75% Grass cover, Good, HSG A |
| 837       | 74 | >75% Grass cover, Good, HSG C |
| 64,775    | 77 | Woods, Good, HSG D            |
| 163,743   | 80 | >75% Grass cover, Good, HSG D |
| 9,428     | 98 | Paved parking, HSG D          |
| 286,514   | 73 | Weighted Average              |
| 277,086   |    | 96.71% Pervious Area          |
| 9,428     |    | 3.29% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 2.4      | 48            | 0.4170        | 0.33              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 2.3      | 21            | 0.0950        | 0.15              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 1.5      | 256           | 0.1560        | 2.76              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 1.3      | 304           | 0.0657        | 3.84              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps   |
| 7.5      | 629           | Total         |                   |                |                                                                      |

**Subcatchment B: B****Hydrograph**

**Summary for Subcatchment C: C**

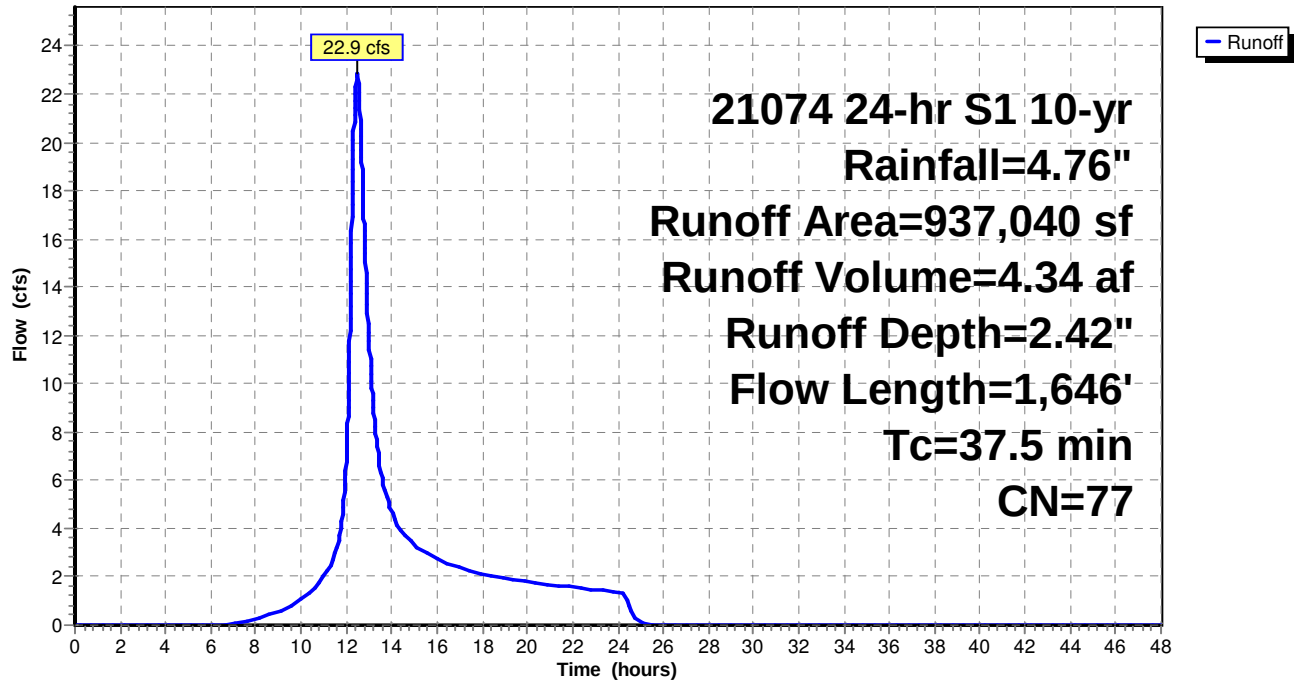
Runoff = 22.9 cfs @ 12.46 hrs, Volume= 4.34 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 24,637    | 39 | >75% Grass cover, Good, HSG A |
| 29,844    | 70 | Woods, Good, HSG C            |
| 154,195   | 74 | >75% Grass cover, Good, HSG C |
| 272,680   | 77 | Woods, Good, HSG D            |
| 451,737   | 80 | >75% Grass cover, Good, HSG D |
| 3,947     | 98 | Paved parking, HSG D          |
| 937,040   | 77 | Weighted Average              |
| 933,093   |    | 99.58% Pervious Area          |
| 3,947     |    | 0.42% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 7.2      | 55            | 0.0360        | 0.13              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 4.3      | 45            | 0.0880        | 0.17              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 3.1      | 430           | 0.1070        | 2.29              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 0.9      | 180           | 0.0550        | 3.52              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps   |
| 4.1      | 308           | 0.0324        | 1.26              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 17.9     | 628           | 0.0070        | 0.59              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 37.5     | 1,646         | Total         |                   |                |                                                                      |

**Subcatchment C: C****Hydrograph**

A - 1

NODE LISTING - 25-YR

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 A: A**

Runoff Area=23,582 sf 12.14% Impervious Runoff Depth=3.80"  
Flow Length=388' Tc=16.0 min CN=80 Runoff=1.3 cfs 0.17 af

**Subcatchment B: B**

Runoff Area=286,514 sf 3.29% Impervious Runoff Depth=3.11"  
Flow Length=629' Tc=7.5 min CN=73 Runoff=17.7 cfs 1.70 af

**Subcatchment C: C**

Runoff Area=937,040 sf 0.42% Impervious Runoff Depth=3.50"  
Flow Length=1,646' Tc=37.5 min CN=77 Runoff=31.9 cfs 6.27 af

**Total Runoff Area = 28.630 ac Runoff Volume = 8.14 af Average Runoff Depth = 3.41"**  
**98.70% Pervious = 28.258 ac 1.30% Impervious = 0.373 ac**

A - 1

NODE LISTING - 50-YR

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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 A: A**

Runoff Area=23,582 sf 12.14% Impervious Runoff Depth=4.87"  
Flow Length=388' Tc=16.0 min CN=80 Runoff=1.6 cfs 0.22 af

**Subcatchment B: B**

Runoff Area=286,514 sf 3.29% Impervious Runoff Depth=4.10"  
Flow Length=629' Tc=7.5 min CN=73 Runoff=22.2 cfs 2.25 af

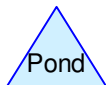
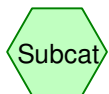
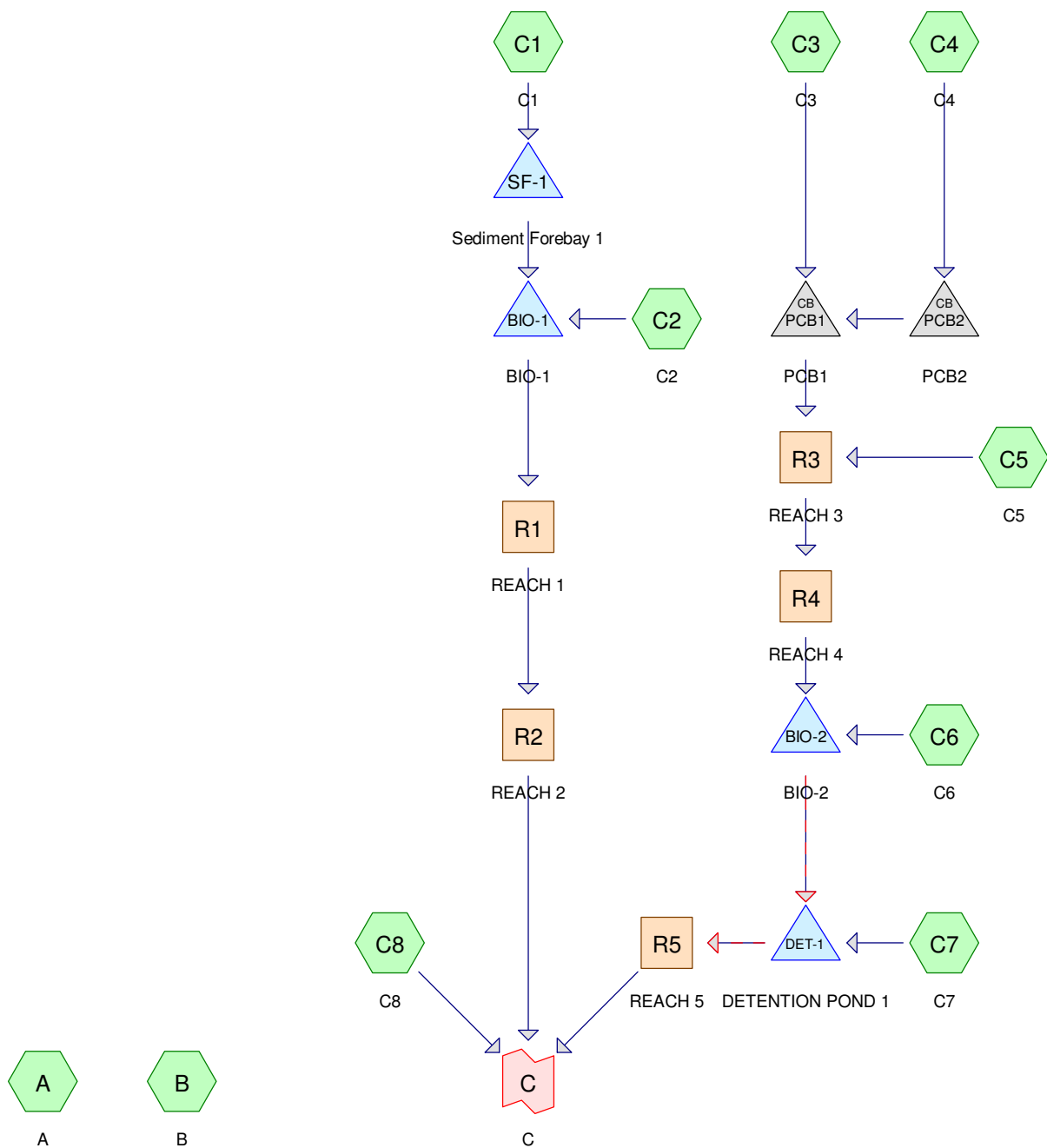
**Subcatchment C: C**

Runoff Area=937,040 sf 0.42% Impervious Runoff Depth=4.54"  
Flow Length=1,646' Tc=37.5 min CN=77 Runoff=39.8 cfs 8.13 af

**Total Runoff Area = 28.630 ac Runoff Volume = 10.60 af Average Runoff Depth = 4.44"**  
**98.70% Pervious = 28.258 ac 1.30% Impervious = 0.373 ac**

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## DEVELOPED WATERSHEDS



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### Area Listing (all nodes)

| Area<br>(acres) | CN        | Description<br>(subcatchment-numbers)                                |
|-----------------|-----------|----------------------------------------------------------------------|
| 1.656           | 39        | >75% Grass cover, Good, HSG A (B, C8)                                |
| 3.559           | 74        | >75% Grass cover, Good, HSG C (B, C8)                                |
| 14.619          | 80        | >75% Grass cover, Good, HSG D (A, B, C1, C2, C3, C4, C5, C6, C7, C8) |
| 1.170           | 98        | Paved parking, HSG D (A, B, C1, C3, C4, C5)                          |
| 0.377           | 98        | Roofs, HSG D (C3, C4, C5)                                            |
| 0.005           | 30        | Woods, Good, HSG A (B)                                               |
| 0.685           | 70        | Woods, Good, HSG C (C8)                                              |
| 6.558           | 77        | Woods, Good, HSG D (A, B, C5, C8)                                    |
| <b>28.630</b>   | <b>77</b> | <b>TOTAL AREA</b>                                                    |

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### Soil Listing (all nodes)

| Area<br>(acres) | Soil<br>Group | Subcatchment<br>Numbers              |
|-----------------|---------------|--------------------------------------|
| 1.661           | HSG A         | B, C8                                |
| 0.000           | HSG B         |                                      |
| 4.244           | HSG C         | B, C8                                |
| 22.725          | HSG D         | A, B, C1, C2, C3, C4, C5, C6, C7, C8 |
| 0.000           | Other         |                                      |
| <b>28.630</b>   |               | <b>TOTAL AREA</b>                    |

A – 2

NODE LISTING – 2-YR

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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

|                            |                                                                                                                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment A: A</b>   | Runoff Area=1,855 sf 50.40% Impervious Runoff Depth=1.96"<br>Flow Length=38' Slope=0.1180 '/' Tc=6.0 min CN=88 Runoff=0.1 cfs 0.01 af     |
| <b>Subcatchment B: B</b>   | Runoff Area=284,057 sf 3.32% Impervious Runoff Depth=0.96"<br>Flow Length=629' Tc=7.5 min CN=73 Runoff=6.0 cfs 0.52 af                    |
| <b>Subcatchment C1: C1</b> | Runoff Area=52,134 sf 31.65% Impervious Runoff Depth=1.80"<br>Flow Length=642' Tc=13.1 min CN=86 Runoff=1.8 cfs 0.18 af                   |
| <b>Subcatchment C2: C2</b> | Runoff Area=2,662 sf 0.00% Impervious Runoff Depth=1.37"<br>Flow Length=9' Slope=0.3300 '/' Tc=6.0 min CN=80 Runoff=0.1 cfs 0.01 af       |
| <b>Subcatchment C3: C3</b> | Runoff Area=26,456 sf 28.44% Impervious Runoff Depth=1.72"<br>Flow Length=242' Tc=7.8 min CN=85 Runoff=1.1 cfs 0.09 af                    |
| <b>Subcatchment C4: C4</b> | Runoff Area=33,666 sf 39.92% Impervious Runoff Depth=1.88"<br>Flow Length=321' Tc=9.1 min CN=87 Runoff=1.4 cfs 0.12 af                    |
| <b>Subcatchment C5: C5</b> | Runoff Area=126,038 sf 15.54% Impervious Runoff Depth=1.51"<br>Flow Length=636' Tc=9.7 min CN=82 Runoff=4.1 cfs 0.36 af                   |
| <b>Subcatchment C6: C6</b> | Runoff Area=15,050 sf 0.00% Impervious Runoff Depth=1.37"<br>Flow Length=206' Tc=7.3 min CN=80 Runoff=0.5 cfs 0.04 af                     |
| <b>Subcatchment C7: C7</b> | Runoff Area=12,255 sf 0.00% Impervious Runoff Depth=1.37"<br>Flow Length=94' Slope=0.1530 '/' Tc=6.8 min CN=80 Runoff=0.4 cfs 0.03 af     |
| <b>Subcatchment C8: C8</b> | Runoff Area=692,963 sf 0.00% Impervious Runoff Depth=1.12"<br>Flow Length=1,430' Tc=33.4 min CN=76 Runoff=8.8 cfs 1.49 af                 |
| <b>Reach R1: REACH 1</b>   | Avg. Flow Depth=0.07' Max Vel=2.18 fps Inflow=0.7 cfs 0.18 af<br>n=0.022 L=373.0' S=0.0429 '/' Capacity=485.5 cfs Outflow=0.6 cfs 0.18 af |
| <b>Reach R2: REACH 2</b>   | Avg. Flow Depth=0.10' Max Vel=2.19 fps Inflow=0.6 cfs 0.18 af<br>n=0.022 L=197.0' S=0.0401 '/' Capacity=429.5 cfs Outflow=0.6 cfs 0.18 af |
| <b>Reach R3: REACH 3</b>   | Avg. Flow Depth=0.63' Max Vel=5.32 fps Inflow=6.5 cfs 0.57 af<br>n=0.022 L=459.0' S=0.0309 '/' Capacity=63.9 cfs Outflow=6.4 cfs 0.57 af  |
| <b>Reach R4: REACH 4</b>   | Avg. Flow Depth=0.78' Max Vel=1.27 fps Inflow=6.4 cfs 0.57 af<br>n=0.150 L=65.0' S=0.0362 '/' Capacity=23.1 cfs Outflow=6.3 cfs 0.57 af   |
| <b>Reach R5: REACH 5</b>   | Avg. Flow Depth=0.25' Max Vel=0.78 fps Inflow=1.9 cfs 0.64 af<br>n=0.150 L=15.0' S=0.0667 '/' Capacity=8.2 cfs Outflow=1.9 cfs 0.64 af    |
| <b>Pond BIO-1: BIO-1</b>   | Peak Elev=119.53' Storage=2,024 cf Inflow=1.8 cfs 0.19 af<br>Outflow=0.7 cfs 0.18 af                                                      |

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**Pond BIO-2: BIO-2**Peak Elev=99.57' Storage=5,579 cf Inflow=6.7 cfs 0.61 af  
Primary=0.9 cfs 0.55 af Secondary=2.8 cfs 0.06 af Outflow=3.7 cfs 0.61 af**Pond DET-1: DETENTION POND 1**Peak Elev=96.37' Storage=2,611 cf Inflow=3.8 cfs 0.64 af  
Primary=1.9 cfs 0.64 af Secondary=0.0 cfs 0.00 af Outflow=1.9 cfs 0.64 af**Pond PCB1: PCB1**Peak Elev=125.53' Inflow=2.5 cfs 0.21 af  
18.0" Round Culvert n=0.012 L=170.0' S=0.0459 '/' Outflow=2.5 cfs 0.21 af**Pond PCB2: PCB2**Peak Elev=133.44' Inflow=1.4 cfs 0.12 af  
18.0" Round Culvert n=0.012 L=141.0' S=0.0567 '/' Outflow=1.4 cfs 0.12 af**Pond SF-1: Sediment Forebay 1**Peak Elev=121.21' Storage=229 cf Inflow=1.8 cfs 0.18 af  
12.0" Round Culvert n=0.012 L=40.0' S=0.0375 '/' Outflow=1.7 cfs 0.18 af**Link C: C**Inflow=11.0 cfs 2.32 af  
Primary=11.0 cfs 2.32 af**Total Runoff Area = 28.630 ac Runoff Volume = 2.85 af Average Runoff Depth = 1.19"**  
**94.60% Pervious = 27.083 ac 5.40% Impervious = 1.547 ac**

A – 2

NODE LISTING – 10-YR

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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

|                            |                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment A: A</b>   | Runoff Area=1,855 sf 50.40% Impervious Runoff Depth=3.44"<br>Flow Length=38' Slope=0.1180 '/' Tc=6.0 min CN=88 Runoff=0.1 cfs 0.01 af      |
| <b>Subcatchment B: B</b>   | Runoff Area=284,057 sf 3.32% Impervious Runoff Depth=2.09"<br>Flow Length=629' Tc=7.5 min CN=73 Runoff=12.3 cfs 1.14 af                    |
| <b>Subcatchment C1: C1</b> | Runoff Area=52,134 sf 31.65% Impervious Runoff Depth=3.24"<br>Flow Length=642' Tc=13.1 min CN=86 Runoff=2.8 cfs 0.32 af                    |
| <b>Subcatchment C2: C2</b> | Runoff Area=2,662 sf 0.00% Impervious Runoff Depth=2.68"<br>Flow Length=9' Slope=0.3300 '/' Tc=6.0 min CN=80 Runoff=0.2 cfs 0.01 af        |
| <b>Subcatchment C3: C3</b> | Runoff Area=26,456 sf 28.44% Impervious Runoff Depth=3.15"<br>Flow Length=242' Tc=7.8 min CN=85 Runoff=1.7 cfs 0.16 af                     |
| <b>Subcatchment C4: C4</b> | Runoff Area=33,666 sf 39.92% Impervious Runoff Depth=3.34"<br>Flow Length=321' Tc=9.1 min CN=87 Runoff=2.2 cfs 0.22 af                     |
| <b>Subcatchment C5: C5</b> | Runoff Area=126,038 sf 15.54% Impervious Runoff Depth=2.87"<br>Flow Length=636' Tc=9.7 min CN=82 Runoff=6.9 cfs 0.69 af                    |
| <b>Subcatchment C6: C6</b> | Runoff Area=15,050 sf 0.00% Impervious Runoff Depth=2.68"<br>Flow Length=206' Tc=7.3 min CN=80 Runoff=0.9 cfs 0.08 af                      |
| <b>Subcatchment C7: C7</b> | Runoff Area=12,255 sf 0.00% Impervious Runoff Depth=2.68"<br>Flow Length=94' Slope=0.1530 '/' Tc=6.8 min CN=80 Runoff=0.7 cfs 0.06 af      |
| <b>Subcatchment C8: C8</b> | Runoff Area=692,963 sf 0.00% Impervious Runoff Depth=2.34"<br>Flow Length=1,430' Tc=33.4 min CN=76 Runoff=17.3 cfs 3.10 af                 |
| <b>Reach R1: REACH 1</b>   | Avg. Flow Depth=0.15' Max Vel=3.50 fps Inflow=2.6 cfs 0.33 af<br>n=0.022 L=373.0' S=0.0429 '/' Capacity=485.5 cfs Outflow=2.5 cfs 0.33 af  |
| <b>Reach R2: REACH 2</b>   | Avg. Flow Depth=0.18' Max Vel=3.35 fps Inflow=2.5 cfs 0.33 af<br>n=0.022 L=197.0' S=0.0401 '/' Capacity=429.5 cfs Outflow=2.5 cfs 0.33 af  |
| <b>Reach R3: REACH 3</b>   | Avg. Flow Depth=0.76' Max Vel=6.02 fps Inflow=10.6 cfs 1.07 af<br>n=0.022 L=459.0' S=0.0309 '/' Capacity=63.9 cfs Outflow=10.5 cfs 1.07 af |
| <b>Reach R4: REACH 4</b>   | Avg. Flow Depth=1.01' Max Vel=1.46 fps Inflow=10.5 cfs 1.07 af<br>n=0.150 L=65.0' S=0.0362 '/' Capacity=23.1 cfs Outflow=10.4 cfs 1.07 af  |
| <b>Reach R5: REACH 5</b>   | Avg. Flow Depth=0.34' Max Vel=0.95 fps Inflow=3.5 cfs 1.21 af<br>n=0.150 L=15.0' S=0.0667 '/' Capacity=8.2 cfs Outflow=3.5 cfs 1.21 af     |
| <b>Pond BIO-1: BIO-1</b>   | Peak Elev=119.62' Storage=2,171 cf Inflow=2.7 cfs 0.34 af<br>Outflow=2.6 cfs 0.33 af                                                       |

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**Pond BIO-2: BIO-2**

Peak Elev=99.67' Storage=5,968 cf Inflow=11.1 cfs 1.14 af  
Primary=0.9 cfs 0.85 af Secondary=10.0 cfs 0.29 af Outflow=11.0 cfs 1.14 af

**Pond DET-1: DETENTION POND 1**

Peak Elev=97.74' Storage=7,887 cf Inflow=11.5 cfs 1.21 af  
Primary=3.5 cfs 1.21 af Secondary=0.0 cfs 0.00 af Outflow=3.5 cfs 1.21 af

**Pond PCB1: PCB1**

Peak Elev=125.74' Inflow=3.8 cfs 0.37 af  
18.0" Round Culvert n=0.012 L=170.0' S=0.0459 '/' Outflow=3.8 cfs 0.37 af

**Pond PCB2: PCB2**

Peak Elev=133.58' Inflow=2.2 cfs 0.22 af  
18.0" Round Culvert n=0.012 L=141.0' S=0.0567 '/' Outflow=2.2 cfs 0.22 af

**Pond SF-1: Sediment Forebay 1**

Peak Elev=121.49' Storage=347 cf Inflow=2.8 cfs 0.32 af  
12.0" Round Culvert n=0.012 L=40.0' S=0.0375 '/' Outflow=2.7 cfs 0.32 af

**Link C: C**

Inflow=22.4 cfs 4.64 af  
Primary=22.4 cfs 4.64 af

**Total Runoff Area = 28.630 ac Runoff Volume = 5.79 af Average Runoff Depth = 2.43"**  
**94.60% Pervious = 27.083 ac 5.40% Impervious = 1.547 ac**

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## 10-YR STORM SUMMARY

**21074 - Post**

21074 24-hr S1 10-yr Rainfall=4.76"

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Page 1

**Summary for Subcatchment A: A**

Runoff = 0.1 cfs @ 12.04 hrs, Volume= 0.01 af, Depth= 3.44"

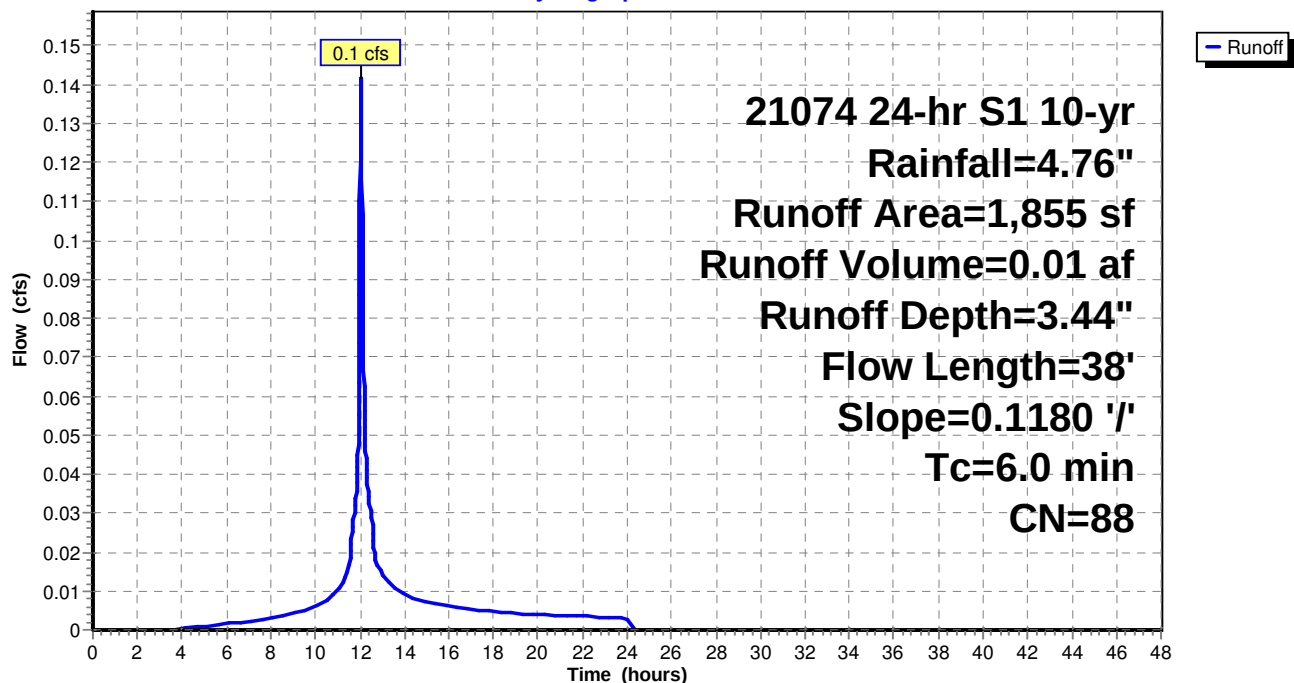
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 690       | 77 | Woods, Good, HSG D            |
| 230       | 80 | >75% Grass cover, Good, HSG D |
| 935       | 98 | Paved parking, HSG D          |
| 1,855     | 88 | Weighted Average              |
| 920       |    | 49.60% Pervious Area          |
| 935       |    | 50.40% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft)                            | Velocity (ft/sec) | Capacity (cfs) | Description                                               |
|----------|---------------|------------------------------------------|-------------------|----------------|-----------------------------------------------------------|
| 0.6      | 4             | 0.1180                                   | 0.12              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.01"            |
| 4.6      | 34            | 0.1180                                   | 0.12              |                | Sheet Flow,<br>Woods: Light underbrush n= 0.400 P2= 3.01" |
| 5.2      | 38            | Total, Increased to minimum Tc = 6.0 min |                   |                |                                                           |

**Subcatchment A: A**

Hydrograph



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21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment B: B**

Runoff = 12.3 cfs @ 12.06 hrs, Volume= 1.14 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

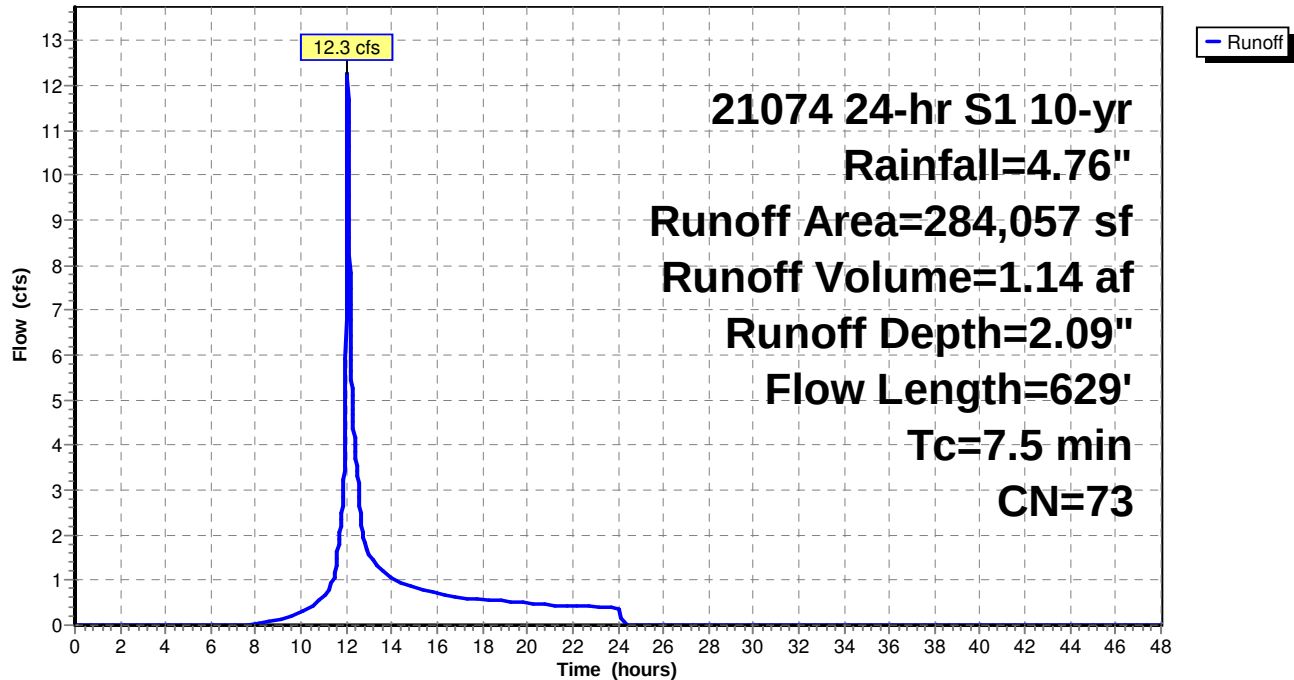
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 233       | 30 | Woods, Good, HSG A            |
| 47,498    | 39 | >75% Grass cover, Good, HSG A |
| 837       | 74 | >75% Grass cover, Good, HSG C |
| 54,408    | 77 | Woods, Good, HSG D            |
| 171,653   | 80 | >75% Grass cover, Good, HSG D |
| 9,428     | 98 | Paved parking, HSG D          |
| 284,057   | 73 | Weighted Average              |
| 274,629   |    | 96.68% Pervious Area          |
| 9,428     |    | 3.32% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 2.4      | 48            | 0.4170        | 0.33              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 2.3      | 21            | 0.0950        | 0.15              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 1.5      | 256           | 0.1560        | 2.76              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 1.3      | 304           | 0.0657        | 3.84              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps   |
| 7.5      | 629           | Total         |                   |                |                                                                      |

## Subcatchment B: B

## Hydrograph



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21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C1: C1**

Runoff = 2.8 cfs @ 12.13 hrs, Volume= 0.32 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

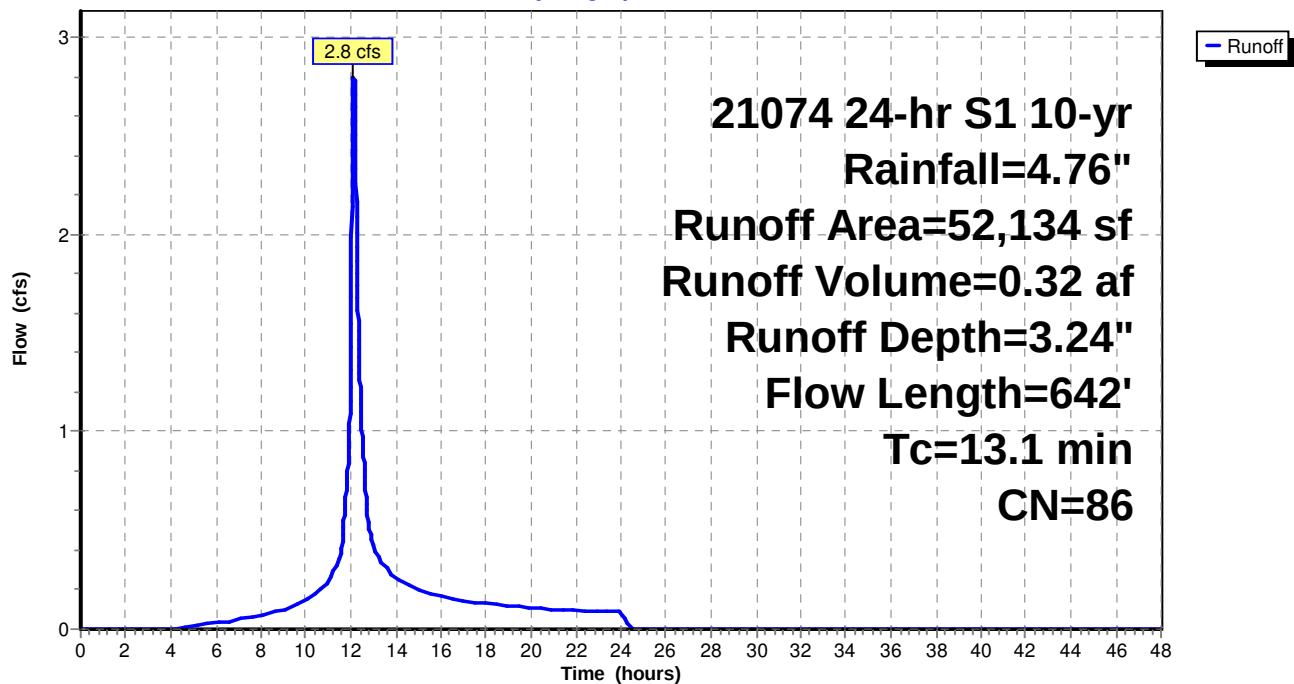
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 35,635    | 80 | >75% Grass cover, Good, HSG D |
| 16,499    | 98 | Paved parking, HSG D          |
| 52,134    | 86 | Weighted Average              |
| 35,635    |    | 68.35% Pervious Area          |
| 16,499    |    | 31.65% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 8.0      | 60            | 0.0330        | 0.12              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 0.4      | 57            | 0.2340        | 2.42              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps            |
| 0.0      | 12            | 0.3300        | 4.02              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 3.2      | 195           | 0.0205        | 1.00              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 1.5      | 312           | 0.0304        | 3.54              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps              |
| 0.0      | 6             | 0.1600        | 2.80              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 13.1     | 642           | Total         |                   |                |                                                                      |

## Subcatchment C1: C1

## Hydrograph



**Summary for Subcatchment C2: C2**

Runoff = 0.2 cfs @ 12.04 hrs, Volume= 0.01 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 21074 24-hr S1 10-yr Rainfall=4.76"

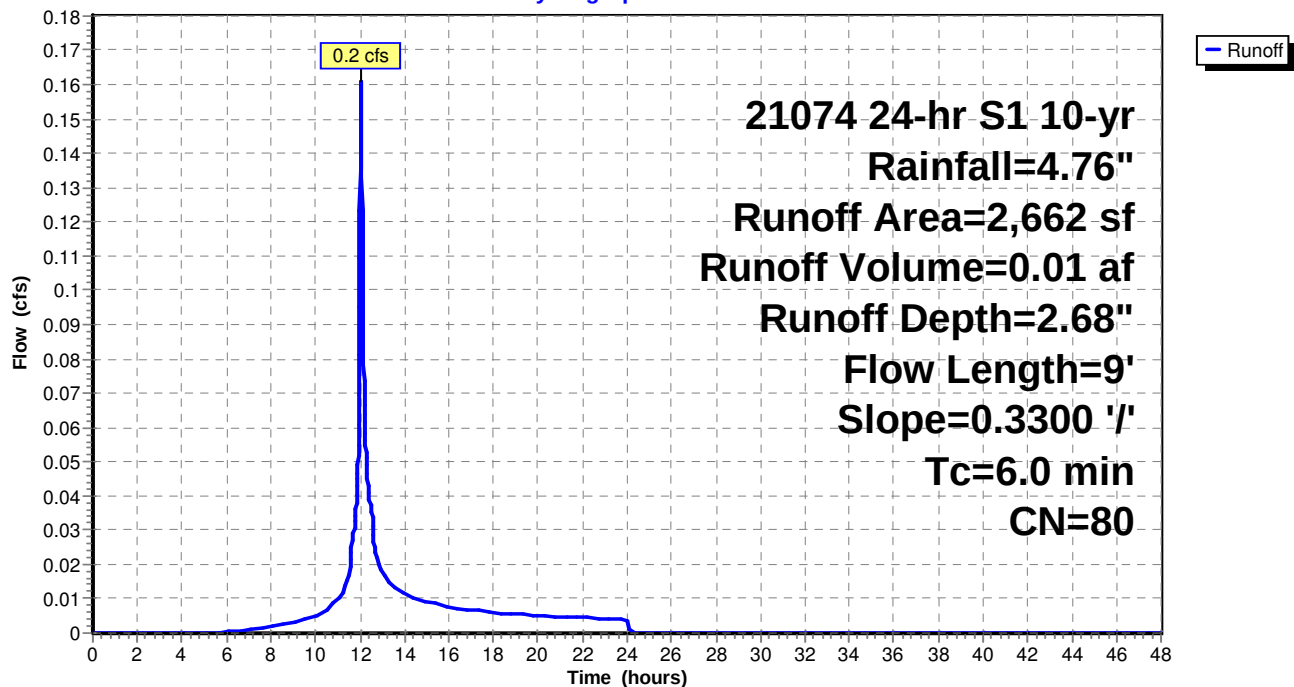
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,662     | 80 | >75% Grass cover, Good, HSG D |
| 2,662     |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft)                            | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|------------------------------------------|-------------------|----------------|------------------------------------------------|
| 0.7      | 9             | 0.3300                                   | 0.21              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.01" |
| 0.7      | 9             | Total, Increased to minimum Tc = 6.0 min |                   |                |                                                |

**Subcatchment C2: C2**

Hydrograph



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21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C3: C3**

Runoff = 1.7 cfs @ 12.06 hrs, Volume= 0.16 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

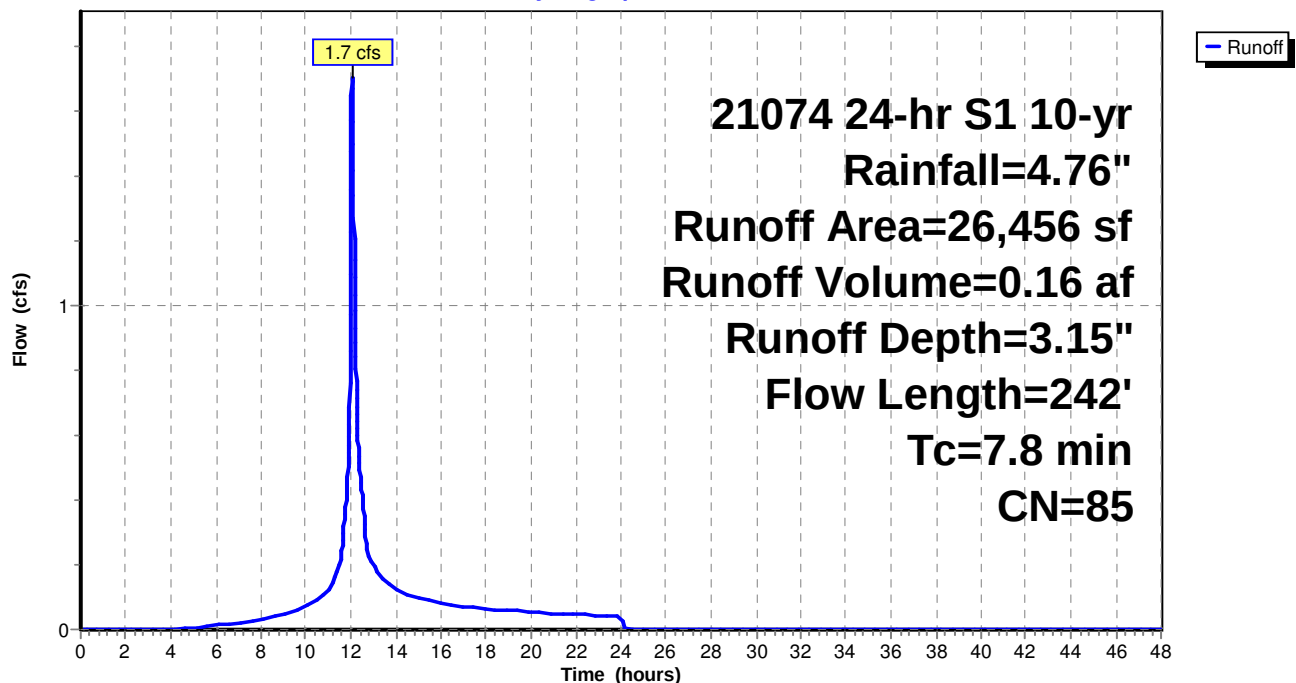
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 18,932    | 80 | >75% Grass cover, Good, HSG D |
| 4,786     | 98 | Paved parking, HSG D          |
| 2,738     | 98 | Roofs, HSG D                  |
| 26,456    | 85 | Weighted Average              |
| 18,932    |    | 71.56% Pervious Area          |
| 7,524     |    | 28.44% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 7.0      | 100           | 0.1270        | 0.24              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 0.6      | 92            | 0.1270        | 2.49              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 0.2      | 50            | 0.0560        | 4.80              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps              |
| 7.8      | 242           | Total         |                   |                |                                                                      |

**Subcatchment C3: C3**

Hydrograph



**21074 - Post**

21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C4: C4**

Runoff = 2.2 cfs @ 12.07 hrs, Volume= 0.22 af, Depth= 3.34"

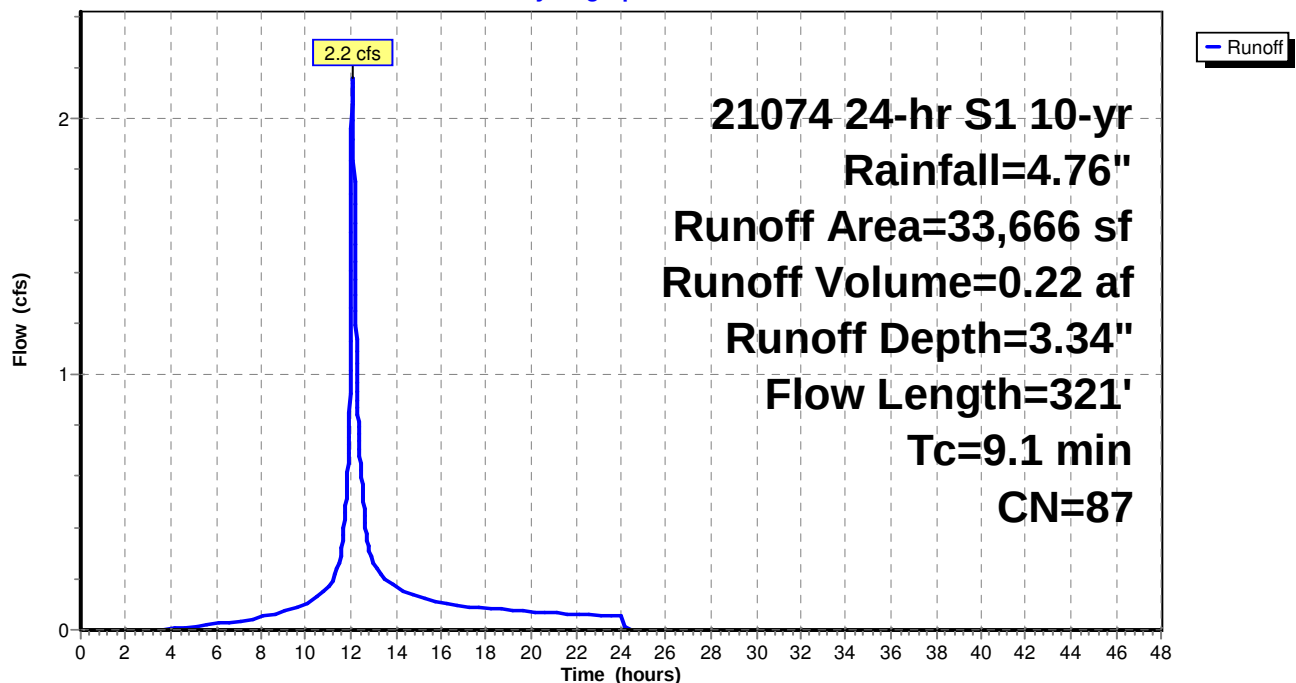
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 20,226    | 80 | >75% Grass cover, Good, HSG D |
| 10,702    | 98 | Paved parking, HSG D          |
| 2,738     | 98 | Roofs, HSG D                  |
| 33,666    | 87 | Weighted Average              |
| 20,226    |    | 60.08% Pervious Area          |
| 13,440    |    | 39.92% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                      |
|----------|---------------|---------------|-------------------|----------------|--------------------------------------------------|
| 8.3      | 63            | 0.0330        | 0.13              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.01"   |
| 0.8      | 258           | 0.0710        | 5.41              |                | Shallow Concentrated Flow,<br>Paved Kv= 20.3 fps |
| 9.1      | 321           | Total         |                   |                |                                                  |

**Subcatchment C4: C4**

Hydrograph



**21074 - Post**

21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C5: C5**

Runoff = 6.9 cfs @ 12.08 hrs, Volume= 0.69 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

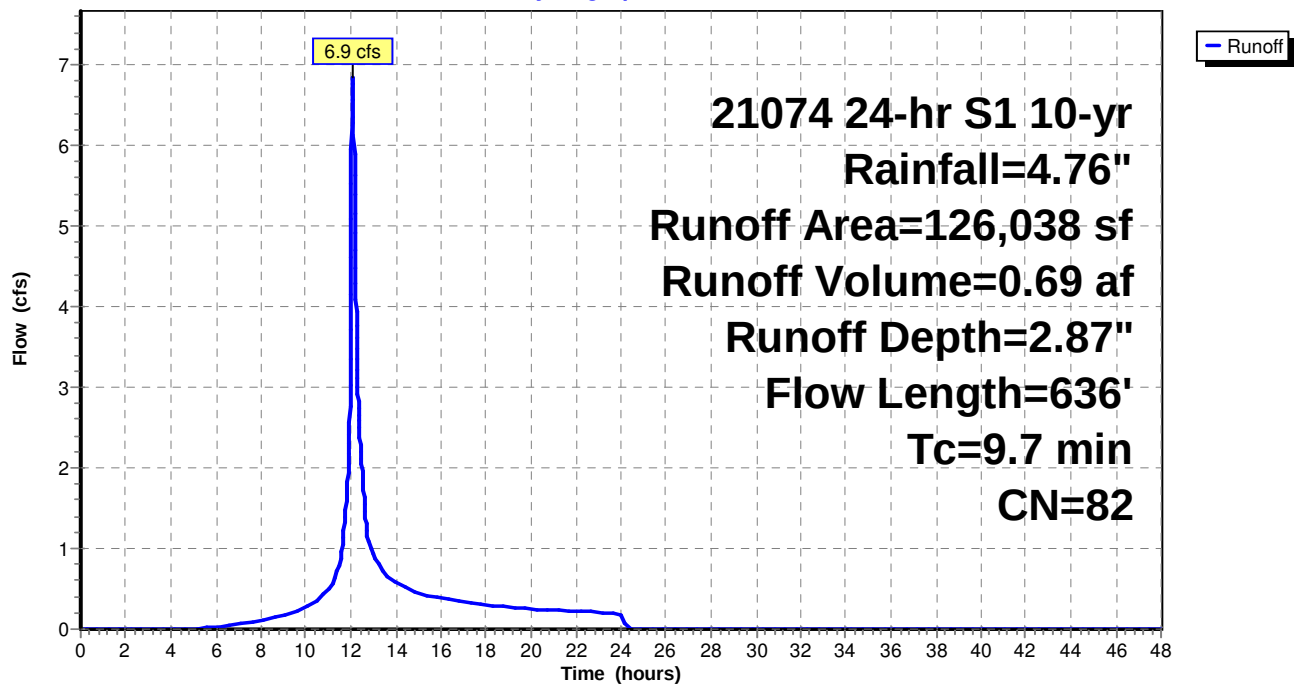
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 13,325    | 77 | Woods, Good, HSG D            |
| 93,132    | 80 | >75% Grass cover, Good, HSG D |
| 8,629     | 98 | Paved parking, HSG D          |
| 10,952    | 98 | Roofs, HSG D                  |
| 126,038   | 82 | Weighted Average              |
| 106,457   |    | 84.46% Pervious Area          |
| 19,581    |    | 15.54% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 5.1      | 42            | 0.0500        | 0.14              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 0.1      | 18            | 0.0200        | 2.87              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps              |
| 1.1      | 150           | 0.0990        | 2.20              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 2.5      | 362           | 0.0249        | 2.37              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps   |
| 0.9      | 64            | 0.0270        | 1.15              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 9.7      | 636           | Total         |                   |                |                                                                      |

## Subcatchment C5: C5

## Hydrograph



**21074 - Post**

21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C6: C6**

Runoff = 0.9 cfs @ 12.05 hrs, Volume= 0.08 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

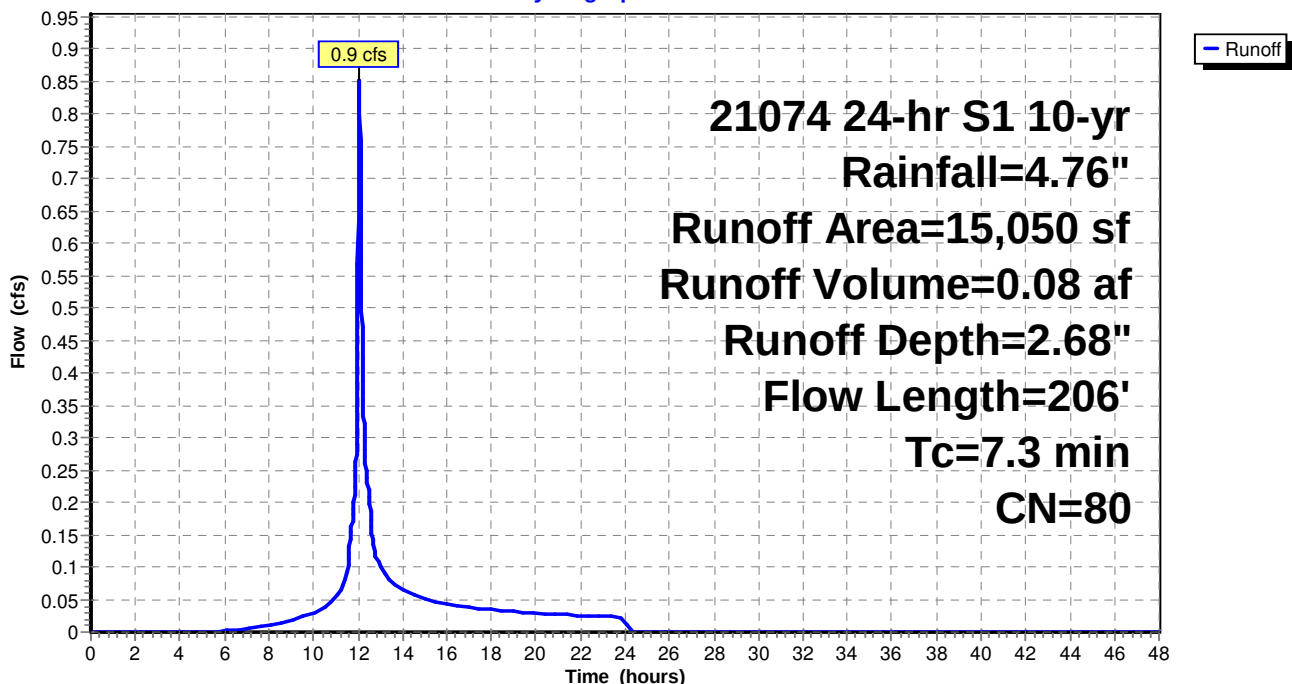
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 15,050    | 80 | >75% Grass cover, Good, HSG D |
| 15,050    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 6.7      | 100           | 0.1440        | 0.25              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 0.6      | 99            | 0.1440        | 2.66              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 0.0      | 7             | 0.5000        | 4.95              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 7.3      | 206           | Total         |                   |                |                                                                      |

**Subcatchment C6: C6**

Hydrograph



**21074 - Post**

21074 24-hr S1 10-yr Rainfall=4.76"

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**Summary for Subcatchment C7: C7**

Runoff = 0.7 cfs @ 12.05 hrs, Volume= 0.06 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

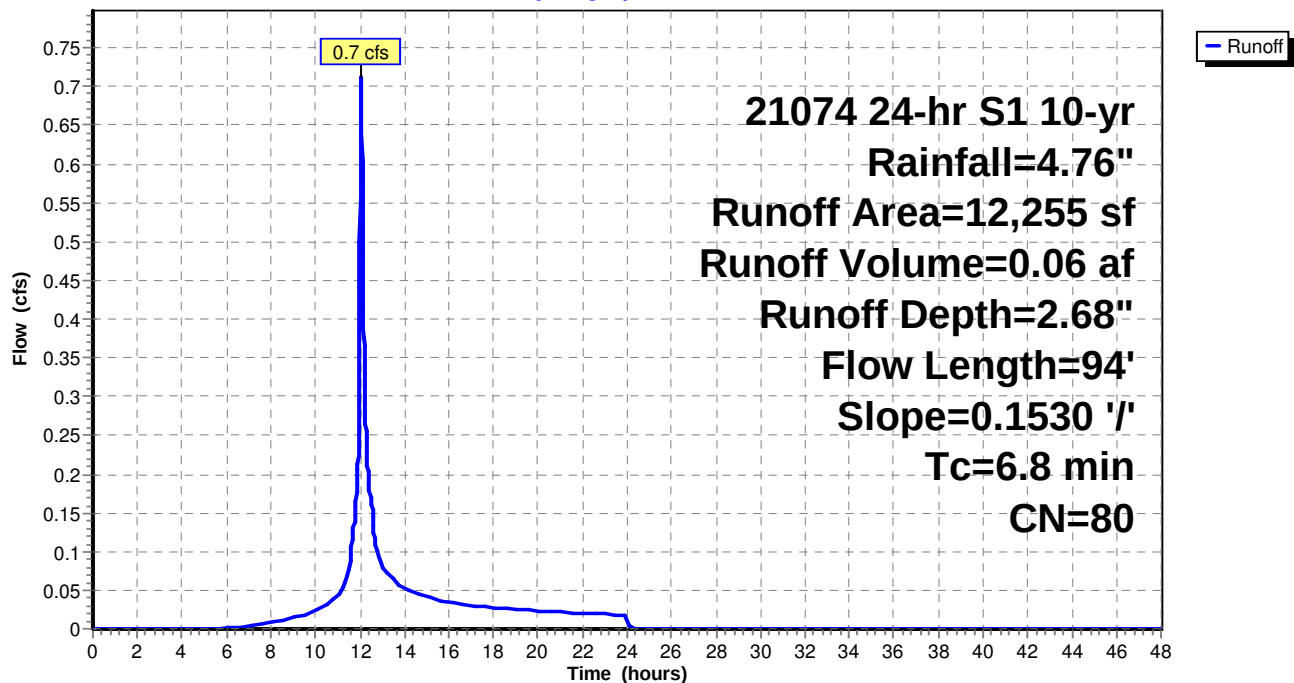
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 12,255    | 80 | >75% Grass cover, Good, HSG D |
| 12,255    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------|
| 5.6      | 82            | 0.1530        | 0.25              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.01" |
| 1.2      | 12            | 0.1530        | 0.17              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.01" |
| 6.8      | 94            | Total         |                   |                |                                                |

**Subcatchment C7: C7**

Hydrograph



**Summary for Subcatchment C8: C8**

Runoff = 17.3 cfs @ 12.43 hrs, Volume= 3.10 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
21074 24-hr S1 10-yr Rainfall=4.76"

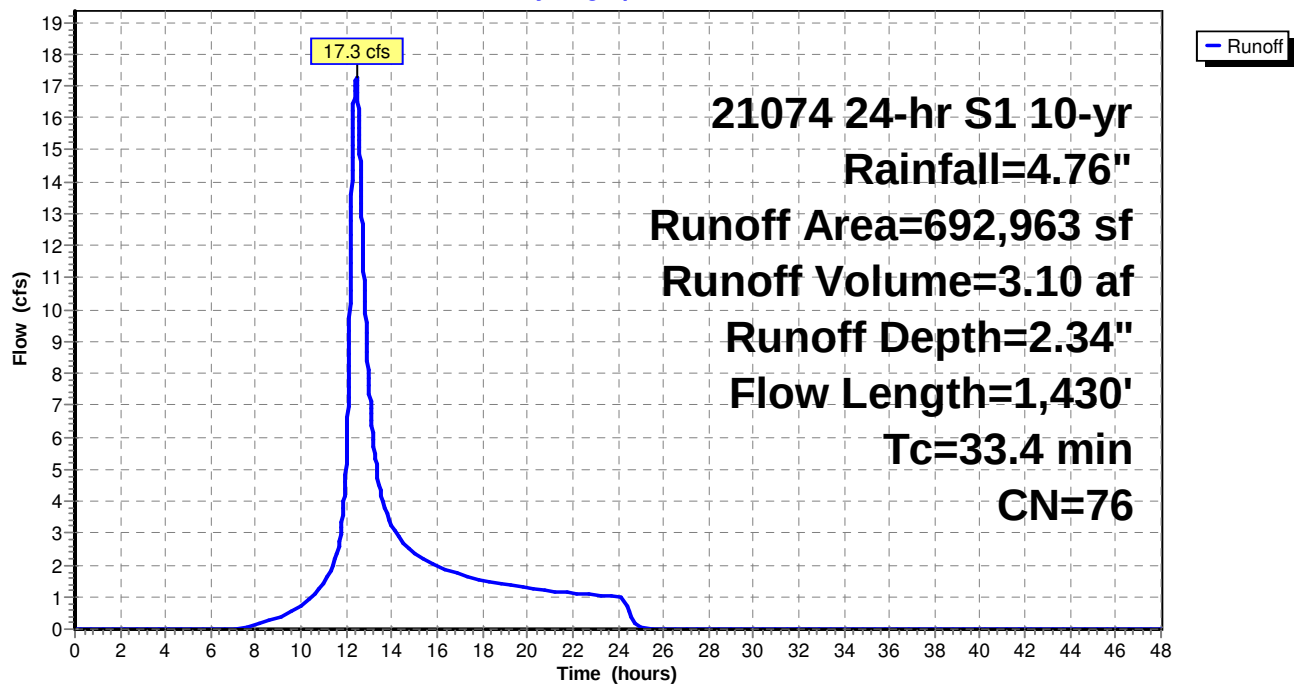
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 24,637    | 39 | >75% Grass cover, Good, HSG A |
| 29,844    | 70 | Woods, Good, HSG C            |
| 154,195   | 74 | >75% Grass cover, Good, HSG C |
| 217,244   | 77 | Woods, Good, HSG D            |
| 267,043   | 80 | >75% Grass cover, Good, HSG D |
| 692,963   | 76 | Weighted Average              |
| 692,963   |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                          |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------------------|
| 5.3      | 33            | 0.0763        | 0.10              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.01"     |
| 4.1      | 39            | 0.0763        | 0.16              |                | <b>Sheet Flow,</b><br>Grass: Dense n= 0.240 P2= 3.01"                |
| 2.0      | 422           | 0.0550        | 3.52              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps   |
| 4.1      | 308           | 0.0324        | 1.26              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 17.9     | 628           | 0.0070        | 0.59              |                | <b>Shallow Concentrated Flow,</b><br>Short Grass Pasture Kv= 7.0 fps |
| 33.4     | 1,430         | Total         |                   |                |                                                                      |

## Subcatchment C8: C8

## Hydrograph



**Summary for Reach R1: REACH 1**

Inflow Area = 1.258 ac, 30.11% Impervious, Inflow Depth = 3.19" for 10-yr event  
 Inflow = 2.6 cfs @ 12.21 hrs, Volume= 0.33 af  
 Outflow = 2.5 cfs @ 12.24 hrs, Volume= 0.33 af, Atten= 4%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.50 fps, Min. Travel Time= 1.8 min

Avg. Velocity= 1.22 fps, Avg. Travel Time= 5.1 min

Peak Storage= 270 cf @ 12.24 hrs

Average Depth at Peak Storage= 0.15' , Surface Width= 5.77'

Defined Flood Depth= 116.00' Flow Area= 3,210.3 sf, Capacity= 64,891.6 cfs

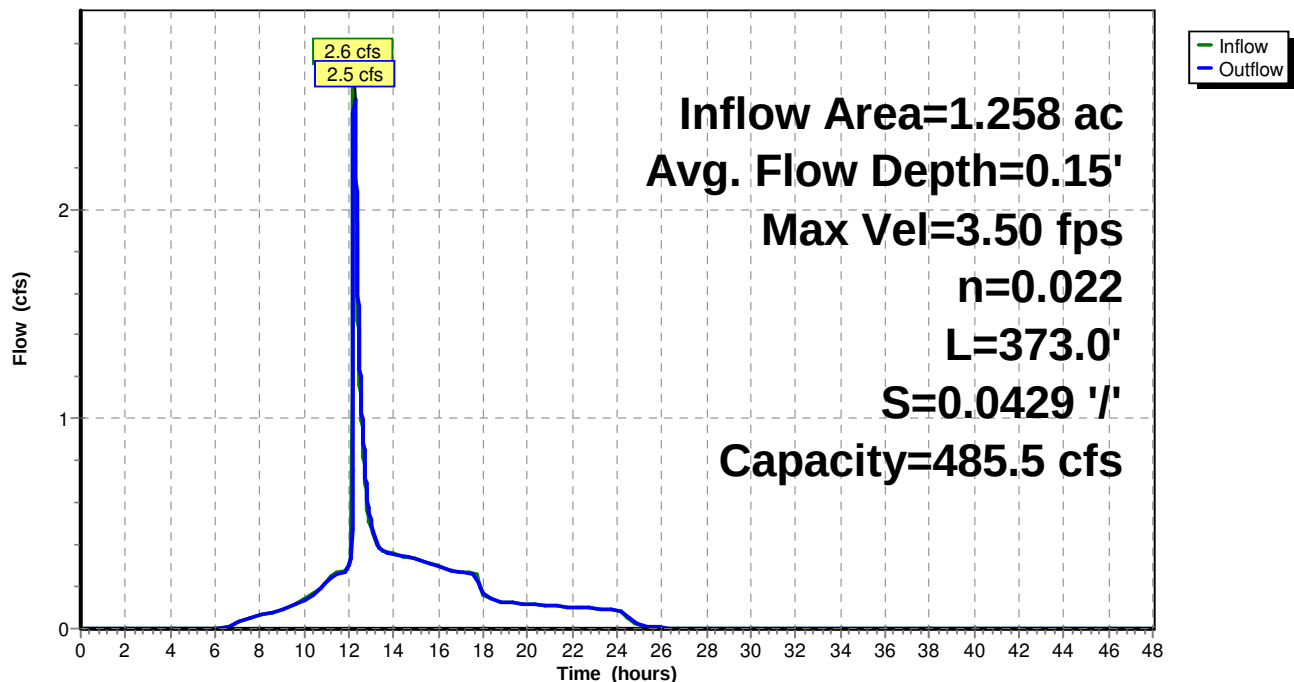
Bank-Full Depth= 2.00' Flow Area= 32.0 sf, Capacity= 485.5 cfs

4.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 6.0 ' / ' Top Width= 28.00'

Length= 373.0' Slope= 0.0429 ' / '

Inlet Invert= 114.00', Outlet Invert= 98.00'

**Reach R1: REACH 1****Hydrograph**

**Summary for Reach R2: REACH 2**

[61] Hint: Exceeded Reach R1 outlet invert by 0.08' @ 12.25 hrs

Inflow Area = 1.258 ac, 30.11% Impervious, Inflow Depth = 3.19" for 10-yr event  
 Inflow = 2.5 cfs @ 12.24 hrs, Volume= 0.33 af  
 Outflow = 2.5 cfs @ 12.25 hrs, Volume= 0.33 af, Atten= 1%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.35 fps, Min. Travel Time= 1.0 min

Avg. Velocity = 1.13 fps, Avg. Travel Time= 2.9 min

Peak Storage= 147 cf @ 12.25 hrs

Average Depth at Peak Storage= 0.18', Surface Width= 6.08'

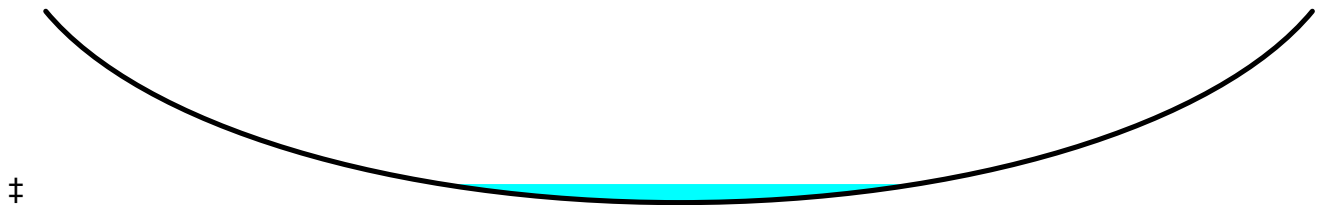
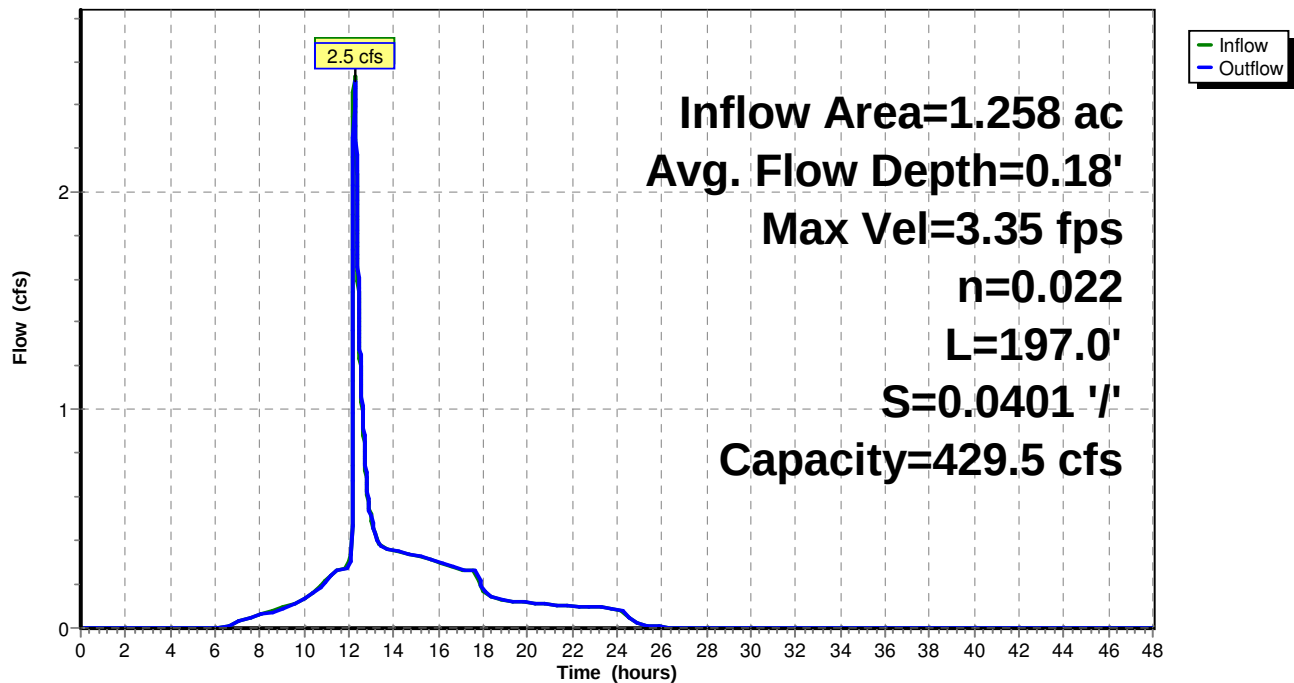
Defined Flood Depth= 100.00' Flow Area= 1,981.8 sf, Capacity= 45,423.8 cfs

Bank-Full Depth= 2.00' Flow Area= 26.7 sf, Capacity= 429.5 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight

Length= 197.0' Slope= 0.0401 '/'

Inlet Invert= 97.90', Outlet Invert= 90.00'

**Reach R2: REACH 2****Hydrograph**

**Summary for Reach R3: REACH 3**

Inflow Area = 4.274 ac, 21.78% Impervious, Inflow Depth = 2.99" for 10-yr event  
 Inflow = 10.6 cfs @ 12.08 hrs, Volume= 1.07 af  
 Outflow = 10.5 cfs @ 12.09 hrs, Volume= 1.07 af, Atten= 2%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 6.02 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 2.51 fps, Avg. Travel Time= 3.0 min

Peak Storage= 797 cf @ 12.09 hrs

Average Depth at Peak Storage= 0.76' , Surface Width= 4.56'

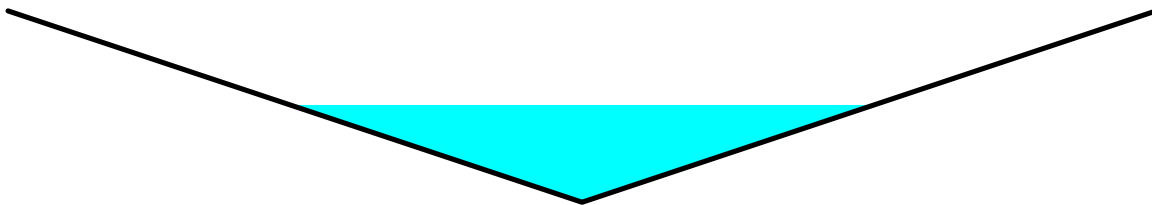
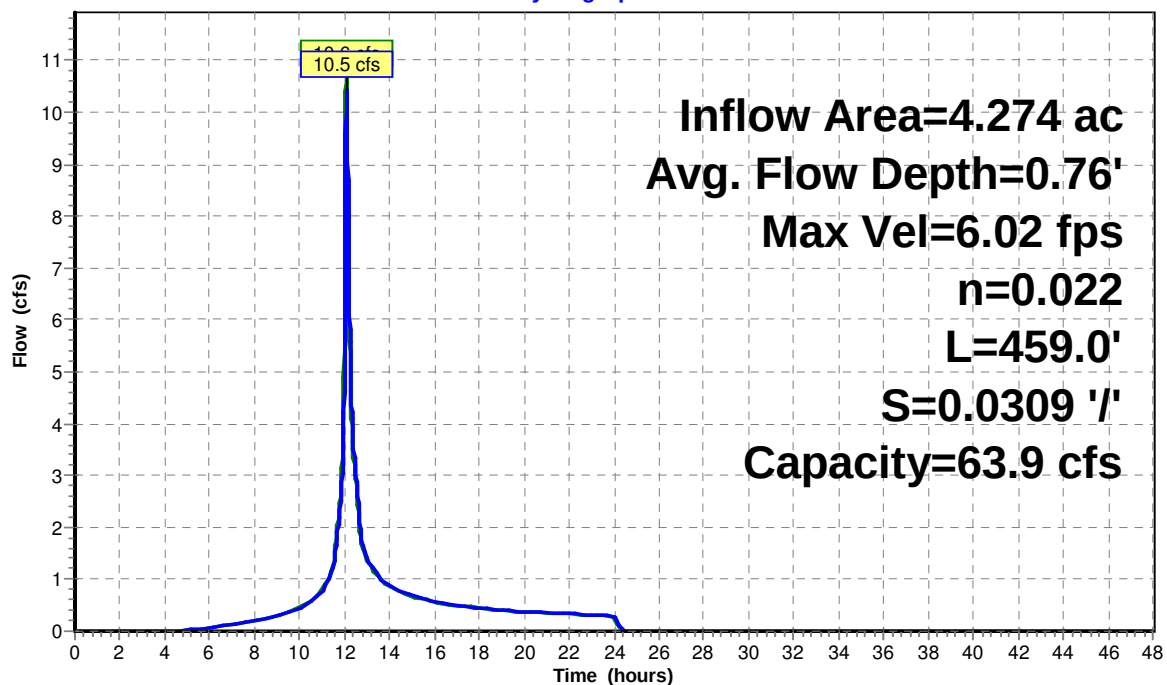
Bank-Full Depth= 1.50' Flow Area= 6.8 sf, Capacity= 63.9 cfs

0.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 3.0 '/' Top Width= 9.00'

Length= 459.0' Slope= 0.0309 '/'

Inlet Invert= 117.00', Outlet Invert= 102.80'

**Reach R3: REACH 3****Hydrograph**

— Inflow  
 — Outflow

**Summary for Reach R4: REACH 4**

[62] Hint: Exceeded Reach R3 OUTLET depth by 0.15' @ 12.11 hrs

Inflow Area = 4.274 ac, 21.78% Impervious, Inflow Depth = 2.99" for 10-yr event  
 Inflow = 10.5 cfs @ 12.09 hrs, Volume= 1.07 af  
 Outflow = 10.4 cfs @ 12.10 hrs, Volume= 1.07 af, Atten= 1%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.46 fps, Min. Travel Time= 0.7 min

Avg. Velocity= 0.49 fps, Avg. Travel Time= 2.2 min

Peak Storage= 462 cf @ 12.10 hrs

Average Depth at Peak Storage= 1.01' , Surface Width= 10.06'

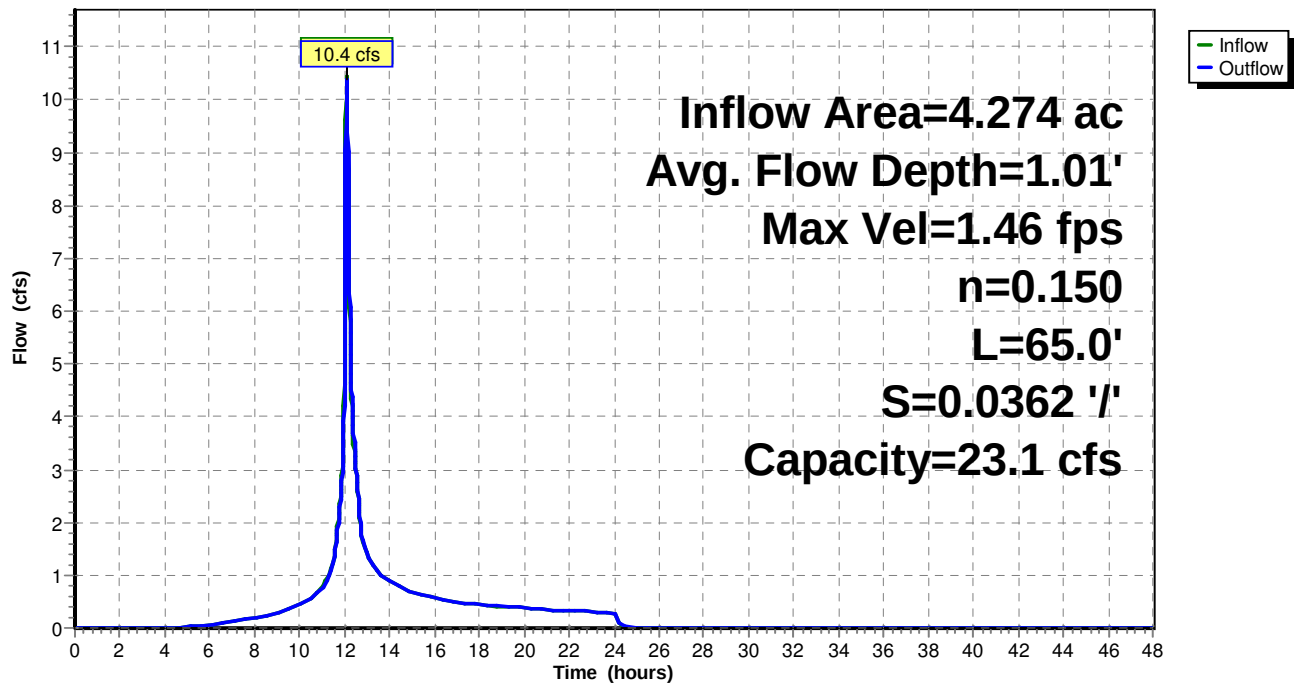
Bank-Full Depth= 1.50' Flow Area= 12.8 sf, Capacity= 23.1 cfs

4.00' x 1.50' deep channel, n= 0.150

Side Slope Z-value= 3.0 ' / ' Top Width= 13.00'

Length= 65.0' Slope= 0.0362 ' / '

Inlet Invert= 102.70', Outlet Invert= 100.35'

**Reach R4: REACH 4****Hydrograph**

**Summary for Reach R5: REACH 5**

Inflow Area = 4.900 ac, 18.99% Impervious, Inflow Depth = 2.95" for 10-yr event  
 Inflow = 3.5 cfs @ 12.50 hrs, Volume= 1.21 af  
 Outflow = 3.5 cfs @ 12.50 hrs, Volume= 1.21 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.95 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 0.29 fps, Avg. Travel Time= 0.9 min

Peak Storage= 56 cf @ 12.50 hrs

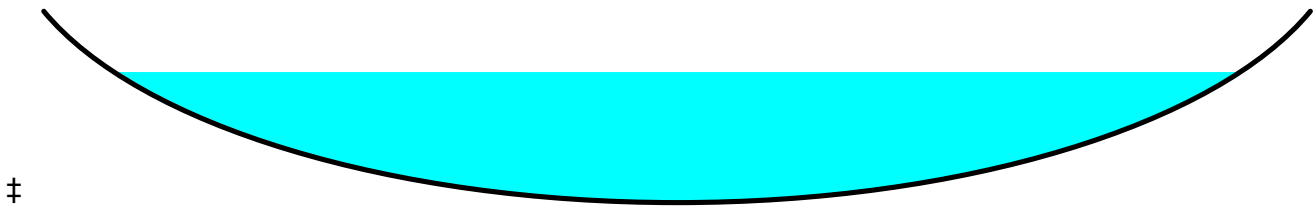
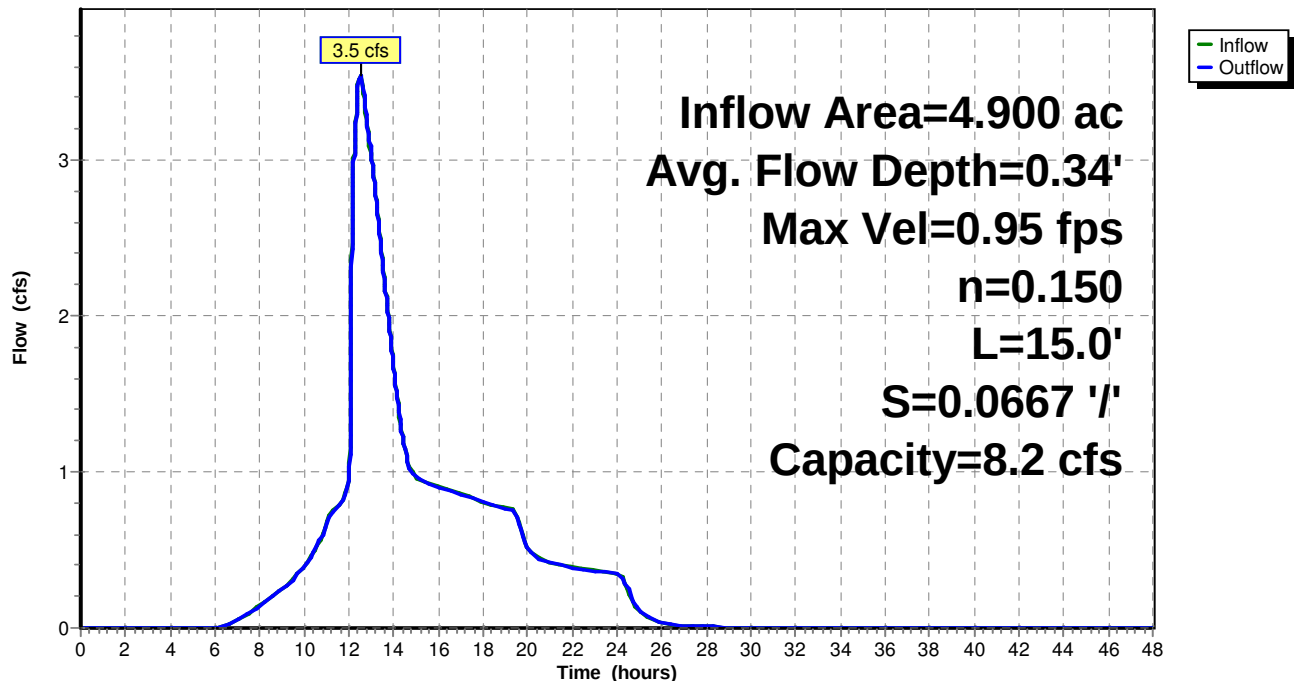
Average Depth at Peak Storage= 0.34' , Surface Width= 16.48'

Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 8.2 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.150

Length= 15.0' Slope= 0.0667 '/'

Inlet Invert= 91.00', Outlet Invert= 90.00'

**Reach R5: REACH 5****Hydrograph**

**Summary for Pond BIO-1: BIO-1**

Inflow Area = 1.258 ac, 30.11% Impervious, Inflow Depth = 3.22" for 10-yr event  
 Inflow = 2.7 cfs @ 12.16 hrs, Volume= 0.34 af  
 Outflow = 2.6 cfs @ 12.21 hrs, Volume= 0.33 af, Atten= 4%, Lag= 2.7 min  
 Primary = 2.6 cfs @ 12.21 hrs, Volume= 0.33 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 119.62' @ 12.21 hrs Surf.Area= 1,626 sf Storage= 2,171 cf  
 Flood Elev= 120.25' Surf.Area= 2,143 sf Storage= 3,310 cf

Plug-Flow detention time= 46.9 min calculated for 0.33 af (99% of inflow)  
 Center-of-Mass det. time= 42.6 min ( 883.3 - 840.6 )

| Volume              | Invert               | Avail.Storage    | Storage Description                          |                           |                           |                     |
|---------------------|----------------------|------------------|----------------------------------------------|---------------------------|---------------------------|---------------------|
| #1                  | 115.75'              | 3,310 cf         | <b>BIO (Irregular)</b> Listed below (Recalc) |                           |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Voids<br>(%)                                 | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 115.75              | 1,138                | 134.2            | 0.0                                          | 0                         | 0                         | 1,138               |
| 116.75              | 1,138                | 134.2            | 35.0                                         | 398                       | 398                       | 1,272               |
| 117.00              | 1,138                | 134.2            | 20.0                                         | 57                        | 455                       | 1,306               |
| 118.50              | 1,138                | 134.2            | 10.0                                         | 171                       | 626                       | 1,507               |
| 119.00              | 1,346                | 143.6            | 100.0                                        | 620                       | 1,246                     | 1,726               |
| 119.50              | 1,569                | 153.1            | 100.0                                        | 728                       | 1,974                     | 1,962               |
| 120.00              | 1,805                | 162.5            | 100.0                                        | 843                       | 2,817                     | 2,211               |
| 120.25              | 2,143                | 175.1            | 100.0                                        | 493                       | 3,310                     | 2,552               |

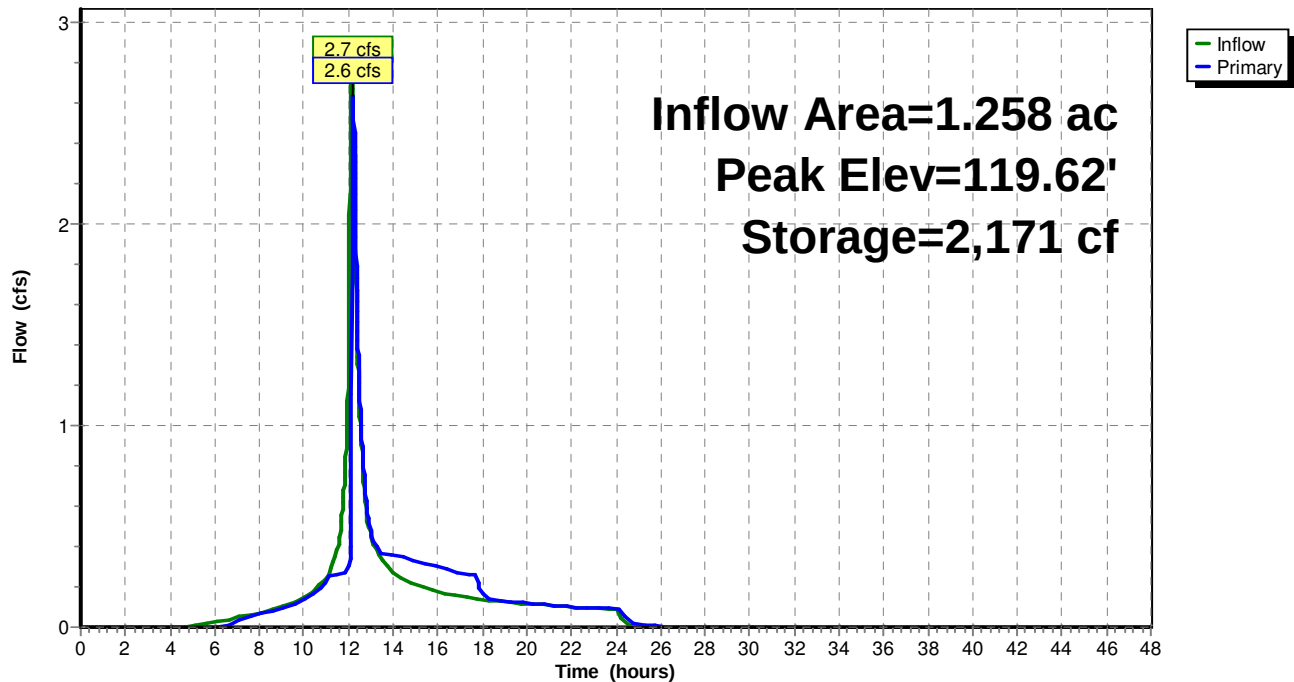
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                |
|--------|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 115.00' | <b>15.0" Round Culvert</b> L= 18.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 115.00' / 114.00' S= 0.0556 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf   |
| #2     | Device 1 | 116.00' | <b>6.0" Round Culvert</b> L= 45.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.00' / 116.00' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 2 | 115.75' | <b>10.000 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'                                                                                                                                            |
| #4     | Device 1 | 119.50' | <b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                       |

**Primary OutFlow** Max=2.6 cfs @ 12.21 hrs HW=119.62' TW=114.14' (Dynamic Tailwater)

- 1=Culvert (Passes 2.6 cfs of 11.8 cfs potential flow)  
 2=Culvert (Passes 0.4 cfs of 1.3 cfs potential flow)  
 3=Exfiltration (Exfiltration Controls 0.4 cfs)  
 4=Orifice/Grate (Weir Controls 2.3 cfs @ 1.15 fps)

## Pond BIO-1: BIO-1

## Hydrograph



**Summary for Pond BIO-2: BIO-2**

Inflow Area = 4.619 ac, 20.15% Impervious, Inflow Depth = 2.97" for 10-yr event  
 Inflow = 11.1 cfs @ 12.10 hrs, Volume= 1.14 af  
 Outflow = 11.0 cfs @ 12.12 hrs, Volume= 1.14 af, Atten= 1%, Lag= 0.9 min  
 Primary = 0.9 cfs @ 12.12 hrs, Volume= 0.85 af  
 Secondary = 10.0 cfs @ 12.12 hrs, Volume= 0.29 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 96.00' Surf.Area= 3,193 sf Storage= 279 cf

Peak Elev= 99.67' @ 12.12 hrs Surf.Area= 4,015 sf Storage= 5,968 cf (5,689 cf above start)

Flood Elev= 100.25' Surf.Area= 4,862 sf Storage= 8,470 cf (8,190 cf above start)

Plug-Flow detention time= 46.5 min calculated for 1.14 af (99% of inflow)

Center-of-Mass det. time= 40.3 min ( 887.7 - 847.4 )

| Volume              | Invert               | Avail.Storage    | Storage Description                                        |                           |                           |                     |
|---------------------|----------------------|------------------|------------------------------------------------------------|---------------------------|---------------------------|---------------------|
| #1                  | 95.75'               | 8,470 cf         | <b>Surface Bowl Area (Irregular)</b> Listed below (Recalc) |                           |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Voids<br>(%)                                               | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 95.75               | 3,193                | 223.4            | 0.0                                                        | 0                         | 0                         | 3,193               |
| 96.75               | 3,193                | 223.4            | 35.0                                                       | 1,118                     | 1,118                     | 3,416               |
| 97.00               | 3,193                | 223.4            | 20.0                                                       | 160                       | 1,277                     | 3,472               |
| 98.50               | 3,193                | 223.4            | 10.0                                                       | 479                       | 1,756                     | 3,807               |
| 99.00               | 3,536                | 232.9            | 100.0                                                      | 1,682                     | 3,438                     | 4,171               |
| 99.50               | 3,892                | 242.3            | 100.0                                                      | 1,856                     | 5,294                     | 4,545               |
| 100.00              | 4,257                | 257.2            | 100.0                                                      | 2,037                     | 7,331                     | 5,151               |
| 100.25              | 4,862                | 272.6            | 100.0                                                      | 1,139                     | 8,470                     | 5,803               |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                            |
|--------|-----------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.00' | <b>6.0" Round Culvert X 3.00</b><br>L= 52.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 96.00' / 96.00' S= 0.0000 ' / Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf                     |
| #2     | Device 1  | 95.75' | <b>10.000 in/hr Exfiltration over Surface area</b> Phase-In= 0.10'                                                                                                                                                                        |
| #3     | Secondary | 99.50' | <b>56.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85<br>3.07 3.20 3.32 |

**Primary OutFlow** Max=0.9 cfs @ 12.12 hrs HW=99.67' TW=96.59' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.9 cfs of 3.6 cfs potential flow)

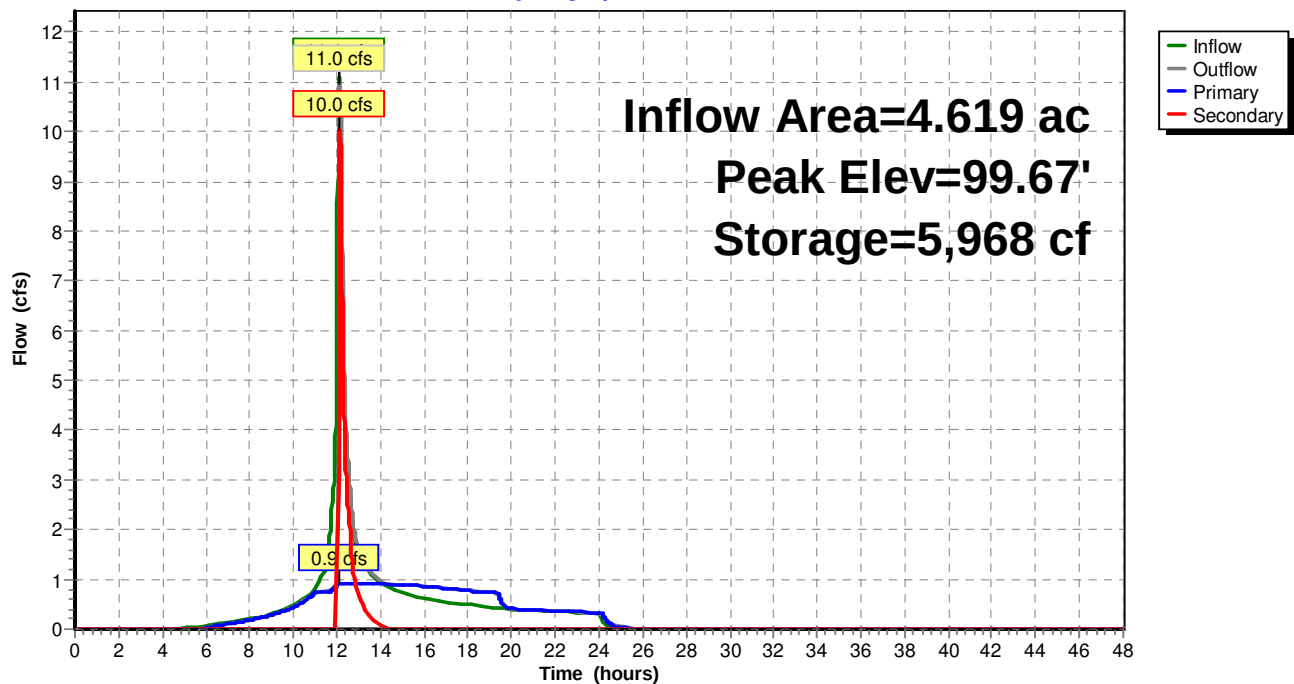
↑ **2=Exfiltration** (Exfiltration Controls 0.9 cfs)

**Secondary OutFlow** Max=10.0 cfs @ 12.12 hrs HW=99.67' TW=96.59' (Dynamic Tailwater)

↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 10.0 cfs @ 1.05 fps)

## Pond BIO-2: BIO-2

## Hydrograph



**Summary for Pond DET-1: DETENTION POND 1**

Inflow Area = 4.900 ac, 18.99% Impervious, Inflow Depth = 2.95" for 10-yr event  
 Inflow = 11.5 cfs @ 12.11 hrs, Volume= 1.21 af  
 Outflow = 3.5 cfs @ 12.50 hrs, Volume= 1.21 af, Atten= 69%, Lag= 23.2 min  
 Primary = 3.5 cfs @ 12.50 hrs, Volume= 1.21 af  
 Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 97.74' @ 12.50 hrs Surf.Area= 4,424 sf Storage= 7,887 cf  
 Flood Elev= 100.25' Surf.Area= 7,419 sf Storage= 21,948 cf

Plug-Flow detention time= 28.1 min calculated for 1.20 af (100% of inflow)  
 Center-of-Mass det. time= 28.0 min ( 914.0 - 886.0 )

| Volume              | Invert               | Avail.Storage    | Storage Description                                        |                           |                     |
|---------------------|----------------------|------------------|------------------------------------------------------------|---------------------------|---------------------|
| #1                  | 95.50'               | 21,948 cf        | <b>Custom Stage Data (Irregular)</b> Listed below (Recalc) |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Inc.Store<br>(cubic-feet)                                  | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 95.50               | 2,683                | 239.3            | 0                                                          | 0                         | 2,683               |
| 96.00               | 3,049                | 248.7            | 1,432                                                      | 1,432                     | 3,068               |
| 98.00               | 4,654                | 286.0            | 7,647                                                      | 9,079                     | 4,743               |
| 99.00               | 5,542                | 305.3            | 5,092                                                      | 14,170                    | 5,698               |
| 99.50               | 6,007                | 314.7            | 2,886                                                      | 17,057                    | 6,187               |
| 100.00              | 6,572                | 337.2            | 3,144                                                      | 20,200                    | 7,365               |
| 100.25              | 7,419                | 352.7            | 1,748                                                      | 21,948                    | 8,221               |

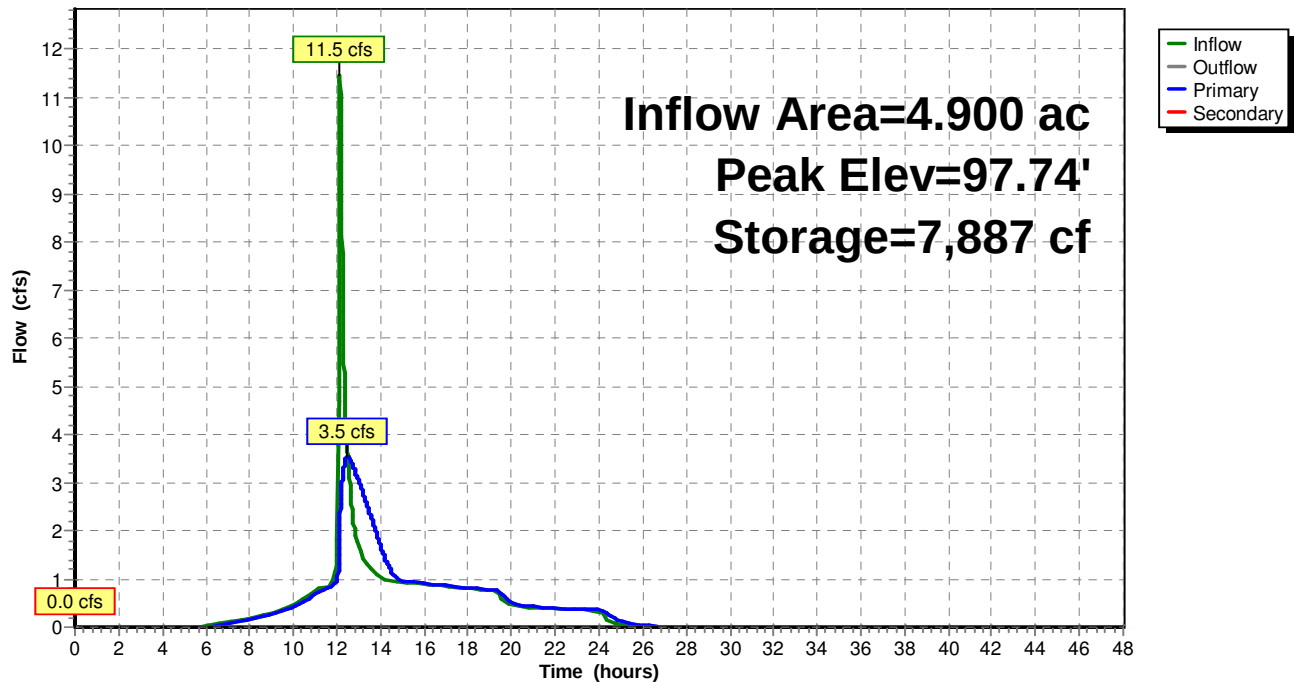
| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                   |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 93.00' | <b>15.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.00' / 91.00' S= 0.0667 ' ' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf                                                                        |
| #2     | Device 1  | 95.50' | <b>12.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                                                                                        |
| #3     | Device 1  | 97.50' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads                                                                                                                                                                                                       |
| #4     | Device 1  | 99.60' | <b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                                                                                          |
| #5     | Secondary | 99.80' | <b>6.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65<br>2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=3.5 cfs @ 12.50 hrs HW=97.74' TW=91.34' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 3.5 cfs of 12.0 cfs potential flow)  
 ↑ **2=Orifice/Grate** (Orifice Controls 3.4 cfs @ 6.78 fps)  
 ↑ **3=Orifice/Grate** (Orifice Controls 0.2 cfs @ 1.66 fps)  
 ↑ **4=Orifice/Grate** ( Controls 0.0 cfs)

**Secondary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=95.50' TW=91.00' (Dynamic Tailwater)

↑ **5=Broad-Crested Rectangular Weir** ( Controls 0.0 cfs)

**Pond DET-1: DETENTION POND 1****Hydrograph**

**Summary for Pond PCB1: PCB1**

Inflow Area = 1.380 ac, 34.87% Impervious, Inflow Depth = 3.26" for 10-yr event  
 Inflow = 3.8 cfs @ 12.07 hrs, Volume= 0.37 af  
 Outflow = 3.8 cfs @ 12.07 hrs, Volume= 0.37 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.8 cfs @ 12.07 hrs, Volume= 0.37 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 125.74' @ 12.07 hrs

Flood Elev= 129.60'

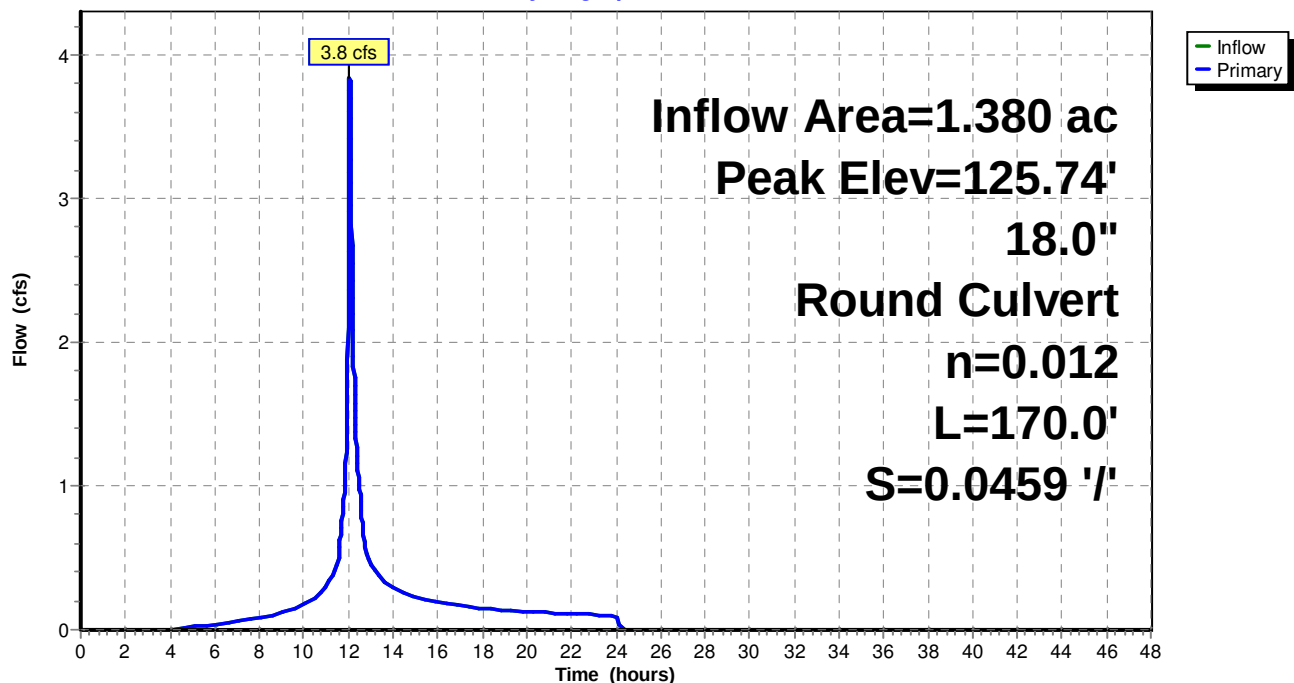
| Device | Routing | Invert  | Outlet Devices                                                                                                                                                                                                  |
|--------|---------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 124.80' | <b>18.0" Round Culvert</b><br>L= 170.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 124.80' / 117.00' S= 0.0459 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.8 cfs @ 12.07 hrs HW=125.74' TW=117.74' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 3.8 cfs @ 3.30 fps)

**Pond PCB1: PCB1**

Hydrograph



**Summary for Pond PCB2: PCB2**

Inflow Area = 0.773 ac, 39.92% Impervious, Inflow Depth = 3.34" for 10-yr event  
 Inflow = 2.2 cfs @ 12.07 hrs, Volume= 0.22 af  
 Outflow = 2.2 cfs @ 12.07 hrs, Volume= 0.22 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.2 cfs @ 12.07 hrs, Volume= 0.22 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 133.58' @ 12.07 hrs

Flood Elev= 137.70'

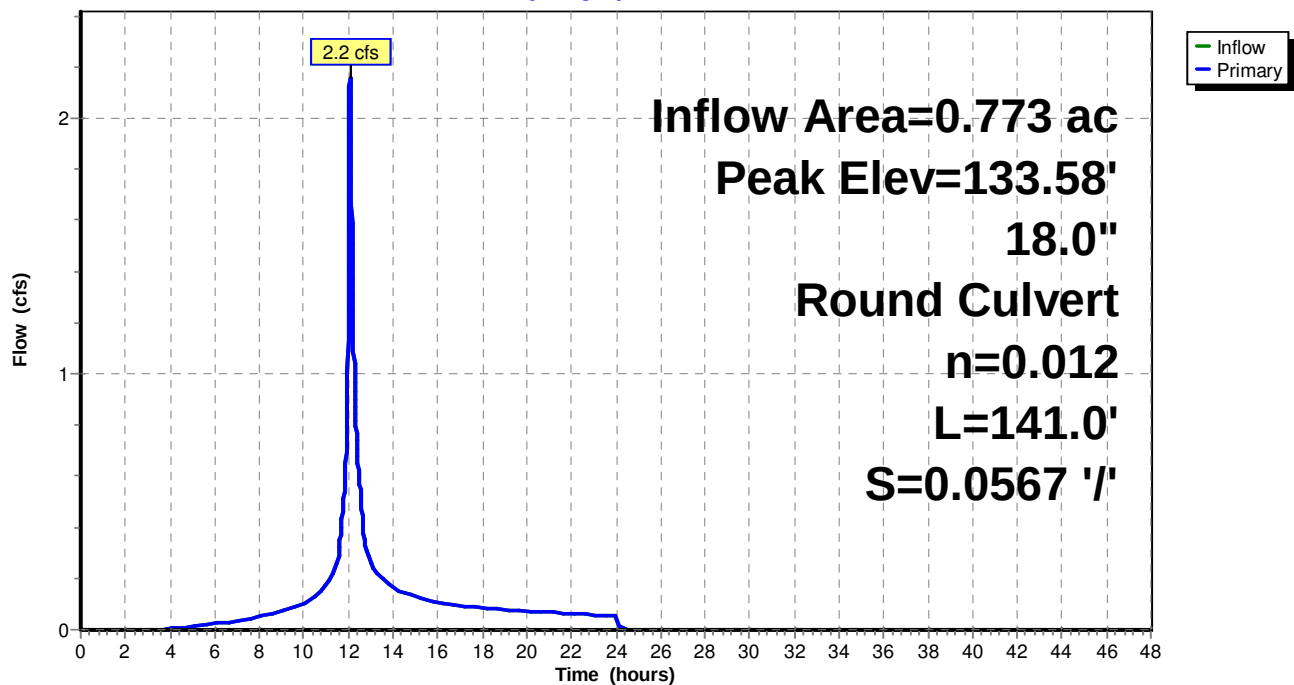
| Device | Routing | Invert  | Outlet Devices                                                                                                                                                                                                  |
|--------|---------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 132.90' | <b>18.0" Round Culvert</b><br>L= 141.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 132.90' / 124.90' S= 0.0567 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.2 cfs @ 12.07 hrs HW=133.57' TW=125.74' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 2.2 cfs @ 2.80 fps)

**Pond PCB2: PCB2**

Hydrograph



**Summary for Pond SF-1: Sediment Forebay 1**

Inflow Area = 1.197 ac, 31.65% Impervious, Inflow Depth = 3.24" for 10-yr event  
 Inflow = 2.8 cfs @ 12.13 hrs, Volume= 0.32 af  
 Outflow = 2.7 cfs @ 12.17 hrs, Volume= 0.32 af, Atten= 5%, Lag= 2.4 min  
 Primary = 2.7 cfs @ 12.17 hrs, Volume= 0.32 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.49' @ 12.17 hrs Surf.Area= 453 sf Storage= 347 cf  
 Flood Elev= 123.35' Surf.Area= 975 sf Storage= 1,642 cf

Plug-Flow detention time= 4.6 min calculated for 0.32 af (100% of inflow)  
 Center-of-Mass det. time= 4.5 min ( 840.1 - 835.5 )

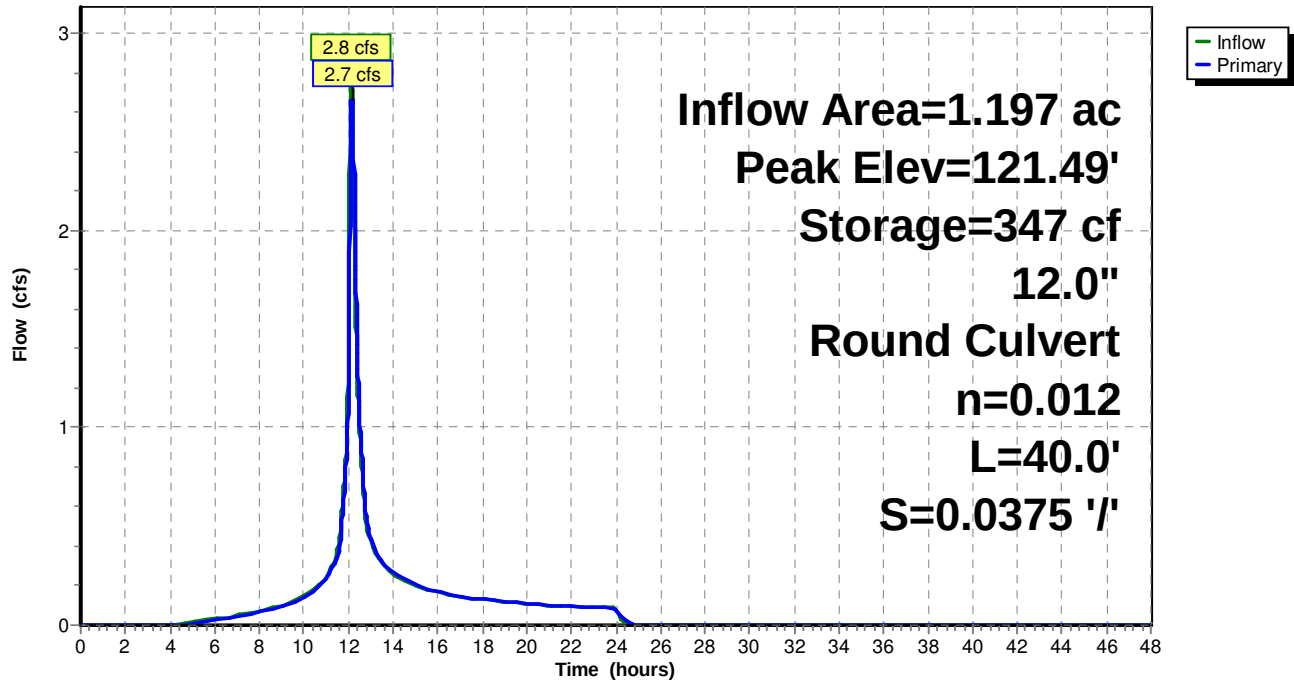
| Volume              | Invert               | Avail.Storage    | Storage Description                                |                           |                     |
|---------------------|----------------------|------------------|----------------------------------------------------|---------------------------|---------------------|
| #1                  | 120.50'              | 1,642 cf         | <b>Detention (Irregular)</b> Listed below (Recalc) |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Inc.Store<br>(cubic-feet)                          | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 120.50              | 254                  | 57.4             | 0                                                  | 0                         | 254                 |
| 121.00              | 348                  | 66.8             | 150                                                | 150                       | 352                 |
| 122.00              | 576                  | 85.6             | 457                                                | 607                       | 592                 |
| 123.35              | 975                  | 111.1            | 1,035                                              | 1,642                     | 1,013               |

| Device | Routing | Invert  | Outlet Devices                                                                                                                                                                                              |
|--------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 120.50' | <b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 120.50' / 119.00' S= 0.0375 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=2.7 cfs @ 12.17 hrs HW=121.49' TW=119.60' (Dynamic Tailwater)  
 ↑**1=Culvert** (Inlet Controls 2.7 cfs @ 3.39 fps)

**Pond SF-1: Sediment Forebay 1**

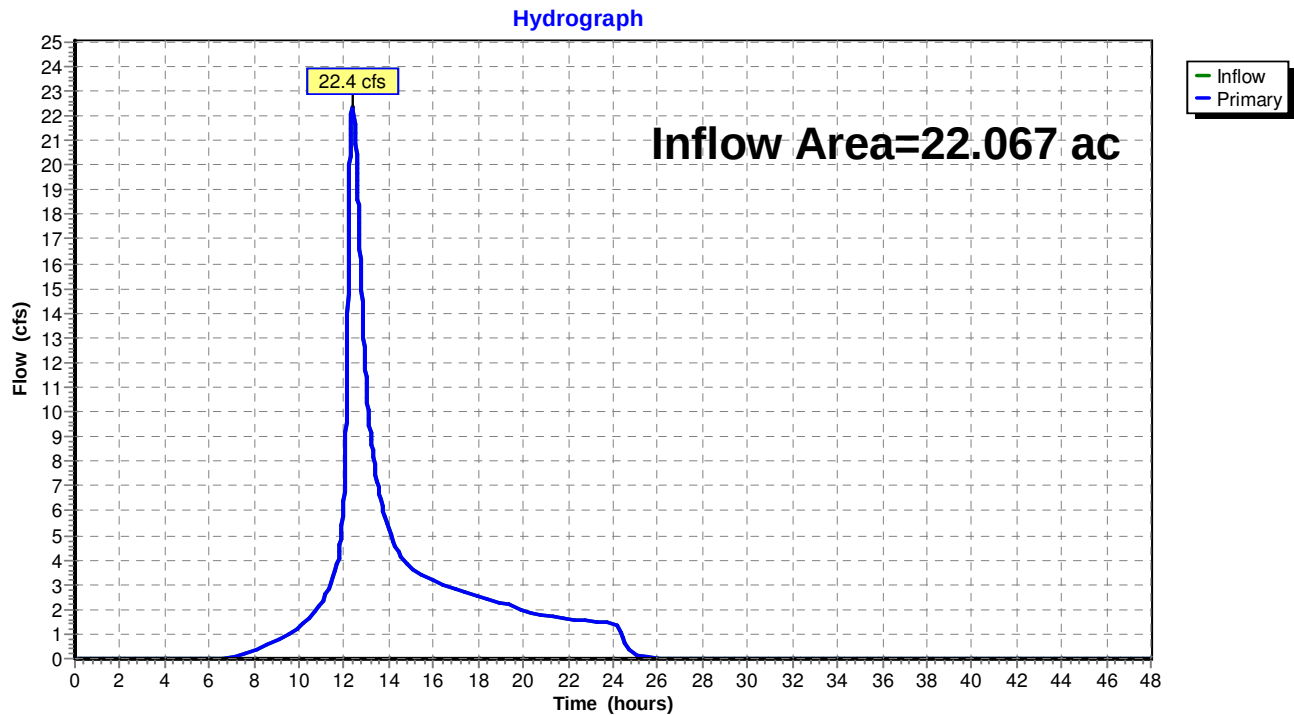
Hydrograph



**Summary for Link C: C**

Inflow Area = 22.067 ac, 5.93% Impervious, Inflow Depth = 2.52" for 10-yr event  
Inflow = 22.4 cfs @ 12.40 hrs, Volume= 4.64 af  
Primary = 22.4 cfs @ 12.40 hrs, Volume= 4.64 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link C: C**

A - 2

NODE LISTING - 25-YR

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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

|                            |                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment A: A</b>   | Runoff Area=1,855 sf 50.40% Impervious Runoff Depth=4.65"<br>Flow Length=38' Slope=0.1180 '/' Tc=6.0 min CN=88 Runoff=0.2 cfs 0.02 af      |
| <b>Subcatchment B: B</b>   | Runoff Area=284,057 sf 3.32% Impervious Runoff Depth=3.11"<br>Flow Length=629' Tc=7.5 min CN=73 Runoff=17.5 cfs 1.69 af                    |
| <b>Subcatchment C1: C1</b> | Runoff Area=52,134 sf 31.65% Impervious Runoff Depth=4.43"<br>Flow Length=642' Tc=13.1 min CN=86 Runoff=3.6 cfs 0.44 af                    |
| <b>Subcatchment C2: C2</b> | Runoff Area=2,662 sf 0.00% Impervious Runoff Depth=3.80"<br>Flow Length=9' Slope=0.3300 '/' Tc=6.0 min CN=80 Runoff=0.2 cfs 0.02 af        |
| <b>Subcatchment C3: C3</b> | Runoff Area=26,456 sf 28.44% Impervious Runoff Depth=4.32"<br>Flow Length=242' Tc=7.8 min CN=85 Runoff=2.2 cfs 0.22 af                     |
| <b>Subcatchment C4: C4</b> | Runoff Area=33,666 sf 39.92% Impervious Runoff Depth=4.54"<br>Flow Length=321' Tc=9.1 min CN=87 Runoff=2.8 cfs 0.29 af                     |
| <b>Subcatchment C5: C5</b> | Runoff Area=126,038 sf 15.54% Impervious Runoff Depth=4.01"<br>Flow Length=636' Tc=9.7 min CN=82 Runoff=9.1 cfs 0.97 af                    |
| <b>Subcatchment C6: C6</b> | Runoff Area=15,050 sf 0.00% Impervious Runoff Depth=3.80"<br>Flow Length=206' Tc=7.3 min CN=80 Runoff=1.1 cfs 0.11 af                      |
| <b>Subcatchment C7: C7</b> | Runoff Area=12,255 sf 0.00% Impervious Runoff Depth=3.80"<br>Flow Length=94' Slope=0.1530 '/' Tc=6.8 min CN=80 Runoff=1.0 cfs 0.09 af      |
| <b>Subcatchment C8: C8</b> | Runoff Area=692,963 sf 0.00% Impervious Runoff Depth=3.40"<br>Flow Length=1,430' Tc=33.4 min CN=76 Runoff=24.2 cfs 4.50 af                 |
| <b>Reach R1: REACH 1</b>   | Avg. Flow Depth=0.17' Max Vel=3.85 fps Inflow=3.4 cfs 0.46 af<br>n=0.022 L=373.0' S=0.0429 '/' Capacity=485.5 cfs Outflow=3.4 cfs 0.46 af  |
| <b>Reach R2: REACH 2</b>   | Avg. Flow Depth=0.21' Max Vel=3.67 fps Inflow=3.4 cfs 0.46 af<br>n=0.022 L=197.0' S=0.0401 '/' Capacity=429.5 cfs Outflow=3.4 cfs 0.46 af  |
| <b>Reach R3: REACH 3</b>   | Avg. Flow Depth=0.84' Max Vel=6.44 fps Inflow=13.9 cfs 1.48 af<br>n=0.022 L=459.0' S=0.0309 '/' Capacity=63.9 cfs Outflow=13.7 cfs 1.48 af |
| <b>Reach R4: REACH 4</b>   | Avg. Flow Depth=1.16' Max Vel=1.58 fps Inflow=13.7 cfs 1.48 af<br>n=0.150 L=65.0' S=0.0362 '/' Capacity=23.1 cfs Outflow=13.6 cfs 1.48 af  |
| <b>Reach R5: REACH 5</b>   | Avg. Flow Depth=0.40' Max Vel=1.06 fps Inflow=5.0 cfs 1.67 af<br>n=0.150 L=15.0' S=0.0667 '/' Capacity=8.2 cfs Outflow=5.0 cfs 1.67 af     |
| <b>Pond BIO-1: BIO-1</b>   | Peak Elev=119.65' Storage=2,215 cf Inflow=3.4 cfs 0.46 af<br>Outflow=3.4 cfs 0.46 af                                                       |

**21074 - Post****21074 24-hr S1 25-yr Rainfall=6.02"**

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**Pond BIO-2: BIO-2**

Peak Elev=99.71' Storage=6,121 cf Inflow=14.6 cfs 1.59 af  
Primary=0.9 cfs 1.05 af Secondary=13.5 cfs 0.53 af Outflow=14.5 cfs 1.59 af

**Pond DET-1: DETENTION POND 1**

Peak Elev=98.66' Storage=12,348 cf Inflow=15.2 cfs 1.67 af  
Primary=5.0 cfs 1.67 af Secondary=0.0 cfs 0.00 af Outflow=5.0 cfs 1.67 af

**Pond PCB1: PCB1**

Peak Elev=125.90' Inflow=4.9 cfs 0.51 af  
18.0" Round Culvert n=0.012 L=170.0' S=0.0459 '/' Outflow=4.9 cfs 0.51 af

**Pond PCB2: PCB2**

Peak Elev=133.67' Inflow=2.8 cfs 0.29 af  
18.0" Round Culvert n=0.012 L=141.0' S=0.0567 '/' Outflow=2.8 cfs 0.29 af

**Pond SF-1: Sediment Forebay 1**

Peak Elev=121.78' Storage=486 cf Inflow=3.6 cfs 0.44 af  
12.0" Round Culvert n=0.012 L=40.0' S=0.0375 '/' Outflow=3.3 cfs 0.44 af

**Link C: C**

Inflow=31.4 cfs 6.64 af  
Primary=31.4 cfs 6.64 af

**Total Runoff Area = 28.630 ac Runoff Volume = 8.34 af Average Runoff Depth = 3.50"**  
**94.60% Pervious = 27.083 ac 5.40% Impervious = 1.547 ac**

A - 2

NODE LISTING - 50-YR

**21074 - Post****21074 24-hr S1 50-yr Rainfall=7.19"**

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 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

|                            |                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment A: A</b>   | Runoff Area=1,855 sf 50.40% Impervious Runoff Depth=5.78"<br>Flow Length=38' Slope=0.1180 '/' Tc=6.0 min CN=88 Runoff=0.2 cfs 0.02 af      |
| <b>Subcatchment B: B</b>   | Runoff Area=284,057 sf 3.32% Impervious Runoff Depth=4.10"<br>Flow Length=629' Tc=7.5 min CN=73 Runoff=22.0 cfs 2.23 af                    |
| <b>Subcatchment C1: C1</b> | Runoff Area=52,134 sf 31.65% Impervious Runoff Depth=5.55"<br>Flow Length=642' Tc=13.1 min CN=86 Runoff=4.3 cfs 0.55 af                    |
| <b>Subcatchment C2: C2</b> | Runoff Area=2,662 sf 0.00% Impervious Runoff Depth=4.87"<br>Flow Length=9' Slope=0.3300 '/' Tc=6.0 min CN=80 Runoff=0.3 cfs 0.02 af        |
| <b>Subcatchment C3: C3</b> | Runoff Area=26,456 sf 28.44% Impervious Runoff Depth=5.43"<br>Flow Length=242' Tc=7.8 min CN=85 Runoff=2.6 cfs 0.28 af                     |
| <b>Subcatchment C4: C4</b> | Runoff Area=33,666 sf 39.92% Impervious Runoff Depth=5.66"<br>Flow Length=321' Tc=9.1 min CN=87 Runoff=3.2 cfs 0.36 af                     |
| <b>Subcatchment C5: C5</b> | Runoff Area=126,038 sf 15.54% Impervious Runoff Depth=5.09"<br>Flow Length=636' Tc=9.7 min CN=82 Runoff=10.9 cfs 1.23 af                   |
| <b>Subcatchment C6: C6</b> | Runoff Area=15,050 sf 0.00% Impervious Runoff Depth=4.87"<br>Flow Length=206' Tc=7.3 min CN=80 Runoff=1.4 cfs 0.14 af                      |
| <b>Subcatchment C7: C7</b> | Runoff Area=12,255 sf 0.00% Impervious Runoff Depth=4.87"<br>Flow Length=94' Slope=0.1530 '/' Tc=6.8 min CN=80 Runoff=1.2 cfs 0.11 af      |
| <b>Subcatchment C8: C8</b> | Runoff Area=692,963 sf 0.00% Impervious Runoff Depth=4.43"<br>Flow Length=1,430' Tc=33.4 min CN=76 Runoff=30.4 cfs 5.87 af                 |
| <b>Reach R1: REACH 1</b>   | Avg. Flow Depth=0.19' Max Vel=4.03 fps Inflow=4.0 cfs 0.58 af<br>n=0.022 L=373.0' S=0.0429 '/' Capacity=485.5 cfs Outflow=3.9 cfs 0.58 af  |
| <b>Reach R2: REACH 2</b>   | Avg. Flow Depth=0.23' Max Vel=3.84 fps Inflow=3.9 cfs 0.58 af<br>n=0.022 L=197.0' S=0.0401 '/' Capacity=429.5 cfs Outflow=3.9 cfs 0.58 af  |
| <b>Reach R3: REACH 3</b>   | Avg. Flow Depth=0.90' Max Vel=6.73 fps Inflow=16.6 cfs 1.87 af<br>n=0.022 L=459.0' S=0.0309 '/' Capacity=63.9 cfs Outflow=16.4 cfs 1.87 af |
| <b>Reach R4: REACH 4</b>   | Avg. Flow Depth=1.26' Max Vel=1.65 fps Inflow=16.4 cfs 1.87 af<br>n=0.150 L=65.0' S=0.0362 '/' Capacity=23.1 cfs Outflow=16.3 cfs 1.87 af  |
| <b>Reach R5: REACH 5</b>   | Avg. Flow Depth=0.43' Max Vel=1.11 fps Inflow=5.9 cfs 2.12 af<br>n=0.150 L=15.0' S=0.0667 '/' Capacity=8.2 cfs Outflow=5.9 cfs 2.12 af     |
| <b>Pond BIO-1: BIO-1</b>   | Peak Elev=119.67' Storage=2,243 cf Inflow=4.0 cfs 0.58 af<br>Outflow=4.0 cfs 0.58 af                                                       |

**21074 - Post****21074 24-hr S1 50-yr Rainfall=7.19"**

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**Pond BIO-2: BIO-2**

Peak Elev=99.74' Storage=6,233 cf Inflow=17.5 cfs 2.01 af  
Primary=0.9 cfs 1.21 af Secondary=16.4 cfs 0.79 af Outflow=17.3 cfs 2.01 af

**Pond DET-1: DETENTION POND 1**

Peak Elev=99.45' Storage=16,780 cf Inflow=18.2 cfs 2.12 af  
Primary=5.9 cfs 2.12 af Secondary=0.0 cfs 0.00 af Outflow=5.9 cfs 2.12 af

**Pond PCB1: PCB1**

Peak Elev=126.02' Inflow=5.8 cfs 0.64 af  
18.0" Round Culvert n=0.012 L=170.0' S=0.0459 '/' Outflow=5.8 cfs 0.64 af

**Pond PCB2: PCB2**

Peak Elev=133.75' Inflow=3.2 cfs 0.36 af  
18.0" Round Culvert n=0.012 L=141.0' S=0.0567 '/' Outflow=3.2 cfs 0.36 af

**Pond SF-1: Sediment Forebay 1**

Peak Elev=122.04' Storage=628 cf Inflow=4.3 cfs 0.55 af  
12.0" Round Culvert n=0.012 L=40.0' S=0.0375 '/' Outflow=3.9 cfs 0.55 af

**Link C: C**

Inflow=39.0 cfs 8.57 af  
Primary=39.0 cfs 8.57 af

**Total Runoff Area = 28.630 ac Runoff Volume = 10.82 af Average Runoff Depth = 4.53"**  
**94.60% Pervious = 27.083 ac 5.40% Impervious = 1.547 ac**

# APPENDIX B

## DESIGN

B – 1

STORMWATER BEST MANAGEMENT  
PRACTICES



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

**Type/Node Name:**

**BIO-RETENTION BASIN 1 (BIO-1)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

|                                                                         |                                                                                                                                    |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Yes                                            | Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).                                           |
| <input type="text" value="1.26"/> ac                                    | A = Area draining to the practice                                                                                                  |
| <input type="text" value="0.38"/> ac                                    | $A_I$ = Impervious area draining to the practice                                                                                   |
| <input type="text" value="0.30"/> decimal                               | I = Percent impervious area draining to the practice, in decimal form                                                              |
| <input type="text" value="0.32"/> unitless                              | $R_v$ = Runoff coefficient = $0.05 + (0.9 \times I)$                                                                               |
| <input type="text" value="0.40"/> ac-in                                 | WQV = $1'' \times R_v \times A$                                                                                                    |
| <input type="text" value="1,463"/> cf                                   | WQV conversion (ac-in $\times$ 43,560 sf/ac $\times$ 1ft/12")                                                                      |
| <input type="text" value="366"/> cf                                     | 25% $\times$ WQV (check calc for sediment forebay volume)                                                                          |
| <input type="text" value="1,097"/> cf                                   | 75% $\times$ WQV (check calc for surface sand filter volume)                                                                       |
| <input type="text" value="Sediment Forebay"/>                           | Method of Pretreatment? (not required for clean or roof runoff)                                                                    |
| <input type="text" value="1,642"/> cf                                   | $V_{SED}$ = Sediment forebay volume, if used for pretreatment <span style="float: right;"><math>\geq 25\%WQV</math></span>         |
| Calculate time to drain if system IS NOT underdrained:                  |                                                                                                                                    |
| <input type="text" value="sf"/>                                         | $A_{SA}$ = Surface area of the practice                                                                                            |
| <input type="text" value="iph"/>                                        | $K_{sat\_DESIGN}$ = Design infiltration rate <sup>1</sup>                                                                          |
| <input type="text" value="Yes/No"/>                                     | If $K_{sat}$ (prior to factor of safety) is $< 0.50$ iph, has an underdrain been provided?<br>(Use the calculations below)         |
| <input type="text" value="-"/> hours                                    | $T_{DRAIN}$ = Drain time = $V / (A_{SA} * I_{DESIGN})$ <span style="float: right;"><math>\leq 72\text{-hrs}</math></span>          |
| Calculate time to drain if system IS underdrained:                      |                                                                                                                                    |
| <input type="text" value="119.46"/> ft                                  | $E_{WQV}$ = Elevation of WQV (attach stage-storage table)                                                                          |
| <input type="text" value="0.40"/> cfs                                   | $Q_{WQV}$ = Discharge at the $E_{WQV}$ (attach stage-discharge table)                                                              |
| <input type="text" value="2.03"/> hours                                 | $T_{DRAIN}$ = Drain time = $2WQV/Q_{WQV}$ <span style="float: right;"><math>\leq 72\text{-hrs}</math></span>                       |
| <input type="text" value="117.00"/> feet                                | $E_{FC}$ = Elevation of the bottom of the filter course material <sup>2</sup>                                                      |
| <input type="text" value="116.00"/> feet                                | $E_{UD}$ = Invert elevation of the underdrain (UD), if applicable                                                                  |
| <input type="text" value="113.50"/> feet                                | $E_{SHWT}$ = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)                                         |
| <input type="text" value="111.00"/> feet                                | $E_{ROCK}$ = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)                                      |
| <input type="text" value="1.00"/> feet                                  | $D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course <span style="float: right;"><math>\geq 1'</math></span>        |
| <input type="text" value="6.00"/> feet                                  | $D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course <span style="float: right;"><math>\geq 1'</math></span> |
| <input type="text" value="3.50"/> feet                                  | $D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course <span style="float: right;"><math>\geq 1'</math></span>    |
| <input type="text" value="119.67"/> ft                                  | Peak elevation of the 50-year storm event (infiltration can be used in analysis)                                                   |
| <input type="text" value="120.25"/> ft                                  | Elevation of the top of the practice                                                                                               |
| <input type="text" value="YES"/>                                        | 50 peak elevation $\leq$ Elevation of the top of the practice <span style="float: right;"><math>\leftarrow</math> yes</span>       |
| <b>If a surface sand filter or underground sand filter is proposed:</b> |                                                                                                                                    |
| <input type="text" value="YES"/> ac                                     | Drainage Area check. <span style="float: right;"><math>&lt; 10</math> ac</span>                                                    |
| <input type="text" value="cf"/>                                         | V = Volume of storage <sup>3</sup> (attach a stage-storage table) <span style="float: right;"><math>\geq 75\%WQV</math></span>     |
| <input type="text" value="inches"/>                                     | $D_{FC}$ = Filter course thickness <span style="float: right;">18", or 24" if within GPA</span>                                    |
| <input type="text" value="Sheet"/>                                      | Note what sheet in the plan set contains the filter course specification.                                                          |
| <input type="text" value="Yes/No"/>                                     | Access grate provided? <span style="float: right;"><math>\leftarrow</math> yes</span>                                              |

|                                        |        |                                                                                                                        |                           |
|----------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------|---------------------------|
| YES                                    | ac     | Drainage Area no larger than 5 ac?                                                                                     | ← yes                     |
| 1,519                                  | cf     | V = Volume of storage <sup>3</sup> (attach a stage-storage table)                                                      | ≥ WQV                     |
| 18.0                                   | inches | D <sub>FC</sub> = Filter course thickness                                                                              | 18", or 24" if within GPA |
| Sheet                                  | 30     | Note what sheet in the plan set contains the filter course specification                                               |                           |
| 3.0                                    | :1     | Pond side slopes                                                                                                       | ≥ 3:1                     |
| Sheet                                  |        | Note what sheet in the plan set contains the planting plans and surface cover                                          |                           |
| <b>If porous pavement is proposed:</b> |        |                                                                                                                        |                           |
|                                        | acres  | Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)<br>A <sub>SA</sub> = Surface area of the pervious pavement |                           |
|                                        | :1     | Ratio of the contributing area to the pervious surface area                                                            | ≤ 5:1                     |
|                                        | inches | D <sub>FC</sub> = Filter course thickness                                                                              | 12", or 18" if within GPA |
| Sheet                                  |        | Note what sheet in the plan set contains the filter course spec.                                                       | mod. 304.1 (see spec)     |

- Designer's Notes:

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**21074 - Post**

21074 24-hr S1 50-yr Rainfall=7.19"

Prepared by {enter your company name here}

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**Summary for Pond SF-1: Sediment Forebay 1**

Inflow Area = 1.197 ac, 31.65% Impervious, Inflow Depth = 5.55" for 50-yr event  
 Inflow = 4.3 cfs @ 12.13 hrs, Volume= 0.55 af  
 Outflow = 3.9 cfs @ 12.19 hrs, Volume= 0.55 af, Atten= 10%, Lag= 3.5 min  
 Primary = 3.9 cfs @ 12.19 hrs, Volume= 0.55 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 122.04' @ 12.19 hrs Surf.Area= 585 sf Storage= 628 cf

Flood Elev= 123.35' Surf.Area= 975 sf Storage= 1,642 cf

Plug-Flow detention time= 4.0 min calculated for 0.55 af (100% of inflow)

Center-of-Mass det. time= 3.8 min ( 820.0 - 816.1 )

| Volume | Invert  | Avail. Storage | Storage Description                         |
|--------|---------|----------------|---------------------------------------------|
| #1     | 120.50' | 1,642 cf       | Detention (Irregular) Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
|---------------------|----------------------|------------------|---------------------------|---------------------------|---------------------|
| 120.50              | 254                  | 57.4             | 0                         | 0                         | 254                 |
| 121.00              | 348                  | 66.8             | 150                       | 150                       | 352                 |
| 122.00              | 576                  | 85.6             | 457                       | 607                       | 592                 |
| 123.35              | 975                  | 111.1            | 1,035                     | 1,642                     | 1,013               |

| Device | Routing | Invert  | Outlet Devices                                                                                                                                                                                              |
|--------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 120.50' | <b>12.0" Round Culvert</b> L= 40.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 120.50' / 119.00' S= 0.0375 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=3.8 cfs @ 12.19 hrs HW=122.04' TW=119.67' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 3.8 cfs @ 4.90 fps)

**21074 - Post**21074 24-hr S1 **50-yr** Rainfall=7.19"

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**Summary for Pond BIO-1: BIO-1**

Inflow Area = 1.258 ac, 30.11% Impervious, Inflow Depth = 5.52" for 50-yr event  
 Inflow = 4.0 cfs @ 12.18 hrs, Volume= 0.58 af  
 Outflow = 4.0 cfs @ 12.20 hrs, Volume= 0.58 af, Atten= 0%, Lag= 0.9 min  
 Primary = 4.0 cfs @ 12.20 hrs, Volume= 0.58 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Peak Elev= 119.67'** @ 12.20 hrs Surf.Area= 1,646 sf Storage= 2,243 cf

Flood Elev= 120.25' Surf.Area= 2,143 sf Storage= 3,310 cf

Plug-Flow detention time= 42.4 min calculated for 0.58 af (100% of inflow)

Center-of-Mass det. time= 39.9 min ( 860.4 - 820.5 )

| Volume              | Invert               | Avail.Storage    | Storage Description                          |                           |                           |                     |
|---------------------|----------------------|------------------|----------------------------------------------|---------------------------|---------------------------|---------------------|
| #1                  | 115.75'              | 3,310 cf         | <b>BIO (Irregular)</b> Listed below (Recalc) |                           |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Voids<br>(%)                                 | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 115.75              | 1,138                | 134.2            | 0.0                                          | 0                         | 0                         | 1,138               |
| 116.75              | 1,138                | 134.2            | 35.0                                         | 398                       | 398                       | 1,272               |
| 117.00              | 1,138                | 134.2            | 20.0                                         | 57                        | 455                       | 1,306               |
| 118.50              | 1,138                | 134.2            | 10.0                                         | 171                       | 626                       | 1,507               |
| 119.00              | 1,346                | 143.6            | 100.0                                        | 620                       | 1,246                     | 1,726               |
| 119.50              | 1,569                | 153.1            | 100.0                                        | 728                       | 1,974                     | 1,962               |
| 120.00              | 1,805                | 162.5            | 100.0                                        | 843                       | 2,817                     | 2,211               |
| 120.25              | 2,143                | 175.1            | 100.0                                        | 493                       | 3,310                     | 2,552               |

| Device | Routing  | Invert         | Outlet Devices                                                                                                                                                                                                |
|--------|----------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 115.00'        | <b>15.0" Round Culvert</b> L= 18.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 115.00' / 114.00' S= 0.0556 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf   |
| #2     | Device 1 | 116.00'        | <b>6.0" Round Culvert</b> L= 45.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.00' / 116.00' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 2 | 115.75'        | <b>10.000 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'                                                                                                                                            |
| #4     | Device 1 | <b>119.50'</b> | <b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                       |

**Primary OutFlow** Max=4.0 cfs @ 12.20 hrs HW=119.67' TW=114.19' (Dynamic Tailwater)

- 1=Culvert (Passes 4.0 cfs of 11.9 cfs potential flow)  
 2=Culvert (Passes 0.4 cfs of 1.3 cfs potential flow)  
 3=Exfiltration (Exfiltration Controls 0.4 cfs)  
 4=Orifice/Grate (Weir Controls 3.6 cfs @ 1.34 fps)

171+620+728=  
1,519 CF > 1,463 (WQV)

**21074 - Post**

21074 24-hr S1 50-yr Rainfall=7.19"

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**Stage-Area-Storage for Pond BIO-1: BIO-1 (continued)**

| Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 118.99              | 1,342              | 1,233                   | 119.53              | 1,583              | 2,021                   |
| 119.00              | 1,346              | 1,246                   | 119.54              | 1,587              | 2,037                   |
| 119.01              | 1,350              | 1,260                   | 119.55              | 1,592              | 2,053                   |
| 119.02              | 1,355              | 1,273                   | 119.56              | 1,596              | 2,069                   |
| 119.03              | 1,359              | 1,287                   | 119.57              | 1,601              | 2,085                   |
| 119.04              | 1,363              | 1,300                   | 119.58              | 1,606              | 2,101                   |
| 119.05              | 1,368              | 1,314                   | 119.59              | 1,610              | 2,117                   |
| 119.06              | 1,372              | 1,328                   | 119.60              | 1,615              | 2,133                   |
| 119.07              | 1,376              | 1,341                   | 119.61              | 1,620              | 2,150                   |
| 119.08              | 1,381              | 1,355                   | 119.62              | 1,624              | 2,166                   |
| 119.09              | 1,385              | 1,369                   | 119.63              | 1,629              | 2,182                   |
| 119.10              | 1,389              | 1,383                   | 119.64              | 1,633              | 2,198                   |
| 119.11              | 1,394              | 1,397                   | 119.65              | 1,638              | 2,215                   |
| 119.12              | 1,398              | 1,411                   | 119.66              | 1,643              | 2,231                   |
| 119.13              | 1,402              | 1,425                   | 119.67              | 1,647              | 2,248                   |
| 119.14              | 1,407              | 1,439                   | 119.68              | 1,652              | 2,264                   |
| 119.15              | 1,411              | 1,453                   | 119.69              | 1,657              | 2,281                   |
| 119.16              | 1,416              | 1,467                   | 119.70              | 1,661              | 2,297                   |
| 119.17              | 1,420              | 1,481                   | 119.71              | 1,666              | 2,314                   |
| 119.18              | 1,424              | 1,495                   | 119.72              | 1,671              | 2,331                   |
| 119.19              | 1,429              | 1,510                   | 119.73              | 1,676              | 2,347                   |
| 119.20              | 1,433              | 1,524                   | 119.74              | 1,680              | 2,364                   |
| 119.21              | 1,438              | 1,538                   | 119.75              | 1,685              | 2,381                   |
| 119.22              | 1,442              | 1,553                   | 119.76              | 1,690              | 2,398                   |
| 119.23              | 1,446              | 1,567                   | 119.77              | 1,694              | 2,415                   |
| 119.24              | 1,451              | 1,582                   | 119.78              | 1,699              | 2,432                   |
| 119.25              | 1,455              | 1,596                   | 119.79              | 1,704              | 2,449                   |
| 119.26              | 1,460              | 1,611                   | 119.80              | 1,709              | 2,466                   |
| 119.27              | 1,464              | 1,625                   | 119.81              | 1,713              | 2,483                   |
| 119.28              | 1,469              | 1,640                   | 119.82              | 1,718              | 2,500                   |
| 119.29              | 1,473              | 1,655                   | 119.83              | 1,723              | 2,517                   |
| 119.30              | 1,478              | 1,670                   | 119.84              | 1,728              | 2,534                   |
| 119.31              | 1,482              | 1,684                   | 119.85              | 1,732              | 2,552                   |
| 119.32              | 1,487              | 1,699                   | 119.86              | 1,737              | 2,569                   |
| 119.33              | 1,491              | 1,714                   | 119.87              | 1,742              | 2,586                   |
| 119.34              | 1,496              | 1,729                   | 119.88              | 1,747              | 2,604                   |
| 119.35              | 1,500              | 1,744                   | 119.89              | 1,752              | 2,621                   |
| 119.36              | 1,505              | 1,759                   | 119.90              | 1,756              | 2,639                   |
| 119.37              | 1,509              | 1,774                   | 119.91              | 1,761              | 2,657                   |
| 119.38              | 1,514              | 1,789                   | 119.92              | 1,766              | 2,674                   |
| 119.39              | 1,518              | 1,804                   | 119.93              | 1,771              | 2,692                   |
| 119.40              | 1,523              | 1,820                   | 119.94              | 1,776              | 2,710                   |
| 119.41              | 1,528              | 1,835                   | 119.95              | 1,781              | 2,727                   |
| 119.42              | 1,532              | 1,850                   | 119.96              | 1,786              | 2,745                   |
| 119.43              | 1,537              | 1,866                   | 119.97              | 1,790              | 2,763                   |
| 119.44              | 1,541              | 1,881                   | 119.98              | 1,795              | 2,781                   |
| 119.45              | 1,546              | 1,896                   | 119.99              | 1,800              | 2,799                   |
| 119.46              | 1,551              | 1,912                   | 120.00              | 1,805              | 2,817                   |
| 119.47              | 1,555              | 1,927                   | 120.01              | 1,818              | 2,835                   |
| 119.48              | 1,560              | 1,943                   | 120.02              | 1,831              | 2,853                   |
| 119.49              | 1,564              | 1,959                   | 120.03              | 1,844              | 2,872                   |
| 119.50              | 1,569              | 1,974                   | 120.04              | 1,857              | 2,890                   |
| 119.51              | 1,574              | 1,990                   | 120.05              | 1,870              | 2,909                   |
| 119.52              | 1,578              | 2,006                   | 120.06              | 1,883              | 2,928                   |

WQV = 1,463  
1,463+398+57=  
1,918 CF

**21074 - Post**

21074 24-hr S1 50-yr Rainfall=7.19"

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**Stage-Discharge for Pond BIO-1: BIO-1**

| Elevation<br>(feet) | Primary<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|---------------------|------------------|---------------------|------------------|
| 115.75              | 0.0              | 118.45              | 0.3              |
| 115.80              | 0.0              | 118.50              | 0.3              |
| 115.85              | 0.0              | 118.55              | 0.3              |
| 115.90              | 0.0              | 118.60              | 0.3              |
| 115.95              | 0.0              | 118.65              | 0.3              |
| 116.00              | 0.0              | 118.70              | 0.3              |
| 116.05              | 0.0              | 118.75              | 0.3              |
| 116.10              | 0.0              | 118.80              | 0.3              |
| 116.15              | 0.0              | 118.85              | 0.3              |
| 116.20              | 0.0              | 118.90              | 0.3              |
| 116.25              | 0.1              | 118.95              | 0.3              |
| 116.30              | 0.1              | 119.00              | 0.3              |
| 116.35              | 0.1              | 119.05              | 0.3              |
| 116.40              | 0.1              | 119.10              | 0.3              |
| 116.45              | 0.2              | 119.15              | 0.3              |
| 116.50              | 0.2              | 119.20              | 0.3              |
| 116.55              | 0.3              | 119.25              | 0.3              |
| 116.60              | 0.3              | 119.30              | 0.3              |
| 116.65              | 0.3              | 119.35              | 0.3              |
| 116.70              | 0.3              | 119.40              | 0.4              |
| 116.75              | 0.3              | 119.45              | 0.4              |
| 116.80              | 0.3              | 119.50              | 0.4              |
| 116.85              | 0.3              | 119.55              | 1.0              |
| 116.90              | 0.3              | 119.60              | 2.0              |
| 116.95              | 0.3              | 119.65              | 3.4              |
| 117.00              | 0.3              | 119.70              | 5.1              |
| 117.05              | 0.3              | 119.75              | 6.9              |
| 117.10              | 0.3              | 119.80              | 9.0              |
| 117.15              | 0.3              | 119.85              | 11.2             |
| 117.20              | 0.3              | 119.90              | 12.2             |
| 117.25              | 0.3              | 119.95              | 12.3             |
| 117.30              | 0.3              | 120.00              | 12.4             |
| 117.35              | 0.3              | 120.05              | 12.4             |
| 117.40              | 0.3              | 120.10              | 12.5             |
| 117.45              | 0.3              | 120.15              | 12.6             |
| 117.50              | 0.3              | 120.20              | 12.6             |
| 117.55              | 0.3              | 120.25              | 12.7             |
| 117.60              | 0.3              |                     |                  |
| 117.65              | 0.3              |                     |                  |
| 117.70              | 0.3              |                     |                  |
| 117.75              | 0.3              |                     |                  |
| 117.80              | 0.3              |                     |                  |
| 117.85              | 0.3              |                     |                  |
| 117.90              | 0.3              |                     |                  |
| 117.95              | 0.3              |                     |                  |
| 118.00              | 0.3              |                     |                  |
| 118.05              | 0.3              |                     |                  |
| 118.10              | 0.3              |                     |                  |
| 118.15              | 0.3              |                     |                  |
| 118.20              | 0.3              |                     |                  |
| 118.25              | 0.3              |                     |                  |
| 118.30              | 0.3              |                     |                  |
| 118.35              | 0.3              |                     |                  |
| 118.40              | 0.3              |                     |                  |



## FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

**Type/Node Name:**

**BIO-RETENTION BASIN 2 (BIO-2)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

|                                                                         |                                                                                                                                 |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Yes                                            | Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).                                        |
| <input type="text" value="4.61"/> ac                                    | A = Area draining to the practice                                                                                               |
| <input type="text" value="0.93"/> ac                                    | A <sub>I</sub> = Impervious area draining to the practice                                                                       |
| <input type="text" value="0.20"/> decimal                               | I = Percent impervious area draining to the practice, in decimal form                                                           |
| <input type="text" value="0.23"/> unitless                              | R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)                                                                          |
| <input type="text" value="1.07"/> ac-in                                 | WQV = 1" x R <sub>v</sub> x A                                                                                                   |
| <input type="text" value="3,875"/> cf                                   | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")                                                                                 |
| <input type="text" value="969"/> cf                                     | 25% x WQV (check calc for sediment forebay volume)                                                                              |
| <input type="text" value="2,906"/> cf                                   | 75% x WQV (check calc for surface sand filter volume)                                                                           |
| <input type="text" value="Swale"/>                                      | Method of Pretreatment? (not required for clean or roof runoff)                                                                 |
| <input type="text" value="N/A"/> cf                                     | V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment <span style="float: right;">≥ 25%WQV</span>                |
| <b>Calculate time to drain if system IS NOT underdrained:</b>           |                                                                                                                                 |
| <input type="text" value=""/> sf                                        | A <sub>SA</sub> = Surface area of the practice                                                                                  |
| <input type="text" value=""/> iph                                       | K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>1</sup>                                                      |
| <input type="text" value=""/> Yes/No                                    | If K <sub>sat</sub> (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?<br>(Use the calculations below) |
| <input type="text" value="-"/> hours                                    | T <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> ) <span style="float: right;">≤ 72-hrs</span>      |
| <b>Calculate time to drain if system IS underdrained:</b>               |                                                                                                                                 |
| <input type="text" value="99.46"/> ft                                   | E <sub>WQV</sub> = Elevation of WQV (attach stage-storage table)                                                                |
| <input type="text" value="0.90"/> cfs                                   | Q <sub>WQV</sub> = Discharge at the E <sub>WQV</sub> (attach stage-discharge table)                                             |
| <input type="text" value="2.39"/> hours                                 | T <sub>DRAIN</sub> = Drain time = 2WQV/Q <sub>WQV</sub> <span style="float: right;">≤ 72-hrs</span>                             |
| <input type="text" value="97.00"/> feet                                 | E <sub>FC</sub> = Elevation of the bottom of the filter course material <sup>2</sup>                                            |
| <input type="text" value="96.00"/> feet                                 | E <sub>UD</sub> = Invert elevation of the underdrain (UD), if applicable                                                        |
| <input type="text" value="94.83"/> feet                                 | E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)                               |
| <input type="text" value="92.17"/> feet                                 | E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)                            |
| <input type="text" value="1.00"/> feet                                  | D <sub>FC to UD</sub> = Depth to UD from the bottom of the filter course <span style="float: right;">≥ 1'</span>                |
| <input type="text" value="4.83"/> feet                                  | D <sub>FC to ROCK</sub> = Depth to bedrock from the bottom of the filter course <span style="float: right;">≥ 1'</span>         |
| <input type="text" value="2.17"/> feet                                  | D <sub>FC to SHWT</sub> = Depth to SHWT from the bottom of the filter course <span style="float: right;">≥ 1'</span>            |
| <input type="text" value="99.74"/> ft                                   | Peak elevation of the 50-year storm event (infiltration can be used in analysis)                                                |
| <input type="text" value="100.25"/> ft                                  | Elevation of the top of the practice                                                                                            |
| <input type="text" value="YES"/>                                        | 50 peak elevation ≤ Elevation of the top of the practice <span style="float: right;">← yes</span>                               |
| <b>If a surface sand filter or underground sand filter is proposed:</b> |                                                                                                                                 |
| <input type="text" value="YES"/> ac                                     | Drainage Area check. <span style="float: right;">&lt; 10 ac</span>                                                              |
| <input type="text" value=""/> cf                                        | V = Volume of storage <sup>3</sup> (attach a stage-storage table) <span style="float: right;">≥ 75%WQV</span>                   |
| <input type="text" value=""/> inches                                    | D <sub>FC</sub> = Filter course thickness <span style="float: right;">18", or 24" if within GPA</span>                          |
| <input type="text" value=""/> Sheet                                     | Note what sheet in the plan set contains the filter course specification.                                                       |
| <input type="text" value=""/> Yes/No                                    | Access grate provided? <span style="float: right;">← yes</span>                                                                 |

|                                        |        |                                                                                                                        |                           |
|----------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------|---------------------------|
| YES                                    | ac     | Drainage Area no larger than 5 ac?                                                                                     | ← yes                     |
| 4,017                                  | cf     | V = Volume of storage <sup>3</sup> (attach a stage-storage table)                                                      | ≥ WQV                     |
| 18.0                                   | inches | D <sub>FC</sub> = Filter course thickness                                                                              | 18", or 24" if within GPA |
| Sheet                                  | 30     | Note what sheet in the plan set contains the filter course specification                                               |                           |
| 3.0                                    | :1     | Pond side slopes                                                                                                       | ≥ 3:1                     |
| Sheet                                  |        | Note what sheet in the plan set contains the planting plans and surface cover                                          |                           |
| <b>If porous pavement is proposed:</b> |        |                                                                                                                        |                           |
|                                        | acres  | Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)<br>A <sub>SA</sub> = Surface area of the pervious pavement |                           |
|                                        | :1     | Ratio of the contributing area to the pervious surface area                                                            | ≤ 5:1                     |
|                                        | inches | D <sub>FC</sub> = Filter course thickness                                                                              | 12", or 18" if within GPA |
| Sheet                                  |        | Note what sheet in the plan set contains the filter course spec.                                                       | mod. 304.1 (see spec)     |

1. Rate of the limiting layer (either the filter course or the underlying soil).  $K_{sat\_design}$  includes factor of safety. 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 structure, 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:

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**21074 - Post**21074 24-hr S1 **50-yr** Rainfall=7.19"

Prepared by {enter your company name here}

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**Summary for Pond BIO-2: BIO-2**

Inflow Area = 4.619 ac, 20.15% Impervious, Inflow Depth = 5.22" for 50-yr event  
 Inflow = 17.5 cfs @ 12.10 hrs, Volume= 2.01 af  
 Outflow = 17.3 cfs @ 12.11 hrs, Volume= 2.01 af, Atten= 1%, Lag= 0.7 min  
 Primary = 0.9 cfs @ 12.11 hrs, Volume= 1.21 af  
 Secondary = 16.4 cfs @ 12.11 hrs, Volume= 0.79 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Starting Elev= 96.00' Surf.Area= 3,193 sf Storage= 279 cf

**Peak Elev= 99.74'** @ 12.11 hrs Surf.Area= 4,062 sf Storage= 6,233 cf (5,953 cf above start)

Flood Elev= 100.25' Surf.Area= 4,862 sf Storage= 8,470 cf (8,190 cf above start)

Plug-Flow detention time= 44.5 min calculated for 2.00 af (100% of inflow)

Center-of-Mass det. time= 40.6 min ( 867.2 - 826.6 )

| Volume              | Invert               | Avail.Storage    | Storage Description                                        |                           |                           |                     |
|---------------------|----------------------|------------------|------------------------------------------------------------|---------------------------|---------------------------|---------------------|
| #1                  | 95.75'               | 8,470 cf         | <b>Surface Bowl Area (Irregular)</b> Listed below (Recalc) |                           |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Voids<br>(%)                                               | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 95.75               | 3,193                | 223.4            | 0.0                                                        | 0                         | 0                         | 3,193               |
| 96.75               | 3,193                | 223.4            | 35.0                                                       | 1,118                     | 1,118                     | 3,416               |
| 97.00               | 3,193                | 223.4            | 20.0                                                       | 160                       | 1,277                     | 3,472               |
| 98.50               | 3,193                | 223.4            | 10.0                                                       | <b>479</b>                | 1,756                     | 3,807               |
| 99.00               | 3,536                | 232.9            | 100.0                                                      | 1,682                     | 3,438                     | 4,171               |
| 99.50               | 3,892                | 242.3            | 100.0                                                      | <b>1,856</b>              | 5,294                     | 4,545               |
| 100.00              | 4,257                | 257.2            | 100.0                                                      | 2,037                     | 7,331                     | 5,151               |
| 100.25              | 4,862                | 272.6            | 100.0                                                      | 1,139                     | 8,470                     | 5,803               |

| Device | Routing   | Invert        | Outlet Devices                                                                                                                                                                                                                            |
|--------|-----------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.00'        | <b>6.0" Round Culvert X 3.00</b><br>L= 52.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 96.00' / 96.00' S= 0.0000 ' / ' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf                   |
| #2     | Device 1  | 95.75'        | <b>10.000 in/hr Exfiltration over Surface area</b> Phase-In= 0.10'                                                                                                                                                                        |
| #3     | Secondary | <b>99.50'</b> | <b>56.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85<br>3.07 3.20 3.32 |

**Primary OutFlow** Max=0.9 cfs @ 12.11 hrs HW=99.74' TW=98.22' (Dynamic Tailwater)↑ **1=Culvert** (Passes 0.9 cfs of 2.5 cfs potential flow)↑ **2=Exfiltration** (Exfiltration Controls 0.9 cfs)**Secondary OutFlow** Max=16.4 cfs @ 12.11 hrs HW=99.74' TW=98.22' (Dynamic Tailwater)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 16.4 cfs @ 1.24 fps)

479+1,682+1,856 =  
4,017 CF > 3,875 (WQV)

**21074 - Post**

21074 24-hr S1 50-yr Rainfall=7.19"

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**Stage-Area-Storage for Pond BIO-2: BIO-2 (continued)**

| Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Surface<br>(sq-ft) | Storage<br>(cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 98.99               | 3,529              | 3,402                   | 99.53               | 3,913              | 5,411                   |
| 99.00               | 3,536              | 3,438                   | 99.54               | 3,921              | 5,450                   |
| 99.01               | 3,543              | 3,473                   | 99.55               | 3,928              | 5,489                   |
| 99.02               | 3,550              | 3,509                   | 99.56               | 3,935              | 5,529                   |
| 99.03               | 3,557              | 3,544                   | 99.57               | 3,942              | 5,568                   |
| 99.04               | 3,564              | 3,580                   | 99.58               | 3,949              | 5,608                   |
| 99.05               | 3,571              | 3,615                   | 99.59               | 3,956              | 5,647                   |
| 99.06               | 3,578              | 3,651                   | 99.60               | 3,964              | 5,687                   |
| 99.07               | 3,585              | 3,687                   | 99.61               | 3,971              | 5,726                   |
| 99.08               | 3,592              | 3,723                   | 99.62               | 3,978              | 5,766                   |
| 99.09               | 3,599              | 3,759                   | 99.63               | 3,985              | 5,806                   |
| 99.10               | 3,606              | 3,795                   | 99.64               | 3,993              | 5,846                   |
| 99.11               | 3,613              | 3,831                   | 99.65               | 4,000              | 5,886                   |
| 99.12               | 3,620              | 3,867                   | 99.66               | 4,007              | 5,926                   |
| 99.13               | 3,627              | 3,903                   | 99.67               | 4,014              | 5,966                   |
| 99.14               | 3,634              | 3,940                   | 99.68               | 4,022              | 6,006                   |
| 99.15               | 3,641              | 3,976                   | 99.69               | 4,029              | 6,046                   |
| 99.16               | 3,648              | 4,012                   | 99.70               | 4,036              | 6,087                   |
| 99.17               | 3,655              | 4,049                   | 99.71               | 4,043              | 6,127                   |
| 99.18               | 3,662              | 4,085                   | 99.72               | 4,051              | 6,168                   |
| 99.19               | 3,669              | 4,122                   | 99.73               | 4,058              | 6,208                   |
| 99.20               | 3,676              | 4,159                   | 99.74               | 4,065              | 6,249                   |
| 99.21               | 3,683              | 4,196                   | 99.75               | 4,072              | 6,289                   |
| 99.22               | 3,691              | 4,233                   | 99.76               | 4,080              | 6,330                   |
| 99.23               | 3,698              | 4,269                   | 99.77               | 4,087              | 6,371                   |
| 99.24               | 3,705              | 4,306                   | 99.78               | 4,094              | 6,412                   |
| 99.25               | 3,712              | 4,344                   | 99.79               | 4,102              | 6,453                   |
| 99.26               | 3,719              | 4,381                   | 99.80               | 4,109              | 6,494                   |
| 99.27               | 3,726              | 4,418                   | 99.81               | 4,116              | 6,535                   |
| 99.28               | 3,733              | 4,455                   | 99.82               | 4,124              | 6,576                   |
| 99.29               | 3,740              | 4,493                   | 99.83               | 4,131              | 6,618                   |
| 99.30               | 3,748              | 4,530                   | 99.84               | 4,138              | 6,659                   |
| 99.31               | 3,755              | 4,568                   | 99.85               | 4,146              | 6,700                   |
| 99.32               | 3,762              | 4,605                   | 99.86               | 4,153              | 6,742                   |
| 99.33               | 3,769              | 4,643                   | 99.87               | 4,161              | 6,783                   |
| 99.34               | 3,776              | 4,681                   | 99.88               | 4,168              | 6,825                   |
| 99.35               | 3,783              | 4,718                   | 99.89               | 4,175              | 6,867                   |
| 99.36               | 3,791              | 4,756                   | 99.90               | 4,183              | 6,909                   |
| 99.37               | 3,798              | 4,794                   | 99.91               | 4,190              | 6,950                   |
| 99.38               | 3,805              | 4,832                   | 99.92               | 4,198              | 6,992                   |
| 99.39               | 3,812              | 4,870                   | 99.93               | 4,205              | 7,034                   |
| 99.40               | 3,819              | 4,908                   | 99.94               | 4,212              | 7,076                   |
| 99.41               | 3,827              | 4,947                   | 99.95               | 4,220              | 7,119                   |
| 99.42               | 3,834              | 4,985                   | 99.96               | 4,227              | 7,161                   |
| 99.43               | 3,841              | 5,023                   | 99.97               | 4,235              | 7,203                   |
| 99.44               | 3,848              | 5,062                   | 99.98               | 4,242              | 7,246                   |
| 99.45               | 3,856              | 5,100                   | 99.99               | 4,250              | 7,288                   |
| 99.46               | 3,863              | 5,139                   | 100.00              | 4,257              | 7,331                   |
| 99.47               | 3,870              | 5,178                   | 100.01              | 4,280              | 7,373                   |
| 99.48               | 3,877              | 5,216                   | 100.02              | 4,304              | 7,416                   |
| 99.49               | 3,885              | 5,255                   | 100.03              | 4,327              | 7,459                   |
| 99.50               | 3,892              | 5,294                   | 100.04              | 4,351              | 7,503                   |
| 99.51               | 3,899              | 5,333                   | 100.05              | 4,375              | 7,546                   |
| 99.52               | 3,906              | 5,372                   | 100.06              | 4,399              | 7,590                   |

WQV = 3,875  
3,875+160+1118=  
5,153 CF

**21074 - Post**

21074 24-hr S1 50-yr Rainfall=7.19"

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**Stage-Discharge for Pond BIO-2: BIO-2 (continued)**

| Elevation<br>(feet) | Discharge<br>(cfs) | Primary<br>(cfs) | Secondary<br>(cfs) | Elevation<br>(feet) | Discharge<br>(cfs) | Primary<br>(cfs) | Secondary<br>(cfs) |
|---------------------|--------------------|------------------|--------------------|---------------------|--------------------|------------------|--------------------|
| 98.99               | 0.8                | 0.8              | 0.0                | 99.53               | 1.6                | 0.9              | 0.7                |
| 99.00               | 0.8                | 0.8              | 0.0                | 99.54               | 2.0                | 0.9              | 1.1                |
| 99.01               | 0.8                | 0.8              | 0.0                | 99.55               | 2.5                | 0.9              | 1.6                |
| 99.02               | 0.8                | 0.8              | 0.0                | 99.56               | 3.0                | 0.9              | 2.1                |
| 99.03               | 0.8                | 0.8              | 0.0                | 99.57               | 3.5                | 0.9              | 2.6                |
| 99.04               | 0.8                | 0.8              | 0.0                | 99.58               | 4.1                | 0.9              | 3.2                |
| 99.05               | 0.8                | 0.8              | 0.0                | 99.59               | 4.8                | 0.9              | 3.8                |
| 99.06               | 0.8                | 0.8              | 0.0                | 99.60               | 5.4                | 0.9              | 4.5                |
| 99.07               | 0.8                | 0.8              | 0.0                | 99.61               | 6.1                | 0.9              | 5.2                |
| 99.08               | 0.8                | 0.8              | 0.0                | 99.62               | 6.8                | 0.9              | 5.9                |
| 99.09               | 0.8                | 0.8              | 0.0                | 99.63               | 7.6                | 0.9              | 6.7                |
| 99.10               | 0.8                | 0.8              | 0.0                | 99.64               | 8.4                | 0.9              | 7.5                |
| 99.11               | 0.8                | 0.8              | 0.0                | 99.65               | 9.2                | 0.9              | 8.3                |
| 99.12               | 0.8                | 0.8              | 0.0                | 99.66               | 10.0               | 0.9              | 9.1                |
| 99.13               | 0.8                | 0.8              | 0.0                | 99.67               | 10.9               | 0.9              | 10.0               |
| 99.14               | 0.8                | 0.8              | 0.0                | 99.68               | 11.8               | 0.9              | 10.9               |
| 99.15               | 0.8                | 0.8              | 0.0                | 99.69               | 12.7               | 0.9              | 11.8               |
| 99.16               | 0.8                | 0.8              | 0.0                | 99.70               | 13.7               | 0.9              | 12.7               |
| 99.17               | 0.8                | 0.8              | 0.0                | 99.71               | 14.6               | 0.9              | 13.7               |
| 99.18               | 0.8                | 0.8              | 0.0                | 99.72               | 15.7               | 0.9              | 14.7               |
| 99.19               | 0.8                | 0.8              | 0.0                | 99.73               | 16.7               | 0.9              | 15.8               |
| 99.20               | 0.9                | 0.9              | 0.0                | 99.74               | 17.8               | 0.9              | 16.8               |
| 99.21               | 0.9                | 0.9              | 0.0                | 99.75               | 18.8               | 0.9              | 17.9               |
| 99.22               | 0.9                | 0.9              | 0.0                | 99.76               | 20.0               | 0.9              | 19.0               |
| 99.23               | 0.9                | 0.9              | 0.0                | 99.77               | 21.1               | 0.9              | 20.1               |
| 99.24               | 0.9                | 0.9              | 0.0                | 99.78               | 22.3               | 0.9              | 21.3               |
| 99.25               | 0.9                | 0.9              | 0.0                | 99.79               | 23.4               | 0.9              | 22.5               |
| 99.26               | 0.9                | 0.9              | 0.0                | 99.80               | 24.6               | 1.0              | 23.7               |
| 99.27               | 0.9                | 0.9              | 0.0                | 99.81               | 25.9               | 1.0              | 24.9               |
| 99.28               | 0.9                | 0.9              | 0.0                | 99.82               | 27.1               | 1.0              | 26.2               |
| 99.29               | 0.9                | 0.9              | 0.0                | 99.83               | 28.4               | 1.0              | 27.4               |
| 99.30               | 0.9                | 0.9              | 0.0                | 99.84               | 29.7               | 1.0              | 28.7               |
| 99.31               | 0.9                | 0.9              | 0.0                | 99.85               | 31.0               | 1.0              | 30.1               |
| 99.32               | 0.9                | 0.9              | 0.0                | 99.86               | 32.4               | 1.0              | 31.4               |
| 99.33               | 0.9                | 0.9              | 0.0                | 99.87               | 33.7               | 1.0              | 32.8               |
| 99.34               | 0.9                | 0.9              | 0.0                | 99.88               | 35.1               | 1.0              | 34.1               |
| 99.35               | 0.9                | 0.9              | 0.0                | 99.89               | 36.5               | 1.0              | 35.6               |
| 99.36               | 0.9                | 0.9              | 0.0                | 99.90               | 37.9               | 1.0              | 37.0               |
| 99.37               | 0.9                | 0.9              | 0.0                | 99.91               | 39.3               | 1.0              | 38.4               |
| 99.38               | 0.9                | 0.9              | 0.0                | 99.92               | 40.8               | 1.0              | 39.8               |
| 99.39               | 0.9                | 0.9              | 0.0                | 99.93               | 42.2               | 1.0              | 41.2               |
| 99.40               | 0.9                | 0.9              | 0.0                | 99.94               | 43.6               | 1.0              | 42.7               |
| 99.41               | 0.9                | 0.9              | 0.0                | 99.95               | 45.1               | 1.0              | 44.1               |
| 99.42               | 0.9                | 0.9              | 0.0                | 99.96               | 46.6               | 1.0              | 45.6               |
| 99.43               | 0.9                | 0.9              | 0.0                | 99.97               | 48.1               | 1.0              | 47.1               |
| 99.44               | 0.9                | 0.9              | 0.0                | 99.98               | 49.6               | 1.0              | 48.6               |
| 99.45               | 0.9                | 0.9              | 0.0                | 99.99               | 51.1               | 1.0              | 50.1               |
| 99.46               | 0.9                | 0.9              | 0.0                | 100.00              | 52.7               | 1.0              | 51.7               |
| 99.47               | 0.9                | 0.9              | 0.0                | 100.01              | 54.2               | 1.0              | 53.2               |
| 99.48               | 0.9                | 0.9              | 0.0                | 100.02              | 55.8               | 1.0              | 54.8               |
| 99.49               | 0.9                | 0.9              | 0.0                | 100.03              | 57.4               | 1.0              | 56.4               |
| 99.50               | 0.9                | 0.9              | 0.0                | 100.04              | 59.0               | 1.0              | 58.0               |
| 99.51               | 1.0                | 0.9              | 0.1                | 100.05              | 60.6               | 1.0              | 59.6               |
| 99.52               | 1.3                | 0.9              | 0.4                | 100.06              | 62.3               | 1.0              | 61.3               |

B - 2

POLLUTANT REMOVAL

| Pollutant Removal Efficiencies for Best Management Practices<br>for Use in Pollutant Loading Analysis |                                                                                                  |       |                                                                                | Values Accepted for<br>Loading Analyses |     |     |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------|-----------------------------------------|-----|-----|
| BMP Type                                                                                              | BMP                                                                                              | Notes | Lit. Ref.                                                                      | TSS                                     | TN  | TP  |
| Stormwater<br>Ponds                                                                                   | Wet Pond                                                                                         |       | B, F                                                                           | 70%                                     | 35% | 45% |
|                                                                                                       | Wet Extended Detention<br>Pond                                                                   |       | A, B                                                                           | 80%                                     | 55% | 68% |
|                                                                                                       | Micropool Extended<br>Detention Pond                                                             | TBA   |                                                                                |                                         |     |     |
|                                                                                                       | Multiple Pond System                                                                             | TBA   |                                                                                |                                         |     |     |
|                                                                                                       | Pocket Pond                                                                                      | TBA   |                                                                                |                                         |     |     |
| Stormwater<br>Wetlands                                                                                | Shallow Wetland                                                                                  |       | A, B, F, I                                                                     | 80%                                     | 55% | 45% |
|                                                                                                       | Extended Detention Wetland                                                                       |       | A, B, F, I                                                                     | 80%                                     | 55% | 45% |
|                                                                                                       | Pond/Wetland System                                                                              | TBA   |                                                                                |                                         |     |     |
|                                                                                                       | Gravel Wetland                                                                                   |       | H                                                                              | 95%                                     | 85% | 64% |
| Infiltration<br>Practices                                                                             | Infiltration Trench (≥75 ft from<br>surface water)                                               |       | B, D, I                                                                        | 90%                                     | 55% | 60% |
|                                                                                                       | Infiltration Trench (<75 ft from<br>surface water)                                               |       | B, D, I                                                                        | 90%                                     | 10% | 60% |
|                                                                                                       | Infiltration Basin (≥75 ft from<br>surface water)                                                |       | A, F, B, D, I                                                                  | 90%                                     | 60% | 65% |
|                                                                                                       | Infiltration Basin (<75 ft from<br>surface water)                                                |       | A, F, B, D, I                                                                  | 90%                                     | 10% | 65% |
|                                                                                                       | Dry Wells                                                                                        |       |                                                                                | 90%                                     | 55% | 60% |
|                                                                                                       | Drip Edges                                                                                       |       |                                                                                | 90%                                     | 55% | 60% |
| Filtering<br>Practices                                                                                | Aboveground or Underground<br>Sand Filter that infiltrates<br>WQV (≥75 ft from surface<br>water) |       | A, F, B, D, I                                                                  | 90%                                     | 60% | 65% |
|                                                                                                       | Aboveground or Underground<br>Sand Filter that infiltrates<br>WQV (<75 ft from surface<br>water) |       | A, F, B, D, I                                                                  | 90%                                     | 10% | 65% |
|                                                                                                       | Aboveground or Underground<br>Sand Filter with underdrain                                        |       | A, I, F, G, H                                                                  | 85%                                     | 10% | 45% |
|                                                                                                       | Tree Box Filter                                                                                  | TBA   |                                                                                |                                         |     |     |
|                                                                                                       | Bioretention System                                                                              |       | I, G, H                                                                        | 90%                                     | 65% | 65% |
|                                                                                                       | Permeable Pavement that<br>infiltrates WQV (≥75 ft from<br>surface water)                        |       | A, F, B, D, I                                                                  | 90%                                     | 60% | 65% |
|                                                                                                       | Permeable Pavement that<br>infiltrates WQV (<75 ft from<br>surface water)                        |       | A, F, B, D, I                                                                  | 90%                                     | 10% | 65% |
|                                                                                                       | Permeable Pavement with<br>underdrain                                                            |       | Use TN and<br>TP values for<br>sand filter w/<br>underdrain and<br>outlet pipe | 90%                                     | 10% | 45% |

B - 3

OUTLET PROTECTION

**OUTLET PROTECTION DESIGN CALCS**  
**NON DEFINED CHANNEL**

Job #: 21074  
 Date: 2/15/2023  
 Structure: Outlet from  
 BIO1

**Variables:**

Q= Discharge from the pipe (cfs)  
 $D_0$ = Diameter of the pipe (ft)  
 Tw= Tailwater depth above the invert of the pipe (ft)  
 La= Apron length  
 $w_1$ = Apron width at pipe outlet  
 $w_2$ = Apron width at downstream end of apron

**Input:** Outlet elev: 114  
 Tailwater elev: 114.17  
 Tw: 0.17  
 Q: 3.4  
 $D_0$ : 1.25

Apron Dimensions

|         |    |      |
|---------|----|------|
| $w_1$ = | 4  | (ft) |
| $w_2$ = | 17 | (ft) |
| La=     | 14 | (ft) |

Apron Length:

$\frac{Tw > .5D_0}{La: 16.049}$        $\frac{Tw < .5D_0}{La: 13.129}$

Apron Width:

$\frac{Tw > .5D_0}{w_2: 10.17}$        $\frac{Tw < .5D_0}{w_2: 16.88}$

$w_1$ : 3.75

$w_1$ = 3.75  
 $w_2$ = 16.8791155  
 La= 13.1291155

RipRap Sizing

|            |      |      |
|------------|------|------|
| $d_{50}$ = | 0.48 | (ft) |
| $d_{50}$ = | 5.77 | (in) |

RipRap Gradation

|      | Stone Size |      | % of Weight Smaller Than the Given Size |
|------|------------|------|-----------------------------------------|
| 0.72 | TO         | 0.96 | 100                                     |
| 0.63 | TO         | 0.87 | 85                                      |
| 0.48 | TO         | 0.72 | 50                                      |
| 0.14 | TO         | 0.24 | 15                                      |

Minimum Depth of Rock= 1.44 (ft)

**21074 - Post**21074 24-hr S1 **25-yr** Rainfall=6.02"

Prepared by {enter your company name here}

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**Summary for Pond BIO-1: BIO-1**

Inflow Area = 1.258 ac, 30.11% Impervious, Inflow Depth = 4.40" for 25-yr event  
 Inflow = 3.4 cfs @ 12.17 hrs, Volume= 0.46 af  
 Outflow = 3.4 cfs @ 12.19 hrs, Volume= 0.46 af, Atten= 0%, Lag= 0.9 min  
 Primary = **3.4 cfs** @ 12.19 hrs, Volume= 0.46 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 119.65' @ 12.19 hrs Surf.Area= 1,638 sf Storage= 2,215 cf  
 Flood Elev= 120.25' Surf.Area= 2,143 sf Storage= 3,310 cf

Plug-Flow detention time= 43.7 min calculated for 0.46 af (99% of inflow)  
 Center-of-Mass det. time= 40.4 min ( 869.4 - 829.0 )

| Volume              | Invert               | Avail.Storage    | Storage Description                          |                           |                           |                     |
|---------------------|----------------------|------------------|----------------------------------------------|---------------------------|---------------------------|---------------------|
| #1                  | 115.75'              | 3,310 cf         | <b>BIO (Irregular)</b> Listed below (Recalc) |                           |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Voids<br>(%)                                 | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 115.75              | 1,138                | 134.2            | 0.0                                          | 0                         | 0                         | 1,138               |
| 116.75              | 1,138                | 134.2            | 35.0                                         | 398                       | 398                       | 1,272               |
| 117.00              | 1,138                | 134.2            | 20.0                                         | 57                        | 455                       | 1,306               |
| 118.50              | 1,138                | 134.2            | 10.0                                         | 171                       | 626                       | 1,507               |
| 119.00              | 1,346                | 143.6            | 100.0                                        | 620                       | 1,246                     | 1,726               |
| 119.50              | 1,569                | 153.1            | 100.0                                        | 728                       | 1,974                     | 1,962               |
| 120.00              | 1,805                | 162.5            | 100.0                                        | 843                       | 2,817                     | 2,211               |
| 120.25              | 2,143                | 175.1            | 100.0                                        | 493                       | 3,310                     | 2,552               |

| Device | Routing  | Invert  | Outlet Devices                                                                          |                                                                                                                                                                                                              |
|--------|----------|---------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 115.00' | <b>15.0"</b>                                                                            | <b>Round Culvert</b> L= 18.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 115.00' / <b>114.00'</b> S= 0.0556 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf |
| #2     | Device 1 | 116.00' | <b>6.0"</b>                                                                             | <b>Round Culvert</b> L= 45.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.00' / 116.00' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf     |
| #3     | Device 2 | 115.75' | <b>10.000 in/hr Exfiltration over Surface area</b> Phase-In= 0.01'                      |                                                                                                                                                                                                              |
| #4     | Device 1 | 119.50' | <b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads |                                                                                                                                                                                                              |

**Primary OutFlow** Max=3.4 cfs @ 12.19 hrs HW=119.65' TW=**114.17'** (Dynamic Tailwater)

- 1=Culvert (Passes 3.4 cfs of 11.9 cfs potential flow)  
 2=Culvert (Passes 0.4 cfs of 1.3 cfs potential flow)  
 3=Exfiltration (Exfiltration Controls 0.4 cfs)  
 4=Orifice/Grate (Weir Controls 3.0 cfs @ 1.27 fps)

**OUTLET PROTECTION DESIGN CALCS**  
**NON DEFINED CHANNEL**

Job #: 21074  
Date: 2/15/2023  
Structure: Outlet from  
Det-1

**Variables:**

Q= Discharge from the pipe (cfs)  
 $D_0$ = Diameter of the pipe (ft)  
Tw= Tailwater depth above the invert of the pipe (ft)  
La= Apron length  
 $w_1$ = Apron width at pipe outlet  
 $w_2$ = Apron width at downstream end of apron

Input: Outlet elev: 91  
Tailwater elev: 91.4  
Tw: 0.4  
Q: 5  
 $D_0$ : 1.25

Apron Dimensions

|         |    |      |
|---------|----|------|
| $w_1$ = | 4  | (ft) |
| $w_2$ = | 19 | (ft) |
| La=     | 16 | (ft) |

Apron Length:

$\frac{Tw > .5D_0}{La: 19.483}$        $\frac{Tw < .5D_0}{La: 15.190}$

Apron Width:

$\frac{Tw > .5D_0}{w_2: 11.54}$        $\frac{Tw < .5D_0}{w_2: 18.94}$

$w_1$ : 3.75

$w_1$ = 3.75  
 $w_2$ = 18.9398758  
La= 15.1898758

RipRap Sizing

|            |      |      |
|------------|------|------|
| $d_{50}$ = | 0.34 | (ft) |
| $d_{50}$ = | 4.10 | (in) |

RipRap Gradation

|      | Stone Size |      | % of Weight Smaller Than the Given Size |
|------|------------|------|-----------------------------------------|
| 0.51 | TO         | 0.68 | 100                                     |
| 0.44 | TO         | 0.62 | 85                                      |
| 0.34 | TO         | 0.51 | 50                                      |
| 0.10 | TO         | 0.17 | 15                                      |

Minimum Depth of Rock= 1.03 (ft)

**21074 - Post**21074 24-hr S<sub>1</sub> 25-yr Rainfall=6.02"

Prepared by {enter your company name here}

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**Summary for Pond DET-1: DETENTION POND 1**

Inflow Area = 4.900 ac, 18.99% Impervious, Inflow Depth = 4.10" for 25-yr event  
 Inflow = 15.2 cfs @ 12.11 hrs, Volume= 1.67 af  
 Outflow = 5.0 cfs @ 12.45 hrs, Volume= 1.67 af, Atten= 67%, Lag= 20.8 min  
 Primary = 5.0 cfs @ 12.45 hrs, Volume= 1.67 af  
 Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 98.66' @ 12.45 hrs Surf.Area= 5,233 sf Storage= 12,348 cf  
 Flood Elev= 100.25' Surf.Area= 7,419 sf Storage= 21,948 cf

Plug-Flow detention time= 29.3 min calculated for 1.67 af (100% of inflow)  
 Center-of-Mass det. time= 29.2 min ( 902.8 - 873.6 )

| Volume              | Invert               | Avail.Storage    | Storage Description                                        |                           |                     |
|---------------------|----------------------|------------------|------------------------------------------------------------|---------------------------|---------------------|
| #1                  | 95.50'               | 21,948 cf        | <b>Custom Stage Data (Irregular)</b> Listed below (Recalc) |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Inc.Store<br>(cubic-feet)                                  | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 95.50               | 2,683                | 239.3            | 0                                                          | 0                         | 2,683               |
| 96.00               | 3,049                | 248.7            | 1,432                                                      | 1,432                     | 3,068               |
| 98.00               | 4,654                | 286.0            | 7,647                                                      | 9,079                     | 4,743               |
| 99.00               | 5,542                | 305.3            | 5,092                                                      | 14,170                    | 5,698               |
| 99.50               | 6,007                | 314.7            | 2,886                                                      | 17,057                    | 6,187               |
| 100.00              | 6,572                | 337.2            | 3,144                                                      | 20,200                    | 7,365               |
| 100.25              | 7,419                | 352.7            | 1,748                                                      | 21,948                    | 8,221               |

| Device | Routing   | Invert | Outlet Devices                                                                                                                                                                                                                                                                   |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 93.00' | <b>15.0" Round Culvert</b> L= 30.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.00' 91.00' S= 0.0667 ' / Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf                                                                          |
| #2     | Device 1  | 95.50' | <b>12.0" W x 6.0" H Vert. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                                                                                        |
| #3     | Device 1  | 97.50' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads                                                                                                                                                                                                       |
| #4     | Device 1  | 99.60' | <b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600<br>Limited to weir flow at low heads                                                                                                                                                                                          |
| #5     | Secondary | 99.80' | <b>6.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65<br>2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=5.0 cfs @ 12.45 hrs HW=98.66' TW=91.40' (Dynamic Tailwater)

- ↑ 1=Culvert (Passes 5.0 cfs of 13.3 cfs potential flow)
- ↑ 2=Orifice/Grate (Orifice Controls 4.1 cfs @ 8.21 fps)
- ↑ 3=Orifice/Grate (Orifice Controls 0.9 cfs @ 4.60 fps)
- ↑ 4=Orifice/Grate ( Controls 0.0 cfs)

**Secondary OutFlow** Max=0.0 cfs @ 0.00 hrs HW=95.50' TW=91.00' (Dynamic Tailwater)

- ↑ 5=Broad-Crested Rectangular Weir ( Controls 0.0 cfs)

# **OUTLET PROTECTION DESIGN CALCS** **DEFINED CHANNEL**

Job #: 21074  
 Date: 2/15/2023  
 Structure: Outlet from  
 PCB1

## **Variables:**

Q= Discharge from the pipe (cfs)  
 D<sub>0</sub>= Diameter of outlet pipe (ft)  
 D= Width of channel (ft)  
 z= Channel side slope (H:V ft/ft)  
 Tw= Tailwater depth above the invert of the pipe (ft)  
 La= Apron length  
 w<sub>1</sub>= Apron width at pipe outlet  
 w<sub>2</sub>= Apron width at downstream end of apron

**Input:** Outlet elev: 117  
 Tailwater elev: 117.83  
 Tw: 0.83  
 Q: 4.9  
 D<sub>0</sub>: 1.50  
 D: 6  
 z: 3

## Apron Dimensions

|                  |    |      |
|------------------|----|------|
| w <sub>1</sub> = | 15 | (ft) |
| w <sub>2</sub> = | 6  | (ft) |
| La=              | 19 | (ft) |

Apron Length:

$\frac{Tw}{D_0} > .5$        $\frac{Tw}{D_0} < .5$   
 La: 18.502      La: 15.301

Apron Width:

w<sub>2</sub>: 6

w<sub>1</sub>: 15

w<sub>1</sub>= 15.00  
 w<sub>2</sub>= 6.00  
 La= 18.5016665

## RipRap Sizing

|                   |      |      |
|-------------------|------|------|
| d <sub>50</sub> = | 0.13 | (ft) |
| d <sub>50</sub> = | 1.60 | (in) |

## RipRap Gradation

|      | Stone Size |      | % of Weight Smaller Than the Given Size |
|------|------------|------|-----------------------------------------|
| 0.20 | TO         | 0.27 | 100                                     |
| 0.17 | TO         | 0.24 | 85                                      |
| 0.13 | TO         | 0.20 | 50                                      |
| 0.04 | TO         | 0.07 | 15                                      |

Minimum Depth of Rock= 0.40 (ft)

**21074 - Post**21074 24-hr S: **25-yr** Rainfall=6.02"

Prepared by {enter your company name here}

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**Summary for Pond PCB1: PCB1**

Inflow Area = 1.380 ac, 34.87% Impervious, Inflow Depth = 4.44" for 25-yr event  
Inflow = 4.9 cfs @ 12.07 hrs, Volume= 0.51 af  
Outflow = 4.9 cfs @ 12.07 hrs, Volume= 0.51 af, Atten= 0%, Lag= 0.0 min  
Primary = **4.9 cfs** @ 12.07 hrs, Volume= 0.51 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 125.90' @ 12.07 hrs

Flood Elev= 129.60'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|----------------|
|--------|---------|--------|----------------|

---

|    |         |         |                            |
|----|---------|---------|----------------------------|
| #1 | Primary | 124.80' | <b>18.0"</b> Round Culvert |
|----|---------|---------|----------------------------|

L= 170.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 124.80' / **117.00'** S= 0.0459 '/' Cc= 0.900

n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

**Primary OutFlow** Max=4.9 cfs @ 12.07 hrs HW=125.89' TW=**117.83'** (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 4.9 cfs @ 3.56 fps)

## APPENDIX C

### INSPECTION AND MAINTENANCE

C – 1

STORMWATER MANAGEMENT SYSTEM  
INSPECTION & MAINTENANCE PLAN

# Stormwater Management System Inspection & Maintenance Plan

**Prepared for**

EMERSON RIDGE  
TAX MAP N, LOT 13-1

Oak Street  
Dover, New Hampshire  
Strafford County

February 2023

**Owner of Record:**

CHINBURG DEVELOPMENT, LLC  
3 Penstock Way  
Newmarket, New Hampshire 03857

**Prepared By:**

CIVILWORKS NEW ENGLAND  
P.O. Box 1166  
181 Watson Road  
Dover, New Hampshire 03821

## **Introduction**

Civilworks NE, has prepared the following Stormwater Management System Inspection & Maintenance Plan for **Chinburg Development, LLC**. The intent of this plan is to provide a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this site.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will also help to minimize potential environmental impacts to the areas surrounding the developed site. By following the enclosed procedures, the property owners, and maintenance personnel will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff while at the same time ensuring the recharge of groundwater resources through continued infiltration.

This plan also requires the Owner/Operator to prepare and implement a salt minimization plan to reduce salt usage on-site and ultimately within the watershed. This plan will allow the owner/operator to monitor and modify how much salt is needed, when it should be applied, where it needs to be applied, with the ultimate goal of reducing salt-use without compromising safety. It is expected that salt-use reduction will lead to long-term cost-savings as a result of purchasing less salt and reduced impacts on vegetation (e.g., landscaping) and corrosion of infrastructure.

The salt minimization plan should include the retention of a contractor who has completed the Green SnowPro Training course and obtained NH DES Salt Application Certification.

It is anticipated that this be a living document that will be updated at regular intervals (recommend updating annually in advance of the winter season in order to facilitate adjustments).

Owner

**Chinburg Development, LLC  
3 Penstock Street  
Newmarket, NH 03857**

Contact / Responsible Party

**Chinburg Development, LLC  
3 Penstock Street  
Newmarket, NH 03857**

**Shawna Sammis  
Phone: (603) 868-5995x31  
Email: ssammis@chinburg.com**

Management Company

**Chinburg Development, LLC  
3 Penstock Street  
Newmarket, NH 03857**

## **Inspection Schedule / Record Retention**

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NH DES. See the Inspection and Maintenance Plan for frequency requirements. A copy of the completed Stormwater Management System's Inspection & Maintenance Log and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law.

## **Stormwater Management System Components**

The Stormwater Management System associated with the project is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)
- Catch Basins
- Detention Pond
- Bio-Retention Basins
- Grassed Lined Conveyance Swale & Pre-Treatment Swale
- Pavement
- Litter / Trash Removal

## **Control of Invasive Species**

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. Invasive plants shall be controlled to prevent them from reproducing, spreading, or re-growing. See the University of New Hampshire – Cooperative Extension's "Method for Disposing Non-Native Invasive Plants", included at the end of this manual, for guidance on the removal and disposal of invasive species.

## **Inspection and Maintenance Plan**

By implementing the following procedures, the owners will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

### **PIPES/CULVERTS:**

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations  $\geq 2$  inches.

#### OUTLET STRUCTURE(S):

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations  $\geq 2$  inches.

#### ENERGY DISSIPATION STRUCTURES (RIP RAP):

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- If stones become displaced from the riprap areas, they should be replaced immediately and chinked in to assure stability. Add additional riprap as needed. Vegetation growing through the riprap should be eliminated at least yearly.

#### CATCH BASIN(S):

- Inspect once per year.
- Inspect for floatables, sediment accumulation, and hydrocarbons (oils and grease).
- Remove all floatables immediately and sediment accumulations  $\geq 1$  foot.
- Hydrocarbons shall be removed immediately by skimming, absorbent materials, or other methods and should be disposed of in accordance with applicable State and Federal regulations.

#### DETENTION POND:

- Inspection, by a **qualified professional**, of detention ponds at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or conducted as warranted by such inspection.
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Inlet and outlet pipes, inlet and outlet structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed, and the vegetation maintained in healthy condition, as appropriate to the function of the facility and type of vegetation.
- Vegetated embankments that serve as “berms” or “dams” that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

#### BIO-RETENTION BASINS:

- Inspection, by a **qualified professional**, of the Bio-Retention Basins 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. If the Bio-Retention Basin systems do not drain within 72-hours following a rainfall event, a qualified professional should assess the condition and determine measures required to restore filtration practice (as applicable).
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the

embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.

- Inlet and outlet pipes, inlet and outlet structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- The bottoms, interior and exterior side slopes, and crest of earthen Bio-Retention Basins should be mowed, and the vegetation maintained in healthy condition, as appropriate to the function of the facility and type of vegetation.
- Vegetated embankments that serve as “berms” or “dams” that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.
- Trash and debris should be removed from the basin and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

#### GRASS LINED CONVEYANCE SWALE & PRE-TREATMENT SWALE:

- Inspect once per year
- Inspect for erosion, sediment accumulation, vegetation loss, and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and dead vegetation.
- Perform periodic mowing of swale (at least twice annually), maintain a 4” stand of vegetative growth.

#### PAVEMENT:

- Minimize sanding.
- Minimize application of salt for ice control.
- Clean periodically (1-2 times per year) using a sweeper or vacuum sweeper. Vacuum sweeping is the preferred method.

#### LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

#### DE-ICING AGENTS:

- To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends that the Owner/Operator develop a Road Salt and Deicing Minimization Plan for the parking lots and roadways. The plan should develop the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. The plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. (See Anti-Icing Data Form in the appendix).
- Use sand as primary agent for driveway and access way safety during ice and snow conditions
- Minimize the use of salt during the winter
- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Recommend using a certified Winter Operator (Green SnowPro Trained) for applying de-icing agents.
- Monitor weather and apply de-icing agents based on weather conditions and temperatures.
- See attached “Winter Maintenance Guidelines for Porous Pavements” for de-icing agent recommendations.

#### ANTI-ICING AND SALT MINIMIZATION:

- Owner to develop a Road Salt and Deicing Minimization Plan
- Provide a written policy that the “Development” will keep in place to minimize salt and other deicer use after the project has been completed.
- Use the attached form to track the use of salt and other deicers for each storm event and compiling salt use data annually.

## **Inspection & Maintenance Table**

| <b>System Component / BMP</b>                                                                                                                                                                                     | <b>Minimum Inspection Frequency</b>                             | <b>Minimum Inspection Requirements</b>                                                                                                                                                                                                                                                                                                            | <b>Maintenance / Cleanout Threshold</b>                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Pipes/Culverts                                                                                                                                                                                                    | Annually                                                        | <ul style="list-style-type: none"> <li>Check for clogging</li> <li>Check for sediment accumulation</li> </ul>                                                                                                                                                                                                                                     | Remove when noticed<br>Clean when necessary                                                                                              |
| Outlet Structure(s)                                                                                                                                                                                               | Annually                                                        | <ul style="list-style-type: none"> <li>Check for clogging</li> <li>Check for sediment accumulation</li> </ul>                                                                                                                                                                                                                                     | Remove when noticed<br>Clean when necessary                                                                                              |
| Energy Dissipation (ED) Structures (Rip Rap)                                                                                                                                                                      | Annually                                                        | <ul style="list-style-type: none"> <li>Check for damage/deterioration</li> <li>Check for displaced stones</li> <li>Check for woody vegetation</li> </ul>                                                                                                                                                                                          | Repair immediately<br>Replace immediately<br>Remove annually                                                                             |
| Catch Basins                                                                                                                                                                                                      | Annually                                                        | <ul style="list-style-type: none"> <li>Check for sediment accumulation</li> <li>Check for floatable contaminants</li> <li>Check for hydrocarbons (oils and grease)</li> </ul>                                                                                                                                                                     | ≥ 1 ft. sediment depth<br>Remove all floatables<br>Remove immediately                                                                    |
| Detention Pond <ul style="list-style-type: none"> <li>Outlet Structure</li> <li>Inlet/Outlet Piping</li> <li>Embankments</li> <li>Pond Sediment</li> <li>Trash/Debris</li> <li>Vegetation</li> </ul>              | Bi-Annually<br>“ “<br>Periodically<br>“ “<br>“ “<br>Bi-Annually | <ul style="list-style-type: none"> <li>See Outlet Structure (OS), required</li> <li>Check for erosion, settlement, seepage, etc.</li> <li>Check for sediment accumulation in pond</li> <li>Check for trash (in pond and structures)</li> <li>Maintain 95% vegetation (pond &amp; slopes)</li> <li>Maintain healthy stand of vegetation</li> </ul> | See OS Requirement<br>Repair immediately<br>≥ 2 in. sediment<br>Remove all trash/debris<br>Restore vegetation in-kind<br>Mow when ≥ 6 in |
| Bio-Retention Basins <ul style="list-style-type: none"> <li>Outlet Structure</li> <li>Inlet/Outlet Piping</li> <li>Embankments</li> <li>Pond Sediment</li> <li>Trash/Debris</li> <li>Vegetation (Veg.)</li> </ul> | Bi-Annually<br>“ “<br>Periodically<br>“ “<br>“ “                | <ul style="list-style-type: none"> <li>See Outlet Structure (OS) Req.</li> <li>Check for erosion, settlement, seepage, etc.</li> <li>Check for sediment accumulation in pond</li> <li>Check for trash (in pond and structures)</li> <li>Maintain 95% veg. (pond &amp; slopes)</li> <li>Maintain healthy stand of veg.</li> </ul>                  | See OS Req.<br>Repair immediately<br>≥ 2 in. sediment<br>Remove all trash/debris<br>Restore veg. in-kind<br>Mow when ≥ 6 in              |
| Grass Lined Conveyance Swale & Pre-Treatment Swale                                                                                                                                                                | Annually                                                        | <ul style="list-style-type: none"> <li>Check for sediment accumulation</li> <li>Check for erosion</li> <li>Ensure Swale is stabilized</li> <li>Maintain healthy stand of veg., 4” minimum</li> <li>Inspect for invasive species</li> </ul>                                                                                                        | ≥ 1 in. sediment<br>Repair immediately<br>Restore vegetation in-kind<br>Mow twice per year<br>Remove/Dispose of accordingly              |
| Pavement <ul style="list-style-type: none"> <li>Sanding</li> <li>Salt Applications</li> <li>Sweep/Vacuum</li> <li>Trash/Debris</li> </ul>                                                                         | Limit use<br>As Req.<br>1 - 2 x's Year<br>Periodically          | <ul style="list-style-type: none"> <li>Minimize use to prevent tracking issues</li> <li>RECORD APPLICATION RATES</li> <li>Sweep or vacuum to prevent tracking issues</li> <li>Check for trash/debris</li> </ul>                                                                                                                                   | Sweep to prevent issues<br>Minimize as Req.<br>Sweep/Vac as needed<br>Remove when noticed                                                |
| Litter / Trash Removal                                                                                                                                                                                            | Periodically                                                    | <ul style="list-style-type: none"> <li>Check for litter and trash</li> </ul>                                                                                                                                                                                                                                                                      | Remove when noticed                                                                                                                      |

## **Inspection & Maintenance Checklist/Log**

The following page contains a blank copy of the Stormwater Management System's Inspection & Maintenance Log and a Deicing Salt Quantity Use Log. These forms are provided to assist the owners with the inspection and maintenance of the aforementioned Stormwater Management System.

## Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance: \_\_\_\_\_ Inspector: \_\_\_\_\_

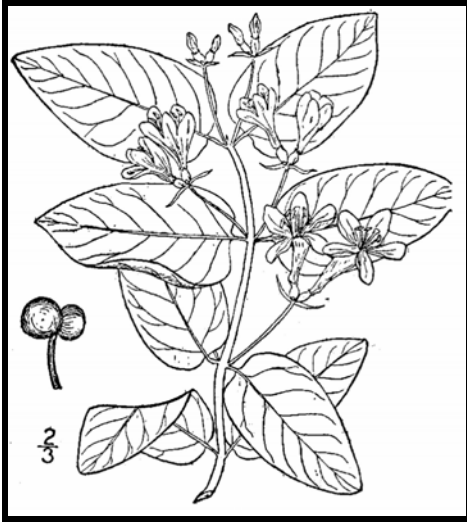
[illegible]

## Deicing Salt Quantity Use Log

[illegible]

## Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



**Tatarian honeysuckle**

*Lonicera tatarica*

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit [www.nhinvasives.org](http://www.nhinvasives.org) or contact your UNH Cooperative Extension office.

### **New Hampshire Regulations**

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

## How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag “head first” at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

**Burning:** Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can’t be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn’t be burned as the seeds may disperse by the hot air created by the fire.

**Bagging (solarization):** Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

**Tarping and Drying:** Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

**Chipping:** Use this method for woody plants that don’t reproduce vegetatively.

**Burying:** This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

**Drowning:** Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn’t used often. Be prepared for an awful stink!

**Composting:** Invasive plants can take root in compost. Don’t compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.



**Japanese knotweed**  
*Polygonum cuspidatum*  
USDA-NRCS PLANTS Database /  
Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

**Be diligent looking for seedlings for years in areas where removal and disposal took place.**

## Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

| Woody Plants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Method of Reproducing                                                                                                        | Methods of Disposal                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Norway maple<br><i>(Acer platanoides)</i><br>European barberry<br><i>(Berberis vulgaris)</i><br>Japanese barberry<br><i>(Berberis thunbergii)</i><br>autumn olive<br><i>(Elaeagnus umbellata)</i><br>burning bush<br><i>(Euonymus alatus)</i><br>Morrow's honeysuckle<br><i>(Lonicera morrowii)</i><br>Tatarian honeysuckle<br><i>(Lonicera tatarica)</i><br>showy bush honeysuckle<br><i>(Lonicera x bella)</i><br>common buckthorn<br><i>(Rhamnus cathartica)</i><br>glossy buckthorn<br><i>(Frangula alnus)</i> | <b>Fruit and Seeds</b><br>                 | <b>Prior to fruit/seed ripening</b><br>Seedlings and small plants <ul style="list-style-type: none"> <li>▪ Pull or cut and leave on site with roots exposed. No special care needed.</li> </ul> Larger plants <ul style="list-style-type: none"> <li>▪ Use as firewood.</li> <li>▪ Make a brush pile.</li> <li>▪ Chip.</li> <li>▪ Burn.</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                              | <b>After fruit/seed is ripe</b><br>Don't remove from site. <ul style="list-style-type: none"> <li>▪ Burn.</li> <li>▪ Make a covered brush pile.</li> <li>▪ Chip once all fruit has dropped from branches.</li> <li>▪ Leave resulting chips on site and monitor.</li> </ul>                                                                         |
| oriental bittersweet<br><i>(Celastrus orbiculatus)</i><br>multiflora rose<br><i>(Rosa multiflora)</i>                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Fruits, Seeds, Plant Fragments</b><br> | <b>Prior to fruit/seed ripening</b><br>Seedlings and small plants <ul style="list-style-type: none"> <li>▪ Pull or cut and leave on site with roots exposed. No special care needed.</li> </ul> Larger plants <ul style="list-style-type: none"> <li>▪ Make a brush pile.</li> <li>▪ Burn.</li> </ul>                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                              | <b>After fruit/seed is ripe</b><br>Don't remove from site. <ul style="list-style-type: none"> <li>▪ Burn.</li> <li>▪ Make a covered brush pile.</li> <li>▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</li> </ul>                                      |

| Non-Woody Plants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Method of Reproducing                                                                                                                                                                                                                                                                   | Methods of Disposal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>garlic mustard<br/>(<i>Alliaria petiolata</i>)</p> <p>spotted knapweed<br/>(<i>Centaurea maculosa</i>)</p> <ul style="list-style-type: none"> <li>▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.</li> </ul> <p>black swallow-wort<br/>(<i>Cynanchum nigrum</i>)</p> <ul style="list-style-type: none"> <li>▪ May cause skin rash. Wear gloves and long sleeves when handling.</li> </ul> <p>pale swallow-wort<br/>(<i>Cynanchum rossicum</i>)</p> <p>giant hogweed<br/>(<i>Heracleum mantegazzianum</i>)</p> <ul style="list-style-type: none"> <li>▪ Can cause major skin rash. Wear gloves and long sleeves when handling.</li> </ul> <p>dame's rocket<br/>(<i>Hesperis matronalis</i>)</p> <p>perennial pepperweed<br/>(<i>Lepidium latifolium</i>)</p> <p>purple loosestrife<br/>(<i>Lythrum salicaria</i>)</p> <p>Japanese stilt grass<br/>(<i>Microstegium vimineum</i>)</p> <p>mile-a-minute weed<br/>(<i>Polygonum perfoliatum</i>)</p> | <p><b>Fruits and Seeds</b></p>                                                                                                                                                                        | <p><b>Prior to flowering</b></p> <p>Depends on scale of infestation</p> <p>Small infestation</p> <ul style="list-style-type: none"> <li>▪ Pull or cut plant and leave on site with roots exposed.</li> </ul> <p>Large infestation</p> <ul style="list-style-type: none"> <li>▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).</li> <li>▪ Monitor. Remove any re-sprouting material.</li> </ul> <hr/> <p><b>During and following flowering</b></p> <p>Do nothing until the following year or remove flowering heads and bag and let rot.</p> <p>Small infestation</p> <ul style="list-style-type: none"> <li>▪ Pull or cut plant and leave on site with roots exposed.</li> </ul> <p>Large infestation</p> <ul style="list-style-type: none"> <li>▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).</li> <li>▪ Monitor. Remove any re-sprouting material.</li> </ul> |
| <p>common reed<br/>(<i>Phragmites australis</i>)</p> <p>Japanese knotweed<br/>(<i>Polygonum cuspidatum</i>)</p> <p>Bohemian knotweed<br/>(<i>Polygonum x bohemicum</i>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>Fruits, Seeds, Plant Fragments</b></p> <p>Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.</p> | <p><b>Small infestation</b></p> <ul style="list-style-type: none"> <li>▪ Bag all plant material and let rot.</li> <li>▪ Never pile and use resulting material as compost.</li> <li>▪ Burn.</li> </ul> <p><b>Large infestation</b></p> <ul style="list-style-type: none"> <li>▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.</li> <li>▪ Monitor and remove any sprouting material.</li> <li>▪ Pile, let dry, and burn.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

January 2010

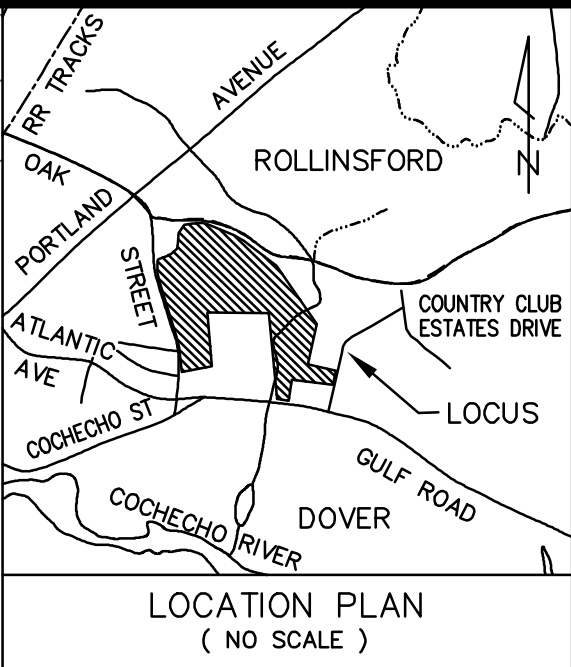
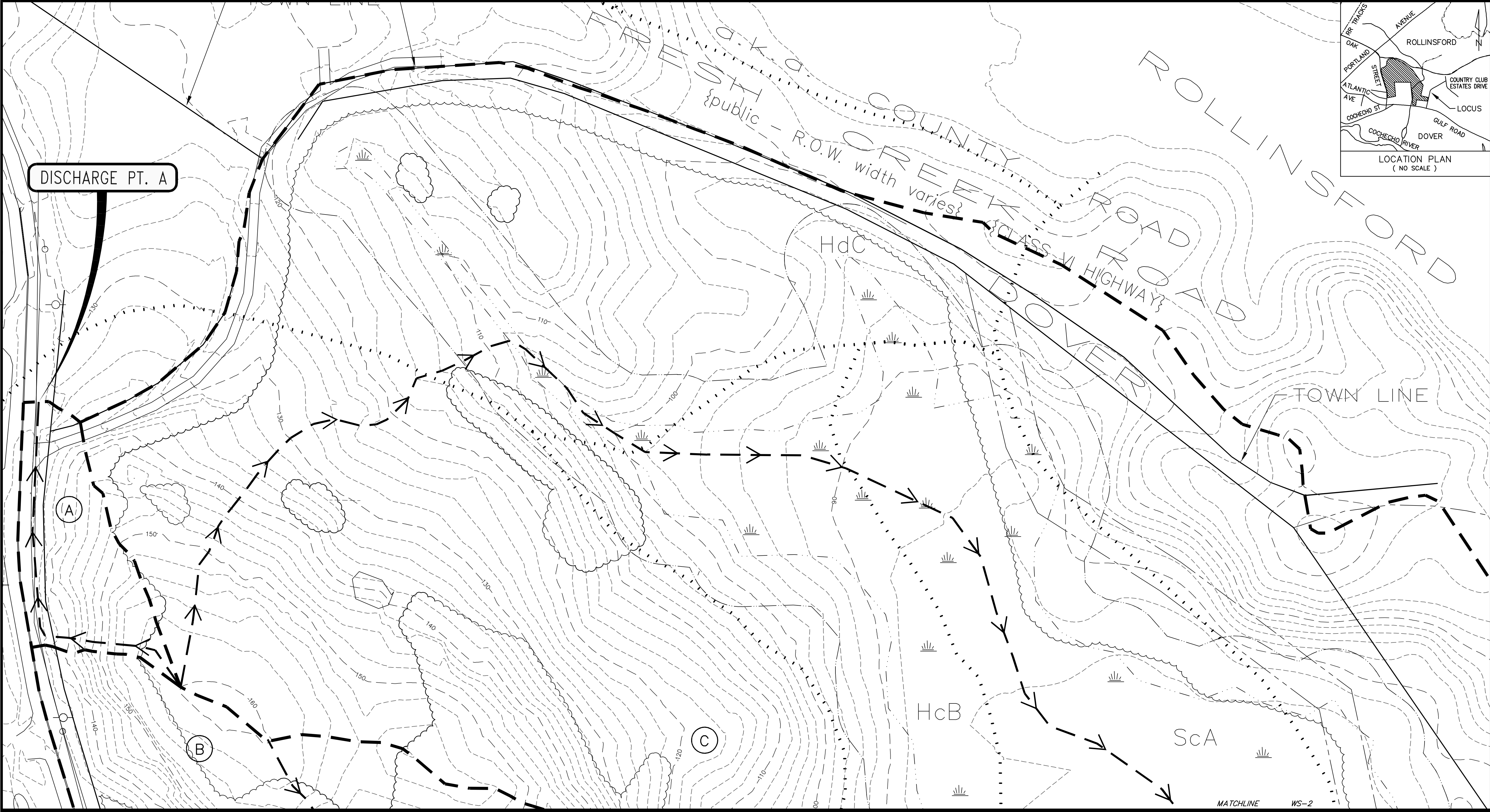
## APPENDIX D

### WATERSHED PLANS

D – 1

PRE-DEVELOPMENT CONDITIONS





**LEGEND:**

- EX 2' CONTOUR
- EX 10' CONTOUR
- EDGE OF WETLAND
- EDGE OF 50' WETLAND BUFFER
- LONGEST FLOW PATH
- OVERALL SUBCATCHMENT BOUNDARY
- SUBCATCHMENT DESIGNATION
- PROPERTY LINE
- LIMIT OF SOIL

**PRE-DEVELOPMENT WATERSHED CHARACTERISTICS**

| SUBCATCHMENT DESIGNATION | AREA (ACRES) | LONGEST FLOW PATH (FEET) | Tc (MIN) |
|--------------------------|--------------|--------------------------|----------|
| A                        | 0.54         | 388                      | 16.0     |
| B                        | 6.58         | 629                      | 7.5      |
| C                        | 21.51        | 1,646                    | 37.5     |

**NRCS SOIL LEGEND:**

**NUMERICAL SYMBOL**

BzB  
HcB  
HcC  
HcD  
HdC  
HdD  
ScA  
WfC

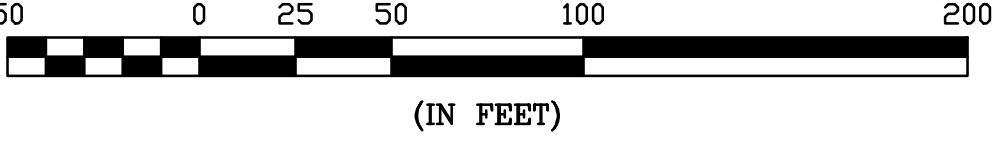
**SOIL MAP UNIT NAME**

BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES  
SCANTIC SILT LOAM, 0 TO 3 PERCENT SLOPES  
WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT, 8 TO 15 PERCENT SLOPES

**HSC**

C/D  
D  
D  
D  
D  
D  
C/D  
A

**GRAPHIC SCALE**



PRE-DEVELOPMENT WATERSHED PLAN

CHINBURG  
DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857

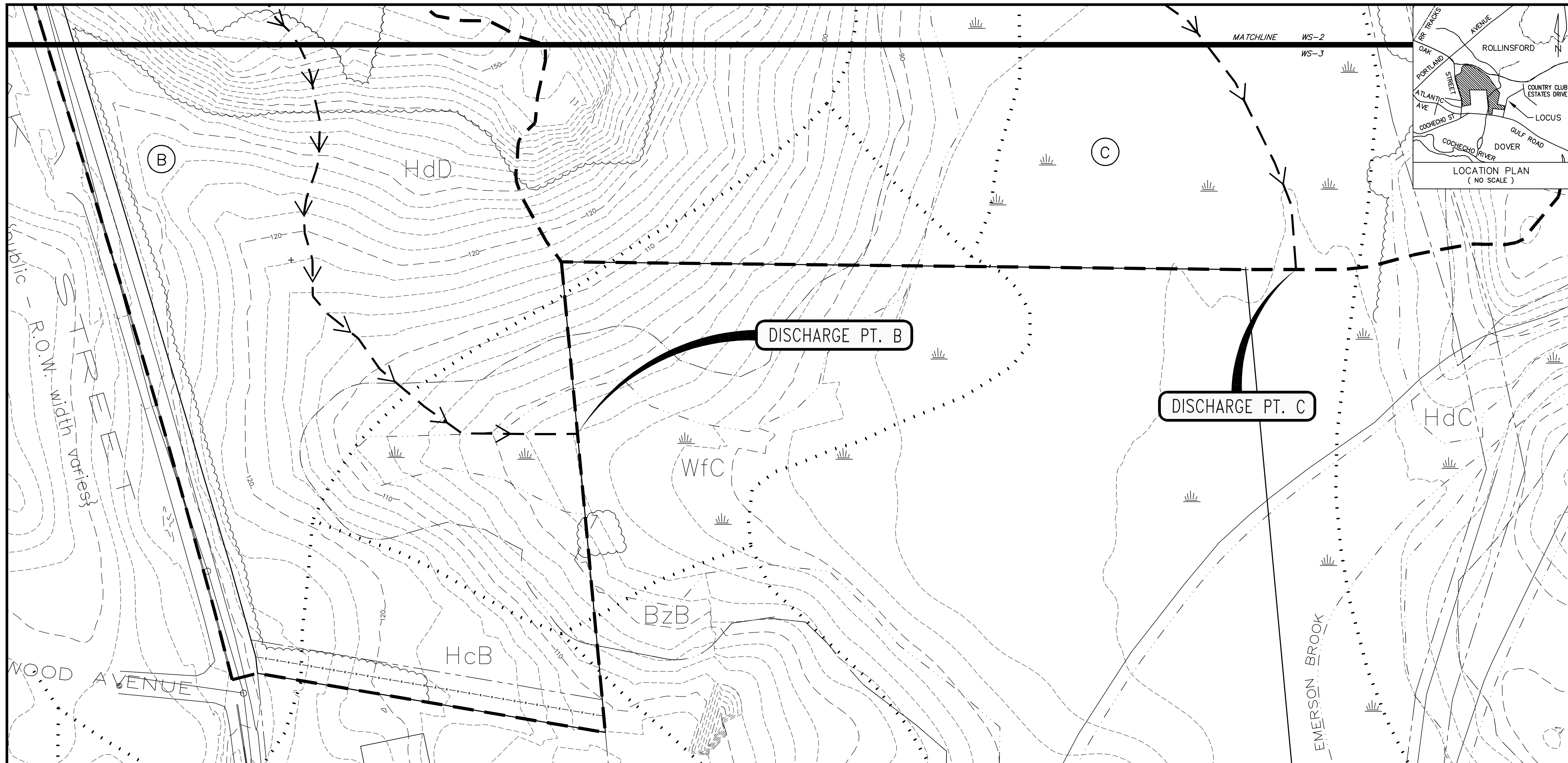
EMERSON RIDGE  
OAK STREET  
DOVER, NH

WS-2

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

| DATE    | SCALE  | DRAWN BY | DESIGN BY | APPROVED BY | PROJECT NO. | FILE | NO. | REVISION | APP'D | DATE |
|---------|--------|----------|-----------|-------------|-------------|------|-----|----------|-------|------|
| 2-16-23 | 1"=50' | GMS      | JRG       | BYSJH       | 21074       | DRN  |     |          |       |      |

CIVILWORKS NEW ENGLAND  
18 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.748.0443



LEGEND:

- |           |                                  |
|-----------|----------------------------------|
| -----     | EX 2' CONTOUR                    |
| - - - - - | EX 10' CONTOUR                   |
| — · · · — | EDGE OF WETLAND                  |
| — · · · — | EDGE OF 50' WETLAND BUFFER       |
| — > —     | LONGEST FLOW PATH                |
| — — — —   | OVERALL<br>SUBCATCHMENT BOUNDARY |
| (B)       | SUBCATCHMENT DESIGNATION         |
| =====     | PROPERTY LINE                    |
|           | LIMIT OF SOIL                    |

| PRE-DEVELOPMENT WATERSHED CHARACTERISTICS |              |                          |          |
|-------------------------------------------|--------------|--------------------------|----------|
| SUBCATCHMENT DESIGNATION                  | AREA (ACRES) | LONGEST FLOW PATH (FEET) | Tc (MIN) |
| A                                         | 0.54         | 388                      | 16.0     |
| B                                         | 6.58         | 629                      | 7.5      |
| C                                         | 21.51        | 1,646                    | 37.5     |

## NRCS SOIL LEGEND:

NUMERICAL SYMBOL

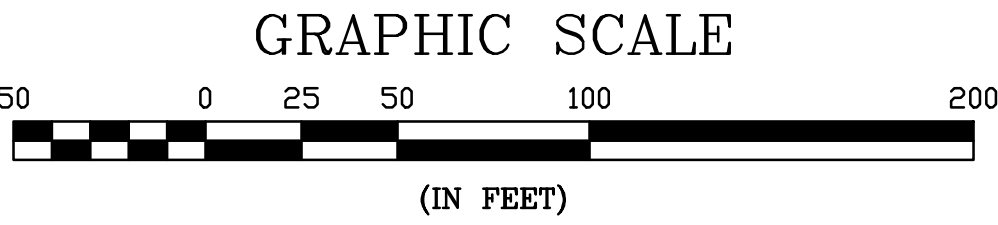
BzB  
HcB  
HcC  
HdB  
HdC  
HdD  
ScA  
WfC

SOIL MAP UNIT NAME

BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
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HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES  
SCANTIC SILT LOAM, 0 TO 3 PERCENT SLOPES  
WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT, 8 TO 15 PERCENT SLOPES

HSG

C/D  
D  
D  
D  
D  
D  
C/D  
A

[illegible]

***PRE-DEVELOPMENT WATERSHED PLAN***

**CHINBURG  
DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857**

**EMERSON RIDGE  
OAK STREET  
DOVER, NH**

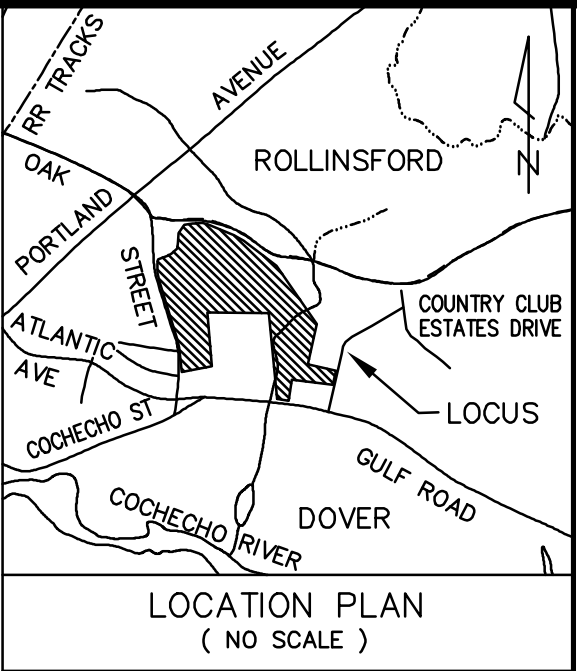
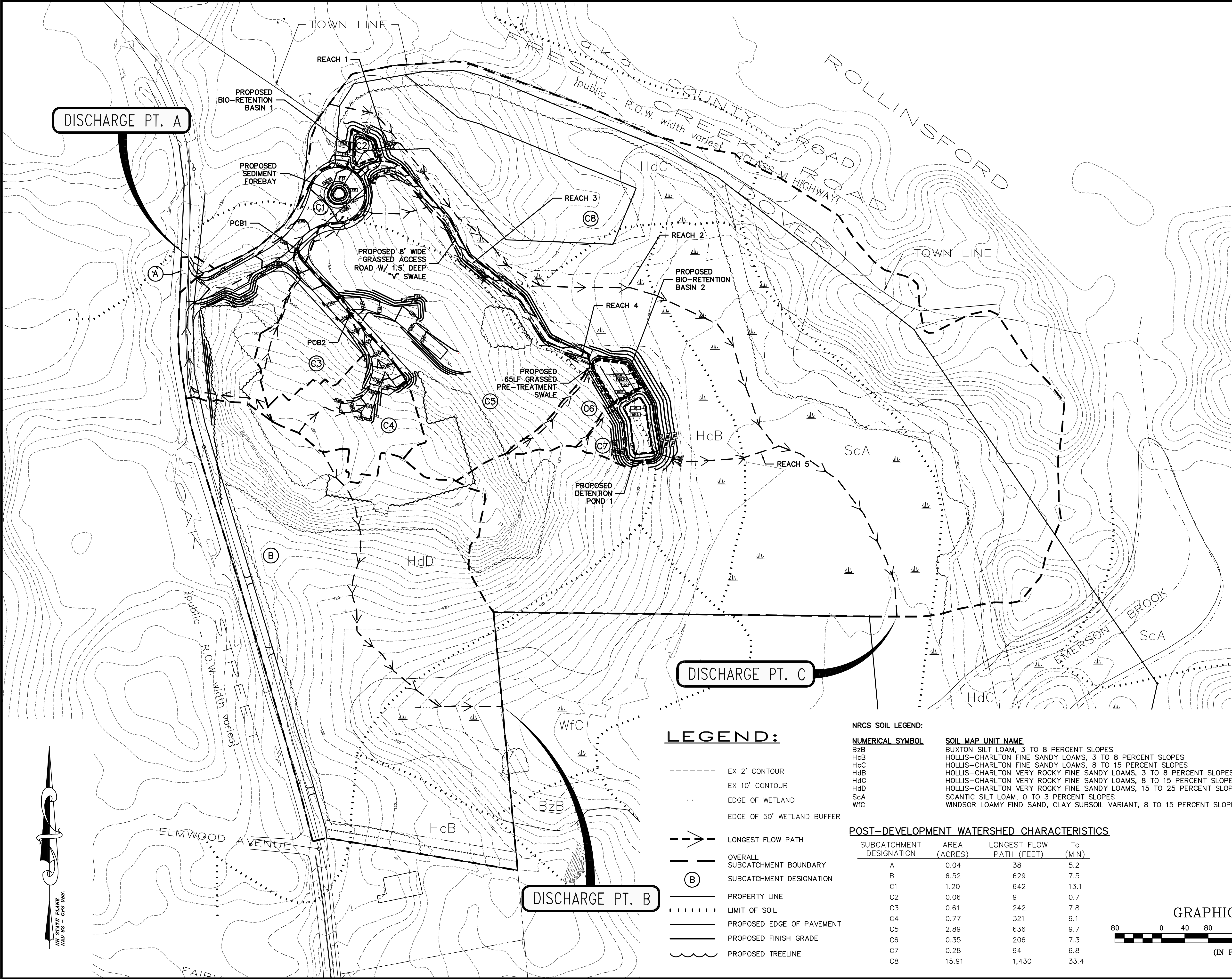
**WS-3**

**CIVILWORKS NEW ENGLAND**  
CIVIL & WATERFRONT ENGINEERING  
181 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.749.0443

|                   |     |          |       |      |
|-------------------|-----|----------|-------|------|
| DATE: 2-16-23     |     |          |       |      |
| SCALE: 1"=50'     |     |          |       |      |
| DRAWN BY: GMS     |     |          |       |      |
| DESIGN BY: JRG    |     |          |       |      |
| APPROVED BY: SJH  |     |          |       |      |
| PROJECT NO: 21074 |     |          |       |      |
| FILE: DRN         | NO. | REVISION | APP'D | DATE |

D – 2

POST-DEVELOPMENT CONDITIONS



LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- EDGE OF WETLAND
- EDGE OF 50' WETLAND BUFFER
- LONGEST FLOW PATH
- OVERALL SUBCATCHMENT BOUNDARY
- SUBCATCHMENT DESIGNATION
- PROPERTY LINE
- LIMIT OF SOIL
- PROPOSED EDGE OF PAVEMENT
- PROPOSED FINISH GRADE
- PROPOSED TREELINE

NRCS SOIL LEGEND:

NUMERICAL SYMBOL

BzB  
HcB  
HcC  
HdB  
HdC  
HdD  
ScA  
WfC

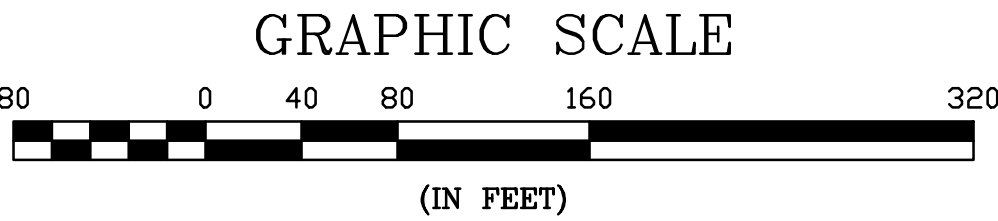
SOIL MAP UNIT NAME

BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES  
SCANTIC SILT LOAM, 0 TO 3 PERCENT SLOPES  
WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT, 8 TO 15 PERCENT SLOPES

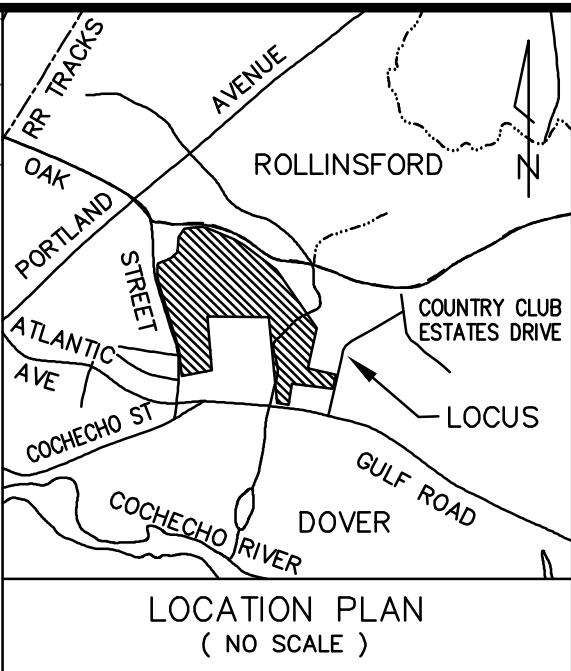
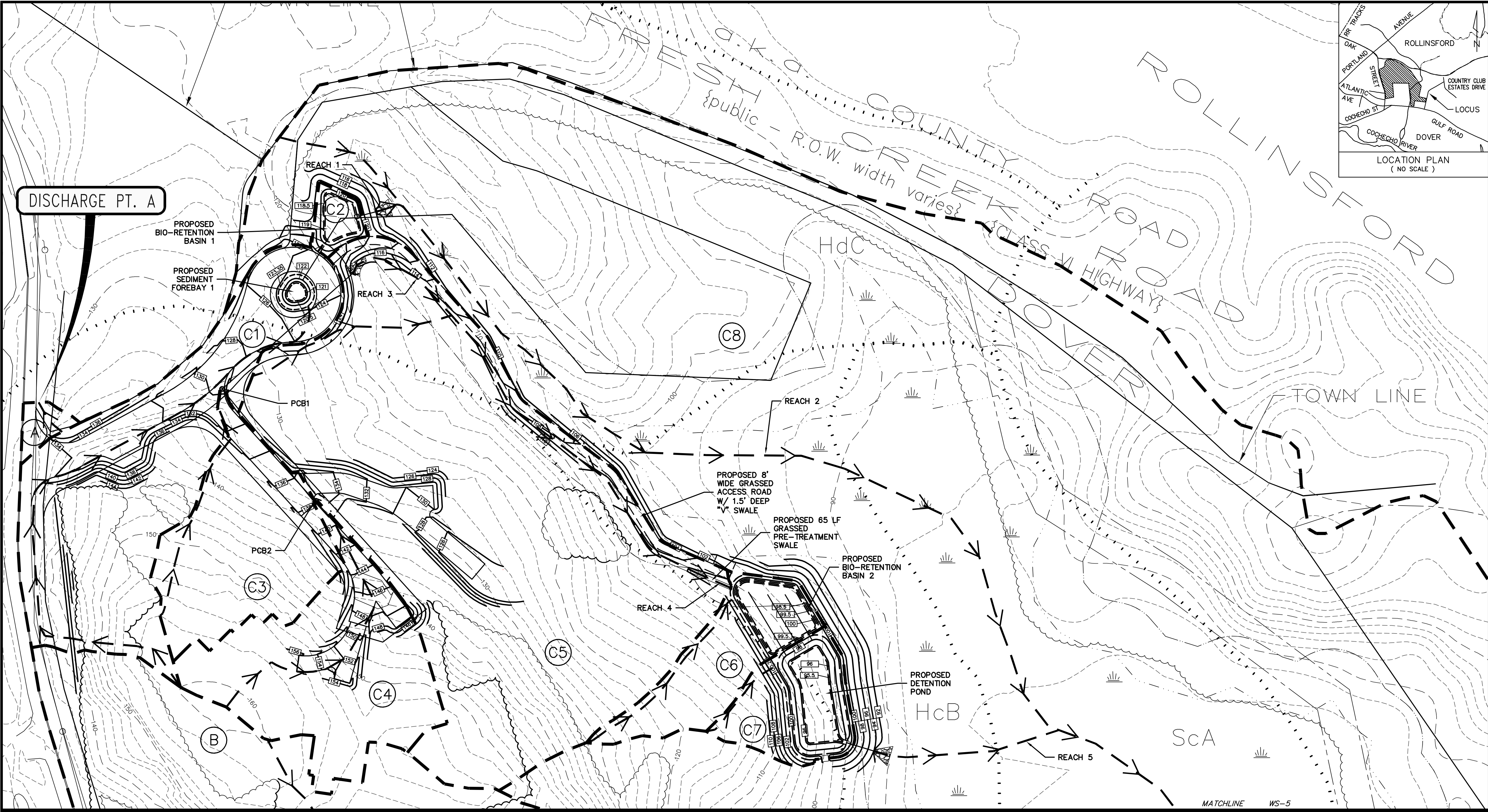
HSG  
C/D  
D  
D  
D  
D  
D  
C/D  
A

POST-DEVELOPMENT WATERSHED CHARACTERISTICS

| SUBCATCHMENT DESIGNATION | AREA (ACRES) | LONGEST FLOW PATH (FEET) | Tc (MIN) |
|--------------------------|--------------|--------------------------|----------|
| A                        | 0.04         | 38                       | 5.2      |
| B                        | 6.52         | 629                      | 7.5      |
| C1                       | 1.20         | 642                      | 13.1     |
| C2                       | 0.06         | 9                        | 0.7      |
| C3                       | 0.61         | 242                      | 7.8      |
| C4                       | 0.77         | 321                      | 9.1      |
| C5                       | 2.89         | 636                      | 9.7      |
| C6                       | 0.35         | 206                      | 7.3      |
| C7                       | 0.28         | 94                       | 6.8      |
| C8                       | 15.91        | 1,430                    | 33.4     |



|                                                                     |                   |                |                  |
|---------------------------------------------------------------------|-------------------|----------------|------------------|
| NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                            |                   |                |                  |
| DATE: 2-16-23                                                       | DRAWN BY: GNS     | DESIGN BY: JRG | APPROVED BY: JRG |
| SCALE: 1"=80'                                                       | PROJECT NO: 21074 | FILE: DRN      |                  |
| CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEW MARKET, NH 03857 |                   |                |                  |
| EMERSON RIDGE<br>OAK STREET<br>DOVER, NH                            |                   |                |                  |
| WS-4                                                                |                   |                |                  |
| NO.                                                                 | REVISION          | APP'D          | DATE             |



**LEGEND:**

- EX 2' CONTOUR
- EX 10' CONTOUR
- EDGE OF WETLAND
- EDGE OF 50' WETLAND BUFFER
- LONGEST FLOW PATH
- OVERALL SUBCATCHMENT BOUNDARY
- SUBCATCHMENT DESIGNATION
- PROPERTY LINE
- LIMIT OF SOIL
- PROPOSED EDGE OF PAVEMENT
- PROPOSED FINISH GRADE
- PROPOSED TREELINE

**POST-DEVELOPMENT WATERSHED CHARACTERISTICS**

| SUBCATCHMENT DESIGNATION | AREA (ACRES) | LONGEST FLOW PATH (FEET) | Tc (MIN) |
|--------------------------|--------------|--------------------------|----------|
| A                        | 0.04         | 38                       | 5.2      |
| B                        | 6.52         | 629                      | 7.5      |
| C1                       | 1.20         | 642                      | 13.1     |
| C2                       | 0.06         | 9                        | 0.7      |
| C3                       | 0.61         | 242                      | 7.8      |
| C4                       | 0.77         | 321                      | 9.1      |
| C5                       | 2.89         | 636                      | 9.7      |
| C6                       | 0.35         | 206                      | 7.3      |
| C7                       | 0.28         | 94                       | 6.8      |
| C8                       | 15.91        | 1,430                    | 33.4     |

**NRCS SOIL LEGEND:**

- NUMERICAL SYMBOL**
- BzB
- HcB
- HcC
- HcD
- HdC
- HdD
- ScA
- WfC

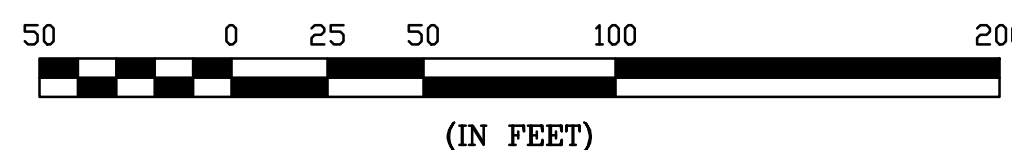
**SOIL MAP UNIT NAME**

- BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES
- HOLLIS-CHARLTON FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES
- HOLLIS-CHARLTON FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES
- HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES
- HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES
- HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES
- SCANTIC SILT LOAM, 0 TO 3 PERCENT SLOPES
- WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT, 8 TO 15 PERCENT SLOPES

**HSC**

- C/D
- D
- D
- D
- D
- D
- C/D
- A

**GRAPHIC SCALE**



NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

|               |               |               |                |                  |                  |           |     |          |      |      |
|---------------|---------------|---------------|----------------|------------------|------------------|-----------|-----|----------|------|------|
| DATE: 2-16-23 | SCALE: 1"=50' | DRAWN BY: GNS | DESIGN BY: JRG | APPROVED BY: JRG | PROJECT NO: 2074 | FILE: DRN | NO. | REVISION | APPD | DATE |
|---------------|---------------|---------------|----------------|------------------|------------------|-----------|-----|----------|------|------|

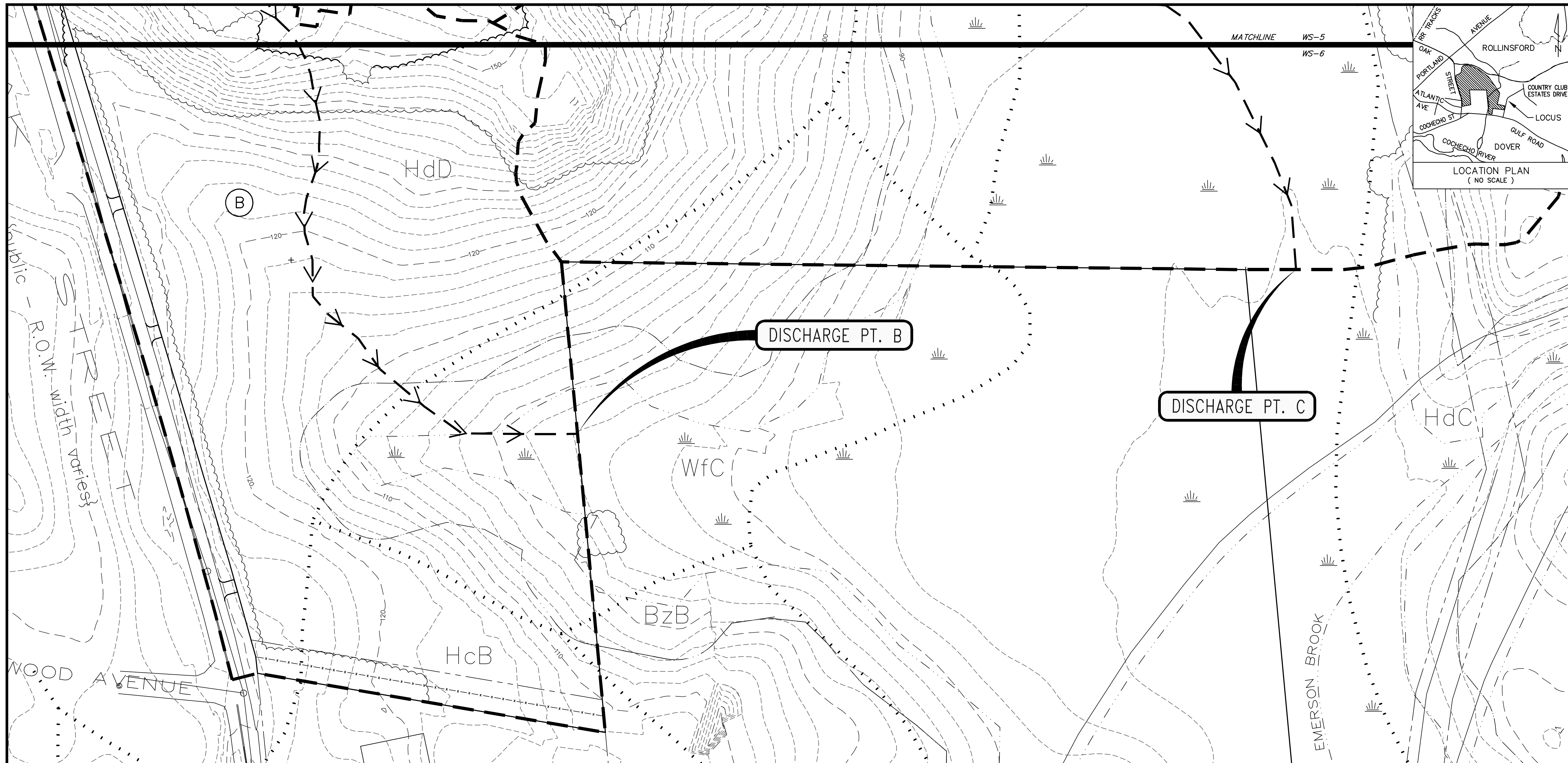
POST-DEVELOPMENT WATERSHED PLAN

CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857

EMERSON RIDGE  
OAK STREET  
DOVER, NH

WS-5

CIVILWORKS NEW ENGLAND  
18 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.748.0443



LEGEND:

- |                                                                                     |                                  |
|-------------------------------------------------------------------------------------|----------------------------------|
|  | EX 2' CONTOUR                    |
|  | EX 10' CONTOUR                   |
|  | EDGE OF WETLAND                  |
|  | EDGE OF 50' WETLAND BUFFER       |
|  | LONGEST FLOW PATH                |
|  | OVERALL<br>SUBCATCHMENT BOUNDARY |
|  | SUBCATCHMENT DESIGNATION         |
|  | PROPERTY LINE                    |
|  | LIMIT OF SOIL                    |
|  | PROPOSED EDGE OF PAVEMENT        |
|  | PROPOSED FINISH GRADE            |
|  | PROPOSED TREELINE                |

## POST-DEVELOPMENT WATERSHED CHARACTERISTICS

| SUBCATCHMENT DESIGNATION | AREA (ACRES) | LONGEST FLOW PATH (FEET) | T <sub>c</sub> (MIN) |
|--------------------------|--------------|--------------------------|----------------------|
| A                        | 0.04         | 38                       | 5.2                  |
| B                        | 6.52         | 629                      | 7.5                  |
| C1                       | 1.20         | 642                      | 13.1                 |
| C2                       | 0.06         | 9                        | 0.7                  |
| C3                       | 0.61         | 242                      | 7.8                  |
| C4                       | 0.77         | 321                      | 9.1                  |
| C5                       | 2.89         | 636                      | 9.7                  |
| C6                       | 0.35         | 206                      | 7.3                  |
| C7                       | 0.28         | 94                       | 6.8                  |
| C8                       | 15.91        | 1,430                    | 33.4                 |

NRCS SOIL LEGEND:

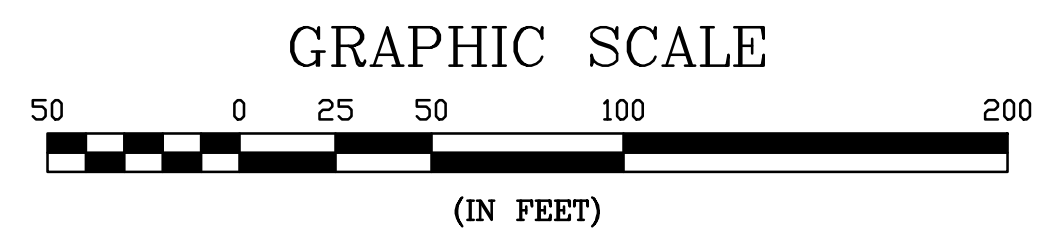
NUMERICAL SYMBOL

## SOIL MAP UNIT NAME

BUXTON SILT LOAM, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 8 TO 15 PERCENT SLOPES  
HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS, 15 TO 25 PERCENT SLOPES  
SCANTIC SILT LOAM, 0 TO 3 PERCENT SLOPES  
WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT, 8 TO 15 PERCENT SLOPES

HSG

C/D  
D  
D  
D  
D  
D  
C/D  
A



## POST-DEVELOPMENT WATERSHED PLAN

**EMERSON RIDGE  
OAK STREET  
DOVER, NH**

**CHINBURG  
DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857**

WS-6

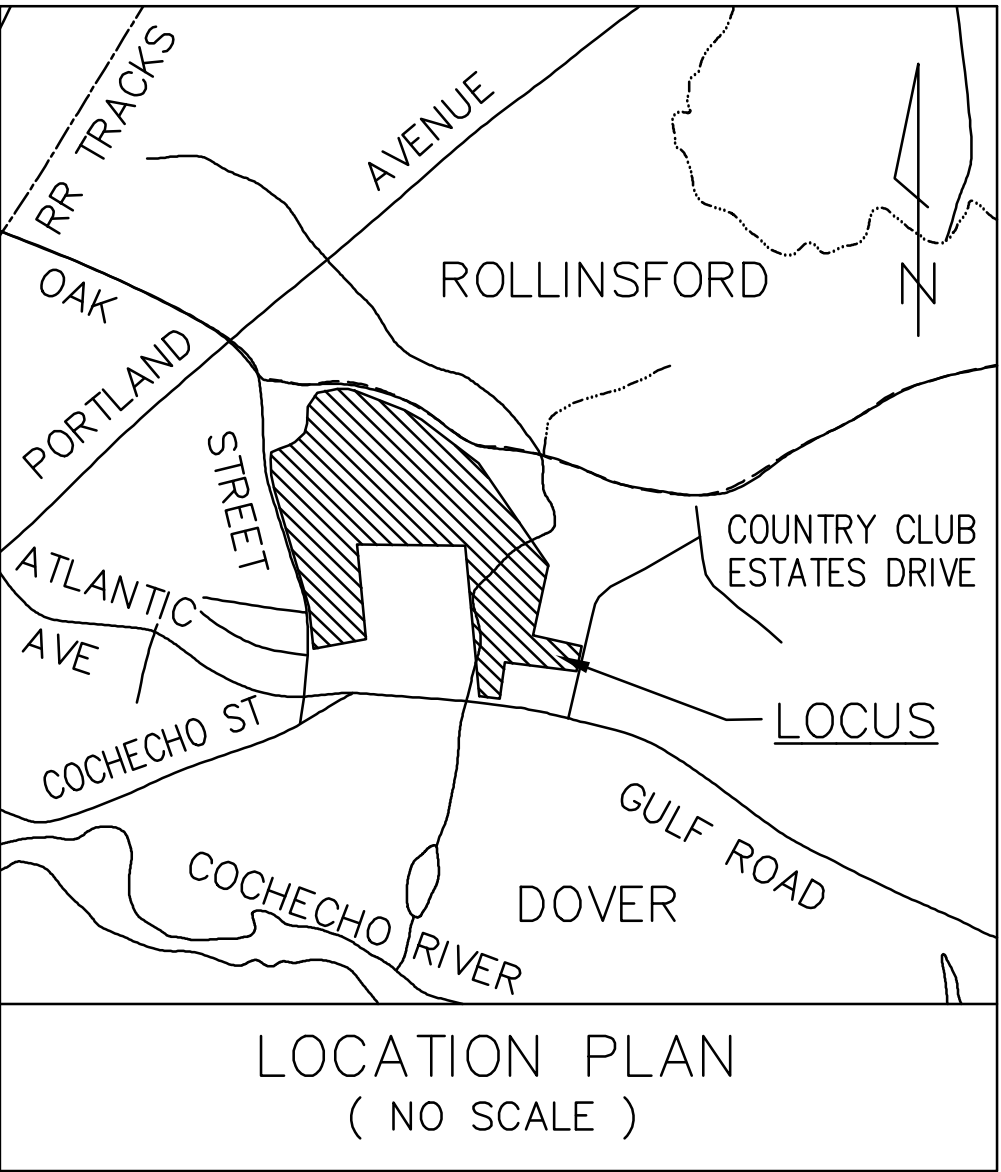
[illegible]

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

**CIVILWORKS NEW ENGLAND**  
CIVIL & WATERFRONT ENGINEERING

LOCATION PLAN  
( NO SCALE )

A map of the area around the Rollinsford Country Club. The clubhouse is a shaded rectangular area. Streets shown include RR Tracks, Avenue, Oak, Portland, Atlantic Ave, Cocheco St, Cocheco River, Gulf Road, and Locust. Landmarks include Rollinsford, Country Club Estates Drive, and Dover. A north arrow is present.



# EMERSON RIDGE OPEN SPACE SUBDIVISION PLAN

TAX MAP N, LOT 13-1  
OAK STREET  
DOVER, NH  
FEBRUARY 22, 2023

OWNER/APPLICANT CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857

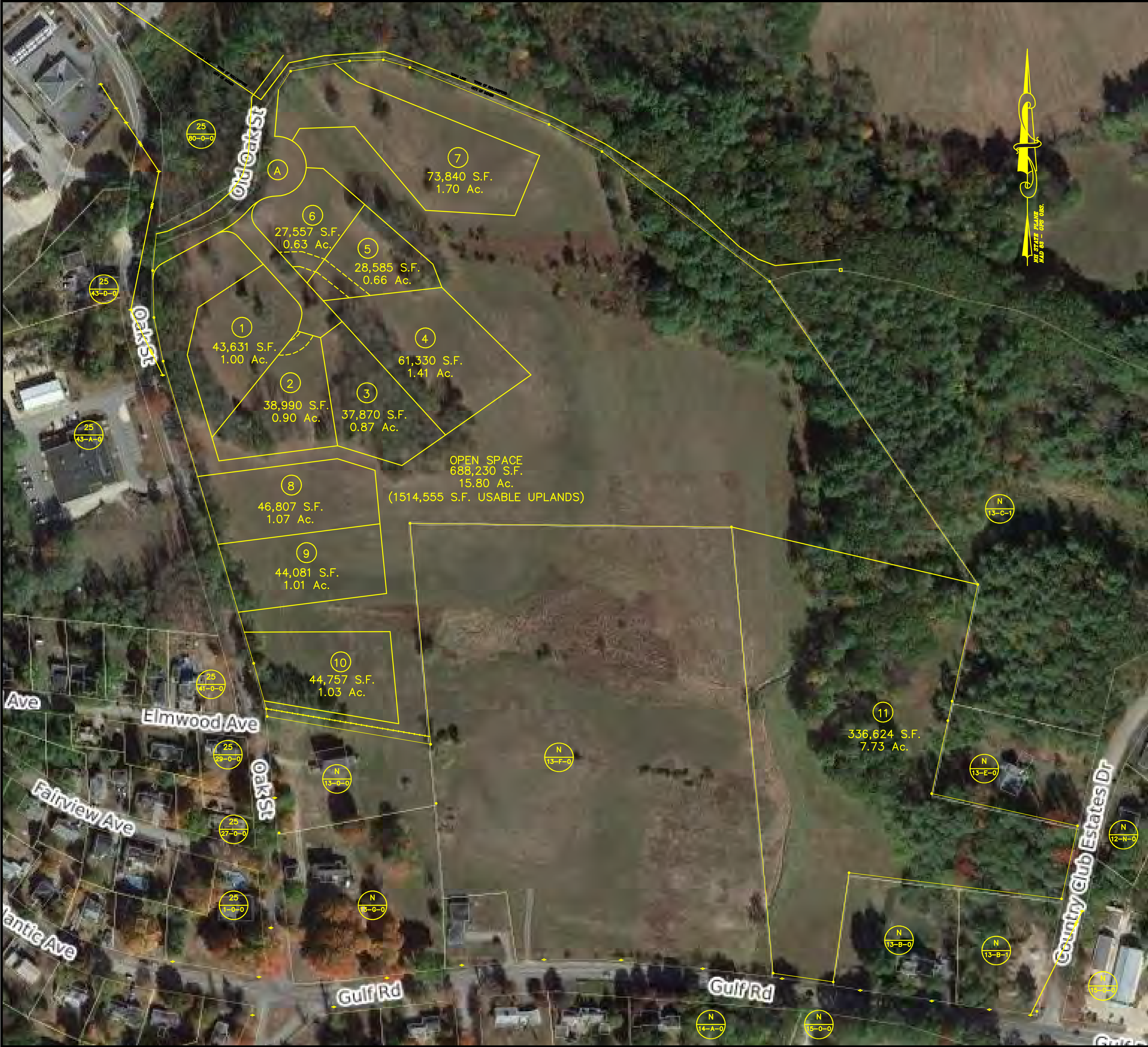
CIVIL ENGINEER **CIVILWORKS NEW ENGLAND**  
CIVIL & WATERFRONT ENGINEERING  
181 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.749.0443

LAND SURVEYOR McENEANEY SURVEY ASSOCIATES OF NEW ENGLAND  
P.O. BOX 681  
24 CHESTNUT STREET  
DOVER, NH 03820  
(603) 742-0911

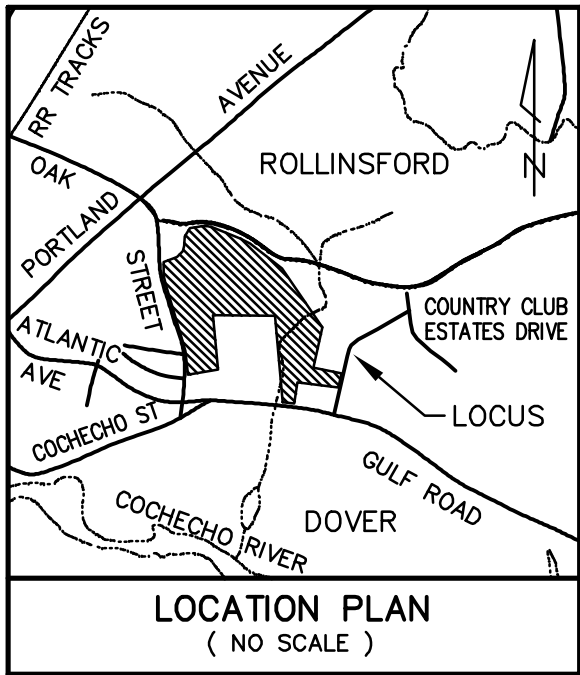
WETLAND SCIENTIST DAMON E. BURT, CWS #00163  
FRAGGLE ROCK ENVIRONMENTAL  
38 GARLAND ROAD  
STRAFFORD, NH 03884  
(603) 969-5574

DATE

| SHEET INDEX                                             | SHEET |
|---------------------------------------------------------|-------|
| COVER SHEET                                             | 1     |
| NEIGHBORHOOD PLAN                                       | 2     |
| OPEN SPACE SUBDIVISION YIELD PLAN (BY MCENEANEY SURVEY) | 3     |
| EXISTING CONDITIONS PLAN (BY MCENEANEY SURVEY)          | 4     |
| OPEN SPACE SUBDIVISION PLAN (BY MCENEANEY SURVEY)       | 5-8   |
| NHDES SUBDIVISION PLAN (BY MCENEANEY SURVEY)            | 9-11  |
| NOTE SHEET                                              | 12    |
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| GRADING, DRAINAGE, & EROSION CONTROL PLAN A, B, & C     | 15-17 |
| UTILITY PLAN A, B, & C                                  | 18-20 |
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| PROPOSED PRIVATE DRIVE PROFILE                          | 22    |
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| EROSION CONTROL DETAILS                                 | 25    |
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| ABUTTERS LIST                                                                                                                              |         |                |                                                                                                                                      | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                                    |  |  |                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------|
| TAX MAP                                                                                                                                    | LOT NO. | NAME & ADDRESS |                                                                                                                                      | PLANNING FILE                                                               |  |  |                                                                                                                                                      |
| <div><div>25</div><div>43-D-0</div></div>                                                                                                  | 25      | 43-D-0         | HUBBARD-LEARY LLC<br>89 OAK STREET<br>DOVER, NH 03820                                                                                |                                                                             |  |  | No.: P23-                                                                                                                                            |
| <div><div>25</div><div>43-A-0</div></div>                                                                                                  | 25      | 43-A-0         | HOT ROD CITY LLC<br>390 SIXTH STREET<br>DOVER, NH 03820                                                                              |                                                                             |  |  |                                                                                                                                                      |
| <div><div>25</div><div>41-0-0</div></div>                                                                                                  | 25      | 41-0-0         | BRIAN M. DALKE<br>KELLY A. DALKE<br>20 ELMWOOD AVENUE<br>DOVER, NH 03820                                                             |                                                                             |  |  | CIVILWORKS NEW ENGLAND<br><div>Civil &amp; Survey Engineering<br/>181 Watson Road, PO Box 1166<br/>Dover, New Hampshire 03821<br/>603.749.0443</div> |
| <div><div>25</div><div>29-0-0</div></div>                                                                                                  | 25      | 29-0-0         | CLARK CHRISTOPHER R &<br>CLARK JEANNE C P<br>21 ELMWOOD AVENUE<br>DOVER, NH 03820                                                    |                                                                             |  |  |                                                                                                                                                      |
| <div><div>25</div><div>27-0-0</div></div>                                                                                                  | 25      | 27-0-0         | MAATTALA JOHN P &<br>MAATTALA JENNIFER A<br>22 FAIRVIEW AVENUE<br>DOVER, NH 03820                                                    |                                                                             |  |  |                                                                                                                                                      |
| <div><div>25</div><div>1-0-0</div></div>                                                                                                   | 25      | 1-0-0          | ST LAURENT JUSTIN & MORGAN TRUSTEES<br>ST LAURENT FAMILY REVOCABLE TRUST<br>44 ATLANTIC AVENUE<br>DOVER, NH 03820                    |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-G-0</div></div>                                                                                                   | N       | 13-G-0         | DAY ANN MARIE &<br>DAY MICHEAL ANN<br>104 GULF ROAD<br>DOVER, NH 03820                                                               |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-F-0</div></div>                                                                                                   | N       | 13-F-0         | CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857                                                                   |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>14-A-0</div></div>                                                                                                   | N       | 14-A-0         | TOWNSEND EDWARD M &<br>TOWNSEND SARAH L<br>117 GULF ROAD<br>DOVER, NH 03820                                                          |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>15-0-0</div></div>                                                                                                   | N       | 15-0-0         | COCHECO COUNTRY CLUB<br>145 GULF ROAD<br>DOVER, NH 03820                                                                             |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-B-0</div></div>                                                                                                   | N       | 13-B-0         | TIBBETT NORMA &<br>TIBBETT DAHN<br>130 GULF ROAD<br>DOVER, NH 03820                                                                  |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-B-1</div></div>                                                                                                   | N       | 13-B-1         | TIBBETT NORMA &<br>TIBBETT DAHN<br>130 GULF ROAD<br>DOVER, NH 03820                                                                  |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>12-N-0</div></div>                                                                                                   | N       | 12-N-0         | GILBERT CLIFFORD M & MARGARET LIFE ESTAT<br>CARTER MARGARET & FORCILLO ROSEMARY L<br>1 COUNTRY CLUB ESTATES DRIVE<br>DOVER, NH 03820 |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-E-0</div></div>                                                                                                   | N       | 13-E-0         | ANDRESS JEFFERY D &<br>ANDRESS AMIE K<br>2A COUNTRY CLUB ESTATES<br>DOVER, NH 03820                                                  |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-C-1</div></div>                                                                                                   | N       | 13-C-1         | MURPHY EDWARD J JR. &<br>MURPHY AHN C<br>35 BELANGER DRIVE<br>DOVER, NH 03820                                                        |                                                                             |  |  |                                                                                                                                                      |
| <div><div>25</div><div>80-0-0</div></div>                                                                                                  | 25      | 80-0-0         | CRE JV MIXED FIVE NH BRANCH HOLDINGS LLC<br>C.O RYAN<br>P.O. BOX 460049<br>HOUSTON, TX 77056                                         |                                                                             |  |  |                                                                                                                                                      |
| <div><div>N</div><div>13-0-0</div></div>                                                                                                   | N       | 13-0-0         | DAHN H. TIBBETT<br>NORMA M. TIBBETT<br>130 GULF ROAD<br>DOVER, NH 03820                                                              |                                                                             |  |  |                                                                                                                                                      |
| <div>GRAPHIC SCALE</div> <div><div>150</div><div>0</div><div>75</div><div>150</div><div>300</div><div>600</div></div> <div>(IN FEET)</div> |         |                |                                                                                                                                      | NEIGHBORHOOD PLAN                                                           |  |  |                                                                                                                                                      |
|                                                                                                                                            |         |                |                                                                                                                                      | PROJECT: CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 |  |  |                                                                                                                                                      |
|                                                                                                                                            |         |                |                                                                                                                                      | PROJECT: EMERSON RIDGE<br>OAK STREET<br>DOVER, NH                           |  |  |                                                                                                                                                      |
|                                                                                                                                            |         |                |                                                                                                                                      | 2                                                                           |  |  |                                                                                                                                                      |

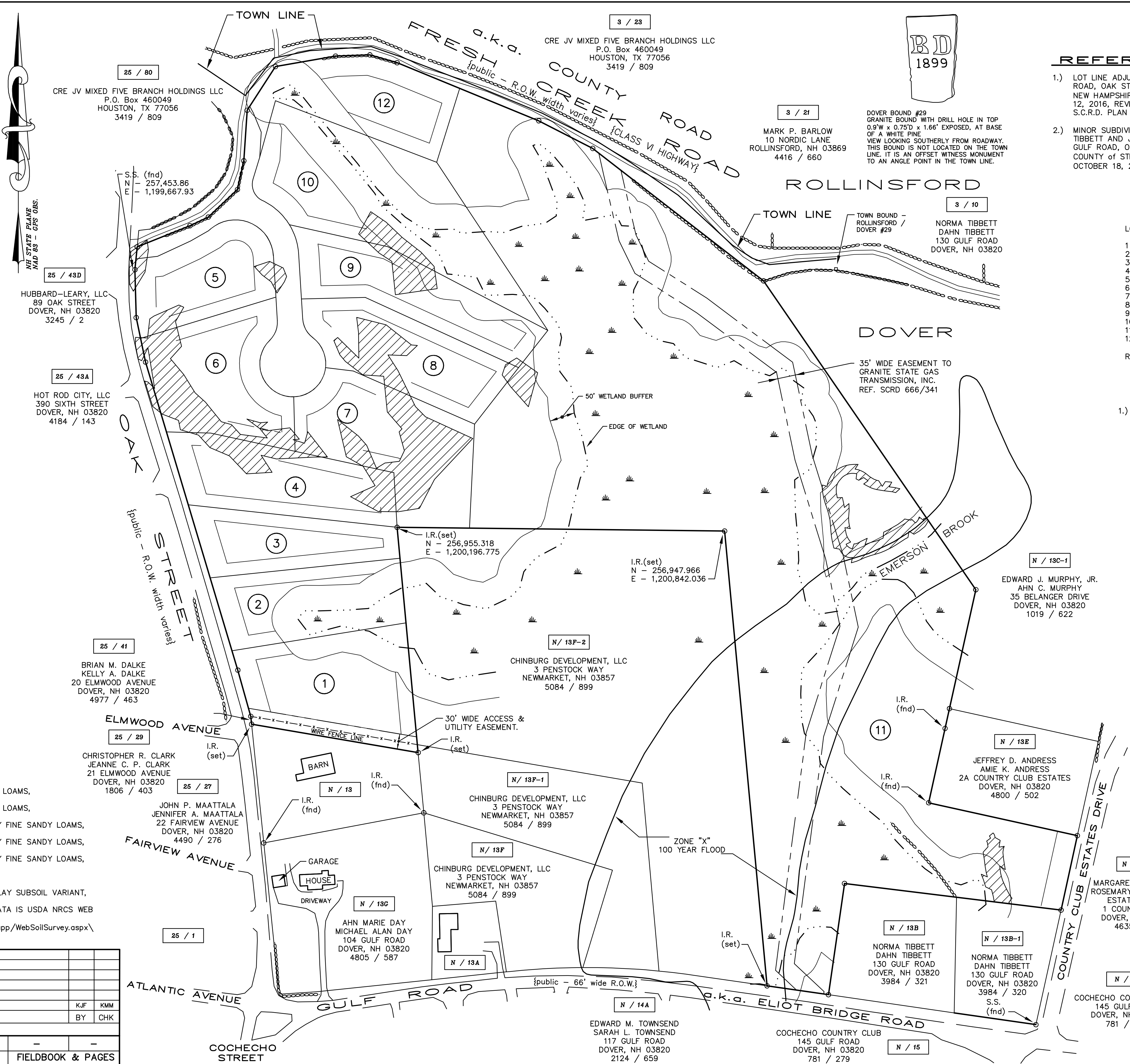


**LEGEND**

I.R.(set) - IRON ROD SET  
I.R.(fnd) - IRON ROD FOUND  
S.S.(fnd) - STEEL STAKE FOUND  
S.F. - SQUARE FEET  
Ac. - ACRE  
(TYP.) - TYPICAL  
± - MORE OR LESS  
Ø - DIAMETER  
S.C.R.D. - STRAFFORD COUNTY  
REGISTRY OF DEEDS  
--- - STONE WALL  
- - - - - EDGE OF WETLAND  
- - - - - WETLAND  
- - - - - SLOPES IN EXCESS  
OF 20 PERCENT

THE SOIL TYPES ON THE SITE ARE:  
BzB BUXTON SILT LOAM,  
3 TO 8 PERCENT SLOPES  
HcB HOLLIS-CHARLTON FINE SANDY LOAMS,  
3 TO 8 PERCENT SLOPES  
HcC HOLLIS-CHARLTON FINE SANDY LOAMS,  
8 TO 15 PERCENT SLOPES  
HdB HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
3 TO 8 PERCENT SLOPES  
HdC HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
8 TO 15 PERCENT SLOPES  
HdD HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
15 TO 25 PERCENT SLOPES  
ScA SCANTIC SILT LOAM,  
0 TO 3 PERCENT SLOPES  
WfC WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT,  
8 TO 15 PERCENT SLOPES  
THE SOURCE FOR THE SOIL TYPE DATA IS USDA NRCS WEB  
SOIL SURVEY  
<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

|            |             |                         |     |     |
|------------|-------------|-------------------------|-----|-----|
| 1          | 2/2/23      | UPDATE PLAN INFORMATION | KJF | KMM |
| NO.        | DATE        | DESCRIPTION             | BY  | CHK |
| REVISIONS  |             |                         |     |     |
| 21-1734    | SUBDIVISION | -                       | -   | -   |
| PROJECT NO | TYPE        | FIELDBOOK & PAGES       |     |     |



**REFERENCE PLANS:**

- 1.) LOT LINE ADJUSTMENT PLAN OF LAND LOT NOS. 13, 13C & 13E, TAX MAP N GULF ROAD, OAK STREET, COUNTRY CLUB ESTATES DRIVE & FRESH CREEK ROAD DOVER, NEW HAMPSHIRE COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: DECEMBER 12, 2016, REVISED THROUGH 2-16-17; BY: CIVILWORKS NEW ENGLAND. RECORDED S.C.R.D. PLAN 113-033.
- 2.) MINOR SUBDIVISION OF LAND PREPARED FOR DAHN H. TIBBETT & NORMA M. TIBBETT AND JAHN H. JANETOS & SUSAN G. JANETOS. TAX MAP N, LOT No. 13, GULF ROAD, OAK STREET & COUNTRY CLUB ESTATES DRIVE, CITY OF DOVER, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: OCTOBER 18, 2021, REVISED THROUGH 1/3/22; BY THIS OFFICE.

**YIELD LOT CALCULATIONS**

| LOT | FTG      | AREA S.F. | Ac.   | NON-WET<br>NON-SLOPE | NON-BUFFER<br>NON-SLOPE |
|-----|----------|-----------|-------|----------------------|-------------------------|
| 1   | 150.0    | 66888.0   | 1.54  | 64597                | 53196                   |
| 2   | 150.0    | 49883.6   | 1.15  | 49746                | 24103                   |
| 3   | 150.0    | 40086.6   | 0.92  | 40086                | 40087                   |
| 4   | 150.0    | 55476.4   | 1.27  | 43515                | 43513                   |
| 5   | 157.8    | 43346.0   | 1.00  | 41449                | 41449                   |
| 6   | 245.0    | 59179.8   | 1.36  | 40005                | 40005                   |
| 7   | 150.0 SB | 68301.0   | 1.57  | 43575                | 43575                   |
| 8   | 150.0    | 54373.1   | 1.25  | 43098                | 43098                   |
| 9   | 150.0    | 53614.5   | 1.23  | 47682                | 40319                   |
| 10  | 167.6    | 97568.1   | 2.24  | 48653                | 27081                   |
| 11  | 150.0    | 82471.4   | 18.93 | 113850               | 84530                   |
| 12  | 575.2    | 50926.1   | 1.17  | 49239                | 36140                   |

ROAD CL TO THROAT = 502.2'

- 1.) ZONING DISTRICT IS R40

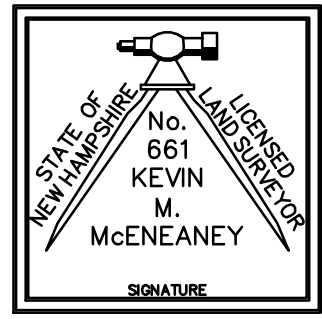
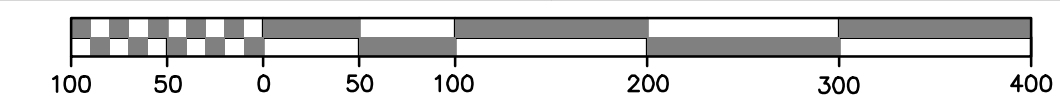
|                                |                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------|
| DIMENSIONAL REQUIREMENTS:      |                                                                                               |
| MINIMUM LOT SIZE               | = 40,000 S.F.<br>= 40,000 S.F. NON-WETLAND<br>NON-SLOPE<br>= 24,000 S.F. OUTSIDE BUFFER (60%) |
| MINIMUM LOT COVERAGE           | = 10 PERCENT                                                                                  |
| MINIMUM FRONTAGE               | = 150 FEET                                                                                    |
| BUILDING SETBACK REQUIREMENTS: |                                                                                               |
| FRONT SETBACK                  | = 40 FEET                                                                                     |
| SIDE SETBACK                   | = 25 FEET                                                                                     |
| REAR SETBACK                   | = 30 FEET                                                                                     |
| MAXIMUM BUILDING HEIGHT        | = 35 FEET MAXIMUM                                                                             |

SHEET 3

**OPEN SPACE SUBDIVISION YIELD PLAN  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY OF DOVER, COUNTY OF STRAFFORD  
STATE of NEW HAMPSHIRE**

DOVER PLANNING FILE No. P 23-\_\_

|                      |                             |
|----------------------|-----------------------------|
| DRAWN BY: <b>RJM</b> | FILE: 1734\DWGS\22-1734 OSS |
| SCALE: 1" = 100'     | DATE: FEBRUARY 10, 2022     |



**McEaney  
Survey  
Associates**  
of NEW ENGLAND  
P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

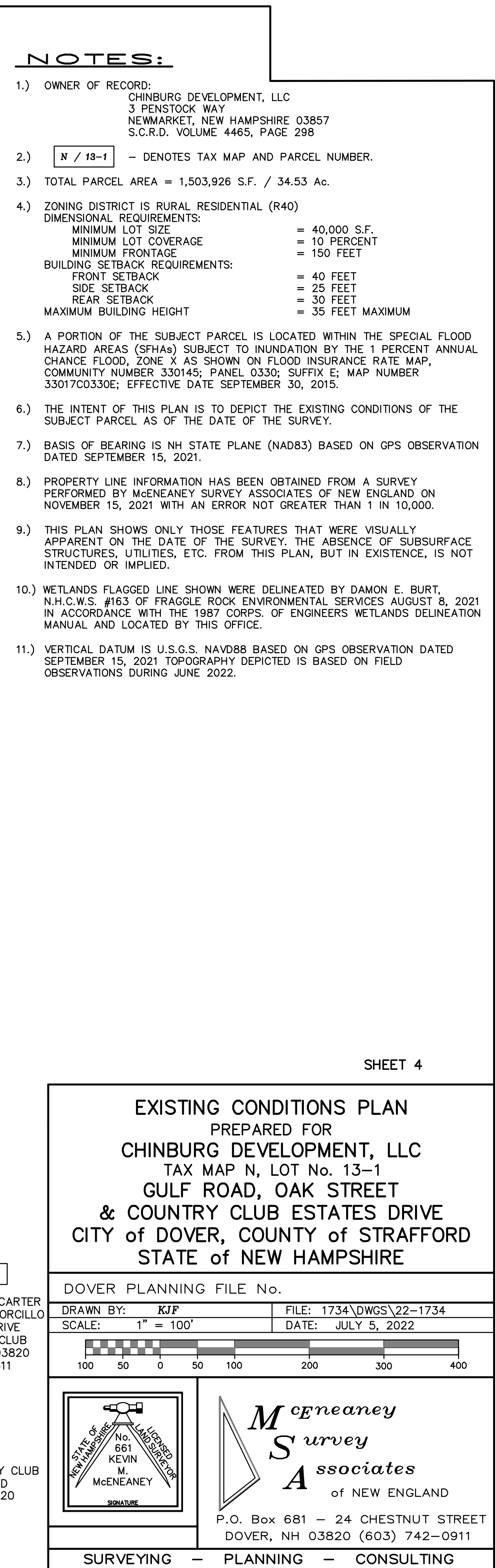
SURVEYING - PLANNING - CONSULTING



|                                                                                   |                                         |
|-----------------------------------------------------------------------------------|-----------------------------------------|
| I.R.(set)                                                                         | - IRON ROD SET                          |
| I.R.(find)                                                                        | - IRON ROD FOUND                        |
| S.S.(find)                                                                        | - STEEL STAKE FOUND                     |
| S.F.                                                                              | - SQUARE FEET                           |
| Ac.                                                                               | - ACRE                                  |
| (TYP.)                                                                            | - TYPICAL                               |
| ±                                                                                 | - MORE OR LESS                          |
| ø                                                                                 | - DIAMETER                              |
| S.C.R.D.                                                                          | - STRAFFORD COUNTY<br>REGISTRY OF DEEDS |
| =====                                                                             | - STONE WALL                            |
| -----                                                                             | - EDGE OF WETLAND                       |
|  | - WETLAND                               |
| - - - - -                                                                         | - CONTOUR (2FT INTER)                   |
| WFC                                                                               | - SOIL DELINEATION                      |
|  | - SEWER MANHOLE                         |
|  | - WATER GATE VALVE                      |
|  | - FIRE HYDRANT                          |
|  | - UTILITY POLE                          |

THE SOIL TYPES ON THE SITE ARE:  
BzB BUXTON SILT LOAM,  
3 TO 8 PERCENT SLOPES  
HcB HOLLIS-CHARLTON FINE SANDY LOAMS,  
3 TO 8 PERCENT SLOPES  
HcC HOLLIS-CHARLTON FINE SANDY LOAMS,  
8 TO 15 PERCENT SLOPES  
HdB HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
3 TO 8 PERCENT SLOPES  
HdC HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
8 TO 15 PERCENT SLOPES  
HdD HOLLIS-CHARLTON VERY ROCKY FINE SANDY LOAMS,  
15 TO 25 PERCENT SLOPES  
ScA SCANTIC SILT LOAM,  
0 TO 3 PERCENT SLOPES  
WFC WINDSOR LOAMY FINE SAND, CLAY SUBSOIL VARIANT,  
8 TO 15 PERCENT SLOPES  
THE SOURCE FOR THE SOIL TYPE DATA IS USDA NRCS WEB  
SOIL SURVEY  
<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

|            |      |             |           |         |  |
|------------|------|-------------|-----------|---------|--|
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|            |      |             |           |         |  |
|            |      |             |           |         |  |
| NO.        | DATE | DESCRIPTION | BY        | CHK     |  |
|            |      | REVISIONS   |           |         |  |
| 22-1734    |      | EC          | 21-09     | 34-74   |  |
| PROJECT NO |      | TYPE        | FIELDBOOK | & PAGES |  |



1. OWNER OF RECORD:  
CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NEW HAMPSHIRE 03857  
S.C.R.D. VOLUME 4465, PAGE 298

2. N / 13-1 – DENOTES TAX MAP AND PARCEL NUMBER.

3. TOTAL PARCEL AREA = 1,503,926 S.F. / 34.53 Ac.

4. ZONING DISTRICT IS RURAL RESIDENTIAL (R40)  
DIMENSIONAL REQUIREMENTS:  
MINIMUM LOT SIZE = 40,000 S.F.  
MINIMUM LOT COVERAGE = 10 PERCENT  
MINIMUM FRONTAGE = 150 FEET  
BUILDING SETBACK REQUIREMENTS:  
FRONT SETBACK = 40 FEET  
SIDE SETBACK = 25 FEET  
REAR SETBACK = 30 FEET  
MAXIMUM BUILDING HEIGHT = 35 FEET MAXIMUM

5. A PORTION OF THE SUBJECT PARCEL IS LOCATED WITHIN THE SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1 PERCENT ANNUAL CHANCE FLOOD, ZONE X AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY NUMBER 330145; PANEL 0330; SUFFIX E; MAP NUMBER 33017C0330E; EFFECTIVE DATE SEPTEMBER 30, 2015.

6. THE INTENT OF THIS PLAN IS TO DEPICT THE EXISTING CONDITIONS OF THE SUBJECT PARCEL AS OF THE DATE OF THE SURVEY.

7. BASIS OF BEARING IS NH STATE PLANE (NAD83) BASED ON GPS OBSERVATION DATED SEPTEMBER 15, 2021.

8. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY McNEANEY SURVEY ASSOCIATES OF NEW ENGLAND ON NOVEMBER 15, 2021 WITH AN ERROR NOT GREATER THAN 1 IN 10,000.

9. THIS PLAN SHOWS ONLY THOSE FEATURES THAT WERE VISUALLY APPARENT ON THE DATE OF THE SURVEY. THE ABSENCE OF SUBSURFACE STRUCTURES, UTILITIES, ETC. FROM THIS PLAN, BUT IN EXISTENCE, IS NOT INTENDED OR IMPLIED.

10. WETLANDS FLAGGED LINE SHOWN WERE DELINEATED BY DAMON E. BURT, N.H.C.W.S. #163 OF FRAGILE ROCK ENVIRONMENTAL SERVICES AUGUST 8, 2021 IN ACCORDANCE WITH THE 1987 CORP. OF ENGINEERS WETLANDS DELINEATION MANUAL AND LOCATED BY THIS OFFICE.

11. VERTICAL DATUM IS U.S.G.S. NAVD88 BASED ON GPS OBSERVATION DATED SEPTEMBER 15, 2021 TOPOGRAPHY DEPICTED IS BASED ON FIELD OBSERVATIONS DURING JUNE 2022.

- 1.) LOT LINE ADJUSTMENT PLAN OF LAND LOT NOS. 13, 13C & 13E, TAX MAP N GULF ROAD, OAK STREET, COUNTRY CLUB ESTATES DRIVE & FRESH CREEK ROAD DOVER, NEW HAMPSHIRE COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: DECEMBER 12, 2016, REVISED THROUGH 2-16-17; BY: CIVILWORKS NEW ENGLAND. RECORDED S.C.R.D. PLAN 113-033.
- 2.) MINOR SUBDIVISION OF LAND PREPARED FOR DAHN H. TIBBETT & NORMA M. TIBBETT AND JAHN H. JANETOS & SUSAN G. JANETOS, TAX MAP N, LOT No. 13, GULF ROAD, OAK STREET & COUNTRY CLUB ESTATES DRIVE, CITY OF DOVER, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE; SCALE: 1" = 100'; DATED: OCTOBER 18, 2021 & REVISED THROUGH 1/3/22; BY: THIS OFFICE; RECORDED S.C.R.D. PLAN 12673.

MARK P. BARLOW  
10 NORDIC LANE  
ROLLINSFORD, NH 03869  
4416 / 660

ROLLINSFORD

3 / 10

NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820

TOWN BOUND ROLLINSFORD/DOVER  
DOVER BOUND #29  
GRANITE BOUND WITH DRILL HOLE IN TOP  
0.9'W x 0.75'D x 1.66' EXPOSED, AT BASE  
OF A WHITE PINE  
VIEW LOOKING SOUTHERLY FROM ROADWAY.  
THIS BOUND IS NOT LOCATED ON THE TOWN  
LINE. IT IS AN OFFSET WITNESS MONUMENT  
TO AN ANGLE POINT IN THE TOWN LINE.

N / 13C-1

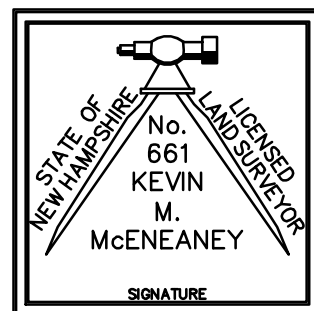
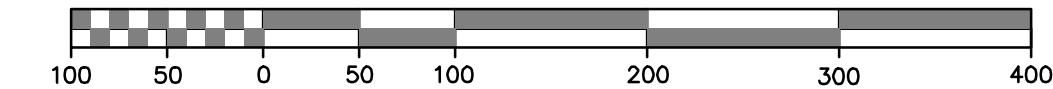
EDWARD J. MURPHY, JR.  
AHN C. MURPHY  
35 BELANGER DRIVE  
DOVER, NH 03820  
1019 / 622

SHEET 4

EXISTING CONDITIONS PLAN  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No.

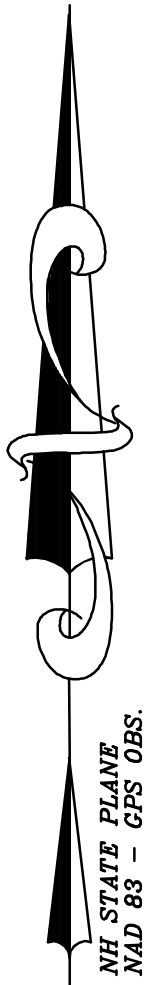
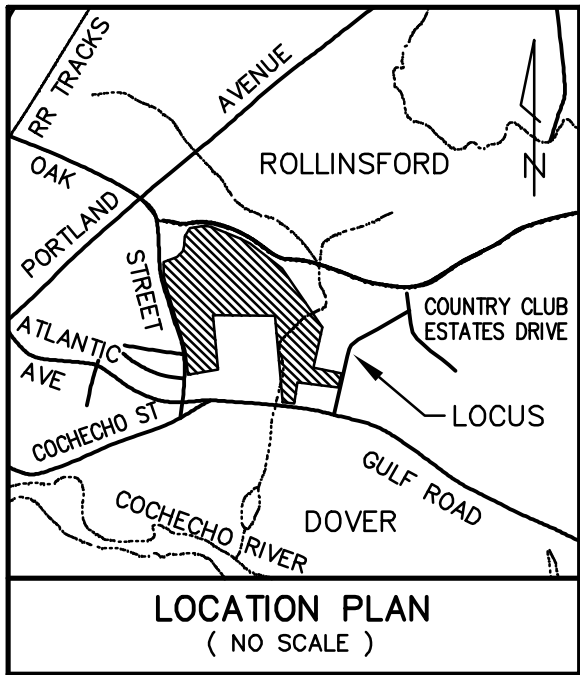
|                      |                         |
|----------------------|-------------------------|
| DRAWN BY: <b>KJF</b> | FILE: 1734\DWGS\22-1734 |
| SCALE: 1" = 100'     | DATE: JULY 5, 2022      |



**McNeaney  
Survey  
Associates**  
of NEW ENGLAND

P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

**SURVEYING – PLANNING – CONSULTING**



25 / 43D  
HUBBARD-LEARY, LLC  
89 OAK STREET  
DOVER, NH 03820  
3245 / 2

25 / 43A  
HOT ROD CITY, LLC  
390 SIXTH STREET  
DOVER, NH 03820  
4184 / 143

25 / 41  
BRIAN M. DALKE  
KELLY A. DALKE  
20 ELMWOOD AVENUE  
DOVER, NH 03820  
4977 / 463

25 / 29  
CHRISTOPHER R. CLARK  
JEANNE C. P. CLARK  
21 ELMWOOD AVENUE  
DOVER, NH 03820  
1806 / 403

N / 13  
DAHN H. TIBBETT  
NORMA M. TIBBETT  
130 GULF ROAD  
DOVER, NH 03820  
5037 / 899

N / 13P-1  
CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857  
5084 / 899

N / 13P  
CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857  
5084 / 899

N / 14A  
EDWARD M. TOWNSEND  
SARAH L. TOWNSEND  
117 GULF ROAD  
DOVER, NH 03820  
2124 / 659

N / 15  
COCHECHO COUNTRY CLUB  
145 GULF ROAD  
DOVER, NH 03820  
781 / 279

N / 13B  
NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820  
3984 / 321

N / 13B-1  
NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820  
3984 / 320

N / 15  
COCHECHO COUNTRY CLUB  
145 GULF ROAD  
DOVER, NH 03820  
781 / 279

N / 13C-1  
EDWARD J. MURPHY, JR.  
AHN C. MURPHY  
35 BELANGER DRIVE  
DOVER, NH 03820  
1019 / 622

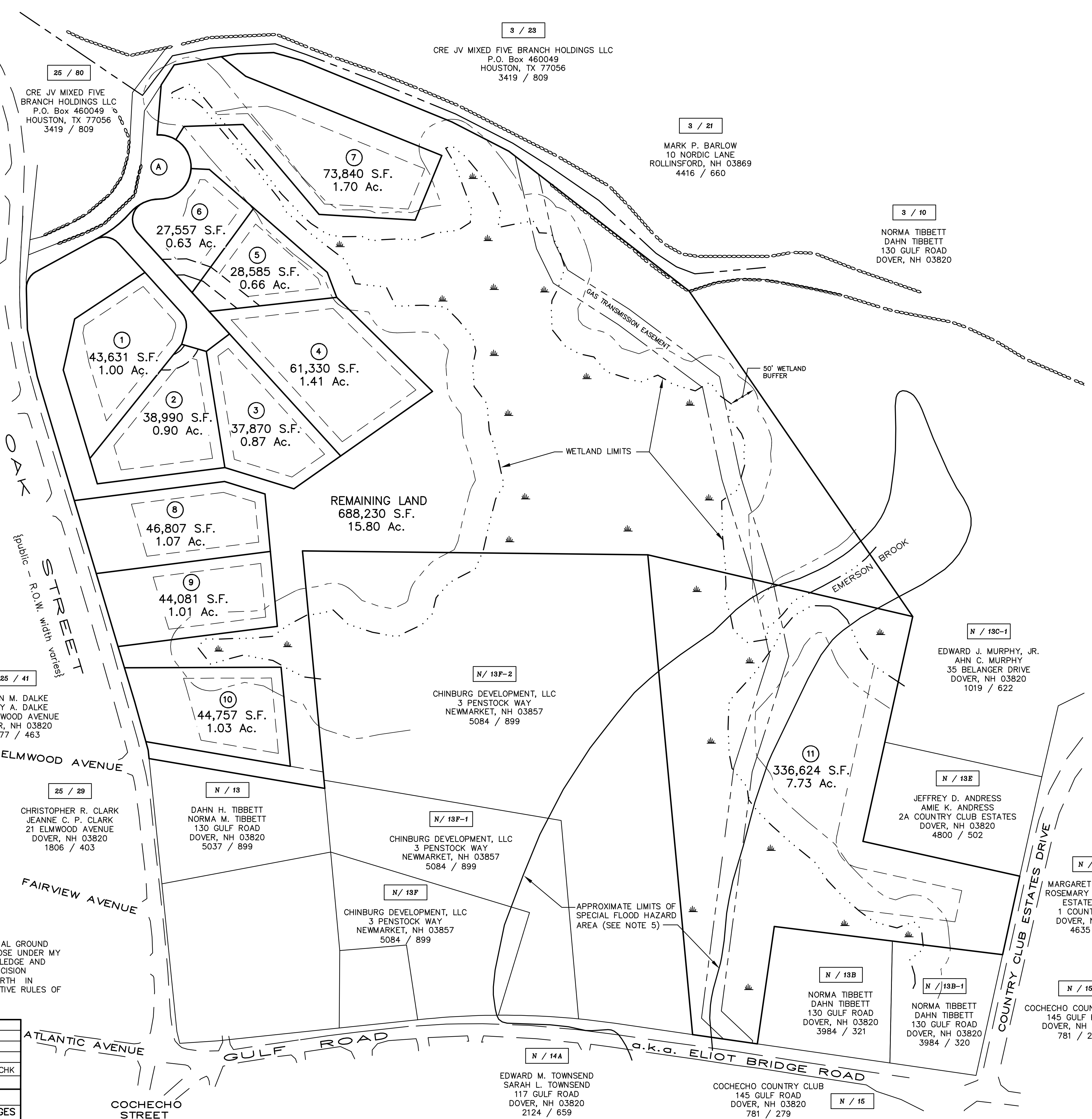
N / 13E  
JEFFREY D. ANDRESS  
AMIE K. ANDRESS  
2A COUNTRY CLUB ESTATES  
DOVER, NH 03820  
4800 / 502

N / 12N  
MARGARET A. CARTER  
ROSEMARY L. FORCILLO  
ESTATES DRIVE  
1 COUNTRY CLUB  
DOVER, NH 03820  
4635 / 411

3 / 23  
CRE JV MIXED FIVE BRANCH HOLDINGS LLC  
P.O. Box 460049  
HOUSTON, TX 77056  
3419 / 809

3 / 21  
MARK P. BARLOW  
10 NORDIC LANE  
ROLLINSFORD, NH 03869  
4416 / 660

3 / 10  
NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820



## ZONING REQUIREMENTS

1.) ZONING DISTRICT IS R40  
OPEN SPACE SUBDIVISION

GENERAL REQUIREMENTS:

NO STRUCTURES OR SEPTIC SYSTEMS WILL BE ALLOWED TO BE BUILT IN:  
SLOPE GREATER THAN 20 PERCENT  
AREAS WITHIN CONSERVATION DISTRICTS  
ALL FLOOD HAZARD AREAS  
WETLANDS

DIMENSIONAL REQUIREMENTS:

MINIMUM LOT SIZE SUBDIV. LOTS = 20,000 S.F.  
MINIMUM FRONTAGE SUBDIV. LOTS = 40 FEET  
MINIMUM BUFFER ALONG FRONTAGE = 100 FEET

MINIMUM DISTANCE AROUND  
INDIVIDUAL UNITS IN CLUSTERS  
STREET SIDE UNITS = 20 FEET  
BETWEEN UNITS = 30 FEET

MINIMUM BUILDING SETBACKS FOR  
SUBDIVISION LOTS  
ABUTTING A STREET = 20 FEET  
ABUTTING A LOT LINE = 20 FEET

MINIMUM DISTANCE FROM EXISTING  
STRUCTURES OR DWELLING UNITS = 100 FEET

MINIMUM DISTANCE FROM EXTERNAL  
BOUNDARIES = 50 FEET

EXTERNAL BOUNDARY BUFFERS SHALL BE CONSIDERED AN UNDISTURBED  
NATURAL AREA FOR THE PURPOSE OF SHIELDING ABUTTERS

OPEN SPACE REQUIREMENTS.

THE AREA OF THE OPEN SPACE SHALL EQUAL OR EXCEED THE TOTAL ALLOWED  
REDUCTION IN THE LOT SIZES WITHIN THE OPEN SPACE SUBDIVISION AND SHALL  
BE PERMANENTLY DEDICATED AS OPEN SPACE OR FOR MUNICIPAL USE, AS  
AGREED UPON. A MINIMUM OF 50% OF THE TOTAL OPEN SPACE LAND MUST BE  
USABLE UPLANDS AND REASONABLY ACCESSIBLE TO ALL PROPERTY OWNERS IN  
THE PROJECT.

OPEN SPACE REQUIREMENTS FOR 11 LOTS  
11 \* 20,000 S.F. = 220,000 S.F. MINIMUM OPEN SPACE  
= 110,000 S.F. MINIMUM USABLE UPLANDS

PROPOSED OPEN SPACE = 688,230 S.F. (15.80 Ac.)  
114,555 S.F. USABLE UPLANDS

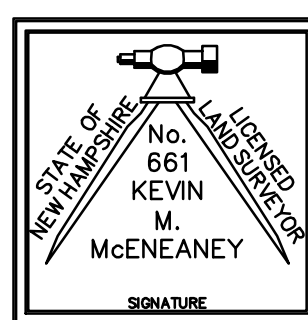
PARCEL (A) IS TO BE GRANTED TO THE CITY OF DOVER AS PART OF THE OLD  
OAK STREET RIGHT OF WAY.

SHEET 5

OPEN SPACE SUBDIVISION  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. P 23 -

DRAWN BY: KJF FILE: MSA\1734\DOV23-1734SUB  
SCALE: 1" = 100' DATE: FEBRUARY 1, 2023



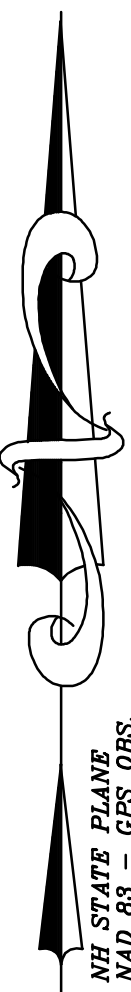
McEneaney  
Survey  
Associates  
of NEW ENGLAND

P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

SURVEYING - PLANNING - CONSULTING

"I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL GROUND  
SURVEY PERFORMED WITH A TOTAL STATION, BY ME OR THOSE UNDER MY  
DIRECT SUPERVISION AND THAT, TO THE BEST OF MY KNOWLEDGE AND  
BELIEF, SAID SURVEY MEETS OR EXCEEDS THE MINIMUM PRECISION  
REQUIREMENTS FOR SURVEY CLASSIFICATION "U" AS SET FORTH IN  
TABLE 500.1 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF  
THE BOARD OF LICENSURE FOR LAND SURVEYORS."

|            |      |             |    |     |                   |
|------------|------|-------------|----|-----|-------------------|
|            |      |             |    |     |                   |
|            |      |             |    |     |                   |
|            |      |             |    |     |                   |
| NO.        | DATE | DESCRIPTION | BY | CHK |                   |
| REVISIONS  |      |             |    |     |                   |
| 23-1784    |      | SUBDIVISION |    |     |                   |
| PROJECT NO |      | TYPE        |    |     | FIELDBOOK & PAGES |



ROLLINSFORD  
DOVER STREET  
OLD OAK STREET

TOWN LINE  
(SEE REFERENCE PLAN 3)

CRE JV MIXED FIVE BRANCH HOLDINGS LLC  
P.O. Box 460049  
HOUSTON, TX 77056  
3419 / 809

I.P.(fnd)

HUBBARD-LEARY, LLC  
89 OAK STREET  
DOVER, NH 03820  
3245 / 2

HOT ROD CITY, LLC  
390 SIXTH STREET  
DOVER, NH 03820  
4184 / 143

## LEGEND

- - GRANITE BOUND TO BE SET
- - IRON ROD TO BE SET
- I.R.(fnd) - IRON ROD FOUND
- S.S.(fnd) - STEEL STAKE FOUND
- S.F. - SQUARE FEET
- Ac. - ACRE
- (TYP.) - TYPICAL
- ± - MORE OR LESS
- Ø - DIAMETER
- S.C.R.D. - STRAFFORD COUNTY REGISTRY OF DEEDS
- - STONE WALL
- - - - - EDGE OF WETLAND
- - - - - WETLAND
- - - - - DOVER CONSERVATION AREA SLOPES >20%

| NO.        | DATE        | DESCRIPTION       | BY | CHK |
|------------|-------------|-------------------|----|-----|
| REVISIONS  |             |                   |    |     |
| 23-1784    | SUBDIVISION |                   |    |     |
| PROJECT NO | TYPE        | FIELDBOOK & PAGES |    |     |

SEE SHEET 7

3 / 23

CRE JV MIXED FIVE BRANCH HOLDINGS LLC  
P.O. Box 460049  
HOUSTON, TX 77056  
3419 / 809

PARCEL AREA  
73,840 S.F.  
1.70 Ac.

PARCEL AREA  
27,557 S.F.  
0.63 Ac.

PARCEL AREA  
28,585 S.F.  
0.66 Ac.

PARCEL AREA  
43,631 S.F.  
1.00 Ac.

PARCEL AREA  
38,990 S.F.  
0.90 Ac.

PARCEL AREA  
37,870 S.F.  
0.87 Ac.

PARCEL AREA  
61,330 S.F.  
1.41 Ac.

PARCEL AREA  
46,807 S.F.  
1.07 Ac.

OPEN SPACE  
688,230 S.F.  
15.80 Ac.  
114,555 S.F. USABLE UPLANDS

| No. | Central Angle | Radius  | Arc Length | Chord Length | Chord Bearing |
|-----|---------------|---------|------------|--------------|---------------|
| C1  | 76°20'08"     | 35.00'  | 46.63'     | 43.26'       | S80°21'33"E   |
| C2  | 58°31'52"     | 35.00'  | 35.75'     | 34.22'       | S12°55'33"E   |
| C3  | 107°14'08"    | 35.00'  | 65.51'     | 56.36'       | N11°25'35"E   |
| C4  | 24°19'51"     | 72.00'  | 30.58'     | 30.35'       | S52°52'43"W   |
| C5  | 20°45'35"     | 200.00' | 72.47'     | 72.07'       | S51°05'35"W   |
| C6  | 24°27'35"     | 72.00'  | 30.74'     | 30.50'       | N77°16'26"E   |
| C7  | 86°46'57"     | 60.00'  | 90.88'     | 82.44'       | N46°06'45"E   |
| C8  | 35°04'15"     | 60.00'  | 36.73'     | 36.16'       | N75°47'50"W   |
| C9  | 62°56'08"     | 35.00'  | 38.45'     | 36.54'       | N30°00'19"E   |
| C10 | 60°58'59"     | 60.00'  | 63.86'     | 60.89'       | N27°46'13"W   |
| C11 | 38°34'31"     | 42.00'  | 28.28'     | 27.75'       | N49°47'47"E   |
| C12 | 71°32'16"     | 68.00'  | 84.90'     | 79.49'       | N60°48'17"E   |

| No. | Bearing     | Distance |
|-----|-------------|----------|
| L1  | S42°11'29"E | 73.71'   |
| L2  | S16°20'23"W | 26.17'   |
| L3  | S73°39'37"E | 48.00'   |
| L4  | N53°03'07"E | 54.23'   |
| L5  | S61°28'23"W | 10.21'   |
| L6  | N16°39'58"W | 49.15'   |
| L7  | N42°12'16"W | 56.65'   |
| L8  | N42°11'29"W | 47.73'   |
| L9  | S21°01'30"E | 50.00'   |
| L10 | S87°16'43"E | 34.13'   |
| L11 | N32°56'01"E | 44.77'   |
| L12 | S51°09'36"E | 58.66'   |
| L13 | S31°44'17"W | 28.87'   |
| L14 | N16°39'58"W | 65.64'   |
| L15 | S12°28'08"W | 40.00'   |
| L16 | N05°48'59"W | 15.56'   |
| L17 | N15°41'21"W | 16.60'   |
| L18 | N16°39'58"W | 41.49'   |
| L19 | N80°09'31"E | 30.93'   |
| L20 | N87°56'29"E | 67.76'   |
| L21 | S73°55'09"E | 55.67'   |
| L22 | N88°21'33"E | 14.87'   |
| L23 | S71°18'39"E | 37.22'   |

MARK P. BARLOW  
10 NORDIC LANE  
ROLLINSFORD, NH 03869  
4416 / 660

SEE SHEET 7

SHEET 6

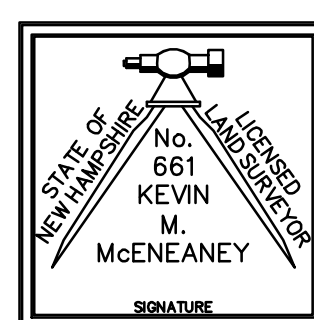
## REFERENCE PLANS:

- LOT LINE ADJUSTMENT PLAN OF LAND LOT NOS. 13, 13C & 13E, TAX MAP N GULF ROAD, OAK STREET, COUNTRY CLUB ESTATES DRIVE & FRESH CREEK ROAD DOVER, NEW HAMPSHIRE COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: DECEMBER 12, 2016, REVISED THROUGH 2-16-17; BY: CIVILWORKS NEW ENGLAND. RECORDED S.C.R.D. PLAN 113-033.
- MINOR SUBDIVISION OF LAND PREPARED FOR DAHN H. TIBBETT & NORMA M. TIBBETT AND JAHN H. JANETOS & SUSAN G. JANETOS, TAX MAP N, LOT No. 13, GULF ROAD, OAK STREET & COUNTRY CLUB ESTATES DRIVE, CITY OF DOVER, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: OCTOBER 18, 2021, REVISED THROUGH 1/3/22; BY THIS OFFICE. RECORDED S.C.R.D. PLAN 12673.
- A PORTION OF CITY / TOWN LINE PREPARED FOR THE CITY OF DOVER, NEW HAMPSHIRE AND THE TOWN OF ROLLINSFORD, NEW HAMPSHIRE LOCATED WITHING THE ROADWAY KNOWN AS OAK STREET, DOVER AND ROLLINSFORD, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE; SCALE: 1" = 50'; DATED: NOV. 18, 2016, REVISED THROUGH 10/2/17; ON FILE WITH THE CITY OF DOVER

OPEN SPACE SUBDIVISION  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. P 23 -

DRAWN BY: KJF FILE: MSA\1734\DV23-1734SUB  
SCALE: 1" = 50' DATE: FEBRUARY 1, 2023

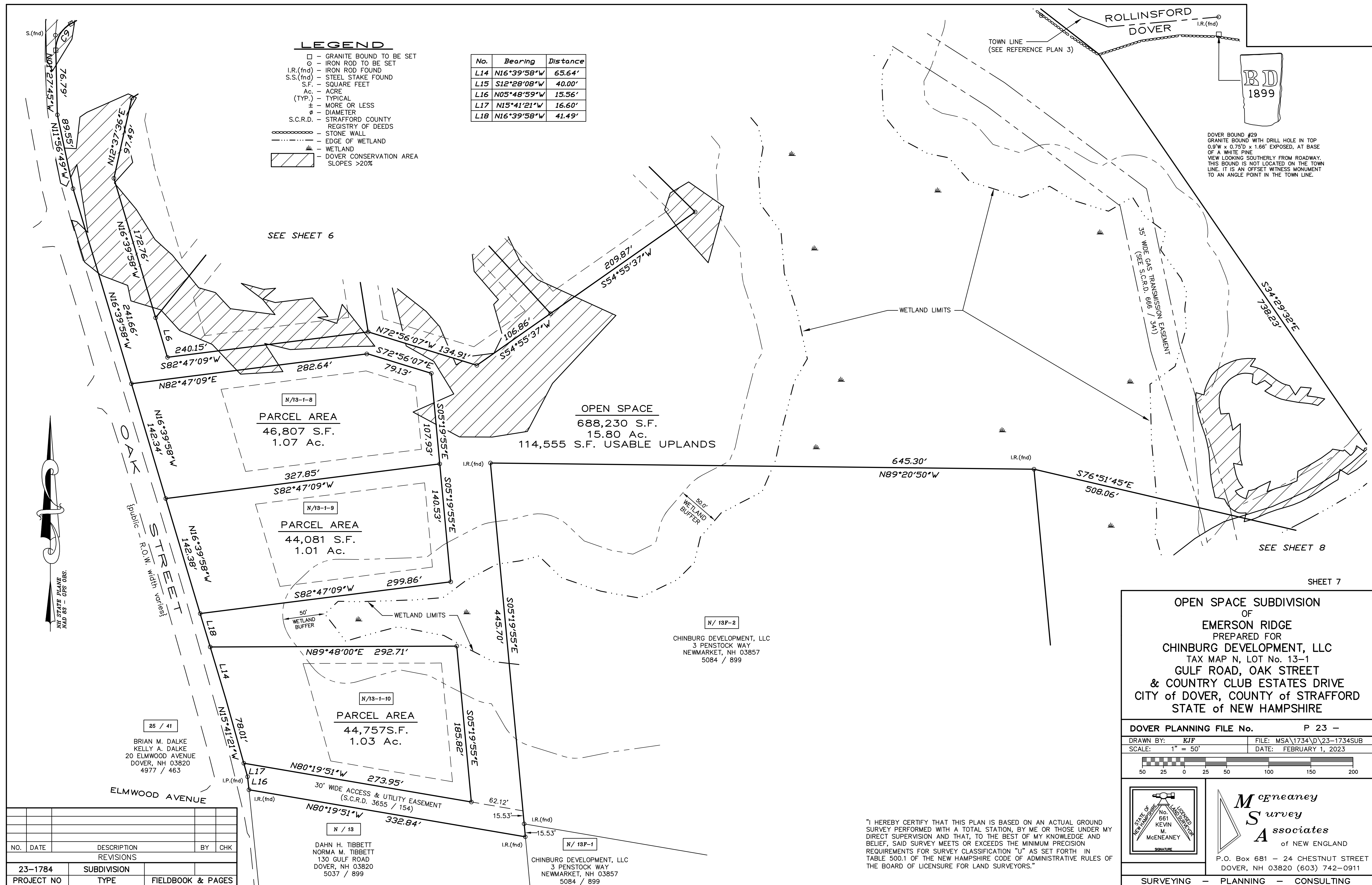


McEneaney  
Survey  
Associates  
of NEW ENGLAND

P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

SURVEYING - PLANNING - CONSULTING

"I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL GROUND SURVEY PERFORMED WITH A TOTAL STATION, BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, SAID SURVEY MEETS OR EXCEEDS THE MINIMUM PRECISION REQUIREMENTS FOR SURVEY CLASSIFICATION "U" AS SET FORTH IN TABLE 500.1 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS."



SEE SHEET 7

645.30'  
N89°20'50"W

I.R.(fnd)

SEE SHEET 7

### LEGEND

-  GRANITE BOUND TO BE SET  
 IRON ROD TO BE SET  
 IRON ROD FOUND  
 STEEL STAKE FOUND  
 SQUARE FEET  
 ACRE  
 TYPICAL  
 MORE OR LESS  
 DIAMETER  
 STRAFFORD COUNTY  
 REGISTRY OF DEEDS  
 STONE WALL  
 EDGE OF WETLAND  
 WETLAND  
 DOVER CONSERVATION AREA  
 SLOPES >20%

NOTES:

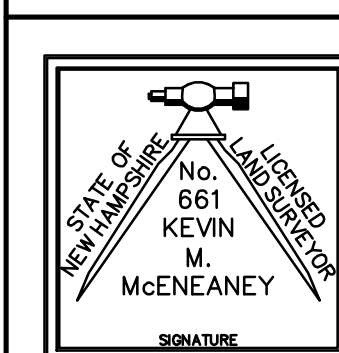
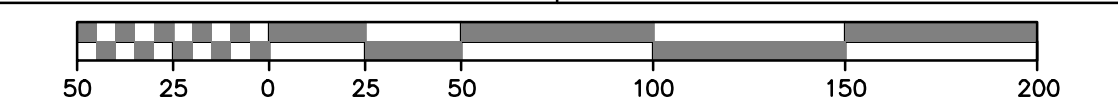
- OWNER OF RECORD AND APPLICANT:  
CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NEW HAMPSHIRE 03857  
S.C.R.D. VOLUME 4465, PAGE 298
- 2.) N / 13-1— DENOTES TAX MAP AND PARCEL NUMBER.
- 3.) PARCEL AREA: 1,503,926 S.F.± / 34.53 Ac.±
- 4.) ZONING DISTRICT IS RURAL RESIDENTIAL R-40 — OPEN SPACE SUBDIVISION. SEE SHEET 1 OF 4 FOR ZONING REQUIREMENTS
- 5.) A PORTION OF THE SUBJECT PARCEL IS LOCATED WITHIN THE SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1 PERCENT ANNUAL CHANCE FLOOD, ZONE X; AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY NUMBER 330145; PANEL 0330; SUFFIX E; MAP NUMBER 33017C0330E; DATE SEPTEMBER 30, 2015.
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- 7.) VERTICAL DATUM IS U.S.G.S. NAVD88 BASED ON GPS OBSERVATION DATED SEPTEMBER 15, 2021 AND TOPOGRAPHY DEPICTED IS BASED ON FIELD OBSERVATIONS DURING JUNE 2022. CONTOUR INTERVAL IS TWO FEET.
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- 10.) WETLANDS FLAGGED LINE SHOWN WERE DELINEATED BY DAMON E. BURT, N.H.C.W.S. #163 OF FRAGILE ROCK ENVIRONMENTAL SERVICES AUGUST 8, 2021 IN ACCORDANCE WITH THE 1987 CORPS. OF ENGINEERS WETLANDS DELINEATION MANUAL AND LOCATED BY THIS OFFICE.
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- 12.) THE PARCEL IS SUBJECT TO A 30' WIDE ACCESS AND UTILITY EASEMENT FOR THE BENEFIT OF PARCELS N/13F, N/13F-1 & N/13F-2, SEE S.C.R.D. VOLUME 3655, PAGE 154.
- 13.) AS-BUILT PLANS OF THE SUBDIVISION SHALL BE SUBMITTED ON PAPER AND IN DIGITAL FORMAT IN PDF AND AUTOCAD DWG FORMAT TO THE CITY OF DOVER ENGINEER'S OFFICE UPON COMPLETION OF THE PROJECT.
- 14.) THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE.
- 15.) THE SUBDIVISION LOTS ARE TO BE SERVICED BY MUNICIPAL WATER AND ONSITE SEWAGE DISPOSAL SYSTEMS.
- 16.) STREET ADDRESSES FOR EACH LOT SHALL BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.
- 17.) THE PROPOSED USE FOR THE SITE IS SINGLE FAMILY RESIDENTIAL.
- 18.) NHDES SUBDIVISION APPROVAL: PENDING

SHEET 8

OPEN SPACE SUBDIVISION  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. P 23 -

|                      |                             |
|----------------------|-----------------------------|
| DRAWN BY: <b>KJF</b> | FILE: MSA\1734\D\23-1734SUB |
| SCALE: 1" = 50'      | DATE: FEBRUARY 1, 2023      |



**McNeaney**  
**Survey**  
**Associates**  
of NEW ENGLAND

P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

SURVEYING – PLANNING – CONSULTING

"I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL GROUND SURVEY PERFORMED WITH A TOTAL STATION, BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, SAID SURVEY MEETS OR EXCEEDS THE MINIMUM PRECISION REQUIREMENTS FOR SURVEY CLASSIFICATION "U" AS SET FORTH IN TABLE 500.1 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS."

|            |      |             |           |         |  |
|------------|------|-------------|-----------|---------|--|
|            |      |             |           |         |  |
|            |      |             |           |         |  |
|            |      |             |           |         |  |
|            |      |             |           |         |  |
| NO.        | DATE | DESCRIPTION | BY        | CHK     |  |
| REVISIONS  |      |             |           |         |  |
| 23-1784    |      | SUBDIVISION |           |         |  |
| PROJECT NO | TYPE |             | FIELDBOOK | & PAGES |  |

CRE JV MIXED FIVE BRANCH HOLDINGS LLC  
P.O. Box 460049  
HOUSTON, TX 77056  
3419 / 809

| No. | Central Angle | Radius  | Arc Length | Chord Length | Chord Bearing |
|-----|---------------|---------|------------|--------------|---------------|
| C1  | 76°20'08"     | 35.00'  | 46.63'     | 43.26'       | S80°21'33"E   |
| C2  | 58°31'52"     | 35.00'  | 35.75'     | 34.22'       | S12°55'33"E   |
| C3  | 107°14'08"    | 35.00'  | 65.51'     | 56.36'       | N11°25'35"E   |
| C4  | 24°19'51"     | 72.00'  | 30.58'     | 30.35'       | S52°52'43"W   |
| C5  | 20°45'35"     | 200.00' | 72.47'     | 72.07'       | S51°05'35"W   |
| C6  | 24°27'35"     | 72.00'  | 30.74'     | 30.50'       | N77°16'26"E   |
| C7  | 86°46'57"     | 60.00'  | 90.88'     | 82.44'       | N46°06'45"E   |
| C8  | 35°04'15"     | 60.00'  | 36.73'     | 36.16'       | N75°47'50"W   |
| C9  | 62°56'08"     | 35.00'  | 38.45'     | 36.54'       | N30°00'19"E   |
| C10 | 60°58'59"     | 60.00'  | 63.86'     | 60.89'       | N27°46'13"W   |
| C11 | 38°34'31"     | 42.00'  | 28.28'     | 27.75'       | N49°47'47"E   |
| C12 | 71°32'16"     | 68.00'  | 84.90'     | 79.49'       | N60°48'17"E   |

| No. | Bearing     | Distance |
|-----|-------------|----------|
| L1  | S42°11'29"E | 73.71'   |
| L2  | S16°20'23"W | 26.17'   |
| L3  | S73°39'37"E | 48.00'   |
| L4  | N53°03'07"E | 54.23'   |
| L5  | S61°28'23"W | 10.21'   |
| L6  | N16°39'58"W | 49.15'   |
| L7  | N42°12'16"W | 56.65'   |
| L8  | N42°11'29"W | 47.73'   |
| L9  | S21°01'30"E | 50.00'   |
| L10 | S87°16'43"E | 34.13'   |
| L11 | N32°56'01"E | 44.77'   |
| L12 | S51°09'36"E | 58.66'   |
| L13 | S31°44'17"W | 28.87'   |
| L14 | N16°39'58"W | 65.64'   |
| L15 | S12°28'08"W | 40.00'   |
| L16 | N05°48'59"W | 15.56'   |
| L17 | N15°41'21"W | 16.60'   |
| L18 | N16°39'58"W | 41.49'   |
| L19 | N80°09'31"E | 30.93'   |
| L20 | N87°56'29"E | 67.76'   |
| L21 | S73°55'09"E | 55.67'   |
| L22 | N88°21'33"E | 14.87'   |
| L23 | S71°18'39"E | 37.22'   |

MARK P. BARLOW  
10 NORDIC LANE  
ROLLINSFORD, NH 03869  
4416 / 660

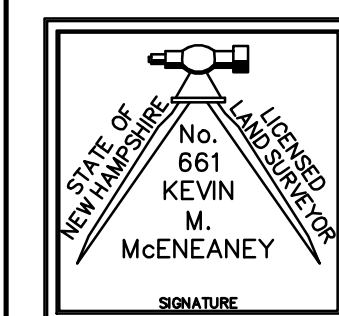
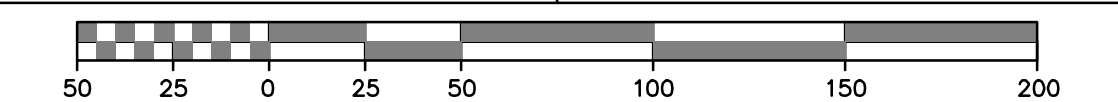
SEE SHEET 10

SHEET 9

NHDES SUBDIVISION PLAN  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. P 23 -

DRAWN BY: KJP FILE: MSA\1734\DV23-1734SUB  
SCALE: 1" = 50' DATE: FEBRUARY 1, 2023



McEneaney  
Survey  
Associates  
of NEW ENGLAND  
P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

SURVEYING - PLANNING - CONSULTING

REFERENCE PLANS:

- 1.) LOT LINE ADJUSTMENT PLAN OF LAND LOT NOS. 13, 13C & 13E, TAX MAP N GULF ROAD, OAK STREET, COUNTRY CLUB ESTATES DRIVE & FRESH CREEK ROAD DOVER, NEW HAMPSHIRE COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: DECEMBER 12, 2016, REVISED THROUGH 2-16-17; BY: CIVILWORKS NEW ENGLAND. RECORDED S.C.R.D. PLAN 113-033.
- 2.) MINOR SUBDIVISION OF LAND PREPARED FOR DAHN H. TIBBETT & NORMA M. TIBBETT AND JAHN H. JANETOS & SUSAN G. JANETOS. TAX MAP N, LOT No. 13, GULF ROAD, OAK STREET & COUNTRY CLUB ESTATES DRIVE, CITY of DOVER, COUNTY of STRAFFORD, STATE of NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: OCTOBER 18, 2021, REVISED THROUGH 1/3/22; BY THIS OFFICE. RECORDED S.C.R.D. PLAN 12673.
- 3.) A PORTION OF CITY / TOWN LINE PREPARED FOR THE CITY OF DOVER, NEW HAMPSHIRE AND THE TOWN OF ROLLINSFORD, NEW HAMPSHIRE LOCATED WITHING THE ROADWAY KNOWN AS OAK STREET, DOVER AND ROLLINSFORD, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE; SCALE: 1" = 50'; DATED: NOV. 18, 2016, REVISED THROUGH 10/2/17; ON FILE WITH THE CITY OF DOVER

OPEN SPACE

688,230 S.F.  
15.80 Ac.

114,555 S.F. USABLE UPLANDS

SEE SHEET 10

TOWN LINE  
(SEE REFERENCE PLAN 3)

CRE JV MIXED FIVE BRANCH HOLDINGS LLC  
P.O. Box 460049  
HOUSTON, TX 77056  
3419 / 809

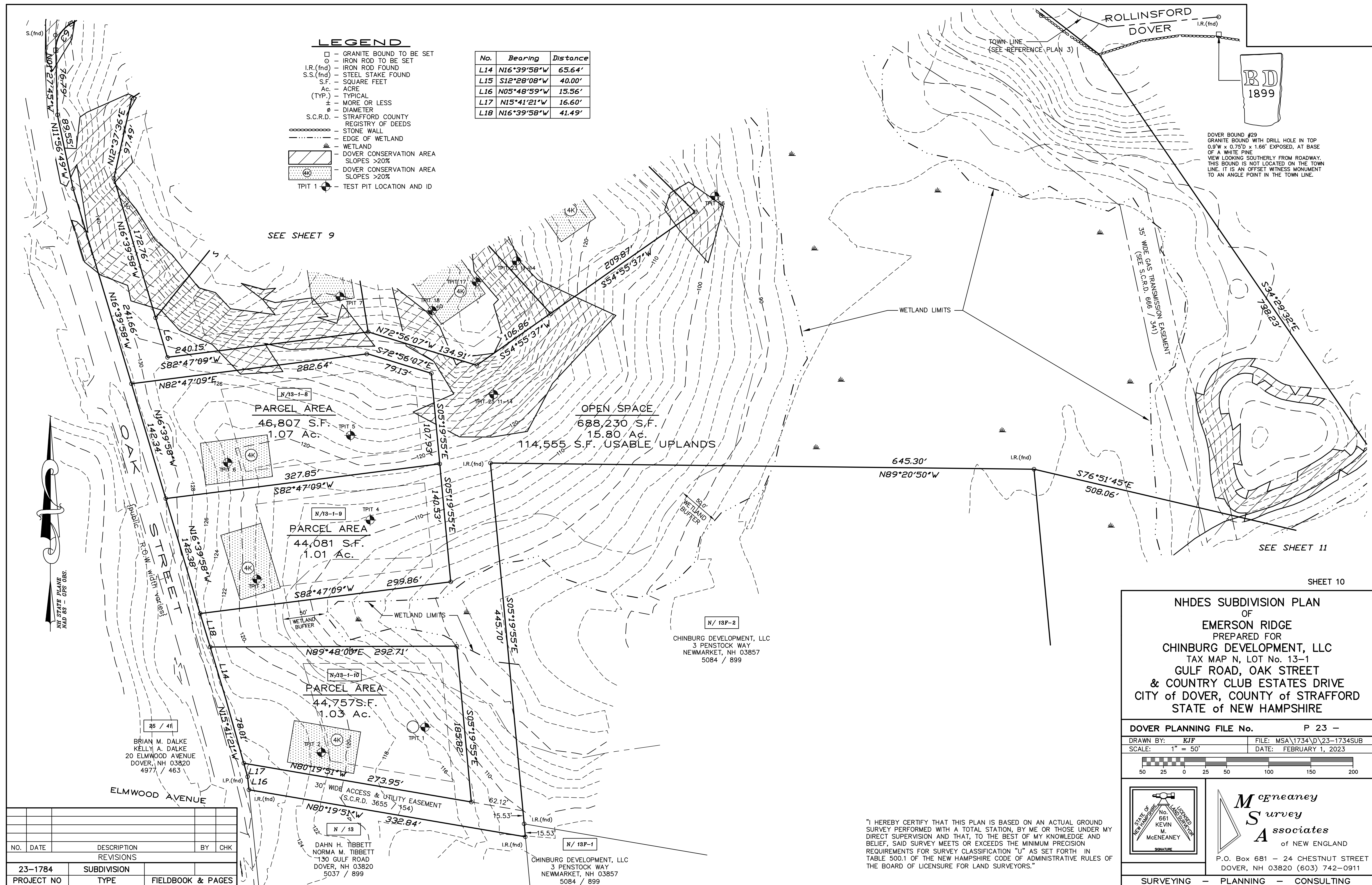
HUBBARD-LEARY, LLC  
89 OAK STREET  
DOVER, NH 03820  
3245 / 2

HOT ROD CITY, LLC  
390 SIXTH STREET  
DOVER, NH 03820  
4184 / 143

LEGEND

- GRANITE BOUND TO BE SET
- IRON ROD TO BE SET
- IRON ROD FOUND
- STEEL STAKE FOUND
- S.F. - SQUARE FEET
- Ac. - ACRE
- (TYP.) - TYPICAL
- ± - MORE OR LESS
- Ø - DIAMETER
- S.C.R.D. - STRAFFORD COUNTY REGISTRY OF DEEDS
- STONE WALL
- EDGE OF WETLAND
- WETLAND
- DOVER CONSERVATION AREA SLOPES >20%
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- TEST PIT LOCATION AND ID

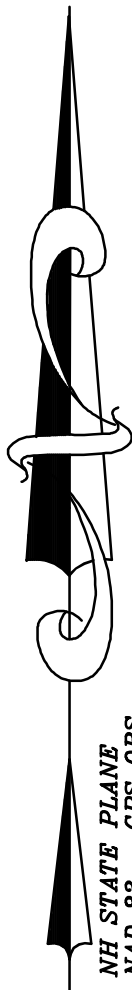
| NO.        | DATE | DESCRIPTION | BY | CHK               |
|------------|------|-------------|----|-------------------|
| REVISIONS  |      |             |    |                   |
| 23-1784    |      | SUBDIVISION |    |                   |
| PROJECT NO |      | TYPE        |    | FIELDBOOK & PAGES |



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SEE SHEET 10

645.30'  
N89°20'50"W



I.R.(fnd)

S76°51'45"E  
508.06'

SEE SHEET 10

### LEGEND

- - GRANITE BOUND TO BE SET
- - IRON ROD TO BE SET
- I.R.(fnd) - IRON ROD FOUND
- S.S.(fnd) - STEEL STAKE FOUND
- S.F. - SQUARE FEET
- Ac. - ACRE
- (TYP.) - TYPICAL
- ± - MORE OR LESS
- ∅ - DIAMETER
- S.C.R.D. - STRAFFORD COUNTY REGISTER OF DEEDS
- - STONE WALL
- - - - - EDGE OF WETLAND
- - - - - WETLAND
- - - - - DOVER CONSERVATION AREA SLOPES >20%
- - - - - DOVER CONSERVATION AREA SLOPES >20%
- TPIT 1 — — — — — TEST PIT LOCATION AND ID

### NOTES:

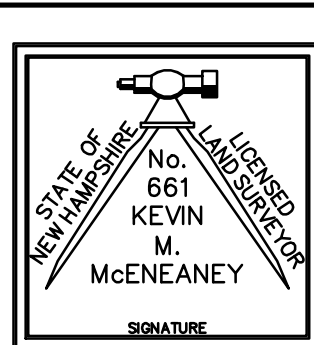
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CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NEW HAMPSHIRE 03857  
S.C.R.D. VOLUME 4465, PAGE 298
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- THE PROPOSED USE FOR THE SITE IS SINGLE FAMILY RESIDENTIAL.
- NHDES SUBDIVISION APPROVAL: PENDING

SHEET 11

NHDES SUBDIVISION PLAN  
OF  
EMERSON RIDGE  
PREPARED FOR  
CHINBURG DEVELOPMENT, LLC  
TAX MAP N, LOT No. 13-1  
GULF ROAD, OAK STREET  
& COUNTRY CLUB ESTATES DRIVE  
CITY of DOVER, COUNTY of STRAFFORD  
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. P 23 -

DRAWN BY: KJF FILE: MSA\1734\DWG\23-1734SUB  
SCALE: 1" = 50' DATE: FEBRUARY 1, 2023



McEneaney  
Survey  
Associates  
of NEW ENGLAND

P.O. Box 681 - 24 CHESTNUT STREET  
DOVER, NH 03820 (603) 742-0911

SURVEYING - PLANNING - CONSULTING

| NO.        | DATE | DESCRIPTION | BY | CHK               |
|------------|------|-------------|----|-------------------|
| REVISIONS  |      |             |    |                   |
| 23-1784    |      | SUBDIVISION |    |                   |
| PROJECT NO |      | TYPE        |    | FIELDBOOK & PAGES |

APPROXIMATE LIMITS OF  
SPECIAL FLOOD HAZARD  
AREA (SEE NOTE 5)

WETLAND LIMITS

N / 13F-2

CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857  
5084 / 899

N / 13F-1

CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857  
5084 / 899

### ATTENTION:

HIGH PRESSURE GAS  
MAIN; PRIOR TO ANY  
EARTH MOVING ACTIVITY  
CONTACT DIGSAFE AT  
1-888-344-7233 TO  
VERIFY LOCATION.

N / 13B

NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820  
3984 / 321

N / 13B-1

NORMA TIBBETT  
DAHN TIBBETT  
130 GULF ROAD  
DOVER, NH 03820  
3984 / 320

N / 12N

MARGARET A. CARTER  
ROSEMARY L. FORCILLO  
ESTATES DRIVE  
1 COUNTRY CLUB  
DOVER, NH 03820  
4635 / 411

N / 15

COACHEO COUNTRY CLUB  
145 GULF ROAD  
DOVER, NH 03820  
781 / 279

"I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN  
ACTUAL GROUND SURVEY PERFORMED WITH A TOTAL  
STATION, BY ME OR THOSE UNDER MY DIRECT  
SUPERVISION AND THAT, TO THE BEST OF MY KNOWLEDGE  
AND BELIEF, SAID SURVEY MEETS OR EXCEEDS THE  
MINIMUM PRECISION REQUIREMENTS FOR SURVEY  
CLASSIFICATION "U" AS SET FORTH IN TABLE 500.1 OF  
THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF  
THE BOARD OF LICENSURE FOR LAND SURVEYORS."

COACHEO COUNTRY CLUB  
145 GULF ROAD  
DOVER, NH 03820  
781 / 279

N / 15

GENERAL NOTES:

1. OWNER OF RECORD AND APPLICANT:  
CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NEW HAMPSHIRE 03857  
S.C.R.D. VOLUME 4465, PAGE 298

2. 

N / 13-1

— DENOTES TAX MAP AND PARCEL NUMBER.

3. PARCEL AREA: 1,503,926 S.F.± / 34.53 Ac.±  
ZONING DESIGN IS RURAL RESIDENTIAL R-40 (OPEN SPACE SUBDIVISION)

DIMENSIONAL REQUIREMENTS:

MINIMUM LOT SIZE

= 20,000 S.F.

MINIMUM FRONTAGE

= 40 FEET

MINIMUM OPEN SPACE

= 220,000 S.F.

BUILDING SETBACK REQUIREMENTS:

ABUTTING A STREET

= 20 FEET

ABUTTING A LOT LINE

= 20 FEET

5. A PORTION OF THE SUBJECT PARCEL IS LOCATED WITHIN THE SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1 PERCENT ANNUAL CHANCE FLOOD, ZONE A (BASE FLOOD ELEVATIONS NOT DETERMINED); AS SHOWN ON FLOOD INSURANCE RATE MAP, COMMUNITY NUMBER 330145; PANEL 0330; SUFFIX E; MAP NUMBER 33017C0330E; DATE SEPTEMBER 30, 2015.

6. BASIS OF BEARING IS NH STATE PLANE (NAD83) BASED ON GPS OBSERVATION DATED SEPTEMBER 15, 2021.

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8. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATES, OF NEW ENGLAND ON NOVEMBER 15, 2021 WITH AN ERROR NOT GREATER THAN 1 IN 10,000.

9. THIS PLAN SHOWS ONLY THOSE FEATURES THAT WERE VISUALLY APPARENT ON THE DATE OF THE SURVEY. THE ABSENCE OF SUBSURFACE STRUCTURES, UTILITIES, ETC. FROM THIS PLAN, BUT IN EXISTENCE, IS NOT INTENDED OR IMPLIED.

10. THE PARCEL IS SUBJECT TO THE CITY OF DOVER CONSERVATION ZONE AREAS WITHIN SLOPES GREATER THAN 20%.

11. WETLANDS FLAGGED LINE SHOWN WERE DELINEATED BY DAMON E. BURT, N.H.C.W.S. #163 OF FRAGGLE ROCK ENVIRONMENTAL SERVICES AUGUST 8, 2021 IN ACCORDANCE WITH THE 1987 CORPS. OF ENGINEERS WETLANDS DELINEATION MANUAL AND LOCATED BY THIS OFFICE.

DEMOLITION NOTES:

1. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.

2. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

3. THE CONTRACTOR SHALL NOTIFY "DIG SAFE" PRIOR TO ANY DEMOLITION/ CONSTRUCTION ACTIVITIES. (811).

4. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, UTILITIES AND PAVEMENT ON THE SITE TO THE LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT AND POLES.

5. IT IS THE CONTRACTORS RESPONSIBILITY TO FAMILIARIZE HIMSELF WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.

6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS NOT ALREADY OBTAINED BY THE OWNER AND ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.

8. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.

9. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES, AND CODES.

10. EXISTING ("OLD") WATER SERVICES TO THE SUBJECT SITE SHALL BE DISCONNECTED AND SHUT-OFF AT THE WATER MAIN.

11. EXISTING SEWER SERVICES TO BE CUT AND PERMANENTLY CAPPED AT PROPERTY LINE AS APPLICABLE.

12. 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.

PERMIT SUMMARY:

1. THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:

NHDES SUBDIVISION APPROVAL: PENDING

2. LIST ANY VARIANCES OR SPECIAL EXCEPTIONS GRANTED BY THE ZONING BOARD OF ADJUSTMENT OR CONDITIONAL USE PERMITS GRANTED BY THE PLANNING BOARD FOR THE PROPOSED USE OR STRUCTURE, INCLUDING THE CASE NUMBER AND DATE OF DECISION AND ANY CONDITIONS.

CONDITIONAL USE PERMIT: PENDING

YIELD PLAN WITH ROAD LENGTH WAIVER: P22-21; APPROVED APRIL 26, 2022

SUBDIVISION NOTES:

1. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A PLAN REFERENCED AND PREPARED BY MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND (SEE EXISTING CONDITIONS PLAN IN THIS PLAN SET).

2. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS ASSOCIATED WITH THE CONSTRUCTION OF 357 LF OF PUBLIC ROADWAY, 311 LF OF PRIVATE ROADWAY, DRAINAGE IMPROVEMENTS, AND UTILITIES FOR A 11 LOT SINGLE FAMILY SUBDIVISION. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO APPLICABLE CITY AND STATE CODES.

3. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS, AND THE AMERICAN WITH DISABILITIES ACT, LATEST EDITIONS.

4. ON-SITE SNOW STORAGE SHALL OCCUR ALONG THE EDGES OF PROPOSED PAVEMENT.

5. ALL CONSTRUCTION LAYOUT SHALL BE DONE BY A LICENSED SURVEYOR UNDER CONTRACT WITH THE CONTRACTOR.

6. SEE DETAILS FOR SIGN LEGENDS.

7. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE CONSTRUCTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE FACILITIES AND THEIR COMPONENTS DURING DEMOLITION AND CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE-DOWNS. SUCH MATERIALS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AT THE COMPLETION OF THE PROJECT.

8. METHODS OF DEMOLITION, CONSTRUCTION AND ERECTION ARE THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN ENVIRONMENTAL CONTROLS AS REQUIRED BY FEDERAL, STATE AND MUNICIPAL REGULATIONS AND PERMITS. ENVIRONMENTAL CONTROLS SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DUST CONTROL AND SILT BARRIERS.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE TO STRUCTURES OR UTILITIES OR INJURIES TO THE PUBLIC DURING THE CONSTRUCTION PHASE CAUSED BY HIMSELF, HIS EMPLOYEES, HIS SUBCONTRACTORS OR EMPLOYEES OF SAME. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES FOR THE PROTECTION OF THE WORK, WORKERS AND PUBLIC SAFETY.

10. BUILDING ADDRESSES TO BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.

11. THE SITE SHALL BE MAINTAINED TO PROVIDE ACCESSIBILITY IN ALL WEATHER CONDITIONS.

12. 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 TO ANY EARTH DISTURBANCE ACTIVITY OCCURS.

13. AS-BUILT PLANS OF THE SITE SHALL BE SUBMITTED ON PAPER AND IN A DIGITAL FORMAT IN PDF AND AUTOCAD DWG, AUTOCAD DXF OR AN 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.

14. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY-FRIDAY 7 AM-6 PM, SATURDAY HOURS 9 AM-4 PM, AND NO SUNDAY WORK HOURS. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE CITY ENGINEER OR ASSISTANT CITY MANAGER.

15. 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.

16. ALL CONSTRUCTION SHALL CONFORM WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AND WITH THE CITY OF DOVER COMMUNITY SERVICES REGULATIONS AND STANDARD SPECIFICATION FOR CONSTRUCTION. THE MORE STRINGENT SPECIFICATION SHALL APPLY.

17. A LETTER OF CREDIT FOR THE COST OF REVEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED AND THE APPROVED CONSTRUCTION SIGN INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.

18. 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.

19. PRIOR TO CONVEYING THE OWNERSHIP AND MAINTENANCE OBLIGATIONS FROM THE DEVELOPER TO THE ASSOCIATION, THE ENGINEER OF RECORD SHALL MEET WITH THE ASSOCIATION AND REVIEW MAINTENANCE OBLIGATIONS, INCLUDING STORMWATER, OPENSOURCE AND ROADWAY MAINTENANCE.

20. PRIOR TO THE LAST C.O. BEING ISSUED, THE ENGINEER OF RECORD SHALL MEET WITH THE ASSOCIATION AND REVIEW THE AS-BUILT FOR THE PROJECT.

21. REFUSE PICKUP WILL BE BY PRIVATE CONTRACTOR.

22. ANY RETAINING WALL TALLER THAN FOUR FEET (4') REQUIRES ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.

23. ANY FENCE TALLER THAN SEVEN FEET (7') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.

24. FIRE DEPARTMENT ACCESS ROAD(S) SHALL BE INSTALLED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRE APPARATUS IN ALL WEATHER CONDITIONS AT ALL TIMES.

25. COMMERCIAL VEHICLE ROUTE DURING CONSTRUCTION SHALL CONFORM TO DOVER CITY CODE OR BE COORDINATED WITH THE COMMUNITY SERVICES DIRECTOR.

26. 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)

27. NO ROADWAY WITH PRIVATE UTILITY EASEMENTS SHALL BE ACCEPTED AS A PUBLIC ROAD BY THE CITY UNLESS THE EASEMENTS ARE EXPUNGED PRIOR TO THE TRANSFER OF LAND TO THE CITY. LICENSE AGREEMENTS FOR ANY AND ALL PRIVATE UTILITIES WITHIN THE RIGHT OF WAY MAY BE GRANTED BY THE CITY UPON ACCEPTANCE OF THE UNENCUMBERED ROADWAY CONSISTENT WITH APPLICABLE STATE LAW.

GRADING NOTES:

1. ALL ROAD DRAINAGE WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS FOR CONSTRUCTION OF THE CITY OF DOVER, N.H. AND "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION", LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL APPLY.

2. CONTRACTOR SHALL RETAIN A GEOTECHNICAL ENGINEERING CONSULTANT APPROVED BY THE OWNER, TO CONDUCT COMPACTION TESTING AND FILL GRADATION MONITORING PER THE ABOVE REFERENCED "STANDARD SPECIFICATIONS".

3. SEE EROSION CONTROL NOTES & DETAIL SHEET FOR TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.

4. ALL DRAINAGE PIPES SHALL BE HDPE OR APPROVED EQUAL UNLESS OTHERWISE NOTED.

5. ALL DISTURBED AREAS NOT OTHERWISE CALLED FOR SURFACE TREATMENT SHALL RECEIVE 6" OF HIGH QUALITY LOAM AND SHALL BE SEEDED WITH GRASS.

6. ALL SITEWORK CONSTRUCTION SHALL BE ADVANCED USING "BEST MANAGEMENT PRACTICES" SANCTIONED BY THE USDA SCS AND NHDES.

7. TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED, UTILIZED AND MAINTAINED UNTIL BASE MATERIALS ARE CONSTRUCTED.

8. CONTRACTOR SHALL PROVIDE A FINISH GRADED SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE AND UNDER RAISED STRUCTURES.

9. DENSITY REQUIREMENTS:

LOCATION

MINIMUM DENSITY

BELOW PAVED OR CONCRETE AREAS

95%

TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL

95%

BELOW LOAM AND SEED AREA

90%

\*ALL PERCENTAGES SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH AASHTO STANDARD 180, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH AASHTO STANDARD T-191, T-204, OR T-238 AND T-239.

10. SEE GENERAL EROSION CONTROL NOTES ON DETAIL SHEET.

11. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.

12. INSPECT SILT BARRIERS AFTER EACH RAIN STORM OF 1/4 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE STRUCTURE HEIGHT.

13. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IS REQUIRED FOR THIS PROJECT. THE SWPPP MUST INCLUDE THE APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) TO MINIMIZE THE DISCHARGE OF POLLUTANTS FROM THE SITE. PARTIES RESPONSIBLE FOR DEVELOPING THE SWPPP SHOULD REFER TO THE EPA NPDES CONSTRUCTION GENERAL PERMITS NOTICE OF INTENT FOR A COMPLETE OUTLINE OR REQUIRED ELEMENTS. THESE PLANS AND THE STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN PREPARED FOR THIS PROJECT MAY BE UTILIZED IN FULFILLING THE REQUIREMENTS.

14. ALL TREATMENT AND PRE-TREATMENT SWALES TO BE CONSTRUCTED SHALL HAVE SOD BOTTOMS.

15. LIMIT TREE CLEARING TO ONLY THE EXTENT NECESSARY FOR CONSTRUCTION.

16. PLACARDS SHALL BE INSTALLED ALONG THE EDGE OF WETLAND PRIOR TO CONSTRUCTION.

UTILITY NOTES:

1. THE PROJECT SITE IS SERVED BY CITY WATER AND ON-SITE SEWER.

2. THE BEST AVAILABLE INFORMATION WAS USED TO DETERMINE THE LOCATION AND SIZE OF EXISTING UTILITIES. THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. THE EXACT SIZE AND LOCATION OF UTILITIES SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR PRIOR TO COMMENCING WORK. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO ANTICIPATE CONFLICTS AND REPAIR EXISTING UTILITIES AS NECESSARY TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.

3. ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AS SHOWN. THE CONTRACTOR SHALL VERIFY THEIR EXACT LOCATIONS WITH THE RESPECTIVE UTILITY OWNERS PRIOR TO WORK BEING PERFORMED. CALL DIGSAFE AT 1-888-388-7233 OR "811".

4. THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE FOR WHICH DEVELOPMENT IS PROPOSED. SUBDIVISION PLANS SHALL SHOW ANY EASEMENTS FOR THESE SERVICES.

5. UNDERGROUND ELECTRIC, TELEPHONE, AND CABLE TV CONDUITS SHALL BE INSTALLED IN ACCORDANCE WITH/PER EVERSOURCE, VERIZON, COMCAST, AND UNTIL STANDARDS.

6. PROPOSED INSTALLATION OF UNDERGROUND CONDUITS FOR TELEPHONE, ELECTRIC AND GAS SERVICE SHALL BE COORDINATED WITH THE RESPECTIVE CONTACTS ARE AS FOLLOWS:

ELECTRIC:

EVERSOURCE 1.800.362.7764

CABLE:

COMCAST 603.334.3615

GAS:

UNTIL 866.933.3821

7. SEE ELECTRICAL DRAWINGS AND DETAILS FOR OUTDOOR LIGHTING CONDUIT LOCATIONS.

8. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.

9. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.

10. SEWAGE LOADING (PER ENV. - Wq 1008.03 TABLE 1008-1)

11 NEW HOMES - 4 BEDROOM

44 BDRMS x 150 GALS./DAY/BDRM = 6,600 GPD

11. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO APPLICABLE CITY AND STATE CODES.

12. APPROVED BACKFLOW PREVENTORS SHALL BE INSTALLED ON BOTH FIRE AND DOMESTIC WATER LINES. AS APPLICABLE

13. ALL UNUSED WATER SERVICES SHALL BE REMOVED BACK TO THE CORPORATION AT THE MAIN.

14. TAPPING SLEEVE AND GATES SHALL BE STAINLESS STEEL.

15. USE FOSTER GATES TO TEES WHERE ANCHOR TEE'S ARE NOT USED.

16. CURB BOXES SHALL BE PLACED AT RIGHT OF WAY AND OUT OF PAVEMENT AS POSSIBLE. IF IN PAVEMENT USE ROAD BOX.

LEGEND

|          |                                    |  |                                    |
|----------|------------------------------------|--|------------------------------------|
| S.F.     | SQUARE FEET                        |  | EDGE OF WET                        |
| Ac.      | ACRE                               |  | 50' WETLAND BUFFER                 |
| ±        | MORE OR LESS                       |  | EMERSON BROOK                      |
| (TYP)    | TYPICAL                            |  | PROPOSED SIGN                      |
| S.C.R.D. | STRAFFORD COUNTY REGISTRY OF DEEDS |  | PROPOSED FINISH GRADE              |
| TBR      | TO BE REMOVED                      |  | PROPOSED SPOT GRADE                |
| D.I.     | DUCTILE IRON                       |  | PAVEMENT WITH CURB                 |
| DIA.     | DIAMETER                           |  | SILT BARRIER                       |
| R.O.W.   | RIGHT OF WAY                       |  | PROPOSED GAS                       |
| TPIT     | TEST PIT                           |  | PROPOSED WATER                     |
| V.I.F.   | VERIFY IN FIELD                    |  | PROPOSED ELECTRIC                  |
|          | EXISTING UTILITY POLE              |  | PROPOSED DRAIN LINE                |
|          | EXISTING SIGN                      |  | PROPOSED UNDERDRAIN LINE           |
|          | EXISTING WATER SHUT-OFF            |  | PROPOSED CATCHBASIN                |
|          | EXISTING WATER VALVE               |  | EXISTING STEEP SLOPE AREAS         |
|          | EXISTING GAS VALVE                 |  | PROPOSED RIPRAP                    |
|          | EXISTING HYDRANT                   |  | PROPOSED CONCRETE                  |
|          | EXISTING LIGHT/SIGNAL POLE         |  | PROPOSED STEEP SLOPE IMPACT        |
|          | EXISTING SEWER MANHOLE             |  | PROPOSED 50' WETLAND BUFFER IMPACT |
|          | EXISTING DRAINAGE MANHOLE          |  |                                    |
|          | EXISTING CATCHBASIN                |  |                                    |
|          | PAVEMENT RADIUS                    |  |                                    |
|          | SLOPED GRANITE CURB                |  |                                    |
|          | SLOPED BITUMINOUS CURB             |  |                                    |
|          | TOP OF WALL                        |  |                                    |
|          | EXISTING SPOT GRADE                |  |                                    |
|          | EXISTING GRADE                     |  |                                    |
|          | OVERHEAD UTILITY                   |  |                                    |
|          | EXISTING ELECTRIC                  |  |                                    |
|          | EXISTING WATER LINE                |  |                                    |
|          | EXISTING SEWER LINE                |  |                                    |
|          | EXISTING DRAINAGE LINE             |  |                                    |
|          | EXISTING GAS LINE                  |  |                                    |
|          | SOIL BOUNDARY                      |  |                                    |

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

PLANNING FILE

No.: P23-

CIVILWORKS NEW ENGLAND

181 Watson Road PO Box 1166  
Dover, New Hampshire 03821  
603.748.0443

DATE: 2-22-23

SCALE: AS SHOWN

DRAWN BY: CAD

DESIGN BY: JRG

APPROVED BY: SJH

PROJECT NO: 2024

FILE: SITE.DWG

NO.

REVISION

APP'D

DATE

CHINBURG DEVELOPMENT, LLC

3 PENSTOCK WAY

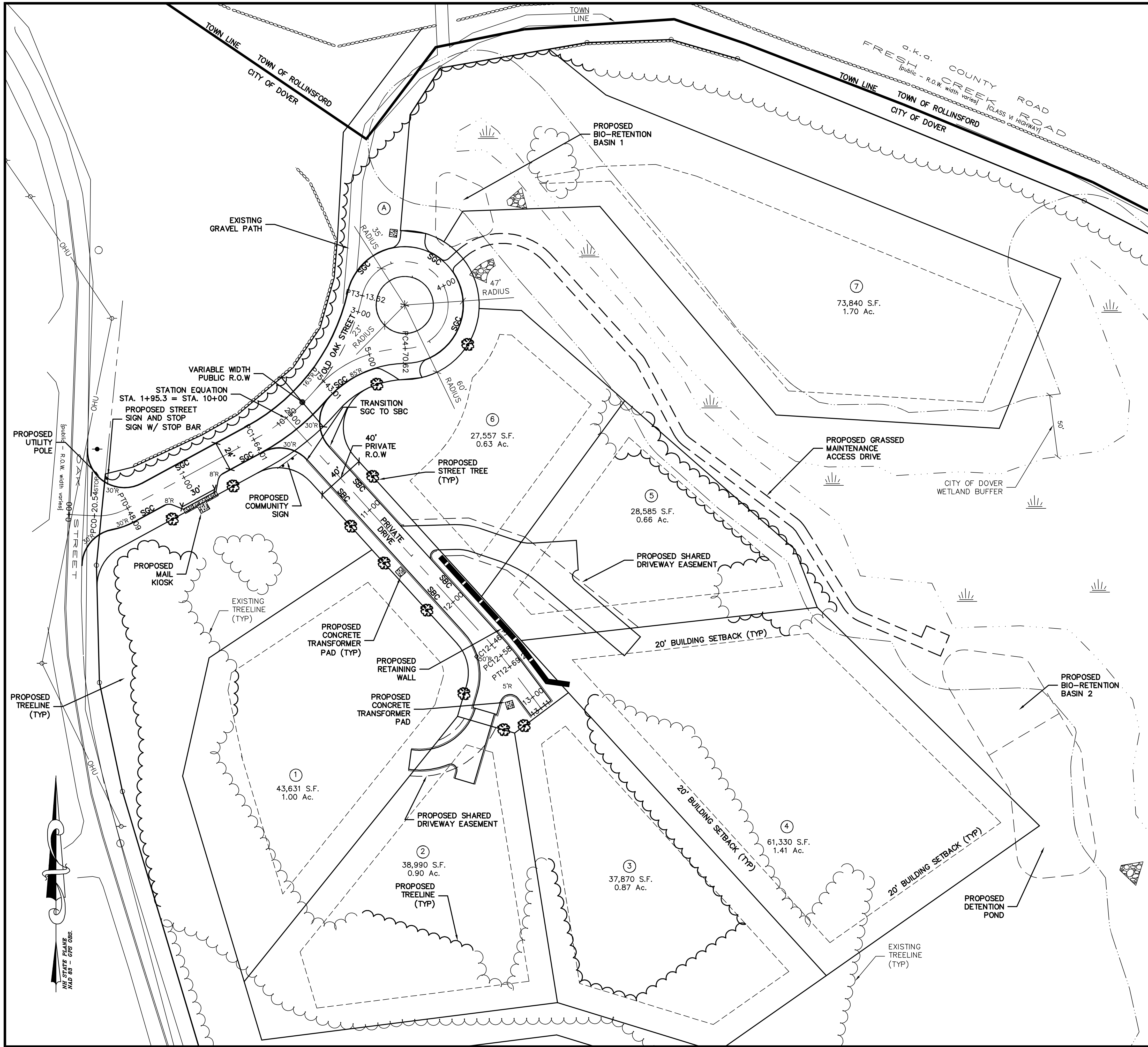
NEWMARKET, NH 03857

EMERSON RIDGE

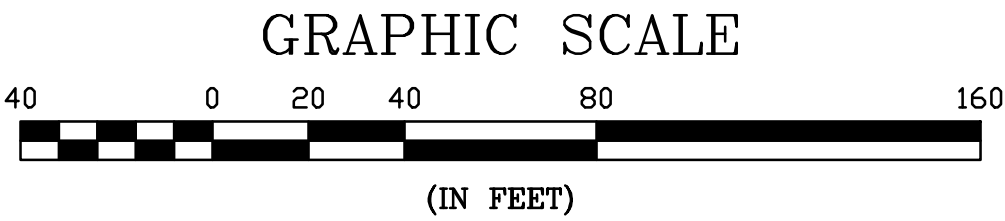
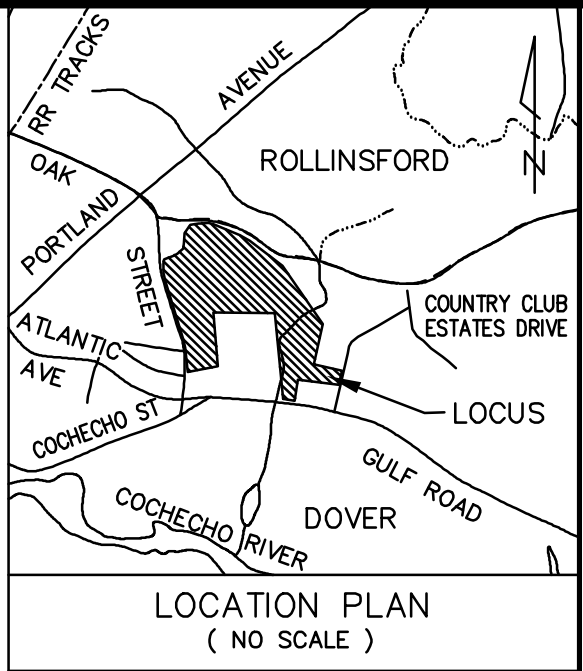
OAK STREET

DOVER, NH

12

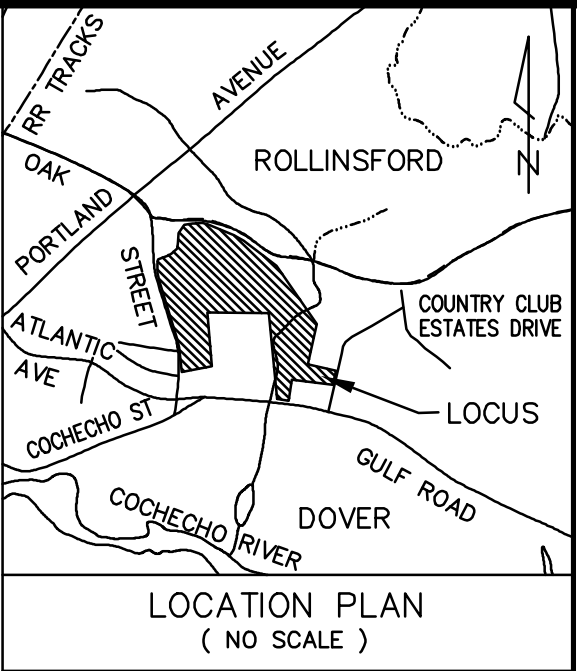
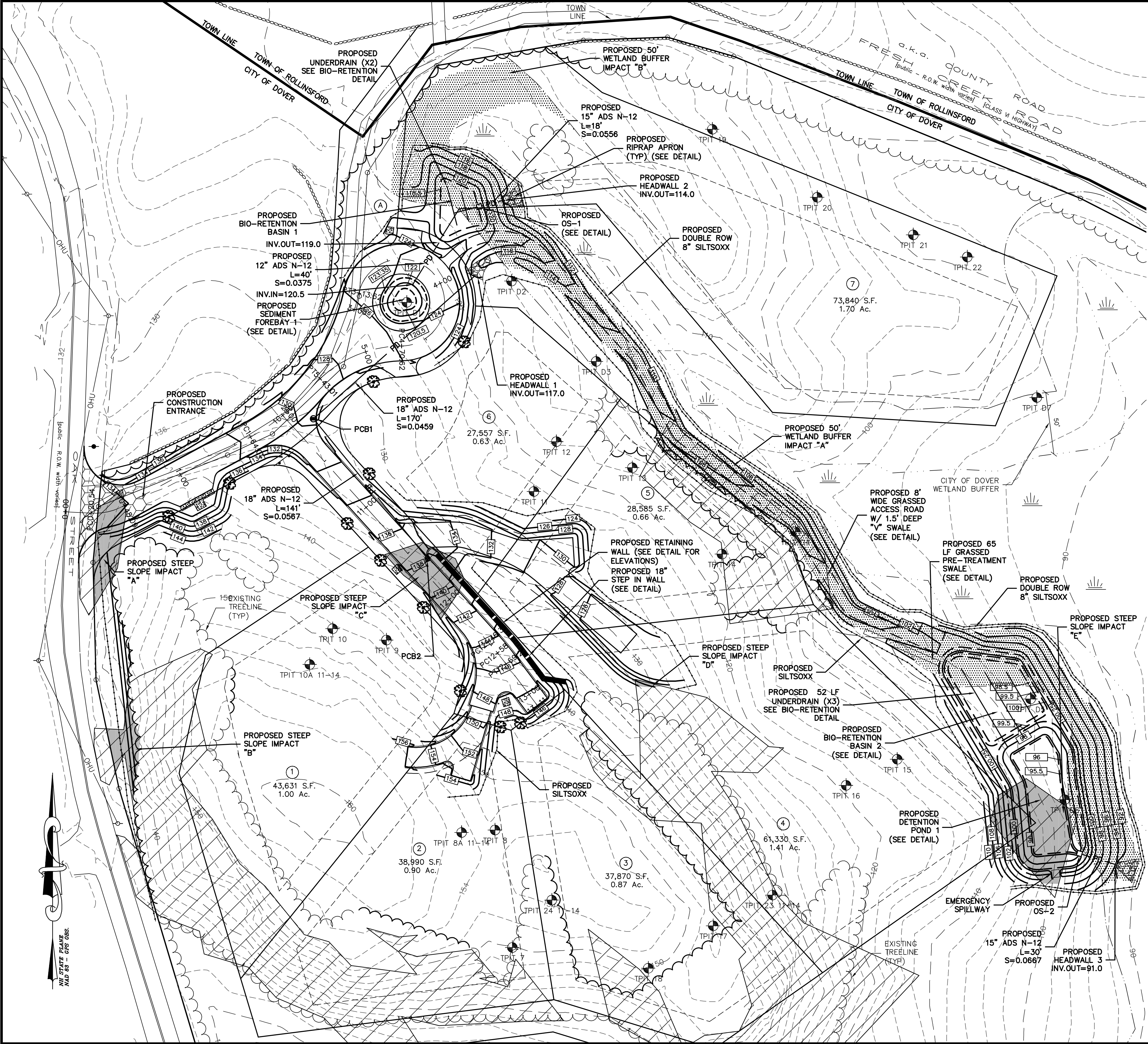


OPEN SPACE  
688,230 S.F.  
15.80 Ac.  
(114,555 S.F. USABLE UPLANDS)



|    |  |                    |  |                                                                    |  |            |  |                                          |  |          |  |               |  |               |  |               |  |                |  |                  |  |                   |  |            |  |          |  |       |  |      |  |                                          |  |                            |  |                                                                                                      |  |
|----|--|--------------------|--|--------------------------------------------------------------------|--|------------|--|------------------------------------------|--|----------|--|---------------|--|---------------|--|---------------|--|----------------|--|------------------|--|-------------------|--|------------|--|----------|--|-------|--|------|--|------------------------------------------|--|----------------------------|--|------------------------------------------------------------------------------------------------------|--|
| 13 |  | SITE LAYOUT PLAN A |  | CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 |  | APPLICANT: |  | EMERSON RIDGE<br>OAK STREET<br>DOVER, NH |  | PROJECT: |  | DATE: 2-22-23 |  | SCALE: 1"=40' |  | DRAWN BY: CAD |  | DESIGN BY: JRG |  | APPROVED BY: SJH |  | PROJECT NO: 21074 |  | FILE: SITE |  | REVISION |  | APP'D |  | DATE |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY |  | PLANNING FILE<br>NO.: P23- |  | CIVILWORKS NEW ENGLAND<br>181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  |
|    |  |                    |  |                                                                    |  |            |  |                                          |  |          |  |               |  |               |  |               |  |                |  |                  |  |                   |  |            |  |          |  |       |  |      |  |                                          |  |                            |  |                                                                                                      |  |





- NOTES:
1. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.
  2. NORTH AMERICAN GREEN EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES (SEE DETAIL).

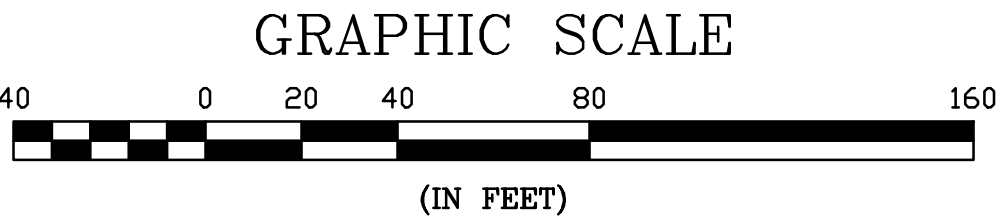
CITY OF DOVER CONSERVATION DISTRICT IMPACTS:

|                                     |           |
|-------------------------------------|-----------|
| 50' WETLAND BUFFER IMPACT "A":      | 26,524 SF |
| 50' WETLAND BUFFER IMPACT "B"       |           |
| (DRIVEWAY CONSTRUCTION FOR LOT 7:   | 5,028 SF  |
| 50' WETLAND BUFFER IMPACT "C"       |           |
| (DRIVEWAY CONSTRUCTION FOR LOT 11): | 537 SF    |
| TOTAL:                              | 32,089 SF |
| 20% STEEP SLOPES IMPACT "A":        | 1,505 SF  |
| 20% STEEP SLOPES IMPACT "B":        | 929 SF    |
| 20% STEEP SLOPES IMPACT "C":        | 1896 SF   |
| 20% STEEP SLOPES IMPACT "D":        | 68 SF     |
| 20% STEEP SLOPES IMPACT "E":        | 3530 SF   |
| 20% STEEP SLOPES IMPACT "F"         |           |
| (DRIVEWAY CONSTRUCTION FOR LOT 11): | 942 SF    |
| TOTAL:                              | 8,870 SF  |

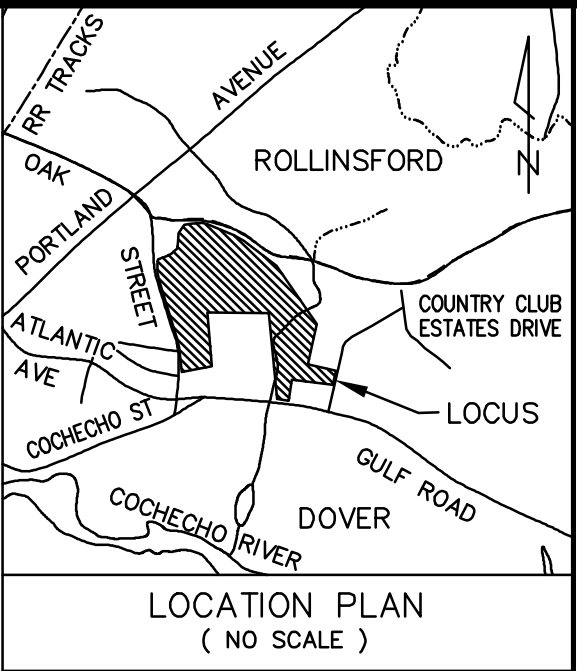
DRAINAGE SCHEDULE:

PCB1 (5' DIA./DOUBLE GRATE)  
RIM=129.6  
INV.IN=124.9  
INV.OUT=124.8

PCB2 (4' DIA.)  
RIM=137.7  
INV.OUT=132.9



|                                             |  |                  |  |                             |  |                            |  |
|---------------------------------------------|--|------------------|--|-----------------------------|--|----------------------------|--|
| NOT FOR CONSTRUCTION FOR PERMIT USE ONLY    |  | PLANNING FILE    |  | NO.: P23-                   |  | CIVILWORKS NEW ENGLAND     |  |
| DATE: 2-22-23                               |  | SCALE: 1"=40'    |  | DRAWN BY: CAD               |  | DESIGN BY: JRG             |  |
| APPROVED BY: JSH                            |  | PROJECT NO: 2074 |  | FILE: SITE                  |  | NO.                        |  |
| NO.                                         |  | REVISION         |  | APP'D                       |  | DATE                       |  |
| GRADING, DRAINAGE, & EROSION CONTROL PLAN A |  | APPLICANT:       |  | PROJECT:                    |  | 15                         |  |
| CHINBURG DEVELOPMENT, LLC                   |  | EMERSON RIDGE    |  | 18 Watson Road, PO Box 1166 |  | Dover, New Hampshire 03821 |  |
| 3 PENSTOCK WAY                              |  | DOVER, NH        |  | 603.745.0443                |  |                            |  |
| NEWMARKET, NH 03857                         |  |                  |  |                             |  |                            |  |



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  2. NORTH AMERICAN GREEN EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES (SEE DETAIL).

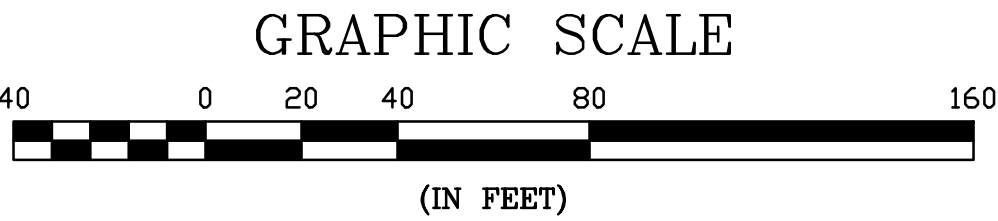
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| TOTAL:                              | 8,870 SF  |

DRAINAGE SCHEDULE:

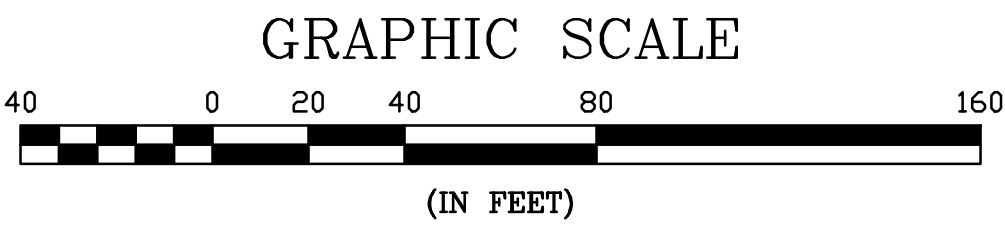
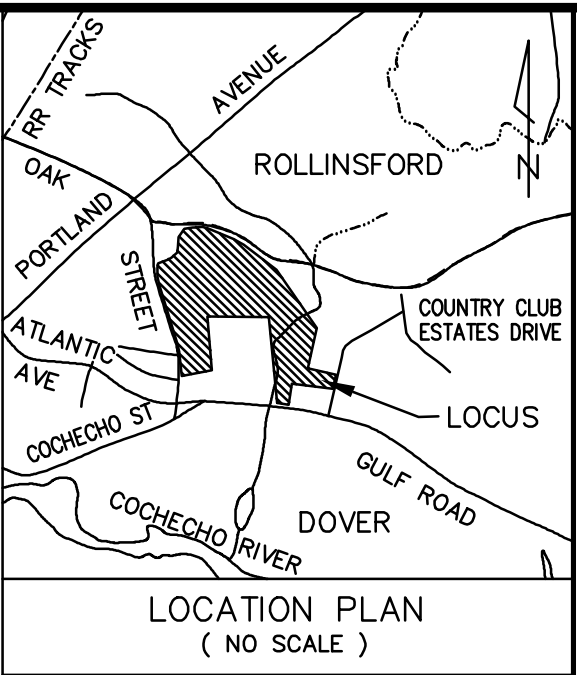
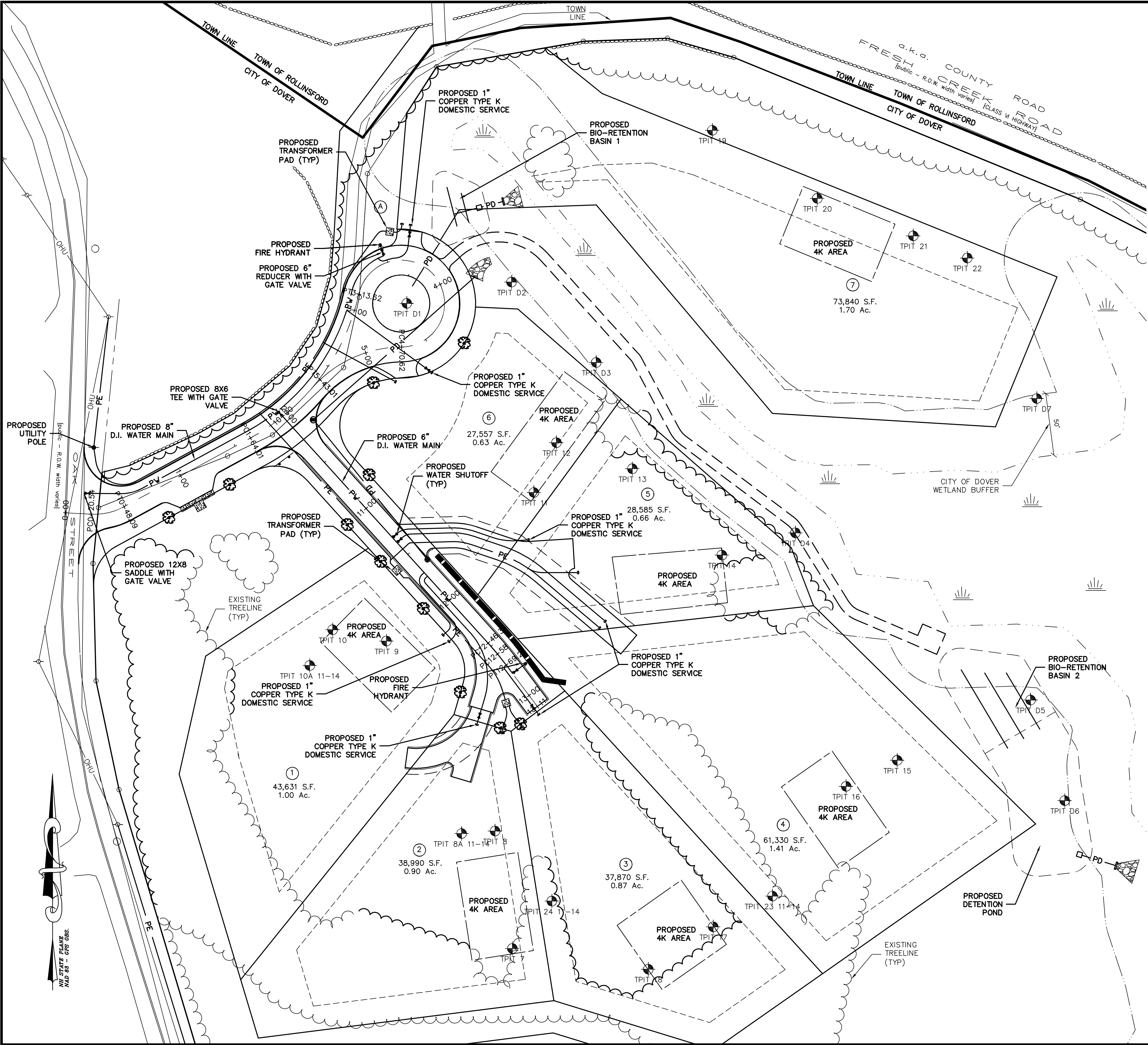
PCB1 (5' DIA./DOUBLE GRATE)  
RIM=129.6  
INV.IN=124.9  
INV.OUT=124.8

PCB2 (4' DIA.)  
RIM=137.7  
INV.OUT=132.9



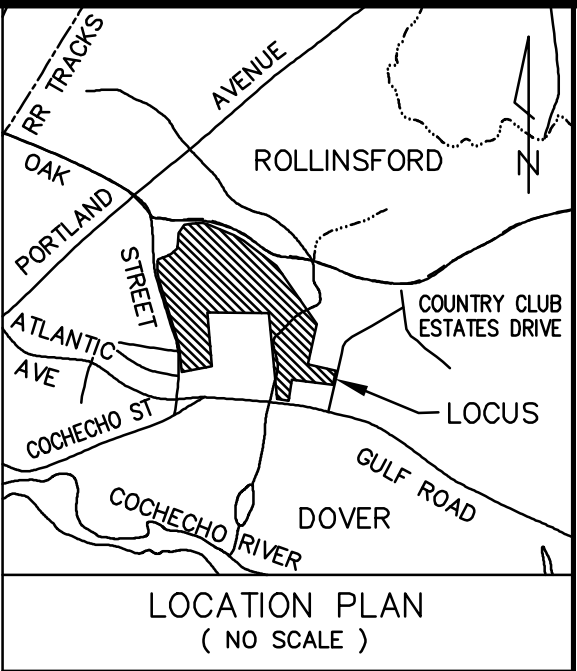
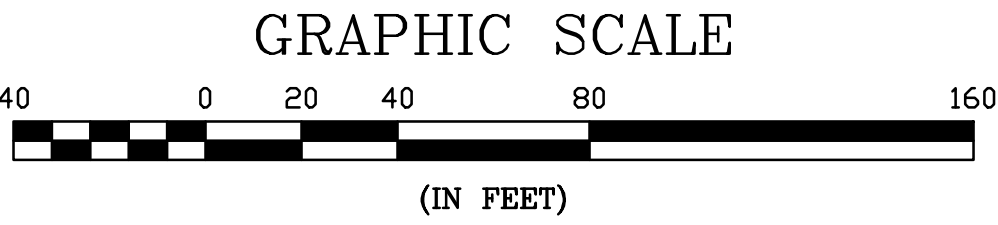
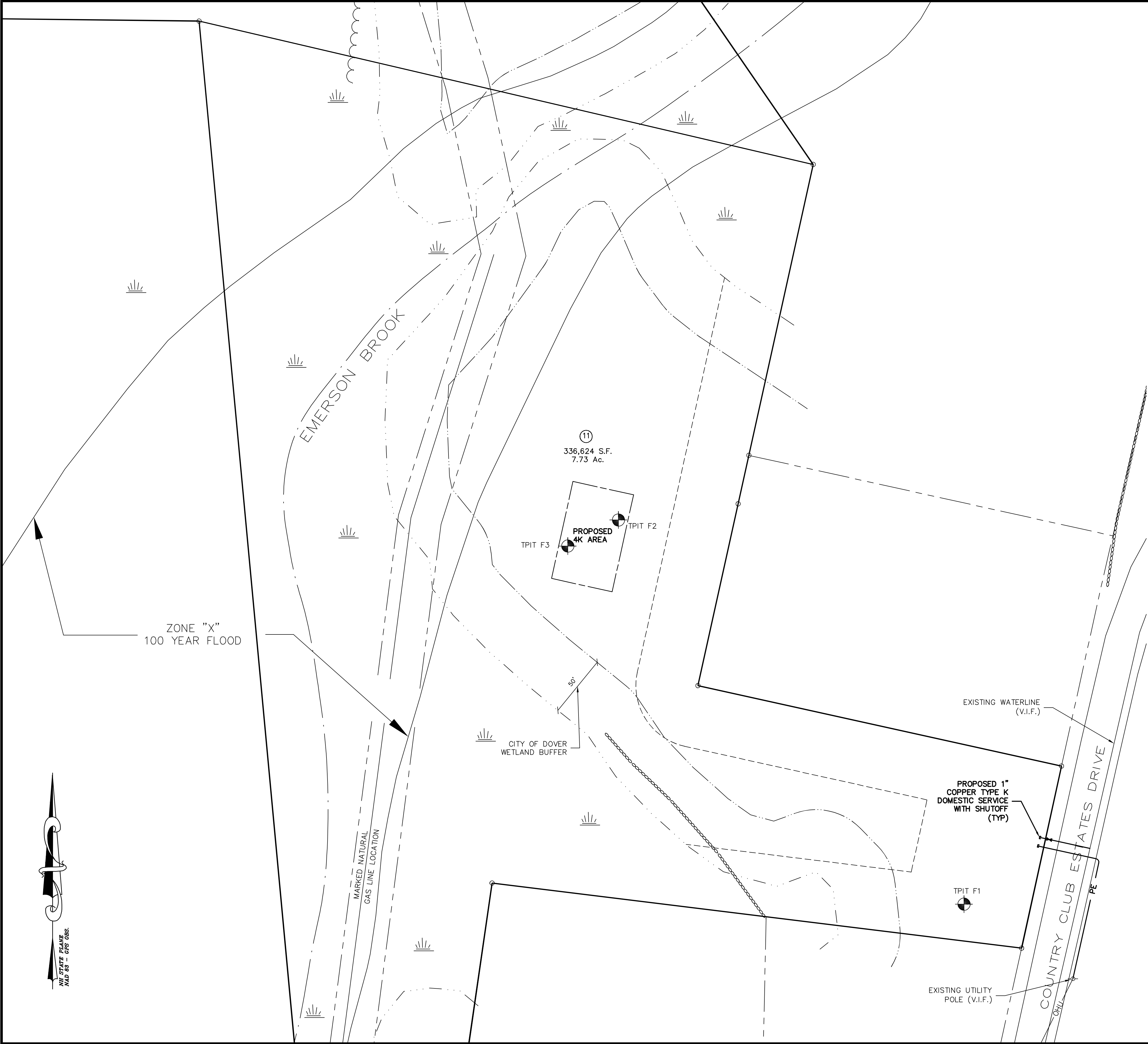
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|---------------|--|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------|--|--|--|--|--|--|--|--|--|
| <div>16</div> |  | <div>PROJECT:</div> <div>EMERSON RIDGE<br/>OAK STREET<br/>DOVER, NH</div> | <div>APPLICANT:</div> <div>CHINBURG<br/>DEVELOPMENT, LLC<br/>3 PENSTOCK WAY<br/>NEWMARKET, NH 03857</div> | GRADING, DRAINAGE, & EROSION CONTROL PLAN B |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | DATE: 2-22-23                               |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | SCALE: 1"=40'                               |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | DRAWN BY: CAD                               |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | DESIGN BY: JRG                              |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | APPROVED BY:SH                              |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | PROJECT NO: 21074                           |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           | FILE: SITE                                  |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
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|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |
|               |  |                                                                           |                                                                                                           |                                             |  |  |  |  |  |  |  |  |  |



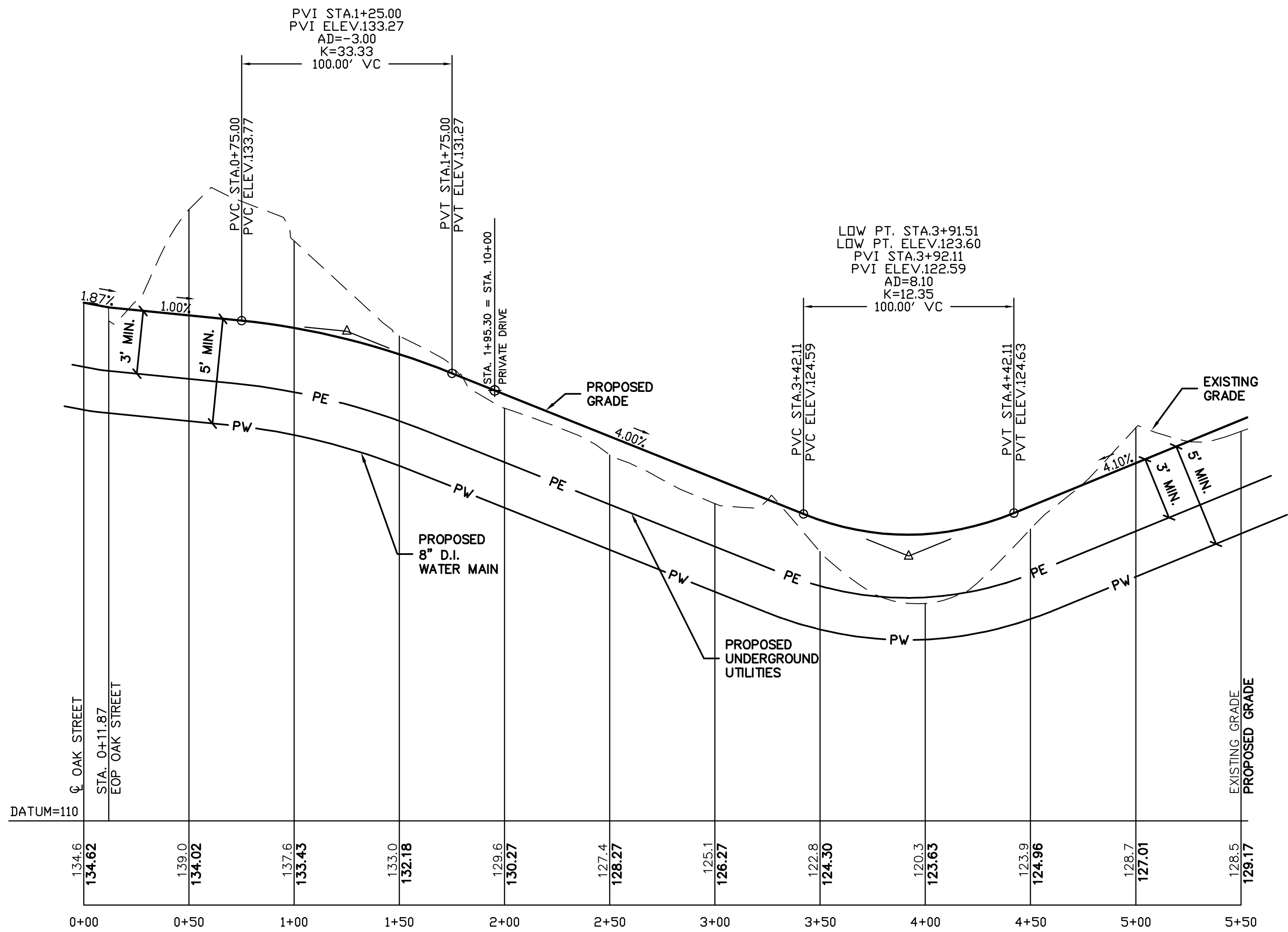


| UTILITY PLAN A          |  | CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 |  | PROJECT NO. 21074                                                          |  | NO.               |  | REVISION            |  | DATE                                     |  |
|-------------------------|--|--------------------------------------------------------------------|--|----------------------------------------------------------------------------|--|-------------------|--|---------------------|--|------------------------------------------|--|
| PROJECT:                |  | APPLICANT:                                                         |  | DATE: 2-22-23                                                              |  | SCALE: 1"=40'     |  | DRAWN BY: CAD       |  | DESIGN BY: JRG                           |  |
| 18                      |  | EMERSON RIDGE<br>OAK STREET<br>DOVER, NH                           |  | APPROVED BY: JSH                                                           |  | PROJECT NO: 21074 |  | FILE: SITE          |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY |  |
| PLANNING FILE NO.: P23- |  | CIVILWORKS NEW ENGLAND                                             |  | 181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  | CITY OF DOVER     |  | CITY OF ROLLINSFORD |  | CITY OF DOVER                            |  |

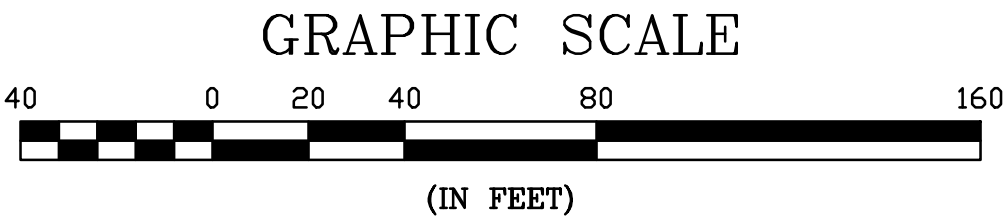




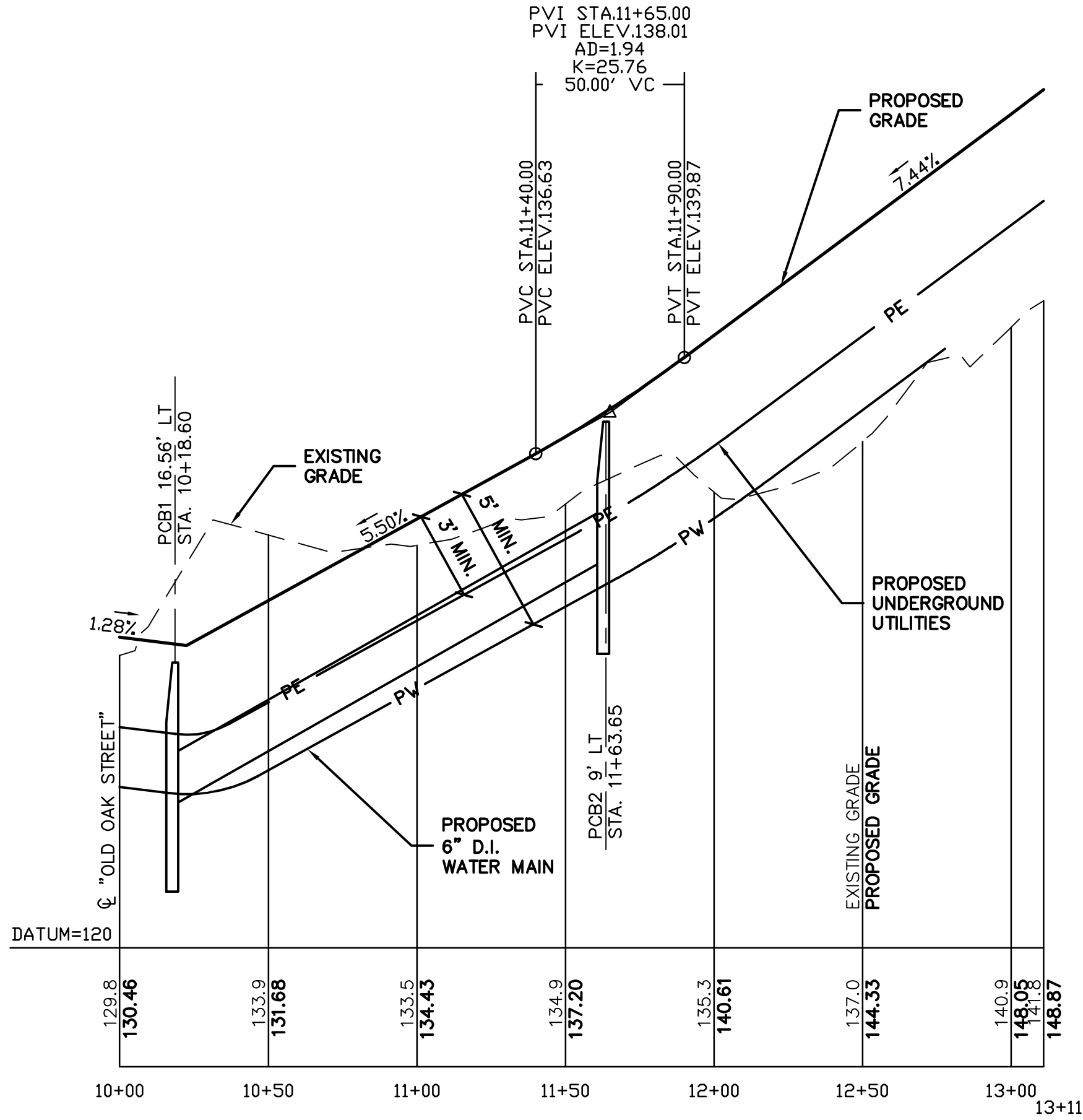
| UTILITY PLAN C |                                                                    | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                   |      |
|----------------|--------------------------------------------------------------------|------------------------------------------------------------|------|
| PROJECT:       | APPLICANT:                                                         | PLANNING FILE                                              |      |
|                |                                                                    | NO.: P23-                                                  |      |
|                |                                                                    | CIVILWORKS NEW ENGLAND                                     |      |
|                |                                                                    | 181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821 |      |
|                |                                                                    | 603.748.0443                                               |      |
| 20             | CHINBURG DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 | DATE: 2-22-23                                              |      |
|                |                                                                    | SCALE: 1"=40'                                              |      |
|                |                                                                    | DRAWN BY: CAD                                              |      |
|                |                                                                    | DESIGN BY: JRG                                             |      |
|                |                                                                    | APPROVED BY: SJH                                           |      |
|                |                                                                    | PROJECT NO: 21074                                          |      |
|                |                                                                    | FILE: SITE                                                 |      |
|                |                                                                    | NO.                                                        |      |
|                |                                                                    | REVISION                                                   |      |
|                |                                                                    | APP'D                                                      | DATE |



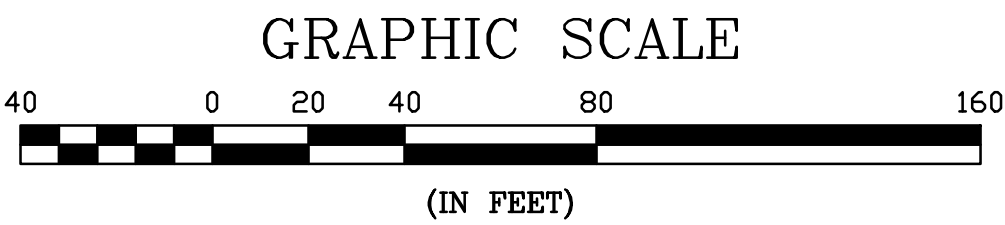
PROFILE VIEW  
HORIZONTAL SCALE: 1"=40'  
VERTICAL SCALE: 1"=4'  
(PROPOSED "OLD OAK STREET")



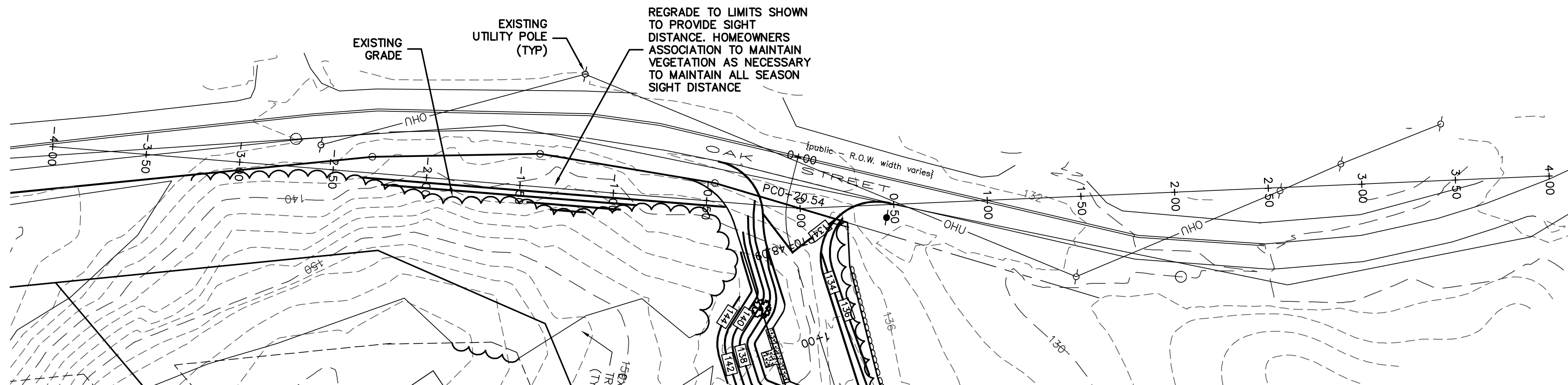
|                                                                                           |  |                   |  |  |  |  |  |  |  |                                                            |  |
|-------------------------------------------------------------------------------------------|--|-------------------|--|--|--|--|--|--|--|------------------------------------------------------------|--|
| PROJECT:<br><b>PROPOSED "OLD OAK STREET" PROFILE</b>                                      |  | DATE: 2-22-23     |  |  |  |  |  |  |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                   |  |
|                                                                                           |  | SCALE: AS SHOWN   |  |  |  |  |  |  |  | PLANNING FILE                                              |  |
| APPLICANT:<br><b>CHINBURG DEVELOPMENT, LLC<br/>3 PENSTOCK WAY<br/>NEWMARKET, NH 03857</b> |  | DRAWN BY: CAD     |  |  |  |  |  |  |  | NO.: P23-                                                  |  |
|                                                                                           |  | DESIGN BY: JRG    |  |  |  |  |  |  |  | CIVILWORKS NEW ENGLAND                                     |  |
| PROJECT:<br><b>EMERSON RIDGE<br/>OAK STREET<br/>DOVER, NH</b>                             |  | APPROVED BY: SJH  |  |  |  |  |  |  |  | 181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821 |  |
|                                                                                           |  | PROJECT NO: 21074 |  |  |  |  |  |  |  | 603.748.0443                                               |  |
| 21                                                                                        |  | FILE: SITE        |  |  |  |  |  |  |  | NO.                                                        |  |
|                                                                                           |  |                   |  |  |  |  |  |  |  | REVISION                                                   |  |
|                                                                                           |  |                   |  |  |  |  |  |  |  | APP'D                                                      |  |
|                                                                                           |  |                   |  |  |  |  |  |  |  | DATE                                                       |  |



PROFILE VIEW  
HORIZONTAL SCALE: 1"=40'  
VERTICAL SCALE: 1"=4'  
(PROPOSED PRIVATE DRIVE)



|                                |            |                                                                                         |                                                                            |       |      |
|--------------------------------|------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------|------|
| PROPOSED PRIVATE DRIVE PROFILE |            | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                                                |                                                                            |       |      |
| 22                             | PROJECT:   | APPLICANT:<br><br>CHINBURG<br>DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 | DATE: 2-22-23                                                              |       |      |
|                                |            |                                                                                         | SCALE: AS SHOWN                                                            |       |      |
|                                |            |                                                                                         | DRAWN BY: CAD                                                              |       |      |
|                                |            |                                                                                         | DESIGN BY: JRG                                                             |       |      |
|                                |            |                                                                                         | APPROVED BY:SHJ                                                            |       |      |
|                                |            |                                                                                         | PROJECT NO: 21074                                                          |       |      |
|                                | FILE: SITE | NO.                                                                                     | REVISION                                                                   | APP'D | DATE |
|                                |            |                                                                                         | CIVILWORKS NEW ENGLAND                                                     |       |      |
|                                |            |                                                                                         | 181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.745.0443 |       |      |



The profile view shows the existing and proposed grades of a road. The horizontal axis represents stationing from -4+00 to 4+00. The vertical axis represents elevation in feet, with a datum of 120.00. The existing grade is shown as a dashed line, and the proposed grade is shown as a solid line. The limits of grading are indicated by vertical lines at stations -2+50 and -0+50. The proposed grade is shown as a solid line, and the existing grade is shown as a dashed line. The profile includes labels for 'LOOKING LEFT' and 'LOOKING RIGHT' views, and a 'DESIGN PROFILE' label. The elevations at the limits of grading are -2+50 STA. -2+63.94 and -0+50 STA. -0+39.13.

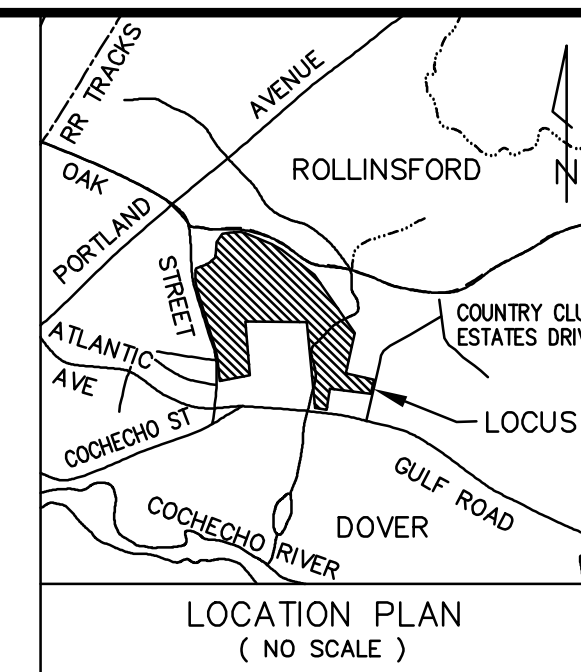
| Station | Existing Grade (ft) | Proposed Grade (ft) |
|---------|---------------------|---------------------|
| -4+00   | 133.7               | 133.7               |
| -3+50   | 133.4               | 133.4               |
| -3+00   | 135.2               | 135.2               |
| -2+50   | 136.5               | 136.5               |
| -2+00   | 140.6               | 137.22              |
| -1+50   | 140.3               | 137.28              |
| -1+00   | 141.1               | 137.34              |
| -0+50   | 138.1               | 137.40              |
| 0+00    | 134.2               | 134.2               |
| 0+50    | 132.7               | 132.7               |
| 1+00    | 133.2               | 133.2               |
| 1+50    | 130.7               | 130.7               |
| 2+00    | 128.0               | 128.0               |
| 2+50    | 128.6               | 128.6               |
| 3+00    | 130.5               | 130.5               |
| 3+50    | 130.1               | 130.1               |
| 4+00    | 133.2               | 133.2               |

GRAPHIC SCALE

40      0      20      40      80      160



(IN FEET)



|                                                                |  |                                                                                  |  |                                                                                                                        |  |                                                                                                                            |  |                                  |  |                                                                                                                                               |  |
|----------------------------------------------------------------|--|----------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------|--|----------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>ALL SEASON SAFE SIGHT DISTANCE</b><br><b>(@ OAK STREET)</b> |  | <b>PROJECT:</b><br><b>EMERSON RIDGE</b><br><b>OAK STREET</b><br><b>DOVER, NH</b> |  | <b>APPLICANT:</b><br><b>CHINBURG</b><br><b>DEVELOPMENT, LLC</b><br><b>3 PENSTOCK WAY</b><br><b>NEWMARKET, NH 03857</b> |  |                                                                                                                            |  |                                  |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY<br><b>PLANNING FILE</b><br><b>NO.: P23-</b>                                                          |  |
|                                                                |  |                                                                                  |  |                                                                                                                        |  | DATE: 2-22-23<br>SCALE: AS SHOWN<br>DRAWN BY: CAD<br>DESIGN BY: JRG<br>APPROVED BY: SJH<br>PROJECT NO: 21074<br>FILE: SITE |  | NO.<br>REVISION<br>APP'D<br>DATE |  | <b>CIVILWORKS NEW ENGLAND</b><br>CIVIL & WATERFRONT ENGINEERING<br>181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  |

DESCRIPTION

1. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS ASSOCIATED WITH THE CONSTRUCTION OF A 311 LF OF PRIVATE ROADWAY, AND 311 LF OF PRIVATE ROADWAY, DRAINAGE IMPROVEMENTS, AND UTILITIES FOR A 11 LOT SINGLE FAMILY SUBDIVISION.

PROJECT NAME AND LOCATION

EMERSON RIDGE  
TAX MAP N, LOT 13-1  
OAK STREET  
DOVER, NH  
DISTURBED AREA  
±96,700 S.F.

LATITUDE N43° 12' 09"  
LONGITUDE W70° 51' 25"

NOTES:

1. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.

SEQUENCE OF MAJOR ACTIVITIES

1. CONTRACTOR SHALL PREPARE THE SWPPP, FILE FOR AND OBTAIN THE NOI A MINIMUM OF 2 WEEKS PRIOR TO COMMENCEMENT OF SITE WORK.
2. PLACE TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S PRIOR TO EARTH MOVING ACTIVITIES.
3. ALL EROSION CONTROL, AND PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO COMMENCING EARTH MOVING OPERATIONS.
4. SELECTIVE DEMOLITION.
5. REGRADE SITE TO SUBGRADE.
6. TEMPORARY WATER DIVERSION (SWALES, BASINS) MUST BE USED AS NECESSARY UNTIL AREAS ARE STABILIZED.
7. SWALES AND PONDS (AS APPLICABLE) SHALL BE CONSTRUCTED EARLY ON IN THE CONSTRUCTION SEQUENCE AND BEFORE ROUGH GRADING OF THE SITE AND ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. INSTALL DRAINAGE STRUCTURES AND CONTROLS.
9. INSTALL FOUNDATION FOOTINGS AND WALLS.
10. INSTALL UTILITIES.
11. PLACE GRAVELS AND FINE GRADE.
12. STABILIZE ROADWAYS AND PARKING AREAS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED (AS APPLICABLE) WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.
14. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EVERY 1/2" OF RAINFALL.
15. IN ALL CASES THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION AND IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
16. WHEN ALL SITE WORK IS COMPLETE AND ALL DISTURBED AREAS ARE STABILIZED REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND FILE THE EPA – N.O.T.

DEFINITIONS

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED.

1. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
2. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
3. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED; OR
4. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED

INSTALLATION, MAINTENANCE, AND INSPECTION PROCEDURES OF EROSION AND SEDIMENT CONTROLS

A. SILT BARRIER

1. INSTALLATION
  - a. USE SILT BARRIER AS PERIMETER CONTROLS, PARTICULARLY AT THE LOWER OR DOWN SLOPE EDGE OF A DISTURBED AREA.
  - b. LEAVE SPACE FOR MAINTENANCE BETWEEN TOW AND SLOPE OF SILT BARRIER.
  - c. TRENCH IN THE SILT BARRIER ON THE UPHILL SIDE (6 INCHES DEEP BY 6 INCHES WIDE).
  - d. INSTALL STAKES ON THE DOWNHILL SIDE OF THE SILT BARRIER.
  - e. CURVE THE END OF THE SILT BARRIER UP-GRADE TO HELP IT CONTAIN RUNOFF.
2. SEQUENCE OF INSTALLATION
  - a. SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.
3. MAINTENANCE
  - a. SILT BARRIERS SHOULD BE INSPECTED AND MAINTAINED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
  - b. SILT BARRIERS HAVE A USEFUL LIFE OF ONE SEASON. ON LONGER CONSTRUCTION PROJECTS, SILT BARRIERS SHOULD BE REPLACED PERIODICALLY TO MAINTAIN EFFECTIVENESS.
  - c. REMOVE SEDIMENT WHEN IT REACHES ONE-THIRD (1/3) THE HEIGHT OF THE SILT BARRIER.
  - d. REPLACE THE SILT BARRIERS WHERE THEY ARE TORN, WORN, OR OTHERWISE DAMAGED AND MONITOR PERFORMANCE TO ENSURE EFFECTIVE PERFORMANCE.
  - e. RETRENCH OR REPLACE ANY SILT BARRIER THAT IS NOT PROPERLY ANCHORED TO THE GROUND.
  - f. 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.
  - g. SILT 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 IMPROUNDING OF THE VOLUMES OF WATER BEHIND THEM, SILT BARRIERS SHOULD BE REPLACED WITH A TEMPORARY CHECK DAM.

B. MULCHING

1. TIMING
  - a. APPLY MULCH PRIOR TO ANY STORM EVENT. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.
  - b. IN OTHER AREAS, THE TIME PERIOD CAN RANGE FROM 14 TO 30 DAYS OF INACTIVITY ON A AREA. THE VARYING WITH SITE CONDITIONS. PROFESSIONAL JUDGEMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.
  - c. WITHIN 100 FEET OF RIVERS, STREAMS, WETLANDS, AND IN LAKE AND POND WATERSHEDS, THE TIME PERIOD OF WHICH MULCHING SHOULD TAKE OCCUR SHOULD BE NO GREATER THAN SEVEN (7) DAYS. THIS SEVEN DAY LIMIT SHOULD BE REDUCED FURTHER DURING WET PRAIRIE PERIODS.
2. APPLICATION RATE
  - a. MULCH SHALL BE APPLIED AT A RATE OF BETWEEN 1.5 TO 2 TONS PER ACRE, OR 70 TO 90 POUNDS PER 1000 SQUARE FEET.
  - b. GUIDELINES FOR WINTER MULCH APPLICATION. WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 150-200 POUNDS OF HAY OR STRAW PER ACRE WITH ABOUT 4 INCHES IN DEPTH. A TACKIFIER MAY BE ADDED TO THE MULCH.
3. MAINTENANCE
  - a. ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS. CHECK FOR SIGNS OF EROSION OR DISPLACEMENT OF THE MULCH. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED.
  - b. NETS MUST BE INSPECTED AFTER RAIN EVENTS FOR DISLOCATION OR FAILURE AND SHOULD BE REPAIRED AS NECESSARY.
  - c. INSPECTIONS SHOULD TAKE PLACE UNTIL THE SITE IS ESTABLISHED.
  - d. EROSION CONTROL MIX MULCH USED FOR TEMPORARY STABILIZATION SHOULD BE LEFT IN PLACE. VEGETATION ADDS STABILITY AND SHOULD BE PROMOTED.

C. TEMPORARY SEEDING

1. NEEDLEB PREDIATION
  - a. STONES AND TRASH SHOULD BE REMOVED SO AS NOT TO INTERFERE WITH THE SEEDING AREA.
  - b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH FERTILIZER, LIME AND FERTILIZER.
  - c. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS.
    - i) APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OR 13.8 POUNDS PER 1,000 SQUARE FEET OF LOW PHOSPHATE FERTILIZER OR EQUIVALENT.
    - ii) APPLY LIMESTONE AT A RATE OF 3 TONS PER ACRE OR 138 POUNDS PER 1,000 SQUARE FEET.
2. SEEDING
  - a. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SUMMARY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
  - b. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
  - c. TEMPORARY SEEDING BETWEEN MAY 15TH AND AUGUST 15TH SHOULD BE COVERED WITH HAY OR STRAW MULCH, ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING" PRACTICE.
  - d. VEGETATED GROWTH COVERING 85% OF THE DISTURBED AREA SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH.
3. MAINTENANCE
  - a. TEMPORARY SEEDING SHALL BE INSPECTED PERIODICALLY. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER FABRICS, CHECK DAMS, ETC.).

D. PERMANENT SEEDING

1. BEDDING – STONES LARGER THAN 2 INCHES, TRASH, ROOTS, AND OTHER DEBRIS INTERFERING WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA SHOULD BE REMOVED. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF 4" TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL.
2. FERTILIZER
  - a. LIME AND FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 4 INCHES USING A DISC, SPRING TOOTH HARROW, OR OTHER SUITABLE EQUIPMENT PRIOR TO OR AT THE SAME TIME OF SEEDING.
  - b. 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 THE SURFACE WATER.
  - c. 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 @ 138 LBS. PER 1,000 S.F.  
LOW PHOSPHATE (N-P2O5-K2O) FERTILIZER @ 13.8 LBS. PER 1,000 S.F.
3. SEED MIXTURE (RECOMMENDED)

| RATE:               | LBS. PER ACRE | LBS. PER 1,000 S.F. |
|---------------------|---------------|---------------------|
| TALL FESCUE         | 20            | 0.45                |
| CREeping RED FESCUE | 20            | 0.45                |
| BIRDFOOT TREFOIL    | 8             | 0.20                |
| TOTAL               | 48            | 1.10                |
4. SEEDING
  - a. 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.
  - b. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
  - c. VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH. IF THIS CONDITION IS NOT ACHIEVED, IMPLEMENT TEMPORARY STABILIZATION MEASURES FOR OVERWINTER PROTECTION.
5. HYDROSEEDING
  - a. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF STRAW MULCH ON CRITICAL AREAS IS PREFERRED SINCE IT GRANTS BETTER SLOPE PROTECTION BY USING ADHESIVE MATERIALS.
  - b. SLOPES MUST BE NO STEEPER THAN 2 TO 1 (2 FEET HORIZONTALLY TO 1 FOOT VERTICALLY).
6. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
7. MAINTENANCE
  - a. 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.
  - b. 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.
  - c. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABILIZATION OF EXPOSED SOILS.
  - d. IF EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS RESEEDED. WITH OTHER TEMPORARY MEASURES USED TO PROVIDE EROSION PROTECTION DURING ESTABLISHMENT.
  - e. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.

E. STORM DRAIN INLET PROTECTION

1. SPECIFICATIONS
  - a. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE BARRIER SHOULD BE LESS THAN ONE ACRE.
  - b. ANY RESULTANT PONDING OF STORMWATER MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.
2. INSTALLATION
  - a. INSTALL INLET PROTECTION AS SOON AS STORM DRAIN INLETS ARE INSTALLED AND BEFORE LAND-DISTURBANCE ACTIVITIES BEGIN IN AREAS WITH EXISTING STORM DRAIN SYSTEMS.
  - b. PROTECT ALL INLETS THAT COULD RECEIVE STORMWATER FROM YOUR CONSTRUCTION PROJECT.
  - c. USE IN CONJUNCTION WITH OTHER EROSION PREVENTION AND SEDIMENT CONTROL BMP'S.
  - d. DESIGN YOUR INLET PROTECTION TO HANDLE THE VOLUME OF WATER FROM THE AREA BEING DRAINED. ENSURE THAT THE DESIGN IS SIZED APPROPRIATELY.
3. MAINTENANCE
  - a. INSPECT INLETS BARRIERS FREQUENTLY, BEFORE AND AFTER EACH RAINFALL EVENT AND REPAIR WHEN NECESSARY.
  - b. SEDIMENT SHOULD BE REMOVED AND THE STORM DRAIN SEDIMENT BARRIER RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE BARRIER.
  - c. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
  - d. SWEEP STREETS, SIDEWALKS, AND OTHER PAVED AREAS REGULARLY.
  - e. ALL CATCH BASINS AND STORM DRAIN INLETS MUST BE CLEANED AT THE END OF CONSTRUCTION AND AFTER THE SITE HAS BEEN FULLY STABILIZED

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES THE SILT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN TWENTY ONE (21) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT FENCES AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED. ALL AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.

WASTE DISPOSAL

- a. WASTE MATERIALS  
ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONNEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
- b. HAZARDOUS WASTE  
ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
- c. SANITARY WASTE  
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

THE PROJECT PROPONENT IS RESPONSIBLE FOR THE MAINTENANCE OF ALL STORMWATER FACILITIES DURING CONSTRUCTION AND THE PROPERTY OWNER IS RESPONSIBLE AFTER CONSTRUCTION IS COMPLETE.

CATCH BASINS & STORMWATER TREATMENT STRUCTURES

1. CATCH BASINS & STORMWATER TREATMENT STRUCTURES SHOULD BE INSPECTED ON A MONTHLY BASIS AND/OR AFTER A MAJOR RAINFALL EVENT TO ASSURE THAT DEBRIS OR SEDIMENTS DO NOT REDUCE THE EFFECTIVENESS OF THE SYSTEM.

SPILL PREVENTION

A. MATERIAL MANAGEMENT PRACTICES

THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL SANITARY EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF.

- a. AN EFFORT WILL BE MADE TO STORE ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB.
  - b. ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.
  - c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
  - d. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.
  - e. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
  - f. WHENEVER POSSIBLE ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
2. HAZARDOUS PRODUCTS:
    - a. THE FOLLOWING PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
    - b. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
    - c. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION.
    - d. SURPLUS PRODUCT THAT MUST BE DISPOSED OF WILL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.

B. PRODUCT SPECIFICATION PRACTICES

THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ON SITE:

1. PETROLEUM PRODUCTS:
  - a. ALL ON SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENANCE TO REDUCE LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
2. FERTILIZERS:
  - a. FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER. STORAGE WILL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY-USED BAGS OF FERTILIZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
3. PAINTS:
  - a. ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM. IT WILL BE DISPOSED OF PROPERLY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
4. CONCRETE TRUCKS:
  - a. CONCRETE TRUCKS WILL DISCHARGE AND WASH OUT SURPLUS CONCRETE OR DRUM WASH WATER IN A CONTAINED AREA ON SITE.

C. SPILL CONTROL PRACTICES

- IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTIONS THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
- a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
  - b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.
  - c. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.
  - d. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
  - e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OF LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.
  - f. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM OCCURRING AND HOW TO CLEANUP A SPILL IF IT OCCURS. A DESCRIPTION OF THE SPILL, ITS CAUSE, AND THE CLEANUP MEASURES WILL BE INCLUDED.
  - g. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.

THE PROJECT PROPONENT IS REQUIRED TO MANAGE CONSTRUCTION TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO CONTROLLING INVASIVE SPECIES AND CONTROLLING FUGITIVE DUST IN ACCORDANCE WITH ENV-A 1002.

AGR 3800 PROHIBITED INVASIVE PLANT SPECIES RULES

THE RULE, AGR 3800, STATES: NO PERSON SHALL COLLECT, TRANSPORT, IMPORT, EXPORT, MOVE, BUY, SELL, DISTRIBUTE, PROPAGATE OR TRANSPLANT ANY LIVING AND VIABLE PORTION OF ANY PLANT SPECIES, WHICH INCLUDED ALL OF THEIR CULTIVARS AND VARIETIES, LISTED IN TABLE 3800.1, NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES LIST. A COMPLETE COPY OF THE RULES CAN BE ACCEESSED ON THE INTERNET AT [HTTP://AGRICULTURE.NH.GOV/TOPICS/PLANTS\\_INSECTS.HTM](http://agriculture.nh.gov/topics/plants_insects.htm).

ENV-A 1002 FUGITIVE DUST: PRECAUTIONS TO PREVENT, ABATE, AND CONTROL FUGITIVE DUST.

- a. ANY PERSON ENGAGED IN ANY ACTIVITY WITHIN THE STATE EMITS FUGITIVE DUST, OTHER THAN THOSE LISTED IN ENV-A 1002.02 (b), SHALL TAKE PRECAUTIONS THROUGHOUT THE ACTIVITY IN ORDER TO PREVENT, ABATE, AND CONTROL THE EMISSION OF FUGITIVE DUST.
- b. PRECAUTIONS REQUIRED BY (a) ABOVE, SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
  - i) THE USE OF WATER OR HYDROPHILIC MATERIAL ON OPERATIONS OR SURFACES, OR BOTH.
  - ii) THE APPLICATION OF ASPHALT, WATER, OR HYDROPHILIC MATERIAL, OR TARPS OR OTHER SUCH COVERS TO MATERIAL STOCKPILES;
  - iii) THE USE OF HOODS, FANS, FABRIC FILTERS, OR OTHER DEVICES TO ENCLOSE AND VENT AREAS WHERE MATERIALS PRONE TO PRODUCING FUGITIVE DUST ARE HANDLED;
  - iv) THE USE OF CONTAINMENT METHODS FOR SANDBLASTING OR SIMILAR OPERATIONS; AND
  - v) THE USE OF VACUUMS OR OTHER SUCTION DEVICES TO COLLECT AIRBORNE PARTICULATE MATTER.

PER 153-10 F.

ALL SITE IMPROVEMENTS WHICH REQUIRE BLASTING OF LAND SHALL MEET THE FOLLOWING REQUIREMENTS PRIOR TO ANY BLASTING OCCURRING.

1. THE APPLICANT SHALL PREPARE A PRE-BLAST SURVEY OF ALL STRUCTURES WITHIN FIVE HUNDRED (500) FEET OF THE EXTERNAL BOUNDARIES OF THE PROPOSED LOT TO BE DEVELOPED. THIS SURVEY, ALONG WITH A MONITORING PLAN, SHALL BE ON FILE WITH THE DOVER FIRE AND RESCUE. UPON RECOMMENDATIONS OF THE CHIEF, THE PLANNING BOARD MAY REQUIRE A PRE-BLAST SURVEY OF ALL STRUCTURES WITHIN ONE THOUSAND (1000) FEET.
2. THE APPLICANT SHALL HOLD A NEIGHBORHOOD MEETING TO REVIEW THE BLASTING PLAN AND PRE-BLAST SURVEY, WITH REPRESENTATIVES OF THE FIRE AND RESCUE AND THE BLASTING COMPANY IN ATTENDANCE, PRIOR TO ANY ON-SITE BLASTING. ABUTTERS WITHIN ONE THOUSAND (1000) FEET OF THE EXTERNAL BOUNDARY OF THE PROJECT PARCEL SHALL BE NOTIFIED BY THE CERTIFIED MAIL (PAID FOR BY THE APPLICANT) OF THE MEETING NO LESS THAN TEN (10) DAYS PRIOR TO THE MEETING AND NO MORE THAN FIFTEEN (15) DAYS PRIOR TO THE MEETING. THE NOTICE SHALL STATE THE TIME AND DATE OF THE BLASTING AND CONTAIN A MAP SHOWING THE BLASTING AREA, THE 1,000-FOOT-RADIUS AREA, AND THE 500-FOOT-RADIUS AREA.
3. PERMIT HOLDERS SHALL BE IN COMPLIANCE WITH NFPA 495, EXPLOSIVE MATERIALS CODE, IN ADDITION TO ALL OTHER ORDINANCES AND CODES SET FORTH IN THE CITY OF DOVER CODE, § 153-14A, STORMWATER MANAGEMENT, EROSION CONTROL AND FLOOD HAZARDS, OF THIS CHAPTER AND THE CITY OF DOVER FIRE PREVENTION CODE, WHICH SPECIFICALLY PROHIBITS THE OVERNIGHT STORAGE OF EXPLOSIVES OR BLASTING AGENTS. FURTHER, ALL STORAGE MAGAZINES SHALL BE LOCKED IN THE OPEN POSITION AT THE END OF THE DAY'S OPERATION FOR EASY INSPECTION BY CITY OFFICIALS.
4. BLASTING PERMITS MAY BE OBTAINED BY CALLING THE DOVER FIRE AND RESCUE DURING NORMAL BUSINESS HOURS. THE PERMITS ARE ONLY ACTIVE FOR THE DATES AND TIME SPECIFIED ON THE PERMIT.
5. PERMIT HOLDERS SHALL HOLD INSURANCE AGAINST CLAIMS FOR DAMAGES FOR PERSONAL INJURY AND PROPERTY WHICH MAY ARISE FROM THE PERFORMANCE OF THE WORK.
6. HOURS OF OPERATION FOR THE BLASTING SHALL BE NO EARLIER THAN 8:00AM AND NO LATER THAN 6:00PM, MONDAY THROUGH FRIDAY, EXCLUDING FEDERAL HOLIDAYS.

WINTER CONSTRUCTION NOTES

1. ALL PROPOSED POST-DEVELOPMENT VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE COVERED WITH EROSION CONTROL AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND. ADVANCE OF THAW OR SPRING MELT SHALL BE MONITORED. BLANKETS ON ALL DITCHES & SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS.
2. AFTER OCTOBER 15TH, INCOMPLETE ROAD AND PARKING SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3-INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT.

ENV-WO 1510: BEST MANAGEMENT PRACTICES FOR BLASTING

1. ALL ACTIVITIES ASSOCIATED WITH BLASTING NEED TO BE OPTIMIZED TO PREVENT THE RELEASE OF CHEMICALS ASSOCIATED WITH BLASTING ACTIVITIES TO THE ENVIRONMENT.
2. IF MORE THAN 5,000 CY OF ROCK REMOVAL IS REQUIRED DRINKING WATER WELLS MUST BE IDENTIFIED AND LOCATED WITHIN 2000 FEET OF THE PROPOSED BLASTING ACTIVITIES. DEVELOP A GROUNDWATER QUALITY SAMPLING PROGRAM TO MONITOR FOR NITRATE AND NITRITE EITHER IN THE DRINKING WATER SUPPLY WELLS OR IN OTHER WELLS THAT ARE REPRESENTATIVE OF THE DRINKING WATER SUPPLY WELLS IN THE AREA. THE PLAN MUST INCLUDE PRE AND POST BLAST WATER QUALITY MONITORING AND BE APPROVED BY NHDES PRIOR TO INITIATING BLASTING. THE GROUNDWATER SAMPLING PROGRAM MUST BE IMPLEMENTED ONCE APPROVED BY NHDES.
- 3) THE FOLLOWING BEST MANAGEMENT PROCEDURES FOR BLASTING SHALL BE COMPLIED WITH:
  - (1) LOADING PRACTICES. THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:
    - (A) DRILLING LOSS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDICATE DEPTHS AND LENGTHS OF VOIDS, CAVITIES, AND FAULT ZONES OR OTHER WEAK ZONES ENCOUNTERED AS WELL AS GROUNDWATER CONDITIONS.
    - (B) EXPLOSIVE PRODUCTS SHALL BE MANAGED ON-SITE SO THAT THEY ARE EITHER USED IN THE BOREHOLE, RETURNED TO THE DELIVERY VEHICLE, OR PLACED IN SECURE CONTAINERS FOR OFF-SITE DISPOSAL.
    - (C) SPILLAGE AROUND THE BOREHOLE SHALL EITHER BE PLACED IN THE BOREHOLE OR CLEANED UP AND RETURNED TO AN APPROPRIATE VEHICLE FOR HANDLING OR IMPLEMENTED TO PREVENT MISTAKES.
    - (D) LOADED EXPLOSIVES SHALL BE DETONATED AS SOON AS POSSIBLE AND SHALL NOT BE LEFT IN THE BLASTHOLES OVERNIGHT, UNLESS WEATHER OR OTHER SAFETY CONCERNS REASONABLY DICTATE THAT DETONATION SHOULD BE POSTPONED.
    - (E) LOADING EQUIPMENT SHALL BE CLEANED IN AN AREA WHERE WASTEWATER CAN BE PROPERLY CONTAINED AND HANDLED IN A MANNER THAT PREVENTS RELEASE OF CONTAMINANTS TO THE ENVIRONMENT.
    - (F) EXPLOSIVES SHALL BE LOADED TO MAINTAIN GOOD CONTINUITY IN THE COLUMN LOAD TO PROMOTE COMPLETE DETONATION. INDUSTRY ACCEPTED LOADING PRACTICES FOR PRIMING, STEMMING, DECKING AND COLUMN RISE NEED TO BE ATTENDED TO.
  - (2) EXPLOSIVE SELECTION. THE FOLLOWING BMP'S SHALL BE FOLLOWED TO REDUCE THE POTENTIAL FOR GROUNDWATER CONTAMINATION WHEN EXPLOSIVES ARE USED:
    - (A) EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT ARE APPROPRIATE FOR SITE CONDITIONS AND SAFE BLAST EXISTENCE.
    - (B) EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT HAVE THE APPROPRIATE WATER RESISTANCE FOR THE SITE CONDITIONS PRESENT TO MINIMIZE THE POTENTIAL FOR HAZARDOUS EFFECT OF THE PRODUCT UPON GROUNDWATER.
  - (3) PREVENTION OF MISTAKES. APPROPRIATE PRACTICES SHALL BE DEVELOPED AND IMPLEMENTED TO PREVENT MISTAKES.
  - (4) MUCK AND ROCK MANAGEMENT. BLASTED MATERIAL MEANS ALL OF EARTH MATERIAL LOOSENED AS A RESULT OF THE BLASTING; MUCK MEANS THE BLASTED MATERIAL REMAINING AFTER THE ROCKS HAVE BEEN REMOVED; ROCKS MEANS THE LARGER PIECES OF BLASTED MATERIAL THAT ARE SEPARATED FROM THE MUCK FOR USE ELSEWHERE. INCLUDING FOR FEEDSTOCK OF A ROCK CRUSHING OPERATION; MUCK SHALL BE REMOVED FROM THE BLAST AREA AS SOON AS REASONABLY POSSIBLE; ROCKS SHALL BE MANAGED SO AS TO PREVENT WATER SUPPLY WELLS OR SURFACE WATERS FROM BEING CONTAMINATED BY RUNOFF.
  - (5) SPILL PREVENTION. SPILL PREVENTION AND SPILL MITIGATION MEASURES SHALL BE IMPLEMENTED TO PREVENT THE RELEASE OF FUEL AND OTHER RELATED SUBSTANCES TO THE ENVIRONMENT. THE MEASURES SHALL INCLUDE AT A MINIMUM:
    - (A) THE FUEL STORAGE REQUIREMENTS SHALL INCLUDE:
      1. STORAGE OF REGULATED SUBSTANCES ON AN IMPERVIOUS SURFACE;
      2. SECURE STORAGE AREAS AGAINST UNAUTHORIZED ENTRY;
      3. LABEL REGULATED CONTAINERS CLEARLY AND VISIBLY;
      4. INSPECT STORAGE AREAS WEEKLY;
      5. COVER REGULATED CONTAINERS IN OUTSIDE STORAGE AREAS;
      6. WHEREVER POSSIBLE, KEEP REGULATED CONTAINERS THAT ARE STORED OUTSIDE MORE THAN 50 FEET FROM SURFACE WATER AND STORM DRAINS, 75 FEET FROM PRIVATE WELLS, AND 400 FEET FROM PUBLIC WELLS; AND
      7. SEDIMENTATION MEASURES TO PREVENT CONTAINERS CONTAINING REGULATED SUBSTANCES STORED OUTSIDE, EXCEPT FOR ON PREMISE USE HEATING FUEL TANKS, OR ABOVEGROUND OR UNDERGROUND STORAGE TANKS OTHERWISE REGULATED.
    - (B) THE FUEL HANDLING REQUIREMENTS SHALL INCLUDE:
      1. LOCK WHEN IN USE. KEEP CONTAINERS CONTAINING REGULATED SUBSTANCES CLOSED AND SEALED;
      2. PLACE DRIP PANS UNDER SPIGOTS, VALVES, AND PUMPS;
      3. HAVE SPILL CONTROL AND CONTAINMENT EQUIPMENT READILY AVAILABLE IN THE WORK AREAS;
      4. USE FUNNELS AND DRIP PANS WHEN TRANSFERRING REGULATED SUBSTANCES; AND
      5. PERFORM TRANSFERS OF REGULATED SUBSTANCES OVER AN IMPERVIOUS SURFACE.
    - (C) THE TRAINING OF ON-SITE EMPLOYEES AND THE ON-SITE POSTING OF RELEASE RESPONSE INFORMATION DESCRIBING WHAT TO DO IN THE EVENT OF A SPILL OF REGULATED SUBSTANCES.
    - (D) FUELING AND MAINTENANCE OF EXCAVATION, EARTHMOVING AND OTHER CONSTRUCTION EQUIPMENT SHALL BE IN COMPLIANCE WITH THE REGULATIONS OF THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES [NOTE THESE REQUIREMENTS ARE SUMMARIZED IN WD-DWGB-22-6 BEST MANAGEMENT PRACTICES FOR FUELING AND MAINTENANCE OF EXCAVATION AND EARTHMOVING EQUIPMENT" OR ITS SUCCESSOR DOCUMENT. (SEE [HTTPS://WWW.DES.NH.GOV/SITES/GOVFILES/DOCUMENTS/2020-01/DWGB-22-6.PDF](https://www.des.nh.gov/sites/govfiles/documents/2020-01/DWGB-22-6.PDF))]
    - (E) FUELING AND MAINTENANCE OF EQUIPMENT:
      - (A) THE FOLLOWING SHALL APPLY TO ANY CONSTRUCTION EQUIPMENT THAT WILL BE FUELED FROM A TANK TRUCK OR OTHER CONTAINER THAT IS MOVED AROUND THE SITE:
        1. PORTABLE CONTAINMENT EQUIPMENT THAT IS SIZED TO CONTAIN THE MOST LIKELY VOLUME OF FUEL TO BE SPILLED DURING A FUEL TRANSFER SHALL BE USED, WHERE THE MOST LIKELY VOLUME TO BE SPILLED IS DETERMINED BASED ON THE FUEL TRANSFER RATE, THE AMOUNT OF FUEL BEING TRANSFERRED, THE DISTANCE BETWEEN THE HOSE NOZZLE AND PUMP SHUT OFF SWITCH, AND THE RESPONSE TIME OF PERSONAL AND EQUIPMENT AVAILABLE AT THE FACILITY;
        2. THE CONTAINMENT EQUIPMENT SHALL BE POSITIONED TO CATCH ANY FUEL SPILLS DUE TO OVERTIPPING THE EQUIPMENT AND ANY OTHER SPILLS THAT MAY OCCUR FROM THE FUEL FILLER PORT TO THAT EQUIPMENT;
        3. THE TYPE OF CONTAINMENT EQUIPMENT USED AND ITS POSITIONING AND USE SHALL ACCOUNT FOR ALL OF THE DRIP POINTS ASSOCIATED WITH THE FUEL FILLING PORT AND THE HOSE FROM THE FUEL DELIVERY TRUCK;
        4. PERSONNEL SHALL LEAVE THE IMMEDIATE AREA WHILE FUELING IS BEING TRANSFERRED, TO ENSURE THAT ANY SPILLS WILL BE OF LIMITED FLOW.
      - (B) IF THE SITE WILL HAVE A FIXED LOCATION FOR FUELING CONSTRUCTION EQUIPMENT, THE FOLLOWING SHALL APPLY:
        1. ALL FUEL CONTAINERS, INCLUDING BUT NOT LIMITED TO SKID-MOUNTED TANKS, DRUMS, AND FIVE GALLON CANS, SHALL HAVE SECONDARY CONTAINMENT ELEMENTS:
          - (A) IS CAPABLE OF CONTAINING 110% OF THE VOLUME OF THE LARGEST FUEL STORAGE CONTAINER; AND
          - (B) HAVE AN IMPERVIOUS FLOOR.
        2. SECONDARY CONTAINMENT FOR TANKS MAY COMPRISE A METAL, PLASTIC, POLYMER OR PRECAST CONCRETE VAULT PROVIDING 110 PERCENT OF THE VOLUME OF THE LARGEST FUEL STORAGE CONTAINER;
        3. FOR FUEL CONTAINERS, SECONDARY CONTAINMENT MAY COMPRISE CONTAINMENT ELEMENTS:
          - (A) SLOPED DOWN TO A CENTRAL LOW POINT OR BERMED ALONG THE PERIMETER.
          - (B) LINED WITH A CONTINUOUS SHEET OF 20 MIL OR THICKER POLYMER MATERIAL OR APPROPRIATE GEOMEMBRANE LINER;
          - (C) BACKFILLED WITH AT LEAST 6 INCHES OF SAND.

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY  
PLANNING FILE  
No.: P23-

CIVILWORKS NEW ENGLAND

18 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.745.0443

DATE: 2-22-23  
SCALE: N/A  
DRAWN BY: CAD  
DESIGN BY: JRG  
APPROVED BY: JSH  
PROJECT NO: 2074  
FILE: SITE

CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEW MARKET, NH 03857

EMERSON RIDGE  
OAK STREET  
DOVER, NH

PROJECT NO. 2074  
FILE: SITE

DATE: 2-22-23  
SCALE: N/A  
DRAWN BY: CAD  
DESIGN BY: JRG  
APPROVED BY: JSH  
PROJECT NO: 2074  
FILE: SITE

CHINBURG DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEW MARKET, NH 03



## SEEKING REPORTS OF RARE TURTLES

The NH Fish & Game Department is collecting  
observations of four turtle species:



### Blanding's turtle (state endangered)

- Large, dark/black domed shell with lighter speckles
- Distinct yellow throat/chin
- Aquatic but often moves on land



### Wood turtle (special concern)

- Sculpted, pyramidal brownish shell
- Orange around neck and limbs
- River/stream turtle spending many months on land



### Eastern box turtle (state endangered)

- Small terrestrial turtle with highly domed shell
- Irregular yellow or orange markings over brown/black base



### Spotted turtle (state threatened)

- Small, mostly aquatic with black or dark brown with yellow spots.
- Fairly flat shell compared to Blanding's turtle

Report sightings to [RAARP@wildlife.nh.gov](mailto:RAARP@wildlife.nh.gov) or 603-271-2461 Please report promptly, noting specific location and date - Photographs strongly encouraged

- NOTES:
1. ALL OUTSIDE CONSTRUCTION PERSONNEL SHALL RECEIVE TRAINING IN THE IDENTIFICATION OF RARE TURTLE SPECIES AND MADE AWARE OF THEIR PROTECTED STATUS.
  2. THE USE OF WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED
  3. THE USE OF EROSION CONTROL BERM, WHITE FILTREXX DEGRADABLE WOVEN SILT SOCK, OR 'WILDLIFE FRIENDLY' WOVEN ORGANIC MATERIAL (E.G. COCO OR JUTE MATTING SUCH AS NORTH AMERICAN GREEN SC150BN OR EQUIVALENT) ARE ACCEPTABLE FOR USE
  4. IF WOOD, SPOTTED, OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERLSKI AT 271-1738 or JOSH MEGYESY AT 271-1125 FOR FURTHER INSTRUCTIONS.

## EROSION CONTROL DETAILS

APPLICANT:

CHINBURG  
DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857

PROJECT:

EMERSON RIDGE  
OAK STREET  
DOVER, NH

25

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

PLANNING FILE  
NO.: P23-

CIVILWORKS NEW ENGLAND  
181 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
603.748.0443

DATE: 2-22-23

SCALE: AS SHOWN

DRAWN BY: CAD

DESIGN BY: JRG

APPROVED BY: JRG

PROJECT NO: 2074

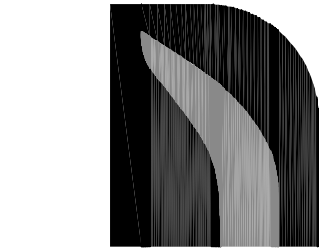
FILE: SITE

NO.

REVISION

APP'D

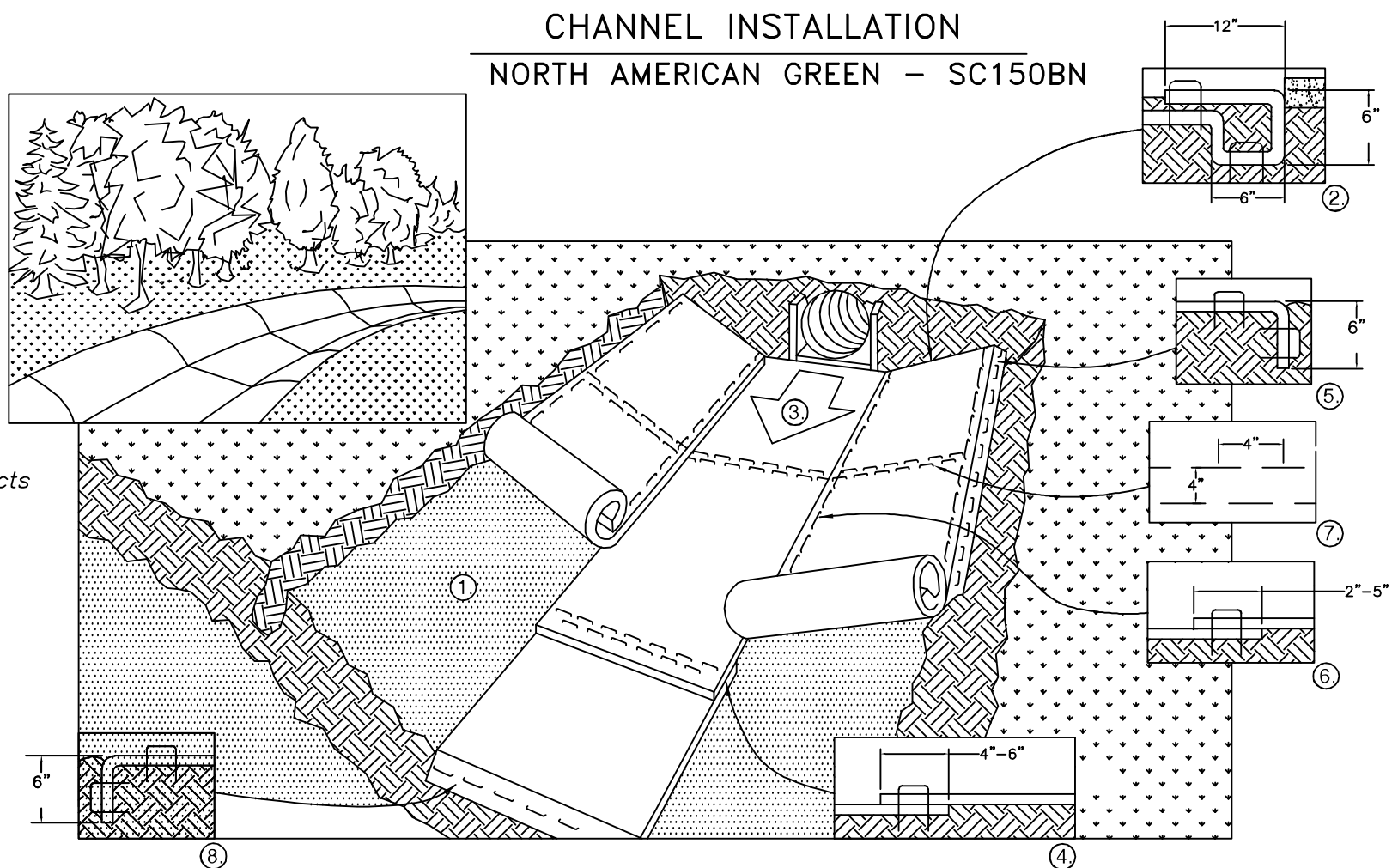
DATE



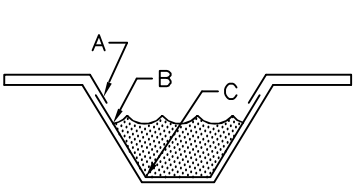
NORTH  
AMERICAN  
GREEN

EROSION CONTROL Products  
Guaranteed SOLUTIONS

## CHANNEL INSTALLATION NORTH AMERICAN GREEN - SC150BN



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.  
NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" - 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" - 5" (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. NOTE: \* IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.



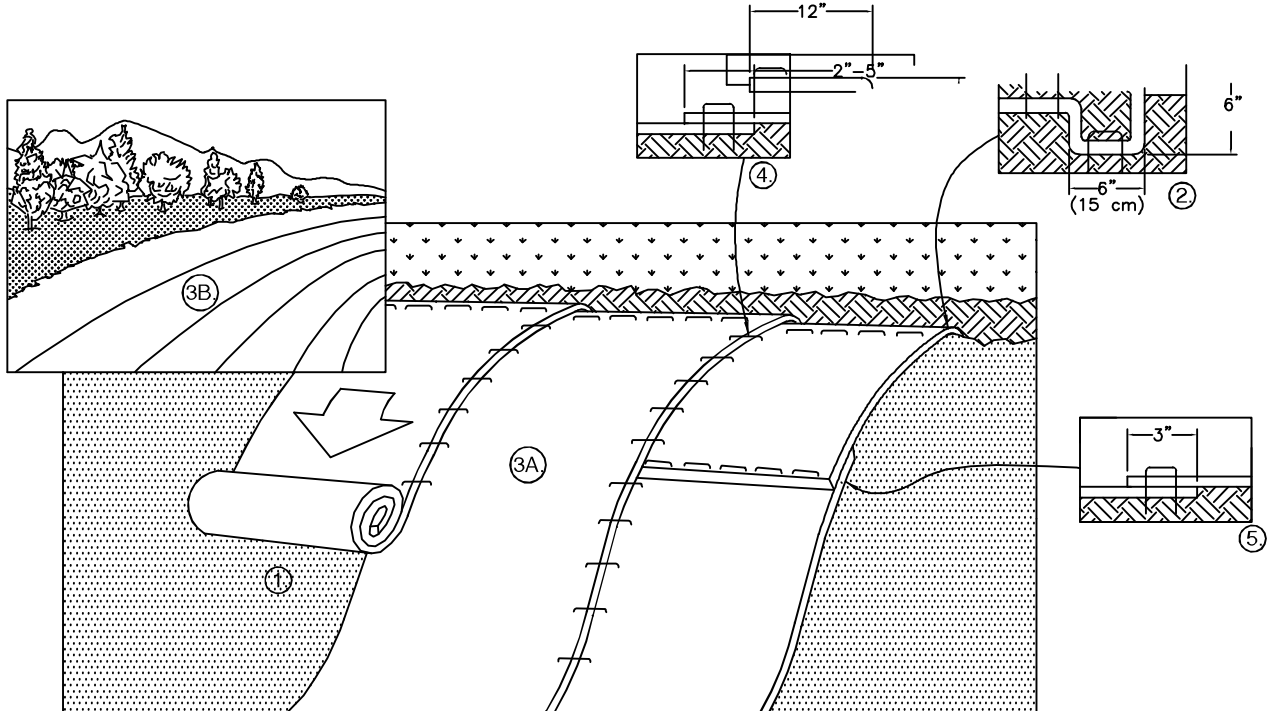
CRITICAL POINTS  
A. OVERLAPS AND SEAMS  
B. PROJECTED WATER LINE  
C. CHANNEL BOTTOM/SIDE  
SLOPE VERTICES

NOTE:  
\* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.  
\*\* IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.



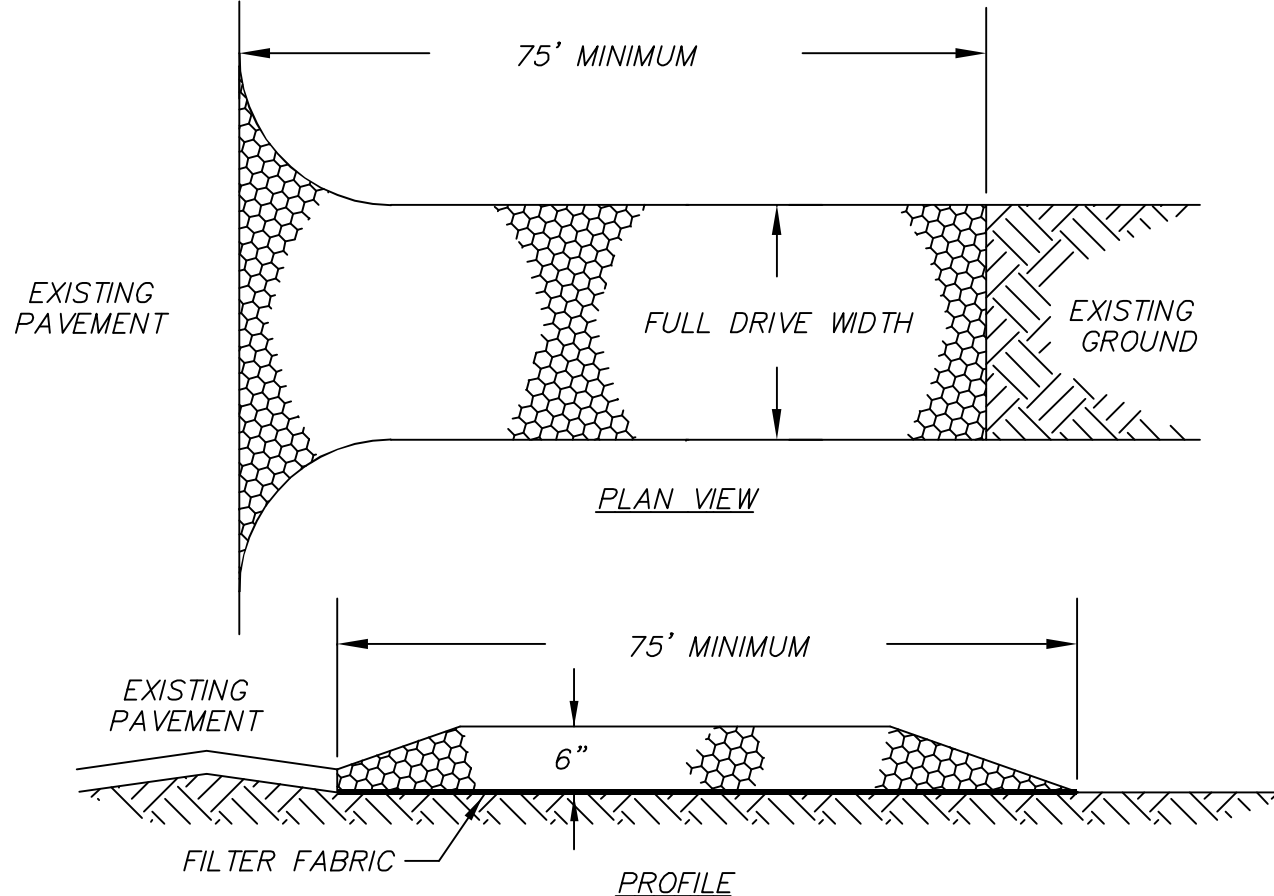
EROSION CONTROL Products  
Guaranteed SOLUTIONS

## SLOPE INSTALLATION NORTH AMERICAN GREEN - SC150BN



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.  
NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.

NOTE:  
1. THE USE OF WELDED PLASTIC OR BIODEGRADABLE PLASTIC NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED. THE USE OF WILDLIFE FRIENDLY ORGANIC MATERIALS IS RECOMMENDED.  
2. ALL EROSION CONTROL MATS SHALL BE INSTALLED ON ALL CUT & FILL SLOPES.



### NOTES:

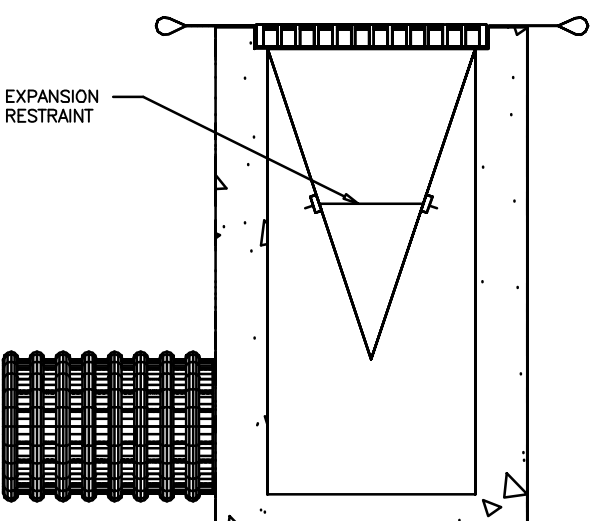
1. SEE EROSION CONTROL NOTES BELOW FOR MATERIAL, INSTALLATION AND MAINTENANCE REQUIREMENTS.
2. TO BE INSTALLED AT EACH POINT OF EGRESS FROM THE WORK AREA.

### STABILIZED CONSTRUCTION ENTRANCE

1. SPECIFICATIONS  
A. AGGREGATE SIZE: USE THREE (3) INCHES STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.  
B. AGGREGATE THICKNESS: NOT LESS THAN SIX (6) INCHES.  
C. WIDTH: TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH OF POINTS WHERE INGRESS OR EGRESS OCCURS.  
D. LENGTH: AS REQUIRED, BUT NOT LESS THAN SEVENTY-FIVE (75) FEET. PIPING OF SURFACE WATER UNDER ENTRANCE SHALL BE PROVIDED AS REQUIRED.  
E. GEOTEXTILE: TO BE PLACED OVER THE ENTIRE AREA TO BE COVERED WITH AGGREGATE.  
F. CRITERIA FOR GEOTEXTILE: THE FABRICS SHALL BE TREVIA SPUNBOND 1135, MIRAFI 600X OR EQUAL.
2. MAINTENANCE  
THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH AGGREGATE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS.

## STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



### INSTALLATION DETAIL

### OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)  
DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK®, WITH A WOVEN PILLOW INSERT.

### SILTSACK® SPECIFICATIONS

NOTE: THE SILTSACK WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.  
AS SUPPLIED BY AH HARRIS OF PORTSMOUTH OR APPROVED EQUAL

### REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

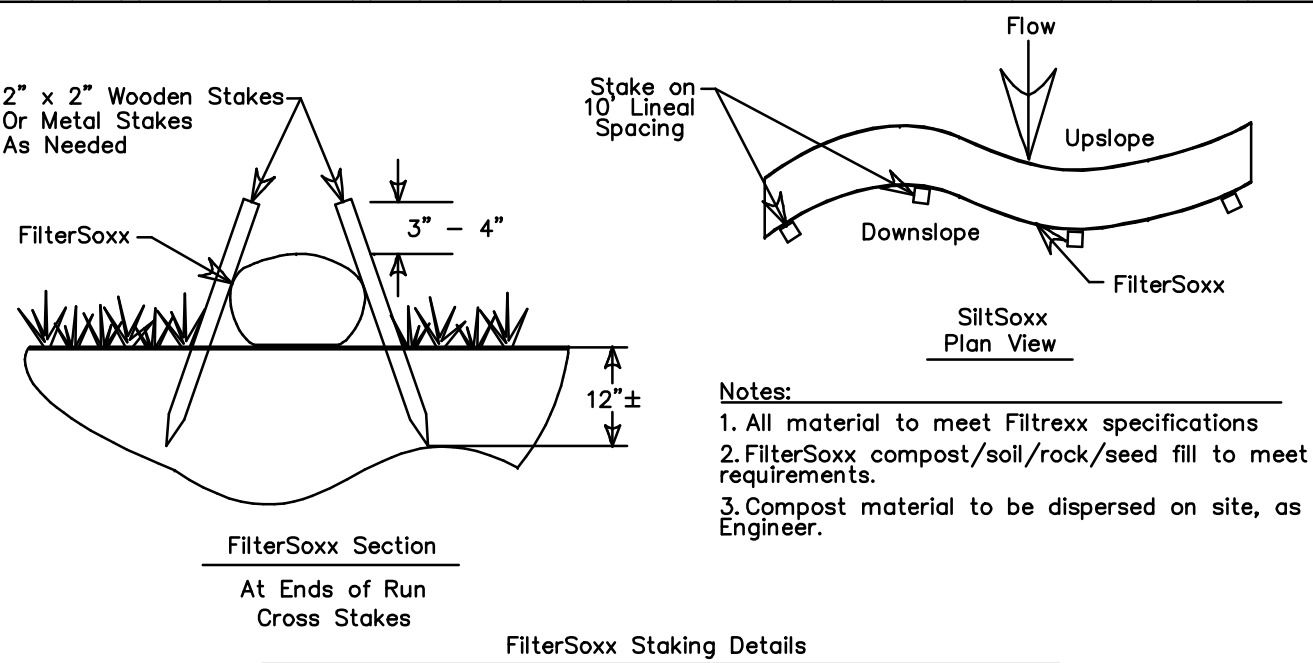
| PROPERTIES              | TEST METHOD | UNITS            |
|-------------------------|-------------|------------------|
| GRAB TENSILE STRENGTH   | ASTM D-4632 | 300 LBS          |
| GRAB TENSILE ELONGATION | ASTM D-4632 | 20 %             |
| PUNCTURE                | ASTM D-4833 | 120 LBS          |
| MULLEN BURST            | ASTM D-3786 | 800 PSI          |
| TRAPEZOID TEAR          | ASTM D-4533 | 120 LBS          |
| UV RESISTANCE           | ASTM D-4355 | 80 %             |
| APPARENT OPENING SIZE   | ASTM D-4751 | 40 US SIEVE      |
| FLOW RATE               | ASTM D-4491 | 40 GAL/MIN/SQ FT |
| PERMITTIVITY            | ASTM D-4491 | 0.55 SEC -1      |

### HI-FLOW SILTSACK®

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

| PROPERTIES              | TEST METHOD | UNITS             |
|-------------------------|-------------|-------------------|
| GRAB TENSILE STRENGTH   | ASTM D-4632 | 265 LBS           |
| GRAB TENSILE ELONGATION | ASTM D-4632 | 20 %              |
| PUNCTURE                | ASTM D-4833 | 135 LBS           |
| MULLEN BURST            | ASTM D-3786 | 420 PSI           |
| TRAPEZOID TEAR          | ASTM D-4533 | 45 LBS            |
| UV RESISTANCE           | ASTM D-4355 | 90 %              |
| APPARENT OPENING SIZE   | ASTM D-4751 | 20 US SIEVE       |
| FLOW RATE               | ASTM D-4491 | 200 GAL/MIN/SQ FT |
| PERMITTIVITY            | ASTM D-4491 | 1.5 SEC -1        |

## DETAIL OF INLET SEDIMENT CONTROL DEVICE

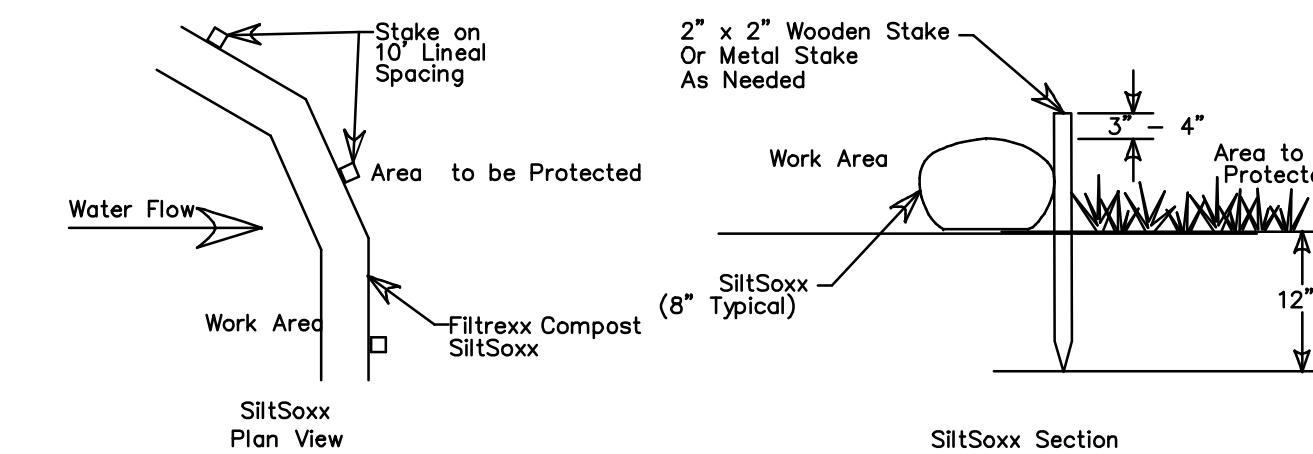


### FilterSocks Section

At Ends of Run

Cross Stakes

FilterSocks Staking Details

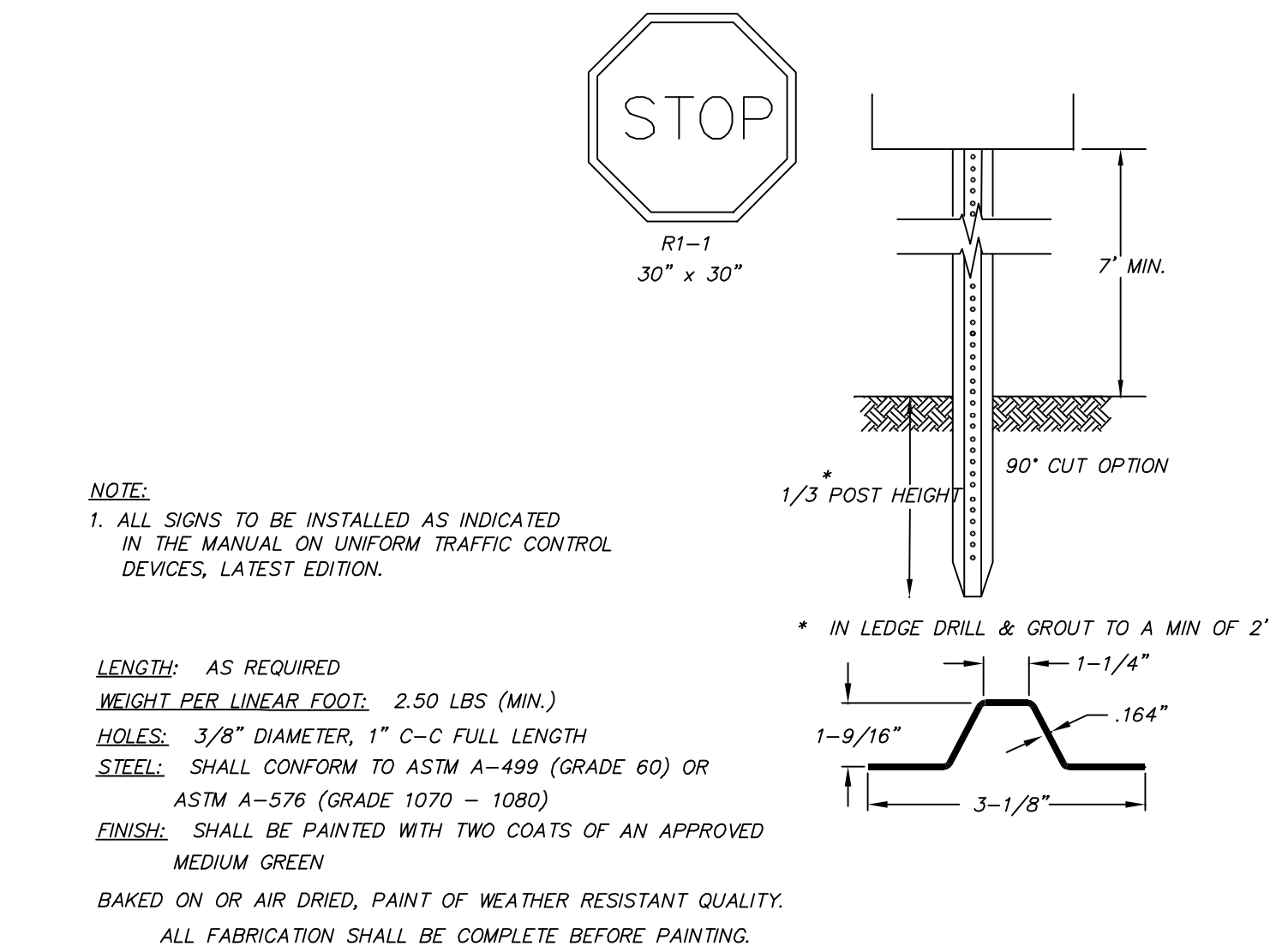


### Notes:

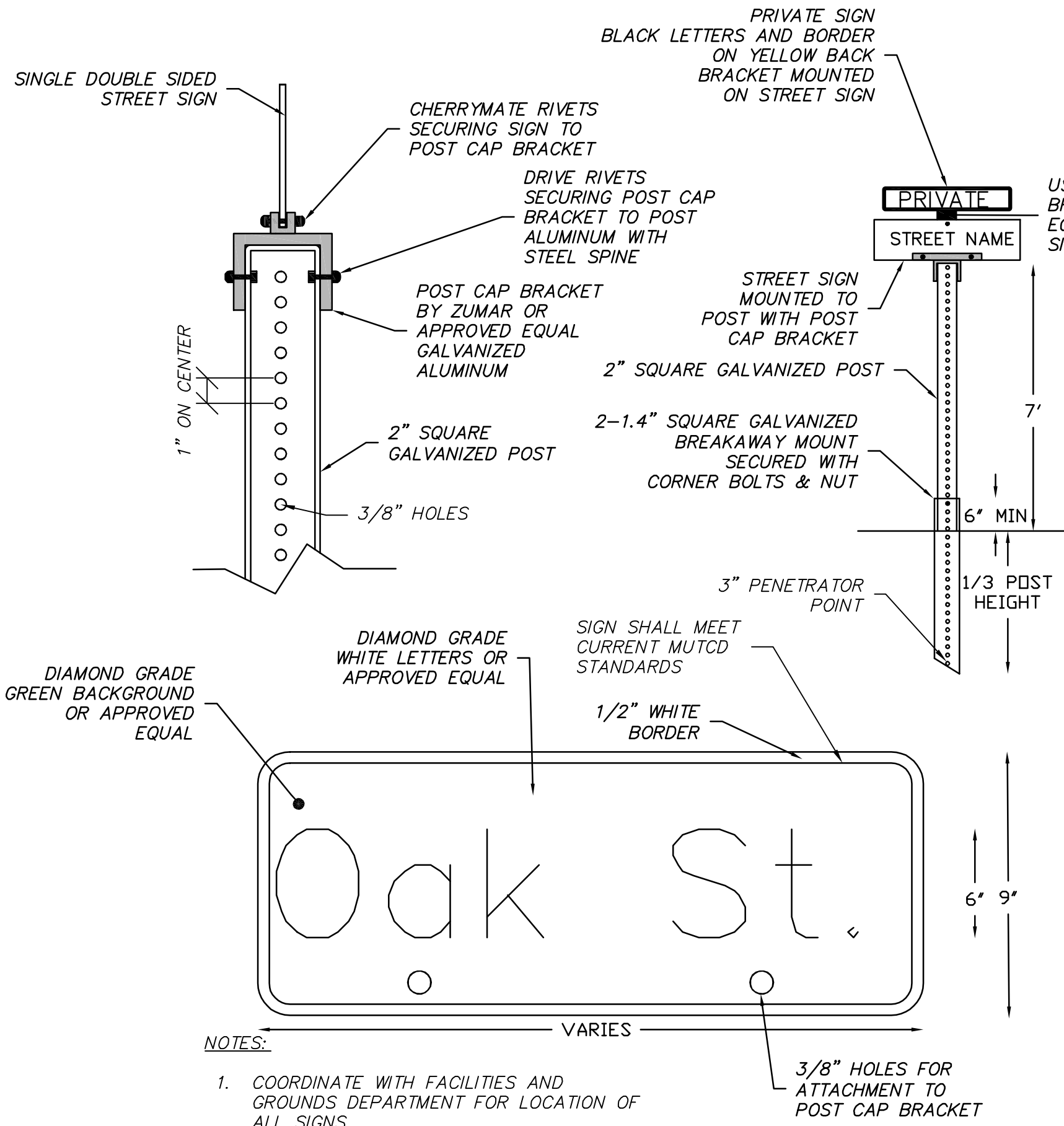
1. All material to meet Filtrxx specifications
2. SiltSocks compost/soil/rock/seed fill to meet application requirements.
3. SiltSocks depicted is for minimum slopes. Greater slopes may require larger socks per the Engineer.
4. Compost material to be dispersed on site, as determined by Engineer.

## SILTSOXX DETAILS

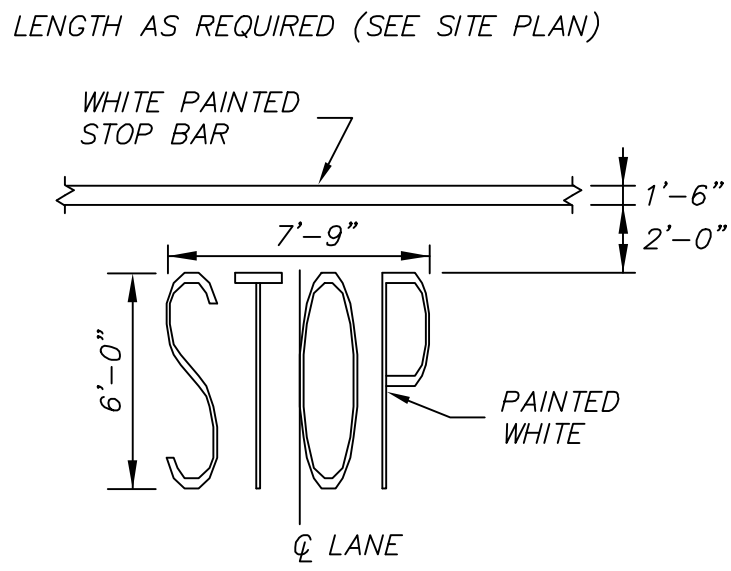
NOT TO SCALE



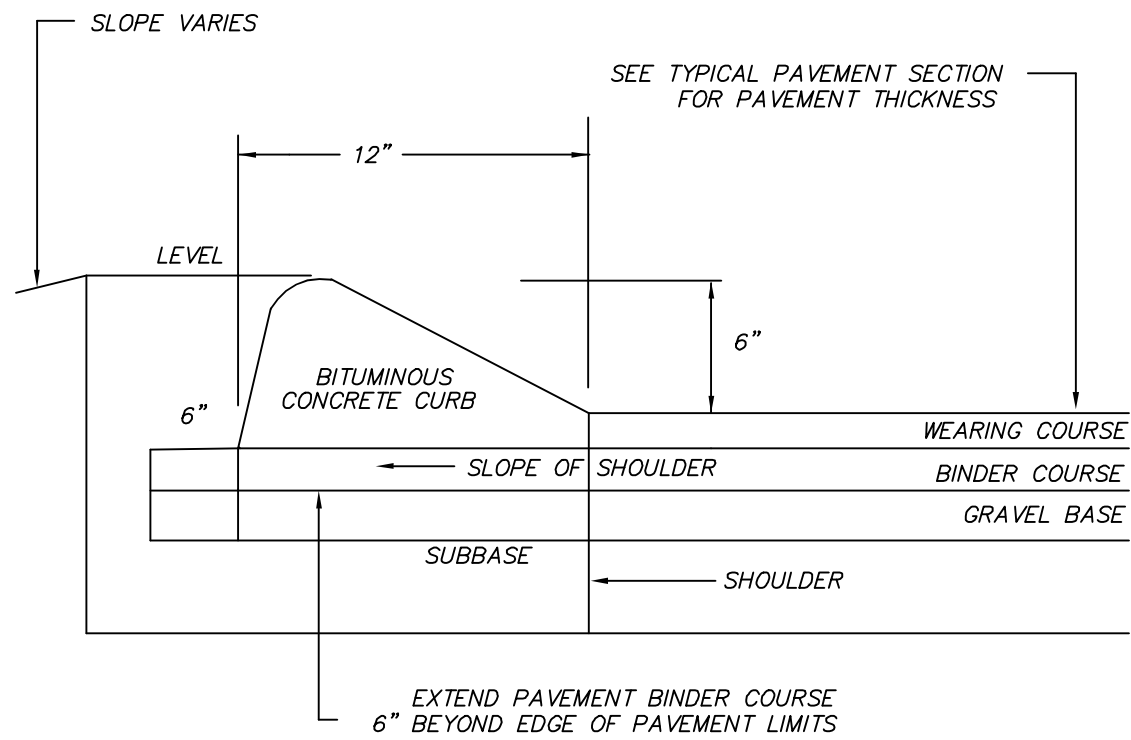
SIGN LEGEND & SIGN POST  
NOT TO SCALE



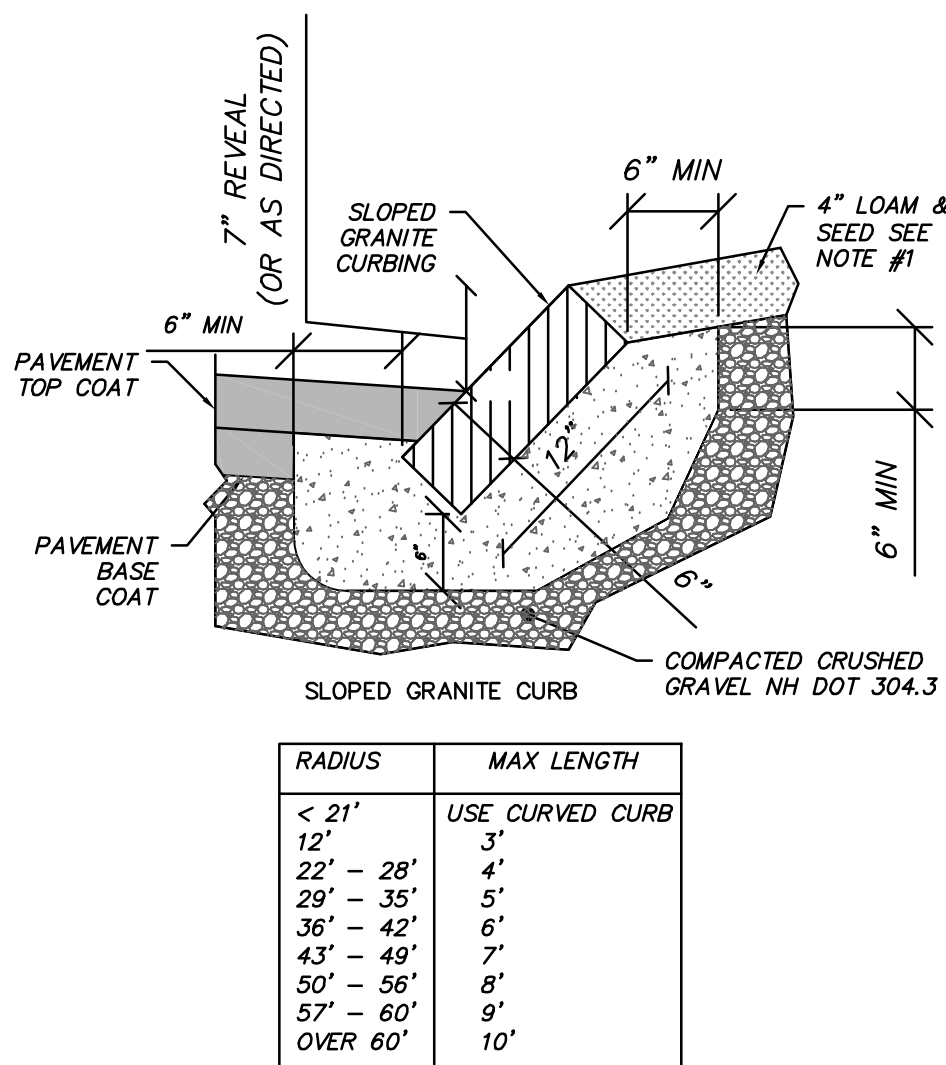
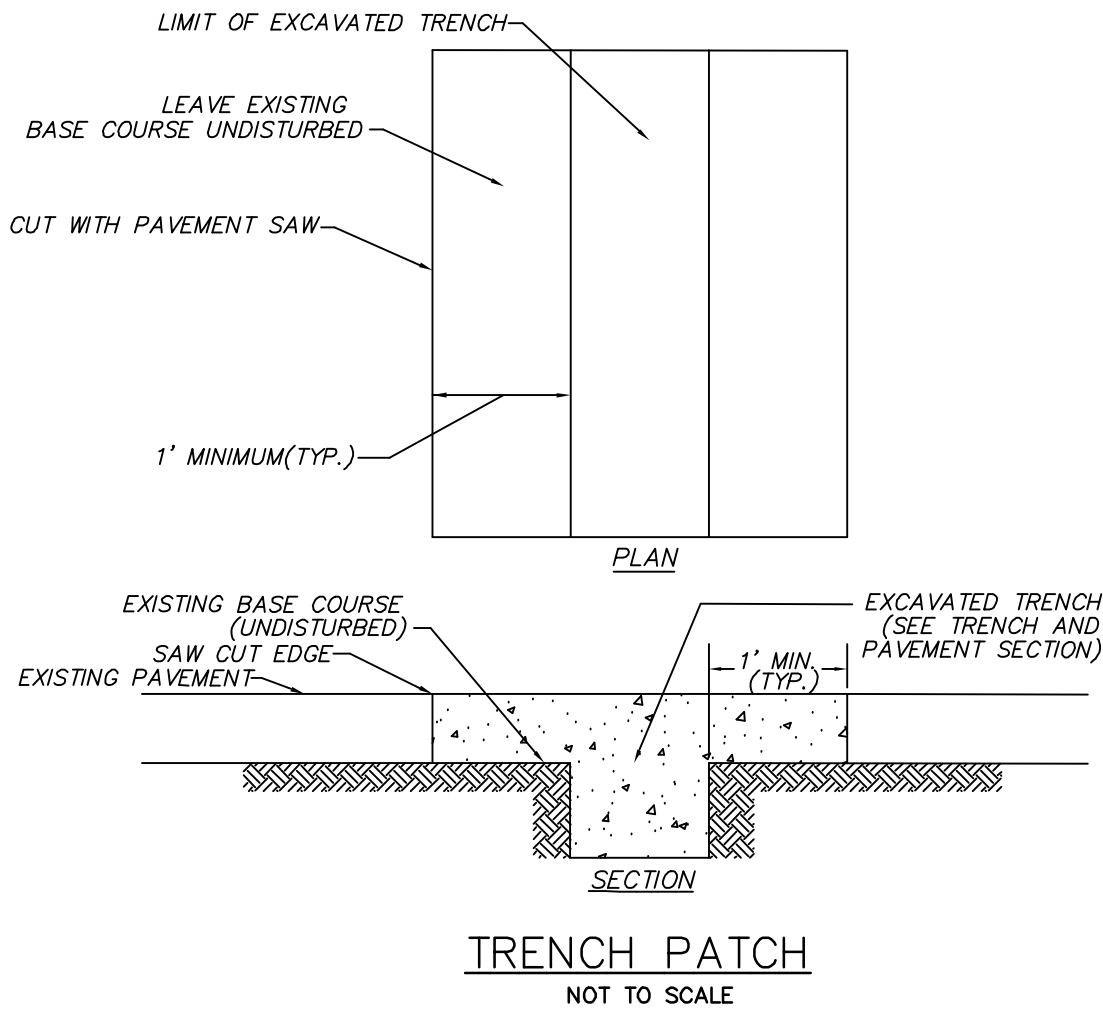
CITY OF DOVER D-1 STREET SIGN DETAIL  
NOT TO SCALE



PAVEMENT MARKINGS  
NOT TO SCALE



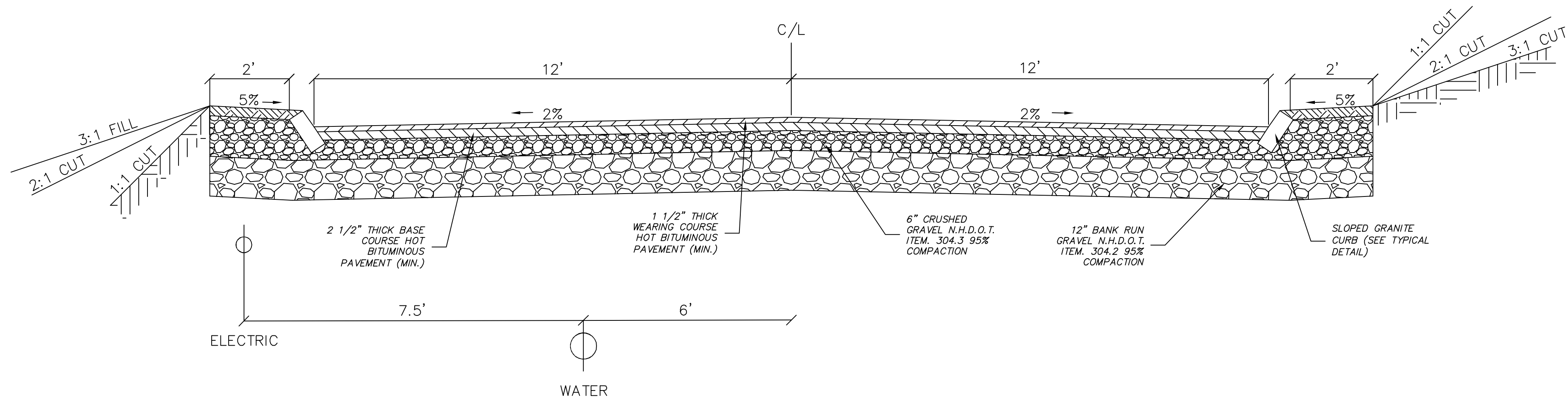
BITUMINOUS SLOPED CURB  
NOT TO SCALE



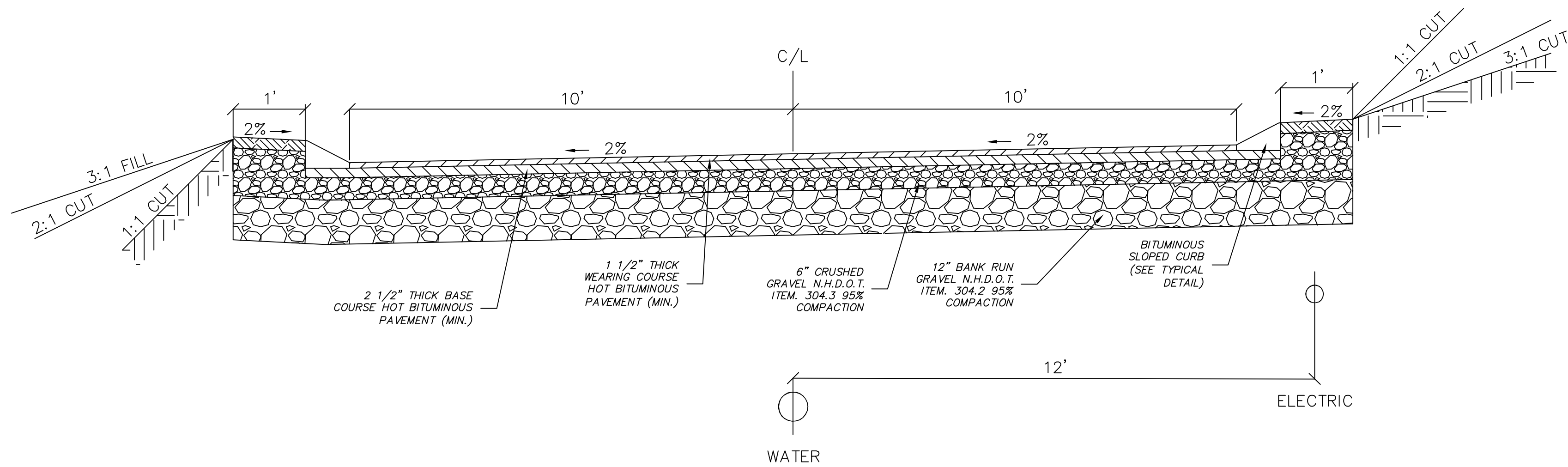
NOTES:  
1. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-8 GRANITE CURB DETAIL  
NOT TO SCALE

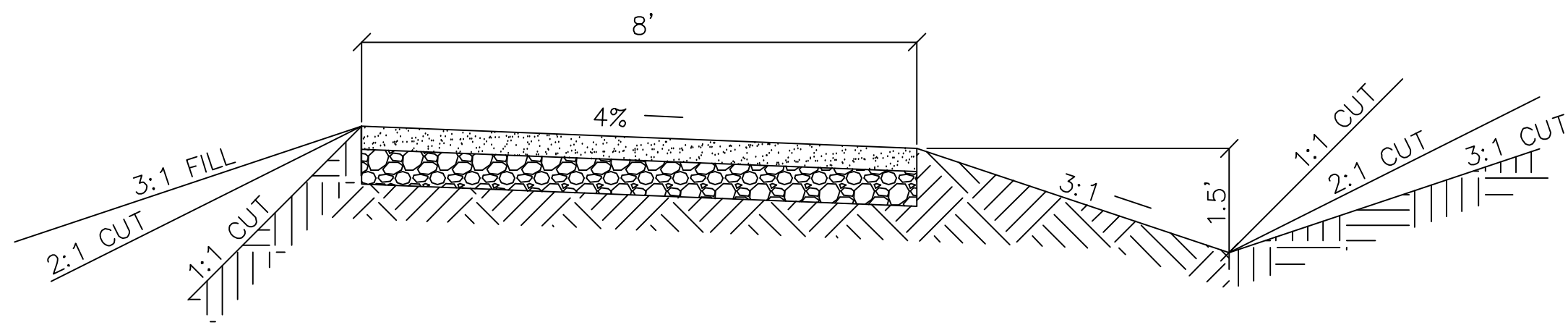
| DETAIL SHEET |          |                                          |            |                                                                       |    |  |  |  |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY |  |  |  |  |  |  |  |  |  |
|--------------|----------|------------------------------------------|------------|-----------------------------------------------------------------------|----|--|--|--|--|------------------------------------------|--|--|--|--|--|--|--|--|--|
| 26           | PROJECT: | EMERSON RIDGE<br>OAK STREET<br>DOVER, NH | APPLICANT: | CHINBURG<br>DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | DATE: 2-22-23                                                         |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | SCALE: AS SHOWN                                                       |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | DRAWN BY: CAD                                                         |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | DESIGN BY: JRG                                                        |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | APPROVED BY: JRG                                                      |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | PROJECT NO: 21074                                                     |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | FILE: SITE                                                            |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
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|              |          |                                          |            | REVISION                                                              |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
|              |          |                                          |            | APP'D                                                                 |    |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |
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|              |          |                                          |            |                                                                       | </ |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  |



"OLD OAK STREET" CROSS SECTION TYPICAL  
NOT TO SCALE



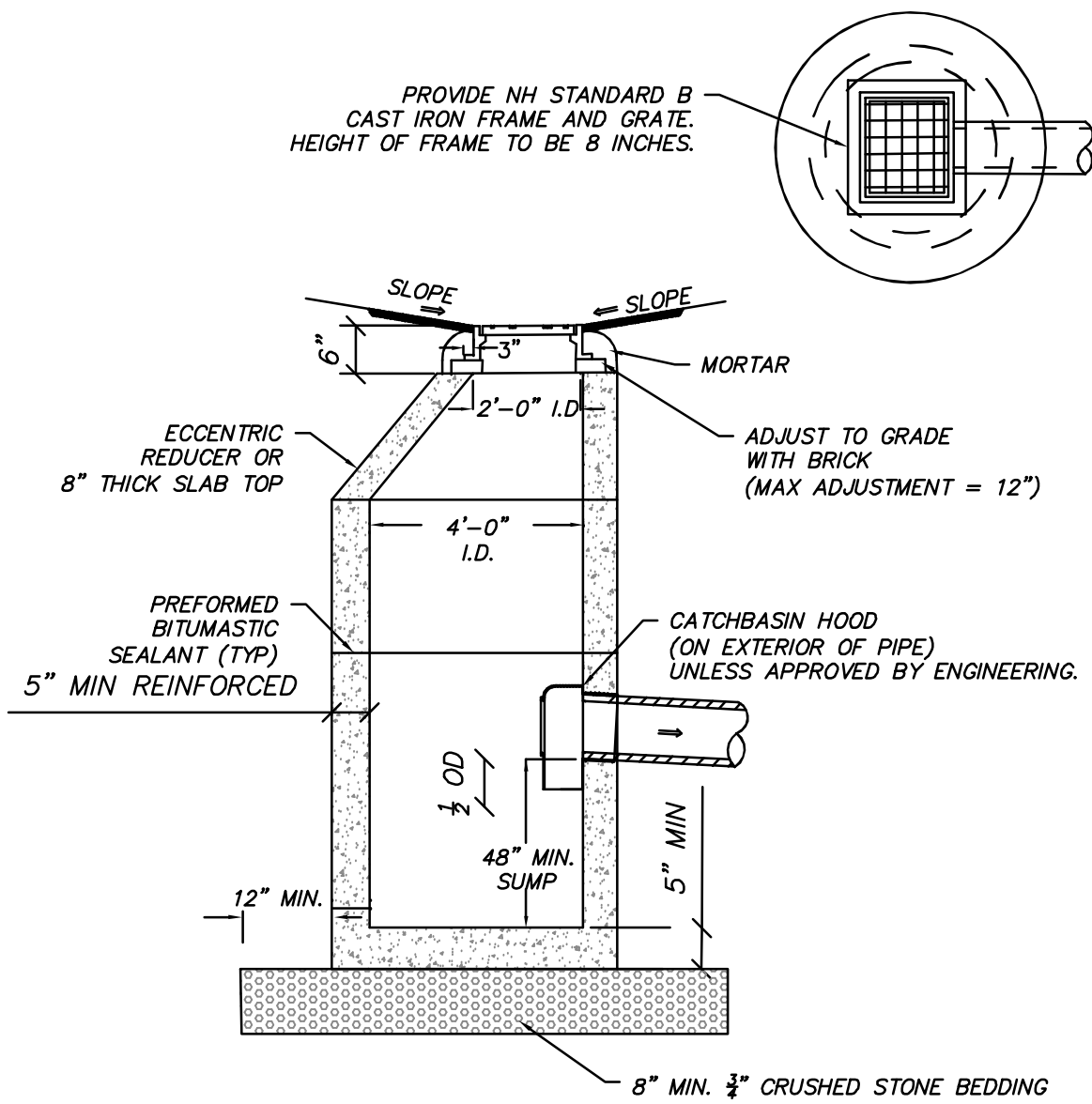
PRIVATE ROAD CROSS SECTION TYPICAL  
NOT TO SCALE



EARTH REINFORCED ACCESS ROAD TO DRAINAGE POND  
NOT TO SCALE

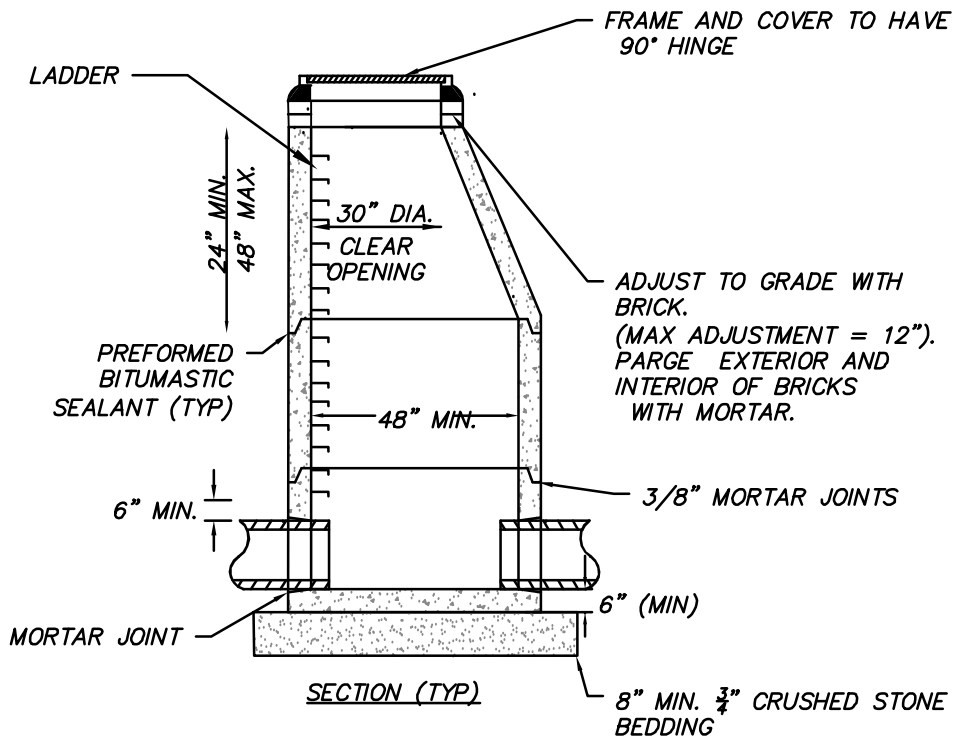
|              |          |                                                                                                                           |                   |       |          |
|--------------|----------|---------------------------------------------------------------------------------------------------------------------------|-------------------|-------|----------|
| DETAIL SHEET |          | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                                                                                  |                   |       |          |
| 27           | PROJECT: | APPLICANT:<br><br>CHINBURG<br>DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857                                   | DATE: 2-22-23     |       |          |
|              |          |                                                                                                                           | SCALE: AS SHOWN   |       |          |
|              |          |                                                                                                                           | DRAWN BY: CAD     |       |          |
|              |          |                                                                                                                           | DESIGN BY: JRG    |       |          |
|              |          |                                                                                                                           | APPROVED BY:SHJ   |       |          |
|              |          |                                                                                                                           | PROJECT NO: 21074 |       |          |
|              |          |                                                                                                                           | FILE: SITE        |       |          |
|              |          |                                                                                                                           |                   | APP'D | REVISION |
|              |          | CIVILWORKS NEW ENGLAND<br>ONE GARDEN STREET<br>181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |                   |       |          |



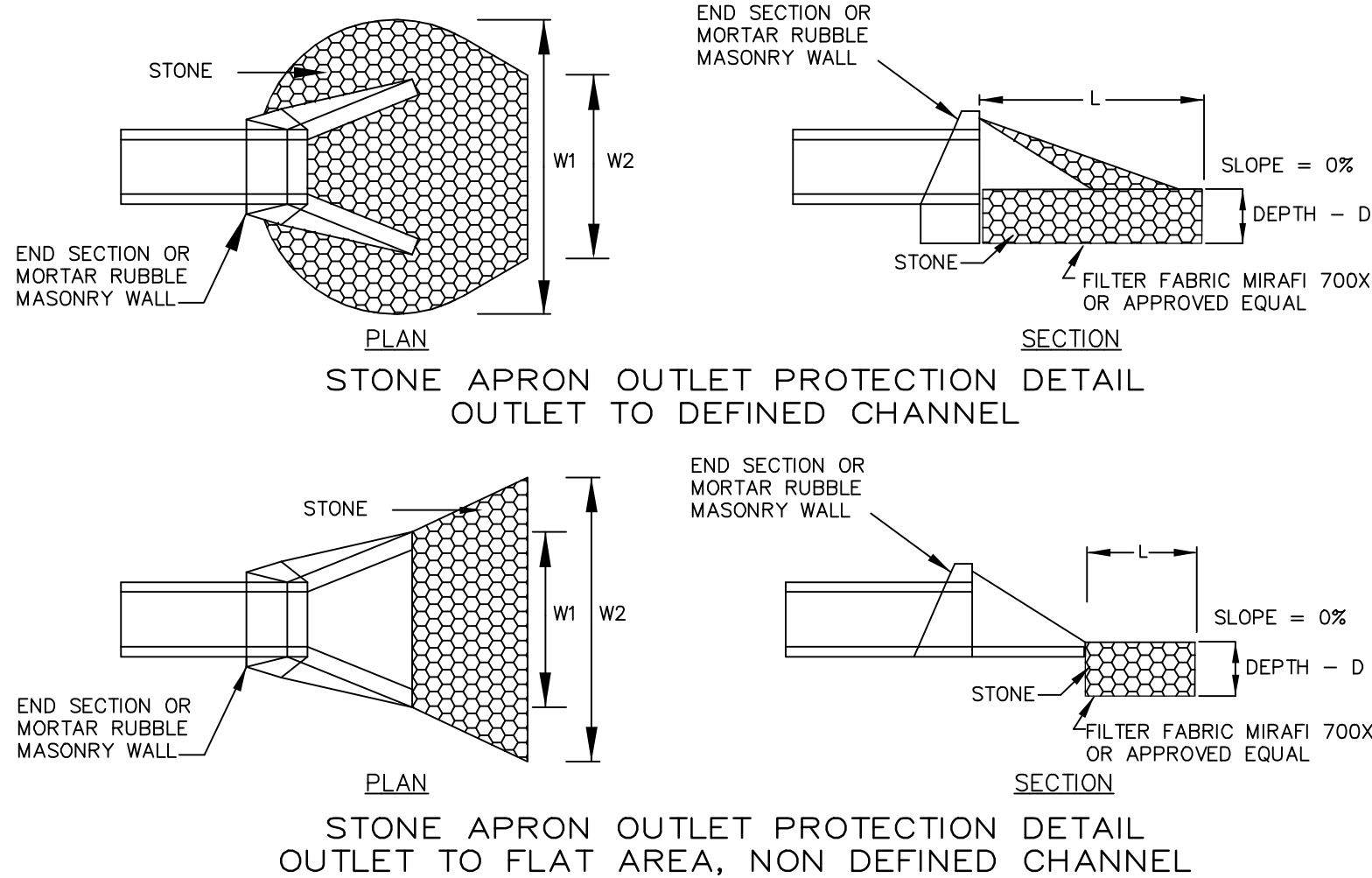


- NOTES:
- ENTIRE STRUCTURE SHALL BE H-20 LOAD RATED. PROVIDE MANUFACTURER REINFORCEMENT DETAILS TO THE CITY ENGINEER UPON REQUEST.

CITY OF DOVER D-19  
CATCHBASIN DETAIL  
NOT TO SCALE



- NOTES:
- CORINGS TO BE SEPARATED BY 6" (MINIMUM) OF MONOLITHIC SECTION
- CITY OF DOVER D-20  
DRAIN MANHOLE DETAIL  
NOT TO SCALE



MAINTENANCE

THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIPRAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

| STONE GRADATION                         |  |                |
|-----------------------------------------|--|----------------|
| % OF WEIGHT SMALLER THAN THE GIVEN SIZE |  | SIZE OF STONE  |
| 100                                     |  | 1.5 TO 2.0 D50 |
| 85                                      |  | 1.3 TO 1.8 D50 |
| 50                                      |  | 1.0 TO 1.5 D50 |
| 15                                      |  | 0.3 TO 0.5 D50 |

CONSTRUCTION SPECIFICATIONS

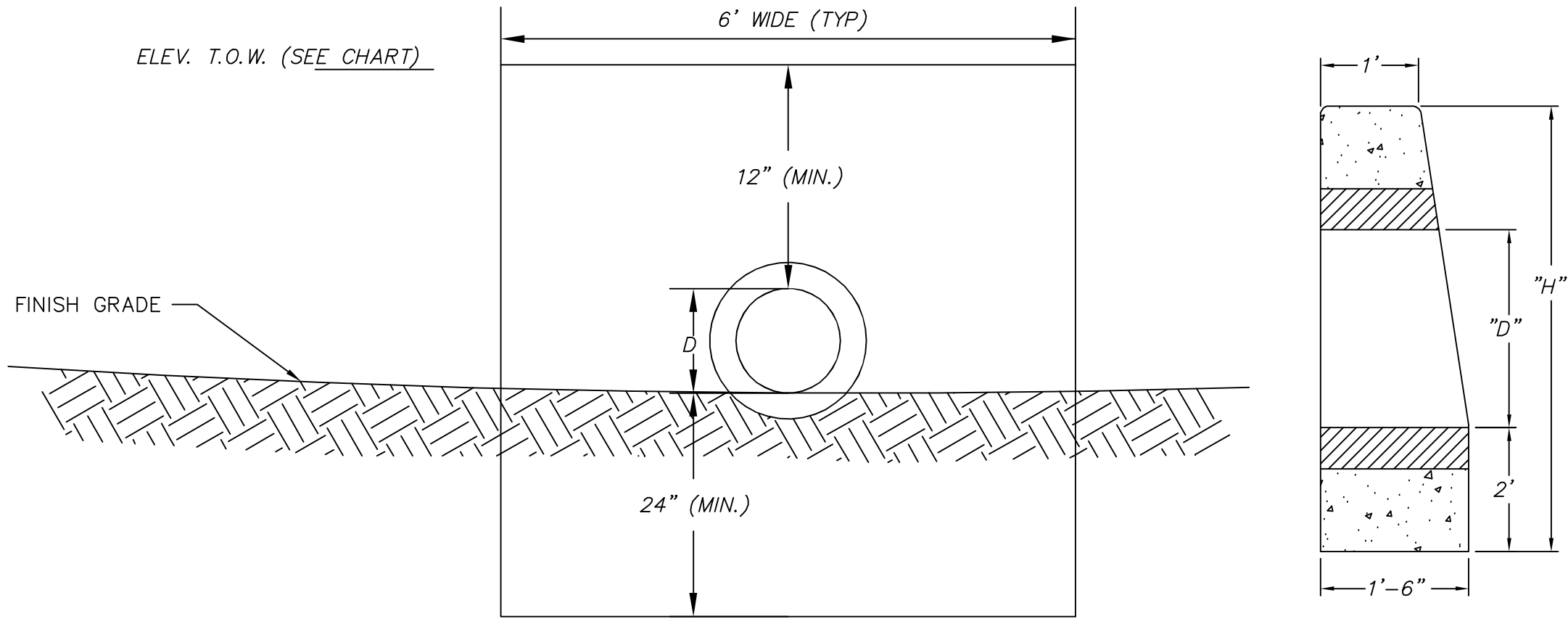
- THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
- THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
- GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. 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 JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
- 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.

| OUTLET FROM | W1<ft> | W2<ft> | L<ft> | D <ft> | D50<IN> | CHANNEL TYPE |
|-------------|--------|--------|-------|--------|---------|--------------|
| DS-1        | 4      | 17     | 14    | 1      | 6       | UNDEFINED    |
| DS-2        | 4      | 19     | 16    | 1      | 6       | UNDEFINED    |
| PCB1        | 15     | 6      | 19    | 1      | 6       | DEFINED      |

RIP RAP OUTLET PROTECTION  
NOT TO SCALE

SPECIFICATIONS

- All construction shall conform with the State of New Hampshire Department of Transportation (NHDOT), "Standard Specifications for Road and Bridge Construction", hereinafter referred to as the "Standard Specifications".
- Storm drains shall be ADS N12 or approved equal, and shall be jointed with neoprene "O" rings.
- Catch basins and manholes shall be pre-cast reinforced concrete designed by an engineer registered in New Hampshire, and able to withstand loadings of 8 tons (H20 Loading).
- Manholes shall have cast iron frames and covers with 30" inside diameter openings. A 3-inch (minimum) letter "D" for drain shall be plainly cast into the center of each cover.
- Catch basins and manholes shall be adjusted to grade with courses of brick. Maximum adjustment to grade shall be 12 inches. Frames shall be set on a full bed of mortar, true to grade and concentric with the masonry. All voids between the top of the structure and the bottom flange of the frame shall be completely filled to make a watertight fit. A ring of mortar at least one inch thick and pitched to shed water away from the frame, shall be placed over and around the outside of the bottom flange. The mortar shall extend to the outer edge of the masonry all around its circumference and shall be finished smooth. No visible leakage will be permitted.
- Invert channels of sewer manholes shall be formed smoothly to the largest pipe radius. Changes in grade shall be formed smoothly and evenly. The floor of the structure outside the channels shall be sloped towards the channels at approximately 1/2 inch per foot. The floor at the channel shall match the crown of the largest pipe.
- Trench construction will conform with Section 603.3.1 of the Standard Specifications (1974).
- Wood sheeting or a suitable trench box shall be used to support the trench as necessary. If wood sheeting is used, it shall be driven at a distance of 1 foot from the outside diameter of the pipe to a depth 6 inches below the invert of the pipe. Wood sheeting shall be cut off and left in place to an elevation not less than 1 foot above the top of the pipe, but not greater than 3 feet below the finished grade.
- Bedding shall conform with Section 603.3.2 of the Standard Specifications (1974).
- Backfill material will conform with Section 603.3.5 of the Standard Specifications (1974) and, in addition, shall exclude debris, pieces of pavement, organic matter, top soil, all wet or soft muck, peat or clay, all excavated ledge material, frozen material, all rocks over 6 inches in largest dimension, or any material which, as determined by the Engineer, will not provide sufficient support or maintain the completed construction in a stable condition. Backfill shall not be placed on frozen or previously frozen material.
- All backfill and bedding compaction shall meet the requirements of AASHTO T 99 Method C. Density shall be 95 percent. Compaction shall be 6 inch lifts for bedding and backfill to a plane 1 foot above the pipe and in 12 inch lifts thereafter by an approved mechanical compactor.
- Should frozen material be encountered, it shall not be placed in the backfill nor shall backfill be placed upon frozen material. Previously frozen material shall be removed as required before new backfill is placed.
- The Contractor shall be responsible for any damage to frames and grates during and from the time of removal from the existing structure to and during the time of resetting, and shall replace in kind any damaged frames or grates at no additional compensation.
- All trenches will be covered and debris, including any rejected materials, shall be removed daily. Strict safety precautions shall be maintained at all times.
- Location of utilities shown on the plans are approximate.
  - The Contractor shall, 48 hours prior to construction, notify the utility companies and have all utilities in the vicinity of the construction marked in the field.
  - After the utilities have been located and prior to construction, the Contractor with the Engineer, shall layout the proposed drainage system in the field and rectify any utility conflicts which may be found.
  - Any conflicts with utilities found during construction by the Contractor shall be immediately brought to the attention of the Engineer and the Utility Company and properly rectified.
  - The Contractor is responsible for the cost of repair for any utilities damaged during construction. The Contractor shall contact the Utility Company to repair any damages, however, the Contractor may make appropriate repairs with the Utility Company's permission.
- Complete shop drawings for pipe, manholes, catch basins, frames, grates and covers shall be submitted in triplicate for approval by the Engineer prior to the start of construction. Each shop drawing shall be checked and initialized by the Contractor to indicate approval before it is submitted to the Engineer.
- Shop drawings for flat concrete covers shall be stamped prior to submission for approval by a New Hampshire Registered Professional Engineer.
- Brick masonry for setting frames and brick and mortar plugs shall conform to the Standard Specification Section 604.2.4.

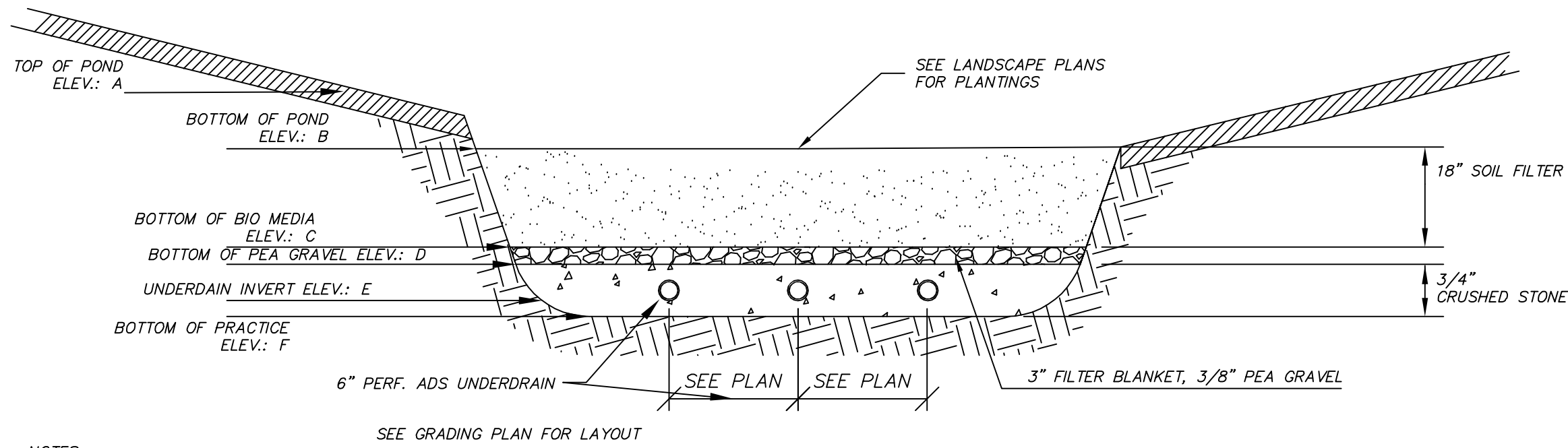


HEADWALL DETAIL CHART

| HEADWALL | T.O.W. | D   | INV.  | H    |
|----------|--------|-----|-------|------|
| HW-1     | 119.5  | 18" | 117.0 | 4.5' |
| HW-2     | 116.5  | 15" | 114.0 | 4.5' |
| HW-3     | 93.5   | 15" | 91.0  | 4.5' |

HEADWALL DETAIL TYPICAL  
NOT TO SCALE

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| DETAIL SHEET |          |  |            |  |  |  |  |  |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 29           | PROJECT: |  | APPLICANT: |  |  |  |  |  |  |                                          |  |  |  |  |  |  |  |  |  | DATE: 2-22-23 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



- NOTES:
- DO NOT BEGIN CONSTRUCTION OF THE BIORETENTION AREAS UNTIL LAWN AREA ON THE ENTIRE SITE AREA ESTABLISHED WITH AT LEAST 80 PERCENT TURF. FILTER ALL DRAIN INLETS IN THE SEDIMENT FOREBAYS TO PREVENT SILTATION INTO THE BIORETENTION AREA.
  - THE RAIN GARDEN SUBGRADE SHALL BE EXCAVATED TO THE DESIGN DEPTH PLUS TWO (2) INCHES. AT THAT DEPTH FOUR (4) INCHES OF COMPOST SHALL BE TILLED INTO THE EXISTING SOILS SUCH THAT THE SOILS ARE WELL MIXED.
  - DO NOT DRIVE CONSTRUCTION EQUIPMENT ON FILTER SUBGRADE NOR ON THE FILTER MATERIAL. INSTALL FILTER MATERIAL BY MEANS OF AN EXCAVATOR LOCATED ADJACENT TO THE FILTER AREA.
  - MATERIALS: CRUSHED STONE LAYER SHALL MEET NHDOT 304.4. PEA STONE SHALL CONTAIN NO MORE THAN 5% FINES PASSING THE #200 SIEVE. TOPSOIL SHALL CONTAIN 15 TO 25% FINES PASSING THE #200 SIEVE. MULCH SHALL BE SHREDDED HARDWOOD, AGES IN A STOCKPILE OR STORED FOR AT LEAST 12 MONTH. NON-WOVEN GEOTEXTILE BE 4 TO 6 OZ. PER SQUARE YARD WITH A.O.S. OF #70 SIEVE OR LOWER, AND A MINIMUM FLOW RATE OF 125 GAL PER SQUARE FEET. UNDERDRAIN SHALL BE PERFORMED 6" PVC OR TRIPLE WALL PE PIPE.
  - REFER TO LANDSCAPE DRAWINGS FOR GRASS SEED MIXES AND PLANTINGS. FERTILIZATION OF THE FILTER AREA SHALL BE AVOIDED UNLESS ABSOLUTELY NECESSARY TO ESTABLISH VEGETATION.
  - INITIAL ESTABLISHMENT: DURING THE FIRST 2-3 MONTHS OF ESTABLISHMENT WATER THE GRASS ON A WEEKLY BASIS (TO SUPPLEMENT RAINFALL FOR TOTAL OF 1 INCH PER WEEK).
  - ANNUAL MAINTENANCE: IN THE SPRING OF EACH YEAR, ANY DEAD VEGETATION SHALL BE REMOVED TO ALLOW FOR NEW GROWTH, AND ANY ACCUMULATED SEDIMENT (NORMALLY AT THE ENTRANCE TO THE GARDEN) SHALL ALSO BE REMOVED. DURING THE GROWING SEASON THE RAIN GARDEN SHALL BE WEDED TWO (2) TIMES. TURF AT FILTER SHALL BE MOWED NO MORE THAN 3 TIMES PER GROWING SEASON. IF WATER PONDS ON THE SURFACE FOR MORE THAN 24 HOURS DURING THE FIRST YEAR OR 72 HOURS THEREAFTER, THE FILTER SURFACE SHALL BE AERATED WITH DEEP TINES OR THE SURFACE REPLACED.
  - GRASS SEED SHALL BE NATIVE NON-INVASIVE SPECIES, SEE LANDSCAPE ARCHITECT DRAWINGS.

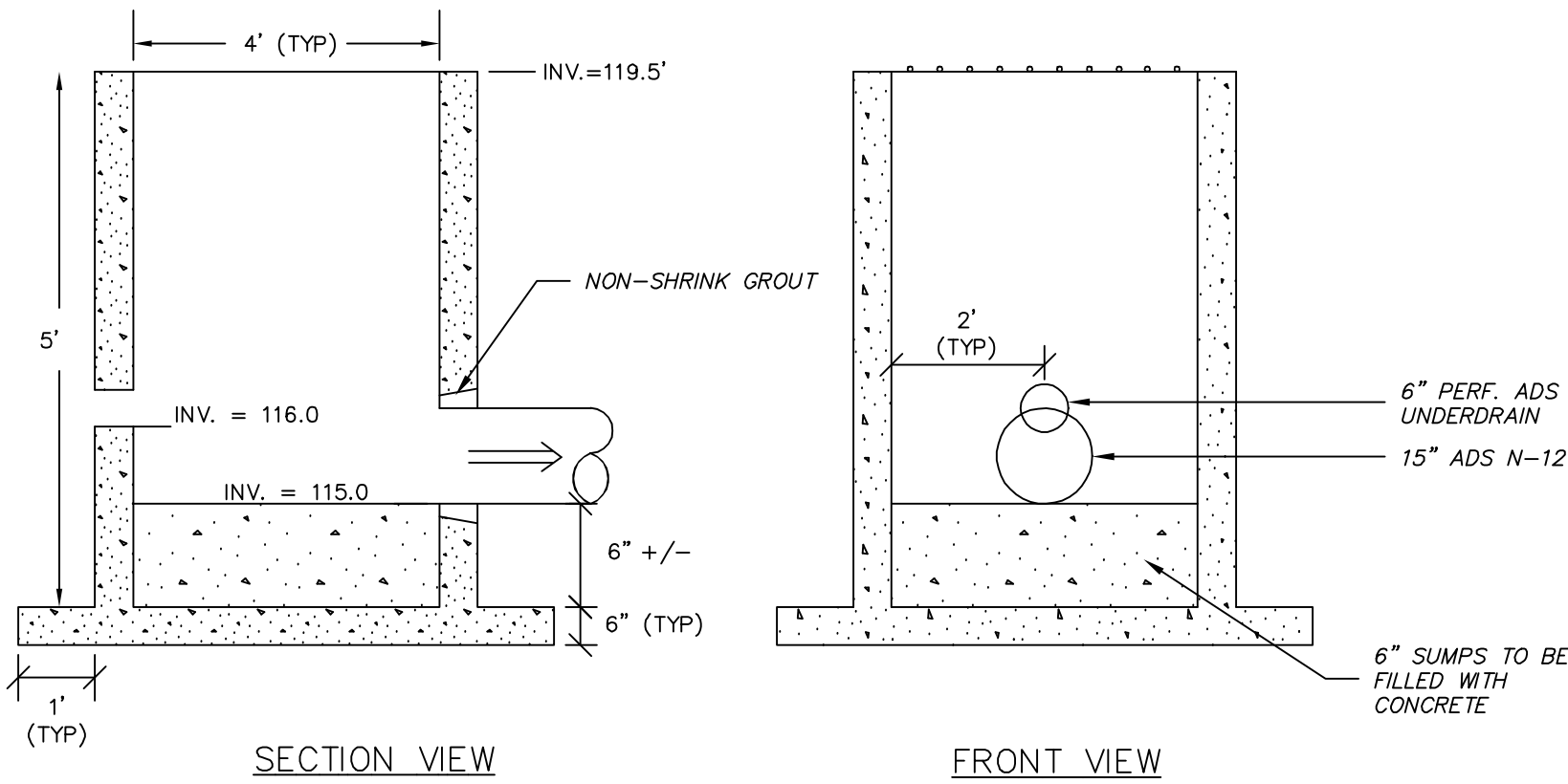
PROPOSED TYPICAL BIO-RETENTION BASIN DETAIL

(SEE GRADING PLAN FOR LOCATION)  
NOT TO SCALE

| BIORETENTION FILTER MEDIA SPECIFICATIONS                                         |                                 |                       |                                             |
|----------------------------------------------------------------------------------|---------------------------------|-----------------------|---------------------------------------------|
| COMPONENT MATERIAL                                                               | PERCENT OF MIXTURE<br>BY VOLUME | GRADATION OF MATERIAL |                                             |
|                                                                                  |                                 | SIEVE NO.             | PERCENT BY WEIGHT<br>PASSING STANDARD SIEVE |
| FILTER MEDIA OPTION A                                                            |                                 |                       |                                             |
| ASTM C-33 CONCRETE SAND                                                          | 50 TO 55                        |                       |                                             |
| LOAMY SAND TOPSOIL,<br>WITH FINES AS INDICATED                                   | 20 TO 30                        | 200                   | 15 TO 25                                    |
| MODERATELY FINE SHREDDED<br>BARK OR WOOD FIBER MULCH,<br>WITH FINES AS INDICATED | 20 TO 30                        | 200                   | < 5                                         |
| FILTER MEDIA OPTION B                                                            |                                 |                       |                                             |
| MODERATELY FINE SHREDDED<br>BARK OR WOOD FIBER MULCH,<br>WITH FINES AS INDICATED | 20 TO 30                        | 200                   | < 5                                         |
| LOAMY COARSE SAND                                                                | 70 TO 80                        | 10                    | 85 TO 100                                   |
|                                                                                  |                                 | 20                    | 70 TO 100                                   |
|                                                                                  |                                 | 60                    | 15 TO 40                                    |
|                                                                                  |                                 | 200                   | 8 TO 15                                     |

BIO-RETENTION SYSTEM CHART

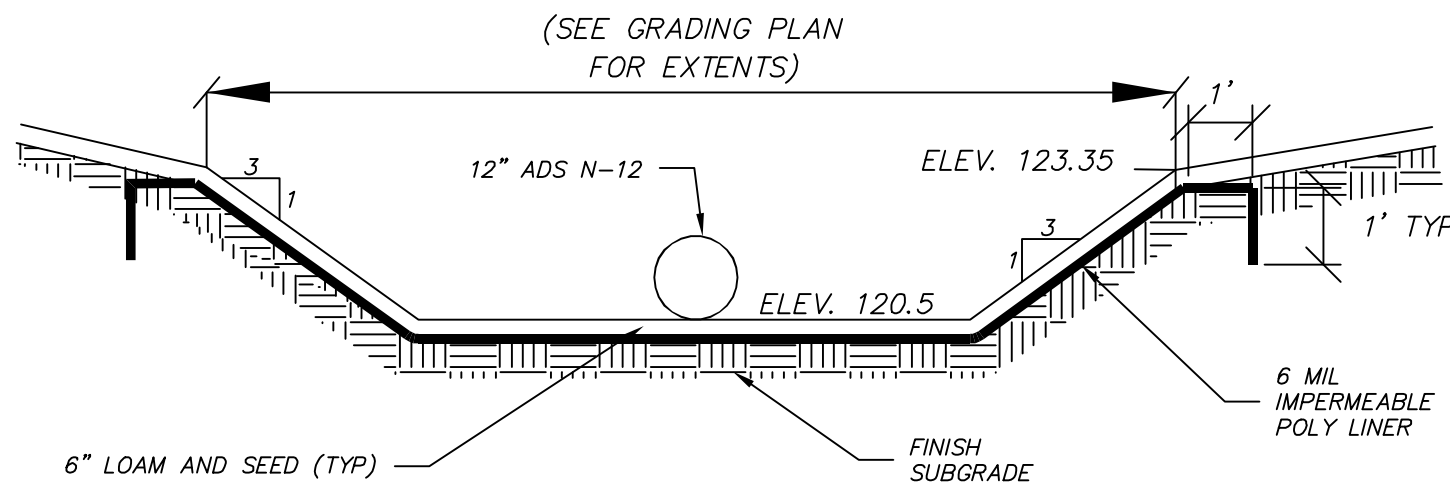
| POND | POND ELEVATION |       |       |        |       |        |
|------|----------------|-------|-------|--------|-------|--------|
|      | A              | B     | C     | D      | E     | F      |
| BI01 | 120.25         | 118.5 | 117.0 | 116.75 | 116.0 | 115.75 |
| BI02 | 100.25         | 98.5  | 97.0  | 96.75  | 96.0  | 95.75  |



- NOTE:
- ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
  - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.

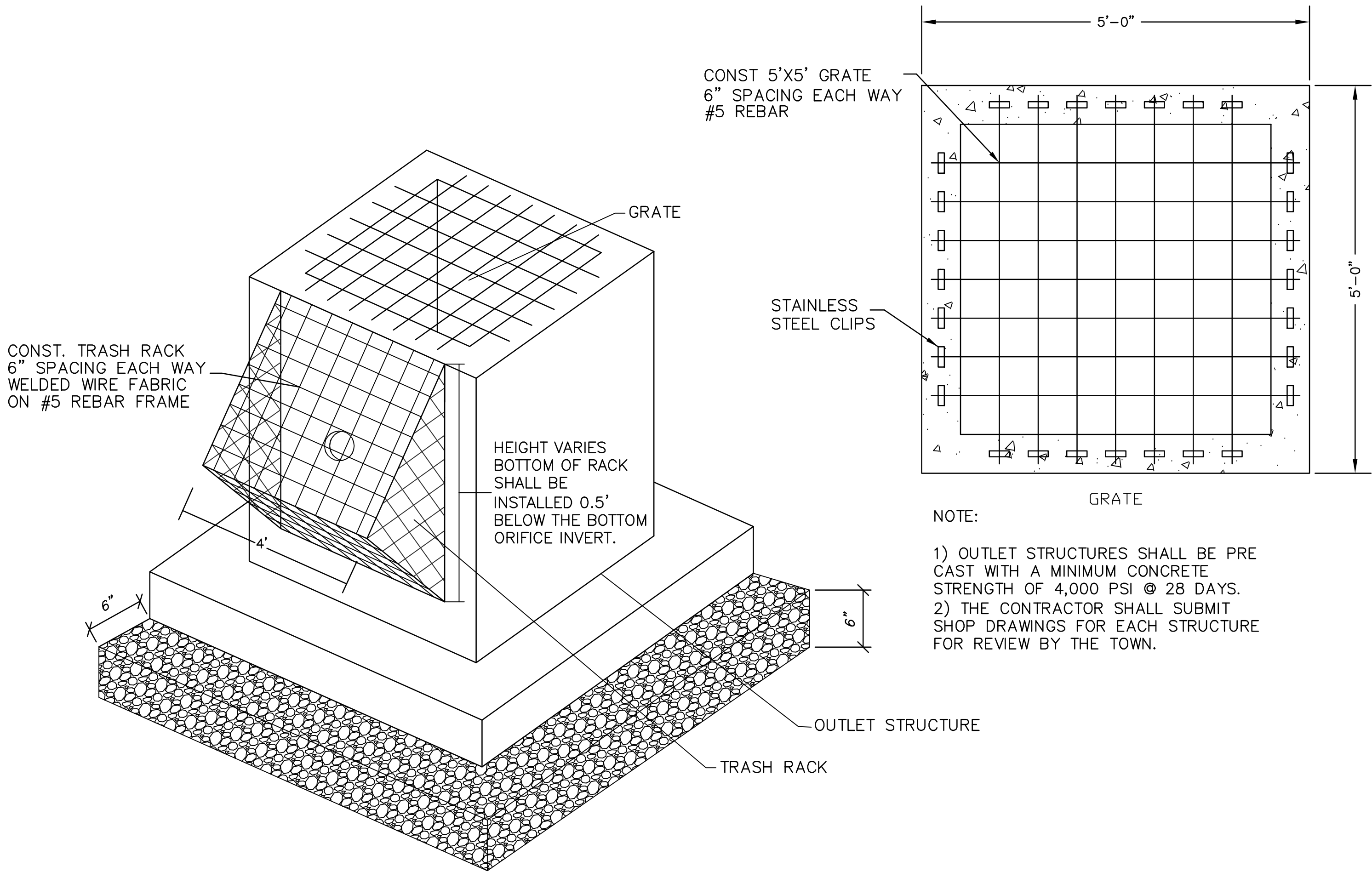
OS-1 OUTLET STRUCTURE DETAIL

NOT TO SCALE



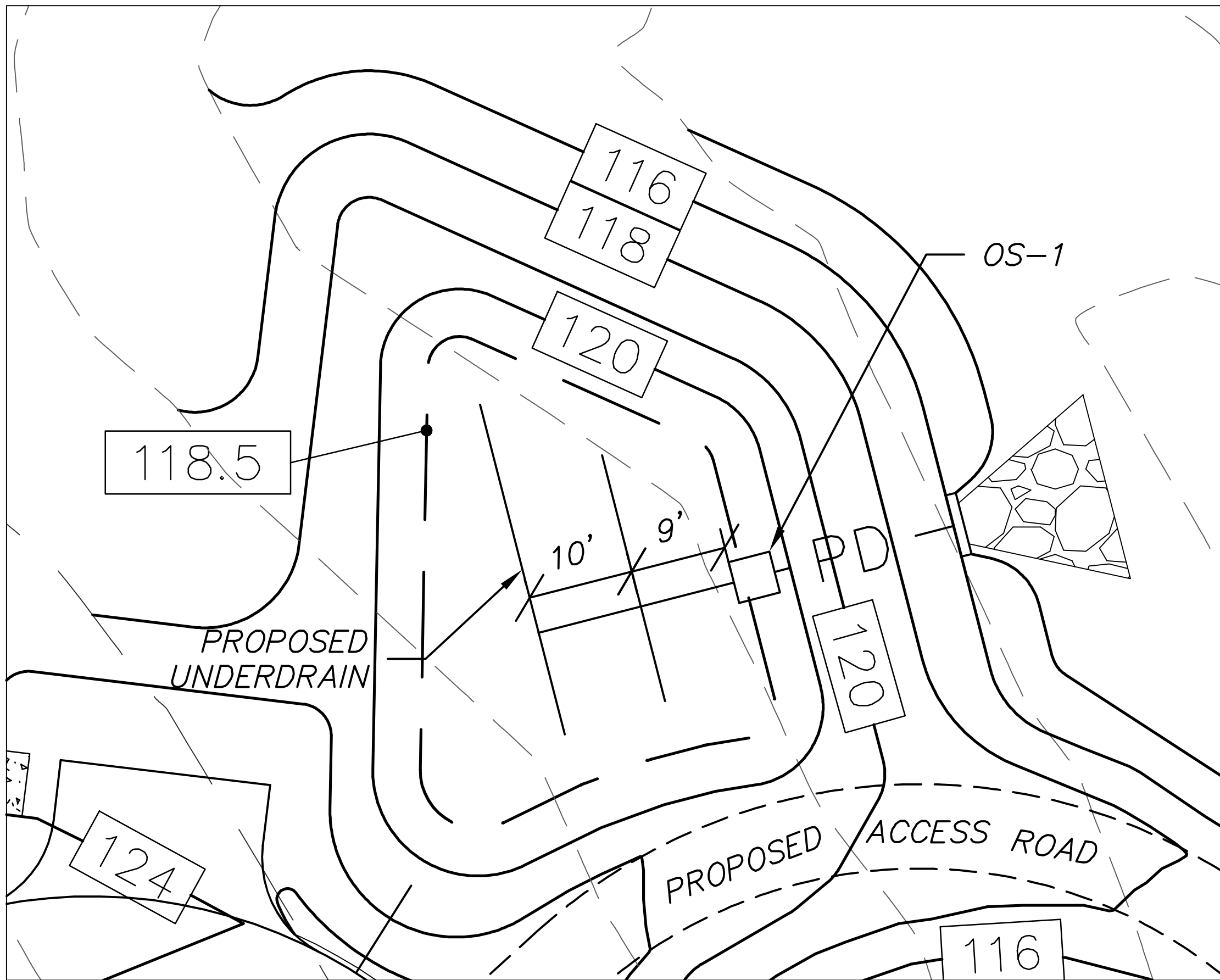
PROPOSED SEDIMENT FOREBAY 1 (SF-1)

NOT TO SCALE



TYPICAL INLET TRASH RACKS

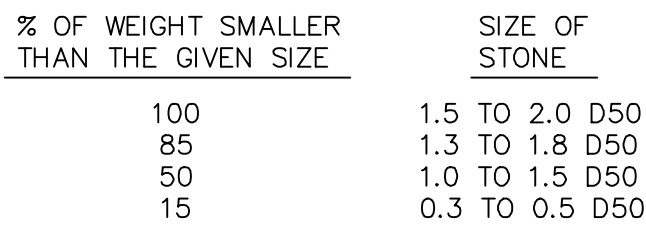
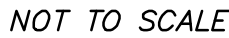
NOT TO SCALE



PLAN VIEW  
BIO-RETENTION BASIN-1

SCALE: 1"=10'

| NOT FOR CONSTRUCTION FOR PERMIT USE ONLY |  |  |  | PLANNING FILE                                                             |  |  |  | CIVILWORKS NEW ENGLAND                                                    |  |  |  |
|------------------------------------------|--|--|--|---------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------|--|--|--|
| PROJECT NO.: P23-                        |  |  |  | 18 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  |  |  | 18 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  |  |  |
| DATE: 2-22-23                            |  |  |  | SCALE: AS SHOWN                                                           |  |  |  | DRAWN BY: CAD                                                             |  |  |  |
| DESIGN BY: JRG                           |  |  |  | APPROVED BY: JRG                                                          |  |  |  | PROJECT NO: 21074                                                         |  |  |  |
| FILE: SITE                               |  |  |  | NO.                                                                       |  |  |  | REVISION                                                                  |  |  |  |
| DATE: 2-22-23                            |  |  |  | SCALE: AS SHOWN                                                           |  |  |  | DRAWN BY: CAD                                                             |  |  |  |
| DESIGN BY: JRG                           |  |  |  | APPROVED BY: JRG                                                          |  |  |  | PROJECT NO: 21074                                                         |  |  |  |
| FILE: SITE                               |  |  |  | NO.                                                                       |  |  |  | REVISION                                                                  |  |  |  |
| PROJECT: CHINBURG DEVELOPMENT, LLC       |  |  |  | APPLICANT: CHINBURG DEVELOPMENT, LLC                                      |  |  |  | PROJECT: CHINBURG DEVELOPMENT, LLC                                        |  |  |  |
| PROJECT: EMERSON RIDGE                   |  |  |  | APPLICANT: EMERSON RIDGE                                                  |  |  |  | PROJECT: EMERSON RIDGE                                                    |  |  |  |
| PROJECT: OAK STREET                      |  |  |  | APPLICANT: OAK STREET                                                     |  |  |  | PROJECT: OAK STREET                                                       |  |  |  |
| PROJECT: DOVER, NH                       |  |  |  | APPLICANT: DOVER, NH                                                      |  |  |  | PROJECT: DOVER, NH                                                        |  |  |  |
| PROJECT: 3 PENSTOCK WAY                  |  |  |  | APPLICANT: 3 PENSTOCK WAY                                                 |  |  |  | PROJECT: 3 PENSTOCK WAY                                                   |  |  |  |
| PROJECT: NEWMARKET, NH 03857             |  |  |  | APPLICANT: NEWMARKET, NH 03857                                            |  |  |  | PROJECT: NEWMARKET, NH 03857                                              |  |  |  |
| PROJECT: 30                              |  |  |  | APPLICANT: 30                                                             |  |  |  | PROJECT: 30                                                               |  |  |  |



*NOT TO SCALE*



NOTE:

- 1) ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
- 2) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.

NOT TO SCALE

- DETENTION AREA EARTH EMBANKMENT:

- 1 SEE GRADING PLAN FOR BERM WIDTHS.
- 2 SIDE SLOPES - THREE HORIZONTAL TO ONE VERTICAL (3:1) OR UNLESS OTHERWISE NOTED.
- 3 FILL MATERIALS SHALL BE FREE OF DETRIMENTAL AMOUNTS OF SOD, ROOTS, FROZEN SOIL, STONES MORE THAN 6 INCHES IN DIAMETER (EXCEPT FOR ROCK FILLS), AND OTHER OBJECTIONABLE MATERIAL.
- 4 FILL MATERIALS SHALL BE A MIXTURE OF STONES (NOT EXCEEDING 6" IN DIAMETER) AND A FINE SANDY SILT MATERIAL.
- 5 SELECTED BACKFILL MATERIAL SHALL BE PLACED AROUND STRUCTURES, PIPE CONDUITS, AND ANTISEEP COLLARS ABOUT THE SAME RATE ON ALL SIDES TO PREVENT DAMAGE FROM UNEQUAL LOADING.

- DETENTION AREA BERM BASE PREPARATION:

- 1 THE BASE AREA SHALL BE CLEARED OF TREES, LOGS, STUMPS, ROOTS, BRUSH, BOULDERS, SOD, AND RUBBISH. IF NEEDED TO ESTABLISH VEGETATION, THE TOPSOIL AND SOD SHALL BE STOCKPILED AND SPREAD ON THE COMPLETED BERM. THE BASE AREA SHALL BE THOROUGHLY SCARIFIED BEFORE PLACEMENT OF MATERIAL.
- 2 REMOVE ALL SOFT ORGANIC MATTER, PEAT, DEBRIS AND FOREIGN MATERIAL TO A DEPTH AS NEEDED (1' MIN) TO REACH AN UNYIELDING BASE OF VIRGIN SOIL.

- EXECUTION:

- 1 FILL MATERIALS SHALL BE PLACED IN HORIZONTAL 12" (MAX.) LIFTS TO FULL WIDTHS AS SHOWN ON THE DESIGN PLAN.
- 2 FILL MATERIALS SHALL BE FRESHLY PLACED PRIOR TO COMPACTION.
- 3 ALL FILLS SHALL BE COMPACTED BY MECHANICAL VIBRATORY COMPACTION TO 95% PROCTOR DENSITY.
- 4 FILL SHALL BE CONSTRUCTED IN CONTINUOUS HORIZONTAL LAYERS EXCEPT WHERE OPENINGS OR SECTIONALIZED FILLS ARE REQUIRED. IN THOSE CASES, THE SLOPE OF THE BONDING SURFACES BETWEEN THE EMBANKMENT IN PLACE AND THE EMBANKMENT TO BE PLACED SHALL NOT BE STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL. PLACE THE MORE IMPERVIOUS SOIL (HIGHER PERCENTAGE OF CLAY) IN THE UPSTREAM TWO-THIRDS (2/3) OF THE BERM. THE MORE GRANULAR SOIL MATERIAL SHOULD BE PLACED IN THE REMAINING DOWNSTREAM ONE-THIRD PORTION OF THE BERM.
- 5 INSTALL ANTI-SEEP COLLARS CONCURRENTLY WITH FILL MATERIAL PLACEMENT.
- 6 INST. CUTOFF TRENCH CONCURRENTLY WITH FILL MATERIAL PLACEMENT. THE CUTOFF TRENCH SHALL BE LOCATED AT OR SLIGHTLY UPSTREAM OF THE CENTER LINE OF THE BERM. IT SHALL EXTEND UP THE ABUTMENTS AS REQUIRED AND BE DEEP ENOUGH TO EXTEND INTO A RELATIVELY IMPERVIOUS LAYER.
- 7 THE CUTOFF TRENCH SHALL HAVE A BOTTOM WIDTH ADEQUATE TO ACCOMMODATE THE EQUIPMENT USED FOR EXCAVATION, BACKFILL AND COMPACTION OPERATIONS. CUTOFF TRENCH TO BE EXCAVATED AND BACKFILLED PRIOR TO PLACING THE BERM.
- 8 CUTOFF TRENCH SIDE SLOPES SHALL NOT BE STEEPER THAN ONE HORIZONTAL TO ONE VERTICAL.

## MOISTURE CONTROL

THE MOISTURE CONTENT OF THE FILL MATERIAL SHALL BE ADEQUATE FOR OBTAINING THE REQUIRED COMPACTION. MATERIAL THAT IS TOO WET SHALL BE DRIED TO MEET THIS REQUIREMENT, AND MATERIAL THAT IS TOO DRY SHALL HAVE WATER ADDED AND MIXED UNTIL THE REQUIREMENT IS MET.

## COMPACTION

FILL ADJACENT TO STRUCTURES, PIPE CONDUITS, AND ANTI-SEEP COLLARS SHALL BE COMPACTED TO A DENSITY EQUIVALENT TO THAT OF THE SURROUNDING FILL BY MEANS OF HAND TAMPING OR MANUALLY DIRECTED POWER TAMPER OR PLATE VIBRATORS.

**MAINTENANCE:**

MAINTENANCE IS NECESSARY TO ENSURE THAT THE DETENTION POND WILL CONTINUE TO FUNCTION AS ORIGINALLY DESIGNED. THE "HOMEOWNERS ASSOCIATION" IS RESPONSIBLE FOR MAINTAINING THE STRUCTURES AND THE BASIN AREA.

1. EMBANKMENT - THE EMBANKMENT SHOULD BE INSPECTED ANNUALLY TO DETERMINE IF RODENT BURROWS, WET AREAS, OR EROSION OF THE FILL IS TAKING PLACE. IF SUCH ISSUES ARE NOTED THEY SHALL BE RECTIFIED AS SOON AS PRACTICABLE.
2. VEGETATION - THE VEGETATION SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH. LIME AND FERTILIZER SHOULD BE APPLIED AS NECESSARY AS DETERMINED BY SOIL TESTS. TREES SHOULD BE KEPT OFF THE BERM AREA.
3. DEBRIS AND OUTFALLS - DEBRIS SHOULD BE REMOVED AFTER EVERY MAJOR STORM. ACCUMULATED DEBRIS AND SEDIMENT SHOULD BE REMOVED.
4. SEDIMENT - SEDIMENT SHOULD BE CONTINUALLY CHECKED IN THE BASIN. WHEN SEDIMENT ACCUMULATIONS EXCEED THE STRUCTURE INLET ELEVATION, THEN THE SEDIMENT SHOULD BE REMOVED AND PROPERLY DISPOSED OF.



NOTES:

1. THE FOUNDATION AREA OF THE WATERWAY SHALL BE CLEARED AND GRUBBED OF ALL TREES, BRUSH, STUMPS, AND OTHER OBJECTIONABLE MATERIAL. MATERIALS REMOVED SHALL BE DISPOSED OF SO THEY WILL NOT INTERFERE WITH THE CONSTRUCTION OR PROPER FUNCTIONING OF THE WATERWAY.
2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS SECTION AS REQUIRED TO MEET THE DESIGN CRITERIA. THE WATERWAY SHALL BE FREE OF IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. EARTH FILLS REQUIRED TO MEET SUBGRADE REQUIREMENTS BECAUSE OF OVER EXCAVATION OR TOPOGRAPHY SHALL BE COMPACTED TO THE SAME DENSITY AS THE SURROUNDING SOIL TO PREVENT UNEQUAL SETTLEMENT THAT COULD CAUSE DAMAGE TO THE COMPLETED WATERWAY. EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AS TO MINIMIZE EROSION AND AIR AND WATER POLLUTION. ALL APPROPRIATE STATE AND LOCAL LAWS AND REGULATIONS SHALL BE COMPLIED WITH FOR INSTALLATION.
5. VEGETATION SHALL BE ESTABLISHED IN THE SWALE PRIOR TO ALLOWING STORMWATER RUNOFF TO FLOW THROUGH THE SWALE.
6. MAINTENANCE OF THE VEGETATION IN THE GRASSSED WATERWAY IS EXTREMELY IMPORTANT IN ORDER TO PREVENT RILLING, EROSION, AND FAILURE OF THE WATERWAY. MOWING SHOULD BE DONE FREQUENTLY ENOUGH TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION AND TO KEEP THE GRASSES IN A VIGOROUS CONDITION. THE VEGETATION SHOULD NOT BE MOWED TOO CLOSELY SO AS TO REDUCE THE EROSION RESISTANCE IN THE WATERWAY.
7. THE WATERWAY SHOULD BE INSPECTED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE THE CONDITION OF THE WATERWAY. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.
8. PERIODIC APPLICATIONS OF LIME AND FERTILIZER MAY BE NEEDED TO MAINTAIN VIGOROUS GROWTH.

| STRUCTURE | LENGTH (FT) | WIDTH | DEPTH | INV.IN | INV.OUT | SLOPE (FT/FT) |
|-----------|-------------|-------|-------|--------|---------|---------------|
| PTS       | 65          | 4.0'  | 1.5'  | 102.0  | 100.35  | 0.025         |

NOT TO SCALE

# DETAIL SHEET

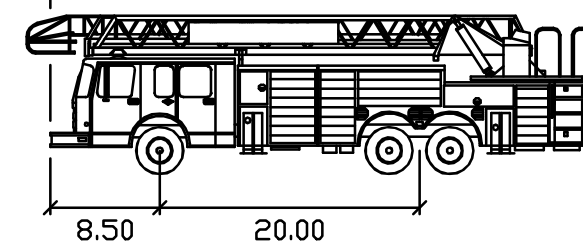
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| TEST PIT DATA |          |                    |            |                     |                  |                  |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                                                                                 |  |  |  |
|---------------|----------|--------------------|------------|---------------------|------------------|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--|--|--|
| TEST PIT #    | DATE     | PERC RATE MIN/INCH | TOP SOIL   | SHWT                | WATER            | RESTRICTIVE      | LEDGE       | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                     | PLANNING FILE NO.: P23-                                                                                                  |  |  |  |
| 1             | 11-11-22 | 8                  | 12"        | 30"<br>ROOTS @ 14"  | NONE<br>OBSERVED | 30"              | NONE TO 60" | 0-12" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-30" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-44" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>44"-60" 2.5Y5/3 OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES       | CIVILWORKS NEW ENGLAND<br>181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.749.0443                     |  |  |  |
| 2             | 11-11-22 | 8                  | 10"        | 30"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 30"              | NONE TO 60" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-30" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-40" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>40"-60" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES | DATE: 2-22-23<br>SCALE: AS SHOWN<br>DRAWN BY: CAD<br>DESIGN BY: RG<br>APPROVED BY: SJH<br>PROJECT NO: 21074<br>FILE SITE |  |  |  |
| 3             | 11-11-22 | 8                  | 12"        | 28"<br>ROOTS @ 16"  | NONE<br>OBSERVED | NONE<br>OBSERVED | NONE TO 64" | 0-12" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-28" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>28"-38" 2.5Y4/3 OLIVE BROWN, VERY FINE SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>38"-64" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES       | REVISION                                                                                                                 |  |  |  |
| 4             | 11-11-22 | 24                 | 12"        | 20"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 32"              | NONE TO 60" | 0-12" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-20" 10YR5/4 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>20"-32" 2.5Y4/3 OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>32"-60" 5Y5/2 OLIVE GRAY, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES        | APP'D                                                                                                                    |  |  |  |
| 5             | 11-11-22 | 8                  | 10"        | 32"<br>ROOTS @ 18"  | NONE<br>OBSERVED | 32"              | NONE TO 64" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-16" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-32" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>32"-64" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                               | NO.                                                                                                                      |  |  |  |
| 6             | 11-11-22 | 8                  | 12"        | 30"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 30"              | NONE TO 62" | 0-12" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-18" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-30" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-62" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                               | DATE                                                                                                                     |  |  |  |
| 7             | 11-11-22 | 8                  | 12"        | 32"<br>ROOTS @ 32"  | NONE<br>OBSERVED | 32"              | 56"         | 0-12" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-32" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>32"-56" 2.5Y5/3 LIGHT OLIVE GRAY, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                           | DATE                                                                                                                     |  |  |  |
| 8             | 11-11-22 | 6                  | 10"        | 36"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 36"              | NONE TO 60" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-20" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>20"-36" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>36"-60" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                          | DATE                                                                                                                     |  |  |  |
| 9             | 11-11-22 | 7                  | 10"        | 42"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 42"              | 60"         | 0-10" 10YR3/3 DARK BROWN, LOAMY FINE SAND, GRANULAR, FRIABLE<br>10"-16" 10YR4/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-42" 10YR5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>42"-60" 2.5Y5/3 SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                                      | DATE                                                                                                                     |  |  |  |
| 10            | 11-11-22 | 8                  | 8"         | 32"<br>ROOTS @ 26"  | NONE<br>OBSERVED | 32"              | 50"         | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-16" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-32" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>32"-50" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                            | DATE                                                                                                                     |  |  |  |
| 11            | 11-11-22 | 8                  | 14"        | 28"<br>ROOTS @ 18"  | NONE<br>OBSERVED | 28"              | NONE TO 60" | 0-14" 10YR3/3 DARK OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>14"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-28" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>28"-60" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                    | DATE                                                                                                                     |  |  |  |
| 12            | 11-11-22 | 8                  | 12"        | 30"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 30"              | NONE TO 62" | 0-12" 10YR3/3 DARK OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>12"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-30" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-60" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                    | DATE                                                                                                                     |  |  |  |
| 13            | 11-11-22 | 8                  | 10"        | 30"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 30"              | NONE TO 62" | 0-10" 10YR3/3 DARK OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-20" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>20"-30" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-62" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                    | DATE                                                                                                                     |  |  |  |
| 14            | 11-11-22 | 8                  | 10"        | 30"<br>ROOTS @ 30"  | NONE<br>OBSERVED | 30"              | NONE TO 64" | 0-10" 10YR3/3 DARK OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-30" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-64" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                    | DATE                                                                                                                     |  |  |  |
| 15            | 11-11-22 | 9                  | 10"        | 28"                 | NONE<br>OBSERVED | 28"              | NONE TO 62" | 0-10" 10YR3/3 DARK OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-14" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>14"-28" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>28"-62" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                    | DATE                                                                                                                     |  |  |  |
| 16            | 11-11-22 | 6                  | 10"        | NONE<br>ROOTS @ 18" | NONE<br>OBSERVED | NONE<br>OBSERVED | 46"         | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-46" 10YR4/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE                                                                                                                                                                                                                                           | DATE                                                                                                                     |  |  |  |
| 17            | 11-11-22 | 6                  | FOREST MAT | NONE<br>ROOTS @ 32" | NONE<br>OBSERVED | NONE<br>OBSERVED | 32"         | 2"-0 10YR3/3 FOREST MAT<br>0-6" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>6"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-32" 10YR4/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>32" BEDROCK                                                                                                                                                                                                   | DATE                                                                                                                     |  |  |  |
| 18            | 11-11-22 | 6                  | FOREST MAT | NONE<br>ROOTS @ 16" | NONE<br>OBSERVED | NONE<br>OBSERVED | 40"         | 2"-0 10YR3/3 FOREST MAT<br>0-6" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>6"-18" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-40" 10YR4/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE                                                                                                                                                                                                                  | DATE                                                                                                                     |  |  |  |
| 19            | 11-11-22 | 36                 | 10"        | 18"<br>ROOTS @ 16"  | NONE<br>OBSERVED | 18"              | NONE TO 61" | 0-10" 2.5Y3/3 DARK OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>10"-18" 2.5Y3/3 LIGHT OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>18"-61" 2.5Y5/2 GRAYISH BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM                                                                                                                                                                                                                                              | DATE                                                                                                                     |  |  |  |
| 20            | 11-11-22 | 36                 | 10"        | 16"<br>ROOTS @ 16"  | 60"              | 16"              | NONE TO 60" | 0-10" 2.5Y3/3 DARK OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>10"-16" 2.5Y5/3 LIGHT OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>16"-60" 2.5Y5/2 GRAYISH BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM                                                                                                                                                                                                                                              | DATE                                                                                                                     |  |  |  |

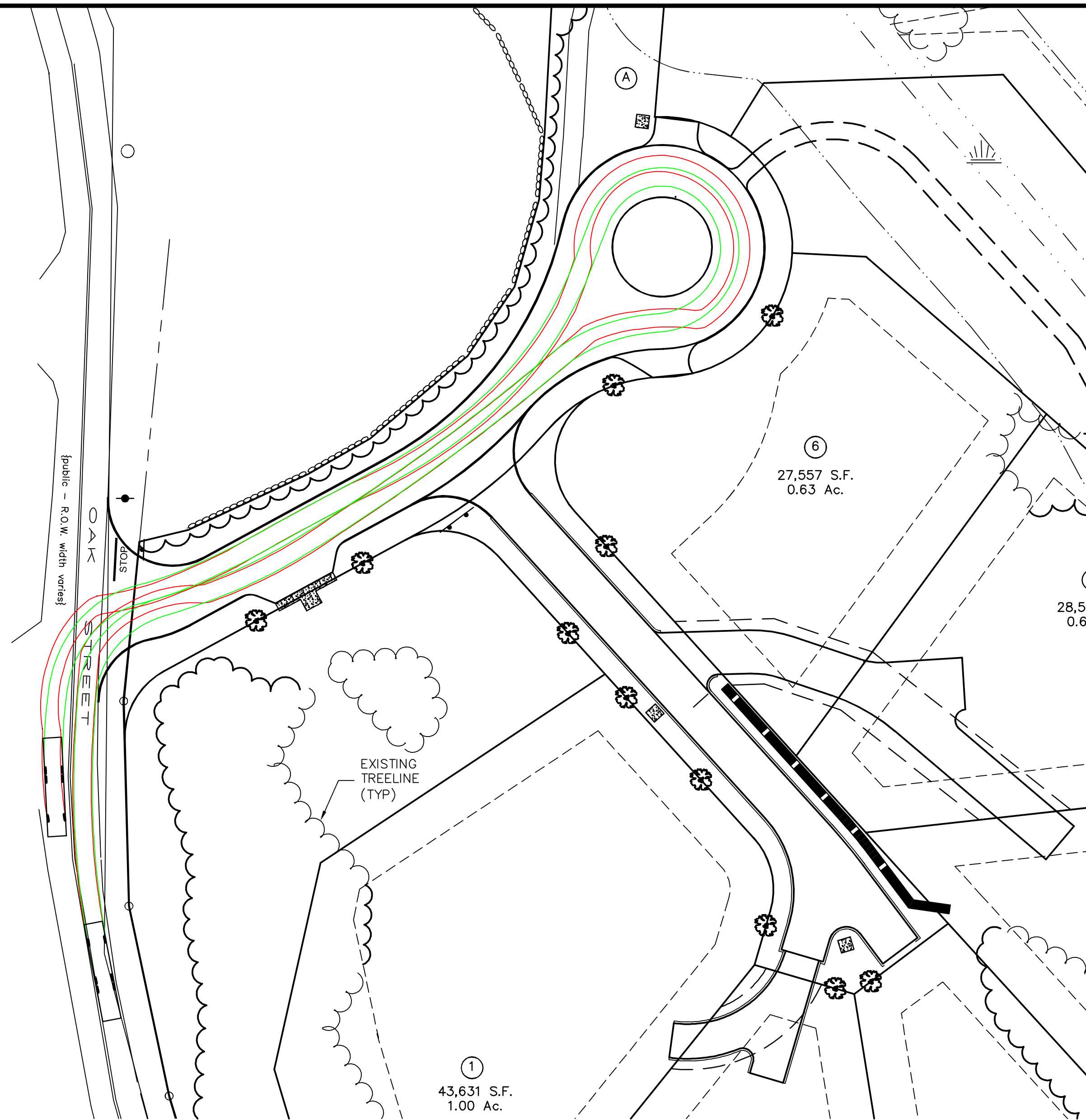
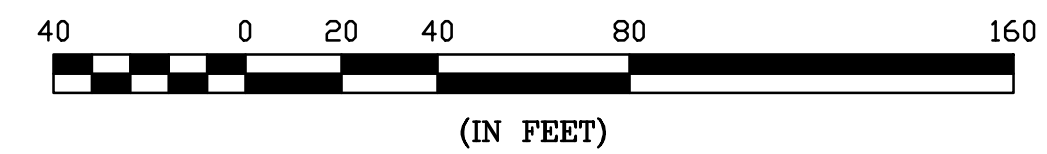
| TEST<br>PIT<br># | DATE     | PERC<br>RATE<br>MIN/INCH | TOP<br>SOIL | SHWT               | WATER            | RESTRICTIVE      | LEDGE          | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|----------|--------------------------|-------------|--------------------|------------------|------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21               | 11-11-22 | 30                       | 8"          | 16"<br>ROOTS @ 16" | 58"              | 16"              | NONE TO<br>62" | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-16" 2.5Y5/4 LIGHT OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>16"-62" 2.5Y5/3 LIGHT OLIVE BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                                                                               |
| 22               | 11-11-22 | 30                       | 8"          | 18"<br>ROOTS @ 16" | NONE<br>OBSERVED | 18"              | NONE TO<br>60" | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-18" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-60" 2.5Y5/3 LIGHT OLIVE BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                                                                         |
| 23               | 11-11-22 | 8                        | 10"         | 36"<br>ROOTS @ 36" | NONE<br>OBSERVED | 36"              | 52"            | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-18" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-36" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, ANGULAR BLOCKY, FIRM<br>36"-52" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                  |
| 24               | 11-11-22 | NONE                     | FOREST MAT  | NONE               | NONE<br>OBSERVED | NONE<br>OBSERVED | 20"            | 2"-0 FOREST MAT<br>0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-20" 10YR4/6 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE                                                                                                                                                                                                                                                                         |
| 25               | 11-11-22 | 8                        | 8"          | 32"<br>ROOTS @ 32" | NONE<br>OBSERVED | 32"              | 48"            | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-16" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-32" 2.5Y5/3 LIGHT OLIVE BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>32"-48" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                       |
| D1               | 11-11-22 | 8                        | 8"          | 28"<br>ROOTS @ 28" | NONE<br>OBSERVED | 28"              | 50"            | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-16" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-28" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>28"-50" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                     |
| D2               | 11-11-22 | 8                        | 10"         | 30"<br>ROOTS @ 16" | 60"              | 30"              | NONE TO<br>64" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-16" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>16"-30" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>30"-64" 2.5Y5/3 LIGHT OLIVE BROWN, SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                   |
| D3               | 11-11-22 | 20                       | 10"         | 26"<br>ROOTS @ 16" | 60"              | 26"              | NONE TO<br>66" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-18" 10YR5/4 YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>18"-26" 10YR5/3 BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>26"-66" 2.5Y5/2 GRAYISH BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                |
| D4               | 11-11-22 | 20                       | 10"         | 20"<br>ROOTS @ 20" | NONE<br>OBSERVED | 20"              | NONE TO<br>66" | 0-10" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>10"-20" 10YR4/4 DARK YELLOWISH BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>20"-46" 2.5Y4/3 OLIVE BROWN, FINE SANDY LOAM, MASSIVE, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>46"-66" 5Y5/2 OLIVE GRAY, SILT, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES   |
| D5               | 11-11-22 | 36                       | 10"         | 16"<br>ROOTS @ 14" | NONE<br>OBSERVED | 14"              | NONE TO<br>62" | 0-10" 2.5Y3/3 DARK OLIVE BROWN, SILTY LOAM, GRANULAR, FRIABLE<br>10"-16" 2.5Y5/3 LIGHT OLIVE BROWN, SILTY LOAM, GRANULAR, FRIABLE<br>16"-32" 2.5Y4/2 DARK GRAYISH BROWN, SILTY CLAY, ANGULAR BLOCKY;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>32"-62" 5Y5/2 OLIVE GRAY, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES |
| D6               | 11-11-22 | 36                       | 10"         | 16"<br>ROOTS @ 16" | 58"              | 16"              | NONE TO<br>66" | 0-10" 2.5Y3/3 DARK OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>10"-16" 2.5Y5/4 LIGHT OLIVE BROWN, SILT LOAM, ANGULAR BLOCKY, FIRM<br>16"-30" 2.5Y4/3 OLIVE BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES<br>30"-66" 5Y4/2 OLIVE GRAY, SILT LOAM, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES  |
| D7               | 11-11-22 | 36                       | 8"          | 18"<br>ROOTS @ 16" | NONE<br>OBSERVED | 18"              | NONE TO<br>60" | 0-8" 10YR3/3 DARK BROWN, FINE SANDY LOAM, GRANULAR, FRIABLE<br>8"-18" 2.5Y4/3 OLIVE BROWN, SILT LOAM, GRANULAR, FRIABLE<br>18"-60" 2.5Y5/2 GRAYISH BROWN, SILTY CLAY, ANGULAR BLOCKY, FIRM;<br>2.5Y6/2 LIGHT BROWNISH GRAY AND 7.5YR4/6 STRONG BROWN REDOXIMORPHIC FEATURES                                                                                                                                                         |
| F-1              | 9-8-22   | NONE                     | N/A         | N/A                | NONE<br>OBSERVED | NONE<br>OBSERVED | <12"           | <12" LEDGE                                                                                                                                                                                                                                                                                                                                                                                                                          |
| F-2              | 9-8-22   | NONE                     | 8"          | 8"                 | NONE<br>OBSERVED | 20"              | NONE TO<br>60" | 0-8" 10YR4/4 DARK YELLOWISH BROWN, LOAM, GRANULAR, FRIABLE<br>8"-20" 2.5Y4/4 OLIVE BROWN, SILT LOAM, BLOCKY, FRIABLE, REDOX<br>20"-60" 5Y4/3 OLIVE, SILTY CLAY LOAM, PRISMATIC, FIRM                                                                                                                                                                                                                                                |
| F-3              | 9-8-22   | NONE                     | 8"          | 16"                | NONE<br>OBSERVED | 16"              | NONE TO<br>54" | 0-8" 10YR4/4 DARK YELLOWISH BROWN, LOAM, GRANULAR, FRIABLE<br>8"-16" 2.5Y4/4 OLIVE BROWN, SILT LOAM, BLOCKY, FRIABLE<br>16"-54" 5Y4/3 OLIVE, SILTY CLAY LOAM, PRISMATIC, FIRM                                                                                                                                                                                                                                                       |

|                                                                       |  |                                                                          |  |
|-----------------------------------------------------------------------|--|--------------------------------------------------------------------------|--|
| TEST PIT DATA                                                         |  | NOT FOR CONSTRUCTION FOR PERMIT USE ONLY                                 |  |
|                                                                       |  | PLANNING FILE                                                            |  |
| PROJECT:                                                              |  | NO.: P23-                                                                |  |
| APPLICANT:                                                            |  | CIVILWORKS NEW ENGLAND                                                   |  |
| EMERSON RIDGE<br>OAK STREET<br>DOVER, NH                              |  | 18 Watson Road PO Box 1166<br>Dover, New Hampshire 03821<br>603.748.0443 |  |
| DATE: 2-22-23                                                         |  | DATE                                                                     |  |
| SCALE: AS SHOWN                                                       |  | DATE                                                                     |  |
| DRAWN BY: CAD                                                         |  | DATE                                                                     |  |
| DESIGN BY: JRG                                                        |  | DATE                                                                     |  |
| APPROVED BY: JH                                                       |  | DATE                                                                     |  |
| PROJECT NO: 21074                                                     |  | DATE                                                                     |  |
| FILE: SITE                                                            |  | DATE                                                                     |  |
| NO.                                                                   |  | DATE                                                                     |  |
| REVISION                                                              |  | DATE                                                                     |  |
| APP'D                                                                 |  | DATE                                                                     |  |
| CHINBURG<br>DEVELOPMENT, LLC<br>3 PENSTOCK WAY<br>NEWMARKET, NH 03857 |  | DATE                                                                     |  |
| 34                                                                    |  | DATE                                                                     |  |



Dover ladder feet

|                   |        |
|-------------------|--------|
| Width             | : 8.50 |
| Track             | : 8.50 |
| Lock to Lock Time | : 6.0  |
| Steering Angle    | : 44.0 |



***DOVER LADDER FIRETRUCK MOVEMENT PLAN***

**EMERSON RIDGE  
OAK STREET  
DOVER, NH**

**CHINBURG  
DEVELOPMENT, LLC  
3 PENSTOCK WAY  
NEWMARKET, NH 03857**

NO.: P231

[illegible]

|              |       |          |       |      |  | CIVILWORKS NEW ENGLAND                                                                                       |
|--------------|-------|----------|-------|------|--|--------------------------------------------------------------------------------------------------------------|
|              |       |          |       |      |  | CIVIL & WATERFRONT ENGINEERING<br>181 Watson Road, PO Box 1166<br>Dover, New Hampshire 03821<br>603.749.0443 |
|              |       |          |       |      |  |                                                                                                              |
| DESIGN BY:   | JRG   |          |       |      |  |                                                                                                              |
| APPROVED BY: | SJH   |          |       |      |  |                                                                                                              |
| PROJECT NO.: | 21074 |          |       |      |  |                                                                                                              |
| FILE: SITE   | NO.   | REVISION | APP'D | DATE |  |                                                                                                              |

**CIVILWORKS NEW ENGLAND**  
CIVIL & WATERFRONT ENGINEERING  
181 Watson Road, PO Box 1166  
Dover, New Hampshire 03821  
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